Appendix X
Responses to Comments on the C/RAWP
Dated September 8, 2014
(On CD-ROM Only)

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)

Groundwater Remedy Basis of Design Report/Final (100%) Design

PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
General Comments											
1	MWD	Non-design	Other	General		The Metropolitan Water District of Southern California (Metropolitan) appreciates the leadership and commitment from DTSC and DOI to resolve outstanding issues and to move this project forward in a timely manner. Implementing the final remedy is vital to ensuring protection of Colorado River water quality. Under current drought conditions, Metropolitan has increased reliance on Colorado River water to serve nearly 19 million residents in the southern California coastal plain.	Comment noted. PG&E concurs with MWD.		The Federal Agencies appreciate the continued involvement and support from MWD.		DTSC – Comment Noted
2	MWD	Non-design	Other	General		Metropolitan recognizes the significant efforts from all project stakeholders interested in streamlining the design review process. We are hopeful that the proposed design decision making process (i.e., RTC protocol) will ensure that all comments are carefully considered, while providing guidance for resolving outstanding design issues. We appreciate that our comments from the 60% design were appropriately addressed. In the interest of meeting the project timeline, if our new comment has already been addressed and/or incorporated, please provide a reference to the final resolution to explain if no further action will be taken to amend the final design.	Comment noted.		Comment noted.		DTSC- Comment Noted
3	MWD	Non-design	Editorial	General		Review the acceptance of edits between the Basis of Design Report/Pre-final 90% Design Submittal and the redline version of the Basis of Design Report. Check all footnote references and citations for accuracy, including footnotes 8 through 10 in the Basis of Design Report/Pre-final 90% Design Submittal.	References and citations to footnotes 8 through 10 will be revised and updated to 7 through 9 accordingly.				Comment resolved.
4	ADEQ					The installation of groundwater wells and the continued monitoring of hydraulic and hydrologic conditions and groundwater quality with respect to hexavalent chromium (Cr VI) and, more recently, remediation byproducts on the Arizona side of the Colorado River have been, and continue to be, important to this agency and others. The technical, practical, and sensitive importance has been documented previously by several entities. For the record, ADEQ supports the technical and practical components that have led PG&E to the proposed locations of MW-X and MW-Y. With the recent confirmation that the increasing concentration of Cr VI in MW-55-120 are statistically significant, ADEQ echoes the DTSC's sentiments expressed during the TWG meeting that more than two additional monitor wells on the Arizona side of the Colorado River are ideal. However, ADEQ will heed to the compromise of two additional monitor wells on the Havasu National Wildlife Refuge (HNWR) peninsula, as long as the VRP decision criteria outlined in 2007 continue to be met: • Exceedances of the total chromium Arizona Aquifer Water Quality Standard (AWQS) of 100 micrograms per liter (µg/L) do not occur; and • Cr VI concentrations are not detected above the regional natural background concentration of 32 µg/L. Once the groundwater remediation system is operational, the WRP will have additional decision criteria that will need to be met such as: • Remediation system byproducts are not to be detected above their respective AWQSs; and • Changes in groundwater quality parameters are not to be determined statistically significant. Specific groundwater quality parameters and preferred statistical analysis methods and bounds will be outlined at a later date. ADEQ acknowledges concerns expressed by the various Tribal stakeholders regarding the cultural significance of the HNWR peninsula as well as the region as a whole. ADEQ recognizes that federal agencies have primary jurisdiction over the HNWR and a decision on whether to drill on the peninsula, and where, will be made through the federal consultation and approval process. ADEQ's mission is to protect human health and the environment and requests to remain a participant in the consultation process to advocate the continued protection of our residents and environment.	Comment noted.				This RTC was discussed at the July 23, August 18, and August 26 TWG meetings. DTSC/DOI – Comment noted. The Agencies will provide final direction to PG&E with respect to MW-X and Y
5	DTSC-1	Non-design	Editorial	Certification Page		DTSC maintains that the draft design document should be certified by a licensed professional to verify that the design was prepared and considered by a professional with adequate expertise.	Agree, the certification page will be completed for the final design.	For future reference, DTSC will be requiring compliance with the California Business and Professions Code requiring name and license number for engineer in charge			Comment resolved. PG&E to add "PG&E will comply with the California Business and Professions Code" for all document submissions.

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								for draft documents or name, license and stamp for geologists on draft documents.			
6	DTSC-2	Design	Editorial			Please ensure design for the contingency Fresh Water Pretreatment System is incorporated into the site design throughout the document. PG&E can insert marker or qualifier that those parts are contingency design, but the design should be incorporated so that reviewer can see how the system is incorporated site wide.	The contingent Fresh Water Pretreatment System was incorporated throughout the documents, e.g., 90% BOD text/figures/ tables, engineering drawings (function code 13 with a marker as “contingent”), O&M Manual Volume 3 (Contingency Plan), and C/RAWP (Section 5, Construction Contingency Plan).				Comment resolved.
7	DTSC-3	Non-design	Process			DTSC observed statements in the basis of design document that referenced a final design (100%) to be prepared. Although DTSC acknowledge that a revised 90% basis of design document based on comment resolution will be produced for agencies deliberation as basis for DTSC’s CEQA evaluation and approval, DTSC did not envision that version to be called 100%, and more importantly, that there will be a follow-up comment process. Therefore, any remaining design decisions should be incorporated into the 90% for review and consideration and not deferred to the 100%.	Comment noted. Text and figures will be revised to reference the “100% design” as the “final design”. PG&E understands that there will not be a comment/ review process for the final design.		DOI envisions a DOI/DTSC review of a redline version of the 90% design package with incorporated changes. As the lead regulatory agencies, DOI and DTSC are responsible for ensuring that resolutions to comments resulting from the RTC process are appropriately incorporated into the final design package and we will review a redline to ensure this occurs. Once the agencies have accepted the redline revisions, the design package will be issued as a Final BOD/Design Submittal and C/RAWP.		Comment resolved.
8	DTSC-4	Design	Editorial and Process			In DOI and DTSC’s directive letter dated April 4, 2014, PG&E was directed to incorporate the removal of all underground utilities and infrastructures to the extent practicable at the time of remedy decommissioning and required PG&E to incorporate this directive into the decommissioning plan as part of the 90% design. Based on PG&E’s November 7, 2014 reply to Tribal inquiry on this matter, DTSC does not concur that PG&E has satisfied this directive in Attachment T to Appendix I of the 90% design. PG&E must prominently carry this directive into the remedy decommissioning and restoration plans at the end of remedy. Document revision required.	The document will be revised in response to this comment. As directed, PG&E will add a dedicated section on decommissioning in the executive summary of the BOD. The new section was provided during the 90% RTC period and included in	**Attachment A** must be revised to acknowledge agencies April 2014 direction to PG&E to incorporate the removal of all underground utilities and infrastructures to the extent			**Attachment A** was revised to address DTSC’s comment and incorporated DTSC’s edits.

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							Attachment A of this RTC table (referred to herein as the final RTC table). All attachments can be found at the end of the table. It is important to note that at this time in the design process and before the remedy is constructed, steps to decommission any remedy components, that will occur decades into the future, will have to be general and conceptual. Descriptions of the conceptual decommissioning steps provided in the 60% RTC #6 (Attachment T of Appendix I) reflects this fact. Any additional details should be considered speculative best guesses, and are subject to change at the time of remedy decommissioning. PG&E has and will continue to reiterate its commitment to remove of all underground utilities and infrastructures to the extent practicable at the time of remedy decommissioning. See also RTC #12 DTSC-8.	practicable at the time of remedy decommissioning. Citing the actual letter is requested. DTSC has also edited PG&E's August 5, 2015 **Attachment A** Decommissioning Section. Those edits should be included in the final document. Finally, a groundwater SEIR is currently being prepared and will evaluate the Tribes current desire to remove all underground utilities and infrastructures to the extent practicable at the time of remedy decommissioning. Therefore, reference in Attachment A to the 2011 EIR language regarding abandonment in place and removal of only above grade facilities will likely need to be amended in the future as part of the upcoming SEIR assessment.			
9	DTSC-5	Design	Monitoring			DTSC has made comments on the uncertainty and difficulty in estimating the number of wells this particular remedy may require over the duration of the project (e.g., see 60% design RTC 225 and 632). Even commenting on a provisional, "next step" well can be difficult (e.g., see 60% design RTC 136 and 137 regarding wells IRL 6 and 7) and DTSC is no longer pursing very detailed information for certain provisional wells as potential well locations and associated circumstances can be too variable. DTSC does believe the 10 provisional, unassigned wells called out in the 90% BOD is good planning, but realizes that it is just a place holder. Ten to twenty percent of the total number of wells may be a more realistic upper bound. DTSC reiterates that wells should be minimized on this site due to cultural concerns, but that the need for the well must be based on technical necessity.	Comment noted.				
10	DTSC-6	Design	Monitoring			The Tribes have noted concern with the presence of Monitoring Wells X and Y on the Arizona peninsula. DTSC wishes to note the importance of these wells as sentry wells for the remedy which will purposely accelerate groundwater flow towards Arizona. Fundamentals on capture zone analysis and associated sentry wells can be found in *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems* (USEPA 2008). DTSC could not approve the remedy without sentry wells. The remedy would have to be drastically modified (groundwater flow in the area would have to move in an opposite direction - towards the west) if sentry wells were to be eliminated. These wells need to be installed early to establish baseline concentrations for water quality	Comment noted. Also note that discussion of sentry (sentinel) wells is provided in Sec 4.3.3.3 of O&M Vol 2.				This RTC was discussed at the July 23, August 18, and August 26 TWG meetings. Agencies to provide direction to PG&E based on input received.

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						constituents (e.g., baseline chromium concentrations) so any naturally occurring trends can be observed before remedy start up. This will assist in determining if the well has been adversely affected by the remedy.					
11	DTSC-7	Design	Monitoring			Lessons learned from the in-situ remedial actions at the PG&E Hinkley Compressor Station should be shared with the CWG/TWG. Tribes had requested this information and PG&E was not able to find the time to schedule it. This information would appear valuable and directly applicable to the Topock site as the contamination and remedial measures are quite similar. As PG&E has recently planned to replace fouled injection wells at Hinkley, a summary of the events that led to that decision should be discussed as wells as preventive maintenance that will be conducted at Topock to alleviate the need to replace wells so quickly. Manganese migration that has exceeded threshold limits at sentry wells should be discussed as well as the Manganese Mitigation Plan that has been developed and as of November 2014 includes active extraction and infiltration dry wells to address the exceedances. Expansion of the plume at Topock via excessive byproduct migration is unacceptable and as it would likely result in significant footprint, infrastructure and costs in order to mitigate. PG&E should identify additional Hinkley topics for discussion at an upcoming TWG meeting.	An educational webinar was held by PG&E on July 7, 2015 to provide an overview of the In-situ Remediation of chrome-six utilizing a similar technology to that under design for the Topock site, and will cover infrastructure, geochemistry, management of byproducts, rate of chromium remediation, and lessons learned.	Hinkley presentations by PG&E and the RWQCB staff on July 7 and 8, 2015 respectively were informational and appeared to be well received by Tribes, agencies, and stakeholders.			Comment resolved.
12	DTSC-8	Design	O&M			The 90% should be revised to readily indicate that all subsurface remedial infrastructures will eventually be removed as part of decommissioning and not be abandoned in place. At a minimum, a section on site decommissioning should be included in the executive summary and should briefly describe the decommissioning process envisioned for the remedy. More decommissioning details should be provided in a dedicated section even though it is understood that a decommissioning plan will be prepared much later in the remedial process. Language contained in Attachment T in Appendix I is not adequate and difficult to find. PG&E should address how certain portions of the remedy may be decommissioned prior to remedy completion if agencies believe they are no longer needed. For clarity, PG&E should list all remedial structures that they believe cannot or should not be removed at the end of the remedy. For example, will horizontal casings installed under the freeway be removed or left in place.	As directed, PG&E will add a dedicated section on decommissioning in the executive summary of the BOD. The new section was provided during the 90% RTC period and included in **Attachment A** of the final RTC table. It is important to note that at this time in the design process and before the remedy is constructed, steps to decommission any remedy components, that will occur decades into the future, will have to be general and conceptual. Descriptions of the conceptual decommissioning steps provided in the 60% RTC #6 (Attachment T of Appendix I) reflects this fact. Any additional details should be considered speculative best guesses, and are subject to change at the time of remedy decommissioning. PG&E has and will continue to reiterate its commitment to remove of all underground utilities and infrastructures to the extent practicable at the time of remedy decommissioning. A conceptual list of	PG&E should note that portions of the remedy may be decommissioned prior to remedy completion if agencies believe they are no longer needed. See also response to RTC # 8.			See RTC #8 DTSC-4. Comment resolved.

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							remedy features that may not be removed was provided in the executive summary as directed. The new decommissioning section also mentioned that a future Bird Impact Avoidance and Minimization Plan will be prepared (prior to decommissioning) based on surveys conducted prior to decommissioning.				
13	FMIT	Design and Non-design	General	Also, in reference to ARAR Table 6.2-1		The Project burdens the traditional religious practices of the Tribe. The burdens are not merely defined by restrictions to physical access and such intrusions as visual and auditory insults to the Tribal members, but includes the continuing and now expanded degradation and desecration of the Traditional Cultural Landscape. The Agencies and design documents should more fully reflect the breadth of the statutes (including RFRA and AIRFA) and the Project's impacts on the Tribe. As reflected elsewhere, consultation under the NHPA continues to be mostly about producing documents, rather than focusing on process inclusion of the Tribe in actual decision-making. Some recent efforts to consult with the Tribe on the continually expanding scope and intensity of impacts is appreciated, but has not been reflected in the design documents.	PG&E defers to the agencies on consultation with Tribes.	Tribes have been consulted throughout the remedy selection and design process. This remedy was specifically recommended by FMIT as compared to other technologies evaluated. Tribal input have been incorporated into the design including injection and monitoring well locations, pipeline alignments, soil storage and staging areas, access routes, etc.	DOI and BLM acknowledge that the site investigation and remediation activities will have an adverse effect to the Traditional Cultural Property from these actions. However, DOI and DTSC, as the regulatory agencies responsible for cleanup, are the decision makers on the project and disagree that the Tribes have not had many opportunities to provide significant input to the agencies. Tribal input is always taken into consideration before decisions are made by BLM and DOI. Design changes have been included at each phase of the process based on input from the Tribes. Furthermore, the BLM is exploring a National Register nomination for the Topock TCP (in response to unavoidable	In its response, DTSC maintains that the "… remedy was specifically recommended by FMIT as compared to other technologies evaluated. Tribal input have [sic] been incorporated into the design including …" This is misleading. First, the Tribe's preferences in regard to the nine alternatives presented in the CMS/FS document were clearly outlined in a comment letter dated February 26, 2009. In that letter, the Tribe clearly expressed its preferences among the alternative remedies in terms of priority. The Tribe's first preference was Alternative A ("No Action" or "Natural Attenuation"). Second was Alternative B ("Monitored Natural Attenuation"). After that, and in consideration of PG&E's preference for Alternative E ("In Situ Treatment with Freshwater Flushing") and believing that this technology would be the least disruptive of the engineered remedies to Tribal interests based on the information presented in the CMS/FS, the Tribe agreed that it could support Alternative E, as	Once again Agencies would like to affirm our commitment to continue working with all Tribes and Stakeholders to see that the cleanup is accomplished in a manner that minimizes impacts to cultural and religious values and resources as well as biological resources.

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									impacts) and are consulting with tribes on the National Register eligibility of the Clay Gathering Area -- all in response to purported impacts to their sacred landscape. The BLM has been following the guidelines documented in the CHPMP and PA which require that sites be evaluated for the National Register if they cannot be avoided. Thus in such cases a report must be produced and tribes must be consulted. Additionally, all cultural documents are reviewed by Tribes and their concerns are factored into revisions. Tribes were also heavily involved in the development of the Programmatic Agreement although only one tribe signed the document. The agencies hope that all Tribes are more involved during the upcoming revision of the Cultural Historical Property Management Plan (CHPMP). The remedy must be implemented in a timely fashion and we will continue to work with all Tribes and Stakeholders to see that this is accomplished in a manner that minimizes impacts	then proposed. For example, the Tribe clearly expressed a preference for above-ground piping installations, a design detail which we are now informed will not be implemented for various reasons. And in fact, Alternative E, during the progression from 30% to 60% to 90% design, has significantly increased in complexity and associated impacts, as reflected by the need for a Subsequent EIR. Second, it may be true that certain preferences of the Tribe have been incorporated into the design on a selected basis, some of the most significant and impactful ones remain such as underground utilities and MW-X and MW-Y sitings. Indeed, some of these have been characterized in the CEQA process as significant, unmitigable and irreversible. Further, DOI also acknowledges that "… the remedial activities will have an adverse effect to the Traditional Cultural Property …." Accordingly, it is misleading and disingenuous for DTSC to make such a blanket claim that it has incorporated the Tribe's input into the design, when changes that would reduce significant religious and cultural impacts were not adopted and the project has substantially evolved from that originally proposed and approved. More generally, both the DTSC and DOI responses sidestep the thrust of the Tribe's comment regarding how the project will limit its ability to exercise and	

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									to protect cultural and religious values and resources as well as biological resources.	enjoy religious freedoms guaranteed under Federal statutes. The Tribe acknowledges that certain design changes have been made on a selective basis, however many of the more impactful features of the design have not. Overall in most instances, the response clearly reflects single-mindedness in achieving technical objectives without commensurate consideration of important cultural issues, whenever such matters come into conflict.	
14	FMIT	Non-Design	CEQA/EIR			The documents still do not set out the *process* as to how CEQA and other environmental review requirements will be met when changes occur during the decades-long operation of the remedy. Nor is there a description as to how the tribes will be appraised of proposed or actual changes and how the tribes will be meaningfully included in the environmental review to determine whether potential impacts, both individually and cumulatively, are significant (This is an open issue that was be carried forward from the 60% BOD to the 90% design.)	PG&E defers to DTSC for response to this comment.	CEQA evaluates the potential environmental impacts of a project in totality. That is why CEQA evaluations use conservative, but realistic estimates, of the project activities during its evaluation. Future allowable modification of the project will be bounded by the scope of the impacts evaluated in the completed CEQA document for the project. Changes with impacts beyond those evaluated in the completed EIR review will be separately evaluated after PG&E puts forth a change proposal and discussion with agencies. DTSC will comply with the requirements of CEQA. Tribal involvement will be maintained through our standard periodic meetings (e.g. CTF, CWG, and TWG) and any other required outreach		Thank you for the commitment to continue Tribal involvement throughout the project. We also note that any environmental review considered after July 1 2015 will need to comply with the provisions of AB 52 (Gatto). The Tribe requests that AB 52 consultations occur with FMIT for all work related to the remediation effort. Please consider also the response at RTC #29 FMIT- 15.	DTSC response: Request noted. DTSC will comply with applicable and relevant requirements of AB52 as procedures are developed by the Governor's Office of Planning and Research and DTSC, as applicable to the project.

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								under CEQA requirements. There is no plan to dissolve or end the current periodic meetings. Tribal involvement will be extended through field monitoring opportunities pursuant to mitigation measures, and SOPs (e.g. well screen calls). Currently, agencies cannot foresee any significant project changes that the Tribes would not be notified or be a participant in its decision making process based on existing meeting and input structure provided in the 90% design document.			
15	FMIT-1	Non-design	Other			On April 4, 2014, the Agencies issued final directives to PG&E on “outstanding issues of the response to the 60% BOD report.” Among the “outstanding issues” was whether the pipeline would be designed as a buried or above-ground facility. The Agencies ultimately directed PG&E “to continue to design the pipeline system for below ground pipeline placement, following the alignment in PG&E’s 60% Design proposal.” This decision purportedly was based on input received from PG&E, the Tribes, and [unidentified] stakeholders as well as other such significant criteria as ecological impacts, construction impacts and long-term maintenance and safety concerns.” The letter states that [FMIT[1]] expressed “... a *revised preference* for below ground piping for the area adjacent to Maze Loci B ... [and] a preference for aboveground placement of the remaining portions of Pipeline A.” [Emphasis added.] These statements grossly misrepresent and deemphasize FMIT’s position as stated in the March 6, 2014, cover letter as well as the conditions of use comments in Enclosure A of that letter. First, the March 6 cover letter clearly states that “... the comments and preferences as expressed in [this letter] do not in any way constitute an endorsement or acceptance of the design ... many of the adverse impacts associated with this project are permanent and irreversible.” However, after several meetings and site walks, the Tribe yielded to the persistent arguments of PG&E regarding asserted "safety issues" associated with an aboveground pipeline along this route, as well as to the realization of potential further damage to *in situ* materials that could result from road cuts that might be necessitated by placing above-ground infrastructure on an access route. Accordingly, after re-iterating its preference for above-ground routing, FMIT yielded to an *acceptance* of the proposed below-ground construction, with the conditions that: (1) no further disturbance would occur to the *in situ* materials on either side of the roadway, and (2) all below-ground piping be removed after remedy completion. And, as correctly indicated in the Agencies’ letter, FMIT did express preference for aboveground design, with the exception of the spur piping to IRL-4.	PG&E will review and consider the Tribes’ response (dated Sept 18 and 21, 2015) to PG&E’s evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.	DTSC would like to thank the Tribes for their continued input on this investigation and cleanup project. DTSC understands through repeated statements by the Tribes that this area is culturally and spiritually significant. Contrary to Tribal perceptions, inputs from the Tribes weigh heavily in DTSC’s decision process. DTSC considers many criteria in our decision including long term maintenance, health and safety, visual impacts, as well as cultural impacts. That is	DOI and BLM met with the Tribes on several occasions regarding the pipeline placement and considered aboveground pipeline segments as design options. DOI developed a pipeline matrix to assist in the analysis of each segment in determining whether the above ground option could be considered. DOI and DTSC directed PG&E to further analyze options for aboveground versus below ground placement for each main segment of the pipeline. PG&E	As claimed by DTSC, can the agency cite one important example of how Tribal input has weighed “... heavily in DTSC’s decision process?” [Emphasis added.] There has rarely been any discussion with the Tribe of the weighing of various factors, on summary conclusions that the Tribe’s input was considered. With particular regard to the decision on the installation of proposed monitor wells MW-X and MW-Y in Arizona, which are sited on the cultural property known as Amut ahar, the Tribe has taken all reasonable measures to objectively assess the technical need and justification for these wells, including	Please see Agencies’ direction letter dated April 4, 2014, on above ground/ belowground pipeline infrastructure. DTSC/DOI – In response to the yellow highlighted section, PG&E must also include language in the Executive Summary that they will work with landowners on decommissioning preferences.

[1] Referencing letter from Dr. Leo S. Leonhart, Hargis + Associates, Inc., on behalf of FMIT to Mr. Aaron Yue, DTSC, and Ms. Pamela Innis, DOI, re “Fort Mojave Indian Tribe Comments on Alternative Pipeline Routings and Proposed Soil Storage/Staging Areas for the Topock Compressor Station 60% Groundwater Remedy Design," April 6, 2014.

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						FMIT further notes that the Agencies' letter also misrepresents the March 10, 2014, letter[2] from the Hualapai Tribe, and the March 13, 2014[3], letter from the Cocopah Tribe, both of which indicate a preference for above ground placement of the last portion of the pipeline route from IRL-3, west along former Route 66 to FW-1 ("F to H to I"). The Tribe has repeatedly appealed for above-ground infrastructure, both verbally and in numerous written comments and letters regarding the 30% and 60% design documents. This preference is rooted in the need to protect the sanctity of the sacred landscape and preserving it for future generations. Contrary to the Tribe's appeals, the present design for the remedy calls for *nearly the entire pipeline routing*, roughly *5 linear miles* to be placed below ground. This decision raises the question as to the *specifics* of the Agencies' criteria apart from the generalities mentioned above that override FMIT's expressed preferences. And it further raises an issue as to whether there were individuals responsible for weighing in on cultural matters involved in such decisions. And finally, what level of commitment there is to completely remove the pipeline once the remedy is completed and how enforceable is that commitment?		why DTSC expended much resources and efforts to meet and discuss these matters with Tribes to seek resolutionAs claimed by DTSC, can the agency cite one important example of how Tribal input has weighed "… heavily between parties. In response to Tribal concerns, agencies directed PG&E to prepare visual simulations of pipeline options which were discussed at several meetings. Ultimately, however, the agencies must make a decision to move forward with the project, even though the decision may not be satisfactory to the Tribes. In the case of the various segments of piping, DTSC understands that the Tribes acknowledged PG&E's needs to install the pipelines underground and that there would be greater disturbance with piping located below ground. DTSC has also requested PG&E to commit in the design document to remove all infrastructures at the end of the remedy.	provided a detailed comparison that is included in the 60% Design Response to Comment. Additionally, visualizations were made for the segments and presented for discussion at the meetings. The Agencies considered all input in their direction to PG&E. We do acknowledge the Tribes preference for aboveground piping however, when considering safety and constructability, visual impacts, impacts to undisturbed areas, potential impacts to biological resources, as well as impacts to the cultural area, our direction to PG&E in our 4/4/14 letter was to carry forward the below ground placement of the pipeline system in the 90% Design, following the alignment in PG&E's 60% Design proposal. Our direction specified that, based on additional input from the Tribes, PG&E shall remove all underground utilities and infrastructures to the extent practicable at the time of remedy decommissioning.	engaging the expertise of the TRC, including the TRC's presentation of a some 60-page white paper, which proposed a program of further testing and evaluation that could address the suitability of the well sites. While the decision remains under consideration, it appears that PG&E has essentially rejected the findings of the white paper and its recommendations, based on limited findings that were never intended to address the specific matter of the wells. It is hoped that the agencies will give due consideration to this good faith analysis. In its response, DTSC asserts that "Ultimately, however, the agencies must make a decision to move forward with the project, even though the decision may not be satisfactory to the Tribes." This language seems to imply that the Tribe is in some way opposed to implementing a groundwater remedy. This is not at all the case. Indeed, the Tribe is extremely concerned over the level of contamination that has been spread throughout the site and its sacred lands. Accordingly, the Tribe represents and speaks for the lands, animals, plant life and all things above and below ground and presents comments to make PG&E and the agencies aware of the nature of its disturbance and requests various design modifications to lessen	

[2] Letter from Ms. Loretta Jackson-Kelly, Hualapai Department of Cultural Resources, to Mr. Aaron Yue, DTSC, and Ms. Pamela Innis, DOI, re "60% Pipeline and Soils Staging Matrices," March 10, 2014.

[3] Letter from Mr. Edgar Castillo, Topock Project Manager, to Mr. Aaron Yue, DTSC, and Ms. Pamela Innis, DOI, re "60% Pipeline and Soils Staging Matrices," March 13, 2014.

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								Finally, DTSC does have cultural resource experts that provide us with input for consideration in our decision making.	See also RTCs #36 FMIT/TRC, #37 Hualapai/TRC, #38 Cocopah/ TRC, and #39 Chemehuevi/ TRC.	its impacts on the TCP and in concert with the PA, CHPMP, CIMP and related documents that state "Avoidance" is the first consideration. Both responses also seem to prioritize visual impact reduction over reduction to other cultural aspects prioritized by the affected community - the Tribe. Relative to the direction of infrastructure removal at time of decommissioning, the Tribe remains concerned about the enforceability of "to the extent practicable" and requests that some performance criteria to determine practicality be considered and adopted prior to final design acceptance. Please see RTC #16 FMIT-2.	
16	FMIT-2	Non-design	Other			As was further expressed in FMIT's letter of March 6, 2014, the March 10, 2014, Hualapai letter and the March 13, 2014, Cocopah letter, any below-ground piping should be removed following the remedy completion. And indeed, this was called for in the April 4, 2014, letter from DTSC/DOI to PG&E. Specifically, PG&E was directed to "... remove all underground utilities and infrastructure to the extent practicable at the time of remedy decommissioning. This directive shall be incorporated into the decommissioning plan as part of the 90% Basis of Design." ~~[Emphasis added.]~~ Despite this directive and contrary to comments made by the FMIT, CRIT, Hualapai, Chemehuevi, and Cocopah Tribes, PG&E apparently believes that it has fully responded to this issue, referencing a narrative presented in Attachment T (to the RTC). However, in regard to "System Components Decommissioning," this narrative provides for either removal or abandonment in place as part of the decommissioning. There is no explicit commitment to actually remove underground infrastructure, as DTSC and DOI directed and as the Tribes' requested. Thus we assume that PG&E prefers that the ultimate decision, which will occur tens of years after construction, remains solely within its own discretion. This is unacceptable to FMIT. Perhaps one reason why PG&E feels it has the freedom to provide only a vague commitment at this time is the qualification "to the extent practicable" in your letter. The Tribes' letters made it quite clear that complete removal is expected. As to practicability, if there are compelling reasons why removal is not practicable, then this needs to be justified in detail in the narrative and performance criteria outlined, and must be consistent with all requirements of California Environmental Quality Act ("CEQA") and the National Environmental Policy Act ("NEPA") equivalent analysis. Moreover, if there is reasonable justification as to the impracticability, then such disclosure needs to be made now. Also, an enforceable commitment must be made that the Tribes will be brought in for consultation prior to abandonment. Again, I wish to remind you that the Tribe will be resident in the Mojave Valley, our historical and cultural homeland, well into the future, far beyond the implementation of this Topock Project. It is therefore critical that the full and proper design, implementation, and decommissioning be established at this time so that our – and your – successors understand how to proceed in the future. This process needs to be spelled out now in the final remedy document to better reflect the Tribe's understanding of this agency directive, not down the road when most of us will no longer be part of the project and left to someone else's interpretation. Fort Mojave will be here still overseeing this	Please see RTC #12 DTSC-8. DTSC and DOI have the ultimate decision making power over the Project and its decommissioning, including the removal of remedy facilities. PG&E understands the Tribes expect "complete removal." PG&E is committed to following the agencies' direction regarding removal in the April 4, 2014 directive letter. As noted in RTC #12 DTSC-8, decommissioning will occur decades from now. PG&E will follow the state and federal requirements that apply to the Project during decommissioning. These requirements include the EIR		Section 5(A) of the Programmatic Agreement (PA) states that "All facilities and appurtenances related to the Topock Remediation Project are to be removed as soon as practicable upon attainment of cleanup standards and a determination by DOI that removal of such facilities is protective of human health and the environment. All such removal will be planned in consultation with the Signatories, Tribes and Invited Signatories, following the guidelines in Appendix B." DOI and the Bureaus , along	As discussed in recent meetings of the TWG, the Tribe understands that a commitment to remove ALL infrastructure as part of decommissioning may not be practicable or may cause more disruption than leaving it in place. However, the Tribe believes from the examples cited in the TWG, this represents more of an exception than a rule. The Tribe understands that it may well be the Agencies decision as to the final disposition of the infrastructure, but notes that PG&E's statements in the BOD lacked firm commitment, and that the direction received from the Agencies on April 4, 2014, was rather explicit in this regard as referenced in the comment. and must be fully and accurately reflected in	A dedicated section (see **Attachment A** of the final RTC Table) that describes the decommissioning process envisioned for the proposed remedy will be added to the Executive Summary of the Final BOD. This RTC was discussed at the August 19 TWG meeting. See final resolution in comment 15 above.

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						cleanup for many generations to come, we need an enforceable removal process and criteria in place now as part of the remedy design documents.	mitigation measures, the PA, and the CHPMP. PG&E does not currently know whether it will be infeasible to remove certain remedy components and cannot provide the Tribes with such information. Any guess regarding future conditions that may make complete removal of the remedy infeasible would be just that—a guess. A more detailed decommissioning plan will be prepared in the future, and will address the feasibility of removal of remedy infrastructure.		with DTSC and PG&E, will evaluate the removal of infrastructure in the decommissioning plan to determine if doing so is protective. As stated in part D of this same section, prior to decommissioning of any remediation facility, the Federal Agencies will consult with all Signatories, Tribes and Invited Signatories during the development and review of related plans.	the final design and CEQA documents. Also, as a landowner the Tribe must be consulted on what happens on its land and requires that at the end of the remedy that all features of the final remedy be removed from its property. The Tribe, as landowner, not the agencies or PG&E, shall determine what "to the extent practicable" means to their respective management practices at project decommissioning especially on lands owned by the Tribe.	
17	FMIT-3	Non-design	Other			It has been eight years since the Tribe submitted a letter to the Arizona Department of Environmental Quality (ADEQ) regarding PG&E's plans to construct wells on the Arizona shore. At that time, the Tribe expressed serious concerns about the plan and opposition to the proposed installation of a well in the area then referred to as "Site 1." Site 1 was characterized at the time as "sensitive," and part of a named Mojave sacred place known as Amut ahar (White Clay). It is the area below the present land surface that relates to the named sacred area, including sediments below this area and any previously dredged areas. Any consideration of wells or other components in this area- also must be consistent with all requirements of CEQA, NEPA-equivalent analysis and the National Historic Preservation Act ("NHPA"). Nothing has changed to amend that characterization of the sacred area. On April 16, 2007, Tribal representatives met with representatives of ADEQ and the Arizona State Historic Preservation Office ("Arizona SHPO") to further discuss this issue. This resulted in Arizona SHPO's transmittal of a letter to ADEQ affirming that the proposed Site 1 was indeed a named traditional historic place and opining that "... the construction and monitoring of these [proposed] drill sites would negatively impact the characteristics that make these properties eligible for inclusion in the State Register of Historic Places." In turn, ADEQ transmitted a letter to PG&E, emphasizing the Tribe's objections, particularly to the Site 1 location. Despite the finding of Arizona SHPO, the BLM subsequently issued an opinion that the proposed drilling at Site 1 "... would result in No Adverse Effect to sites listed or eligible for listing on the National Register of Historic Places." It is interesting to examine the events leading to this conclusion. Specifically: • BLM met with FMIT on July 17, 2007, to argue that the Site 1 area was "under water" until the U.S. Bureau of Reclamation placed dredge materials there in 1962. • Following this, BLM asserted it did not hear further from FMIT re its and therefore BLM was uncertain as to whether FMIT maintained its position and did not consult further with us. • BLM claims to have conducted further research as to whether "... Site #1 was in the vicinity of any known gathering place," but failed to make such a determination to our knowledge. The source and outcome of the "research" remain unidentified to us. • On September 7, 2007, BLM claims to have met with representatives of the Colorado River Indian Tribes ("CRIT") from the Topock and Golden Shores vicinity. BLM claims that the CRIT representatives "... informed the Federal agencies that there are no sites of traditional or cultural use or importance in the vicinity of Site #1 to the Mohave [sic] people, at least historically." On March 6, 2008, FMIT Chairman Williams wrote again to BLM pointing out serious shortcomings in the NHPA Section 106 consultation process and the fact that the BLM had been rather	PG&E will review and consider the Tribes' response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.	DTSC thanks the Tribe for adding some detail and clarifying the Tribes concern with the area in question. DTSC is aware that the Arizona SHPO had requested information from the Tribes and on February 4, 2008, SHPO concluded that no substantial information was provided to support the Tribes position. DTSC is also aware that the Arizona SHPO is currently recommending additional consultation on the installation of wells X and Y. DTSC strongly disagrees with the Tribes portrayal that the Arizona wells lack technical basis. DTSC offers the following discussion to hopefully clarify the misconceptions. For this remedy, wells MW-X and	DOI disagrees with the Tribe's characterization regarding the consultation related to the installation of wells at Site 1 in 2008, as set forth in the FMIT's comment. In 2007 through 2008, BLM engaged in extensive consultation with the Tribes regarding Site 1. On many occasions during this time period, BLM requested from the Tribes information that might support the eligibility of Site 1 for the National Register. On January 24, 2008, BLM concluded that "DOI/BLM does not currently have evidence that the vicinity of Arizona Well No. 1 contains any documentable historic properties eligible for inclusion on the	As discussed thoroughly during the TWG RTC review process, the Tribe understands the position as presented by PG&E with regard to the need and basis for siting the monitor wells MW-X and MW-Y on the Arizona shore. Likewise, the Tribe hopes that the Agencies fully understand and appreciate the Tribe's opposition to the intrusion onto that culturally-sensitive area. Moreover, the Tribe hopes that PG&E and the Agencies will some objectively consider (1) the possibility that further analysis on this issue is warranted as presented in the TRC's "White Paper," and (2) some thinking "out of the box" as to the possibility of some alternative for assessing the effectiveness of hydraulic capture of the remedy, noting that the purpose of the monitor wells is to provide a	This RTC was discussed at the July 23, August 18, and August 26 TWG meetings. DTSC/DOI response to highlighted section: The rational of the proposed MW-X and Y wells has not been to address some future contingency. As explained in various meetings with the Tribes, the purpose of those wells is to directly monitor the down gradient effect of the remedy. Nevertheless, in deference to Tribal cultural concerns, The Agencies have considered the various proposal made by the TRC on behalf of the Tribes to further evaluate the geological understanding of the area prior to making a decision on the installation of MW-X and Y. Our direction letter to PG&E will lay out our expectations.

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						confrontational with the Tribe, "challenging and den[ying] [the Tribe's] beliefs and concerns," and requesting further consultation on the matter. And on March 7, 2008, FMIT legal counsel wrote to the Advisory Council for Historic Preservation ("ACHP") requesting full review of the record and consultation with the Tribe and BLM on the matter. Finally, on March 10, 2008, the Yavapai-Prescott Indian Tribe ("Yavapai') sent a letter supporting FMIT's position in regard to the Site 1 drilling. Ultimately, PG&E proceeded to construct the wells in 2008 over the Tribes' objections and contrary to the recommendations of Arizona SHPO and ADEQ. And among the approvals and authorizations they cited was the May 10, 2007, letter from ADEQ, without mention of the discussions and proceedings that occurred subsequently. Despite the flagrant disregard for the Tribe's legitimate concerns and the misrepresentation of approvals from the State of Arizona, PG&E is now planning the construction of two additional wells in Arizona to the north of the location of monitor well MW-54 (at Site 1), an area which is still within the sacred place affirmed by the discussions with the Arizona SHPO back in 2007. FMIT has made the CWG aware of this fact during recent meetings. Additionally, the Tribe has discussed this with DOI in the context of the Cultural and Historic Property Management Plan (CHPMP) meetings and consultations as recently as February of this year. Still it seems that both the Agencies and PG&E remain steadfast in their position as to the necessity of constructing wells at these locations, notwithstanding the significant adverse impacts and lack of valid supporting technical and environmental analysis. The Hualapai Tribe requested that the TRC perform a technical evaluation of the need for MW-X and MW-Y. In summary, the TRC has concluded that the need for these wells in the proposed locations is not justified on technical grounds. Specifically, the TRC notes that the proposed locations might be too far north to capture any potential migration of hexavalent chromium ("Cr(VI)"). While DOI has argued that the modeling shows a pathway toward these locations in the event of a contaminant (Cr(VI)) breakthrough, the TRC points out that the model may be flawed in regard to discretization of hydraulic conductivity values beneath and adjacent to the River. Accordingly, in the opinion of TRC, the groundwater flowlines from the California side would deflect further to the south. The 90% BOD states that the purpose of monitor wells MW-X and MW-Y is to address a contingency involving the detection of elevated concentrations of Cr(VI) at those locations. As expressed in the strategy, if such conditions were to arise, it would trigger a discussion as to a need to construct additional slant wells under the river. The Tribe's review of the documents failed to reveal any other rationale explaining why such a contingency would be realistic, particularly considering that the design concept involves the line of In-Situ Reactive Zone ("IRZ") wells and a line of River Bank wells, both intended to intercept the eastward movement of the Cr(VI) plume, and additionally the expectation that the floodplain will be cleaned up in a rather short timeframe, based on model simulations. Moreover, this does not account for known information about the reductive properties of the naturally-occurring "rind" of reducing sediments that envelopes the River as well as the fact that, in the time it has been monitored, Cr(VI) has not been detected in the River. Finally, if Cr(VI) has not been detected in the River or at monitor well MW-54 on the Arizona shore, with riverbank extraction, it would be even less likely that there would be plume migration beneath the River from west to east into the area of the proposed MW-X and MW-Y monitor wells. At the recent CHPMP meeting, DOI indicated that it was concerned about using the MW-X and MW-Y wells also to monitor hydraulic capture of the plume. This was presented in the context of gradient control in reference to the hydraulic effects of the River Bank extraction wells and the pumping at freshwater well HNWR-1A. Certainly, this is an effect that should be first examined using simulations. Also, a notion of the drawdown effects can initially be gained from monitoring wells MW-54 and the TCS wells 2 and 3. Further, given the large surface water body between HNWR-1A and the proposed monitor wells MW-X and MW-Y locations, it is quite likely that any drawdown associated with pumping of HNWR-1A would likely be dampened by the constant recharge source short of the radial distance to MW-X and MW-Y. The above-referenced section of the 90% BOD indicates that PG&E held discussions with the Agencies regarding this technical issue during the development of the 90% BOD report. Presumably other issues important to the Tribe were discussed during this timeframe as well. The Tribes should have been included in such discussions. In summary, the Tribe asserts that the construction and monitoring of wells MW-X and MW-Y would be impactful to the cultural and religious values of the landscape.		MW-Y are a critical part of the monitoring program. DTSC would be extremely reluctant to approve the remedy design without them. The reason is that PG&E's remedy intentionally accelerates groundwater flow to the east towards Arizona. This is in direct opposition to the current interim measure which pulls outboard contamination back to the west towards California. So wells MW-X and Y are proposed to monitor the outboard, downgradient portion of the remedy and make sure untreated chromium contamination does not escape the remediation zone and continues on towards Arizona. Additionally, the wells would also be monitored for byproducts (e.g., arsenic, manganese) that would be generated by the remedy's in-situ treatment zone. USEPA's 2008 guidance document titled, Systematic Approach for Evaluation of Capture Zones at Pump and Treat System, refers to these types of monitoring wells as, "sentinel wells". Without these sentinel wells, there would be no direct way to confirm that the Arizona	[National Register]." The Arizona SHPO then concurred with the January 29, 2008 BLM finding of "no historic properties affected" in their correspondence of February 4, 2008 (see **Attachment B** of the final RTC table). As BLM explained in a February 29, 2008 letter to the FMIT, it is problematic to define the area as a Traditional Cultural Place (TCP) when insufficient information regarding discrete boundaries and locations has been provided by Fort Mojave Indian Tribe. However, in response to the Tribes concerns with proposed well MW-X and -Y, BLM has re-initiated consultation on the proposed Arizona wells to evaluate the National Register eligibility of the area. Related to this action, on May 1, 2015, BLM sent a letter to the Tribes requesting that the information needed to further evaluate the clay gathering area be provided by mid-July. It should be noted that Arizona Department of Environmental Quality (ADEQ)	contingency for another contingency in order to determine whether a further contingency may be necessary. As also discussed during the TWG, the Tribe does not approve of any new wells on the peninsula. While one well is better than two, no wells are better than one. Monitor well MW-54 is already on the peninsula. Moving MW-Y to the road is better than at its proposed location, but still represents an intrusion into the area and the important strata at depth. Fort Mojave provided a letter dated July 10, 2015, to BLM Field Manager, Kim Liebhauser related to adverse effects to cultural properties related to the siting of proposed Monitoring wells, which further supports its evidence of Amut ahar, a named Mojave place and the Traditional Cultural Area (TCA) elated to the lower river region of Mohave Valley, AZ. A response from BLM and in consultation with AZ SHPO is still pending. While the Tribes understand that wells maybe important to control the spread of the contamination, the reasoning used for the need of these wells has not been provided beyond the need to support the model, which is insufficient justification for the permanent adverse effects to this area and the TCP in general. There needs to be concrete justification and an exhaustion of other methods to	DOI/BLM will continue to consult with the Tribes on this issue until a final decision is made. It is important to note that DTSC does not completely agree with the technical basis or statements made by the TRC in their white paper and their rebuttal to PG&E's response. However, for the purpose of promoting progress on this project, DTSC will not debate those disagreements here.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
						Moreover, the purpose of and technical justification for these wells has not been well established, and therefore the Tribe is opposed to their emplacement at the proposed locations, which are within both a named place, a Tribal sacred area and, within the Havasu National Wildlife Refuge.		groundwater is adequately guarded and if the assumptions used in the design are correct. In addition to monitoring for contaminant data, the proposed wells would also monitor hydraulic data and determine if the groundwater flow in the area responds to the remedy as anticipated. The current level of understanding of groundwater flow in Arizona is minimal (e.g., many monitoring wells exist on the California side, yet only two monitoring locations – MW-54 and MW-55 – currently occur in Arizona that allow for collection of reliable water level measurements). Data obtained from the Arizona wells would be incorporated into the groundwater model to improve its predictive capabilities. It is important to note that Arizona Department of Environmental Quality (ADEQ) sent a letter to DTSC and DOI on March 26, 2015 supporting the importance of these sentinel wells as part of their design review comments. Finally, as echoed in the PG&E Topock March 18, 2015 Technical Work Group Meeting,	(letter to DTSC dated March 26, 2015 on the 90% BOD) has pledged its support for the "technical and practical components that have led PG&E to the proposed locations of MW-X and MW-Y". DOI and BLM will continue to consult with the Tribes and AZ SHPO in resolving this issue and anticipate further technical discussions during 90% Design comment resolution.	secure similar data for the placement and number of wells in this location that is shown to clearly outweigh the impact to the sacredness of the area.	

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								many more Arizona monitoring wells would be added to the monitoring program for this type of remedy as standard practice absent Tribal concerns. DTSC believes that MW-X and MW-Y represent the minimum number of wells the agency believes would be necessary for the monitoring needs of the remedy.			
18	FMIT-4	Non-design	Other			In its March 6, 2014 letter[4], the Tribe provided a table summarizing the acceptability of, and concerns about, PG&E's proposed staging areas and soil processing and soil storage areas. The table provided by the Tribes' indicated the preference and acceptance (or non-acceptance) of each of 29 areas proposed for such purposes with specific conditions for use. Based on various discussions and site walks to each of these areas, the Tribe has, at multiple times and specifically in their comment letter, expressed strong objections to the use of Areas 6, 7, 12, and 13, which are so-called "upland staging areas." In the April 4, 2014, joint letter from DOI/DTSC[5], PG&E was directed "... to consider all the information in the [Tribes'] revised matrix, communications from the Tribes in meetings, and design comments to identify the minimum number of preferred storage and staging locations necessary in the 90% design for the Agencies [sic] consideration." It has been argued by others that these areas underwent prior disturbance, and therefore potentially represent areas that may be preferable to other, undisturbed areas. However, the Tribe has surveyed these proposed work areas, and, despite past desecrations, noted that these areas continue to hold tribal cultural significance and values, and conclude that further disturbances are unacceptable. In fact, the Tribes have yet to hear from BLM as to the disposition of their original Tribal Cultural Values Assessment (TVCA) report and the acceptability of the alternative methodology proposed by the Tribes' to document their findings. Also, amongst these areas is the location of an "Exclusion Area" which encompasses areas 6 and 7. Most of the areas identified in the TCVA, should fall under new discoveries in the already accepted and approved PA and CHPMP documents. This must be resolved prior to the final remedy design acceptance and approval by the agencies. It appears that Areas 6, 7, 12, and 13, despite the Tribes' preferences and the direction from DOI/ DTSC, still remain under consideration by PG&E.[6] However, PG&E included an evaluation of options that could be employed in lieu of using these areas. The Tribe, a landowner, strongly prefers the implementation of "Alternative Approach Option 1" as described in Table 1 of that evaluation, and under its rights as a landowner objects to the implementation of any other alternative. Under a 2006 Settlement Agreement with the Tribe, PG&E has expressly agreed to "honor Tribal concerns to the maximum extent practicable." (2006 FMIT-PG&E Settlement, Sec. VIII.A.) As to FMIT property, an easement agreement, recorded in 2006 pursuant to that same settlement, only grants rights to PG&E for the purpose of "conduct[ing] its legally-required Remediation" including, among other things, "to install, access, use, operate, maintain, modify, upgrade and remove any and all additional Remediation-related Facilities required by the DTSC or another agency or governmental body with jurisdiction over the Property or the Remediation." Thus, Tribal concerns must be honored to the maximum extent practicable and, as to FMIT	PG&E has participated in discussions with the agencies and Tribes, including the FMIT, on this topic at several TWG and other meetings and site visits since March 2013. In response to comments from Tribes and DOI and through further discussions to resolve these comments, a number of the proposed staging and soil storage areas were removed from further consideration. PG&E thoroughly evaluated alternative approaches to avoid the use of the proposed Upland areas, which the FMIT objects to, but the alternatives would have adverse effects on worker safety, and public safety, and create potential nuisances, environmental impacts, and construction schedule delays that would outweigh the benefits of eliminating those areas. Use of the Upland areas (Areas #6, 7, 12, and 13), which are in close proximity to the	DTSC understands that there are Tribal sensitivities to the use of all areas within the project site, and did receive Tribal input objecting to the use of several staging areas as pointed out in your comment. DTSC and DOI, however, have attempted to seek a balance in Tribal preference with the necessities of the cleanup project by hosting discussions and conducting site visits to identify suitable areas for the soil staging and storage areas. The agencies have also proposed to the Tribes during the TWG and site walk of October 19 and 20, 2014 to map and reduce the amount of areas to be used within each of those proposed staging locations prior to providing	The Federal agencies have received written comments and met with the Tribes on several occasions regarding the staging areas for the remedy. In the DTSC/DOI Direction letter of April 4, 2014, DOI provided direction to PG&E to eliminate Sites 15, 16 and 19 from further consideration based on Tribal input. It is unfortunate that areas 6, 7, 12 and 13 are located in areas of tribal cultural significance and values while being optimum locations for construction of the remedy and decommissioning of the IM-3 facility. The agencies, however, must also consider the information provide by PG&E	While worker and public safety are of paramount importance to the Tribe as well, the Tribe believes that, with proper planning and management, PG&E can safely operate with alternative storage and staging areas in deference to the Tribe's legitimate cultural issues at the proposed sites. Again, DTSC maintains that it must "… seek a balance in Tribal preference." The DTSC has decided to direct PG&E to consider whether it can perform construction and decommissioning without using those areas. It is no surprise therefore that PG&E concluded that the work could not possibly be done without using those areas, and that the benefits of using those areas "… would outweigh the benefits of eliminating [them]." It is not appropriate for PG&E to attempt to balance the effects and	This RTC was discussed at the July 23 TWG meeting.

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						property, may otherwise be overridden *only if expressly required by DTSC or the federal government*. Absent further agreement by the Tribe or an express order by DTSC or DOI to PG&E, the Tribe will allow only the implementation of "Alternative Approach Option 1."	remedial infrastructure in the Upland, is required for efficient, successful and safe implementation of construction activities and will be beneficial for a number of reasons set forth in RTCs #860 FMIT/TRC, #861 Hualapai/ TRC, #862 Cocopah/TRC, and #863 Chemehuevi/TRC . The FMIT comment refers to the 2006 Settlement Agreement between the Tribe and PG&E. As the FMIT note, PG&E agreed to "timely and meaningfully consult with the Tribe and . . . honor Tribal concerns to the maximum extent practicable." PG&E understands that the FMIT objects to the use of Areas 6, 7, 12 and 13 and has considered the information provided by the FMIT regarding staging and soil storage areas, as described above, and believes it has fulfilled its Settlement Agreement obligations. PG&E disagrees that it cannot use the FMIT's property for remedy-related uses absent an "express order" by DTSC or DOI. As noted by the FMIT, the easement gives PG&E the right to use the FMIT property for "conduct[ing] its legally-required Remediation." Approval of the design and the C/RAWP by DTSC or DOI would obligate PG&E to carry out the remedy as proposed therein and would be sufficient to show that use of the FMIT's property for staging and soil storage is necessary for PG&E to conduct its legally required remediation.	direction to PG&E on the supplemental 90% design. As a result of Tribal input, the agencies directed PG&E in our April 4, 2014 letter to eliminate the use of sites 15, 16 and 19. DTSC understands that BLM is working with the Tribes on a treatment plan related to the TCVA. Nevertheless, agencies have charged PG&E with the responsibility to evaluate if construction and decommissioning can be done without the use of areas 6, 7, 12 and 13. It is PG&E's belief that the uses of those areas are necessary.	regarding the health and safety of the public and workers, the environmental impacts from additional traffic and schedule in making our decisions. Therefore, areas 6, 7, 12 and 13 should remain as options for staging during construction; however PG&E should minimize their use to the extent practicable. See also RTC #26 FMIT-12.	benefits of its project components. The Tribe requests that an alternative(s) be studied in the SEIR that excludes these objectionable staging areas, just because it was disturbed by earlier Interim Measures (IM) doesn't mean the land has lost its cultural integrity. As has been relayed in many meeting venues, the Fort Mojave Tribe was not consulted with during the earlier IM 1, 2 and 3, project disturbances by BLM. Had it been consulted, this subject conversation wouldn't be happening. But because it didn't occur then, we are being asked to allow further cumulative adverse impacts to the TCP. The "after the fact" consultation/environmental analysis does not give PG&E, DTSC/DOI a ride for free card. Since all impacts cannot be eliminated, then reduction to the bare minimum should be the focus. Again, this is a situation between want and need. The tribe did not waive its right to comment on the remedy design and potential impacts of such and so offers these final thoughts on the project use, cumulative effect and future implementation of the final design. As to PG&E's interpretation of the easement, there is an express requirement that "Remediation," a term defined to mean "investigation and remediation activities on and at the Property," be "legally required." Thus, the	

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							PG&E also notes that under the 2006 Settlement Agreement, the FMIT agreed to not to "oppose PG&E's efforts that are subject to [the] Agreement to remediate the chromium plume at the Topock Compressor Station," and that both PG&E and the FMIT are obligated to cooperate with state and federal agencies "in ensuring that the selected Groundwater Remedy and Soils Remedy become operational and are certified as complete." (2006 PG&E/FMIT Settlement Agreement, VI.B.2.d; 2012 PG&E/FMIT Settlement Agreement § VI.C.)			activities themselves on the Property must be legally required, not that PG&E can engage in any activity that it wants or it feels it needs that is related to the overall remedial action required by DTSC and DOI.	
19	FMIT-5	Non-design	Other			The Tribe notes that PG&E has considered the alternative design concepts proposed by the TRC[7] for the utility crossing at Bat Cave Wash as presented with the December 23, 2014, directives from DOI/DTSC[8]. The location of this proposed crossing is on FMIT property at the location of the current Bat Cave Wash bridge crossing. PG&E has previously considered the need to extend its utilities across Bat Cave Wash at this location. In lieu of PG&E's earlier proposal to construct an aerial crossing, it is now proposing a design involving a raised structure over box culverts. This design will accommodate installation of piping and conduits above the wash channel. In addition to that design, PG&E provided an analysis in the Supplemental 90% of the alternative designs proposed by the TRC[9]. Characterizing the TRC designs as "ford crossings," PG&E rejected such designs based on essentially the following reasons: • This type of design allegedly had been rejected by both Agency direction and Tribal preference at the 30% design phase. • The design would drastically alter the road profile, thereby altering PG&E's design criteria. • Such a facility would be overtopped by a 25-year, 24-hour design storm, again violating PG&E's design criteria. In contrast to PG&E's position, the Tribe responds point-by-point as follows: • Design review as established for this project is a progressive process. As such, more details regarding the proposed design have unfolded at each review stage. Details regarding the nature of the current design proposal for this crossing were not presented at the 30% design. As stated earlier, it was instead an aerial crossing that was proposed. Not that the Tribe would have preferred such a structure, but it is not appropriate for PG&E to suggest that the Tribe would have preferred the current design without consideration of reasonable alternatives. Alternatives related to this design were not previously presented. • The Tribe recognizes that the alternative design would alter the road profile, though the term "drastically" has not been substantiated by PG&E. That is the point of creating a design that is compatible with the existing landscape and avoiding an obtrusive structure. Based on what	After further deliberation and consideration of all 90% comments received on this topic, PG&E changed the design of the northern BCW crossing to involve a) keeping the existing access road and b) burying the piping/ conduits within BCW and up-gradient of the existing access road. Similarly and concurrently, PG&E also changed the design of the southern BCW crossing to remove the aerial crossing and bury piping/conduit within BCW. The revised design was provided during the 90% RTC period and included in **Attachment C** of the final RTC table.	**Attachment C** illustrates that the new pipeline alignment "I" will travel through many AOCs and SWMUs (i.e., SWMU-1, SMWU-5, SWMU-9, Station Perimeter, Storm water Piping, AOC-1, extension of AOC-4, AOC-13, and AOC-21) including waste disposal/ discharge/ treatment areas in Bat Cave Wash and the lower yard. Therefore, enhanced opportunistic sampling pursuant to C/RAWP (Table 5.5-1) is required as well as general added caution due to the increased potential for		The Tribe appreciates PG&E's adoption of an alternative design at the Bat Cave Wash crossing and maintaining the natural setting in the design process.	

[7] Technical Memorandum from Topock Technical Review Committee prepared by Charlie Schlinger, "Design Alternatives – Bat Cave Wash Crossing – Topock Compressor Station Groundwater Remediation Project," November 12, 2014.

[8] Letter from Ms. Pamela Innis, DOI, and Mr. Aaron Yue, DTSC, to Ms. Yvonne Meeks, PG&E, re "Directives on Outstanding Issues on the Basis of Design Report ...," December 23, 2014.

[9] See Section 4.0, particularly Section 4.4, in the 90% Supplemental BOD.

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						was presented by the TRC in December of 2014, the vented ford design results in little / no change to the road crossing profile. The Tribe notes that at the February 19, 2015, TWG meeting, PG&E disclosed that there was not even the current crossing structure present at this location prior to 2004 and prior to the construction of the IM-3 treatment plant. The current crossing structure was installed by PG&E without consultation with the Tribes and without a CEQA document. We understand that previous access was unimproved access. • What is inviolable about deviating from the referenced design storm, other than it is inconsistent with PG&E's arbitrary design criterion (25-year return period, 24-hour duration storm)? During the February 19, 2015, TWG meeting it was also disclosed that the referenced PG&E design criteria were established *ad hoc*. Also, the referenced design criteria (Appendix C, 90% BOD Report) do not indicate a 24- hour duration storm, instead they related to a reference storm of duration equal to the time of concentration ("TOC") within the watershed. For the relatively small tributary watershed above this location, TOC would likely be considerably less than 24 hours. Considering that the project may extend well beyond a 25-year timeframe or that a storm of a magnitude greater than a 25- year average recurrence interval could occur during the operational period of the remedy, or even on two successive days in the operational period, the 25-year criterion does not afford full assurance that the road will not flood out. At the same meeting, PG&E pointed out that a ford would likely be overtopped every year. While this would likely involve increased maintenance on an as-needed basis, its advantage is in providing a less intrusive structure across the landscape. It may also be a cheaper alternative. Also at the meeting it was pointed out that continued use of a bridge structure over an extended period, might somehow constrain FMIT's future preferences regarding its eventual removal on its own property. Finally, improving accessibility in a manner that would invite more users onto its property, is not a preference for the Tribe. The landowner's preference should be provided great weight here as outlined above pursuant to settlement and easement terms. During the meeting, DTSC explained its position that, despite the Hualapai's December 3, 2014, letter[10] requesting consideration of various alternative crossing designs as presented by the TRC, that the joint DTSC/DOI letter of December 23, 2014,[11] directed PG&E to proceed with its own preferred design for the crossing, because the Agencies had not received (written) direction from FMIT, the property owner. This is a rather insulting position that the Agencies are presenting to FMIT. Recognizing that FMIT is indeed the property owner, and that the Hualapai Tribe deferred to FMIT on the decision after presenting some alternative designs, why would the Agencies not direct PG&E to consider presentations of the alternatives or even an open discussion of them at a TWG meeting? The agency letter maintains that it considered "... all input received to [that] date." Should we then conclude that the alternative designs prepared by the TRC and presented by Hualapai were considered and dismissed without notice to or consultation with the Tribes or FMIT, the landowner? FMIT did not directly respond in writing, expecting that some type of analysis would be included in the Supplemental 90%. Indeed it was, but only to the extent that any alternatives would be dismissed. The Tribes were also told that consideration of a buried utility crossing was rejected at the 30% design stage and, therefore, PG&E did not consider burying the utility trench at the crossing. This is also misleading considering that the earlier designs were considering burial of utilities along the axis of Bat Cave Wash, not at one location transverse to the wash, such as the location under discussion. As for the issue of site access, FMIT was told at the recent TWG meeting that the area is already accessible from the west by one other route. The FMIT position should be abundantly clear: Because of the reasons of the impacts, not only to the FMIT property, but also to the unique cultural resources downstream from the crossing, the Tribe vigorously objects to the design proposed in the Supplemental 90% design document. FMIT requests to discuss/consult on this further with the agencies, including considering an alternative involving keeping the existing crossing and burying the utility trench within the wash.		encountering contaminated media. Finally, detailed trench logs are requested for this pipeline segment as well as other segments passing through soil investigation areas. Appropriate sections of the document should be revised to incorporate the requested changes.			
20	FMIT-6	Non-design	Other			Figure 3.5-9A of the 90% BOD report depicts "Proposed Access Routes for Remedy Features – California." Considering the attendant impacts that would be projected from ongoing incursions for the purposes of monitoring and maintenance along these routes over the lengthy period of remedy	PG&E will be discussing this comment, and its response to this	DTSC will be communicating with FMIT directly		Please note that the Tribe is only asking for consideration and	The agencies will provide direction to PG&E, see response

[10] Letter from Ms. Loretta Jackson Kelly, Hualapai Tribe, to Mr. Aaron Yue, DTSC, and Ms. Pamela Innis, DOI, re "Addendum for Verification of Staging Areas and Arsenic Monitoring Well Locations," December 3, 2014.

[11] Ibid., Footnote 14.

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						performance, the Tribe proposes, to the extent practicable, consideration of a policy of *access by foot traffic only* ("ABFTO"), wherever and whenever possible. This would not only lessen the severity of the impacts to the sacred areas, but might also establish a spirit of respect, if not reverence, for the landscape. Again, the Tribe requests to discuss the logistics of this proposal with the agencies and PG&E prior to final design.	comment, directly with counsel for DTSC and counsel for the Fort Mojave Indian Tribe.	regarding this matter.		further discussion as to the practicability of applying ABFTO to avoid impacts to certain sensitive areas in accordance with the PA, CHPMP, CIMP and Access agreements which recommend "Avoidance" as the first step. Relative to PG&E's comment, a brief discussion between counsel occurred in which positions were restated but no agreement reached. The Tribe therefore requests further discussion of this matter.	to comment 69.
21	FMIT-7	Non-design	Other			Considering the status of the remedy design, the Tribe's technical consultants spent considerable time reviewing the technical specifications and drawings as presented in the 90% BOD document. Particular consideration was given to whether the designs provide for optimal configurations to achieve the Tribe's preferences for minimizing the impacts of the design. In doing so, our reviewers noted several instances where the drawings were inconsistent with the written specifications. While the written specifications allow for a range in the minimum spacing between pipelines, the application to the drawings appear inconsistent. While this may seem simply a matter of fixing one or the other, this problem confounded the Tribe's technical review. An example is that the pipe spacing between similar water line sizes was inconsistent on Sheet C-07-102, where in Section H1 the space between water lines ranged from 8 to 10 inches, but in Section A10, the spacing ranged from 4 to 6 inches. The Tribe's preference is the minimum feasible separation that results in the narrowest trench and a minimum of disturbance. The Tribe offers the assistance of our technical personnel to assist in achieving this goal, if requested by the Agencies and/or PG&E. Design drawings and specifications become part of the bid package for contractors performing the work and eventually their field guidance. If the information provided to contractors is inexact or inconsistent, there is a high risk that the contractors may opt for a design or location that is not optimal, while still potentially conforming to the contract. This example further underscores the importance of impact minimization at the design stage and the presence of Tribal Monitors. This also supports the Tribe's comments requesting for a clear framework for Tribal participation in the construction and implementation of the groundwater remedy moving forward.	Pipe and conduit spacing and configurations within trenches will be reviewed for consistency and revised as needed during the final design. This goal of this effort will be for consistency in final documentation and to minimize the disturbance impact of the trenches.			This item was discussed with PG&E engineering staff during a recent TWG meeting. FMIT is satisfied that PG&E has committed to reconciling conflicting information between design narratives and drawings.	This RTC was discussed at the July 23 TWG meeting.
22	FMIT-8	Non-design	Other			During the approval of the Groundwater FEIR and then subsequently throughout the reviews and discussion of the groundwater remedy design, the Tribe was told that the cap on the number of boreholes is 170. Likewise, the Tribe has repeatedly emphasized that each such intrusions desecrates the landscape individually and cumulatively. Now, Tables ES-2A and ES-2B provide "estimated" borehole counts and construction information, respectively. Examination of Table ES-2A indicates that the borehole count could very well exceed the 170 well count. This is confirmed in Line 41 of the table, where PG&E makes an allowance for up to 20 additional boreholes for monitor wells that may be needed at "unidentified locations." Figure ES-4A illustrates the entire layout of infrastructure incorporating the proposed monitor and remediation wells as well as the existing wells that will be incorporated into the design. Needless to say, simple examination of this figure reveals a disturbing level of impact to the landscape. PG&E has said that it expects the utility of some wells to be ineffective during the project lifetime. And accordingly, PG&E plans to "replace" wells at the "same locations" if they remain essential to remedy performance. However, these "replacement wells" will not be the same borehole, but will be in a *new* borehole near – but not in – the already counted borehole thereby making a farce of	Regarding well replacement, Section 4.2.2.5 of the O&M Manual Volume 1 states	As stated in the 60% RTC to DTSC-101, "DTSC based the number of wells on estimates provided by PG&E at a stage when the remedy was quite conceptual. While every effort should be made to minimize the total number of wells, if necessary, wells should be installed for an identified	DOI defers to DTSC regarding the well count found in the FEIR. In response to your concerns stated in the last paragraph, it is true that the project is a technically driven project that must ultimately result in cleanup remedies implemented to protect human	The Tribe fully understands and appreciates the realities of wear-and-tear of material components over time. The comment is intended to highlight the Tribe's continuing concern over these intrusions into sacred grounds and the potential spiritual implications of the infrastructure. 170 is a significant number, but	This RTC was discussed at the July 23 TWG meeting.

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						the alleged 170 well count. Again, this creative math represents further intrusions into the landscape, one that has not been the subject of the required environmental analysis. Finally, it is evident that the soils investigation will superimpose another level of intrusions including both borings and trenches upon what has already been projected for the groundwater program increasing further the direct and cumulative impacts to the area. It seems that the project is being dominated by a technical mindset, one in which the overarching view is to collect whatever information may be desired, largely regardless of the impact to the cultural and environmental resources. Despite claims to the contrary, and the occasional compromise or impact reduction, there appears to be no real effort to constrain the level of site disturbance, and again, no one at the decision making level has the professional qualifications and experience to consider a proper and reasonable balance between the competing interests. DTSC and BLM have recently brought on archaeologists to the project, which should have allowed a qualified experienced new set of eyes and viewpoint to understand the concerns raised by the Tribes. However, the views of those experts seem to be focused mainly on the archaeological aspects and not the tribal cultural values. Those archaeologists have not been able to consider the full picture of the remedy design impacts, because they have been limited by their specific tasks, time dictated in their respective contract/ employment or lack of qualifications beyond archaeology. This is an issue the Tribes have raised face-to-face in meetings, such as the recent consultation meeting with DOI on January 23, 2015.	"Wells that cannot be restored to a condition that is satisfactory to fulfill the given well objective using routine or non-routine maintenance methods…. may require replacement. Well replacement entails the construction of a new well within a new borehole, and should be considered as the least desirable option to achieve the given objective of a well. The location of replacement wells will be determined based on the evaluation of available remediation system performance data (e.g., current hydraulic gradient and water quality data, as well as model predictions), accessibility, and agency-approved work plans and compliance documents. If it is determined after further evaluation and discussions with agencies that a replacement well is warranted and that the most suitable location to achieve the well objective is within the area of the original well location, well replacement will proceed under the scope of this O&M Plan..." In addition, the FEIR addresses this same well replacement concept and the associated well count, with the following language: "One option would be for existing wells to be abandoned and replaced with an entire new well. The new well would be located close to the existing well, within the areas currently designated in the FEIR (see Exhibit 3-4 above).	purpose and not be artificially bound by the specific well counts for the design." Please recall that DTSC has been explicit during the CTF, CWG and TWG meetings that the well count from the certified EIR was based on PG&E's estimate prior to completion of the East Ravine and Topock Compressor Station sampling. DTSC will evaluate impacts of additional wells in the subsequent EIR. DTSC express grave concerns regarding the Tribes' statement that the project is "…dominated by a technical mindset, one in which the **overarching view is to collect whatever information may be desired, largely regardless of the impact to the cultural and environmental resources"** (emphasis added). DTSC acknowledges that the project is located in a culturally significant area; however, DTSC is mandated to protect human health and the environment. In the process we try to protect the biological and cultural resources to the extent possible; however, infrastructures are needed to achieve the necessary cleanup. Impacts are unavoidable. Agencies and PG&E	health and the environment. It is unfortunate that the project occurs in a location that of such significant cultural and spiritual importance to the Tribes. There will be cultural and biological impacts resulting from the groundwater remedy and the efforts by DOI, BLM, DTSC, and PG&E to minimize/ mitigate those impacts should not go unrecognized (see the following documents: CIMP, PA, CHPMP, MMRP from the 2011 Groundwater Remediation EIR). DOI and BLM believe we have a very qualified and knowledgeable archeologist and an experienced tribal liaison dedicated to this project. Both of these people have worked with Tribes on similar projects for many years. As noted in our May 1, 2015 letter to the FMIT, the BLM Arizona Deputy Preservation Officer also has advisory role. Accordingly, we believe the BLM has the appropriate federal cultural resource preservation expertise to fulfill its responsibilities.	even a lesser number is a concern. Further, the Tribe's comment represents an appeal to extend every consideration towards not increasing the number of wells beyond the prescribed number in the FEIR.	

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							Unless the new well encountered different geologic conditions and/or has significantly smaller capacity than the well it replaced, there would be no net change in the total number of existing wells. If the new well has significantly smaller capacity, it might be necessary to replace an existing well with two new wells under certain conditions" (see FEIR, pages 3-26 and 3-27). Replacement wells put in the same location as original wells would not be counted as additions to the estimated number of wells disclosed in the EIR. See also 60% RTC #606 FMIT-169 for references to the evaluation of environmental impacts of well replacement in the FEIR.	have been very mindful of Tribal concerns with remedy and monitoring wells and have held several meetings and conducted several field visits (including multiple trips for the same proposed well) to evaluate the proposed well location(s) and consider alternative locations more acceptable to Tribes. This has included trips and/or discussions regarding, at a minimum, the following wells: FW-1, FW-2, MW-S, MW-HH, MW-II, MW-10D, MW-11D, MW-V, IRL-4, MW-DD, MW-EE, IRL-3, IRL-2, MW-BB, MW-I, MW-P, MW-AA, IRL-1, MW-CC, MW-Z, location of IRZ wells along the road, location of River Bank extraction wells and provisional wells, and East Ravine extraction wells, and wells MW-X and MW-Y. These efforts have been conducted to attempt to minimize impacts to cultural and environmental resources identified by Tribes as well as to notify Tribes of the need for particular wells. DTSC would like to point out that even during the April 2015 TWG meeting, it was pointed out to the Tribes that the agencies would have installed many			

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								more sentry wells to ensure the safe and effective operation of the remedy, but it is due to the understanding of the Tribal concerns that the agencies are self-limiting the proposed sentry wells to two in Arizona.			
23	FMIT-9	Non-design	Other			As has been said many times by the Tribe over the years, because to Tribal people there is a sanctity associated with this landscape, and because the Tribe holds religious and spiritual connection and ceremony to the Topock area, noise control and abatement is essential. It is equally important to recognize that adverse impacts arise both from audible and inaudible energy. Vibrations, high and low frequency waves, etc. are all impactful to the spiritual setting of the landscape, regardless of the presence of Tribal members. As you are aware, the ambient noise levels across the landscape arise from a number of sources including the Interstate highway, railroad, compressor station operations, and nearby recreational areas and enterprises. The construction activities and eventual operational activities associated with the remedy will add incrementally and cumulatively to these existing sources. Treatment of noise levels is addressed in PG&E's Cultural Impact Mitigation Program ("CIMP") in CUL-1a-8h. In the 90% BOD document, compliance with noise standards is addressed in Appendix C, Section C.11. This section cites San Bernardino County Code, Division 3, Chapter 83.01.080, which exempts "temporary construction, maintenance, repair, or demolition activities between 7:00 AM and 7:00 PM, except on Sundays and federal holidays." Clearly this part of the code is potentially less stringent than the protocols and practices established in the CIMP. Again, the Tribe expects that PG&E will work earnestly to achieve practices that go beyond the minimum civil standards. Appendix C addresses design standards in general and should not be limited to codes. Reference to that County Code must be struck throughout the 90% BOD document as inconsistent with governing project requirements. Moreover, the project documents must commit to resolving Tribal noise concerns that might arise during project construction and implementation – beyond simply referencing the existence of a Noise Coordinator.	San Bernardino County Development Code, as well as the Mohave County Zoning Ordinance, noise and vibration standards are applicable legal requirements that PG&E cannot ignore. Because these standards were part of the EIR analysis and incorporated directly into Mitigation Measures NOISE-1 and NOISE-2, as well as indirectly into Mitigation Measure NOISE-3, PG&E also cannot delete references to the County code (in whole or in part) in the project documents. According to the Tribe, it is "important to recognize that adverse impacts arise both from audible and inaudible energy." PG&E agrees with the EIR, which recognize that even with mitigation, the "values associated with the Topock Cultural Area cannot be reconciled with additional project-related noise," and thus concludes the project will have a significant an unavoidable impact. (EIR, Vol. 2, at p. 4.9-24; see also EIR, Vol. 1 at p. 4-118 [responding to FMIT's concern that tribal values were not addressed in the EIR]; id. at p. 4-127 [responding to FMIT's request not to rely on the County's		DOI believes the CIMP noise protocol and the EIR noise mitigation measures adequately address the FMIT concern.	By continuing to cite conflicting noise standards, the intent of the Basis of Design report remains ambiguous and open to interpretation and possible future disagreement. The Tribe requests the addition of language to the effect that, when and where there is a conflict among the various noise standards, the most stringent (most noise restrictive) shall apply. Further, the Tribe notes that in addition to current standards, CEQA allows for the provision of project-specific standards. See CEQA Guidelines section 15064(d). The Tribe requests that such standards for outdoor worship be developed and considered in the SEIR.	DTSC Response: Comment noted. Noise impact evaluations are based on established regulatory thresholds. Noise impact is a resource area that DTSC will consider in the upcoming SEIR.

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							noise standards]). This analysis included consideration of ambient noise and vibration. (EIR, Vol. 1 at p. 4-123.) PG&E commits to constructing the remedy in a manner that is safe, compliant with the law, respectful as possible given the fact that unavoidable impacts exist, and expedient, and has committed to numerous steps, above and beyond those required by the San Bernardino County Code to address the Tribes' concerns. As the Tribe notes, the EIR requires compliance with Mitigation Measure NOISE-3 and the CIMP protocols for noise (CUL-1a-8h) to minimize noise impacts on the Topock Cultural Area to the extent feasible. The EIR also analyzed the cumulative impacts of adding the project's noise to the existing noise in the environment. (EIR at p. 6-38.) That analysis acknowledges that the project "would generate noise that could expose the Topock Cultural Area (a place of worship for Native Americans) to levels that . . . would conflict with Native American values associated with this resource" and notes that those impacts are significant and unavoidable. (EIR, Vol. 2, at p. 6-38.) . Regarding commitment to resolving Tribal concerns, PG&E has proposed protocols in addition to designating a Noise Disturbance Coordinator. Section 2.8.4 of the CIMP CUL-1a-8h (Noise Protocols)				

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							states "[s]hould a concern about the actual noise generated by remedy construction arise, PG&E disturbance coordinator will thoroughly investigate and resolve the issue. A qualified acoustical consultant (Institute of Noise Control Engineering [INCE] Board Certified or Professional Engineer in Acoustics) will evaluate all reoccurring disturbances for compliance with applicable standards. All noise complaints and resolutions will be recorded, tracked, and reported to DTSC in the quarterly compliance reports." Further, Section 2.8.5 of CIMP includes the following specific communication protocols with nearby noise-sensitive receptors and the Tribes: • A detailed project schedule is established and published for all stakeholders. • Monthly notification to Agencies and the Tribes of scheduled field activities. During periods of extensive construction activity, these notifications will be issued more frequently – weekly and/or daily, as appropriate. • After issuing these notifications, notify the nearby noise-sensitive receptors and Tribes of any schedule changes. • Provide an open-				

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							communication process for Tribal representatives to seek more information about Project noise-generating activities. PG&E welcomes Tribal input on timing of Project noise-generating activities and on potential noise-reducing methods. • The contact information for the disturbance coordinator will be posted in a conspicuous location near the construction areas. This information will also be mailed to all nearby noise-sensitive receptors and Interested Tribes. • In addition to the communication methods described above, PG&E will consider posting construction schedule information at the information kiosk (CUL-1a-3c). PG&E also will consider and may decide to use additional communication processes. The CIMP noise protocol and the EIR noise mitigation measures go beyond the County's noise requirements, but do not conflict with the County's noise standards, which also are applicable to the project. Accordingly, no revision to Appendix C, Section C.11, which mentions both the EIR noise mitigation measures as well as the County noise standards on which the EIR relied,				

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							is required.				
24	FMIT-10	Non-design	Other			The Tribe is concerned that there are a number of developments that have occurred and are planned within the Park Moabi Area, which comprises parcels of land leased by private developments from the U.S. Bureau of Land Management ("BLM"). To date, there has been considerably greater development within the present Park Moabi lease area than originally envisioned by the Tribe. Presently, the C/RAWP proposes an option for the "Use of Staging Areas at Moabi Regional Park."[12] This option is offered by PG&E as an alternative to using staging areas 6, 7, 12 and 13 on the FMIT property, sites which the Tribe has indicated are unacceptable due to cultural impacts. PG&E points out that these areas "... were not originally intended for temporary facilities or as a support zone for construction in the Upland because they were not adjacent or central to the primary work zone in the Upland." It had previously been suggested by PG&E that these areas could serve as construction headquarters and a main temporary equipment and materials laydown area. The memo now indicates that use of these areas for the added purposes of replacing the aforementioned proposed staging areas might result in their expansion to accommodate the added purposes. The memo concludes that in PG&E's view this option, along with the other alternatives evaluated, "... would outweigh the benefits of eliminating those areas [on FMIT property]." It is unacceptable that PG&E would be making such decisions that adversely impact cultural resources identified by the Tribe, particularly in light of PG&E's limited rights on FMIT property. It seems as though PG&E is asking to have *both* an expanded Park Moabi present and the staging areas that are unacceptable to the Tribe. This is unacceptable to the Tribe and is why consultation is necessitated. Similarly, the Tribe must be involved in the terms for any lease amendments prior to lease finalization. Moreover, if such areas were dedicated to such uses, regardless of whether they are slated for the original purposes or expanded to accommodate the additional uses as described above, are there provisions within the property lease(s) that would control future developments? The Tribe is concerned with the precedent established by the original situation involving seemingly continual expansion of the lease associated with the regional park. The limits of the added infrastructure associated with the remedy must be explicit within the terms of the lease and guard against mission creep. Moreover, at the present time, it appears that the proposed developments in the Park Moabi area do not adequately address the treatment of the nearby cultural resources or the open-ended nature of the potential and alternate sewer, fire water, and water connections. When would these environmental effects be considered if not now? How would their potentially significant environmental impacts, including cumulative impacts, be considered? Some of these areas are outside the Area of Potential Effects and project boundaries. When will these aspects be handled pursuant to the Programmatic Agreement? These seem to be critical path items requiring Tribal participation.	Please see RTCs #860 FMIT/TRC, #861 Hualapai/ TRC, #862 Cocopah/TRC, and #863 Chemehuevi/TRC, for response to the proposed use of Areas 6, 7, 12, and 13. PG&E defers to DOI/BLM for response on Tribal consultation and Park Moabi lease(s). PG&E defers to DTSC for response on environmental review and the project boundary, and to DOI for response on APE and PA.	DTSC is conducting a subsequent EIR (SEIR) to evaluate whether the additional remedy design features that were not considered or were changed since the conceptual design used for the 2011 certified FEIR may have new significant impacts from those disclosed in the 2011 certified FEIR or increase the severity of the impacts disclosed in that document. This upcoming SEIR analysis will consider the use of Park Moabi for the remedy and determine whether use of that area will have new significant impacts	DOI and BLM appreciate the concerns of the Fort Mojave regarding the ongoing development of the Park Moabi area. The lease agreement with San Bernardino County and the associated use by the concessionaire are not part of this project and will not be address as part of the design review. The FMIT may contact BLM directly regarding the Park Moabi lease. A cultural resources inventory of the operations and staging areas was conducted in January of 2015. Tribes were present during the archaeological fieldwork. BLM is evaluating the information provided in the survey report and will work with the Tribes regarding potential impacts to cultural resources. The Area of Potential Effect changes have been discussed between the agencies and the tribes at several recent technical and cultural meetings. Consultation with the Tribes and SHPO will occur once the	The Tribe appreciates DOI's invitation to contact BLM to discuss issues related to the types of development permissible on its lessee's parcel. The Tribe looks forward to further discussion and consultation regarding both the potential impacts to cultural resources which is required by the PA and other documents and the amendment of APE boundaries. The Tribe reiterates its request for the agencies to allow meaningful discussion of these important issues and not leave them to the very end of the project process.	This RTC was discussed at the July 23 TWG meeting. RTCs related soil storage and construction staging areas were also discussed at the July 23, August 19, and August 26 TWG meetings.

[12] See C/RAWP Appendix W, "Technical Memorandum: Proposed Use of Certain Areas for Construction, Staging, and Soil Storage at PG&E Topock Compressor Station," Option 2, p. 7.

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PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
								beyond those disclosed in the 2011 certified FEIR.	boundaries of the amended APE are determined.		
25	FMIT-11	Non-design	Other			The Tribe recognizes that the PG&E Project organization listed in various organizational charts throughout the documents are living documents. However, because of the potential for conflicts in communications to arise in the field during construction and remedy implementation, clarification of reporting contacts for Tribal Monitors is essential. Clear lines of communication and lines of authority are critical for successful implementation of Tribal Monitoring. For example, the CHPMP and the C/RAWP document outline that Tribal Monitors provide "Daily Reports" to the designated "Site Supervisor" and /or "PG&E's On-Site Project Manager" (or designee). The C/RAWP organization chart and related document text uses different terminology that indicate that the "Site Operations Manager" will be responsible for contacts with site visitors and observers. The "On-Site Project Manager" must be identified, if Tribal Monitors need to coordinate with this individual. Additionally, the Tribal Monitors need to be able to communicate with the person having authority to stop construction or otherwise modify the field activities as appropriate if such actions are warranted in order for cultural resource protection purposes.	Comment noted. The project organization language in the final C/RAWP will be made consistent. The "On-Site Project Manager" and "Site Operations Manager" refer to the same position. The final C/RAWP will use the term Site Operations Manager exclusively. Tribal monitors will be able to communicate directly with the Site Operations Manager or his designee, as described in the C/RAWP. Tribal monitors will also be able to communicate directly with the Construction Manager. The Construction Manager, Site Operations Manager or their designee will have authority to stop construction. Any modification to field activities would only be implemented after a complete compliance review.			This is an important provision that will assure proper and efficient communications through the construction and operations phases of the project. If a "complete compliance review" is necessitated, the Tribe must be a participant in the process. Please keep in mind that, due to the complexity of the project work schedules, the Tribal monitoring duties will necessarily be shared among the participating Tribes. The Tribes have established an intertribal communication network for information exchange. Accordingly, the compliance review must allow time for this intertribal communication to take place.	Comment noted.
26	FMIT-12	Non-design	Other			FMIT has been working with BLM and the other Topock participating Tribes for the past two years on the previously mentioned Tribal Cultural Values Assessment (TCVA) document that was provided to BLM in September 2013, and an amended version of the TCVA was subsequently submitted on February 18, 2014. On April 2, 2014, BLM directed PGE "to go forth with a field inspection of the findings" in the TCVA. That letter summarized certain discussion during a conference call held on December 2, 2013, between BLM, PG&E and the cultural resource management firm hired by PG&E, Applied Earthworks (AE). As stated in the April letter, during the December 2nd conference call, as a "preliminary, interim measure," BLM had instructed PG&E: • To create a methodology for conducting a field check of the findings identified in the CVA; to develop protocols/guidance on what will be • Recorded/confirmed as an archaeological manifestation; to develop criteria for distinguishing sites from isolates; and to identify the • Archaeological manifestation of the Topock Maze. The April 2nd letter also directed AE, based on the "discussion items" in the passage quoted above, to develop a "study plan" to be used "to guide the field effort to evaluate the archaeological potential of the findings identified in the CVA." The Tribes received written notification of this direction from BLM to PG&E and AE by letters dated April 9, 2014. Subsequently, the Tribes were provided, with a "Study Plan" dated April 25, 2014 prepared by AE. At a CHPMP meeting held on June 4, 2014, the Tribe informed BLM, PG&E and others, that the draft "Study Plan" dated April 25, 2014, is not acceptable given that it misses the point of the TCVA. The sites that the Tribe had identified in the TCVA are important to the Tribes for their cultural value. The strictly archaeological methodology proposed by AE in its Study Plan would yield a fragmented perspective that would fail to consider the range of cultural values associated with the Topock landscape.			In April 2015, BLM provided a new proposal to the Tribes concerning the process for recordation of tangibles and intangibles associated with the Traditional Cultural Property in the area prescribed in the TCVA. The purpose of the Draft Proposal for Documentation of Tribal Cultural Values in response to the TCVA was to acknowledge special values to tribes over and above the traditional archaeological	On August 4, 2015, the Topock Tribal Work Group presented to the BLM, DOI, and PG&E; a Counter Proposal to the BLM's April 2, 2015, draft proposal during the CHPMP meeting. Within this document, the importance of protecting the intangible cultural heritage related to the Topock area was identified and explained. During the August 4 presentation; the BLM, DOI and PG&E all expressed a need to review the document, which the Tribes agreed was appropriate. The Counter Proposal document strategy basically followed	BLM received the Tribes alternative TCVA proposal at the August 4 CHPMP meeting. BLM provided a final response on October 6, 2015

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						The Tribes offered to develop an alternative methodology for following up on the TCVA and provided a letter and document captioned "Recommended Approach for Inspecting Cultural Locations Identified in the Tribal Cultural Values Assessment" in August 2014. Although the Tribes have meet with BLM/DOI/ PGE and others during the course of two years, we still have not had a response to the Tribal documents referenced above. Until we have an official response, we cannot move forward or provide our comments or opinions on prioritizing which sites are to be addressed first. We need to have BLM's decisions on the numerous items we have discussed during the CHPMP meetings. This issue is of grave concern to the Tribes and since it related to implementation of the MMRP for the Groundwater FEIR, it is there to address the cultural impacts of the remedy implementation and its affects/effects to the TCP and the participating tribes. BLM's response is time critical: The final design and construction of such remedy is imminent, and the Tribes are once again a missing link. The Tribe's input into the process does not get added until it is too late and critical decisions will have be made by the Agencies without addressing the tribal cultural values and cultural resources that exist within the remedial footprint where the final remedy design will be implemented. We are at a critical time in the design stage of the Topock Project, and the decisions of BLM/DOI regarding this TCVA document are pivotal to the ability of the project to proceed. It behooves the Agencies to respond and address this tribal concern now, not later or down the road. The FMIT requests (1) an official response to the TCVA submitted November 21, 2013, and as amended February 18, 2014; (2) consideration of the Tribal alternative methodology that was recommended by the Tribes as part of the BOD; and (3) whatever CEQA measures would be applied to address this impact prior to project finalization.			manifestation s on the landscape. BLM anticipates meeting with the Tribes in the near future.	BLM's April 2, 2015, Draft Proposal, except that the Tribes would conduct the study and control the indigenous or Tribal Intellectual Property which resulted. From further discussions immediately after the presentation, the Tribes identified that there would be no impacts to the upcoming soils investigation work plan implementation schedule. At present, no response has been received from the agencies related to this Counter Proposal. BLM, did indicate via email from Renee Kolvet, that more time was required for BLM to respond, most likely in October 2015. To facilitate and not delay the implementation and schedule of either the Groundwater FEIR and SEIR documents, the tribes have begun the implementation of the Counter Proposal on FMIT lands in a good faith effort to ensure progress is being accomplished.	
27	FMIT-13	Non-design	Other			The Tribe holds firm to its holistic belief that the land and water as well as all other earthly components are connected. For reasons of schedule, the implementation of soil and water remedy components of this project had been implemented on independent timelines by the Agencies. Regardless of the reasons for such logistics, technical rationale dictates consideration of the interrelationship between these two programs. For example, the Tribe is aware that there may be important information to the conceptual groundwater model that might arise from sampling the pore waters in the Colorado River at the mouth of the East Ravine. Yet this sampling and the resulting information will not be available until the next phase of implementation of the soils remedial investigation. While it is obviously too late to change the remedy bifurcation, the Tribe would like assurance that soil information has been thoroughly considered and integrated as appropriate within the groundwater remedy design.	Much effort was put into integrating the soil information into the remedy design and coordinating with the Soil RFI/RI program to minimize duplication and disturbance. This integration is evident throughout the BOD, the O&M Manual, and the C/RAWP. Examples include: • Section 2.4.3 (Soil Contamination Areas) of the 90% BOD discusses the status of the soil investigation effort and the coordination between the soil			The Tribe appreciates PG&E's effort to date to integrate soil information into the groundwater remedy design. Moreover, the Tribe understands that information from the soil remedial investigation will be generated during the groundwater remedy implementation schedule. Of course, should such data collection provide information applicable to any aspect of the remedy design, it may be necessary to adjust as appropriate to that information. In such instances, the Tribe	This RTC was discussed at the August 19 TWG meeting.

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							investigation and groundwater remedy implementation. Section 2.4.3.1 states that "As soil data become available they will be used to guide and inform groundwater remedy design and construction in the vicinity of the soil investigation areas. Where appropriate—considering timing, efficiency and protectiveness—construction of groundwater remedy facilities will be coordinated with soil investigation and remediation activities." • Section C.2 of Appendix C (Design Criteria) discusses collection of additional geotechnical samples to support remedy design in coordination with the soil investigation program. As a result of this coordination, no new boreholes were proposed at the 90% design stage just for geotechnical data collection, thereby minimizing disturbance. • Section 7 (Soil Confirmation Sampling and Coordination with Soil RFI/RI) of the IM3 Decommissioning Work Plan incorporates existing soil data in			should be advised and brought in to participate in discussions related to whatever decision is at hand.	

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							the planning for confirmation sampling to minimize duplication and disturbance. • The Soil Management Plan (Volume 4 of the O&M Manual) establishes procedures and protocols to ensure that the management and disposal of potentially contaminated soil derived from the soil investigation areas that are generated during groundwater remedy implementation is handled in a manner that is protective of human health (including construction workers) and the environment within the framework of appropriate federal, state, and local requirements, and consistent with United States Environmental Protection Agency (USEPA) guidance. Regarding implementation of site cleanup activities, PG&E commits to carry out the work as expedient as possible. To that end, PG&E submitted additional details on the construction and start-up sequence in anticipation of construction activity in 2016, during the 90% RTC period and included in **Attachment D** of the final RTC table. This sequencing plan				

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							provides for start-up of system elements while construction proceeds. This approach will provide more time for data analysis and design refinement while still completing the overall program within the originally planned schedule. See also RTCs #72-75.				
28	FMIT-14					At the recent meeting of the CWG, a high-level schedule was presented, titled "Groundwater Remedy Design, Construction, and Initial Start-Up Schedule." The schedule addressed the general activities such as design, construction, CEQA Review, etc. One particular timeline on the schedule that caught the Tribe's attention is labeled "Ongoing Consultative Work Group/Tribal Communication and Tribal Consultation." This timeline is shown in brown and is a continuous line throughout the project duration. While the Tribe appreciates recognition of the need for ongoing communication and consultation, there are certain milestones in the process that in particular necessitate formal consultation. The Tribe notes that the schedule marks certain decision points where design, work plan, and CEQA approvals occur, there likewise should be definite milestones marking the timing of input from Tribes that would be used in making such determinations. Moreover, the Tribes are entitled to consultation at the Government-to-Government level pursuant to Section 106 of the National Historic Preservation Act ("NHPA"). As such, the Tribes should not be lumped with the CWG. The Tribe also strongly believes that a timeframe and performance criteria for the decommissioning of the Groundwater Remedy should be developed now. The Tribe is concerned if these items are put off into the distant future, that the concerns of the Tribe and its elders may be ignored and forgotten—"out of sight and out of mind" and left to someone's future interpretation who has no idea of the importance and seriousness of Tribal affiliation to this sacred place to the Mojave peoples. Consultation should begin immediately on developing those criteria.	The completion criteria/ performance standards for the remedy are presented in the BOD (Sections ES-2 and 1.2.1) and the O&M Manual (Section L.4). The current projection of remedial timeframe is also presented in the BOD. Once the completion criteria/ performance standards are met to the satisfaction of the agencies, PG&E will submit a plan to decommission the remedy in accordance with the CD and CACA. As stated in RTC #12 DTSC-8, PG&E will add a dedicated section on decommissioning in the executive summary of the BOD. It is important to note that at this time in the design process and before the remedy is constructed, steps to decommission any remedy components, that will occur decades into the future, will have to be general and conceptual. Descriptions of the conceptual decommissioning steps	DTSC anticipates that Tribal involvement beyond the 90% design will continue. DTSC believes that the current forum to gather input (CTF, CWG, TWG and specially arranged Tribal meetings) affords Tribes with many opportunities to consult with DTSC. DTSC does not envision the cancellation of the aforementioned meetings. Moreover, DTSC has offered, and did meet with Tribes on specific issues or concerns as requested. Furthermore, there are adopted mitigation measures in the certified 2011 EIR that provides additional opportunities for the Tribes to voice their concerns during remedy construction and operation outside of the meetings stated above. Please also note DTSC comment 8 requested PG&E to provide commitment to decommission all remedial	The Tribes have been afforded multiple opportunities for National Historic Preservation Act consultation pursuant to the Programmatic Agreement's Consultation Protocol throughout the design process. DOI and BLM will continue to consult with the Tribes through the comment resolution process should specific topics necessitate this (e.g., reinitiating consultation pursuant to the PA's Consultation Protocol on the Arizona wells) or should a Tribe request consultation on specific issues. We also will be working with the Tribes and Signatories and Invited Signatories in revising the CHPMP in the future. The timeframe for decommission the remedy is based on achievement of the remedial action objective and cannot be determined at this time.	As a landowner within the project area, FMIT must be apprised of any and all changes to the remedy that occur in its land, particularly those that have the potential for impacts. We reiterate our concerns regarding a decommissioning plan being done sooner than later after the remedial years have been completed. Developing even a conceptual plan now that documents Tribal priorities, goals and performance standards - followed up at a later time by a more detailed plan - would be more consistent with CEQA requirements and superior to a wholly deferred plan. See also RTC 15 FMIT-1. PG&E states its understanding that that there will not be a comment/review process for the final design. The Tribe remains concerned that the final design be considered in some transparent way, such as at least in the SEIR analysis.	A dedicated section (see **Attachment A** of the final RTC Table) that describes the decommissioning process envisioned for the proposed remedy will be added to the Executive Summary of the Final BOD. DTSC response to highlighted section: The final design will be made available to all stakeholders and Tribes once completed by PG&E. DTSC will also provide the draft SEIR for review during the 45-day comment period.

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						Additionally, the Tribe is aware that design review is a progressive process, and that this current review represents review at the *pre-final* stage of design. So it is likely that further design modifications will be made between now and the final ("100%") design and subsequent agency approval later this year. So in order to truly assess the project's significant impacts, there will be a need for Tribal participation beyond this 90% review stage. The "high-level" schedule indicates tribal consultation terminates with the submittal of comments on the 90%. After this time, the schedule refers to a period of "Comment Resolution" extending through (approximately) mid-June 2015, with the 100% to be completed by (approximately) mid-July 2015. CEQA review of design is estimated to be completed in early August 2015. Tribal input/review during each of these timeframes is essential and needs to be specifically identified in the schedule for that input to be truly timely and meaningful. In short, moving forward, there is a need for continuing and substantive Tribal input during final design, construction, and implementation of the groundwater remedy. The documents do not necessarily reflect that need.	provided in the 60% RTC #6 (Attachment T of Appendix I) reflects this fact. Any additional details should be considered speculative best guesses, and are subject to change at the time of remedy decommissioning. In general, high level schedules presented at CWG meetings are based on best available info at the time and are subject to change. Changes to the schedule are announced by the agencies. The latest version of the project schedule is posted on the DTSC website www.dtsc-topock.com. As for design modification between now and the final design, PG&E will present all anticipated design modifications for agencies, Tribes, and stakeholder review and comment during the 90% comment resolution period. Design modifications that are accepted by the agencies will be incorporated into the final design. As noted in RTC #7 DTSC-3 and RTCs #56-59, PG&E understands that there will not be a comment/ review process for the final design.	infrastructures at the end of the remedy.	DOI and BLM anticipate continued tribal communication throughout remedy construction as well and look forward to working with Tribal monitors and representatives to ensure that resources are protected.		
29	FMIT-15	Non-design	Other			As mentioned above, there were a number of items that the Tribe had commented in regard to the 60% BOD report, but resolution was deferred to the 90% BOD report. Our review noted that there were such items that were not properly addressed or for which the final comment resolution has been considered "resolved." In the former instance, it is explained that the 90% BOD document does not require revision.[13] For many dispositions of the Tribe's comments, the characterization of the resolution is questioned by the Tribe: (1) Who made the determination that the item is "resolved"? (2) In instances where the Tribe indicated that resolution at the 60% stage was "... pending review of 90% design," it is appropriate to consult with the Tribe(s) to affirm whether the item is indeed resolved. Accordingly, the Tribe's enclosed comments speak to whether PG&E's determinations of resolution are accurate. These may require consultation to truly resolve.	With respect to the question as to the determination that a comment was "resolved," that determination was made after discussion of the comment in comment resolution meetings, which occurred between September 2013 and		DOI concurs with the PG&E account of the 60% Design RTC process. Sections of the design package that were deferred, noted at the 60% RTC stage as "... pending review of 90% design,", were	Comment considered resolved while noting that the SEIR must consider the final design. See also RTC 28 FMIT-14.	Comment considered resolved while noting that the SEIR must consider the final design

[13] See, for example of "Not applicable" in Table I-1, Item No. 7, last column.

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							February 2014. PG&E, Agencies, Tribes, and stakeholders participated in those meetings. The final 60% Master RTC table with attachments was sent to everyone on April 18, 2014. To PG&E's knowledge, no comments were received on the RTC table nor were there expressed disagreements with the resolution recorded in the RTC table at the time. Additionally, PG&E anticipates that the comments for which resolution was marked "pending review of 90% design" were either addressed in the 90% design or will be addressed through the 90% RTC process.		to be taken under consideration by the commenter/ interested party during the 90% BOD/Design Package and C/RAWP review.		
30	Hualapai					Native plants are an important part of the life cycle, sustaining the diet for humans and animals, as well as providing sources of healing. There is a need to protect native plants at Topock and foster their growth in the face of the onslaught of activities at Topock. The Hualapai Tribe has suggested garden plots at the site where native plants can be nurtured for replanting as part of restoration and decommissioning, but this suggestion was rejected by PG&E.	Creating gardens for native plants would increase the project footprint and require substantial material and labor inputs. This approach would only be justified where many more plants were needed for restoration than have actually been estimated. The anticipated restoration plant need can more technically and economically be met using existing commercial plant facilities in the area with locally collected seeds.			Nurturing of native plants could go hand-in-hand with restoration of the effects of the groundwater remedy; for example, native plants could be planted in restoration areas, plants could be used to prevent erosion of long-term soil stockpiles, which would also help to keep the soil alive. Clean soil from the project could be stored at staging area 5, and the soil could be contoured against the western hillside, covered with clay for protection, and native plants seeded upon the protected soil. With occasional watering, it seems like an efficient way to care for the displaced soil and to nurture native plants at the same time. This comment is considered unresolved.	DTSC response: Protection and avoidance of native plants is a priority during the remedy construction and through operation and maintenance of the remedy. DTSC will consider the mitigation measures necessary as part of the SEIR. Hualapai's preference is noted.

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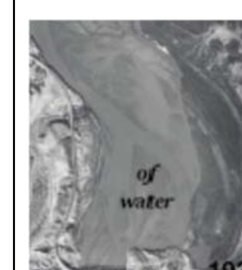
31	Hualapai					Geothermal water is sacred to the Hualapai Tribe, and pumping of geothermal water from well HNWR-1 is a desecration of this precious resource. We believe that the geothermal water at HNWR-1 comes from the sacred hot springs of the Black Mesa area (Warm Springs Wilderness Area), and that our ancestors performed ceremonies in the same water that now is being proposed for pumping and extraction. We believe that this geothermal water is a finite resource, floating on cool water near the confluence of Warm Springs Wash and the Mohave Valley. Pumping of water from well HNWR-1 will deplete this limited sacred resource, and when it has been depleted, it will take thousands of years to replenish. The Hualapai Tribe requests that water-quality and temperature conditions of the freshwater source wells should be monitored over time during implementation of the groundwater remedy, and the geothermal water should be treated with respect, for example by allowing the water to cool before being injected into the groundwater remedy.	Clarification provided during April TWG: Hualapai suggests that geothermal water is sacred, and the temperature of water pumped from HNWR or Site B will be elevated and should be cooled, if possible by natural means, before being used for industrial purposes. Response to clarified comment: High ambient temperatures during most of the year will prevent significant natural cooling of water pumped from HNWR or Site B. However, monitoring of water quality and temperature of freshwater will be conducted during groundwater implementation as discussed in Appendix L, Volume 2, Section 5.2 and Table 5.2.4.			Hualapai Tribe requests to be notified if water temperature from the freshwater well increases significantly. This comment is considered resolved pending verification of the notification procedure within 100% design.	This comment is considered resolved pending verification of the notification procedure within 100% design.
32	Hualapai					In regards to the proposed monitoring wells on the Arizona side of the Colorado River (MW X-Y), the Hualapai support FMIT in regards to their specific cultural affiliation through nomenclature. Hualapai oppose any wells being placed in that sacred traditional cultural property. We have attached a technical memo in this regard.		See RTC #17 FMIT-3.	See RTC #17 FMIT-3.	The historical aerial photos show that the proposed locations for these wells is a sacred place because it is of both land and water, 	RTCs related on MW-X/Y were discussed at the July 23, August 18, and August 26 TWG meetings. DTSC/DOI Response: See response to RTC #17

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										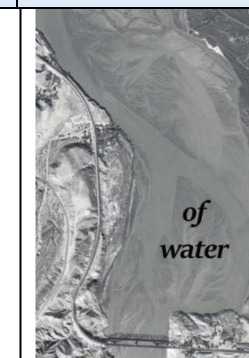 Within a confluence. Hualapai believe, even in contemporary times, that confluences and the landscape near-by are sacred. We agree with the Fort Mohave Tribe that this is a significant cultural place where no wells should be drilled.	
33	Hualapai					Use of soil storage and staging areas during the remedy will contribute dramatically to the overall cumulative impacts and destruction of the cultural landscape. We have worked diligently with the agencies to define acceptable storage and staging areas. However, storage and staging are still proposed within some of the most sacred areas of the cultural landscape, and we find this frustrating that despite objections from the Tribes, these staging areas remain as part of the proposed remedy. In regards to areas being selected, prior to consultations, during consultations and outside of consultations for staging and or construction and arsenic monitoring wells, we would like to take this opportunity to remind the agencies that the Advisory Council on Historic Preservation commented back in 2011, (December 5, 2011 Federal Property Management Section, Office of Federal Agency Programs, ACHP) that in regards to expertise, the "details…are best specified by those experts at the local and state level with the most familiarity with the site." Consultations as specified by Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f, requires that, prior to approving the expenditure of any federal funds on undertaking with the potential to affect historic properties, or prior to issuing any license or other authorization for such an undertaking, the federal agency must engage in the consultation process mandated by NHPA section 106, a process that has been implemented through regulations issued by the Advisory Council on Historic Preservation, (36 C.F.R. part 800). We are aware that DTSC takes the perspective that the DTSC is not subject to S106, however there are best practices to consider, and continued consultation is of prime importance for the Hualapai. Specifically to storage and or construction staging areas, Tribal knowledge and preferences as specified by tribal experts at times, were not being considered by the agencies. For example, there were instances in which the Tribes, as a group, made decisions early-on and some of these decisions have been superseded by the DOI. In particular areas # 6 thru 8 were specified (January 14, 2014) as not acceptable, and that 16, was noted as not acceptable because it is too close to Loci B.	See RTC #18 FMIT-4.	See RTC #18 FMIT-4.	See RTC #18 FMIT-4.	As areas #6, 7, 12, and 13 are going to remain as options for staging, Hualapai formally states for the record, that 'Avoidance' still remains the most preferred option. We consider this RTC# 33 closed but not resolved.	RTCs related soil storage and construction staging areas were discussed at the July 23, August 19, and August 26 TWG meetings. The Agencies have provided a direct response to the Tribes regarding staging areas. DOI and will provide further direction to PG&E on staging and storage area usage.
34	Hualapai					After completion of the groundwater remedy, it is necessary that all elements of the remedy should be removed and decommissioned, and the land should be returned to its original condition. While the Tribes have previously indicated that decommissioning of wells and subsurface casings may cause additional damage to the earth, we feel that new technologies will be developed in the future that will provide for decommissioning of wells with less disturbance. In addition, many of the states (e.g. Kentucky and North Carolina) have mandated that abandoned wells must be decommissioned and removed. Therefore, we need to allow for flexibility in well decommissioning on a case-by-case basis, and in the event of future well decommissioning regulations in California, we should not allow these remedy wells to be grandfathered, hence bypassing any new requirements.	See RTC #12 DTSC-8.			The Basis of Design report language continues to incorporate uncertain plans for remedy infrastructure removal, for example, deferring to priorities and decisions of future land and agency managers. The granting of	See above for decommissioning.

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										easements for remedy infrastructure construction should include explicit requirements for the future removal of that infrastructure. It is realized that much of the detail for these issues cannot be made with certainty at this point, therefore this comment remains unresolved.	
35	Hualapai					In regards to cumulative impacts and our growing concern for the integrity of the entire Topock Cultural landscape, on December 16, 2013, Hualapai and other tribes presented a draft conceptual cultural resources mitigation document containing specific mitigation measures that Hualapai felt did address the intent of CEQA and actually mitigated to some degree cultural, religious, social and economic impacts, (reference CEQA § 15002(h), 15123(b)(3), 15270, and 15124(d)(1)(c), yet the DEIR as it is presented, did not address any of our suggested mitigations. We again, present these mitigation recommendations in this comment letter, with one additional suggestion. Also on September 5th, 2014, in a letter to DTSC and DOI (HDCR File 2014-741) Hualapai commented that "…analysis of the role of social change has been largely absent in prior CEQA analyses relative to Topock and has resulted in the minimization of certain potential impacts to the Tribe and its members, such as those related to noise, visual and aesthetics, among others and a failure to seek out, consider and analyze tribal views of significance and impacts for specific resources and impacts." We have again, attached those mitigation requirement here and hope that future activities at Topock could take into consideration CEQA to the extent that CEQA regulations require EIR's to define mitigation measure per the spirit of the law in regards to mitigating cumulative impacts. These are:[1] 1. Methods or plans to reduce, offset, or eliminate adverse project impacts. Action taken to avoid, reduce the severity of, or eliminate an adverse impact. Mitigation can include one or more of the following: 2. Avoiding impacts. 3. Minimizing impacts by limiting the degree or magnitude of an action. 4. Rectifying impacts by restoration, rehabilitation, or repair of the affected environment. 5. Reducing or eliminating impacts over time. 6. Compensating for the impact by replacing or providing substitute resources or environments to offset the loss. Mitigation measures affecting Resources of Tribal, Cultural, Religious, Social, and Use Values: 1. A biological survey of riparian habitat associated with the Topock Cultural landscape shall be conducted (by PG&E with tribes and or tribal representatives) bi-annually to document vegetation characteristics and conditions in order to determine if there are any long-term impacts of the project on the riparian habitat, and to determine if the project revegetation process is functioning. The findings of all biological surveys shall be submitted to the Tribes. These surveys should occur every year from start of soils remediation selection through the life of the remediation project in its entirety. 2. If any grading, clearing, brushing, or construction occurs during the bird breeding season (approximately February 15 through August 31), a qualified biologist, with tribal assistance, shall conduct a survey of the habitat to determine whether there are active bird nests in the area, including raptors and ground nesting birds. The survey would begin not more than three days prior the beginning of work. If an active nest is observed, a minimum 300-foot buffer (500 feet for raptors) would be established using temporary fencing. The buffer would be in effect as long as work is occurring and until the nest is no longer active. 3. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized to suppress dust emissions using typical methods such as: water, organic stabilizers / coverage with a tarp or other suitable material, or vegetative ground cover. All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized to suppress dust emissions using water or organic stabilizers. All land clearing, grubbing, scraping, excavation, land leveling, grading, cut/ fill, and demolition activities shall be effectively controlled		DTSC appreciates the input from the Hualapai regarding proposed mitigation measures to the draft soil investigation EIR. Those comments have been responded to as part of the final soil investigation EIR. DTSC will also consider any input from Tribes during the subsequent EIR comment period for the groundwater remedy design.		Hualapai will wait to receive a response as a part of the final soil investigation in regards to how agencies DTSC and PG&E are going to incorporate these suggested mitigation measures. Hualapai considers this RTC#35 un-resolved.	DTSC Response: Proposed Mitigation Measures are considered based on threshold of impacts in CEQA evaluation. Mitigation Measures will be considered in the SEIR if warranted.

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						of fugitive dust emissions utilizing application of water and/ or by presoaking. 4. When soil or similar materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. Use of blower devices is expressly prohibited. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized to suppress fugitive dust emissions utilizing sufficient water or organic stabilizers. Within urban areas, track out of mud or dirt onto public roads shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. Any site with 150 or more vehicle trips per day shall prevent carryout and track-out of mud or dirt onto public roads. 5. Physical disturbance within the Project area will occur to significant trails and will cut-off the ability of participating tribes to travel physically and spiritually along these trails. In consultation with participating tribes, extant trails in Topock Cultural Landscapes should be field mapped, and preserved by qualified cultural resource personnel with the assistance of participating tribes and or tribal representatives. Low-level aerial photography and video photography should be used to document trails that are within the APE and throughout the Topock Cultural Landscape. It appears from present information that certain trail corridors can be preserved, including routes to Spirit Mountain, Boundary Cone, and the Needles. 6. Physical disturbance within the Project area will occur to significant cultural resources including but not limited to, stone circles, rock cairns, stone scatters, trails, tool refining stations, spiritual teaching areas, minerals etc. In consultation with participating tribes, the entire Topock Cultural Landscapes should be field mapped, and preserved by qualified cultural resource personnel with the assistance of participating tribes and or tribal representatives. 7. Tribal Interpretive Centers. Provide financial support for tribal interpretive centers on tribal lands that describe, educate, and engage tribal communities in disseminating and preserving traditional cultural identity through tribal languages. Provide support through grants and phased funding, for tribal interpretive facilities/museums, language programs, and healthy food systems. Resulting programs could then be components for continued outreach and education to stakeholder/agency staff with linking cultural information at Topock. Grants to be phased over life of the remediation project. 8. Continue on-going reasonable compensation for tribal participation in monitoring, attending meetings, and participating in project development, as with the present Consultative Work Group, Technical Work Group, Clearinghouse Task Force, and subcommittee involvement. Funding support to continue through the life of the remediation clean-up project. 9. Create a trust fund for a Cultural Preserve at Topock. This would help in attempting to preserve the Topock Cultural Landscape in view of the encroaching Park Moabi tourist facility. Future generations. 10. Funding for increased security measures around the Topock Cultural Landscape. Due to tourism and increasing numbers of visitors to the Topock area. This also relates to recent vandalism at Grapevine Canyon. We do not want this to happen at Topock. 11. Funding support for education and technical training for tribal members. In conjunction with all of the above, provide for full higher-education tribal scholarships (two per educational year per participating tribe) for biology and / or ethnobotanical degrees, archaeology, hydrogeology, and museum studies. 12. Create a collaborative land management working group to include tribal and agency members to discuss; plan; and implement a long-term landscape management plan for the Topock Remediation Project area.					
36	FMIT/TRC	Design	Infrastructures		Overall Comment	The Tribes have repeatedly voiced a strong preference for aboveground installations of the remedy infrastructure, both verbally and in numerous written comments and letters regarding the 30% and 60% design documents. This preference has remained unchanged and is rooted in the strong desire to protect the ultimate condition and continuity of the subsurface of this sacred area, preserving it for future generations. Regardless, the ultimate decision for this remedy has placed essentially all ~5 miles of pipeline corridor below ground. This situation will result in permanent and irreparable adverse cumulative impacts throughout the Topock cultural landscape over the life of the project and into the future. Given the magnitude of the impact of this decision, the Tribes should be provided with a summary of the detailed, technical basis for this decision, which was deemed to override cultural and spiritual considerations.		See response in DOI column.	DOI and DTSC respectfully refer the Tribes to RTCs 159, 182, 183, 184, 185, and 188 - 193 from the 30% Design, RTCs 1, 8a & b, 9, 434a, 850, 852, 855, and 865 from the 60% Design, the DOI/ DTSC Direction letter to PG&E dated April 4, 2014	In spite of the consultation and the RTC processes at 30% and 60%, the fact is that the cumulative disturbance footprint of the project has only gradually taken form as the design has progressed, has grown as that designed changed and has only gradually become evident to Tribal staff	DTSC response: See 4/4/2014 direction letter to PG&E . Additionally, see RTCs #8 DTSC-4, #12 DTSC-8, and #16 FMIT-2. The Tribes have been afforded the opportunity to use the TRC and technical consultants to clarify technical

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									and the associated Pipeline Matrix. Presentations provided and discussions held at the Technical Working Group meetings (Refer to materials/agendas provided for 5/22/13, 6/13/13, 9/17/13, 12/27/13, 1/23/14 and 2/11/14). DOI and BLM also held consultation meetings on 3/8/12, 5/23/13, 12/17/13 and 1/14/14 that included technical discussions regarding above/ below ground pipelines. Also see RTC #15 FMIT-1.	and leaders, few if any of whom are technical specialists in these matters, and this strong preference remains. Moreover, the agencies 'specific rationale in its "balancing" and "independent judgment" to override Tribal concerns has still not been well laid out or to the Tribe's satisfaction. Therefore, this comment remains unresolved.	design issues with their staff and leaders.
37	Hualapai/TRC	Design	Infrastructures		Overall Comment	The Tribes have repeatedly voiced a strong preference for aboveground installations of the remedy infrastructure, both verbally and in numerous written comments and letters regarding the 30% and 60% design documents. This preference has remained unchanged and is rooted in the strong desire to protect the ultimate condition and continuity of the subsurface of this sacred area, preserving it for future generations. Regardless, the ultimate decision for this remedy has placed essentially all ~5 miles of pipeline corridor below ground. This situation will result in permanent and irreparable adverse cumulative impacts throughout the Topock cultural landscape over the life of the project and into the future. Given the magnitude of the impact of this decision, the Tribes should be provided with a summary of the detailed, technical basis for this decision, which was deemed to override cultural and spiritual considerations.		See above	See above	In spite of the consultation and the RTC processes at 30% and 60%, the fact is that the cumulative disturbance footprint of the project has increased as the design has progressed. Hualapai respectfully refers agencies to the Programmatic Agreement, as ultimately, PG&E will be responsible for removing structure related to the remediation project. The P.A. states, "All facilities and appurtenances related to the Topock Remediation Project are to be removed as soon as practicable upon attainment of cleanup standards and a determination by DOI that removal of such facilities is protective of human health and the environment. All such removal will be planned in consultation with the Signatories, Tribes, and Invited Signatories	DTSC/DOI Response: See 4/4/2014 direction letter to PG&E . Additionally, see RTCs #8 DTSC-4, #12 DTSC-8, and #16 FMIT-2.

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										following the guidelines in Appendix B" (P.A. Section V. Removal of Existing Treatment Plant and Other Remediation Facilities). Since this project is not over yet, this RTC#37 will remain open and un-resolved.	
38	Cocopah/TRC	Design	Infrastructures		Overall Comment	The Tribes have repeatedly voiced a strong preference for aboveground installations of the remedy infrastructure, both verbally and in numerous written comments and letters regarding the 30% and 60% design documents. This preference has remained unchanged and is rooted in the strong desire to protect the ultimate condition and continuity of the subsurface of this sacred area, preserving it for future generations. Regardless, the ultimate decision for this remedy has placed essentially all ~5 miles of pipeline corridor below ground. This situation will result in permanent and irreparable adverse cumulative impacts throughout the Topock cultural landscape over the life of the project and into the future. Given the magnitude of the impact of this decision, the Tribes should be provided with a summary of the detailed, technical basis for this decision, which was deemed to override cultural and spiritual considerations.		See above	See above	In spite of the consultation and the RTC processes at 30% and 60%, the fact is that the cumulative disturbance footprint of the project has only gradually taken form as the design has progressed, and has only gradually become evident to Tribal staff and leaders, few if any of whom are technical specialists in these matters, and this strong preference remains. Therefore, this comment remains unresolved.	This RTC was discussed at the August 19 TWG meeting. DTSC response: See 4/4/2014 direction letter to PG&E.
39	Chemehuevi/ TRC	Design	Infrastructures		Overall Comment	The Tribes have repeatedly voiced a strong preference for aboveground installations of the remedy infrastructure, both verbally and in numerous written comments and letters regarding the 30% and 60% design documents. This preference has remained unchanged and is rooted in the strong desire to protect the ultimate condition and continuity of the subsurface of this sacred area, preserving it for future generations. Regardless, the ultimate decision for this remedy has placed essentially all ~5 miles of pipeline corridor below ground. This situation will result in permanent and irreparable adverse cumulative impacts throughout the Topock cultural landscape over the life of the project and into the future. Given the magnitude of the impact of this decision, the Tribes should be provided with a summary of the detailed, technical basis for this decision, which was deemed to override cultural and spiritual considerations.		See above	See above	In spite of the consultation and the RTC processes at 30% and 60%, the fact is that the cumulative disturbance footprint of the project has only gradually taken form as the design has progressed, and has only gradually become evident to Tribal staff and leaders, few if any of whom are technical specialists in these matters, and this strong preference remains. Therefore, this comment remains unresolved.	See 4/4/2014 direction letter to PG&E. Additionally, see RTCs #8 DTSC-4, #12 DTSC-8, and #16 FMIT-2.
40	FMIT/TRC	Design	Infrastructures		Overall Comment	Since 2007, the Tribes have made very clear that the area across the river in AZ was extremely sensitive and a named, traditional historic place. The Arizona SHPO and ADEQ affirmed this position. In spite of this, yet again wells are proposed for this same area, with little technical basis. There appears to be no compelling reason or technical argument to over-ride such strong Tribal objections.		See RTC #17 FMIT-3. PG&E will review and consider the Tribes' response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates	See RTC #17 FMIT-3.	FMIT strongly requests that no wells be placed in the vicinity of the White Clay area, not only because this is a sacred area, but also because of the poor technical justification for the need, number and locations of these wells.	This RTC was discussed at the July 23, August 18, and August 26 TWG meetings. DTSC/DOI Response: See RTC #17, FMIT-3.

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								that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.		Prucha and Eggers, July 15, 2015 MW-X/MW-Y whitepaper identified a number of problems with the underlying model, used to determine MW-X/MW-Y locations, number (i.e., x2) and provides many recommendations to better understand the hydraulic connectivity between California and Arizona groundwater and to improve a flawed model, which doesn't simulate flows correctly, which only adds to the significant overall uncertainty associated with flows beneath the river and within Arizona. Numerous problems identified with the present model setup should be fixed now, before attempting to determine whether MW-X and MW-Y are needed, optimal number (i.e., are 2 really needed), and optimal locations. We continue to believe that the most likely location for any flow beneath the river would be from the MW-34 area towards existing Arizona wells MW-54, MW- 55 and MW-56. See **Attachment CC** summarizing responses to CH2MHill August 14, 2015 review of the Prucha and Eggers whitepaper. The Tribe looks forward to additional discussions and consultations with DOI and other agencies on this issue. Therefore, the comment remains open.	
41	Hualapai/TRC	Design	Infrastructures		Overall Comment	Since 2007, the Tribes have made very clear that the area across the river in AZ was extremely sensitive and a named, traditional historic place. The Arizona SHPO and ADEQ affirmed this position. In spite of this, yet again wells are proposed for this same area, with little technical basis.		See above	See above	Hualapai strongly requests that no wells be placed in the vicinity	RTCs related to MW-X/Y were discussed at the July 23,

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						There appears to be no compelling reason or technical argument to over-ride such strong Tribal objections.				of the White Clay, not only because this is a sacred area but also because of the poor technical justification for the need, number and locations of these wells. Prucha and Eggers, July 15, 2015 MW-X/MW-Y whitepaper identified a number of problems with the underlying model, used to determine MW-X/MW-Y locations, number (i.e., x2) and provides many recommendations to better understand the hydraulic connectivity between California and Arizona groundwater and to improve a flawed model, which doesn't simulate flows correctly, which only adds to the significant overall uncertainty associated with flows beneath the river and within Arizona. Numerous problems identified with the present model setup should be fixed now, before attempting to determine whether MW-X and MW-Y are needed, optimal number (i.e., are 2 really needed), and optimal locations. We continue to believe that the most likely location for any flow beneath the river would be from the MW-34 area towards existing Arizona wells MW-54, MW- 55 and MW-56. See **Attachment CC** summarizing responses to CH2MHill August 14, 2015 review of the Prucha and Eggers whitepaper.	August 18, and August 26 TWG meetings. DTSC/ DOI response: See RTC #17, FMIT-3.
42	Cocopah/TRC	Design	Infrastructures		Overall Comment	Since 2007, the Tribes have made very clear that the area across the river in AZ was extremely sensitive and a named, traditional historic place. The Arizona SHPO and ADEQ affirmed this position. In spite of this, yet again wells are proposed for this same area, with little technical basis.		See above	See above	FMIT strongly requests that no wells be placed in the vicinity of the	This RTC was discussed at the July 23, August 18, and

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						There appears to be no compelling reason or technical argument to over-ride such strong Tribal objections.				White Clay, not only because this is a sacred area but also because of the poor technical justification for the need, number and locations of these wells. Prucha and Eggers, July 15, 2015 MW-X/MW-Y whitepaper identified a number of problems with the underlying model, used to determine MW-X/MW-Y locations, number (i.e., x2) and provides many recommendations to better understand the hydraulic connectivity between California and Arizona groundwater and to improve a flawed model, which doesn't simulate flows correctly, which only adds to the significant overall uncertainty associated with flows beneath the river and within Arizona. Numerous problems identified with the present model setup should be fixed now, before attempting to determine whether MW-X and MW-Y are needed, optimal number (i.e., are 2 really needed), and optimal locations. We continue to believe that the most likely location for any flow beneath the river would be from the MW-34 area towards existing Arizona wells MW-54, MW- 55 and MW-56. See **Attachment CC** summarizing responses to CH2MHill August 14, 2015 review of the Prucha and Eggers whitepaper.	August 26 TWG meetings. DTSC/DOI Response: See RTC #17, FMIT-3.
43	Chemehuevi/ TRC	Design	Infrastructures		Overall Comment	Since 2007, the Tribes have made very clear that the area across the river in AZ was extremely sensitive and a named, traditional historic place. The Arizona SHPO and ADEQ affirmed this position. In spite of this, yet again wells are proposed for this same area, with little technical basis. There appears to be no compelling reason or technical argument to over-ride such strong Tribal		See above	See above	FMIT strongly requests that no wells be placed in the vicinity of the White Clay, not only	RTCs related to MW-X/Y were discussed at the July 23, August 18, and

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						objections.				because this is a sacred area but also because of the poor technical justification for the need, number and locations of these wells. Prucha and Eggers, July 15, 2015 MW-X/MW-Y whitepaper identified a number of problems with the underlying model, used to determine MW-X/MW-Y locations, number (i.e., x2) and provides many recommendations to better understand the hydraulic connectivity between California and Arizona groundwater and to improve a flawed model, which doesn't simulate flows correctly, which only adds to the significant overall uncertainty associated with flows beneath the river and within Arizona. Numerous problems identified with the present model setup should be fixed now, before attempting to determine whether MW-X and MW-Y are needed, optimal number (i.e., are 2 really needed), and optimal locations. We continue to believe that the most likely location for any flow beneath the river would be from the MW-34 area towards existing Arizona wells MW-54, MW- 55 and MW-56. See **Attachment CC** summarizing responses to CH2MHill August 14, 2015 review of the Prucha and Eggers whitepaper.	August 26 TWG meetings. DTSC/DOI Response: See RTC #17, FMIT-3.
44	FMIT/TRC	Non-design	Process		Overall Comment	Numerous examples exist within the 90% BOD report indicating that many final design decisions will be determined post the design phase of the project. For example the final locations of many wells and pipeline runs, determination of whether the system is OPS, determination regarding the need and installation of provisional wells, and decisions on the timing and use of monitored natural attenuation are just a few of the many examples of final design decisions that will be made after			DOI concurs with the PG&E response.	The Tribe as a landowner, Indian Tribe with religious connection to the project property and a	A similar RTC (RTC #46) was discussed at the August 18 TWG meeting.

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						the finalization of the project design. Specific referenced examples of these post design phase decisions found throughout the 90% BOD report have been provided (1a-1s) and are found as an attachment to this comment. This list should be considered as some examples found in the report but is not intended to be considered comprehensive. Please clearly discuss how data collected post the design phase of the groundwater remediation could result in changes to infrastructure locations that are different than the locations presented within the BOD reports. In addition please clearly outline how the Tribes will be involved in final design decisions that are made post approval of the 100% BOD report. Any future deviations from the infrastructure locations determined during the design phase necessitates Tribal involvement at a level that has been established during the design process. Therefore please clearly describe how the Tribes will be part of data review post design phase and the forum in which Tribes will be involved in design phase decisions made after finalization of the BOD report.	Discoveries made during construction and start-up could result in changes to infrastructure locations. These include discovery of human remains or burials, previously unidentified potentially significant cultural, historic, or paleontological resources or listed species, groundwater quality data or soil data, etc. See Table 5.1-1 of the Construction Contingency Plan (Section 5 of the C/RAWP) for a listing of potential contingencies due to issues that may arise during construction and start-up, and proposed mitigation. As mentioned in Table 5.1-1, the lack of site-specific subsurface data (e.g., certain groundwater quality data, certain hydrogeologic data, supplemental geotechnical data, soil conditions) during design could lead to later discovery during construction of site conditions that render the design non-compliant with codes, laws, regulations and/or engineering standard of practice, planned well locations and/or constructions fail to meet the project objectives, etc. Typically, these subsurface data would be collected during the design phase. Here, these subsurface data were not collected during design to minimize ground disturbance prior to	DTSC will continue periodic consultative workgroup meetings, technical workgroup meetings, and the clearinghouse taskforce meetings. Although the frequencies and duration of these meetings may be adjusted based on need and number of agenda items. In addition to regular meetings and construction oversight, DTSC may also meet with the Tribes when requested regarding specific issues. Furthermore, DTSC has also adopted specific mitigation measures as part of		government entity reiterates its strong desire to be included along with DOI and DTSC as primary parties to whom communication is addressed if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape or Tribal property. PG&E should remain mindful of its independent legal obligations under the 2006 Settlement Agreement to consult with FMIT and to provide all non-attorney-client privileged material information, documentary or otherwise, to the Tribe contemporaneously with its receipt or development by PG&E.	DTSC Response: Tribal comment noted.

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							construction. The only exceptions to the curtailment of intrusive filed data collection were the alternative freshwater evaluation and the potholing for underground utilities. The curtailed data collection efforts have been combined with construction and/or soil investigation activities. To minimize the potential for uncertainties in the conceptual site model to cause unnecessary disturbance (that is, to avoid constructing unnecessary infrastructure), measures such as scheduling data collection at planned Category 1 well locations early in the construction schedule (see Section 3.2.1.3 of C/RAWP) and combining the collection of geotechnical data with the upcoming soil investigation were proposed. Communication and outreach are key elements of all phases of remedy implementation. A summary of communication procedures and protocols to be used during the construction and startup, as well as operation and maintenance of the groundwater remedy is presented in Table 2.3-1 of the C/RAWP and Exhibit L2.2-1 of the O&M Manual, respectively. The communication procedures and protocols are intended to be used by the PG&E Topock project team to inform and/or seek input from agencies, stakeholders, and Tribes; to seek approvals from	the 2011 certified FEIR that include additional Tribal coordination during the construction and O&M phase of the project (i.e. CIMP). Finally, if agencies determine that changes to operation are necessary based on Five Year reviews, DTSC will also notify the Tribes for input.			

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
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							agencies; to resolve issues; and to comply with certain requirements. The summary is a compilation of PG&E's obligations for formal communication to certain parties during this phase of work that is specified in various directives from, and agreements with, State and Federal Agencies, state and federal laws, Memoranda of Understanding ("MOUs") with certain Tribes, the 2006 Settlement Agreement with the FMIT, and other required project documents. In general, communications occur in two forms -- routine (regular periodic communication) and non-routine (communication when the project experiences unexpected changes during construction, startup, or O&M). Examples of routine communication include monthly progress reports during construction and start-up, and quarterly progress reports during O&M submitted to DTSC and DOI and Tribal outreach, including, for example, regarding scheduled field activities. Examples of non-routine communications include requests for a work variance in the event of a material deviation to the C/RAWP or design documents. For example, during construction, routine monthly progress reports will be a key tool for PG&E to inform agencies, stakeholders,				

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							and Tribes of work completed, forecasted work, issues encountered, actions taken to rectify problems/issues, personnel changes, variance requests to the agencies to deviate from design documents or C/RAWP, agencies' actions, etc. See Exhibit 2.6-2 of the C/RAWP (Monthly Progress Report Template) for additional details. The monthly reports will be submitted to DTSC and DOI, and posted on a SharePoint site for access by Tribes and stakeholders (Section 2.6.4.2 of the C/RAWP [Retention and Reporting]). In addition, PG&E will continue to conduct outreach with the Tribes under the terms of any MOUs in effect with various Tribes, the 2006 Settlement Agreement with the FMIT, protocols specified in the CIMP, and additional protocols under communication-related EIR mitigation measures, including, but not limited to: • CIMP § 2.1: Protocols for continued communication. • CIMP § 2.3: Protocols for the review of cultural resource-related documents throughout the design, construction, and operational phases. • CIMP § 2.10: Protocols for Tribal notification in advance of project-related activities. • CIMP § 2.12: Protocols for Tribal Monitors to				

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							observe ground disturbing activities. • EIR Mitigation Measure CUL-1a-4: PG&E will continue to work with the representative members of Tribes through the Technical Review Committee during final design and remedy construction, at which time DTSC will determine the committee's status. • PA Appendix C – Monitoring Protocol/CHPMP §§ 6.6.4: Protocols for Tribal Monitors to observe ground disturbing activities. PG&E currently holds monthly meetings with Tribes to address current issues and provide a forecast of upcoming activities. Other communications may take place depending on purpose of the communication and type of information to be exchanged. Tribes are welcome to request discussions of specific topics or information that are of interested to the Tribes during these information exchanges. In the event of a material deviation from the design documents and/or C/RAWP due to discovery of site conditions discussed above, PG&E will formally submit a request for work variance to the agencies (see Table 2.3-1 of C/RAWP and Exhibit L.2.2-3 of the O&M Manual). In response to comment #907 JDS-1,				

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							PG&E will also notify the FMIT when a work variance request for material deviation on the FMIT property is submitted to the agencies. Such requests and agencies' actions will be included in the monthly progress reports.				
45	Hualapai/TRC	Non-design	Process		Overall Comment	Numerous examples exist within the 90% BOD report indicating that many final design decisions will be determined post the design phase of the project. For example the final locations of many wells and pipeline runs, determination of whether the system is OPS, determination regarding the need and installation of provisional wells, and decisions on the timing and use of monitored natural attenuation are just a few of the many examples of final design decisions that will be made after the finalization of the project design. Specific referenced examples of these post design phase decisions found throughout the 90% BOD report have been provided (1a-1s) and are found as an attachment to this comment. This list should be considered as some examples found in the report but is not intended to be considered comprehensive. Please clearly discuss how data collected post the design phase of the groundwater remediation could result in changes to infrastructure locations that are different than the locations presented within the BOD reports. In addition please clearly outline how the Tribes will be involved in final design decisions that are made post approval of the 100% BOD report. Any future deviations from the infrastructure locations determined during the design phase necessitates Tribal involvement at a level that has been established during the design process. Therefore please clearly describe how the Tribes will be part of data review post design phase and the forum in which Tribes will be involved in design phase decisions made after finalization of the BOD report.	See above	See above	See above	Hualapai reiterates the need to be included (along with DOI and DTSC) as a primary party in communications regarding all project design changes, or work variance requests including material deviations from the design documents and/or C/RAWP due to discovery of changed site conditions as discussed in these earlier comments (at left). Communicating these changes needs to occur as soon as it is known that a change needs to be made. Hualapai needs to be included in those discussions via informing a tribal monitor, or email or telephone calls to designated points of contact. Once the change has been approved then a formal document can be forwarded to Hualapai.	A similar RTC (RTC #46) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.
46	Cocopah/TRC	Non-design	Process		Overall Comment	Numerous examples exist within the 90% BOD report indicating that many final design decisions will be determined post the design phase of the project. For example the final locations of many wells and pipeline runs, determination of whether the system is OPS, determination regarding the need and installation of provisional wells, and decisions on the timing and use of monitored natural attenuation are just a few of the many examples of final design decisions that will be made after the finalization of the project design. Specific referenced examples of these post design phase decisions found throughout the 90% BOD report have been provided (1a-1s) and are found as an attachment to this comment. This list should be considered as some examples found in the report but is not intended to be considered comprehensive. Please clearly discuss how data collected post the design phase of the groundwater remediation could result in changes to infrastructure locations that are different than the locations presented within the BOD reports. In addition please clearly outline how the Tribes will be involved in final design decisions that are made post approval of the 100% BOD report. Any future deviations from the infrastructure locations determined during the design phase necessitates Tribal involvement at a level that has been established during the design process. Therefore please clearly describe how the Tribes will be part of data review post design phase and the forum in which Tribes will be	See above	See above	See above	The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties that communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level	This RTC was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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						involved in design phase decisions made after finalization of the BOD report.				of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape.	
47	Chemehuevi/ TRC	Non-design	Process		Overall Comment	Numerous examples exist within the 90% BOD report indicating that many final design decisions will be determined post the design phase of the project. For example the final locations of many wells and pipeline runs, determination of whether the system is OPS, determination regarding the need and installation of provisional wells, and decisions on the timing and use of monitored natural attenuation are just a few of the many examples of final design decisions that will be made after the finalization of the project design. Specific referenced examples of these post design phase decisions found throughout the 90% BOD report have been provided (1a-1s) and are found as an attachment to this comment. This list should be considered as some examples found in the report but is not intended to be considered comprehensive. Please clearly discuss how data collected post the design phase of the groundwater remediation could result in changes to infrastructure locations that are different than the locations presented within the BOD reports. In addition please clearly outline how the Tribes will be involved in final design decisions that are made post approval of the 100% BOD report. Any future deviations from the infrastructure locations determined during the design phase necessitates Tribal involvement at a level that has been established during the design process. Therefore please clearly describe how the Tribes will be part of data review post design phase and the forum in which Tribes will be involved in design phase decisions made after finalization of the BOD report.	See above	See above	See above	The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties that communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape.	A similar RTC (RTC #46) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.
48	FMIT/TRC	Design	Infrastructures		Overall Comment	The treatment of noise during the construction period is well developed in the CIMP (CUL-1a-8h in Appendix H of the C/RAWP), but this is at odds with language regarding exemption for San Bernardino County noise regulations as stated in Appendix C-11 of the 90% BODBOD Report. The Appendix C-11 criteria need to be stricken from the BOD Report. Noise impacts related to backup generators, TEGs, pump and emitter operation at the water evaporation ponds need to be quantified, as this facility will have cumulative negative impacts on the soundscape at the Topock Maze and the Topock cultural landscape.	Please see RTC #23 FMIT-9. As with other equipment, equipment at the ponds are designed/specified to comply with the noise design criteria (Section C.11 of Appendix C). The ponds are located on the Refuge; therefore, the operational noise criteria is 60 dB(A). In addition, the operational noise will also comply with applicable San Bernardino County Development Code 83.01.080 for acceptable exterior noise standards for place of worship, which is 55 dB(A) Leq daytime (7 a.m.-10 p.m.) and 45 dB(A) Leq nighttime (10 p.m.-7 a.m.) (Leq is the equivalent average hourly noise level) (See EIR, Vol. 2, p. 4.9-24 [DTSC 2011]). The noise			The comment response is unsatisfactory because cumulative project noise impacts remain unquantified and unknown. Therefore, this comment remains unresolved. See also Tribal comment at RTC 23 FMIR-9. While not requesting additional mitigation, the Tribe respectfully disagrees with PG&E's opinion on nexus particularly considering cumulative effects under CEQ A and notes the agencies have an independent obligation to fully consider all project impacts.	DTSC Response: Comment noted. Noise impact evaluations are based on established regulatory thresholds. Noise impact is a resource area that DTSC will consider in the upcoming SEIR.

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						Sound power levels of new electrical generation equipment at the TCS need to be quantified, in relationship to sound power levels of existing equipment at the TCS.	measurement locations will be at the edge of the Maze closest to the subject facilities and at the short-term ambient noise measurement locations (ST-1, ST-2, and ST-3) in Exhibit 4.9-2 of the certified EIR (DTSC 2011). The noise design criteria are consistent with the noise mitigation measures in the EIR and supplemented by protocols to reduce auditory impacts in the CIMP. PG&E must implement the EIR mitigation measures and the CIMP protocol. Designing equipment to meet the design criteria prevents the equipment from creating direct and cumulative impacts more severe than those disclosed in the EIR. For this reason, the noise generated by various pieces of equipment does not need to be individually quantified. The TCS, including its new electrical generation equipment, is not part of the project. Although the remedy project's equipment may increase ambient noise levels, the project's contribution to cumulative noise impacts would remain as disclosed in the EIR. Additional mitigation measures to control noise from the TCS would lack a nexus to the proposed project.				
49	Hualapai/TRC	Design	Infrastructures		Overall Comment	The treatment of noise during the construction period is well developed in the CIMP (CUL-1a-8h in Appendix H of the C/RAWP), but this is at odds with language regarding exemption for San Bernardino County noise regulations as stated in Appendix C-11 of the 90% BODBOD Report. The Appendix C-11 criteria need to be stricken from the BOD Report. Noise impacts related to backup generators, TEGs, pump and emitter operation at the water evaporation ponds need to be quantified, as this facility will have cumulative negative impacts on the soundscape at the Topock Maze and the Topock cultural landscape. Sound power levels of new electrical generation equipment at the TCS need to be quantified, in	See above			The comment response is unsatisfactory because cumulative project noise impacts remain unquantified and unknown. Therefore, this comment remains unresolved.	DTSC Response: Comment noted. Noise impact evaluations are based on established regulatory thresholds. Noise impact is a resource area that DTSC will consider in the

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						relationship to sound power levels of existing equipment at the TCS.					upcoming SEIR.
50	Cocopah/TRC	Design	Infrastructures		Overall Comment	The treatment of noise during the construction period is well developed in the CIMP (CUL-1a-8h in Appendix H of the C/RAWP), but this is at odds with language regarding exemption for San Bernardino County noise regulations as stated in Appendix C-11 of the 90% BODBOD Report. The Appendix C-11 criteria need to be stricken from the BOD Report. Noise impacts related to backup generators, TEGs, pump and emitter operation at the water evaporation ponds need to be quantified, as this facility will have cumulative negative impacts on the soundscape at the Topock Maze and the Topock cultural landscape. Sound power levels of new electrical generation equipment at the TCS need to be quantified, in relationship to sound power levels of existing equipment at the TCS.	See above			The comment response is unsatisfactory because cumulative project noise impacts remain unquantified and unknown. Therefore, this comment remains unresolved.	DTSC Response: Comment noted. Noise impact evaluations are based on established regulatory thresholds. Noise impact is a resource area that DTSC will consider in the upcoming SEIR.
51	Chemehuevi/ TRC	Design	Infrastructures		Overall Comment	The treatment of noise during the construction period is well developed in the CIMP (CUL-1a-8h in Appendix H of the C/RAWP), but this is at odds with language regarding exemption for San Bernardino County noise regulations as stated in Appendix C-11 of the 90% BODBOD Report. The Appendix C-11 criteria need to be stricken from the BOD Report. Noise impacts related to backup generators, TEGs, pump and emitter operation at the water evaporation ponds need to be quantified, as this facility will have cumulative negative impacts on the soundscape at the Topock Maze and the Topock cultural landscape. Sound power levels of new electrical generation equipment at the TCS need to be quantified, in relationship to sound power levels of existing equipment at the TCS.	See above			The comment response is unsatisfactory because cumulative project noise impacts remain unquantified and unknown. Therefore, this comment remains unresolved.	DTSC Response: Comment noted. Noise impact evaluations are based on established regulatory thresholds. Noise impact is a resource area that DTSC will consider in the upcoming SEIR.
52	FMIT/TRC	Design	Infrastructures		Overall Comment	The BOD Report, the C/RAWP, the CIMP, the CHPMP, and the project plans and specifications should have sections that clearly and consistently identify the coordinate systems (and any scale factors) being used on the project as they relates to both horizontal and vertical coordinates. Also, there should be a set of 5 to 10 +/- vertical and horizontal control points established throughout the site where the various users of various GPS and other positioning instrumentation can check their equipment at any time to verify that the instrumentation is working correctly. These steps will help to reduce incorrect positioning during construction and during the operational life of the project when it comes to field positioning. Sites selected shall be chosen to be free, as much as possible, from construction/operations/maintenance disturbance, with a clear view of the sky in all directions, and free, to the greatest extent possible of nearby walls of surfaces likely to create multi-path positioning errors. Information on locations and coordinates shall be made available to all Tribes and stakeholders.	Sufficient monuments currently exist at Topock to provide for 'land survey' accuracy. An additional monument(s) would introduce unnecessary new ground disturbance. Section C.2.1 of Appendix C lists the project vertical and horizontal datum. Temporary control points will be placed and surveyed in during construction and will be included in the as-built drawings. Handheld GPS units using the same coordinate system which PG&E uses can provide the necessary accuracy non-surveyors would require. Additional details on the coordinate system which PG&E and its contractors will use can be added to the BOD (e.g., Section C.2.1 [Site Civil Datum] of Appendix C [Design Criteria]) and/or C/RAWP (e.g., Section 4).		DOI concurs with the PG&E response.	The Tribe will consider the utility of the conventions described by PG&E.	DTSC Response: It is PG&E's responsibility to construct the remedy system in compliance with all applicable requirements and prescribed mitigation measures.
53	Hualapai/TRC	Design	Infrastructures		Overall Comment	The BOD Report, the C/RAWP, the CIMP, the CHPMP, and the project plans and specifications should have sections that clearly and consistently identify the coordinate systems (and any scale factors) being used on the project as they relates to both horizontal and vertical coordinates. Also, there should be a set of 5 to 10 +/- vertical and horizontal control points established throughout the site where the various users of various GPS and other positioning instrumentation can check their equipment at any time to verify that the instrumentation is working correctly. These steps will	See above		See above.		

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						help to reduce incorrect positioning during construction and during the operational life of the project when it comes to field positioning. Sites selected shall be chosen to be free, as much as possible, from construction/operations/maintenance disturbance, with a clear view of the sky in all directions, and free, to the greatest extent possible of nearby walls of surfaces likely to create multi-path positioning errors. Information on locations and coordinates shall be made available to all Tribes and stakeholders.					
54	Cocopah/TRC	Design	Infrastructures		Overall Comment	The BOD Report, the C/RAWP, the CIMP, the CHPMP, and the project plans and specifications should have sections that clearly and consistently identify the coordinate systems (and any scale factors) being used on the project as they relates to both horizontal and vertical coordinates. Also, there should be a set of 5 to 10 +/- vertical and horizontal control points established throughout the site where the various users of various GPS and other positioning instrumentation can check their equipment at any time to verify that the instrumentation is working correctly. These steps will help to reduce incorrect positioning during construction and during the operational life of the project when it comes to field positioning. Sites selected shall be chosen to be free, as much as possible, from construction/operations/maintenance disturbance, with a clear view of the sky in all directions, and free, to the greatest extent possible of nearby walls of surfaces likely to create multi-path positioning errors. Information on locations and coordinates shall be made available to all Tribes and stakeholders.	See above		See above.		
55	Chemehuevi/ TRC	Design	Infrastructures		Overall Comment	The BOD Report, the C/RAWP, the CIMP, the CHPMP, and the project plans and specifications should have sections that clearly and consistently identify the coordinate systems (and any scale factors) being used on the project as they relates to both horizontal and vertical coordinates. Also, there should be a set of 5 to 10 +/- vertical and horizontal control points established throughout the site where the various users of various GPS and other positioning instrumentation can check their equipment at any time to verify that the instrumentation is working correctly. These steps will help to reduce incorrect positioning during construction and during the operational life of the project when it comes to field positioning. Sites selected shall be chosen to be free, as much as possible, from construction/operations/maintenance disturbance, with a clear view of the sky in all directions, and free, to the greatest extent possible of nearby walls of surfaces likely to create multi-path positioning errors. Information on locations and coordinates shall be made available to all Tribes and stakeholders.	See above		See above.		
56	FMIT/TRC	Choose an item.	SOPs		Overall Comment	At present, there appears to be little or no explicit future role for the Tribes when it comes to review of significant (to the Tribes) changes that may occur during the bid-, construction-, start-up-, or operations & maintenance periods of the project. This should be remedied with a standard operating procedure, protocol or some other suitable document that contains appropriate and acceptable language to remedy this situation. The following elements should be included. Tribal consultation will be conducted beginning after finalization and Agency approval of the 100% Topock Groundwater Remediation Project Basis of Design (BOD) Report, Construction/Remedial Action Work Plan (C/RWAP), and construction plans & specifications, referred to herein as the 100% Documents, and continue to be in effect and applicable to all remedy activities, including operations and maintenance activities, through completion of remedy decommissioning. Prior to the approval of the 100% Documents, there has been an opportunity for Tribal Representatives to review the remedial design documents and provide input in the form of review comments. Tribal participation and consultation during the development of these documents was crucial in ensuring that adverse effects on cultural, archaeological, and historical resources were either avoided or minimized to the extent practicable. This level of Tribal participation during the preparation of the 100% Documents has reduced the level of cultural impacts associated with the implementation of the groundwater remedy during the planned construction and operation & maintenance (O&M) periods. Continuation of that participation at a similar level is essential. Additionally, the Tribes should have an agreed-upon role and level of involvement in the review of data collected during remedy construction and O&M, after Agency approval of the 100% Documents, because that information may be relevant to changes to the remedy implementation or to remedy O&M that may be made going forward from the time of that Agency approval. It is expected that, during remedy well installation and testing, after system start-up, and during remedy operation, data will be collected and analyzed to evaluate whether the groundwater flow, geochemical, and solute transport models do not differ significantly from the conceptual site model with respect to the hydrogeologic characterization or remedy performance. If there are significant differences, the groundwater flow model, geochemical model, and/or the solute transport model will be updated and recalibrated. In addition data will be collected from monitoring and injection	PG&E appreciates the comment and understands that the Tribes are concerned about continued involvement in the project post design approval. The Tribes have and continue to be important stakeholders for the project. As mentioned in RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/TRC, PG&E will continue to implement the adopted mitigation measures, which include multiple requirements for Tribe monitoring and outreach/coordination with Tribes during project implementation, including the protocols for continued communication and tribal communication set forth in the CIMP that is required pursuant to EIR Mitigation Measure CUL-	See RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/ TRC above.	As noted by PG&E, there are several existing documents that provided guidance and protocols for continued communication and consultation with the Tribes. Should specific topics necessitate additional Section 106 consultation during comment resolution or construction (e.g., reinitiating of consultation pursuant to the PA's Consultation Protocol on the Arizona wells) or should a Tribe request consultation on specific issues such consultation will be conducted pursuant to the PA. BLM and DOI will be working with	Relative to PG&E's comment on review of final design, please see Tribal comment at RTC 28 FMIT-14. The Tribe also is of the understanding that DOI will discuss specific project mitigation with the Tribe once the final design is completed.	A similar RTC (RTC #58) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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						wells to establish baseline conditions and to provide insight into whether and why future modifications to the remedy or to its O&M will be required to optimize the remedy performance. The Tribes will be on a footing equivalent to other stakeholders regarding communications concerning the review of data collected during construction of the groundwater remedy well network, model updates and monthly progress reporting. This communication will help further reduce cultural impacts associated with the implementation of the final groundwater remedial design. In addition, consultation with the Tribes will be held prior to deviating from the 100% Documents, especially concerning changes that could result in ground-disturbing activities in locations other than those specified in the 100% Documents. When planned/anticipated change(s) to the 100% Documents arise, notification of such will be communicated in writing (email or letter) by a designated PG&E representative to Tribal representatives, who will determine if, from their perspective, the change(s) is (are) significant. If the change(s) is (are) deemed significant, a timely consultation between PG&E and the Tribal Representative(s) will occur. PG&E will evaluate the results of the consultation, and render a decision, which will be recorded and communicated to Agencies, Tribes and Stakeholders, and entered into the Agency records. If the Tribes disagree with the decision, they will communicate for the record their objections to PG&E and the Agencies.	1a-8, as well as additional protocols under communication-related mitigation measures in the EIR as well as under federal communication-related measures. Many existing documents including the CIMP, the PA, the CHPMP, the C/RAWP, the MOUs with Tribes, and the 2006 Settlement Agreement with the FMIT, contain requirements or protocols for consultation and/or communication with Tribes in various phases of the project, including during construction, operations and maintenance, and decommissioning. PG&E does not believe that an additional or new document on interaction/communication with the Tribes is necessary. PG&E defers to DOI/BLM on parts of this comment related to Tribal consultation. Regarding review of the final (100%) design mentioned in the 3rd paragraph of the comment, PG&E understands that there will not be a follow-up review and comment period of the final design (see RTC #7 DTSC-3). Please see RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/TRC for responses related to progress reports and data collected during construction, startup, and O&M.		the Tribes in revising the CHPMP in the future as well.		
57	Hualapai/TRC	Choose an item.	SOPs		Overall Comment	At present, there appears to be little or no explicit future role for the Tribes when it comes to review of significant (to the Tribes) changes that may occur during the bid-, construction-, start-up-,	See above	See above	See above		A similar RTC (RTC #58) was discussed

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						or operations & maintenance periods of the project. This should be remedied with a standard operating procedure, protocol or some other suitable document that contains appropriate and acceptable language to remedy this situation. The following elements should be included. Tribal consultation will be conducted beginning after finalization and Agency approval of the 100% Topock Groundwater Remediation Project Basis of Design (BOD) Report, Construction/Remedial Action Work Plan (C/RWAP), and construction plans & specifications, referred to herein as the 100% Documents, and continue to be in effect and applicable to all remedy activities, including operations and maintenance activities, through completion of remedy decommissioning. Prior to the approval of the 100% Documents, there has been an opportunity for Tribal Representatives to review the remedial design documents and provide input in the form of review comments. Tribal participation and consultation during the development of these documents was crucial in ensuring that adverse effects on cultural, archaeological, and historical resources were either avoided or minimized to the extent practicable. This level of Tribal participation during the preparation of the 100% Documents has reduced the level of cultural impacts associated with the implementation of the groundwater remedy during the planned construction and operation & maintenance (O&M) periods. Continuation of that participation at a similar level is essential. Additionally, the Tribes should have an agreed-upon role and level of involvement in the review of data collected during remedy construction and O&M, after Agency approval of the 100% Documents, because that information may be relevant to changes to the remedy implementation or to remedy O&M that may be made going forward from the time of that Agency approval. It is expected that, during remedy well installation and testing, after system start-up, and during remedy operation, data will be collected and analyzed to evaluate whether the groundwater flow, geochemical, and solute transport models do not differ significantly from the conceptual site model with respect to the hydrogeologic characterization or remedy performance. If there are significant differences, the groundwater flow model, geochemical model, and/or the solute transport model will be updated and recalibrated. In addition data will be collected from monitoring and injection wells to establish baseline conditions and to provide insight into whether and why future modifications to the remedy or to its O&M will be required to optimize the remedy performance. The Tribes will be on a footing equivalent to other stakeholders regarding communications concerning the review of data collected during construction of the groundwater remedy well network, model updates and monthly progress reporting. This communication will help further reduce cultural impacts associated with the implementation of the final groundwater remedial design. In addition, consultation with the Tribes will be held prior to deviating from the 100% Documents, especially concerning changes that could result in ground-disturbing activities in locations other than those specified in the 100% Documents. When planned/anticipated change(s) to the 100% Documents arise, notification of such will be communicated in writing (email or letter) by a designated PG&E representative to Tribal representatives, who will determine if, from their perspective, the change(s) is (are) significant. If the change(s) is (are) deemed significant, a timely consultation between PG&E and the Tribal Representative(s) will occur. PG&E will evaluate the results of the consultation, and render a decision, which will be recorded and communicated to Agencies, Tribes and Stakeholders, and entered into the Agency records. If the Tribes disagree with the decision, they will communicate for the record their objections to PG&E and the Agencies.					at the August 18 TWG meeting.
58	Cocopah/TRC	Choose an item.	SOPs		Overall Comment	At present, there appears to be little or no explicit future role for the Tribes when it comes to review of significant (to the Tribes) changes that may occur during the bid-, construction-, start-up-, or operations & maintenance periods of the project. This should be remedied with a standard operating procedure, protocol or some other suitable document that contains appropriate and acceptable language to remedy this situation. The following elements should be included. Tribal consultation will be conducted beginning after finalization and Agency approval of the 100% Topock Groundwater Remediation Project Basis of Design (BOD) Report, Construction/Remedial Action Work Plan (C/RWAP), and construction plans & specifications, referred to herein as the 100% Documents, and continue to be in effect and applicable to all remedy activities, including operations and maintenance activities, through completion of remedy decommissioning.	See above	See above	See above		This RTC was discussed at the August 18 TWG meeting.

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						Prior to the approval of the 100% Documents, there has been an opportunity for Tribal Representatives to review the remedial design documents and provide input in the form of review comments. Tribal participation and consultation during the development of these documents was crucial in ensuring that adverse effects on cultural, archaeological, and historical resources were either avoided or minimized to the extent practicable. This level of Tribal participation during the preparation of the 100% Documents has reduced the level of cultural impacts associated with the implementation of the groundwater remedy during the planned construction and operation & maintenance (O&M) periods. Continuation of that participation at a similar level is essential. Additionally, the Tribes should have an agreed-upon role and level of involvement in the review of data collected during remedy construction and O&M, after Agency approval of the 100% Documents, because that information may be relevant to changes to the remedy implementation or to remedy O&M that may be made going forward from the time of that Agency approval. It is expected that, during remedy well installation and testing, after system start-up, and during remedy operation, data will be collected and analyzed to evaluate whether the groundwater flow, geochemical, and solute transport models do not differ significantly from the conceptual site model with respect to the hydrogeologic characterization or remedy performance. If there are significant differences, the groundwater flow model, geochemical model, and/or the solute transport model will be updated and recalibrated. In addition data will be collected from monitoring and injection wells to establish baseline conditions and to provide insight into whether and why future modifications to the remedy or to its O&M will be required to optimize the remedy performance. The Tribes will be on a footing equivalent to other stakeholders regarding communications concerning the review of data collected during construction of the groundwater remedy well network, model updates and monthly progress reporting. This communication will help further reduce cultural impacts associated with the implementation of the final groundwater remedial design. In addition, consultation with the Tribes will be held prior to deviating from the 100% Documents, especially concerning changes that could result in ground-disturbing activities in locations other than those specified in the 100% Documents. When planned/anticipated change(s) to the 100% Documents arise, notification of such will be communicated in writing (email or letter) by a designated PG&E representative to Tribal representatives, who will determine if, from their perspective, the change(s) is (are) significant. If the change(s) is (are) deemed significant, a timely consultation between PG&E and the Tribal Representative(s) will occur. PG&E will evaluate the results of the consultation, and render a decision, which will be recorded and communicated to Agencies, Tribes and Stakeholders, and entered into the Agency records. If the Tribes disagree with the decision, they will communicate for the record their objections to PG&E and the Agencies.					
59	Chemehuevi/ TRC	Choose an item.	SOPs		Overall Comment	At present, there appears to be little or no explicit future role for the Tribes when it comes to review of significant (to the Tribes) changes that may occur during the bid-, construction-, start-up-, or operations & maintenance periods of the project. This should be remedied with a standard operating procedure, protocol or some other suitable document that contains appropriate and acceptable language to remedy this situation. The following elements should be included. Tribal consultation will be conducted beginning after finalization and Agency approval of the 100% Topock Groundwater Remediation Project Basis of Design (BOD) Report, Construction/Remedial Action Work Plan (C/RWAP), and construction plans & specifications, referred to herein as the 100% Documents, and continue to be in effect and applicable to all remedy activities, including operations and maintenance activities, through completion of remedy decommissioning. Prior to the approval of the 100% Documents, there has been an opportunity for Tribal Representatives to review the remedial design documents and provide input in the form of review comments. Tribal participation and consultation during the development of these documents was crucial in ensuring that adverse effects on cultural, archaeological, and historical resources were either avoided or minimized to the extent practicable. This level of Tribal participation during the preparation of the 100% Documents has reduced the level of cultural impacts associated with the implementation of the groundwater remedy during the planned construction and operation & maintenance (O&M) periods. Continuation of that participation at a similar level is essential.	See above	See above	See above		A similar RTC (RTC #58) was discussed at the August 18 TWG meeting.

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						Additionally, the Tribes should have an agreed-upon role and level of involvement in the review of data collected during remedy construction and O&M, after Agency approval of the 100% Documents, because that information may be relevant to changes to the remedy implementation or to remedy O&M that may be made going forward from the time of that Agency approval. It is expected that, during remedy well installation and testing, after system start-up, and during remedy operation, data will be collected and analyzed to evaluate whether the groundwater flow, geochemical, and solute transport models do not differ significantly from the conceptual site model with respect to the hydrogeologic characterization or remedy performance. If there are significant differences, the groundwater flow model, geochemical model, and/or the solute transport model will be updated and recalibrated. In addition data will be collected from monitoring and injection wells to establish baseline conditions and to provide insight into whether and why future modifications to the remedy or to its O&M will be required to optimize the remedy performance. The Tribes will be on a footing equivalent to other stakeholders regarding communications concerning the review of data collected during construction of the groundwater remedy well network, model updates and monthly progress reporting. This communication will help further reduce cultural impacts associated with the implementation of the final groundwater remedial design. In addition, consultation with the Tribes will be held prior to deviating from the 100% Documents, especially concerning changes that could result in ground-disturbing activities in locations other than those specified in the 100% Documents. When planned/anticipated change(s) to the 100% Documents arise, notification of such will be communicated in writing (email or letter) by a designated PG&E representative to Tribal representatives, who will determine if, from their perspective, the change(s) is (are) significant. If the change(s) is (are) deemed significant, a timely consultation between PG&E and the Tribal Representative(s) will occur. PG&E will evaluate the results of the consultation, and render a decision, which will be recorded and communicated to Agencies, Tribes and Stakeholders, and entered into the Agency records. If the Tribes disagree with the decision, they will communicate for the record their objections to PG&E and the Agencies.					
60	FMIT/TRC	Design	Infrastructures		Overall Comment	Dimensioning in the 90% engineering drawings, appears to result in trench excavation widths or depths in excess of required minimums. Final drawing dimensioning should be consistent across drawings, and minimize excavation widths and depths to the greatest extent possible. Any unnecessary over-excavation will be compounded over 5 miles of piping infrastructure. Therefore, final plan dimensions should be consistent with, but not in excess of, minimum requirements.	See RTC #21 FMIT-7.			Noted.	A similar RTC (RTC #21) was discussed at the July 23 TWG meeting.
61	Hualapai/TRC	Design	Infrastructures		Overall Comment	Dimensioning in the 90% engineering drawings, appears to result in trench excavation widths or depths in excess of required minimums. Final drawing dimensioning should be consistent across drawings, and minimize excavation widths and depths to the greatest extent possible. Any unnecessary over-excavation will be compounded over 5 miles of piping infrastructure. Therefore, final plan dimensions should be consistent with, but not in excess of, minimum requirements.	See above				A similar RTC (RTC #21) was discussed at the July 23 TWG meeting.
62	Cocopah/TRC	Design	Infrastructures		Overall Comment	Dimensioning in the 90% engineering drawings, appears to result in trench excavation widths or depths in excess of required minimums. Final drawing dimensioning should be consistent across drawings, and minimize excavation widths and depths to the greatest extent possible. Any unnecessary over-excavation will be compounded over 5 miles of piping infrastructure. Therefore, final plan dimensions should be consistent with, but not in excess of, minimum requirements.	See above				A similar RTC (RTC #21) was discussed at the July 23 TWG meeting.
63	Chemehuevi/ TRC	Design	Infrastructures		Overall Comment	Dimensioning in the 90% engineering drawings, appears to result in trench excavation widths or depths in excess of required minimums. Final drawing dimensioning should be consistent across drawings, and minimize excavation widths and depths to the greatest extent possible. Any unnecessary over-excavation will be compounded over 5 miles of piping infrastructure. Therefore, final plan dimensions should be consistent with, but not in excess of, minimum requirements.	See above				A similar RTC (RTC #21) was discussed at the July 23 TWG meeting.
64	FMIT/TRC	Non-design	Infrastructures			Currently PG&E has been directed by DOI/DTSC to remove the infrastructure for the remedy "to the extent practicable". There should be greater, and specific clarity to what this means to ensure that nearly ALL the buried infrastructure is actually removed. These should include an anticipated plan by PG&E regarding what elements of the remedy might not be "practicable" to remove, and assurances to remove all but the absolute minimum of the buried elements for this remedy. Tribal consultation be part of the process in deciding what is "practicable" to be removed at the time of decommissioning of this remedy.	Please see RTCs #12 DTSC-8 and #16 FMIT-2.		See RTC #16 FMIT-2.	Despite the RTC discussions, the Tribes remain with nearly complete uncertainty as to whether and when any underground piping will be removed as part of remedy	See RTCs #8 DTSC-4, #12 DTSC-8, and #16 FMIT-2.

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										decommissioning. Therefore, this comment remains unresolved. See also RTC 16 FMIT-2.	
65	Hualapai/TRC	Non-design	Infrastructures			Currently PG&E has been directed by DOI/DTSC to remove the infrastructure for the remedy "to the extent practicable". There should be greater, and specific clarity to what this means to ensure that nearly ALL the buried infrastructure is actually removed. These should include an anticipated plan by PG&E regarding what elements of the remedy might not be "practicable" to remove, and assurances to remove all but the absolute minimum of the buried elements for this remedy. Tribal consultation be part of the process in deciding what is "practicable" to be removed at the time of decommissioning of this remedy.	See above		See RTC #16 FMIT-2.		See RTCs #8 DTSC-4, #12 DTSC-8, and #16 FMIT-2.
66	Cocopah/TRC	Non-design	Infrastructures			Currently PG&E has been directed by DOI/DTSC to remove the infrastructure for the remedy "to the extent practicable". There should be greater, and specific clarity to what this means to ensure that nearly ALL the buried infrastructure is actually removed. These should include an anticipated plan by PG&E regarding what elements of the remedy might not be "practicable" to remove, and assurances to remove all but the absolute minimum of the buried elements for this remedy. Tribal consultation be part of the process in deciding what is "practicable" to be removed at the time of decommissioning of this remedy.	See above		See RTC #16 FMIT-2.	Despite the RTC discussions, the Tribes remain with nearly complete uncertainty as to whether and when any underground piping will be removed as part of remedy decommissioning. Therefore, this comment remains unresolved.	See RTCs #8 DTSC-4, #12 DTSC-8, and #16 FMIT-2.
67	Chemehuevi/ TRC	Non-design	Infrastructures			Currently PG&E has been directed by DOI/DTSC to remove the infrastructure for the remedy "to the extent practicable". There should be greater, and specific clarity to what this means to ensure that nearly ALL the buried infrastructure is actually removed. These should include an anticipated plan by PG&E regarding what elements of the remedy might not be "practicable" to remove, and assurances to remove all but the absolute minimum of the buried elements for this remedy. Tribal consultation be part of the process in deciding what is "practicable" to be removed at the time of decommissioning of this remedy.	See above		See RTC #16 FMIT-2.	Despite the RTC discussions, the Tribes remain with nearly complete uncertainty as to whether and when any underground piping will be removed as part of remedy decommissioning. Therefore, this comment remains unresolved. It may be helpful to formally detail any possible reasoning for not decommissioning infrastructure.	See RTCs #8 DTSC-4, #12 DTSC-8, and #16 FMIT-2.
68	FMIT/TRC	Non-design	Infrastructures		Overall Comment	Locations or points which need to be monitored, but do not require significant equipment, should be classified as "Access by Foot Traffic Only." One factor in limiting impacts would include encouraging limitations on vehicular traffic where possible. PG&E should work with Tribes to determine which access routes would be eligible for this designation. Given the decades long time frame for this project, and the long timeframe for the desert landscape to recover, any repeated impacts by vehicular access will be compounded over decades. It's important to minimize the impacts of accesses needed to conduct this remedy. Therefore, published examples of other areas where precautions have been taken to preserve cultural resources should be considered.	See RTC #20 FMIT-6.	See RTC #20 FMIT-6.		TBD.	DTSC Response: See RTC 20
69	Hualapai/TRC	Non-design	Infrastructures		Overall Comment	Locations or points which need to be monitored, but do not require significant equipment, should be classified as "Access by Foot Traffic Only." One factor in limiting impacts would include encouraging limitations on vehicular traffic where possible. PG&E should work with Tribes to determine which access routes would be eligible for this designation. Given the decades long time frame for this project, and the long timeframe for the desert landscape to recover, any repeated impacts by vehicular access will be compounded over decades. It's important to minimize the impacts of accesses needed to conduct this remedy. Therefore, published examples of other areas where precautions have been taken to preserve cultural resources should be considered.	"Access by foot traffic only" routes would require installation of additional infrastructure to facilitate safe sampling and O&M over the long term. For example, "access by foot traffic only" sample collection methods at monitoring wells would require the installation	DTSC disagrees with the Tribes proposal to conduct monitoring and maintenance by foot traffic only. Not only is this proposed method of access inefficient due to necessity of carrying equipment, this practice can be		Comments noted. However this issue is considered unresolved. As this project moves forward, minimization of impacts from vehicular traffic to service and/or monitor wells or equipment should be also be a priority.	DTSC Response: While Agencies will not limit PG&E to access by foot traffic only we agree that work should be conducted in a manner that minimizes impacts from vehicular traffic.

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							of additional pipes and conduits (not currently included in the design) for management of purge water, so that it could be collected without requiring a person to carry purge water over a long distance. Without such infrastructure, there is a health and safety concern for workers who have to carry the purge water, especially during the summer months when carrying a heavy load of water in the heat can be dangerous. Currently all monitoring wells have established vehicle access routes. All additional monitoring wells installed with the remedy will also have access routes established as a result of construction. PG&E plans to continue to use these access routes with existing monitoring equipment because it will not add any additional disturbance and will avoid the need for additional disturbance which would be caused by adding sample collection infrastructure (pipes and conduits) that would be required if sample collection was accomplished by "foot traffic only" methods.	seriously dangerous to workers during warm weather days. Foot traffic only also reduces the ability for expeditious egress in the event of emergencies. Although DTSC is committed to minimizing disturbance into areas that Tribes considers sacred, health and safety of potential workers must also be considered.			
70	Cocopah/TRC	Non-design	Infrastructures		Overall Comment	Locations or points which need to be monitored, but do not require significant equipment, should be classified as "Access by Foot Traffic Only." One factor in limiting impacts would include encouraging limitations on vehicular traffic where possible. PG&E should work with Tribes to determine which access routes would be eligible for this designation. Given the decades long time frame for this project, and the long timeframe for the desert landscape to recover, any repeated impacts by vehicular access will be compounded over decades. It's important to minimize the impacts of accesses needed to conduct this remedy. Therefore, published examples of other areas where precautions have been taken to preserve cultural resources should be considered.	See RTC #69 Hualapai/ TRC.			Comments noted. However this issue is considered unresolved. As this project moves forward, minimization of impacts from vehicular traffic to service and/or monitor wells or equipment should be a priority.	DTSC Response: See response to RTC #69.
71	Chemehuevi/ TRC	Non-design	Infrastructures		Overall Comment	Locations or points which need to be monitored, but do not require significant equipment, should be classified as "Access by Foot Traffic Only." One factor in limiting impacts would include encouraging limitations on vehicular traffic where possible. PG&E should work with Tribes to determine which access routes would be eligible for this designation. Given the decades long time frame for this project, and the long timeframe for the desert landscape to recover, any repeated	See RTC #69 Hualapai/ TRC.			Comments noted. However this issue is considered unresolved. As this project moves forward, minimization	DTSC Response: See response to RTC #69.

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						impacts by vehicular access will be compounded over decades. It's important to minimize the impacts of accesses needed to conduct this remedy. Therefore, published examples of other areas where precautions have been taken to preserve cultural resources should be considered.				of impacts from vehicular traffic to service and/or monitor wells or equipment should be a priority.	
72	FMIT/TRC	Choose an item.	Choose an item.		Overall Comment	Large amounts of NEW geologic and hydrogeologic data will be generated during drilling, installation and testing of the various elements of the remediation system. These data should be part of an ongoing evaluation for the usefulness of the design elements. The amount of geologic and hydrogeologic data that will be generated during the installation of the system amounts to a very significant portion of ALL geologic data known for the Topock site. The data generated during the installation need to be part of an ongoing evaluation of the design. If unexpected geologic conditions are encountered and there is no flexibility in the design, this could result in wells and construction elements being installed "as planned" that may ultimately not generate any benefit. Significant effort has been made on the part of all parties to minimize such disturbances/number of wells. This effort should continue even as construction of the remedy proceeds.	PG&E is aligned with the Tribes on the goal of minimizing disturbance, overall project footprint, and number of wells. Specifically, PG&E's goal is to avoid unnecessary disturbance and constructing unnecessary infrastructure. To that end, as discussed in RTC #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/ TRC, to minimize the potential for uncertainties in the conceptual site model to cause unnecessary disturbance (that is, to avoid constructing unnecessary infrastructure), PG&E had proposed measures such as scheduling data collection at planned Category 1 well locations early in the construction schedule (see Section 3.2.1.3 of C/RAWP) and combining the collection of geotechnical data with the upcoming soil investigation. To this end, PG&E submitted a more detailed construction and start-up sequence in anticipation of construction activity in 2016, during the 90% RTC period (see **Attachment D** of the final RTC table). This sequencing plan provides for start-up of system elements while construction proceeds. This approach will provide more time for data analysis and adaptive design changes while still completing the overall program within the originally			Comments noted. However this issue is considered unresolved. As this project moves forward, minimization of impacts from vehicular traffic to service and/or monitor wells or equipment should be a priority. In addition, responses to the numerous comments regarding groundwater modeling and its application to this remediation as well as the white paper by Prucha and Eggers contain detailed suggestions regarding methods to improve the usefulness and reliability of the model output. Finally, it should always be kept in mind that the Tribe favors early removal of the IM3 facility.	DTSC Response: Tribal comment noted.

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							planned schedule. Specifically the sequencing will allow time to assess and accommodate, as appropriate, changes to the remedial system footprint; including the number and location of the Uplands IW, MWs and the associated pipeline alignment, and the Riverbank wells, in coordination with tribal stakeholders and agencies. PG&E will review and consider the Tribes' response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.				
73	Hualapai/TRC	Choose an item.	Choose an item.		Overall Comment	Large amounts of NEW geologic and hydrogeologic data will be generated during drilling, installation and testing of the various elements of the remediation system. These data should be part of an ongoing evaluation for the usefulness of the design elements. The amount of geologic and hydrogeologic data that will be generated during the installation of the system amounts to a very significant portion of ALL geologic data known for the Topock site. The data generated during the installation need to be part of an ongoing evaluation of the design. If unexpected geologic conditions are encountered and there is no flexibility in the design, this could result in wells and construction elements being installed "as planned" that may ultimately not generate any benefit. Significant effort has been made on the part of all parties to minimize such disturbances/number of wells. This effort should continue even as construction of the remedy proceeds.	See above			Comments noted. However this issue is considered unresolved. As this project moves forward, minimization of impacts from vehicular traffic to service and/or monitor wells or equipment should be a priority. In addition, responses to the numerous comments regarding groundwater modeling and its application to this remediation as well as the technical memo by Prucha and Eggers contain detailed suggestions regarding improvements to improve the usefulness and reliability of the model output.	DTSC Response: Tribal comment noted.
74	Cocopah/TRC	Choose an item.	Choose an item.		Overall Comment	Large amounts of NEW geologic and hydrogeologic data will be generated during drilling, installation and testing of the various elements of the remediation system. These data should be part of an ongoing evaluation for the usefulness of the design elements. The amount of geologic and hydrogeologic data that will be generated during the installation of the system amounts to a very significant portion of ALL geologic data known for the Topock site. The data generated during the installation need to be part of an ongoing evaluation of the design. If unexpected geologic conditions are encountered and there is no flexibility in the design, this could	See above			Comments noted. However this issue is considered unresolved. As this project moves forward, minimization of impacts from vehicular traffic to	This RTC was discussed at the August 27 TWG meeting. DTSC Response: Tribal comment

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						result in wells and construction elements being installed "as planned" that may ultimately not generate any benefit. Significant effort has been made on the part of all parties to minimize such disturbances/number of wells. This effort should continue even as construction of the remedy proceeds.				service and/or monitor wells or equipment should be a priority. In addition, responses to the numerous comments regarding groundwater modeling and its application to this remediation as well as the technical memo by Prucha and Eggers contain detailed suggestions regarding improvements to improve the usefulness and reliability of the model output.	noted.
75	Chemehuevi/ TRC	Choose an item.	Choose an item.		Overall Comment	Large amounts of NEW geologic and hydrogeologic data will be generated during drilling, installation and testing of the various elements of the remediation system. These data should be part of an ongoing evaluation for the usefulness of the design elements. The amount of geologic and hydrogeologic data that will be generated during the installation of the system amounts to a very significant portion of ALL geologic data known for the Topock site. The data generated during the installation need to be part of an ongoing evaluation of the design. If unexpected geologic conditions are encountered and there is no flexibility in the design, this could result in wells and construction elements being installed "as planned" that may ultimately not generate any benefit. Significant effort has been made on the part of all parties to minimize such disturbances/number of wells. This effort should continue even as construction of the remedy proceeds.	See above			Comments noted. However this issue is considered unresolved. As this project moves forward, minimization of impacts from vehicular traffic to service and/or monitor wells or equipment should be a priority. In addition, responses to the numerous comments regarding groundwater modeling and its application to this remediation as well as the technical memo by Prucha and Eggers contain detailed suggestions regarding improvements to improve the usefulness and reliability of the model output.	DTSC Response: Tribal comment noted.
76	FMIT/TRC	Non-design	GW Modeling		Overarching Comment	Modeling tools (microFEM, modflow and MT3D) have been critical to the development of both the proposed remedial system design and operations. Once the system is operating, observed water levels, hydraulic gradients and concentration trends will be compared to simulated values to make critical decisions (decision monitoring frameworks/tables) regarding changes to the currently proposed system design (i.e., new wells) and operation. These models have the ability to incorporate the best available information on the 3-dimensional aquifer geometry, heterogeneous hydraulic property distributions and complex array and timing of the proposed multi-layer injections and extractions. As such, they represent the best available tools for demonstrating to all stakeholders that the remedial system design and operation at any point in time continues to meet RAOs, and that any proposals to change the currently proposed design and operation will do so as well. Despite the clear importance and continued need for these modeling tools, especially during startup and early operations when adjustments to the design and operation will be most frequent, several issues have been identified. These issues are of considerable concern to Tribes because of the potential for poorly thought-out or 'urgent crisis' decisions which lead to increased number of wells/disturbance or unnecessarily impacting sensitive cultural areas. Key issues include: 1) Triggers (i.e., "significant differences") for updating/use of the models are still vague/non-committal as noted comment to the 60% BOD and highlighted in the Prucha, April 3, 2014 summary memo to the Tribes. 2) Details on approach/methodology for updating, re-calibrating, re-optimizing and re-running	The groundwater flow and transport model will be updated during the remedy installation, start-up, and operation phases in an effort to refine the predictive performance of the model. While the model will remain an important tool to predict long term changes, the system performance will be demonstrated and measured with site specific empirical data. 1. Rather than defining specific criteria to trigger model updates, the term "significant differences"			Using site-specific empirical data can certainly be useful in evaluating the CURRENT system performance, but when considering changes to the design and operation of the remedial system, we believe the model will be essential for correctly guiding a) how much to adjust some knob, b) which direction to adjust the knob, c) which knob(s) to adjust. Probably more importantly, we continue to strongly feel that the model	A similar RTC (RTC #78) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
						long-term remedial system operations remains vague and limited. Any re-calibration or modification to operations (i.e., rates, TOC dosing) or design (i.e., new wells) should require full re-evaluation of whether the modified system continues to meet RAOs, especially long-term remedial cleanup times. 3) Critical decisions on assessments and potential changes to the operation and design will be made based on various O&M Monitoring Decision Framework diagrams. But detailed narrative on updates to and use of the models is vague and limited.	will be removed from the text and model updates will be conducted according to the timetable described in Section 12 of Appendix B. Due to the large amount of data that will be collected during the various remedy phases, model updates will be beneficial independent of specific "significant difference" thresholds. 2. Additional details will be provided with respect to the approach/ methodology for updating, re-calibrating, re-optimizing, and re-running the model. During each defined model update the following steps will be included: a) the 3D structure of the model will be refined based on new vertical characterization of the alluvial aquifer/bedrock contact. b) hydraulic property distributions will be refined based on updates to the spatial distribution of aquifer test data. c) Actual operational data will be integrated into the groundwater flow model (i.e. pumping rates, pumping schedule, and vertical flow distribution) d) the groundwater flow model will be recalibrated to average observed water levels during each model update interval. e) geochemical modeling parameters will be refined based on observed water quality data and field parameters. f) solute transport modeling parameters will be refined based on			represents the ONLY tool (not empirical site data) that will permit evaluating whether the planned OR modified remedial system design and operation still meet all RAOs, especially over the long term (i.e., decades out). There is no way that empirical site data alone will be sufficient to confirm attainment of long-term RAOs, or long-term performance of the system. The risk to updating on an annual basis rather than for example, after specific sets of data are collected, significantly reduces the potential to learn about actual flow conditions within the natural hydrogeologic environment and how they will change. This in turn limits the ability to 'adaptively manage' the design and operation of the system. We recommend updating/ re-calibrating the model more frequently and immediately after sets of key wells are installed and tested. The model certainly doesn't have to 'drive' all decisions related to design modifications or operational changes BUT stakeholders need to get guarantees that the model will be updated, re-calibrated and future scenarios regenerated whenever new designs/operations are made primarily to ensure for stakeholders that all RAOs are being met, especially the long-term ones that cannot be assessed using "empirical" field data. ONLY the model	

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							observed water quality data and field parameters as well as geochemical modeling. g) actual remedy operation parameters will be integrated into the solute transport model (i.e. TOC concentration, TOC injection frequency, etc). h) solute transport model will be calibrated against observed movement of Cr(VI), Mn, and As during previous time interval. i) After model calibration, predictive modeling runs will be conducted to evaluate the simulated remedy performance in the future. j) Potential design updates and operations will be considered to further optimize remedy operation (i.e. pumping rates, TOC dosing concentration, dosing and operational frequency) j) Assessment of hydraulic capture zones based on simulated capture delineation and hydraulic gradients. The model will be used to predict future performance and assess the need for infrastructure changes in conjunction with empirical data. The model will not be used for all changes associated with system operation where current empirical data is a more accurate reflection of system performance and the need for operational changes; such as flow rate changes, TOC feed adjustments, and maintenance needs. 3. Text describing the use of models during the remedy installation,			can estimate the changed response in the future - i.e., cleanup times. But to do this, the model must be maintained (i.e., updated, calibrated and long-term future scenarios re-simulated). ALL stresses, and changes to stresses need to be monitored/measured to successfully re-calibrate the model. This will become a serious challenge to do correctly/adequately - and details of how updates and re-calibrations will be performed should be clearly defined for all stakeholders.	

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							start-up, and operation will be integrated into the model report.				
77	Hualapai/TRC	Non-design	GW Modeling		Overarching Comment	Modeling tools (microFEM, modflow and MT3D) have been critical to the development of both the proposed remedial system design and operations. Once the system is operating, observed water levels, hydraulic gradients and concentration trends will be compared to simulated values to make critical decisions (decision monitoring frameworks/tables) regarding changes to the currently proposed system design (i.e., new wells) and operation. These models have the ability to incorporate the best available information on the 3-dimensional aquifer geometry, heterogeneous hydraulic property distributions and complex array and timing of the proposed multi-layer injections and extractions. As such, they represent the best available tools for demonstrating to all stakeholders that the remedial system design and operation at any point in time continues to meet RAOs, and that any proposals to change the currently proposed design and operation will do so as well. Despite the clear importance and continued need for these modeling tools, especially during startup and early operations when adjustments to the design and operation will be most frequent, several issues have been identified. These issues are of considerable concern to Tribes because of the potential for poorly thought-out or 'urgent crisis' decisions which lead to increased number of wells/disturbance or unnecessarily impacting sensitive cultural areas. Key issues include: 1) Triggers (i.e., "significant differences") for updating/use of the models are still vague/non-committal as noted comment to the 60% BOD and highlighted in the Prucha, April 3, 2014 summary memo to the Tribes. 2) Details on approach/methodology for updating, re-calibrating, re-optimizing and re-running long-term remedial system operations remains vague and limited. Any re-calibration or modification to operations (i.e., rates, TOC dosing) or design (i.e., new wells) should require full re-evaluation of whether the modified system continues to meet RAOs, especially long-term remedial cleanup times. 3) Critical decisions on assessments and potential changes to the operation and design will be made based on various O&M Monitoring Decision Framework diagrams. But detailed narrative on updates to and use of the models is vague and limited.	See above			Using site specific empirical data can certainly be useful in evaluating the CURRENT system performance, but when considering changes to the design and operation of the remedial system, we believe the model will be essential for correctly guiding a) how much to adjust some knob, b) which direction to adjust the knob, c) which knob(s) to adjust. Probably more importantly, we continue to strongly feel that the model represents the ONLY tool (not empirical site data) that will permit evaluating whether the planned OR adjusted/ modified remedial system design and operation still meet all RAOs, especially over the long term (i.e., decades out). There is no way that empirical site data by itself will be able to confirm meeting long-term RAOs, or long-term performance of the system. The risk to updating on an annual basis rather than for example, after specific sets of data are collected, significantly reduces the potential to learn about actual flow conditions within the natural hydrogeologic environment and how they will change. This in turn limits the ability to 'adaptively manage' the design and operation of the system. We recommend updating/re-calibrating	A similar RTC (RTC #78) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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78	Cocopah/TRC	Non-design	GW Modeling		Overarching Comment	Modeling tools (microFEM, modflow and MT3D) have been critical to the development of both the proposed remedial system design and operations. Once the system is operating, observed water levels, hydraulic gradients and concentration trends will be compared to simulated values to make critical decisions (decision monitoring frameworks/tables) regarding changes to the currently proposed system design (i.e., new wells) and operation. These models have the ability to incorporate the best available information on the 3-dimensional aquifer geometry, heterogeneous hydraulic property distributions and complex array and timing of the proposed multi-layer injections and extractions. As such, they represent the best available tools for demonstrating to all stakeholders that the remedial system design and operation at any point in time continues to meet RAOs, and that any proposals to change the currently proposed design and operation will do so as well. Despite the clear importance and continued need for these modeling tools, especially during	See above			Using site specific empirical data can certainly be useful in evaluating the CURRENT system performance, but when considering changes to the design and operation of the remedial system, we believe the model will be essential for correctly guiding a)	This RTC was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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						startup and early operations when adjustments to the design and operation will be most frequent, several issues have been identified. These issues are of considerable concern to Tribes because of the potential for poorly thought-out or 'urgent crisis' decisions which lead to increased number of wells/disturbance or unnecessarily impacting sensitive cultural areas. Key issues include: 1) Triggers (i.e., "significant differences") for updating/use of the models are still vague/non-committal as noted comment to the 60% BOD and highlighted in the Prucha, April 3, 2014 summary memo to the Tribes. 2) Details on approach/methodology for updating, re-calibrating, re-optimizing and re-running long-term remedial system operations remains vague and limited. Any re-calibration or modification to operations (i.e., rates, TOC dosing) or design (i.e., new wells) should require full re-evaluation of whether the modified system continues to meet RAOs, especially long-term remedial cleanup times. 3) Critical decisions on assessments and potential changes to the operation and design will be made based on various O&M Monitoring Decision Framework diagrams. But detailed narrative on updates to and use of the models is vague and limited.				how much to adjust some knob, b) which direction to adjust the knob, c) which knob(s) to adjust. Probably more importantly, we continue to strongly feel that the model represents the ONLY tool (not empirical site data) that will permit evaluating whether the planned OR adjusted/ modified remedial system design and operation still meet all RAOs, especially over the long term (i.e., decades out). There is no way that empirical site data by itself will be able to confirm meeting long-term RAOs, or long-term performance of the system. The risk to updating on an annual basis rather than for example, after specific sets of data are collected, significantly reduces the potential to learn about actual flow conditions within the natural hydrogeologic environment and how they will change. This in turn limits the ability to 'adaptively manage' the design and operation of the system. We recommend updating/re-calibrating the model more frequently and immediately after sets of key wells are installed and tested. The model certainly doesn't have to 'drive' all decisions related to design modifications or operational changes BUT stakeholders need to get guarantees that the model will be updated, re-calibrated and future scenarios	

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										regenerated whenever new designs/operations are made primarily to ensure for stakeholders that all RAOs are being met, especially the long-term ones that can't be assessed using 'empirical' field data. ONLY the model can estimate the changed response in the future - i.e., cleaup times. But to do this, the model must be maintained (ie updated, calibrated and long-term future scenarios resimulated). ALL stresses, and changes to stresses need to be monitored/ measured to successfully re-calibrate the model. This will become a serious challenge to do correctly/adequately - and details of how updates and re-calibrations will be performed should be clearly defined for all stakeholders.	
79	Chemehuevi/ TRC	Non-design	GW Modeling		Overarching Comment	Modeling tools (microFEM, modflow and MT3D) have been critical to the development of both the proposed remedial system design and operations. Once the system is operating, observed water levels, hydraulic gradients and concentration trends will be compared to simulated values to make critical decisions (decision monitoring frameworks/tables) regarding changes to the currently proposed system design (i.e., new wells) and operation. These models have the ability to incorporate the best available information on the 3-dimensional aquifer geometry, heterogeneous hydraulic property distributions and complex array and timing of the proposed multi-layer injections and extractions. As such, they represent the best available tools for demonstrating to all stakeholders that the remedial system design and operation at any point in time continues to meet RAOs, and that any proposals to change the currently proposed design and operation will do so as well. Despite the clear importance and continued need for these modeling tools, especially during startup and early operations when adjustments to the design and operation will be most frequent, several issues have been identified. These issues are of considerable concern to Tribes because of the potential for poorly thought-out or 'urgent crisis' decisions which lead to increased number of wells/disturbance or unnecessarily impacting sensitive cultural areas. Key issues include: 1) Triggers (i.e., "significant differences") for updating/use of the models are still vague/non-committal as noted comment to the 60% BOD and highlighted in the Prucha, April 3, 2014 summary memo to the Tribes. 2) Details on approach/methodology for updating, re-calibrating, re-optimizing and re-running long-term remedial system operations remains vague and limited. Any re-calibration or modification to operations (i.e., rates, TOC dosing) or design (i.e., new wells) should require full re-evaluation of whether the modified system continues to meet RAOs, especially long-term remedial cleanup times. 3) Critical decisions on assessments and potential changes to the operation and design will be made based on various O&M Monitoring Decision Framework diagrams. But detailed narrative on updates to and use of the models is vague and limited.	See above			Using site specific empirical data can certainly be useful in evaluating the CURRENT system performance, but when considering changes to the design and operation of the remedial system, we believe the model will be essential for correctly guiding a) how much to adjust some knob, b) which direction to adjust the knob, c) which knob(s) to adjust. Probably more importantly, we continue to strongly feel that the model represents the ONLY tool (not empirical site data) that will permit evaluating whether the planned OR adjusted/ modified remedial system design and operation still meet all	A similar RTC (RTC #78) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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										long-term future scenarios resimulated). ALL stresses, and changes to stresses need to be monitored/ measured to successfully re-calibrate the model. This will become a serious challenge to do correctly/adequately - and details of how updates and re-calibrations will be performed should be clearly defined for all stakeholders.	
Specific Comments – 90% BOD, Executive Summary											
80	FMIT-16	Non-design	Editorial	Executive Summary	Global ES	This ES represents a helpful compilation of information about the 90% BOD. The tabular summaries and provided figures are an excellent summary of information for the reviewers. It might have been nice to have the ES separate from the remainder of the voluminous document.	PG&E appreciates the Tribe's feedback and is glad that the tabular summaries and figures provided in the 90% BOD are useful to the Tribe in your review. It is customary that an executive summary be created for large documents to provide an overview of key contents in the document, and to refer the readers to subsequent chapters for additional details. Separation of the executive summary from the remainder of the document defeats the purpose of an executive summary and introduces yet another document to account for. Therefore, it is not recommended.		Comment noted.		
81	DOI-1	Non-design	Process	ES Introduction/ v	As shown, inputs from Interested Tribes and Stakeholders were solicited and received on the preliminary (30%) and intermediate (60%) Basis of Design Submittals (30% BOD [CH2M HILL	The text inappropriately identifies that comments were solicited only from "interested Tribes and Stakeholders". In accordance with the PA, comments were solicited from all nine federally recognized Tribes. Comments were received from a subset of those Tribes, specifically the Fort Mojave, Hualapai, Cocopah, and Chemehuevi Indian Tribes. Input was received from these Tribes and the Colorado River Indian Tribe throughout the design process. A notation/footnote should be inserted here to note that the term "interested Tribes" will be used to reference the aforementioned Tribes.	Text will be revised to state that comments were solicited from nine federally recognized Tribes, and comments were received throughout the design process from a subset of those Tribes, specifically the Fort Mojave, Hualapai, Cocopah, Chemehuevi, and Colorado River Indian Tribes. A footnote will be inserted to note that the term "Interested				Comment resolved pending DOI review of the final design documents.

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					2011l] and 60% BOD [CH2M HILL 2013k]) and are being solicited again at this 90% design stage.		Tribes" is used to reference the aforementioned Tribes plus the Fort Yuma-Quechan Tribe.				
82	FMIT/TRC 1s	Design	Process	ES.1 Overview	Surrounding project site includes land owned and/or managed by a number of government and private entities	At what point will the final decision on use of private lands be determined. In the case that private land owners do not grant permission for a remedial infrastructure as proposed within the 90% BOD, how will design changes be effected and how will tribes be involved.	PG&E is working diligently to secure all necessary access agreements for remedy implementation, consistent with the requirements in the Corrective Action Consent Agreement between PG&E and DTSC and the Remedial Design/Remedial Action Consent Decree between PG&E and the United States, on behalf of DOI. If a needed access agreement cannot be obtained, PG&E will inform the Agencies and propose solutions which may include design modifications.	Deviation from the approved design will be communicated to the Tribes. It is DTSC's expectations that PG&E will have all access agreements within 30 days of the approval of the C/RAWP in accordance with the 1996 CACA and design of outstanding infrastructures flushed out during the RTC process for DTSC's CEQA consideration prior to design approval.	DOI concurs with PG&E response.		A similar RTC (RTC #84) was discussed at the August 18 TWG meeting.
83	Hualapai/TRC 1s	Design	Process	ES.1 Overview	Surrounding project site includes land owned and/or managed by a number of government and private entities	At what point will the final decision on use of private lands be determined. In the case that private land owners do not grant permission for a remedial infrastructure as proposed within the 90% BOD, how will design changes be effected and how will tribes be involved.	See above	See above	See above	Hualapai reiterates the need to be included (along with DOI and DTSC) as a primary party in communications regarding all project design changes, or work variance requests including material deviations from the design documents and/or C/RAWP due to discovery of changed site conditions as discussed in these earlier comments (at left). Communicating these changes needs to occur as soon as it is known that a change needs to be made. Hualapai needs to be included in those discussions via informing a tribal monitor, or email or telephone calls to designated points of contact. Once the change has been approved then a formal	A similar RTC (RTC #84) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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										document can be forwarded to Hualapai. Hualapai state their intended interest to stay involved with decisions addressing any deviations during implementation of the work plan with the same level of involvement that has occurred during the drafting of the work plan. This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources identified by Hualapai and other interested tribes as well as to notify Tribes of the need for particular wells.	
84	Cocopah/TRC 1s	Design	Process	ES.1 Overview	Surrounding project site includes land owned and/or managed by a number of government and private entities	At what point will the final decision on use of private lands be determined. In the case that private land owners do not grant permission for a remedial infrastructure as proposed within the 90% BOD, how will design changes be effected and how will tribes be involved.	See above	See above	See above	The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape. The Tribes state their intended interest to stay involved with decisions addressing any deviations during implementation of the work plan with the same level of involvement that has	This RTC was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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										occurred during the drafting of the work plan This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources identified by Tribes as well as to notify Tribes of the need for particular wells.	
85	Chemehuevi/ TRC 1s	Design	Process	ES.1 Overview	Surrounding project site includes land owned and/or managed by a number of government and private entities	At what point will the final decision on use of private lands be determined. In the case that private land owners do not grant permission for a remedial infrastructure as proposed within the 90% BOD, how will design changes be effected and how will tribes be involved.	See above	See above	See above	The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape. The Tribes state their intended interest to stay involved with decisions addressing any deviations during implementation of the work plan with the same level of involvement that has occurred during the drafting of the work plan This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and	A similar RTC (RTC #84) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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										environmental resources identified by Tribes as well as to notify Tribes of the need for particular wells.	
86	FMIT/TRC 1l	Design	CEQA/EIR	ES.1 Overview	Specifically, impacts to cultural resources will be minimized by implementing the mitigation measures required by the Mitigation Monitoring and Reporting Program (MMRP; DTSC 2011a), adopted by DTSC in 2011 as part of the certified EIR (DTSC 2011b). In addition, mitigation measures have been and will continue to be implemented in accordance with the Programmatic Agreement (PA; BLM 2010); the Cultural and Historic Properties Management Plan (CHPMP; BLM 2012); the Cultural Impact Minimization Program (CIMP; PG&E 2014); and in consultation with the Tribes throughout the construction and startup process. The work will be conducted in a manner that recognizes and respects these resources and	The tribes would like for the report to indicate that consultation with the Tribes will continue through and beyond the startup process. Specifically the Tribes would like for any changes that are made post the construction and startup process that deviate from the design as dictated in the final 100% BOD to require Tribal consultation prior to implementation.	Please see RTCs #44 FMIT/TRC, #45 Hualapai/ TRC, #46 Cocopah/TRC, #47 Chemehuevi/TRC, #56 FMIT/TRC, #57 Hualapai/ TRC, #58 Cocopah/TRC, #59 Chemehuevi/TRC.			Please see response to comment FMIT/TRC RTC #44.	A similar RTC (RTC #88) was discussed at the August 18 TWG meeting. The Tribes and DOI/BLM will discuss which changes during construction invoke Tribal consultation.

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					the spiritual values of the area.						
87	Hualapai/TRC 1l	Design	CEQA/EIR	ES.1 Overview	Specifically, impacts to cultural resources will be minimized by implementing the mitigation measures required by the Mitigation Monitoring and Reporting Program (MMRP; DTSC 2011a), adopted by DTSC in 2011 as part of the certified EIR (DTSC 2011b). In addition, mitigation measures have been and will continue to be implemented in accordance with the Programmatic Agreement (PA; BLM 2010); the Cultural and Historic Properties Management Plan (CHPMP; BLM 2012); the Cultural Impact Minimization Program (CIMP; PG&E 2014); and in consultation with the Tribes throughout the construction and startup process. The work will be conducted in a manner that recognizes and respects these resources and the spiritual values of the area.	The tribes would like for the report to indicate that consultation with the Tribes will continue through and beyond the startup process. Specifically the Tribes would like for any changes that are made post the construction and startup process that deviate from the design as dictated in the final 100% BOD to require Tribal consultation prior to implementation.	See above			See response to comment Hualapai/ TRC RTC #83.	A similar RTC (RTC #88) was discussed at the August 18 TWG meeting. Tribes and DOI/BLM will discuss which changes during construction invoke Tribal consultation.

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88	Cocopah/TRC 1l	Design	CEQA/EIR	ES.1 Overview	Specifically, impacts to cultural resources will be minimized by implementing the mitigation measures required by the Mitigation Monitoring and Reporting Program (MMRP; DTSC 2011a), adopted by DTSC in 2011 as part of the certified EIR (DTSC 2011b). In addition, mitigation measures have been and will continue to be implemented in accordance with the Programmatic Agreement (PA; BLM 2010); the Cultural and Historic Properties Management Plan (CHPMP; BLM 2012); the Cultural Impact Minimization Program (CIMP; PG&E 2014); and in consultation with the Tribes throughout the construction and startup process. The work will be conducted in a manner that recognizes and respects these resources and the spiritual values of the area.	The tribes would like for the report to indicate that consultation with the Tribes will continue through and beyond the startup process. Specifically the Tribes would like for any changes that are made post the construction and startup process that deviate from the design as dictated in the final 100% BOD to require Tribal consultation prior to implementation.	See above			See response to Cocopah RTC #84.	This RTC was discussed at the August 18 TWG meeting. Tribes and DOI/BLM will discuss what changes during construction invoke Tribal consultation.
89	Chemehuevi/ TRC 1l	Design	CEQA/EIR	ES.1 Overview	Specifically, impacts to cultural	The tribes would like for the report to indicate that consultation with the Tribes will continue through and beyond the startup process. Specifically the Tribes would like for any changes that are made post the construction and startup process that deviate from the design as dictated in the final 100%	See above			See Chemehuevi/TRC RTC #85	A similar RTC (RTC #88) was discussed at the August 18

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					resources will be minimized by implementing the mitigation measures required by the Mitigation Monitoring and Reporting Program (MMRP; DTSC 2011a), adopted by DTSC in 2011 as part of the certified EIR (DTSC 2011b). In addition, mitigation measures have been and will continue to be implemented in accordance with the Programmatic Agreement (PA; BLM 2010); the Cultural and Historic Properties Management Plan (CHPMP; BLM 2012); the Cultural Impact Minimization Program (CIMP; PG&E 2014); and in consultation with the Tribes throughout the construction and startup process. The work will be conducted in a manner that recognizes and respects these resources and the spiritual values of the area.	BOD to require Tribal consultation prior to implementation.					TWG meeting. Tribes and DOI/BLM will discuss what changes during construction invoke Tribal consultation.
90	DTSC-9	Non-design	Editorial	ES.1 Overview/ Page vii	Data collected during the East Ravine Groundwater Investigation indicate that	The cited sentence should be revised. As constructed, the sentence can suggest that all bedrock groundwater occurs simultaneously in irregularly distributed, highly localized, and discontinuous water-bearing zones. The data indicates that bedrock groundwater typically occurs in irregularly distributed fractures. The basis for stating that the bedrock groundwater occurs in discontinuous water-bearing zones should be supported and clarified. As the bedrock formations are generally hydraulically connected to river fluctuations and the more permeable bedrock wells are suggested	The cited sentence will be edited as follows: "Data collected during the East Ravine Groundwater	Resolved.			Comment resolved.

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					groundwater in bedrock occurs in irregularly distributed, highly localized, and discontinuous water-bearing zones, which is characteristic of fractured crystalline rocks.	to be connected with the alluvium, it is currently requested that the sentence be revised to omit "discontinuous water-bearing zones". Identical language and change requested on Section 2.2, Page 2-4.	Investigation indicate that groundwater in bedrock occurs in <u>an</u> irregularly distributed and <u>complex network of fractures</u> ~~discontinuous water-bearing zones~~, which is characteristic of fractured crystalline rocks." The same edits will be made to the sentence in Section 2.2, Page 2-4.				
91	MWD	Non-design	Editorial	ES.2/vii; Sect. 1.2.1/1-8	The Remedial Action Objectives (RAOs) for selected groundwater remedy at the Topock site.	California's MCL of 10 ug/L for hexavalent chromium is cited in Item No. 52 of Table 6.2-1 (Basis of Design Report/Pre-final 90% Design Submittal). California's MCL for hexavalent chromium should also be cited throughout the document whenever the water quality standards that support the designated beneficial uses of the Colorado River are referenced (such as in RAO #2 on page vii of the Executive Summary and in Section 1.2.1).	As mentioned in Item 100 of Table 6.2-1, reducing Cr(VI) concentrations in groundwater by implementation of the remedy will increase the level of certainty that surface water quality will continue to remain below the designated beneficial uses of the Colorado River. To date, surface water sampling in the Colorado River upstream, midstream, and downstream of the Topock site show concentrations of Cr(VI) less than the California Toxics Rule criteria of 11 µg/L (protection of freshwater aquatic life) and the California MCL for Cr(VI) of 10 µg/L. Surface water sampling will be conducted during remedy start-up and operations to confirm and document compliance with RAO #2. If Cr(VI), and manganese concentrations in surface water samples increase and are attributed to the Topock site, operational adjustments will be made according to the decision rules presented in the O&M Manual. If Cr(VI), arsenic, and manganese concentrations do not return to baseline as a result of operational adjustments, the				Comment resolved.

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							contingency plan will be implemented.				
92	FMIT-17	Non-design	Other	ES.2, p. vii	RAO #4	It is noted that RAO #4 addresses the *permanent* expansion of the "target remediation area." Accordingly, this permits at least a temporary expansion. For example, the migration of the plume beyond its initial footprint.	Comment noted. Data will be collected as part of the Compliance Monitoring Program (Section 2.1 of the Sampling and Monitoring Plan, O&M Manual Volume 2) to ensure compliance with this RAO. As the remedy is implemented, data will be collected to determine whether operations or remedy components should be modified to meet the RAO. Groundwater samples will be collected periodically from the Compliance Monitoring Program well network outside the plume. The compliance monitoring wells outside the plume are shown on Figure 2.1-1 and listed in Table 2.1-3. The data collected will be analyzed to ensure that the concentrations of Cr(VI) and remedy by-products, specifically manganese and arsenic, do not permanently increase outside of the baseline Cr(VI) plume. Monitoring for COPCs will also be conducted as described in Section 5.1 and summarized in Table 2.1-6.			How the monitoring data outside the footprint will be used to differentiate whether the plume has temporarily or permanently expanded should be explained further.	DTSC Response: Monitoring data will continue to be reviewed throughout the life of the remedy. DTSC's position is to maintain the water quality outside of the plume in compliance with the anti-degradation policy. Continuous exceedances or changes to the water chemistry outside of the plume will warrant discussion and careful evaluation. At a minimum, the required 5 year reviews will be a trigger for such an evaluation, if not earlier.
93	DTSC-10	Non-design	Process	ES.2, p vii	Attaining the cleanup criteria of 32 µg/L Cr(VI) in groundwater may be through active	The referenced text is not quite accurate. The use of "Monitored Natural Attenuation" is appropriate only after optimization of the active remedy and as a long term component to address residual hexavalent chromium as stated in the following paragraph on that page and per the January 31, 2010 statement of basis. Recommend changing the last part of the sentence to "…or monitored natural attenuation after active remediation has been employed and optimized."	As recommended, the bullet will be revised as follows (<u>underline</u> for text addition): "Attaining the cleanup criteria of 32 µg/L Cr(VI)	Resolved.			Comment resolved.

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					remediation or through natural attenuation.		in groundwater may be through active remediation or through <u>monitored natural attenuation (MNA) after active remediation has been employed and optimized</u>."				
94	FMIT-18	Design	Contingencies	ES.2, p. vii, beginning at 2nd para. from bottom and continuing onto p. viii.	Discussion of MNA as a long-term component of the groundwater remedy.	This section provides for the contingency of using MNA as a component remedy based on the recalcitrance of certain areas of the aquifer. Such decisions would be made during the 5-year review(s) on the basis of information gathered in the field. The concept of recalcitrance resulting from heterogeneities in the aquifer is understood, however, further insight as to what might be considered acceptable timeframes for such allowable MNA to occur. It is noted that the projected timeframe for the CMS/FS MNA scenario was considered unacceptable by the Regional Board. How might the timeframe(s) for MNA to achieve RAOs be viewed for these (presently unknown) recalcitrant areas? Has PG&E done any simulation to assess this using a reasonable sensitivity range? Is it likely that the MNA timeframes projected for recalcitrant areas be similarly viewed as unacceptable, thereby triggering future expansion of the remedy?	MNA would be applied following active remediation for relative smaller and/or lower concentration areas than the current plume that is to be remediated. The time for concentrations to reduce to less than 32 ppb would depend on the concentration, size and local hydrogeologic conditions of any recalcitrant portion(s) of the plume. Modeling has not been conducted of MNA of potentially recalcitrant areas following active remediation, and modeling results would be highly uncertain before the areas are identified and the factors affecting timeframe are known. It is possible that the timeframe could extend beyond the currently described 10 year MNA timeframe. Given that the aerial extent and potential mass in recalcitrant areas is anticipated to be much smaller relative to the current plume and that the fact that these areas are recalcitrant indicating limited mobility, the agencies may have a different view on the acceptability of timeframes for this portion of the remedy.			The Tribe is interested in hearing how the agencies may view the acceptability of the timeframes for recalcitrant areas differently.	The Agencies will evaluate the extent and mass of contamination of recalcitrant zones during 5-year reviews to determine if the current remedy is still effective. MNA is considered a long-term component of the remedy in addressing residual contamination.
95	DTSC-11	Design	Remedial design	ES.2 Remedial Action Objectives, Completion Criteria/ Performance Standards, and Short-Term	"Based on modeling, the current projection of the remedial timeframe is 30 years of active remediation	Item 1: The section introduces how MNA may be used in the remedy, but the cited sentence doesn't account for the likely effect that MNA would have on the cleanup schedule. Suggest adding the following sentence after the cited sentence, "This timeframe does not account for any additional time for monitoring that may be required if MNA is selected for portions of the plume. Item 2: Text should be revised to clarify why a remedial timeframe of 30 years is stated, yet modeling (see Figures 7.1-1 to 4 of the Appendix B modeling section) illustrates that the plume is not cleaned up after 30 years.	The 30 years of active remediation quoted in this comment refers to the target remedial timeframe. As discussed in Section 7.1 of the groundwater modeling Appendix B, the majority	Resolved.			Comment resolved.

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				Goals/ Page viii	followed by up to 10 years of long term monitoring and up to 20 years of arsenic monitoring."		of the alluvial Cr(IV) plume in all for model layers has been remediated by year 30 of the simulated transport run of the nominal case design. The alluvial aquifer Cr(VI) remaining at year 30 for the nominal case is a relatively small footprint located just upgradient of the central portion of the NTH IRZ, as shown on Figures 7.1-1 through 7.1-4. As discussed in this modeling section, optimization of the nominal case over time will be needed to reduce the timeframe toward the target of 30 years. One potential optimization, the addition of intermediate recirculation wells IRL-6 and IRL-7 at year 20 was evaluated in the modeling (Appendix B, Section 10.13). The results shown on Figures 10.13-1 and 10.13-2 indicate this intermediate recirculation well pair can reduce the remaining footprint of the Cr(VI) plume. In practice, routine data evaluations will be conducted to inform the remedy improvements needed to meet the 30 year timeframe target. The following edits will be made to clarify these points in the text (revisions are shown as underline for added text and ~~strikeout~~ as deleted text): "~~Based on modeling, the current projection of t~~ The anticipated remedial timeframe is 30 years of active remediation followed by up to 10 years of long term monitoring and up to 20 years of arsenic				

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							monitoring. <u>This timeframe does not account for any additional time for monitoring that may be required if MNA is selected for portions of the plume and extends past the 10 years of long term monitoring</u>."				
96	FMIT-19	Design	Remedial Design	ES.2, p. viii	Bullets describing OF & OPS	How do OF and OPS differ? Would it be possible to achieve one without the other? The paragraph above the bullets describes the development of short-term goals and criteria for such evaluations. When will this information be available? The FMIT would like to be involved in discussions during the development of these goals and criteria, as well as in the process of evaluating OF and OPS.	Section 6.2 (Functional Testing, Startup, and Transition to O&M) of the C/RAWP provides expanded discussions of OF and OPS and descriptions of activities involved in making OF and OPS determination. In brief, OPS determination overlaps with OF determination, and the two work in tandem to ensure that the remedy functions and operates properly and successfully. See also DTSC and DOI's responses to this comment.	DOI and DTSC have sole responsibility for the OF and OPS determinations, respectively. Short term goals and criteria are based on agencies' expectations of the design as proposed by the design. The agencies will openly discuss the rationale and approach with stakeholders and Tribes before setting those goals.	The NCP, 40 CFR§300.435(f)(2), states, "A remedy becomes 'operational and functional' either one year after construction is complete, or when the remedy is determined concurrently by EPA and the State to be functioning properly and is performing as designed, whichever is earlier. EPA may grant extensions to the one-year period, as appropriate." DOI, as the lead CERCLA agency, will make the OF determination in coordination with DTSC's OPS determination. DOI and DTSC have sole responsibility for the OF and OPS determinations, respectively, and will conduct a joint inspection at the conclusion of construction of the groundwater remedy to determine that it has been constructed properly. The joint inspection also marks the beginning of the one-year O&F period described above. After the remedy has been	Noted.	

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									operating for approximately one year, the determination of O&F signifies the end of the shakedown period, when the remedy is determined to be operating as designed.		
97	FMIT/TRC 1a	Non-design	Process	ES.2 Remedial Action Objectives, Completion Criteria/ Performance Standards, and Short- Term Goals	Monitored natural attenuation (MNA) is included as a long-term component of the groundwater remedy to address residual chromium that may remain in recalcitrant portions of the aquifer following efforts to enhance and optimize in-situ treatment and flushing systems during the O&M phase. Decisions on specific areas of the plume appropriate for MNA will be made during future evaluations, such as the 5-year reviews to be conducted by DTSC and DOI, based on information about the types and options for active remediation system adjustments, data evaluating the effectiveness of active remediation	What level of involvement in these types of decisions will be provided to the Tribal stakeholders? Please clearly communicate how the Tribes will be part of the data review and decision making process for future remedial design processes including decisions on areas eligible for MNA and when the appropriate timing for MNA?	The agencies will make the decisions regarding MNA cited in the referenced text. PG&E defers to the agencies for response on Tribal involvement in agencies' decision making process. During O&M, quarterly progress reports will be a key tool for PG&E to inform agencies, stakeholders, and Tribes of, amongst other things, operational status of the remedy and remedy performance including a description of the monitoring events and sampling performed during the current reporting period, the sampling results and interpretation of results (including volume of water collecte d and treated, Cr(VI) ma ss treated, influent-effluent data, etc.), an interpretation of progress toward RAOs, any request for material deviations from design documents and O&M Manual (e.g., gaps or inconsistencies in the site conceptual model) and agencies' actions. See Exhibit L2.2-2 (Quarterly Progress Report Template) of the O&M Manual for additional details. The reports will be submitted to DTSC and DOI, and will be posted on a SharePoint site for access by Tribes and stakeholders. Other	PG&E must submit all MNA proposals in writing for agency consideration. These proposals, however, must be based on their evaluation of the progress of the remedy. Furthermore, the remedy progress would be documented in the periodic (quarterly) remedy progress reports which will also be provided to all stakeholders as they are submitted. DTSC also expects PG&E to summarize and report significant information and findings of those periodic reports during the regular CWG meetings.	The DOI 2011 Record of Decision states " Because the variable nature of the geologic materials beneath the site may result in some localized areas being resistant to in-situ treatment and flushing, the Selected Remedy also includes monitored natural attenuation as a long term component to address residual Cr (VI) that may remain in portions of the aquifer formation after a majority has been treated by In-situ Treatment with Fresh Water Flushing." As part of the ongoing remedy review and during the 5-year review process, DOI and DTSC will evaluate the effectiveness of the remedy and determine if MNA is appropriate for areas where residual Cr(VI) remains that cannot be addressed through the more active in-situ treatment. PG&E will provide any documentation to support this determination. Tribes and stakeholders may	Please see response to comment FMIT/TRC RTC #44.	A similar RTC (RTC #99) was discussed at the August 18 TWG meeting.

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					systems, and location of proposed MNA areas relative to natural reductive zones in the aquifer.		venues for posting these reports may be utilized during the decades-long operation of the remedy.		provide input to the agencies for consideration during the ongoing remedy evaluation and 5-year review process.		
98	Hualapai/TRC 1a	Non-design	Process	ES.2 Remedial Action Objectives, Completion Criteria/ Performance Standards, and Short- Term Goals	Monitored natural attenuation (MNA) is included as a long-term component of the groundwater remedy to address residual chromium that may remain in recalcitrant portions of the aquifer following efforts to enhance and optimize in-situ treatment and flushing systems during the O&M phase. Decisions on specific areas of the plume appropriate for MNA will be made during future evaluations, such as the 5-year reviews to be conducted by DTSC and DOI, based on information about the types and options for active remediation system adjustments, data evaluating the effectiveness of active remediation systems, and location of proposed MNA areas relative	What level of involvement in these types of decisions will be provided to the Tribal stakeholders? Please clearly communicate how the Tribes will be part of the data review and decision making process for future remedial design processes including decisions on areas eligible for MNA and when the appropriate timing for MNA?	See above	See above	See above	See response to comment Hualapai/ TRC RTC #83.	A similar RTC (RTC #99) was discussed at the August 18 TWG meeting.

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					to natural reductive zones in the aquifer.						
99	Cocopah/TRC 1a	Non-design	Process	ES.2 Remedial Action Objectives, Completion Criteria/ Performance Standards, and Short- Term Goals	Monitored natural attenuation (MNA) is included as a long-term component of the groundwater remedy to address residual chromium that may remain in recalcitrant portions of the aquifer following efforts to enhance and optimize in-situ treatment and flushing systems during the O&M phase. Decisions on specific areas of the plume appropriate for MNA will be made during future evaluations, such as the 5-year reviews to be conducted by DTSC and DOI, based on information about the types and options for active remediation system adjustments, data evaluating the effectiveness of active remediation systems, and location of proposed MNA areas relative to natural reductive zones in the aquifer.	What level of involvement in these types of decisions will be provided to the Tribal stakeholders? Please clearly communicate how the Tribes will be part of the data review and decision making process for future remedial design processes including decisions on areas eligible for MNA and when the appropriate timing for MNA?	See above	See above	See above	See response to Cocopah RTC #84	This RTC was discussed at the August 18 TWG meeting.
100	Chemehuevi/	Non-design	Process	ES.2 Remedial	Monitored	What level of involvement in these types of decisions will be provided to the Tribal	See above	See above	See above	See Chemehuevi/TRC	A similar RTC (RTC

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	TRC 1a			Action Objectives, Completion Criteria/ Performance Standards, and Short- Term Goals	natural attenuation (MNA) is included as a long-term component of the groundwater remedy to address residual chromium that may remain in recalcitrant portions of the aquifer following efforts to enhance and optimize in-situ treatment and flushing systems during the O&M phase. Decisions on specific areas of the plume appropriate for MNA will be made during future evaluations, such as the 5-year reviews to be conducted by DTSC and DOI, based on information about the types and options for active remediation system adjustments, data evaluating the effectiveness of active remediation systems, and location of proposed MNA areas relative to natural reductive zones in the aquifer.	stakeholders? Please clearly communicate how the Tribes will be part of the data review and decision making process for future remedial design processes including decisions on areas eligible for MNA and when the appropriate timing for MNA?				RTC#85	#99) was discussed at the August 18 TWG meeting.
101	DTSC-12	Design	Editorial	ES.3 Summary of Engineering Design Parameters and	"Injection of fresh water to assist with flushing the chromium	Revise cited text as follows: "Injection of fresh water to control and confine the plume migration to the west, assist with flushing the chromium plume through the NTH IRZ, and to constrain westward spread of carbon-amended water and in-situ byproducts from the Inner Recirculation Loop." A main purpose of fresh water injection has always been to confine the chromium plume along the	The cited text will be edited as indicated in the comment in Section ES.3 and throughout the document.	Resolved.			Comment resolved.

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				Features/Key Changes from 60% to 90% Design/ Page ix	plume through the NTH IRZ and to constrain westward spread of carbon-amended water and in-situ byproducts from the Inner Recirculation Loop."	western boundary. Revise this and other similar text throughout the document (e.g., Section 3.3, page 3-30, C/RAWP Section 3.1, Page 3-1).					
102	DTSC-14	Design	Editorial	ES.3 Summary of Engineering Design Parameters and Features/Key Changes from 60% to 90% Design/ Page ix	"DTSC also notes that the removal of fluoride from fresh water is not warranted due to the elevated baseline fluoride concentrations (i.e., values already above the MCL) in the area where fresh water will be injected."	For accuracy, the sentence should be revised as follows, "DTSC also notes that the removal of fluoride from fresh water is currently not warranted as fresh water fluoride concentrations are similar to the concentrations in the injection area and both are ~~due to the elevated baseline fluoride concentrations (i.e., values~~ already above the MCL~~) in the area where fresh water will be injected~~." Make similar text change in Exhibit 3.3-1 page 3-34, and on page 3-36.	Revision will be made as requested.	Resolved.			Comment resolved.
103	DTSC-15	Non-design	Editorial	ES.3 Summary of Engineering Design Parameters and Features/Key Changes from 60% to 90% Design/ Page ix	"Conceptual visualizations of select features were prepared and are presented in Figures ES-5 through ES-7 to facilitate visualization of these remedy features. Based on inputs from Agencies, Interested Tribes, and Stakeholders and through further design development, a number of key adjustments were made between the intermediate (60%) and this pre-final (90%) design. Figures ES-8 through ES-11 illustrate the key changes	Correct typo as follows: "Conceptual visualizations of select features were prepared and are presented in Figures ES-5 through ES-~~7~~8 to facilitate visualization of these remedy features. Based on inputs from Agencies, Interested Tribes, and Stakeholders and through further design development, a number of key adjustments were made between the intermediate (60%) and this pre-final (90%) design. Figures ES-~~8~~9 through ES-11 illustrate the key changes graphically to facilitate visualization and understanding of these changes; detailed descriptions are provided in the body of this report."	Correction will be made as requested.	Resolved.			Comment resolved.

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					graphically to facilitate visualization and understanding of these changes; detailed descriptions are provided in the body of this report."						
104	DTSC-13	Design	Infrastructures	ES, p X, second to last paragraph	Results from this evaluation will be included in the final (100%) design.	All design elements should be included in 90%. DTSC recommends PG&E to resolve this pipeline alignment and provide the design as soon as possible for evaluation.	Comment noted. PG&E's goal is to resolve the pipeline alignment referenced in the cited text during the 90% RTC period. PG&E has reviewed the recommended changes to this crossing and submitted the revised design for both the northern and southern crossings of Bat Cave Wash (see **Attachment C** of the final RTC table).	Resolved.			Comment resolved.
105	FMIT-20	Design	Infrastructures	ES.3. p. x	5th bullet describing staging areas and support zones	FMIT is opposed to certain staging areas/support zones identified. This is discussed further in regard to Figure 4.2-3 of the C/RAWP.	Please see RTC #860 FMIT/TRC, #861 Hualapai/ TRC, #862 Cocopah/TRC, and #863 Chemehuevi/TRC.				This RTC and other RTCs related to staging areas were discussed at the July 23, August 19, and August 26 TWG meetings.
106	MWD	Non-design	Other	ES-4/xi; Sect. 5.0/5- 1; Figure 5.1-1	Institutional Controls	Figure 5.1-1 shows the line for the approximate area for Category 1 Institutional Control going through the top left corner of Metropolitan's property. Section 5.0 is silent on property owned by Metropolitan that is within the southeastern area of the designated Area of Potential Effects (APE). Either the APE boundary should not include Metropolitan's property, or access and other control issues should be described.	As noted, the APE boundary includes a small area of MWD's property. At this time, PG&E does not propose groundwater remedial infrastructure nor plan to conduct remedial activities on MWD property. Therefore, PG&E does not request access to MWD's property for the purpose of remedial or investigative activities. Further, in discussions with DTSC and DOI, a Category 1 IC is determined to not be necessary at this time by the Agencies for the MWD property. The need for and effectiveness of institutional controls for the remedy will continue to be evaluated in the		The APE refers to the geographic area or areas within which an Undertaking may directly or indirectly cause alterations in the character or use of historic properties. The APE for this Undertaking was initially comprised of 1,600.69 acres of surface area, 325 and a section of the Colorado River. The Programmatic Agreement (PA) notes that "At each phase (workplan or design document) of implementation of the Undertaking, an evaluation will occur to determine if the APE should be amended." This		Comment resolved.

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							future, including during 5-year reviews to be conducted by DTSC and DOI.		evaluation will occur once the final groundwater remedy boundaries are determined. BLM will take the MWD comment into consideration during the evaluation. The PA also defines the process for revising the boundaries.		
107	FMIT-21	Design	Legal	ES.4	Summary of ICs	This section broadly describes IC categories potentially anticipated in conjunction with the remedy. FMIT believes it may be possible to use ICs to restrict certain categories of land use and access to areas of the site. This is important due to the somewhat unrestricted development and use activities that have occurred recently in adjacent areas.	PG&E will be discussing this comment, and its response to this comment, directly with counsel for DTSC and counsel for the Fort Mojave Indian Tribe.	DTSC will be communicating with FMIT directly regarding this matter.	Land use and access to federal property is addressed through the specific BLM Resource Management Plan and FWS Refuge Comprehensive Management Plan for the property. Institutional Controls are also addressed in the DOI Groundwater Record of Decision. Under the PA, the Tribal Access Plan has been established. BLM has taken measures to reduce potential for incursion by outside parties, e.g., recreational ORVs, and is scheduled to amend the Bullhead Travel Management Plan in FY 2016.	Relative to PG&E's comment, a brief discussion between counsel occur. Please see response to comment FMIT/TRC RTC #44. ed in. Relative to DOI's comments, the Tribe respectfully requests that an ACEC management Plan be developed. It remains unresolved when this plan will be drafted despite the RMP being adopted 8 years ago. The Tribe looks forward to direct discussion with DTSC regarding this matter.	DTSC Response: Tribal comment noted.
108	FMIT/TRC	Non-design	Process	ES.4 Summary of Institutional Controls	With respect to privately-owned lands, PG&E is in the process of obtaining Covenants access agreements from existing landowners or employing other similar mechanisms, as appropriate.	Please discuss the effects on remedial design if Covenants access agreements are not provided by private land owners. Could this cause changes in remedial design?	PG&E is working diligently to secure all necessary access agreements for remedy implementation, consistent with the requirements in the Corrective Action Consent Agreement between PG&E and DTSC and the Remedial Design/Remedial Action Consent Decree between PG&E and the United States, on behalf of DOI. If a needed access agreement cannot be obtained,	See RTCs #82 FMIT/TRC 1s, #83 Hualapai FMIT/TRC 1s, #84 Cocopah/ TRC 1s, and #85 Chemehuevi/TRC 1s above.	DOI agrees with the course of action presented by PG&E.	The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties to whom communication is addressed if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level	A similar RTC (RTC #110) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							PG&E will inform the Agencies and propose solutions which may include design modifications.			of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape. PG&E should remain mindful of its independent legal obligations under the 2006 Settlement Agreement to consult with FMIT and to provide all non-attorney-client privileged material information, documentary or otherwise, to the Tribe contemporaneously with its receipt or development by PG&E.	
109	Hualapai/TRC	Non-design	Process	ES.4 Summary of Institutional Controls	With respect to privately-owned lands, PG&E is in the process of obtaining Covenants access agreements from existing landowners or employing other similar mechanisms, as appropriate.	Please discuss the effects on remedial design if Covenants access agreements are not provided by private land owners. Could this cause changes in remedial design?	See above			Hualapai reiterates the need to be included (along with DOI and DTSC) as a primary party in communications regarding all project design changes, or work variance requests including material deviations from the design documents and/or C/RAWP due to discovery of changed site conditions as discussed in these earlier comments (at left). Communicating these changes needs to occur as soon as it is known that a change needs to be made. Hualapai needs to be included in those discussions via informing a tribal monitor, or email or telephone calls to designated points of contact. Once the change has been approved then a formal document can be forwarded to Hualapai.	A similar RTC (RTC #110) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.
110	Cocopah/TRC	Non-design	Process	ES.4 Summary of Institutional Controls	With respect to privately-owned lands, PG&E is in the process of obtaining	Please discuss the effects on remedial design if Covenants access agreements are not provided by private land owners. Could this cause changes in remedial design?	See above			The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material	This RTC was discussed at the August 18 TWG meeting. DTSC Response:

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					Covenants access agreements from existing landowners or employing other similar mechanisms, as appropriate.					deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape.	Tribal comment noted.
111	Chemehuevi/ TRC	Non-design	Process	ES.4 Summary of Institutional Controls	With respect to privately-owned lands, PG&E is in the process of obtaining Covenants access agreements from existing landowners or employing other similar mechanisms, as appropriate.	Please discuss the effects on remedial design if Covenants access agreements are not provided by private land owners. Could this cause changes in remedial design?	See above			The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape.	A similar RTC (RTC #110) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.
112	FMIT-22	Design	GW Modeling	ES.5	Summary of modeling	FMIT appreciates the inclusion of this summary, and agrees with the intended iterative application of models to evaluate remedy performance. FMIT requests ongoing involvement in the process of performance evaluation.	Comment noted, the model will be updated as necessary and will be at a frequency based on the data obtained. Please see also RTCs related to communication with Tribes including RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, #47 Chemehuevi/TRC, #97 FMIT/TRC-1a, #98 Hualapai/TRC-1a, #99 Cocopah/TRC-1a, #100 Chemehuevi/TRC-1a, #154 FMIT/TRC-1b, #155 Hualapai/TRC-1b, #156 Cocopah/TRC-1b, #157 Chemehuevi/TRC-1b, #941 FMIT/TRC, #942		Comment noted.	This response appears inconsistent with PG&E response in comment #76. Current annual adjustments do not appear adequate. Any time design or operations are adjusted/modified, the model input should be updated, re-calibrated and long-term scenarios re-run. If PG&E consultants do not wish to run the model every time something is adjusted/ modified --> then it should be adequately demonstrated to stakeholders that consultants fully	PG&E Response: Comment noted. Response was revised to be consistent with language from RTC #76 as follows: "The groundwater flow and transport model will be updated during the remedy installation, start-up, and operation phases in an effort to refine the predictive performance of the model. Per RTC#76, updates will be conducted according to the timetable described in Section

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							Hualapai/TRC, #943 Cocopah/TRC, and #944 Chemehuevi/TRC.			understand how long-term changes in system performance towards meeting RAOs is achieved. One important example would be when the current plume is expanded (i.e. area just east of northern current plume extent which has not reached river bank) into clean areas. RAO says any plume expansion should not be permanently. Another example would be making a change to system which results in future breakthrough of plume into Arizona GW, or which indicates direct flow into the river.	12 of Appendix B. Additional details are available in RTC #76." DTSC/DOI response: Tribal comment and PG&E's response noted.
113	FMIT/TRC	Non-design	Process	ES.5 Summary of Modeling	During system installation and baseline sampling, additional data will be collected that will refine the current conceptual model. Where appropriate, the data may be used to refine the design, for example, of remedial well screens and perhaps locations.	Where will this occur? Are the steps for this refinement outlined anywhere within the 90% BOD documents? What level of involvement will the Tribes have in this process?	The refinement of the well design is described in the C/RAWP Section 3.2.1.4. Please see RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, #47 Chemehuevi/TRC for communications with Tribes.	Please see RTC #44 FMIT/TRC		The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication to whom addressed if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape. PG&E should remain mindful of its independent legal obligations under the 2006 Settlement Agreement to consult with FMIT and to provide all non-attorney-client privileged material information, documentary or otherwise, to the Tribe contemporaneously	A similar RTC (RTC #115) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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										with its receipt or development by PG&E.	
114	Hualapai/TRC	Non-design	Process	ES.5 Summary of Modeling	During system installation and baseline sampling, additional data will be collected that will refine the current conceptual model. Where appropriate, the data may be used to refine the design, for example, of remedial well screens and perhaps locations.	Where will this occur? Are the steps for this refinement outlined anywhere within the 90% BOD documents? What level of involvement will the Tribes have in this process?	See above			Hualapai reiterates the need to be included (along with DOI and DTSC) as a primary party in communications regarding all project design changes, or work variance requests including material deviations from the design documents and/or C/RAWP due to discovery of changed site conditions as discussed in these earlier comments (at left). Communicating these changes needs to occur as soon as it is known that a change needs to be made. Hualapai needs to be included in those discussions via informing a tribal monitor, or email or telephone calls to designated points of contact. Once the change has been approved then a formal document can be forwarded to Hualapai.	A similar RTC (RTC #115) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.
115	Cocopah/TRC	Non-design	Process	ES.5 Summary of Modeling	During system installation and baseline sampling, additional data will be collected that will refine the current conceptual model. Where appropriate, the data may be used to refine the design, for example, of remedial well screens and perhaps locations.	Where will this occur? Are the steps for this refinement outlined anywhere within the 90% BOD documents? What level of involvement will the Tribes have in this process?	See above			The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape	This RTC was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.
116	Chemehuevi/ TRC	Non-design	Process	ES.5 Summary of Modeling	During system installation and baseline sampling,	Where will this occur? Are the steps for this refinement outlined anywhere within the 90% BOD documents? What level of involvement will the Tribes have in this process?	See above			The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties	A similar RTC (RTC #115) was discussed at the August 18 TWG meeting.

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					additional data will be collected that will refine the current conceptual model. Where appropriate, the data may be used to refine the design, for example, of remedial well screens and perhaps locations.					communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape	DTSC Response: Tribal comment noted.
117	DTSC-16	Non-design	Editorial	Page xiii	Table ES-1 National Trails Highway In-situ Reactive Zone (NTH IRZ) "The system will be initiated with an anticipated initial total organic carbon (TOC) amendment concentration of 100 micrograms per liter (mg/L) to achieve sufficient lateral distribution of organic carbon while minimizing byproduct generation."	Micrograms per liter are cited in text, but abbreviated "(mg/L)". Units need to be corrected.	Correction will be made as requested.	Resolved.			Comment resolved.
118	MWD	Design	Remedial Design	Table ES- 1/xv; Sect. 3.5.3/3-60	Design Parameters/ Quantity: Supporting Facilities during remedy operation and maintenance	A leachfield is shown on Figures ES-4A and 3.5-4 on the Transwestern Bench as a Proposed Remedy Structure but is not listed in Tables ES-1 or Exhibit 3.5-2 nor is it discussed in the text in Section 3.5.3. What is the source of the discharges to the leachfield and what effect would the discharges have on groundwater flow and Cr (VI) plume movement? The leachfield is apparently not considered in the groundwater flow model as a recharge source.	The leach field on the Transwestern Bench was originally designed to serve sinks and toilets in the planned operations building; however, the leach field cannot be permitted with San Bernardino County given the proximity to planned extraction wells TWB-1 and TWB-2. The leach field will be replaced with a holding tank in the final design, and the referenced figures will be revised accordingly. Holding tank waste will				Comment resolved.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
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							be pumped and hauled off site. Consequently, there will be no recharge source that could possibly affect the groundwater flow and Cr(VI) plume movement.				
119	MWD	Design	Remedial Design	Table ES- 1/xvi; Sect. 3.5/3-57	Design Parameters/ Quantity: SCADA	The SCADA should include Eh/Redox Potential with the various process and analytical instrumentation.	PG&E appreciates MWD input and has determined that field parameters collected during quarterly sampling is sufficient.				Comment resolved.
120	FMIT-23	Design	Infrastructures	Table ES- 1, note 7	Northern pipe bridge	FMIT needs to be involved in discussions re alternatives to the northern pipe bridge.	Please see RTC #19 FMIT-5.				
121	FMIT/TRC	Non-design	CEQA/EIR	TABLE ES-2A Estimated Borehole Count Associate d with Well Construction: Summary		How will an exceedance of the EIR well count limit be addressed? What additional EIR documents will be drafted to address this? What level of Tribal stakeholder involvement will be provided?		See RTC #22 FMIT-8.		Despite much discussion, the Tribes are left with nearly complete uncertainty as to how many drill holes will ultimately be completed during the life of the project, but are quite certain that at the present time it appears no limit on their number has been set or will be enforced by PG&E, DTSC, or DOI. Therefore, this comment is considered unresolved. The Tribes will review the upcoming Subsequent Groundwater EIR to ensure that it adequately address the cultural impacts that are associated with the increased number of wells proposed within the current iteration of the remedial design. The Tribes expect that the SEIR, and any future deviations from the work plan, will continue to incorporate Tribal concerns. The Tribe states its intended interest to stay involved with decisions addressing any deviations during implementation of the work plan with the same level of involvement that has occurred during the drafting of the work	A similar RTC (RTC #123) was discussed at the August 18 TWG meeting. Other RTCs related to well count were also discussed at the July 23 TWG meeting. DTSC Response: Tribal comment noted.

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										plan. The Tribe needs to be included in all alternative/additional well location discussions. This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources identified by Tribes as well as to notify Tribes of the need for particular wells.	
122	Hualapai/TRC	Non-design	CEQA/EIR	TABLE ES-2A Estimated Borehole Count Associate d with Well Construction: Summary		How will an exceedance of the EIR well count limit be addressed? What additional EIR documents will be drafted to address this? What level of Tribal stakeholder involvement will be provided?		See above		Despite much discussion, Hualapai are left with uncertainty as to how many drill holes will ultimately be completed during the life of the project, but are quite certain that no limit on their number has been set Hualapai will review the upcoming Supplemental Groundwater EIR to ensure that it adequately address the cultural impacts that are associated with the increased number of wells proposed within the current iteration of the remedial design. The Tribes expect that the SEIR, and any future deviations from the work plan, will continue to incorporate Hualapai concerns. Hualapai state their intended interest to stay involved with decisions addressing any deviations during implementation of the work plan with the same level of involvement that has occurred during the drafting of the work plan. The Tribes need to be included in all	A similar RTC (RTC #123) was discussed at the August 18 TWG meeting. Other RTCs related to well count were also discussed at the July 23 TWG meeting. DTSC Response: Tribal comment noted.

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										alternative/additional well location discussions. This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources identified by Hualapai and other interested tribes as well as to notify Hualapai of the need for particular wells. Therefore, this comment is considered unresolved.	
123	Cocopah/TRC	Non-design	CEQA/EIR	TABLE ES-2A Estimated Borehole Count Associate d with Well Construction: Summary		How will an exceedance of the EIR well count limit be addressed? What additional EIR documents will be drafted to address this? What level of Tribal stakeholder involvement will be provided?		See above		Despite much discussion, the Tribes are left with nearly complete uncertainty as to how many drill holes will ultimately be completed during the life of the project, but are quite certain that no limit on their number has been set or will be enforced by PG&E, DTSC, or DOI. Therefore, this comment is considered unresolved. The Tribes will review the upcoming Supplemental Groundwater EIR to ensure that it adequately addresses the cultural impacts that are associated with the increased number of wells proposed within the current iteration of the remedial design. The Tribes expect that the SEIR, and any future deviations from the work plan, will continue to incorporate Tribal concerns. The Tribes state their intended interest to stay involved with decisions addressing any	This RTC was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

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124	Chemehuevi/ TRC	Non-design	CEQA/EIR	TABLE ES-2A Estimated Borehole Count Associate d with Well Construction: Summary		How will an exceedance of the EIR well count limit be addressed? What additional EIR documents will be drafted to address this? What level of Tribal stakeholder involvement will be provided?		See above		Despite much discussion, the Tribes are left with nearly complete uncertainty as to how many drill holes will ultimately be completed during the life of the project, but are quite certain that no limit on their number has been set or will be enforced by PG&E, DTSC, or DOI. Therefore, this comment is considered unresolved. The Tribes will review the upcoming Supplemental Groundwater EIR to ensure that it adequately addresses the cultural impacts that are associated with the increased number of wells proposed within the current iteration of the remedial design. The Tribes expect that the SEIR, and any future deviations from the work plan, will continue	A similar RTC (RTC #123) was discussed at the August 18 TWG meeting. Other RTCs related to well count were also discussed at the July 23 TWG meeting. DTSC Response: Tribal comment noted.

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										to incorporate Tribal concerns. The Tribes state their intended interest to stay involved with decisions addressing any deviations during implementation of the work plan with the same level of involvement that has occurred during the drafting of the work plan. The Tribes need to be included in all alternative/additional well location discussions. This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources identified by Tribes as well as to notify Tribes of the need for particular wells.	
125	FMIT-24	Design	Editorial	Table ES- 2B	Key Assumptions	Figures illustrating the alternative well construction designs would be helpful.	Monitoring well design, including alternate well designs, is presented in Section 3.6. Detailed design drawings of the potential designs are included in Appendix D-2, Drawings C-16-01, C-16-02, and C-16-03.				
126	FMIT-25	Design	Monitoring	Table ES- 2B, Lines 28 & 29	Arizona monitor wells.	FMIT has concerns over the proposed locations of the sites at MW-X & MW-Y. As discussed later in reference to Figure 3.2-1. (Also shown on Figure ES-4A)	Comment noted.	See DTSC-6 comment on importance of sentry wells.			
127	FMIT/TRC	Design	Infrastructures	Table ES-2B	(same as C/RAWP Exhibit 3.1-2B)	ES-2B/Exhibit 3.1-2b should contain a final row with appropriate column totals, e.g., total number of boreholes, total number of planned boreholes, total number of future provisional boreholes, estimated replacement boreholes, and overall total of estimated boreholes.	These summations are provided in Table ES-2A, which summarizes the detail provided in Table ES-2B.			Comment noted.	A similar RTC (RTC #129) was discussed at the August 18 TWG meeting. Other RTCs related to well count were also discussed at the July 23 TWG meeting.
128	Hualapai/TRC	Design	Infrastructures	Table ES-2B	(same as C/RAWP Exhibit 3.1-2B)	ES-2B/Exhibit 3.1-2b should contain a final row with appropriate column totals, e.g., total number of boreholes, total number of planned boreholes, total number of future provisional boreholes, estimated replacement boreholes, and overall total of estimated boreholes.	See above			Comment noted.	A similar RTC (RTC #129) was discussed at the August 18 TWG meeting. Other RTCs related to well count were also discussed at the July

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											23 TWG meeting.
129	Cocopah/TRC	Design	Infrastructures	Table ES-2B	(same as C/RAWP Exhibit 3.1-2B)	ES-2B/Exhibit 3.1-2b should contain a final row with appropriate column totals, e.g., total number of boreholes, total number of planned boreholes, total number of future provisional boreholes, estimated replacement boreholes, and overall total of estimated boreholes.	See above			Comment noted.	This RTC was discussed at the August 18 TWG meeting.
130	Chemehuevi/ TRC	Design	Infrastructures	Table ES-2B	(same as C/RAWP Exhibit 3.1-2B)	ES-2B/Exhibit 3.1-2b should contain a final row with appropriate column totals, e.g., total number of boreholes, total number of planned boreholes, total number of future provisional boreholes, estimated replacement boreholes, and overall total of estimated boreholes.	See above			Comment noted.	A similar RTC (RTC #129) was discussed at the August 18 TWG meeting. Other RTCs related to well count were also discussed at the July 23 TWG meeting.
131	FMIT-26	Non-design	Process	Figure ES- 1	Site cleanup process	Despite the representation of this figure as “Site Cleanup,” it excludes the soils component, which is an important component in addition to the groundwater remedy. While it has been decided that the groundwater and the soils remedies will proceed on different tracks, it remains necessary to disclose that these two components in some way interact with each other. At a minimum, a footnote should be added to emphasize this fact.	As discussed in RTC #27 FMIT-13, much effort were put into integrating the soil information into the remedy design and coordinating with the Soil RFI/RI program to minimize duplication and disturbance. Soil information is prominently discussed and the integration of soil info/program is evident throughout the BOD, the O&M Manual, and the C/RAWP (refer to examples provided in RTC #27). Figure ES-1 is intended to illustrate the cleanup process and various phases for implementation of the groundwater remedy. This figure is not meant to include the soil component and adding a footnote is not necessary.	As the Tribes are aware, the potential need for cleanup of soil at the site can only be determined after the completion of the RFI/RI work plan for soil investigation and the appropriate risk assessment. It is important to note that DTSC has requested PG&E to consider the soil sampling locations relative to the groundwater remedy infrastructures so that soil sampling activities or potential remedy would not be hindered.			
132	FMIT-27	Non-design	Process	Figure ES- 2	Schedule	This schedule represents that “Tribal Communication and Tribal Consultation” is ongoing throughout the project timeframe. While this is appropriate, it would further be helpful to identify junctures where specific consultation with the tribes is intended. For example, prior to startup, prior to construction, etc.	PG&E defers to DOI/BLM for response to this comment. Please see RTCs #44 FMIT/TRC, #45 Hualapai/ TRC, #46 Cocopah/TRC, and #47 Chemehuevi/ TRC, for responses related to tribal communications by PG&E.	See RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/ TRC above.	Consultation will occur in accordance with the Programmatic Agreement (PA) and Appendix B [to the PA] - Consultation Protocol for the Topock Remediation Project.		
133	DTSC-17	Non-design	Editorial	Figure ES-3		Suggest adding FWIP area that was added to project area based on EIR addendum	Addition to Figure ES-3 will be made as requested.	Resolved.			Comment resolved.
134	DTSC-18	Design	Infrastructures	Figure ES-4A	MW-20 Bench	Aside from the additional carbon amendment building and storage tanks, will all other structures	Not all IM features on	See RTC # 1152			Comment resolved.

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						and tanks associated with the IM be removed as part of IM3 decommissioning? If not all, what will remain?	the MW-20 Bench will be removed as part of IM3 decommissioning. The brine storage and loading facility (three tanks, the truck lane, and associated pumps and piping) will remain and will be reused by the groundwater remedy in its existing location at the MW-20 Bench (see Section 1.3 of the IM-3 Decommissioning Work Plan for additional details).	regarding retention of addition IM infrastructure.			
135	DTSC-19	Design	Remedial design	ES.3 Summary of Engineering Design Parameters and Features/Key Changes from 60% to 90% Design	Figure ES-4D, Future Provisional/ Contingent Fresh Water Pipe	The document should comment on under what scenarios the Site B well would be used in the future. It would seem more prudent to blend with either wells Topock 2 or 3. A contingent boring/well could evaluate the old Topock 1 water quality and quantity in the future if ever needed as it is ideally located along the planned pipeline and would not require installation of thousands of feet of additional pipeline and trenches. The entire document should be revised to delegate utilization of the Site B well as a last resort. Less impactful alternatives (e.g., see above) should be evaluated and fully vetted prior to proposing selection of the Site B well.	Exhibit 3.3-2 of the 90% BOD and Table 2.3-1 of the Contingency Plan (O&M Manual Volume 3) outline potential scenarios under which water from Site B well could be used in the future. For each scenario, potential operational actions and possible contingency measures were identified. Operational actions (e.g., tie-in HNWR-1, rehabilitate a well) are more readily implementable than the contingency measure (e.g., use water from Site B, implement pre-injection treatment). The use of Site B is identified as a possible contingency measure under each scenario because of the associated added infrastructure (e.g., pipeline, pre-injection treatment system). As for blending with either wells Topock 2 or 3, it should be noted that, in order to separate the freshwater supply for TCS and remedy and ensure that the use of the infrastructure designed and constructed under this project is prioritized for remedy use first, the tie-in of Topock-2 and -3	As the only contingent fresh water supply source located away from the HNWR-1/1A area, the Site B well has water quality concerns as well as significant infrastructure impacts associated with it. Depending on future water supply problems/ needs (e.g., quality and/or quantity), pre-treatment to maintain California water quality (e.g. arsenic, chromium) may be required. Alternatively, PG&E may at some future time elect to investigate the possibility of another new water well in Arizona or California. As PG&E clarified during the August 26, 2015 TWG Meeting, the footprint of the ancestral Colorado River east of the Topock Marina in the general vicinity of Topock 1 is believed to have greater aquifer thickness and			

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							wells was eliminated in the 90% design (see 60% RTC 168 DTSC-63). However, as discussed in RTC #267 DTSC-67, Topock-2 and -3 wells can be tied in with added infrastructure within the Compressor Station footprint. In response to DTSC's request, additional details that describe this tie-in will be provided for review during the 90% RTC period and included in **Attachment E** of the final RTC table. If there is a competing need for Topock-2 and -3 water in the future, the first priority for this water, as noted in 60% RTC 168 DTSC-63, is for fire protection and operational needs at the Station, and that priority cannot be changed. Given the existing infrastructure identified in the design for remedy freshwater supply, and the listed contingency options, it is PG&E's opinion that an additional exploratory borehole/ well at the former Topock-1 location is not necessary. While the former Topock-1 site is located along the planned pipeline route, unlike Site B, it is in close proximity to/within habitat where sensitive biological receptors have been documented (Yuma clapper rail). With respect to EIR mitigation measure WATER-1, the site at Topock 1 is much closer to the bedrock outcrop near the Topock Marina. The proximity of this low permeability bedrock aquifer boundary would tend to focus and increase drawdown of a well pumping at Topock 1	transmissivity than to the west of the marina; therefore, it holds potential for a water well. DTSC does wish to clarify that the exact Topock 1 location was a recommendation and that other locations could also be considered. Finally, one would anticipate drawdown effects at Topock 2 and 3 and private wells associated with a new well in the ancestral Colorado area to be similar to HNWR-1 pumping if aquifer thickness were similar or if hydraulic conductivities were greater in the ancestral Colorado deposits. Regardless, the needed pumping rate for a future contingency pumping well might make this drawdown point moot.			

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							location. Therefore, pumping from a well at Topock 1 is more likely to result in measurable drawdown at Topock 2 and 3 and the domestic wells near the Topock Marina than pumping from HNWR-1A or Site B. It would be necessary to install and test a well at Topock 1 location to determine whether WATER-1 could be met at this location.				
136	DTSC-20	Design	Editorial	Figure ES-5		Since this is a simulation of new remedy building/structures, PG&E should also simulate the Transwestern North Access Road. Also, in ES-7, Trailers were depicted, but did not identify their purpose and ES-5 did not show these trailers. Are the trailers for remediation or station operations?	A simulation of the Transwestern North Access road will be added to Figure ES-5. The trailers depicted in Figure ES-7 are potential trailers used by PG&E and/or its contractors during construction and/or O&M of the groundwater remedy, not for station operations. The need for, the numbers, or types of trailers for remedy use may vary over time. Text will be added to the BOD and Figure ES-7 to reflect above. If helpful, temporary trailers can also be added to Figure ES-5. In addition, after additional evaluation of ways to further minimize remedy footprint/soil disturbance, PG&E proposes to move the carbon amendment facilities (i.e., carbon amendment building and storage tank) at the Transwestern Bench to the MW-20 Bench and consolidate dosing activities. This minimizes cutting into the hillside and resulting in less earthwork at the Transwestern Bench, while keeping the 90% fenced footprint on the MW-20 Bench the same. Further, PG&E proposes	Sheet C-08-03/04, **Attachment BB**, shows both a leach field and reserve leach field. These should be remove as the plan was not to have any leach fields as part of project.			**Attachment BB** was revised to incorporate DTSC's comments.

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							to move the Operations Building at the Transwestern Bench slightly to the east, away from the hillside, which again minimizes cutting into the hillside. The revised design was included in **Attachment BB** for review during the 90% comment resolution period.				
137	DTSC-22	Design	Remedial design	ES.3 Summary of Engineering Design Parameters and Features/Key Changes from 60% to 90% Design	Figure ES-6, Approximate Location of New Air Compressor Building (not shown, design in progress)	The Portable Generator Pad and Transformer/Switchgear structure are not show in figure ES-6 as compared to ES-10. The air compressor station building footprint is also not shown. The design of the new compressor building should not be "in progress" as stated. It needs to be developed ASAP. Visualizations should not include the old scrubber banks in the lower yard as they are no longer there. Current lower yard facilities should be used instead.	An updated Figure ES-6 was provided in the Supplemental 90%. In the updated Figure ES-6, the air compressor building is noted as Station facility and not a remedy feature (see RTC #839 DTSC-194). As discussed in RTC# 287, the remedy air compressor is located on the first floor of the Remedy-produced Water Conditioning Plant for remedy-produced water (see 90% drawing M-12-01). Like other elements of the remedy, the remedy air compressor was designed to the 90% level. The Station air compressor building is being designed by the Station on the Station's timeline. PG&E does not anticipate that construction of the Station air compressor building will overlap with construction of the remedy. The portable generator pad is just a reserved flat area behind the Remedy-produced Water Conditioning Plant, so it does not show on Figure ES-6. The transformer/ switchgear does not show on Figure ES-6 due to the angle of the photo. The purpose of Figure ES-6 and similar figures throughout the design reports is to facilitate	Resolved.			Comment resolved.

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							visualizations of the remedy features. Best available photo at the time of the work was selected for the simulation. A note will be added to Figure ES-6 that the scrubber banks at the lower yard were removed in 2014.				
138	DTSC-23	Design	Infrastructures	Figure ES-8	Photo simulation of MW-20 bench	Is the fire hydrant existing or new? If new, where is the water line coming from? If hydrant is used for onsite fires, how will PG&E control the run-off?	The simulated fire hydrant is new. Fire protection water for the MW-20 Bench will be supplied from the existing TCS freshwater storage tanks (Section 3.3.3.2, last sentence of last paragraph). Secondary containment is provided for all areas that may store or contain hazardous materials, e.g., the truck loading/unloading station, and the existing frac tanks area. The secondary containment can contain some runoff from a fire fighting event. In addition, the carbon amendment building is equipped with sprinklers and has an interior containment system that can contain discharge from the sprinkler heads (Section C.5.5, Appendix C Design Criteria).	Resolved.			Comment resolved.
139	FMIT-28	Design	Infrastructures	Figures ES-4D & ES-9	Future provisional pipeline in Arizona.	When and on what basis will a decision be made on the future provisional pipeline to Site B in Arizona?	Exhibit 3.3-2 of the 90% BOD and Table 2.3-1 of the Contingency Plan (O&M Manual Volume 3) outline potential scenarios under which water from the Site B well could be used in the future and therefore trigger the installation of the associated pipeline to Site B well. In summary, the potential scenarios include: • Well yield declines below the minimum required for optimal remedy operation • Quality of water in freshwater well				This RTC was discussed at the August 18 TWG meeting.

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							declines over time • Freshwater pumping causes adverse effects on water quality or capacity in nearby wells.				
140	DTSC-24	Design	Infrastructures	Figure ES-10		Why was the contingent Fresh Water Pre-Injection Treatment System building split into three parts? As shown in ES-10, they use to be one building, tanks and chemical storage, please explain the rationale for the design change from 60% to 90%.	While the total footprint of the contingent FWPTS has remained largely unchanged between 60% and 90% design (less than 10% difference), its layout has changed due to the elimination of fluoride treatment and addition of a remedy freshwater storage tank at 90%. **Attachment F** of the final RTC table includes Figure 3 of Appendix M of the 60% BOD and Figure 5 of the Appendix M of the 90% BOD which best illustrate the changes in spatial layout. As shown, the 90% system (Figure 5) has fewer tanks, vessels, and equipment due to the elimination of fluoride treatment. The building in the 90% is also slightly smaller than 60% to accommodate the additional remedy freshwater storage tank.	Resolved.			Comment resolved.
141	DTSC-25	Non-design	Editorial	Figure ES-11		Please provide outline of plume in figure. It is recommended that the chromium plume outline be depicted in aerial figures showing overall infrastructure to facilitate understanding of the relationship between the infrastructure and the plume.	The plume was not shown previously to avoid possibly overcrowding of these figures. At DTSC's request, the outline of the plume will be added to Figures ES-9, ES-11, and ES-12.	Resolved			Comment resolved.
142	DTSC-26	Non-design	Editorial	ES.3 Summary of Engineering Design Parameters and Features/Key Changes from 60% to 90% Design	Figure ES-11/ES-4A, PGE-01/PGE-02	Note: Wells PGE-01 and PGE-02 are incorrectly plotted. Please revise as figure is finalized. Revise GIS layer so other figures will plot them correctly as well.	Applicable figures in the BOD, O&M Manual, and C/RAWP will be revised as requested. See also RTC #866 DTSC-150.	Resolved			Comment resolved.
143	DTSC-27	Design	Contingency	Figure ES-13		SCADA system does not show process control for contingent Fresh Water Pretreatment system. Although this will be a contingency, PG&E should design all components in detail similar to PG&E's design level for contingency use of Well B in Arizona. Additions to the design document needed.	The remedy SCADA and control systems are designed to be adaptable to any future system control and data transmission needs. The	Resolved			Comment resolved.

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							SCADA and control connections to and details of those systems are determined when the design for each is completed. Figure ES-13 will be revised to include the FWPTS in the final BOD.				
Specific Comments – 90% BOD, Section 1: Introduction											
144	DTSC-28	Non-design	Editorial	SECTION 1 Introduction/ Page 1-2	"Following their review of this Freshwater Source Evaluation Technical Memorandum, the California Regional Water Quality Control Board, Colorado River Basin Region (RWQCB), subject to its invitation for PG&E to seek review by the State Water Resources Control Board (SWRCB), indicated that the HNWR-1 water would likely need treatment to remove naturally occurring arsenic prior to injection. In addition to the slightly elevated levels of arsenic in the HNWR-1 water, fluoride is present at slightly elevated levels. Water quality data at the area of injection exhibits high levels of naturally occurring fluoride."	Please revise the sentences to more accurately reflect site conditions: "Following their review of this Freshwater Source Evaluation Technical Memorandum, the California Regional Water Quality Control Board, Colorado River Basin Region (RWQCB), subject to its invitation for PG&E to seek review by the State Water Resources Control Board (SWRCB), indicated that the HNWR-1 water would likely need treatment to remove naturally occurring arsenic elevated above the MCL prior to injection. In addition to the slightly elevated levels of arsenic in the HNWR-1 water, fluoride wais also present at concentrations slightly above the MCL ~~elevated levels~~. Water quality data at the area of injection currently exhibits ~~high~~ similar levels of naturally occurring fluoride."	PG&E suggest the following edits (shown in green) to the suggested language: "Following their review of this Freshwater Source Evaluation Technical Memorandum, the California Regional Water Quality Control Board, Colorado River Basin Region (RWQCB), subject to its invitation for PG&E to seek review by the State Water Resources Control Board (SWRCB), indicated that the current HNWR-1 water would likely need treatment to remove naturally occurring arsenic elevated above the MCL prior to injection (see Table 1A of Final BOD, Appendix M). In addition to the slightly elevated levels of arsenic in the HNWR-1 water, fluoride wais also present at concentrations slightly above the MCL ~~elevated levels~~. Water quality data at the area of injection currently exhibits ~~high~~ similar levels of naturally occurring fluoride (see Final BOD, Section 2.3.4.5)."	Resolved			Comment resolved.
145	DTSC-29	Design	Contingencies	Page 1-2, Last Sentence	As such guidance was	If PG&E implements the fresh water pretreatment contingency, will PG&E's treatment goals be below MCL for arsenic and fluoride as stated? If not, please specify what the treatment goal would	If pre-treatment of freshwater is required	Resolved			Comment resolved.

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					still forthcoming at the time of the 60% BOD submittal on April 5, 2013, PG&E made the conservative assumption for freshwater treatment goals, specifically that the arsenic treatment goal was to below the federal/state maximum contaminant level (MCL) of 10 micrograms per liter (µg/L) and the fluoride treatment goal was to below the state MCL of 2 milligrams per liter (mg/L).	be.	per State Water Resource Control Board letter (November 2013), the goal would be to treat arsenic to below the federal/state MCL of 10 micrograms per liter (µg/L). Fluoride treatment is not warranted because, although fluoride concentration from Arizona source well might be slightly above the MCL (see Table 1A for HNWR-1 data), it is similar in concentration to the water at the injection area in California (see Section 2.3.4.5 for fluoride background value). Fluoride is proposed to be monitored in the freshwater source, see Table 5.2-4 of O&M Manual, Volume 2.				
146	DTSC-30	Non-design	Editorial	SECTION 1 Introduction/ Page 1-3	"DTSC further noted that removal of fluoride was not warranted due to the elevated baseline values already above the MCL where water will be injected."	Please revise the sentences to more accurately reflect DTSC's position: "DTSC further noted that removal of elevated fluoride from the Arizona supply water was not warranted ~~due to the elevated baseline values already above the MCL~~ as it was similar in concentration to the water at the injection area in California ~~where water will be injected~~."	Revision will be made as requested.	Resolved			Comment resolved.
147	DTSC-31	Non-design	Editorial	1.1.1 Description and History of SWMU 1/AOC 1 and AOC 10/ Page 1-6	"A recent (2013) discovery of a 1964 site record shows a steel pipe extending from a "water treatment chamber" at the former sludge drying bed area on the TCS to an "abandoned water well" in the bottom of Bat Cave Wash;	Please revise the sentences to more accurately reflect historic site conditions: "A recent (2013) discovery of a 1964 site record shows installation of a waste water treatment and disposal facility. A steel pipe extending from a "water treatment chamber" at the former sludge drying bed area on the TCS leads to an "abandoned water well" in the bottom of Bat Cave Wash.~~;~~ More detailed information ~~wa~~is provided in the RFI/RI Volume 1 Addendum (CH2M HILL 2014a)."	PG&E suggests potential edits (shown in green) to DTSC's edits: "A recent (2013) discovery of a 1964 site record/work order shows installation of a waste water treatment and disposal facility. A steel pipe extending from a "water treatment chamber" at the former sludge drying bed area on the TCS leads to an "abandoned water well" in the bottom of Bat Cave Wash.~~;~~ More	Resolved			Comment resolved.

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					detailed information was provided in the RFI/RI Volume 1 Addendum (CH2M HILL 2014a)."		detailed information ~~wa~~ is provided in the RFI/RI Volume 1 Addendum (CH2M HILL 2014a)."				
148	DTSC-32	Non-design	Editorial	1.1.1 Description and History of SWMU 1/AOC 1 and AOC 10/ Page 1-6	"DTSC had previously sampled some of the identified white powder materials."	The sentence as written is not informational, so revised language has been prepared, "DTSC had previously sampled some of the identified white powder materials in the AOC10d area and detected elevated levels of chromium."	Revision will be made as requested.	Resolved			Comment resolved.
149	DTSC-33	Design	Remedial design	1.2 Selected Final Groundwater Remedy and Requirements/ Page 1-7	"Extraction wells near the Colorado River (referred to as the River Bank Extraction Wells) to provide hydraulic capture of the plume, accelerate cleanup of the floodplain, and enhance the flow of contaminated groundwater through the IRZ line."	Revise objective description to be more accurate: "Extraction wells near the Colorado River (referred to as the River Bank Extraction Wells) to provide hydraulic capture of the plume, ~~accelerate~~ cleanup ~~of~~ the floodplain downgradient of the IRZ, and enhance the flow of contaminated groundwater through the IRZ line." The River Bank Extractors are the only active remedial feature that is cleaning up existing chromium contamination downgradient of the IRZ. A similar revision is needed for the C/RAWP Section 3.1, Page 3-1.	The cited text will be edited as indicated in the comment in Section 1.2 and in C/RAWP Section 3.1.	Resolved			Comment resolved.
150	DTSC-34	Design	Remedial Design	1.2.2 Incorporation of ARARs and EIR Mitigation Measures into the Design/ Page 1-9	"The chemical-specific ARARs have already been incorporated into the RAOs, ensuring that compliance with these ARARs will be attained when the remedy is complete (defined by attainment of the RAOs)."	The cited sentence should be revised as it is not accurate. All chemical-specific ARARs are not captured by RAOs (e.g., arsenic).	The RAOs of this remedial action were defined based on the conclusions of the groundwater risk assessment and ARARs identification (Section 3 of CMS/FS): • The groundwater risk assessment was completed to assist risk management decision-making by quantitatively evaluating COPCs in groundwater and surface water and determining whether the COPCs are potential threats to human health or the environment. The COPCs that are	Note: the groundwater risk assessment did not consider remedy produced byproducts including arsenic and manganese.			Comment resolved.

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							related to the facility and are identified as potential risks to human or ecological receptors are identified as COCs that then become the focus of the RAOs and remedial alternatives. The risk characterization concluded that based on the results of the risk estimates and the fact that the presence of Cr(VI) is related to historical releases from SWMU 1/AOC 1, Cr(VI) is a COC for this remedial action. • CERCLA requires that remedial action attain ARARs unless they are waived. The identified site-specific ARARs for Topock were included in the ROD. Chemical-specific ARARs are generally health- or risk-based numerical values or methodologies applied to site-specific conditions that result in the establishment of a remediation goal. While in-situ byproducts such as arsenic and manganese have been disclosed and thoroughly evaluated the CMS/FS (e.g., in the alternatives analysis, Appendix G – In-Situ Reactive Zone Treatment Design Elements) and fully considered in the design documents (e.g., in the evaluation of compliance with ARARs,	DTSC wishes to go on record to clearly indicate that in-situ byproducts such as arsenic and manganese are a concern to the Department and will need to be monitored to ensure they do not impart excessive risk or exceed established ARARs (e.g., MCLs, Water			

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							the fate and transport modeling, the Sampling and Monitoring Plan, etc.), they are not COCs for this remedial action and therefore, not part of the RAOs. The cited text will be revised to read as follows: "The chemical-specific ARARs <u>for the site COCs (Cr[VI], Cr[T])</u> have already been incorporated into the RAOs, ensuring that compliance with these ARARs <u>(for the site COCs)</u> will be attained when the remedy is complete (defined by attainment of the RAOs). <u>Evaluation of the compliance with chemical specific ARARs for arsenic in the freshwater source is addressed in Table 6.2-1 Summary of Compliance with Identified ARARs (Items 2, 52, 99, and 100)</u>."	Board Basin Plan Objectives/Resolutions, etc.).			
151	DTSC-35	Non-design	Other	Section 1.1.3	Ecological Resources	Recently the California Fish and Wildlife Service submitted comments to the Soil Investigation EIR which notified DTSC that the Townsend's Big-eared bat is a candidate for protection, and requires immediate protection under Fish and Game Code 2050-2069. Since a thorough bat survey has not been completed for the groundwater remedy related project area, it might be important to note the possible presence of this protected bat around the area. PG&E must identify all critical biological resources. Failure to do so will, at a minimum, lead to delays in the project.	Text will be revised to read that "Townsend's big-eared bat is a candidate species for State protection. A single male Townsend's big-eared bat was detected within the project area during the 2015 spring bat survey.	Resolved.			Comment resolved.
152	DOI-2	Non-design	Other	1.2.1/1-8	…short-term goals and criteria are being developed in coordination with DTSC and DOI to facilitate remedy performance assessments…	Suggest adding a statement on how short term goals will be documented and approved by DTSC/DOI.	Please see RTC #96 FMIT-19 .	See RTC #96 FMIT-19.			Resolved
153	MWD	Non-design	Editorial	Sect.1.2.1/ 1-8	"Prevent or minimize migration of total chromium (Cr[T]) and Cr(VI) to ensure	As identified in Item No. 100 of Table 6.2-1, clarify that 11 ug/L refers to California Toxics Rule criteria.	The 11 µg/L Cr(VI) is the water quality standard which is based upon the California Toxics Rule criteria. As noted in RTC #91				Comment resolved.

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					concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 ?g/L Cr[V1]).		MWD, to date, surface water sampling in the Colorado River upstream, midstream, and downstream of the Topock site show concentrations of Cr(VI) less than the California Toxics Rule criteria of 11 µg/L (protection of freshwater aquatic life) and the California MCL for Cr(VI) of 10 µg/L. Surface water sampling will be conducted during remedy start-up and operations to confirm and document compliance with RAO #2. If Cr(VI), arsenic, and manganese concentrations in surface water samples increase and are attributed to the Topock site, operational adjustments will be made according to the decision rules presented in the O&M Manual. If Cr(VI), arsenic, and manganese concentrations do not return to baseline as a result of operational adjustments, the contingency plan will be implemented.				
154	FMIT/TRC 1b	Non-design	Process	1.2.1 Remedial Action Objectives, Completion Criteria/Performance Standards, and Short- Term Goals	Pursuant to Exhibit A to the Settlement Agreement between DTSC and the FMIT (DTSC 2012b), the groundwater remedy is considered to be OPS when a) the remedy is operating as designed, b) the information obtained from remedy operation indicates that the remedy is protective of human health	What level of involvement will the Tribes have in data review during the OPS phase of the remedial design? What level of technical support will be made available to the tribes through this phase?	As mentioned in Section 6 of the C/RAWP, data will be collected for OPS determination in the O&M period. During O&M, quarterly progress reports will be prepared to present data and interpretation of results (see Exhibit L2.2-2, Quarterly Progress Report Template). It should be noted that OPS evaluation will not be made quarterly. The quarterly reports will be submitted to DTSC and DOI, and will be posted on a SharePoint site for access by Tribes and stakeholders. Other venues for posting these reports may be utilized during the decades-long	See RTC #96 FMIT-19.	Noted.		A similar RTC (RTC #156) was discussed at the August 18 TWG meeting.

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					and the environment, and c) the remedy is likely to be able to achieve the cleanup levels or performance goals delineated in the DTSC SOB (DTSC 2011a) and the DOI ROD (DOI 2010) for the groundwater remedy at the PG&E Topock Site. In general, OPS is expected within 1 to 2 years of the beginning of remedy start-up.		operation of the remedy. Pursuant to EIR Mitigation Measure CUL-1a-4, PG&E worked with representative members of the Interested Tribes to create a multidisciplinary panel of independent scientific and engineering experts as part of a Technical Review Committee (TRC). CUL-1a-4 states that "[u]pon conclusion of the construction phase of the project, the necessity and dollar value of the TRC shall be assessed by PG&E and, with the approval of DTSC, shall either be extended, reduced, or terminated under the operations and maintenance phase." Thus, DTSC will be responsible for determining whether and to what extent the TRC continues during operation and maintenance.				
155	Hualapai/TRC 1b	Non-design	Process	1.2.1 Remedial Action Objectives, Completion Criteria/Performance Standards, and Short- Term Goals	Pursuant to Exhibit A to the Settlement Agreement between DTSC and the FMIT (DTSC 2012b), the groundwater remedy is considered to be OPS when a) the remedy is operating as designed, b) the information obtained from remedy operation indicates that the remedy is protective of human health and the environment, and c) the remedy is likely	What level of involvement will the Tribes have in data review during the OPS phase of the remedial design? What level of technical support will be made available to the tribes through this phase?	See above	See above	See above		A similar RTC (RTC #156) was discussed at the August 18 TWG meeting.

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					to be able to achieve the cleanup levels or performance goals delineated in the DTSC SOB (DTSC 2011a) and the DOI ROD (DOI 2010) for the groundwater remedy at the PG&E Topock Site. In general, OPS is expected within 1 to 2 years of the beginning of remedy start-up.						
156	Cocopah/TRC 1b	Non-design	Process	1.2.1 Remedial Action Objectives, Completion Criteria/Performance Standards, and Short- Term Goals	Pursuant to Exhibit A to the Settlement Agreement between DTSC and the FMIT (DTSC 2012b), the groundwater remedy is considered to be OPS when a) the remedy is operating as designed, b) the information obtained from remedy operation indicates that the remedy is protective of human health and the environment, and c) the remedy is likely to be able to achieve the cleanup levels or performance goals delineated in the DTSC SOB (DTSC 2011a) and the DOI ROD (DOI	What level of involvement will the Tribes have in data review during the OPS phase of the remedial design? What level of technical support will be made available to the tribes through this phase?	See above	See above	See above		This RTC was discussed at the August 18 TWG meeting.

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					2010) for the groundwater remedy at the PG&E Topock Site. In general, OPS is expected within 1 to 2 years of the beginning of remedy start-up.						
157	Chemehuevi/ TRC 1b	Non-design	Process	1.2.1 Remedial Action Objectives, Completion Criteria/Performance Standards, and Short- Term Goals	Pursuant to Exhibit A to the Settlement Agreement between DTSC and the FMIT (DTSC 2012b), the groundwater remedy is considered to be OPS when a) the remedy is operating as designed, b) the information obtained from remedy operation indicates that the remedy is protective of human health and the environment, and c) the remedy is likely to be able to achieve the cleanup levels or performance goals delineated in the DTSC SOB (DTSC 2011a) and the DOI ROD (DOI 2010) for the groundwater remedy at the PG&E Topock Site. In general, OPS is expected within 1 to 2 years of the beginning of remedy start-	What level of involvement will the Tribes have in data review during the OPS phase of the remedial design? What level of technical support will be made available to the tribes through this phase?	See above	See above	See above		A similar RTC (RTC #156) was discussed at the August 18 TWG meeting.

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					up.						
158	DTSC-36	Non-design	CEQA/EIR	Section 1.2.2	EIR Project Area	In addition to the January 2011 certified EIR, DTSC has also completed an EIR addendum to change the project boundary to incorporate the fresh water well locations. Please add language to the design document and update project area maps for accuracy.	Text will be added to Section 1.2.2 to discuss the August 2013 EIR addendum and applicable figures in the design documents will be updated to incorporate the area added pursuant to the 2013 Addendum.	Resolved.			Comment resolved.
Specific Comments – 90% BOD, Section 2: Baseline Site Conditions and Pre-Design Work											
159	DTSC-37	Non-design	Editorial	2.3.3 General Geochemical Indicator Parameters/ Page 2-9	"They are natural compounds that are abundant in the area, as evidenced by their ubiquitous concentrations in the region and across the Colorado River. There are multiple sources of dissolved salts, including geologically older groundwater upwelling across the southern portion of the Mohave basin, evaporite minerals in the aquifer matrix, and evapotranspiration associated with the more vegetated areas of the floodplain, etc. (CH2M HILL 2009a)."	Add the following sentence after the cited sentences to clarify that since the chromium plume is not natural, the TDS associated with the chromium plume would also not be natural within the confines of the plume footprint: "Of course, TDS associated with the chromium plume would have mixed to some degree with the naturally occurring TDS within the aquifer (see last paragraph in this subsection)."	The following statement will be inserted after the cited text in Section 2.3.3. "Of course, TDS associated with the chromium plume could have mixed to some degree with the naturally occurring TDS within the aquifer (see last paragraph in this subsection)."	Resolved.			Comment resolved.
160	DTSC-38	Non-design	Editorial	2.3.3.1 Total Dissolved Solids/ Page 2-10	"Most plume wells are screened close to the bedrock surface."	Delete this sentence as it is not accurate as written (e.g., shallow zone wells are not screened close to the bedrock surface).	This sentence is from the RFI/RI Vol 2 Report (Section 6.5.1, page 6-26, last paragraph), with only the figure reference from that report's sentence deleted. Shallow wells refer to those wells screened near the water table, but if the aquifer is thin in a	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							particular location, that screen can also be much closer to the bedrock surface than a shallow well in a thicker part of the aquifer. Figure 5-20 from the RFI/RI Vol 2 Report shows that 17 out of 31 plume wells are screened within 50 feet of the bedrock surface, whereas only seven out of 50 non-plume wells are screened within this same distance of bedrock. The figure shows the same relationship between TDS and screen distance from bedrock for both non-plume and plume wells. This is an artifact of plume characterization concentrated at the up-gradient fringes of the Alluvial Aquifer. The sentence will be deleted as requested.				
161	DTSC-39	Design	Monitoring	2.3.4 Freshwater Injection Area Baseline Concentrations / Page 2-11	"Data from wells listed above are expected to represent the proposed southern injection area as well as the remaining injection areas along the corridor that extends from the northwest boundary of the plume at IRL-1 to the southwest boundary at FW-2."	Delete the cited sentence and replace with the following: "New monitoring and remedy wells to be installed as part of the groundwater remedy will assist in assessing baseline concentrations in the injection areas."	Since existing wells will continue to be used to assess baseline conditions and for consistency with RTC #167 DTSC-41, PG&E propose potential edits (shown in green) to DTSC's edits: "New monitoring and remedy wells to be installed as part of the groundwater remedy will be combined with existing wells described above ~~assist~~ in assessing baseline concentrations in the injection areas. For the reasons noted by DTSC in 90% RTC #161 DTSC-39, certain existing wells, MW-13, MW-14, MW-35, MW-37, MW-40, and OW-5 cluster will be re-evaluated and discussed with the agencies prior to assessing baseline concentrations."	For the purpose of assessing baseline concentrations in freshwater injection areas, DTSC requests the following changes to the list of existing wells: **Remove**: MW-13, MW-37, and MW-40: within plume boundary (not appropriate for baseline) MW-14 and MW-35: both wells contained chromium above 32 ppb in past. **Add**: OW-5 cluster			Comment resolved.
162	DTSC-40	Design	Monitoring	2.3.4	"Constituents	Revise the sentence as follows to allow for additional monitoring, "At a minimum, constituents that	Revision will be made as	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
				Freshwater Injection Area Baseline Concentrations / Page 2-11	that will be monitored during injection include the COPCs (molybdenum, selenium, and nitrate), manganese (an in-situ byproduct), and fluoride (a general geochemical indicator parameter)."	will be monitored during injection will include the COPCs (molybdenum, selenium, and nitrate), manganese (an in-situ byproduct), and fluoride (a general geochemical indicator parameter)." Monitoring for additional constituents will be required (i.e., arsenic) or prudent to track fresh/river bank water travel/influence over time.	requested.				
163	FMIT/TRC	Non-design	Monitoring	2.3.4 Freshwater Injection Area Baseline Concentrations p. 2-11	Constituents that will be monitored during injection include the COPCs (molybdenum, selenium, and nitrate), manganese (an in-situ byproduct), and fluoride (a general geochemical indicator parameter).	Why is arsenic not listed here?	Monitoring for arsenic in the freshwater injection area is included in Section 2.2.4 of the O&M Manual Volume 2. The data collection program for arsenic in freshwater injection area is based upon requirements put forth in the State Board letter dated November 20, 2013. Baseline arsenic concentrations in new and existing monitoring wells will be collected prior to the start of freshwater injection. See Section 2.2.4 of O&M Manual Volume 2 for the data collection and assessment of baseline concentrations for arsenic from freshwater injection.			The Tribe reiterates its desire to have arsenic monitored in the injection water rather than sampling for arsenic only after it has been injected into the California aquifer.	Monitoring of arsenic in freshwater at HNWR-1 is addressed in the O&M Plan, Volume 2 Sampling & Monitoring Plan Section 5.2.
164	Hualapai/TRC	Non-design	Monitoring	2.3.4 Freshwater Injection Area Baseline Concentrations p. 2-11	Constituents that will be monitored during injection include the COPCs (molybdenum, selenium, and nitrate), manganese (an in-situ byproduct), and fluoride (a general geochemical indicator parameter).	Why is arsenic not listed here?	See above			Hualapai reiterate the desire to have arsenic monitored in the injection water rather than sampling for arsenic only after it has been injected into the California aquifer.	DTSC/DOI Response: See RTC 163
165	Cocopah/TRC	Non-design	Monitoring	2.3.4 Freshwater Injection Area Baseline	Constituents that will be monitored during injection	Why is arsenic not listed here?	See above			The Tribes reiterate the desire to have arsenic monitored in the injection water rather	DTSC/DOI Response: See RTC 163

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
				Concentrations p. 2-11	include the COPCs (molybdenum, selenium, and nitrate), manganese (an in-situ byproduct), and fluoride (a general geochemical indicator parameter).					than sampling for arsenic only after it has been injected into the California aquifer.	
166	Chemehuevi/ TRC	Non-design	Monitoring	2.3.4 Freshwater Injection Area Baseline Concentrations p. 2-11	Constituents that will be monitored during injection include the COPCs (molybdenum, selenium, and nitrate), manganese (an in-situ byproduct), and fluoride (a general geochemical indicator parameter).	Why is arsenic not listed here?	See above			The Tribes reiterate the desire to have arsenic monitored in the injection water rather than sampling for arsenic only after it has been injected into the California aquifer.	DTSC/DOI Response: See RTC 163
167	DTSC-41	Design	Monitoring	2.3.4 Freshwater Injection Area Baseline Concentrations / Page 2-11	"These data form the baseline condition for the freshwater injection areas."	Revise the sentence as follows to acknowledge that new monitoring data will be utilized to update baseline conditions, "These data form the baseline condition for the freshwater injection areas <u>and will be updated with data from new wells before remedial system start up</u>." Include a section in the design that will document when the update will be done and what it will encompass. This section should be referenced within this portion of the document.	Agreed. The sentence will be changed as written, and the following text will be added to Section 2.3.4: "<u>It is anticipated that the update could be done as early as one year after a few sampling events at the new wells. This would involve updating Section 2.3.4 including Table 2.3-2 to incorporate data from new wells. The timing of the update will depend on the stability of observed concentrations in each new well. Some site wells have taken time to equilibrate with the aquifer following installation, and if a new well shows a continuous increase or decrease in one or more constituents, more time will be allotted for additional sampling before representative values are incorporated</u>	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							into the baseline update. The updates to the injection area baseline may or may not change the range and statistics of baseline concentrations."				
168	DTSC-42	Non-design	Editorial	2.3.4.1 Molybdenum/ Page 2-11	Average molybdenum concentrations in the injection area range from 8.77 to 46.01 µg/L, with a mean around 20 µg/L. The calculated UTL for this injection area dataset is 46.8 µg/L (Table 2.3-2), which exceeds the background UTL of 36.3 µg/L. The wells within the influence of IM-3 injection (i.e., the OW- and CW- well clusters presented in Table 2.3-2) have all shown breakthrough of IM-3 effluent water, which contains much lower molybdenum concentrations than the native groundwater. As a result, the average values for these wells have been skewed downward by the IM-3 injection operations. Pre-breakthrough concentrations in some of these wells ranged between 50 and 90 µg/L	The following portions of the cited paragraphs should be revised to more accurately reflect site conditions: "The calculated UTL for this injection area dataset is 46.8 µg/L (Table 2.3-2), which exceeds the background UTL of 36.3 µg/L. Two of the 27 wells currently exhibit concentrations slightly in excess of the background UTL (Table 2.3-2 and Figure 2.3-2). Most of the wells within the influence of IM-3 injection (i.e., the OW- and CW- well clusters presented in Table 2.3-2) have ~~all~~ shown breakthrough of IM-3 effluent water... These data demonstrate that the deeper zones of the injection area contain~~s~~ moderately elevated natural molybdenum concentrations compared to the dataset used for the regional background study."	The first two suggested changes will be included. The second sentence changes will be modified to read: "~~Most~~ Of the wells within the influence of IM-3 injection (i.e. the OW- and CW- well clusters presented in Table 2.3-2), 16 of the 17 wells have water quality that either approaches or is equivalent to that ~~shown breakthrough~~ of the IM-3 effluent water." The third change will be revised to state: "...the deeper zones of the injection area typically contained moderately elevated natural molybdenum concentrations compared to the dataset used for the regional background."	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					during the period 2004-2006. These data demonstrate that the injection area contains moderately elevated natural molybdenum concentrations compared to the dataset used for the regional background study.						
169	DTSC-43	Non-design	Editorial	2.3.4.3 Nitrate/ Page 2-11	"Because there are no non-plume wells in the injection area at the mountain front, a natural nitrate level cannot be clearly defined for this area. The three wells with the highest nitrate concentrations in the present data set, MW-14, MW-15, and MW-40S, are the closest to the mountain front recharge area, suggesting higher concentrations may be encountered when new data are collected during remedy construction."	The following portions of the cited paragraph should be revised as indicated to better describe site conditions, "Because there are no non-plume wells in the injection area at the mountain front, a natural nitrate level cannot be clearly defined for <u>the southern</u> area. ~~The three wells with the highest nitrate concentrations in the present data set, MW-14, MW-15, and MW-40S, are the closest to the mountain front recharge area, suggesting higher concentrations may be encountered when new data are collected during remedy construction~~. "<u>New remedy wells should assist in determining non-plume nitrate concentrations for the south western portion of the Bat Cave Wash area."</u> The sentence above was deleted to minimize speculation. Well MW-14 has been contaminated in the past and MW-40S is near MW-14 and contaminated well MW-40D.	The suggested changes will be made to the revised text.	Resolved.			Comment resolved.
170	DTSC-44	Non-design	Editorial	2.3.4.4 Manganese/ Page 2-11		Revise the section to indicate that the manganese well cluster data (i.e., Table 2.3-2) suggests that the deeper portion of the aquifer always exhibits greater manganese concentrations than the corresponding shallow well within the cluster.	The following text will be added to Section 2.3.4.4: "<u>The manganese concentrations in the deep zone are generally higher than those in the shallow zone. This is consistent with the generally more reducing</u>	Resolved.			Comment resolved.

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							conditions in the deep zone, in which manganese oxide minerals are reductively dissolved to a greater degree. Though this difference between shallow and deep concentrations is fairly consistent in the injection area, it should be noted that the some of the differences reported in Table 2.3-2 are skewed upward by anomalously high manganese values reported in the early samples collected from some of the deep zone wells."				
171	DTSC-45	Design	Remedial design	2.4.1 Land Ownership, Disturbance, and Development/Page 2-13	"An inventory of existing infrastructure outside the Compressor Station has been conducted and is included in Figure 2.4-1A)."	Figure 2.4-1A was not included in the 90% document and needs to be included.	Figure 2.4-1A was distributed to agencies, Tribes, and stakeholders for review on October 15, 2014. This figure will be included in the BOD.	Resolved.			Comment resolved.
172	FMIT/TRC	Non-design	Editorial	2.4.1 Land Ownership Disturbance, and Development p. 2-13	Land owners and leaseholders will have to grant permission to access their property for construction and operation of groundwater remedy facilities or equipment.	As worded it seems as though the landowner has no choice but to grant access permission. This is inconsistent with statements made previously which indicated permission for use of private land will need to be obtained from the landowner. Please confirm or reword. In addition please provide information on what access agreements to date have been obtained, and discuss in more detail what additional permissions are outstanding for use of private lands.	The intent of the cited text is to recognize that the landowners will need to grant permission before PG&E can access their property for construction and O&M of the remedy. The text will be revised to state that PG&E will obtain permission from landowners and leaseholders to access their property for construction and operation of groundwater remedy facilities or equipment. Sections 5.3.2 (Access to non-federal lands) and 5.3.3 (Other Anticipated Approvals, Permits, and Agreements) listed the approvals/permits/agreements PG&E anticipates obtaining for this project. As discussed in RTCs #82 FMIT/TRC, #108 FMIT/ TRC, and			In the case access rights are not granted to PG&E resulting in changes to the final design, the Tribe expects any future deviations from the work plan, will continue to incorporate Tribal concerns and Tribal participation. The Tribe states their intended interest to stay involved with any deviations from the work plan with the same level of involvement that has occurred during the drafting of the work plan. The Tribe needs to be included in all alternative/additional well location discussions. This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or	A similar RTC (RTC #174) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							#875 DOI-138, PG&E is working diligently to secure all necessary access agreements for remedy implementation. PG&E is working towards obtaining all non-federal access agreements within 30 days of DTSC's approval of the Final Design and C/RAWP and within 90 days of DOI's request for such access agreements, consistent with the timing requirements in the Corrective Action Consent Agreement between PG&E and DTSC and the Remedial Design/Remedial Action Consent Decree between PG&E and the United States, on behalf of DOI.			replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources identified by Tribes as well as to notify the Tribe of the need for particular wells.	
173	Hualapai/TRC	Non-design	Editorial	2.4.1 Land Ownership Disturbance, and Development p. 2-13	Land owners and leaseholders will have to grant permission to access their property for construction and operation of groundwater remedy facilities or equipment.	As worded it seems as though the landowner has no choice but to grant access permission. This is inconsistent with statements made previously which indicated permission for use of private land will need to be obtained from the landowner. Please confirm or reword. In addition please provide information on what access agreements to date have been obtained, and discuss in more detail what additional permissions are outstanding for use of private lands.	See above			In the case access rights are not granted to PG&E resulting in changes to the final design, Hualapai expect any future deviations from the work plan, will continue to incorporate Tribal concerns and Tribal participation. The Tribes state their intended interest to stay involved with any deviations from the work plan with the same level of involvement that has occurred during the drafting of the work plan. The Tribes need to be included in all alternative/additional well location discussions. This includes Hualapai presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources identified by Tribes as well as to	A similar RTC (RTC #174) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										notify Tribes of the need for particular wells.	
174	Cocopah/TRC	Non-design	Editorial	2.4.1 Land Ownership Disturbance, and Development p. 2-13	Land owners and leaseholders will have to grant permission to access their property for construction and operation of groundwater remedy facilities or equipment.	As worded it seems as though the landowner has no choice but to grant access permission. This is inconsistent with statements made previously which indicated permission for use of private land will need to be obtained from the landowner. Please confirm or reword. In addition please provide information on what access agreements to date have been obtained, and discuss in more detail what additional permissions are outstanding for use of private lands.	See above			In the case access rights are not granted to PG&E resulting in changes to the final design, The Tribes expect any future deviations from the work plan, will continue to incorporate Tribal concerns and Tribal participation. The Tribes state their intended interest to stay involved with any deviations from the work plan with the same level of involvement that has occurred during the drafting of the work plan. The Tribes need to be included in all alternative/additional well location discussions. This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources identified by Tribes as well as to notify Tribes of the need for particular wells.	This RTC was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.
175	Chemehuevi/ TRC	Non-design	Editorial	2.4.1 Land Ownership Disturbance, and Development p. 2-13	Land owners and leaseholders will have to grant permission to access their property for construction and operation of groundwater remedy facilities or equipment.	As worded it seems as though the landowner has no choice but to grant access permission. This is inconsistent with statements made previously which indicated permission for use of private land will need to be obtained from the landowner. Please confirm or reword. In addition please provide information on what access agreements to date have been obtained, and discuss in more detail what additional permissions are outstanding for use of private lands.	See above			In the case access rights are not granted to PG&E resulting in changes to the final design, The Tribes expect any future deviations from the work plan, will continue to incorporate Tribal concerns and Tribal participation. The Tribes state their intended interest to stay involved with any deviations from the work plan with the same level of involvement that has	A similar RTC (RTC #174) was discussed at the August 18 TWG meeting. DTSC Response: Tribal comment noted.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										occurred during the drafting of the work plan. The Tribes need to be included in all alternative/additional well location discussions. This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources identified by Tribes as well as to notify Tribes of the need for particular wells.	
176	FMIT/TRC	Non-design	CEQA/EIR	2.4.2 Site Topography and Surface Geology p. 2-14	Surface conditions and topography have a significant effect on project implementation. For example, variation in surface elevations will require installing air release valves on pipes	Have these air release valves been addressed under the EIR for noise impacts?	The EIR addressed air release valves on pages 3-18 and 3-25.		Noted.	Noted.	
177	Hualapai/TRC	Non-design	CEQA/EIR	2.4.2 Site Topography and Surface Geology p. 2-14	Surface conditions and topography have a significant effect on project implementation. For example, variation in surface elevations will require installing air release valves on pipes	Have these air release valves been addressed under the EIR for noise impacts?	See above		See above	Noted.	
178	Cocopah/TRC	Non-design	CEQA/EIR	2.4.2 Site Topography and Surface Geology p. 2-14	Surface conditions and topography have a significant effect on project	Have these air release valves been addressed under the EIR for noise impacts?	See above		See above	Noted.	

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					implementation. For example, variation in surface elevations will require installing air release valves on pipes						
179	Chemehuevi/ TRC	Non-design	CEQA/EIR	2.4.2 Site Topography and Surface Geology p. 2-14	Surface conditions and topography have a significant effect on project implementation. For example, variation in surface elevations will require installing air release valves on pipes	Have these air release valves been addressed under the EIR for noise impacts?	See above		See above	Noted.	
180	FMIT/TRC 1c	Design	Remedial Design	2.4.3.1 Coordination of RFI/RI Soil Investigation with Remedy Design and Construction	Groundwater remedy infrastructure may be relocated to avoid the contaminated soil areas.	It is not clear the exact meaning of this as much collaborative effort on the part of Stakeholders has been involved in determining the exact location of the remedial infrastructure. This statement however appears to suggest that final locations may not be as determined within the BOD documents and will potentially be changed. If this is true how will Tribal stakeholder involvement work on the final placement of remedy structure?	Please see RTCs #44 FMIT/TRC, #45 Hualapai/ TRC, #46 Cocopah/TRC, and #47 Chemehuevi/ TRC, first paragraph for discussion on potential changes. Please see the rest of RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/TRC for discussion of communication with Tribes during construction. In addition, PG&E will notify and invite Tribal monitors to monitor and observe ground disturbing activities during construction in accordance with the PA, the CHPMP, and the CIMP, e.g., tribal notification prior to certain activities and Tribal monitoring/ observation of ground disturbing activities (PA Appendix B, CHPMP Section 6, CIMP section 2.10), and/or inspection of remediation facilities and staging areas (CUL-		DOI concurs with the response.	Please see response to comment FMIT/TRC RTC #44.	DTSC Response: Tribal comment noted.

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							1a-8p).				
181	Hualapai/TRC 1c	Design	Remedial Design	2.4.3.1 Coordination of RFI/RI Soil Investigation with Remedy Design and Construction	Groundwater remedy infrastructure may be relocated to avoid the contaminated soil areas.	It is not clear the exact meaning of this as much collaborative effort on the part of Stakeholders has been involved in determining the exact location of the remedial infrastructure. This statement however appears to suggest that final locations may not be as determined within the BOD documents and will potentially be changed. If this is true how will Tribal stakeholder involvement work on the final placement of remedy structure?	See above		See above	See response to comment Hualapai/ TRC RTC #83.	DTSC Response: Tribal comment noted.
182	Cocopah/TRC 1c	Design	Remedial Design	2.4.3.1 Coordination of RFI/RI Soil Investigation with Remedy Design and Construction	Groundwater remedy infrastructure may be relocated to avoid the contaminated soil areas.	It is not clear the exact meaning of this as much collaborative effort on the part of Stakeholders has been involved in determining the exact location of the remedial infrastructure. This statement however appears to suggest that final locations may not be as determined within the BOD documents and will potentially be changed. If this is true how will Tribal stakeholder involvement work on the final placement of remedy structure?	See above		See above	See response to Cocopah RTC# 84.	DTSC Response: Tribal comment noted.
183	Chemehuevi/ TRC 1c	Design	Remedial Design	2.4.3.1 Coordination of RFI/RI Soil Investigation with Remedy Design and Construction	Groundwater remedy infrastructure may be relocated to avoid the contaminated soil areas.	It is not clear the exact meaning of this as much collaborative effort on the part of Stakeholders has been involved in determining the exact location of the remedial infrastructure. This statement however appears to suggest that final locations may not be as determined within the BOD documents and will potentially be changed. If this is true how will Tribal stakeholder involvement work on the final placement of remedy structure?	See above		See above	See response to Chemehuevi/TRC RTC# 85.	DTSC Response: Tribal comment noted.
184	DTSC-48	Non-design	Other	Section 2.4.7, Special Status Species	Special Status Wildlife	Since the 2011 certified groundwater EIR, DTSC has learned of the potential presence of several special status species at or around the proposed project area. In addition to the Townsend's Big-eared Bat that is now a candidate for protection, DTSC also understands that the Ringtail Cat is also a fully protected species and has been sighted at the Station. The Ring-tail Cat should be listed under this subheading instead of an undescriptive paragraph beneath "Other Avian Species." DTSC also understands that Big Horn Sheep have been sighted near the project area as well. Please include these species in the list.	Special-status wildlife list will be revised to include: Townsend's big-eared bat, ring-tailed cat, Nelson's big horn sheep, and the Western Yellow-billed cuckoo. A subheading for 'Other Mammal Species' will be added and text will be provided to describe the status and occurrence of each at or near the site.				
185	FMIT/TRC	Non-design	CEQA/EIR	2.4.7 p. 2-17	Special-Status Species	Please update this section to include discussion of the Thompson long-eared bat	PG&E is unaware of a species called "Thompson long-eared bat," and believes the commenter may be referring to Townsend's big-eared bats. Please see RTC #184 DTSC-48.			Noted.	
186	Hualapai/TRC	Non-design	CEQA/EIR	2.4.7 p. 2-17	Special-Status Species	Please update this section to include discussion of the Thompson long-eared bat	See above			Noted.	
187	Cocopah/TRC	Non-design	CEQA/EIR	2.4.7 p. 2-17	Special-Status Species	Please update this section to include discussion of the Thompson long-eared bat	See above			Noted.	
188	Chemehuevi/ TRC	Non-design	CEQA/EIR	2.4.7 p. 2-17	Special-Status Species	Please update this section to include discussion of the Thompson long-eared bat	See above			Noted.	
189	DTSC-46	Non-design	Other	2.4.7 Special-Status Species/ Page 2-19	"An individual was observed within the Topock Compressor Station on October 25, 2007 and a second ringtail	DTSC and PG&E consultants noted the carcass of a Ringtail sometime between 2006 and 2010. It was located in Arizona underneath the railroad bridge area. This siting should be included in the document if there is sufficient documentation.	This incidental sighting by DTSC will be added as directed. While the date was not recalled, it would be helpful to document the particular, if available, regarding PG&E consultant (or firm) with whom, this	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					sighting was made a few years later. No other ringtail sightings have been reported in the project area before or after these occasions."		ring-tailed cat sighting was made. This would allow PG&E to better document the sighting.				
190	DTSC-47	Design	Remedial Design	2.4.7 Special-Status Species/ Page 2-19	"There have been no CNDDB desert tortoise occurrences within 15 kilometers of the PG&E Topock survey area."	Add any other occurrences of desert tortoise in the area that are available. For instance, in April 2011, DTSC noted a tortoise crossing Airport Road about 7 miles to the northwest of the site. Photographs are available if desired.	This incidental sighting by DTSC will be added. No other tortoise occurrences of desert tortoise are known by PG&E at this time.	Resolved.			Comment resolved.
191	FMIT/TRC	Non-design	CEQA/EIR	2.4.7 Special-Status Species p. 2-19	It is important to note that five years of annual protocols survey for desert tortoise were conducted in the APE from 2005 to 2009. None of these protocol surveys indicated the presence of live desert tortoises, as only aged desert tortoise remains and inactive burrows were found.	Please indicate if the survey have evaluated the presence of tortoise in the drainage for the proposed well location MW-V?	There are actually two wells labeled MV-V shown on this map. One is within BCW and the other is in the drainage to the west of BCW. This entire area was part of the original protocol-level desert tortoise surveys by GANDA.			Noted.	
192	Hualapai/TRC	Non-design	CEQA/EIR	2.4.7 Special-Status Species p. 2-19	It is important to note that five years of annual protocols survey for desert tortoise were conducted in the APE from 2005 to 2009. None of these protocol surveys indicated the presence of live desert tortoises, as	Please indicate if the survey have evaluated the presence of tortoise in the drainage for the proposed well location MW-V?	See above			Noted.	

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

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					only aged desert tortoise remains and inactive burrows were found.						
193	Cocopah/TRC	Non-design	CEQA/EIR	2.4.7 Special-Status Species p. 2-19	It is important to note that five years of annual protocols survey for desert tortoise were conducted in the APE from 2005 to 2009. None of these protocol surveys indicated the presence of live desert tortoises, as only aged desert tortoise remains and inactive burrows were found.	Please indicate if the survey have evaluated the presence of tortoise in the drainage for the proposed well location MW-V?	See above			Noted.	
194	Chemehuevi/ TRC	Non-design	CEQA/EIR	2.4.7 Special-Status Species p. 2-19	It is important to note that five years of annual protocols survey for desert tortoise were conducted in the APE from 2005 to 2009. None of these protocol surveys indicated the presence of live desert tortoises, as only aged desert tortoise remains and inactive burrows were found.	Please indicate if the survey have evaluated the presence of tortoise in the drainage for the proposed well location MW-V?	See above			Noted.	
195	DTSC-52	Non-design	Other	Table 2.3-1	Calculated Site Background UTLs for Groundwater	The title of this table should be revised to "Regional Background" as the background concentrations were calculated from a regional study and not site level.	Revision will be made as requested.	Resolved.			Comment resolved.
196	DTSC-49	Non-design	Editorial	Figure 2.1-1	Figure 2.1-1	The referenced figure is improperly contoured. Several groundwater well water elevations are not appropriately contoured: MW-01, MW-06, MW-08, MW-10, MW-15, MW-25, MW-59-100 and the 456.0 contour line is absent in the IM3 injection area.	The contours on the figure are from a different time period than the posted data.	Resolved.			Comment resolved.

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						A revised, properly contoured figure is required.	For the contours with correct water level data, see CH2M HILL. 2014a. Fourth Quarter 2013 and Annual Interim Measures Performance Monitoring and Site Wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California. March 14. A revised figure was prepared in response to this comment and included in **Attachment G** of the final RTC table.				
197	DTSC-50	Non-design	Monitoring	Figure 2.1-2	Figure 2.1-2 "Approximate Extent of Saturated Alluvium."	The legend for saturated alluvium is incorrect. Revision required. Suggest either removing the legend reference for the grey area or changing it to "Approximate Extent of Saturated ~~Alluvium~~ Bedrock."	The symbol in the legend will be removed. The feature in question is bedrock (not saturated bedrock) and is labeled as such on the face of the figure, so no legend entry is needed for it.	Resolved.			Comment resolved.
198	DTSC-53	Non-design	CEQA/EIR	Figure 2.4-1		In addition to the 2011 certified EIR project boundary and the APE, the project boundary from the August 2013 EIR addendum for fresh water wells should also be included due to the expansion of the project into those locations. Please note, as additional areas outside of the current APE are considered for remedy use, the project area will need to be revised and fully surveyed for biological and cultural resources prior to use.	Applicable figures in the design documents will be updated to incorporate the area added pursuant to the August 2013 EIR addendum. Comment noted. The areas proposed for remedy use at Moabi Regional Park that are outside of the APE and EIR Project Area, were surveyed for biological and cultural resources. Survey results were included in the Supplemental 90% design submittal that was submitted on February 2, 2015. More recent field surveys for cultural resources were conducted in those areas and the updated information is included in the *Addendum 12: Annual Report of Archaeological and Historical Resources Investigations During 2014*. PG&E understands that adjustments to the	Okay.			Comment resolved.

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							EIR Project Area will be made by DTSC during the CEQA review of the final design. Similarly, PG&E understands that BLM will consult with the Tribes, PG&E and the California and Arizona State Historic Preservation Offices regarding any amendments to the APE, pursuant to the requirements of the PA.				
199	DOI-3	Non-design	Editorial	Figure 2.4-8	Legend: Vegetation Types, Colors and Labels	The salt cedar has a purple coloring and a label of '21' in the legend. The figure shows the salt cedar in purple, but with the label '19'. Please check.	Figure will be corrected to show Salt Cedar (19) in figure and legend and Oleander (21) deleted.		Resolved.		Comment resolved.
200	DTSC-51	Non-design	Other	Fig 2.4-10	Legend of Infrastructure and Habitat Area	The two legends are confusing. The color for proposed remedy structure and for Morafkai's Desert tortoise is too similar to distinguish in figure. Use another color or marking to separate similar colored information.	Morafkai's DETO symbol will be revised to a different color to avoid confusion.	Resolved.			Comment resolved.
Specific Comments – 90% BOD, Section 3: Design Basis and Assumptions											
201	FMIT/TRC 1d	Design	Infrastructures	3.1.4 Remediation System Design and Analysis	Potential well locations were carefully selected by first avoiding culturally or otherwise sensitive areas to minimize impact to the extent possible; delineated areas were closely evaluated, and site walks were conducted with Agencies and Tribes to review and adjust the general well locations. Precise well locations will be confirmed in the field prior to construction.	This is confusing as it was the general understanding during site walks that consultation has been conducted to determine exact infrastructure locations. This statement suggests further location adjustments will occur after the finalization of the BOD reports. Please indicate how Tribal Stakeholders will participate in these final decisions on well locations.	The intent of the text cited by the commenter is to acknowledge the site preparation and demarcation activities that will occur shortly before ground-disturbing activities, as described in C/RAWP Section 4.2.3. These activities will be conducted to field verify site conditions and sensitive resources prior to the actual ground disturbing activities, to be sure that there have not been changes in conditions since preparation of the 90% design document, or to account for changes that have taken place. These activities also include demarcating work area limits, identifying biologically and/or culturally sensitive areas, identifying subsurface utilities and other existing constraints, documenting preconstruction site conditions, and establishing access routes and work areas that will minimize		DOI concurs with the PG&E response.	Please see response to comment FMIT/TRC RTC #44.	DTSC Response: Tribal comment noted.

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							impacts to these features to the extent possible. Precise well locations will be confirmed in the field during this field verification process. Consistent with current practice, PG&E will notify the tribal stakeholders in advance of ground-disturbing activities and invite tribal monitors to observe such activities (see RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, #47 Chemehuevi/TRC #180 FMIT/TRC-1c, #181 Hualapai/TRC-1c, #182 Cocopah/TRC-1c, and #183 Chemehuevi/TRC-1c).				
202	Hualapai/TRC 1d	Design	Infrastructures	3.1.4 Remediation System Design and Analysis	Potential well locations were carefully selected by first avoiding culturally or otherwise sensitive areas to minimize impact to the extent possible; delineated areas were closely evaluated, and site walks were conducted with Agencies and Tribes to review and adjust the general well locations. Precise well locations will be confirmed in the field prior to construction.	This is confusing as it was the general understanding during site walks that consultation has been conducted to determine exact infrastructure locations. This statement suggests further location adjustments will occur after the finalization of the BOD reports. Please indicate how Tribal Stakeholders will participate in these final decisions on well locations.	See above		See above	See response tp comment Hualapai /TRC RTC #83.	DTSC Response: Tribal comment noted.
203	Cocopah/TRC 1d	Design	Infrastructures	3.1.4 Remediation System Design and Analysis	Potential well locations were carefully selected by first avoiding culturally or otherwise sensitive areas to minimize	This is confusing as it was the general understanding during site walks that consultation has been conducted to determine exact infrastructure locations. This statement suggests further location adjustments will occur after the finalization of the BOD reports. Please indicate how Tribal Stakeholders will participate in these final decisions on well locations.	See above		See above	See response to Cocopah RTC# 84.	DTSC Response: Tribal comment noted.

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					impact to the extent possible; delineated areas were closely evaluated, and site walks were conducted with Agencies and Tribes to review and adjust the general well locations. Precise well locations will be confirmed in the field prior to construction.						
204	Chemehuevi/ TRC 1d	Design	Infrastructures	3.1.4 Remediation System Design and Analysis	Potential well locations were carefully selected by first avoiding culturally or otherwise sensitive areas to minimize impact to the extent possible; delineated areas were closely evaluated, and site walks were conducted with Agencies and Tribes to review and adjust the general well locations. Precise well locations will be confirmed in the field prior to construction.	This is confusing as it was the general understanding during site walks that consultation has been conducted to determine exact infrastructure locations. This statement suggests further location adjustments will occur after the finalization of the BOD reports. Please indicate how Tribal Stakeholders will participate in these final decisions on well locations.	See above		See above	See Chemehuevi/TRC RTC #85.	DTSC Response: Tribal comment noted.
205	FMIT/TRC RTC, 60% #360	Non-design	GW Modeling	3.1.5 p. 3-4	(orig comment #360 response)....*The groundwater flow and solute transport model will be updated and recalibrated if significant differences from the conceptual site*	Although there is general discussion to update the model in the 90% BOD, it is stated that it will be *"updated annually if the data collected suggest that updates are needed"* [emphasis added] during the well installation/drilling phase. Updating of the model during this data collection phase is critical. This is important to the Tribes as having an updated, working model will be an important predictive tool to ensure this system is installed and operated in a proactive process. Every effort should be made to avoid "surprises" during the initial operational phase of this system. As there is a high probability that in reacting to unanticipated results (crisis mode), Tribal cultural values will be more likely to be pushed aside in lieu of solving an immediate, technical issue.	The following statements from the model update procedure will be removed to reduce the uncertainty of the timing of model updates: "if the data collected suggest that updates are needed" and "if significant differences from the conceptual site model are encountered".			Comment noted.	DTSC Response: Tribal comment noted.

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					model are encountered with respect to hydrogeologic characterization or remedy performance. This will allow the model to be used as a tool to evaluate the performance and guide the operation of the remedial design after including the adjusted data		Instead the model update procedure will adhere to the proposed update schedule presented in Appendix B Section 12 independent of the degree of variability between observed data and the model.				
206	Hualapai/TRC RTC, 60% #360	Non-design	GW Modeling	3.1.5 p. 3-4	(orig comment #360 response)....*The groundwater flow and solute transport model will be updated and recalibrated if significant differences from the conceptual site model are encountered with respect to hydrogeologic characterization or remedy performance. This will allow the model to be used as a tool to evaluate the performance and guide the operation of the remedial design after including the adjusted data*	Although there is general discussion to update the model in the 90% BOD, it is stated that it will be *"updated annually if the data collected suggest that updates are needed"* [emphasis added] during the well installation/drilling phase. Updating of the model during this data collection phase is critical. This is important to the Tribes as having an updated, working model will be an important predictive tool to ensure this system is installed and operated in a proactive process. Every effort should be made to avoid "surprises" during the initial operational phase of this system. As there is a high probability that in reacting to unanticipated results (crisis mode), Tribal cultural values will be more likely to be pushed aside in lieu of solving an immediate, technical issue.	See above			Comment noted.	DTSC Response: Tribal comment noted.
207	Cocopah/TRC RTC, 60% #360	Non-design	GW Modeling	3.1.5 p. 3-4	(orig comment #360 response)....*The groundwater flow and solute transport model will be updated and recalibrated if significant differences from the conceptual site*	Although there is general discussion to update the model in the 90% BOD, it is stated that it will be *"updated annually if the data collected suggest that updates are needed"* [emphasis added] during the well installation/drilling phase. Updating of the model during this data collection phase is critical. This is important to the Tribes as having an updated, working model will be an important predictive tool to ensure this system is installed and operated in a proactive process. Every effort should be made to avoid "surprises" during the initial operational phase of this system. As there is a high probability that in reacting to unanticipated results (crisis mode), Tribal cultural values will be more likely to be pushed aside in lieu of solving an immediate, technical issue.	See above			Comment noted.	DTSC Response: Tribal comment noted.

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					model are encountered with respect to hydrogeologic characterization or remedy performance. This will allow the model to be used as a tool to evaluate the performance and guide the operation of the remedial design after including the adjusted data						
208	Chemehuevi/ TRC RTC, 60% #360	Non-design	GW Modeling	3.1.5 p. 3-4	(orig comment #360 response)....*The groundwater flow and solute transport model will be updated and recalibrated if significant differences from the conceptual site model are encountered with respect to hydrogeologic characterization or remedy performance. This will allow the model to be used as a tool to evaluate the performance and guide the operation of the remedial design after including the adjusted data*	Although there is general discussion to update the model in the 90% BOD, it is stated that it will be *"updated annually if the data collected suggest that updates are needed"* [emphasis added] during the well installation/drilling phase. Updating of the model during this data collection phase is critical. This is important to the Tribes as having an updated, working model will be an important predictive tool to ensure this system is installed and operated in a proactive process. Every effort should be made to avoid "surprises" during the initial operational phase of this system. As there is a high probability that in reacting to unanticipated results (crisis mode), Tribal cultural values will be more likely to be pushed aside in lieu of solving an immediate, technical issue.	See above			Comment noted.	DTSC Response: Tribal comment noted.
209	DTSC-54	Design	GW Modeling	3.1.5 Model Update Procedures/ Page 3-5, and section 3.1.5.1	"If there are significant differences, the groundwater flow model, geochemical model, and/or the solute transport model will be updated and recalibrated."	As described here in the cited sentences, model updates will be performed if there are "significant differences" or if "if the data collected suggest that updates are needed". Please define "significant differences" and "if data collected suggest…" DTSC agrees that annual update of flow and solute transport model is appropriate. It is preferable to calibrate the model periodically with measured data to confirm its accuracy and predictions than a subjective decision that it is needed. Update based on subjective "significant differences" is not appropriate. Currently, the predicted remedy duration, by-product generation and plume capture relies heavily on model predictions. PG&E should provide a table with strategy on timing of model verification and recalibration. The section (or references to other sections) should describe as best as possible what would trigger an actual model update.	See RTC #205 FMIT/TRC, #206 Hualapai/TRC, #207 Cocopah/TRC, and #208 Chemehuevi/ TRC.				

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					"During the remedy well construction and testing period, the groundwater flow and solute transport model will be updated annually if the data collected suggest that updates are needed;…" 3.1.5.1 ""…if data collected suggest that updates are needed…"						
210	FMIT/TRC RTC, 60% #359	Non-design	GW Modeling	3.1.1/3-1 and 3.1.5/3-4	Use of PEST to reduce uncertainty	The information provided gave further context to the use of PEST in the model development. However, given the long term, high-quality water level data, associated trends in well CrVI concentrations and operational data associated with the IM3 system, PEST should be used to further calibrate key flow and fate/transport model parameters to reduce uncertainty in a key area of the proposed remedial system (i.e., high concentrations nearest river). Doing so now could provide a) greater credibility in modeling results, and b) greater sense that proposed new wells and associated operations are optimal for system performance to meet RAOs/OPS determination.	It is proposed that the model will be updated and recalibrated as per the schedule described in the model update procedure (Appendix B Section 12). Recent hydraulic data and groundwater quality data have been used to update the groundwater flow model and refine the geochemical and solute transport model parameters. The proposed remedy design is not solely based on modeling and additional calibration prior to remedy design implementation would not likely alter the selected remedy approach. PG&E will review and consider the Tribes' response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.			We continue to believe it is in the best interest of all Stakeholders, including PG&E, to fix noted deficiencies in the model in a timely manner (i.e., see Prucha and Eggers, July 2015 whitepaper). The model would then be re-calibrated to existing flow and fate/transport data associated with the broader IM-3 area (as opposed to local-scale tests used to calibrate some parameters), as this is a key area of the proposed remediation. At a minimum, the existing model should be validated (standard modeling protocol) against IM-3 flow and fate/transport data now to demonstrate that proposed remediation system design and operation are able to reproduce changes in a key remediation area. This would provide greater transparency and more confidence that the existing model (despite noted flaws) does not need to be updated until after construction of the entire system.	DTSC/DOI Response: See RTC #17

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211	Hualapai/TRC RTC, 60% #359	Non-design	GW Modeling	3.1.1/3-1 and 3.1.5/3-4	Use of PEST to reduce uncertainty	The information provided gave further context to the use of PEST in the model development. However, given the long term, high-quality water level data, associated trends in well CrVI concentrations and operational data associated with the IM3 system, PEST should be used to further calibrate key flow and fate/transport model parameters to reduce uncertainty in a key area of the proposed remedial system (i.e., high concentrations nearest river). Doing so now could provide a) greater credibility in modeling results, and b) greater sense that proposed new wells and associated operations are optimal for system performance to meet RAOs/OPS determination.	See above			We continue to believe it is in the best interest of all Stakeholders, including PG&E, to fix noted deficiencies in the model in a timely manner (i.e., see Prucha and Eggers, July 2015 whitepaper). The model would then be re-calibrated to existing flow and fate/transport data associated with the broader IM-3 area (as opposed to local-scale tests used to calibrate some parameters), as this is a key area of the proposed remediation. At a minimum, the existing model should be validated (standard modeling protocol) against IM-3 flow and fate/transport data now to demonstrate that proposed remediation system design and operation are able to reproduce changes in a key remediation area. This would provide greater transparency and more confidence that the existing model (despite noted flaws) does not need to be updated until after construction of the entire system.	DTSC/DOI Response: See RTC #17
212	Cocopah/TRC RTC, 60% #359	Non-design	GW Modeling	3.1.1/3-1 and 3.1.5/3-4	Use of PEST to reduce uncertainty	The information provided gave further context to the use of PEST in the model development. However, given the long term, high-quality water level data, associated trends in well CrVI concentrations and operational data associated with the IM3 system, PEST should be used to further calibrate key flow and fate/transport model parameters to reduce uncertainty in a key area of the proposed remedial system (i.e., high concentrations nearest river). Doing so now could provide a) greater credibility in modeling results, and b) greater sense that proposed new wells and associated operations are optimal for system performance to meet RAOs/OPS determination.	See above			We continue to believe it is in the best interest of all Stakeholders, including PG&E, to fix noted deficiencies in the model in a timely manner (i.e., see Prucha and Eggers, July 2015 whitepaper). The model would then be re-calibrated to existing flow and fate/transport data associated with the broader IM-3 area (as opposed to local-scale tests used to calibrate some parameters), as this is a key area of the proposed remediation. At a minimum, the	DTSC/DOI Response: See RTC #17

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										existing model should be validated (standard modeling protocol) against IM-3 flow and fate/transport data now to demonstrate that proposed remediation system design and operation are able to reproduce changes in a key remediation area. This would provide greater transparency and more confidence that the existing model (despite noted flaws) does not need to be updated until after construction of the entire system.	
213	Chemehuevi/ TRC RTC, 60% #359	Non-design	GW Modeling	3.1.1/3-1 and 3.1.5/3-4	Use of PEST to reduce uncertainty	The information provided gave further context to the use of PEST in the model development. However, given the long term, high-quality water level data, associated trends in well CrVI concentrations and operational data associated with the IM3 system, PEST should be used to further calibrate key flow and fate/transport model parameters to reduce uncertainty in a key area of the proposed remedial system (i.e., high concentrations nearest river). Doing so now could provide a) greater credibility in modeling results, and b) greater sense that proposed new wells and associated operations are optimal for system performance to meet RAOs/OPS determination.	See above			We continue to believe it is in the best interest of all Stakeholders, including PG&E, to fix noted deficiencies in the model in a timely manner (i.e., see Prucha and Eggers, July 2015 whitepaper). The model would then be re-calibrated to existing flow and fate/transport data associated with the broader IM-3 area (as opposed to local-scale tests used to calibrate some parameters), as this is a key area of the proposed remediation. At a minimum, the existing model should be validated (standard modeling protocol) against IM-3 flow and fate/transport data now to demonstrate that proposed remediation system design and operation are able to reproduce changes in a key remediation area. This would provide greater transparency and more confidence that the existing model (despite noted flaws) does not need to be updated until after construction of the entire system.	DTSC/DOI Response: See RTC #17
214	FMIT/TRC	Non-design	GW Modeling	3.2.1/ P. 3-7	"EXHIBIT 3.2-1	The 90% BOD documents indicate design/operation of the proposed remedial system is flexible	The pre-final range of			This was understood.	PG&E Response:

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					NATIONAL TRAILS HIGHWAY IN-SITU REACTIVE ZONE (NTH IRZ) ENGINEERING DESIGN ELEMENTS AND FEATURES Groundwater Remedy Basis of Design Report/Pre-Final (90%) Design PG&E Topock Compressor Station, Needles, California"	enough to accommodate all uncertainty in model inputs. To give Tribes a better sense that the 'optimized' system injection/extraction rates/locations etc. are indeed flexible enough to accommodate the significant uncertainty in model inputs/ conceptualization of flow, fate and transport etc. – can a range of maximum/minimum possible injection/extraction rates be provided here for each well rather than the range presented? This is important because additional wells might not be required if additional pumping capacity exists at initial remedial wells, beyond the somewhat loosely defined operational range presented here. This becomes even more relevant given the proposed hydraulic testing which is limited to only a few select wells and not necessarily aimed at determining maximum pumping capacities for each and every injection well.	minimum/ nominal/ maximum injection/ extraction rates on a well-by-well basis are presented in Table 3.2-1 of the BOD document.			However, Table 3.2-1 presents what appears to be prescribed values for minimum/maximum rates that were not fully determined through modeling or other rationale. What are the actual min/max possible ranges at each well rather than the desired ranges. Another way to ask this is, could the min/max ranges provided in Table 3.2-1 actually be extended, thereby potentially limiting the need for new wells? Please describe exactly how min/max ranges were defined for each well. It is our understanding that true evaluation of max/min possible rates at each well were never really assessed via modeling, or any other method. This becomes especially important in wells such as riverbank extraction, which would affect potential movement into Arizona groundwater.	Minimum and maximum well injection and extraction rates were estimates through assessment of available hydrogeologic data, current observed operational rates, and modeling. Actual minimum and maximum rates can only be fully determined after well construction through system operation or field testing. DTSC/DOI Response: Tribal comment and PG&E's response noted.
215	Hualapai/TRC	Non-design	GW Modeling	3.2.1/ P. 3-7	"EXHIBIT 3.2-1 NATIONAL TRAILS HIGHWAY IN-SITU REACTIVE ZONE (NTH IRZ) ENGINEERING DESIGN ELEMENTS AND FEATURES Groundwater Remedy Basis of Design Report/Pre-Final (90%) Design PG&E Topock Compressor Station, Needles, California"	The 90% BOD documents indicate design/operation of the proposed remedial system is flexible enough to accommodate all uncertainty in model inputs. To give Tribes a better sense that the 'optimized' system injection/extraction rates/locations etc. are indeed flexible enough to accommodate the significant uncertainty in model inputs/ conceptualization of flow, fate and transport etc. – can a range of maximum/minimum possible injection/extraction rates be provided here for each well rather than the range presented? This is important because additional wells might not be required if additional pumping capacity exists at initial remedial wells, beyond the somewhat loosely defined operational range presented here. This becomes even more relevant given the proposed hydraulic testing which is limited to only a few select wells and not necessarily aimed at determining maximum pumping capacities for each and every injection well.	See above			This was understood. However, Table 3.2-1 presents what appears to be prescribed values for minimum/maximum rates that were not fully determined through modeling or other rationale. What are the actual min/max possible ranges at each well rather than the desired ranges. Another way to ask this is, could the min/max ranges provided in Table 3.2-1 actually be extended, thereby potentially limiting the need for new wells? Please describe exactly how min/max ranges were defined for each well. It is our understanding that true evaluation of	DTSC Response: See RTC #214

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										max/min possible rates at each well were never really assessed via modeling, or any other method. This becomes especially important in wells such as riverbank extraction, which would affect potential movement into Arizona groundwater.	
216	Cocopah/TRC	Non-design	GW Modeling	3.2.1/ P. 3-7	"EXHIBIT 3.2-1 NATIONAL TRAILS HIGHWAY IN-SITU REACTIVE ZONE (NTH IRZ) ENGINEERING DESIGN ELEMENTS AND FEATURES Groundwater Remedy Basis of Design Report/Pre-Final (90%) Design PG&E Topock Compressor Station, Needles, California"	The 90% BOD documents indicate design/operation of the proposed remedial system is flexible enough to accommodate all uncertainty in model inputs. To give Tribes a better sense that the 'optimized' system injection/extraction rates/locations etc. are indeed flexible enough to accommodate the significant uncertainty in model inputs/ conceptualization of flow, fate and transport etc. – can a range of maximum/minimum possible injection/extraction rates be provided here for each well rather than the range presented? This is important because additional wells might not be required if additional pumping capacity exists at initial remedial wells, beyond the somewhat loosely defined operational range presented here. This becomes even more relevant given the proposed hydraulic testing which is limited to only a few select wells and not necessarily aimed at determining maximum pumping capacities for each and every injection well.	See above			This was understood. However, Table 3.2-1 presents what appears to be prescribed values for minimum/maximum rates that were not fully determined through modeling or other rationale. What are the actual min/max possible ranges at each well rather than the desired ranges. Another way to ask this is, could the min/max ranges provided in Table 3.2-1 actually be extended, thereby potentially limiting the need for new wells? Please describe exactly how min/max ranges were defined for each well. It is our understanding that true evaluation of max/min possible rates at each well were never really assessed via modeling, or any other method. This becomes especially important in wells such as riverbank extraction, which would affect potential movement into Arizona groundwater.	DTSC Response: See RTC #214
217	Chemehuevi/ TRC	Non-design	GW Modeling	3.2.1/ P. 3-7	"EXHIBIT 3.2-1 NATIONAL TRAILS HIGHWAY IN-SITU REACTIVE ZONE (NTH IRZ) ENGINEERING DESIGN ELEMENTS AND FEATURES Groundwater Remedy Basis of Design Report/Pre-	The 90% BOD documents indicate design/operation of the proposed remedial system is flexible enough to accommodate all uncertainty in model inputs. To give Tribes a better sense that the 'optimized' system injection/extraction rates/locations etc. are indeed flexible enough to accommodate the significant uncertainty in model inputs/ conceptualization of flow, fate and transport etc. – can a range of maximum/minimum possible injection/extraction rates be provided here for each well rather than the range presented? This is important because additional wells might not be required if additional pumping capacity exists at initial remedial wells, beyond the somewhat loosely defined operational range presented here. This becomes even more relevant given the proposed hydraulic testing which is limited to only a few select wells and not necessarily aimed at determining maximum pumping capacities for each and every injection well.	See above			This was understood. However, Table 3.2-1 presents what appears to be prescribed values for minimum/maximum rates that were not fully determined through modeling or other rationale. What are the actual min/max possible ranges at each well rather than the desired ranges? Another way to ask this	DTSC Response: See RTC #214

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					Final (90%) Design PG&E Topock Compressor Station, Needles, California"					is, could the min/max ranges provided in Table 3.2-1 actually be extended, thereby potentially limiting the need for new wells? Please describe exactly how min/max ranges were defined for each well. It is our understanding that true evaluation of max/min possible rates at each well were never really accessed via modeling, or any other method. This becomes especially important in wells such as riverbank extraction, which would affect potential movement into Arizona groundwater.	
218	FMIT/TRC 1e	Non-design	Monitoring	3.2.1 National Trails Highway In-Situ Reactive Zone (NTH IRZ)	One provisional extraction well (IRZ-40) and up to 30 provisional injection wells situated within 19 locations within the NTH IRZ (see Figure 3.0-1Figure ES-4A) may also be installed and activated dependent on the monitored performance of the NTH IRZ over time, and flexibility will be retained to adjust the locations of provisional wells in the future as the remedial program evolves; provisional well locations will be discussed with the stakeholders prior to implementation; criteria for installation and activation	Please provide additional detail on how Tribal stakeholders will be involved in the final decisions on well locations. In addition will Tribes have an opportunity to review and provide comment on data analysis that is used in determining the need for provisional wells and final well locations?	Please see RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/TRC for discussion of communication with Tribes during construction, startup, and O&M. In addition, PG&E will notify and invite Tribal monitors to monitor and observe ground disturbing activities in accordance with the PA, the CHPMP, and the CIMP, e.g., tribal notification prior to certain activities and Tribal monitoring/ observation of ground disturbing activities (PA Appendix B, CHPMP Section 6, and CIMP section 2.10).			Please see response to comment FMIT/TRC RTC #44.	DTSC Response: Tribal comment noted.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					of the provisional wells are provided in Appendix L, the O&M Manual, Volume 2, Section 2.2.1						
219	Hualapai/TRC 1e	Non-design	Monitoring	3.2.1 National Trails Highway In-Situ Reactive Zone (NTH IRZ)	One provisional extraction well (IRZ-40) and up to 30 provisional injection wells situated within 19 locations within the NTH IRZ (see Figure 3.0-1Figure ES-4A) may also be installed and activated dependent on the monitored performance of the NTH IRZ over time, and flexibility will be retained to adjust the locations of provisional wells in the future as the remedial program evolves; provisional well locations will be discussed with the stakeholders prior to implementation; criteria for installation and activation of the provisional wells are provided in Appendix L, the O&M Manual, Volume 2, Section 2.2.1	Please provide additional detail on how Tribal stakeholders will be involved in the final decisions on well locations. In addition will Tribes have an opportunity to review and provide comment on data analysis that is used in determining the need for provisional wells and final well locations?	See above			See response to comment Hualapai/TRC RTC #83.	DTSC Response: Tribal comment noted.
220	Cocopah/TRC 1e	Non-design	Monitoring	3.2.1 National Trails Highway In-Situ Reactive Zone (NTH IRZ)	One provisional extraction well (IRZ-40) and up to 30 provisional injection wells situated within	Please provide additional detail on how Tribal stakeholders will be involved in the final decisions on well locations. In addition will Tribes have an opportunity to review and provide comment on data analysis that is used in determining the need for provisional wells and final well locations?	See above			See response to Cocopah RTC#84.	DTSC Response: Tribal comment noted.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment (Please provide sufficient detail, include specifically what you are looking for)	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					19 locations within the NTH IRZ (see Figure 3.0-1Figure ES-4A) may also be installed and activated dependent on the monitored performance of the NTH IRZ over time, and flexibility will be retained to adjust the locations of provisional wells in the future as the remedial program evolves; provisional well locations will be discussed with the stakeholders prior to implementation; criteria for installation and activation of the provisional wells are provided in Appendix L, the O&M Manual, Volume 2, Section 2.2.1						
221	Chemehuevi/ TRC 1e	Non-design	Monitoring	3.2.1 National Trails Highway In-Situ Reactive Zone (NTH IRZ)	One provisional extraction well (IRZ-40) and up to 30 provisional injection wells situated within 19 locations within the NTH IRZ (see Figure 3.0-1Figure ES-4A) may also be installed and activated dependent on the monitored performance of the NTH IRZ over time, and flexibility will be retained to adjust the	Please provide additional detail on how Tribal stakeholders will be involved in the final decisions on well locations. In addition will Tribes have an opportunity to review and provide comment on data analysis that is used in determining the need for provisional wells and final well locations?	See above			See Chemehuevi/TRC RTC #85.	DTSC response: Tribal comment noted.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					locations of provisional wells in the future as the remedial program evolves; provisional well locations will be discussed with the stakeholders prior to implementation; criteria for installation and activation of the provisional wells are provided in Appendix L, the O&M Manual, Volume 2, Section 2.2.1						
222	DTSC-55	Non-design	Editorial	Section 3.2.1.1, Description of NTH IRZ, page 3-8 1st paragraph	i.e., the threshold optimization criterion of minimizing the Cr[VI] remedial timeframe has been met; see also section 3.1.4).	This statement seems out of place. The preceding statement asserts that the spacing of the NTH IRZ line will minimize the potential for the extraction of carbon substrate or treated water. How does that, by itself, fulfill the criterion to minimize the remedial timeframe? Please clarify or remove the referenced sentence.	The intent of the statement was to tie the NTH IRZ-specific optimization criteria to the threshold optimization criteria summarized in Section 3.1.4 and detailed in Appendix B (Section 6.4 and Table 6.4-1). The referenced text will be revised as follows to clarify: "Based on the results of groundwater flow and solute transport modeling, the current recirculation system configuration—injection wells spaced along the NTH IRZ line with extraction wells located at the ends and in the central portion of the NTH IRZ—will allow for adequate lateral dispersion of organic carbon while minimizing the potential for the extraction of carbon substrate or treated water ~~(i.e., the threshold optimization criterion of minimizing the Cr[VI] remedial timeframe has been met; see also~~	Resolved.			Comment resolved.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							~~Section 3.1.4~~). Adequate lateral dispersion of organic carbon prevents breakthrough of the Cr(VI) plume that, if allowed, may in turn lead to an extended remedial timeframe; thus, the threshold optimization criterion of minimizing the Cr(VI) remedial timeframe has been met through model assessment of the NTH IRZ well spacing."				
223	FMIT/TRC	Design	CEQA/EIR	3.2.1.1 Description of NTH IRZ - Portable Tanks. p. 3-11	The NTH IRZ Injection Well design will include manual addition ports to accommodate the potential use of portable tanks (5- to 1,000-gallon capacity) for the direct injection of dilute carbon substrate solution at the wellheads. Portable tanks may be preferred over pipelines at locations where the carbon injection volume is low, injections occur with long rest periods, or long pipelines are expected to pose health and safety and/or long term O&M challenges.	Please describe how the presence of portable tanks at well heads was addressed within the groundwater EIR. Please provide an image of what this will look like so Tribes can see how the visual landscape would be affected?	Photograph of a typical 500 to 1,000 gallon portable tank that would be pulled on a small trailer by a pickup is included in **Attachment H** of the final RTC table. See 60% RTC #96a for reference to how the FEIR addressed portable tanks.	Portable tanks were considered in the 2011 FEIR. DTSC will evaluate if additional discussion is warranted in the SEIR associated with this activities.		It is the opinion of the Tribe that portable tanks specifically used at the NTH IRZ Injection wells must be addressed within the SEIR in regards to impacts on both the Cultural and Visual resources.	DTSC response: See DTSC's original response. Tribal comment noted.
224	Hualapai/TRC	Design	CEQA/EIR	3.2.1.1 Description of NTH IRZ - Portable Tanks. p. 3-11	The NTH IRZ Injection Well design will include manual addition ports to accommodate the potential use of portable tanks (5- to	Please describe how the presence of portable tanks at well heads was addressed within the groundwater EIR. Please provide an image of what this will look like so Tribes can see how the visual landscape would be affected?	See above			It is the opinion of the Hualapai that portable tanks specifically used at the NTH IRZ Injection wells were not adequately addressed in the 2011 FEIR and needs to be addressed within the SEIR in regards to impacts on	DTSC response: See DTSC's original response to RTC #223. Tribal comment noted.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					1,000-gallon capacity) for the direct injection of dilute carbon substrate solution at the wellheads. Portable tanks may be preferred over pipelines at locations where the carbon injection volume is low, injections occur with long rest periods, or long pipelines are expected to pose health and safety and/or long term O&M challenges.					both the Cultural and Visual resources.	
225	Cocopah/TRC	Design	CEQA/EIR	3.2.1.1 Description of NTH IRZ - Portable Tanks. p. 3-11	The NTH IRZ Injection Well design will include manual addition ports to accommodate the potential use of portable tanks (5- to 1,000-gallon capacity) for the direct injection of dilute carbon substrate solution at the wellheads. Portable tanks may be preferred over pipelines at locations where the carbon injection volume is low, injections occur with long rest periods, or long pipelines are expected to pose health and safety and/or long	Please describe how the presence of portable tanks at well heads was addressed within the groundwater EIR. Please provide an image of what this will look like so Tribes can see how the visual landscape would be affected?	See above			It is the opinion of the Tribes that portable tanks specifically used at the NTH IRZ Injection wells was not adequately addressed in the 2011 FEIR and needs to be addressed within the SEIR in regards to impacts on both the Cultural and Visual resources.	DTSC response: See DTSC's original response to RTC #223. Tribal comment noted.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					term O&M challenges.						
226	Chemehuevi/ TRC	Design	CEQA/EIR	3.2.1.1 Description of NTH IRZ - Portable Tanks. p. 3-11	The NTH IRZ Injection Well design will include manual addition ports to accommodate the potential use of portable tanks (5- to 1,000-gallon capacity) for the direct injection of dilute carbon substrate solution at the wellheads. Portable tanks may be preferred over pipelines at locations where the carbon injection volume is low, injections occur with long rest periods, or long pipelines are expected to pose health and safety and/or long term O&M challenges.	Please describe how the presence of portable tanks at well heads was addressed within the groundwater EIR. Please provide an image of what this will look like so Tribes can see how the visual landscape would be affected?	See above			It is the opinion of the Tribes that portable tanks specifically used at the NTH IRZ Injection wells was not adequately addressed in the 2011 FEIR and needs to be addressed within the SEIR in regards to impacts on both the Cultural and Visual resources.	DTSC response: See DTSC's original response to RTC #223. Tribal comment noted.
227	FMIT/TRC	Non-design	Remedial Design	3.2.1.1 p. 3-13 Description of NTH IRZ Well Maintenance and Rehabilitation Reagents	The biological dispersant is not expected to impact groundwater chemistry or the reducing environment of the IRZ during rehabilitation.	Please provide detail on how the zero impact conclusion was determined, (i.e. what is the reference for this conclusion?)	The use of Nu-Well 310 Bioacid Polymer is not expected to impact groundwater chemistry or the reducing environment of the IRZ during rehabilitation. The product is NSF approved for cleaning potable water wells, pipelines and filter systems. As part of the well rehabilitation process, the majority of the water containing the added well chemicals is removed during purging of the wells. Any remaining Nu-Well 310 decomposes into carbon monoxide, carbon dioxide with extremely small amounts of			Noted.	

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							phosphorus compounds.				
228	Hualapai/TRC	Non-design	Remedial Design	3.2.1.1 p. 3-13 Description of NTH IRZ Well Maintenance and Rehabilitation Reagents	The biological dispersant is not expected to impact groundwater chemistry or the reducing environment of the IRZ during rehabilitation.	Please provide detail on how the zero impact conclusion was determined, (i.e. what is the reference for this conclusion?)	See above			Noted.	
229	Cocopah/TRC	Non-design	Remedial Design	3.2.1.1 p. 3-13 Description of NTH IRZ Well Maintenance and Rehabilitation Reagents	The biological dispersant is not expected to impact groundwater chemistry or the reducing environment of the IRZ during rehabilitation.	Please provide detail on how the zero impact conclusion was determined, (i.e. what is the reference for this conclusion?)	See above			Noted.	
230	Chemehuevi/ TRC	Non-design	Remedial Design	3.2.1.1 p. 3-13 Description of NTH IRZ Well Maintenance and Rehabilitation Reagents	The biological dispersant is not expected to impact groundwater chemistry or the reducing environment of the IRZ during rehabilitation.	Please provide detail on how the zero impact conclusion was determined, (i.e. what is the reference for this conclusion?)	See above			Noted.	
231	DTSC-56	Design	Infrastructures	Section 3.2.1.3, Uncertainties and Assumptions	"…adjustments to injection or extraction locations…"	Please clarify if this implies PG&E will exchange wells from injection to extraction, or changing well locations altogether? If infrastructure locations are changed, what would be the deciding factors to assist in that determination (i.e. why move a location and why would another location be better)?	There are several ways in which injection and extraction locations may be changed to optimize organic carbon distribution and Cr(VI) treatment. Future provisional well locations may be installed. Locations that are not operating may be turned on, or locations that are operating may be turned off. Extraction wells (e.g., IRZ-23) could be turned into injection wells, although this is not likely. Note it is also unlikely that previously used injection wells will be converted into extraction wells. We have found that injection for a period of time into a given well makes it difficult for that well to be used for extraction, i.e., the well dewaters.	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							Infrastructure location changes may be triggered if the current locations are not sufficient to achieve carbon distribution as detailed in Appendix L, Volume 2, Section 2.2.				
232	DTSC-57	Design	Editorial	3.2.2 Inner Recirculation Loop/ Page 3-15	"…and (3) provide secondary protection for the Colorado River by controlling the migration of potential byproducts generated by the NTH IRZ."	Revise the cited sentence as follows as to better capture the intent of the loop for protection of both groundwater and surface water: "…and (3) ~~provide secondary protection for the Colorado River by~~ controll~~ing~~ the migration of potential byproducts generated by the NTH IRZ."	The sentence will be revised as suggested. The same language used in other sections of the document will also be revised accordingly.	Resolved.			Comment resolved.
233	DTSC-58	Design	Remedial design	3.2.2 Inner Recirculation Loop/ Page 3-15	"Up to four provisional River Bank Extraction Wells (RB-6 through RB-9, to be located within the approximate area shown in Figure ES-4A)…"	Revise Figure ES-4A to allow, if needed, installation of provisional River Bank Extraction Wells to areas south of the I-40. This is requested to control potential migration of the chromium or byproducts downgradient of the southern IRZ. This concept had been requested during the 60%.	The "Area for River Bank Extraction Wells (RB-6 to RB-9)", as shown on Figure ES-4A, will not be revised per the comment as that portion of this area that can be practicably used to construct a well is severely limited by the actual area of dry land. A portion of this area is wetland with the degree of saturation varying by river stage. As discussed in PG&E's 60% RTC #100 DTSC-27, it is PG&E's opinion that it is unlikely that installing a well to the south of RB-5 would provide significant benefit because the saturated thickness of the unconsolidated aquifer decreases as the bedrock contact is approached in this direction. In addition, it should be noted that there may not be much saturated thickness above the bedrock and below the reducing rind in this southern area of the river bank. Nonetheless, in response to 60% comment, a contingency has been included in Table 2.1-1 of the	To clarify, DTSC is concerned with controlling potential migration of chromium or byproducts downgradient of the southern IRZ south of RB-5. As discussed in the 60% RTC #99 DTSC-26, DTSC is concerned that a contingency may not exist to capture/mitigate potential eastbound byproducts or chromium south of RB-5 towards bedrock (e.g., MW-23). DTSC notes that several roads/ routes currently exist in this specific area and is not mandating that contingency extraction wells would have to necessarily be placed along the river's edge. Resolved.			Comment resolved. DTSC response: Aside from ability to install additional contingency extraction well to control potential migration of chromium or byproducts, PG&E must consider the installation of the River Bank extraction wells during the earlier part of the construction phase. The River Bank extraction wells are important safeguards against unexpected mobilization of contaminants, and should be in place for use shortly after initialization of IRZ injection, if needed.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							Contingency Plan (O&M Manual Volume 3) to install additional wells, including wells south of RB-5, to control potential migration of the chromium or byproducts.				
234	FMIT/TRC	Design	Remedial Design	3.2.2.1 p. 3-16 Description River Bank Extraction Wells	Four of the River Bank Extraction Wells (shown on Figure ES-4A) are planned to be operated initially, although flexibility will be provided to operate any and all River Bank Extraction Wells at any given time based on the need to control potential migration of Cr(VI) located down gradient of the NTH IRZ, control byproduct migration	Specific to the control of potential migration of byproduct migration with the use of river bank extraction wells, please indicate where in the 90% BOD detailed discussions are included pertaining to the method used to remove byproducts from extracted/recirculated water. The information provided on the DMRS is not sufficient to evaluate the efficacy of the design.	The remedy will be operated to control byproduct generation at the NTH IRZ and to control migration across the floodplain that may necessitate extraction at the Riverbank. The process for controlling byproduct generation at the NTH IRZ is discussed in Appendix L, O&M Manual Volume 2, the Sampling and Monitoring Plan, Section 2.2.1 under NTH IRZ DQO-3. Per the comment clarification meeting held on April 23, 2015, the commenter is asking where the detailed information on the DMRS is located. PG&E's response to the clarified comment is the DMRS is a contingency system to address manganese and low pH in remedy-produced water in response to Tribes' comment (60% RTC #341). The system design basis including influent water quality, treatment goals, design flowrate, technology, footprint, and sustainability factors are presented in Appendix A of the Contingency Plan, O&M Manual Vol. 3.			The Dissolved Metal Removal System (DMRS) contingency plan was presented in response to concerns regarding the possible effects of remedy byproducts on groundwater pH, integrity of the organic rind, and the quality of the Colorado River. However, there were few discussions regarding possible scenarios where there could be endangerment to the rind and river. We are uncertain what the DMRS proposes to accomplish, except that a large capacity treatment system to treat high manganese or arsenic concentrations would be no different than a classic pump-and-treat system. If this is the case, then the pump-and-treat system should be employed from the beginning. Otherwise, more discussions are needed regarding the possible scenarios that could endanger the river, and what could be done about it. For example, rather than pump-and-treat, how about chemical stabilization of the byproduct plume using reagents? Response unresolved pending further design scenarios and contingency plans.	DTSC Response: The DMRS is PG&E's proposal to manage pH and other scaling compounds that may be present during system maintenance. DTSC is accepting the contingent design for the purpose of CEQA evaluation. PG&E must decide if the DMRS will need to be installed and operated after remedy is in place. Current proposed throughput is 20-35 gpm and not a high volume treatment. PG&E Response: The purpose of the contingent DMRS is to remove scaling ions (iron, manganese, calcium, and magnesium) from remedy-produced water for well and aquifer protection. Contingencies related to migration of Cr(VI) and in-situ byproducts are presented in Table 2.1-1 of the O&M Contingency Plan (O&M Manual Volume 3).
235	Hualapai/TRC	Design	Remedial Design	3.2.2.1 p. 3-16 Description River Bank Extraction	Four of the River Bank Extraction Wells (shown	Specific to the control of potential migration of byproduct migration with the use of river bank extraction wells, please indicate where in the 90% BOD detailed discussions are included pertaining to the method used to remove byproducts from extracted/recirculated water. The information provided on the DMRS is not sufficient to evaluate the efficacy of the design.	See above			The Dissolved Metal Removal System (DMRS) contingency plan was presented in	DTSC response: See RTC #234

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
				Wells	on Figure ES-4A) are planned to be operated initially, although flexibility will be provided to operate any and all River Bank Extraction Wells at any given time based on the need to control potential migration of Cr(VI) located down gradient of the NTH IRZ, control byproduct migration					response to concerns regarding the possible effects of remedy byproducts on groundwater pH, integrity of the organic rind, and the quality of the Colorado River. However, there were few discussions regarding possible scenarios where there could be endangerment to the rind and river. We are uncertain what the DMRS proposes to accomplish, except that a large capacity treatment system to treat high manganese or arsenic concentrations would be no different than a classic pump-and-treat system. If this is the case, then the pump-and-treat system should be employed from the beginning. Otherwise, more discussions are needed regarding the possible scenarios that could endanger the river, and what could be done about it. For example, rather than pump-and-treat, how about chemical stabilization of the byproduct plume using reagents? Response unresolved pending further design scenarios and contingency plans.	
236	Cocopah/TRC	Design	Remedial Design	3.2.2.1 p. 3-16 Description River Bank Extraction Wells	Four of the River Bank Extraction Wells (shown on Figure ES-4A) are planned to be operated initially, although flexibility will be provided to operate any and all River Bank Extraction Wells at any	Specific to the control of potential migration of byproduct migration with the use of river bank extraction wells, please indicate where in the 90% BOD detailed discussions are included pertaining to the method used to remove byproducts from extracted/recirculated water. The information provided on the DMRS is not sufficient to evaluate the efficacy of the design.	See above			The Dissolved Metal Removal System (DMRS) contingency plan was presented in response to concerns regarding the possible effects of remedy byproducts on groundwater pH, integrity of the organic rind, and the quality of the Colorado River. However, there were few discussions regarding possible scenarios where there	DTSC response: See RTC #234

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					given time based on the need to control potential migration of Cr(VI) located down gradient of the NTH IRZ, control byproduct migration					could be endangerment to the rind and river. We are uncertain what the DMRS proposes to accomplish, except that a large capacity treatment system to treat high manganese or arsenic concentrations would be no different than a classic pump-and-treat system. If this is the case, then the pump-and-treat system should be employed from the beginning. Otherwise, more discussions are needed regarding the possible scenarios that could endanger the river, and what could be done about it. For example, rather than pump-and-treat, how about chemical stabilization of the byproduct plume using reagents? Response unresolved pending further design scenarios and contingency plans.	
237	Chemehuevi/ TRC	Design	Remedial Design	3.2.2.1 p. 3-16 Description River Bank Extraction Wells	Four of the River Bank Extraction Wells (shown on Figure ES-4A) are planned to be operated initially, although flexibility will be provided to operate any and all River Bank Extraction Wells at any given time based on the need to control potential migration of Cr(VI) located down gradient of the NTH IRZ, control byproduct migration	Specific to the control of potential migration of byproduct migration with the use of river bank extraction wells, please indicate where in the 90% BOD detailed discussions are included pertaining to the method used to remove byproducts from extracted/recirculated water. The information provided on the DMRS is not sufficient to evaluate the efficacy of the design.	See above			The Dissolved Metal Removal System (DMRS) contingency plan was presented in response to concerns regarding the possible effects of remedy byproducts on groundwater pH, integrity of the organic rind, and the quality of the Colorado River. However, there were few discussions regarding possible scenarios where there could be endangerment to the rind and river. We are uncertain what the DMRS proposes to accomplish, except that a large capacity treatment system to treat high manganese or arsenic concentrations would be no different than a classic pump-and-treat	DTSC response: See RTC #234

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										system. If this is the case, then the pump-and-treat system should be employed from the beginning. Otherwise, more discussions are needed regarding the possible scenarios that could endanger the river, and what could be done about it. For example, rather than pump-and-treat, how about chemical stabilization of the byproduct plume using reagents? Response unresolved pending further design scenarios and contingency plans.	
238	DTSC-59	Non-design	Editorial	3.2.2.1 Description River Bank Extraction Well Details/ Page 3-17	"Note that the lower screen of the River Bank Extraction Wells are proposed to be screened beneath the reducing rind to minimize negative hydraulic impacts to this natural reductive zone, and to minimize the potential for well fouling caused by ~~the high dissolved mineral content of~~ the naturally-reduced groundwater of the rind."	It seems that this sentence should be revised as indicated in the adjacent column to emphasize that fouling due to reduced groundwater being injected into an aerobic aquifer is the key issue. For example, high dissolved mineral content is also being extracted from the lower screen, but is not called out as a concern.	Revision will be made as requested.	Resolved.			Comment resolved.
239	DTSC-60	Design	Remedial design	3.2.2.1 Description Inner Recirculation Loop Injection Well Layout and Flow Rate/ Page 3-18	"The current layout of the Groundwater Flow and Solute Transport Model has the two northern Inner Recirculation Loop Injection Wells (IRL-1 and IRL-2)	DTSC has previously requested that the shallow aquifer be managed for TDS at the IRL injection area. PG&E responded by installing dual screen IRL injection wells so that elevated TDS could be injected into similar TDS zones at depth and not adversely impact the shallow zone that has low TDS. DTSC assumed that freshwater would be injected in the shallow screen at IRL 1 and 2 to assist in managing TDS over time. Table 3.2.-2 indicates that a dual screen well is installed, but the upper screen is not being used. Please discuss anticipated impacts to hydraulic movement if upper third of aquifer is not receiving water. The document should be revised to inject an appropriate amount (e.g., 15 to 20 gpm) of freshwater into the shallow screens at IRL-1 and 2. DTSC is concerned that not injecting water into the shallow screens would not protect the shallow TDS (see results of IM-3 injection monitoring). There is also concern whether the groundwater model flow path and particle track figures have been updated throughout the 90% design document that actually portray not injecting into Layer 1 at both IRL 1 and 2.	Although the proposed injection into IRL-1 and IRL-2 is focused on the deeper portion of the screen, it is anticipated that the resultant mounding and increased pressure head will still enhance flushing in the shallow portion of the alluvial aquifer. TDS mixing may occur within the immediate vicinity of	Increasing TDS concentration trends in the shallow aquifer downgradient of IRL-1 and IRL-2 should trigger fresh water injection at those IRLs if TDS levels depart background levels (e.g., greater than ~1,000 ppm).			

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					receiving water from the River Bank Extraction Wells (without carbon amendment) to the lower two-thirds of the saturated interval, while fresh water is injected at the two southern wells (IRL-3 and IRL-4)."		the well, but it is not anticipated to result in any significant density driven flow. Additionally, freshwater is being injected across the full screen of the upgradient freshwater injection wells (IRL-3, IRL-4, and FW-1) at a total nominal rate of 400 gpm (more than that will help to preserve lower TDS values in the shallow portion of the aquifer throughout the area reducing the need for shallow freshwater injection at IRL-1 and IRL-2. Although the need for shallow freshwater injection into IRL-1 and IRL-2 is not anticipated, flexibility was built into the design if it is deemed necessary. Hydraulic gradients and TDS concentrations in the shallow aquifer will be monitored in the vicinity of IRL-1 and IRL-2 to gauge the impact of deep injection into these two wells. If there are steady increasing TDS concentration trends in the shallow aquifer downgradient of IRL-1 and IRL-2, freshwater injection into the shallow screen of IRL-1 and IRL-2 will be considered. Groundwater flow modeling and particle pathlines indicate that without shallow injection in IRL-1 and IRL-2, the resultant gradient magnitudes are similar. The greatest impact is the radial distribution of particles around IRL-1 and IRL-2 shallow is narrowed and at depth is widened, but there is not a significant impact on the remedy performance. Figures will be adjusted	Comparison to approaching deep TDS concentrations that can exceed 10,000 ppm is not appropriate.			

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							accordingly. Given the plume footprint widens with depth, injecting only in the deeper screens in IRL-1 and IRL-2 may slightly enhance remedial timeframes.				
240	FMIT/TRC	Design	Remedial design	3.2.2.1 p. 3-18 Inner Recirculation Loop Injection Well Layout and Flow Rate	Future provisional well IRL-5 may be located in the area between IRL-3 and IRL-4 to provide additional eastward hydraulic push along the western edge of the Cr(VI) plume (Figure ES-4A). In addition, future provisional wells IRL-6 and IRL-7, located in the current central portion of the chromium plume (Figure ES-4A), were included as "late time" remediation wells that are intended to accelerate the remediation process once eastward migration of the plume has occurred. However, the need for installation and activation of these provisional wells will depend on operational and monitoring data, and earlier start- up may be determined to be necessary. Decision criteria for increasing the	Please document the Tribal input that has been sought and provided specific to the arsenic monitoring wells around the proposed IRL 5, 6, 7.	Proposed arsenic monitoring well locations were provided to the TWG on April 14, 2014. The proposed locations included a map of provisional IRZ-5, 6, and 7 locations and associated potential locations for 150 and 225 foot arsenic monitoring wells. A sitewalk was held on April 17, 2014 to review the proposed arsenic monitoring well locations. Tribes provided written feedback in proposed locations in May 2014, although no comments specific to the arsenic monitoring wells for the provisional injection wells were received.			The Tribe expects that the any future decisions pertaining to arsenic monitoring well locations will continue to incorporate Tribal input and concerns. The Tribe states its intended interest to stay involved with any future design decisions with the same level of involvement that has occurred during the drafting of the work plan. The Tribe needs to be included in all alternative/additional well location discussions. This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources.	DTSC Response: Tribal comment noted.

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					number of IRL Injection Wells are provided in the O&M Manual, Volume 2, Section 2.2.2.						
241	Hualapai/TRC	Design	Remedial Design	3.2.2.1 p. 3-18 Inner Recirculation Loop Injection Well Layout and Flow Rate	Future provisional well IRL-5 may be located in the area between IRL-3 and IRL-4 to provide additional eastward hydraulic push along the western edge of the Cr(VI) plume (Figure ES-4A). In addition, future provisional wells IRL-6 and IRL-7, located in the current central portion of the chromium plume (Figure ES-4A), were included as “late time” remediation wells that are intended to accelerate the remediation process once eastward migration of the plume has occurred. However, the need for installation and activation of these provisional wells will depend on operational and monitoring data, and earlier start- up may be determined to be necessary. Decision criteria for increasing the	Please document the Tribal input that has been sought and provided specific to the arsenic monitoring wells around the proposed IRL 5, 6, 7.	See above			Hualapai expects that the any future decisions pertaining to arsenic monitoring well locations will continue to incorporate Hualapai input and concerns. Hualapai state their intended interest to stay involved with any future design decisions with the same level of involvement that has occurred during the drafting of the work plan. The Hualapai need to be included in all alternative/ additional well location discussions. This includes Hualapai presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources.	DTSC Response: Tribal comment noted.

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					number of IRL Injection Wells are provided in the O&M Manual, Volume 2, Section 2.2.2.						
242	Cocopah/TRC	Design	Remedial Design	3.2.2.1 p. 3-18 Inner Recirculation Loop Injection Well Layout and Flow Rate	Future provisional well IRL-5 may be located in the area between IRL-3 and IRL-4 to provide additional eastward hydraulic push along the western edge of the Cr(VI) plume (Figure ES-4A). In addition, future provisional wells IRL-6 and IRL-7, located in the current central portion of the chromium plume (Figure ES-4A), were included as “late time” remediation wells that are intended to accelerate the remediation process once eastward migration of the plume has occurred. However, the need for installation and activation of these provisional wells will depend on operational and monitoring data, and earlier start- up may be determined to be necessary. Decision criteria for increasing the	Please document the Tribal input that has been sought and provided specific to the arsenic monitoring wells around the proposed IRL 5, 6, 7.	See above			The Tribes expect that the any future decisions pertaining to arsenic monitoring well locations will continue to incorporate Tribal input and concerns. The Tribes state their intended interest to stay involved with any future design decisions with the same level of involvement that has occurred during the drafting of the work plan. The Tribes need to be included in all alternative/additional well location discussions. This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources.	DTSC Response: Tribal comment noted.

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					number of IRL Injection Wells are provided in the O&M Manual, Volume 2, Section 2.2.2.						
243	Chemehuevi/ TRC	Design	Remedial Design	3.2.2.1 p. 3-18 Inner Recirculation Loop Injection Well Layout and Flow Rate	Future provisional well IRL-5 may be located in the area between IRL-3 and IRL-4 to provide additional eastward hydraulic push along the western edge of the Cr(VI) plume (Figure ES-4A). In addition, future provisional wells IRL-6 and IRL-7, located in the current central portion of the chromium plume (Figure ES-4A), were included as "late time" remediation wells that are intended to accelerate the remediation process once eastward migration of the plume has occurred. However, the need for installation and activation of these provisional wells will depend on operational and monitoring data, and earlier start- up may be determined to be necessary. Decision criteria for increasing the	Please document the Tribal input that has been sought and provided specific to the arsenic monitoring wells around the proposed IRL 5, 6, 7.	See above			The Tribes expect that the any future decisions pertaining to arsenic monitoring well locations will continue to incorporate Tribal input and concerns. The Tribes state their intended interest to stay involved with any future design decisions with the same level of involvement that has occurred during the drafting of the work plan. The Tribes need to be included in all alternative/additional well location discussions. This includes Tribal presence at meetings and field visits to evaluate proposed changes in well location(s) or replacement wells. These efforts are needed to minimize impacts to cultural and environmental resources	DTSC Response: Tribal comment noted.

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					number of IRL Injection Wells are provided in the O&M Manual, Volume 2, Section 2.2.2.						
244	FMIT/TRC 1f	Design	Remedial Design	3.2.2.1 Inner Recirculation Loop Injection Well Layout and Flow Rate	Future provisional well IRL-5 may be located in the area between IRL-3 and IRL-4 to provide additional eastward hydraulic push along the western edge of the Cr(VI) plume (Figure ES-4A). In addition, future provisional wells IRL-6 and IRL-7, located in the current central portion of the chromium plume (Figure ES-4A), were included as “late time” remediation wells that are intended to accelerate the remediation process once eastward migration of the plume has occurred. However, the need for installation and activation of these provisional wells will depend on operational and monitoring data, and earlier start- up may be determined to be necessary. Decision criteria for increasing the number of	What level of Tribal stakeholder involvement will be provided during the future discussions of injection and monitoring well placement? In addition please memorialize the Tribal input that has been sought and provided specific to the arsenic monitoring wells around the proposed IRL 5, 6, 7.	See RTC #218 FMIT/ TRC-1e.			Please see response to comment FMIT/TRC RTC #44.	DTSC Response: Tribal comment noted.

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					IRL Injection Wells are provided in the O&M Manual, Volume 2, Section 2.2.2.						
245	Hualapai/TRC 1f	Design	Remedial Design	3.2.2.1 Inner Recirculation Loop Injection Well Layout and Flow Rate	Future provisional well IRL-5 may be located in the area between IRL-3 and IRL-4 to provide additional eastward hydraulic push along the western edge of the Cr(VI) plume (Figure ES-4A). In addition, future provisional wells IRL-6 and IRL-7, located in the current central portion of the chromium plume (Figure ES-4A), were included as "late time" remediation wells that are intended to accelerate the remediation process once eastward migration of the plume has occurred. However, the need for installation and activation of these provisional wells will depend on operational and monitoring data, and earlier start- up may be determined to be necessary. Decision criteria for increasing the number of IRL Injection	What level of Tribal stakeholder involvement will be provided during the future discussions of injection and monitoring well placement? In addition please memorialize the Tribal input that has been sought and provided specific to the arsenic monitoring wells around the proposed IRL 5, 6, 7.	See above			See response to comment Hualapai/ TRC RTC #83	DTSC Response: Tribal comment noted.

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					Wells are provided in the O&M Manual, Volume 2, Section 2.2.2.						
246	Cocopah/TRC 1f	Design	Remedial Design	3.2.2.1 Inner Recirculation Loop Injection Well Layout and Flow Rate	Future provisional well IRL-5 may be located in the area between IRL-3 and IRL-4 to provide additional eastward hydraulic push along the western edge of the Cr(VI) plume (Figure ES-4A). In addition, future provisional wells IRL-6 and IRL-7, located in the current central portion of the chromium plume (Figure ES-4A), were included as “late time” remediation wells that are intended to accelerate the remediation process once eastward migration of the plume has occurred. However, the need for installation and activation of these provisional wells will depend on operational and monitoring data, and earlier start- up may be determined to be necessary. Decision criteria for increasing the number of IRL Injection Wells are	What level of Tribal stakeholder involvement will be provided during the future discussions of injection and monitoring well placement? In addition please memorialize the Tribal input that has been sought and provided specific to the arsenic monitoring wells around the proposed IRL 5, 6, 7.	See above			See response to Cocopah RTC #84.	DTSC Response: Tribal comment noted.

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					provided in the O&M Manual, Volume 2, Section 2.2.2.						
247	Chemehuevi/ TRC 1f	Design	Remedial Design	3.2.2.1 Inner Recirculation Loop Injection Well Layout and Flow Rate	Future provisional well IRL-5 may be located in the area between IRL-3 and IRL-4 to provide additional eastward hydraulic push along the western edge of the Cr(VI) plume (Figure ES-4A). In addition, future provisional wells IRL-6 and IRL-7, located in the current central portion of the chromium plume (Figure ES-4A), were included as "late time" remediation wells that are intended to accelerate the remediation process once eastward migration of the plume has occurred. However, the need for installation and activation of these provisional wells will depend on operational and monitoring data, and earlier start- up may be determined to be necessary. Decision criteria for increasing the number of IRL Injection Wells are provided in the	What level of Tribal stakeholder involvement will be provided during the future discussions of injection and monitoring well placement? In addition please memorialize the Tribal input that has been sought and provided specific to the arsenic monitoring wells around the proposed IRL 5, 6, 7.	See above			See Chemehuevi/TRC RTC #85.	DTSC Response: Tribal comment noted.

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					O&M Manual, Volume 2, Section 2.2.2.						
248	DTSC-61	Design	Remedial design	3.2.3 TCS Recirculation Loop/ Page 3-22	Exhibit 3.2-3 "…maximum flow includes up to 75 gpm of freshwater"	The basis and triggers for adding up to 75 gpm freshwater to the TCS loop needs to be discussed as it is lacking in the document. Discussion is also lacking in Section 3.3.3 and Exhibit 3.3-4.	Freshwater would be used in the TCS Recirculation Loop should yields from the Transwestern Bench Extraction Wells and East Ravine Extraction Wells be insufficient to promote treatment in this area,. The maximum of 75 gpm is specified to match the design maximum injection flow rate. However, this scenario is not likely. We recommend moving this potential scenario of injecting freshwater into the TCS injection loop to Appendix L, Volume 3, the Contingency Plan, Table 2.1-1 in the TCS Recirculation loop section. This section will acknowledge that a plan for arsenic monitoring wells and establishing baseline arsenic conditions including prior carbon injections in the area would be required prior to changing operations to injection of freshwater at the TCS injection wells. The quoted design detail on use of freshwater at the TCS injection loop in Exhibit 3.2-3 in the main BOD will be deleted. The following text will be edited in Section 3.2.3.3 Uncertainties and Assumptions, "Modifications to operations and design may include adjustments to injection rates, extraction rates, <u>augmentation of injection rates with freshwater,</u> and/or organic carbon loading."	Resolved.			Comment resolved.
249	DTSC-62	Design	Remedial design	3.2.3.1 Description/East Ravine Extraction Well Details/	"Up to 6-inch nominal diameter carrier casing would be set to	Is there any advantage to drilling the East Ravine extraction wells with larger diameters (e.g., 12-inches as previously proposed) to better accommodate anticipated well cycling due to low yield?	Based on the hydraulic testing of the bedrock wells previously constructed in the East Ravine area, PG&E	Resolved.			Comment resolved.

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				Page 3-23	the top of competent bedrock, or a minimum of 20 feet bgs."		anticipates that the East Ravine extraction wells will be low yielding relative to wells installed within the unconsolidated aquifer. Therefore, it is anticipated that the current design, which utilizes 5-inch diameter wells/boreholes, will be sufficient to operate submersible pumps up to 4-inches in diameter. A 4-inch diameter pump is capable of providing flows in the tens to hundreds of gallons per minute (gpm), which is significantly greater than the less than 10 gpm yield that is current estimated for these wells. Therefore, there is not a significant advantage to constructing the East Ravine extraction wells with a larger diameter at this time; however, as discussed in the response to comment 950 (DTSC-171), the diameter of the carrier casing will be increased to 12-inch to allow for reaming the bedrock borehole to a larger diameter at a future date if well performance were to decline significantly or if actual well yield warrants a larger pump.				
250	DOI-4	Non-design	Other	3.2.3.1/3-23	Up to 6-inch nominal diameter carrier casing would be set to the top of competent bedrock, or a minimum of 20 feet bgs.	The latter part of this statement is confusing. It indicates carrier casing would not be set at the top of bedrock if bedrock were greater than 20 feet bgs, and if bedrock were near the ground surface, it indicates the casing would be set 20 feet into bedrock. Neither scenario seems logical. Suggest deleting "or a minimum of 20 feet bgs".	The carrier casing diameter is now 12-inch per RTC #950. The sentence will be clarified as follows: "Up to 12-inch nominal diameter carrier casing would be set to the top of competent bedrock, or a minimum of 20 feet bgs. A minimum of 20 feet of carrier casing is required to comply with State well regulations for a sanitary seal."		Resolved		Comment resolved.
251	DTSC-63	Design	Remedial design	3.2.3.3 Uncertainties	"The need for and location of	The sentence should be modified to clearly allow for an injection or extraction well to be installed to optimize the remedy, not just as a contingency for remedy failure. The following modification is	The referenced text will be revised as follows:	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
				and Assumptions/ Page 3-27	additional injection and/or extraction wells will be evaluated and considered as operational data are collected and system performance is evaluated."	requested: "The need for and location of additional injection and/or extraction wells will be evaluated and considered as operational data are collected and system performance is evaluated as part of contingency measures or remedy optimization."	"The need for and location of additional injection and/or extraction wells will be evaluated and considered as operational data are collected and system performance is evaluated for remedy optimization or contingency measure implementation."				
252	FMIT/TRC 1g	Design	Remedial Design	3.2.3.3 Uncertainties and Assumptions	The TCS Recirculation Loop will be implemented and operated using an adaptive approach, similar to operation of the NTH IRZ system—data will be collected from select monitoring wells, and operations will be modified to optimize the remedy performance. Modifications to operations and design may include adjustments to injection rates, extraction rates, extraction locations, and/or organic carbon loading.	It should be noted that throughout the document the location of wells has much flexibility, what type of Tribal involvement will be allowed after the 100% BOD is released?	See RTC #218 FMIT/ TRC-1e.			Please see response to comment FMIT/TRC RTC #44.	DTSC Response: Tribal comment noted.
253	Hualapai/TRC 1g	Design	Remedial Design	3.2.3.3 Uncertainties and Assumptions	The TCS Recirculation Loop will be implemented and operated using an adaptive approach, similar to operation of the NTH IRZ system—data will be collected from select monitoring	It should be noted that throughout the document the location of wells has much flexibility, what type of Tribal involvement will be allowed after the 100% BOD is released?	See above			See response to comment Hualapai/ TRC RTC #83	DTSC Response: Tribal comment noted.

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					wells, and operations will be modified to optimize the remedy performance. Modifications to operations and design may include adjustments to injection rates, extraction rates, extraction locations, and/or organic carbon loading.						
254	Cocopah/TRC 1g	Design	Remedial Design	3.2.3.3 Uncertainties and Assumptions	The TCS Recirculation Loop will be implemented and operated using an adaptive approach, similar to operation of the NTH IRZ system—data will be collected from select monitoring wells, and operations will be modified to optimize the remedy performance. Modifications to operations and design may include adjustments to injection rates, extraction rates, extraction locations, and/or organic carbon loading.	It should be noted that throughout the document the location of wells has much flexibility, what type of Tribal involvement will be allowed after the 100% BOD is released?	See above			See response to Cocopah RTC #84.	DTSC Response: Tribal comment noted.
255	Chemehuevi/ TRC 1g	Design	Remedial Design	3.2.3.3 Uncertainties and Assumptions	The TCS Recirculation Loop will be implemented and operated using an adaptive approach, similar to operation of the NTH IRZ	It should be noted that throughout the document the location of wells has much flexibility, what type of Tribal involvement will be allowed after the 100% BOD is released?	See above			See Chemehuevi/TRC RTC #85.	DTSC Response: Tribal comment noted.

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					system—data will be collected from select monitoring wells, and operations will be modified to optimize the remedy performance. Modifications to operations and design may include adjustments to injection rates, extraction rates, extraction locations, and/or organic carbon loading.						
256	FMIT/TRC 1h	Design	Remedial Design	3.2.2.3 Uncertainties and Assumptions	Modifications to operations and design may include adjustments to injection rates, extraction rates, injection or extraction locations, and/or organic carbon loading. The specifications on injection/extraction flow rates, the carbon source, carbon concentrations, etc. presented in this document are a starting point for design and implementation, but may vary in practice as the adaptive operational approach is implemented.	This seems contrary to intense amount of stakeholder involvement in determining agreeable locations of much of the infrastructure location. Specifically much work has gone into determining agreeable well locations by including the tribes? This statement however appears to suggest that well location as outlined in the BOD report is only a starting point. Please confirm that the Tribes will be included in any future discussions regarding modifications of the design.	See RTC #218 FMIT/ TRC-1e.			Please see response to comment FMIT/TRC RTC #44.	DTSC Response: Tribal comment noted.
257	Hualapai/TRC 1h	Design	Remedial Design	3.2.2.3 Uncertainties and Assumptions	Modifications to operations and design may include adjustments to injection rates, extraction rates, injection	This seems contrary to intense amount of stakeholder involvement in determining agreeable locations of much of the infrastructure location. Specifically much work has gone into determining agreeable well locations by including the tribes? This statement however appears to suggest that well location as outlined in the BOD report is only a starting point. Please confirm that the Tribes will be included in any future discussions regarding modifications of the design.	See above			See response to comment Hualapai/ TRC RTC #83	DTSC Response: Tribal comment noted.

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					or extraction locations, and/or organic carbon loading. The specifications on injection/extraction flow rates, the carbon source, carbon concentrations, etc. presented in this document are a starting point for design and implementation, but may vary in practice as the adaptive operational approach is implemented.						
258	Cocopah/TRC 1h	Design	Remedial Design	3.2.2.3 Uncertainties and Assumptions	Modifications to operations and design may include adjustments to injection rates, extraction rates, injection or extraction locations, and/or organic carbon loading. The specifications on injection/extraction flow rates, the carbon source, carbon concentrations, etc. presented in this document are a starting point for design and implementation, but may vary in practice as the adaptive operational approach is implemented.	This seems contrary to intense amount of stakeholder involvement in determining agreeable locations of much of the infrastructure location. Specifically much work has gone into determining agreeable well locations by including the tribes? This statement however appears to suggest that well location as outlined in the BOD report is only a starting point. Please confirm that the Tribes will be included in any future discussions regarding modifications of the design.	See above			See response to Cocopah RTC #84.	DTSC Response: Tribal comment noted.
259	Chemehuevi/ TRC 1h	Design	Remedial Design	3.2.2.3 Uncertainties and Assumptions	Modifications to operations and design may include adjustments to injection rates,	This seems contrary to intense amount of stakeholder involvement in determining agreeable locations of much of the infrastructure location. Specifically much work has gone into determining agreeable well locations by including the tribes? This statement however appears to suggest that well location as outlined in the BOD report is only a starting point. Please confirm that the Tribes will be included in any future discussions regarding modifications of the design.	See above			See Chemehuevi/TRC RTC #85.	DTSC Response: Tribal comment noted.

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					extraction rates, injection or extraction locations, and/or organic carbon loading. The specifications on injection/extraction flow rates, the carbon source, carbon concentrations, etc. presented in this document are a starting point for design and implementation, but may vary in practice as the adaptive operational approach is implemented.						
260	FMIT/TRC	Design	Infrastructures	3.2	Tables 3.2-1 to 3.2-4	Tables 3.2-1 thru 3.2-4 contain projected locational coordinates but the projected coordinate system is not indicated. Please indicate the coordinate system. Also, the coordinates should be indicated to the nearest foot, or tenth of a foot, rather than to the nearest thousandth of a foot – a precision which is not attainable in the field using equipment likely to be used. Also, the tables contain fonts in either black or gray – which indicate provisional or planned. This should be stated in the table description. Also, the text discusses 3 categories of wells, but the tables do not reflect the categorization, but should.	The coordinate system used at the site is State Plane. A note will be added to these tables referencing the coordinate system. The tables will be modified to reflect rounding to the nearest 0.1 ft. There is already a note at the bottom of the tables indicating that grey italics indicate future provisional. A column will be added to these tables indicating well category.			In the note to be added, please indicate the State Plane Zone, and horizontal datum. With the additional text, this comment is considered resolved.	Comment resolved.
261	Hualapai/TRC	Design	Infrastructures	3.2	Tables 3.2-1 to 3.2-4	Tables 3.2-1 thru 3.2-4 contain projected locational coordinates but the projected coordinate system is not indicated. Please indicate the coordinate system. Also, the coordinates should be indicated to the nearest foot, or tenth of a foot, rather than to the nearest thousandth of a foot – a precision which is not attainable in the field using equipment likely to be used. Also, the tables contain fonts in either black or gray – which indicate provisional or planned. This should be stated in the table description. Also, the text discusses 3 categories of wells, but the tables do not reflect the categorization, but should.	See above			In the note to be added, please indicate the State Plane Zone, and horizontal datum. With the additional text, this comment is considered resolved.	Comment resolved.
262	Cocopah/TRC	Design	Infrastructures	3.2	Tables 3.2-1 to 3.2-4	Tables 3.2-1 thru 3.2-4 contain projected locational coordinates but the projected coordinate system is not indicated. Please indicate the coordinate system. Also, the coordinates should be indicated to the nearest foot, or tenth of a foot, rather than to the nearest thousandth of a foot – a precision which is not attainable in the field using equipment likely to be used. Also, the tables contain fonts in either black or gray – which indicate provisional or planned. This should be stated in the table description. Also, the text discusses 3 categories of wells, but the tables do not reflect the categorization, but should.	See above			In the note to be added, please indicate the State Plane Zone, and horizontal datum. With the additional text, this comment is considered resolved.	Comment resolved.
263	Chemehuevi/ TRC	Design	Infrastructures	3.2	Tables 3.2-1 to 3.2-4	Tables 3.2-1 thru 3.2-4 contain projected locational coordinates but the projected coordinate system is not indicated. Please indicate the coordinate system. Also, the coordinates should be indicated to the nearest foot, or tenth of a foot, rather than to the nearest thousandth of a foot – a precision which is not attainable in the field using equipment likely to be used. Also, the tables contain fonts in either black or gray – which indicate provisional or planned. This should be stated	See above			In the note to be added, please indicate the State Plane Zone, and horizontal datum. With the additional	Comment resolved.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
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						in the table description. Also, the text discusses 3 categories of wells, but the tables do not reflect the categorization, but should.				text, this comment is considered resolved.	
264	DTSC-64	Design	Request for Information	Section 3.2.4.1, CIP description, page 3-28, 2nd paragraph	"… and clean water will be used to flush the lines."	Is this water from Arizona? Where is the source of the clean water for line flushing?	The clean water referenced in the specified text is anticipated to be freshwater from Arizona, although conditioned water from the Remedy Produced Water Conditioning Plant may also be considered. The text will be revised to read "freshwater or conditioned water" in place of "clean water".	Resolved.			Comment resolved.
265	DTSC-65	Design	Editorial	3-31	Below-grade piping will be constructed with HDPE pipe in a standard construction trench.	Additional text describing above-grade piping construction, similar to the description for below-grade, should be added for clarity.	The IRZ system design does not include above-grade piping outside of the MW-20 Bench; thus, text describing above-grade piping construction is not considered applicable to this section (Section 3.2.5.2 of the BOD).	Resolved.			Comment resolved.
266	DTSC-66	Non-design	Editorial	3.3.1 Freshwater Supply Sources/ Page 3-32	"However, the groundwater in the shallow zone beneath the river contains water that is geochemically reduced and contains elevated concentrations of iron and manganese, which could foul the injection wells. It is likely that a conditioning system would be needed to remove iron and manganese before the water pumped from beneath the river bottom could be used in the injection wells. Therefore, no matter whether water was extracted	As part of TDS groundwater management discussions, PG&E has recently cited data from deep extraction well PE-1 and how it indicates that initial deep water conditions (e.g., high TDS) have changed over time due to capture of groundwater from the shallow zone. PG&E indicates that high TDS concentrations indicative of the deep zone will be a transient condition and lower in concentration as Riverbank wells operate over the years. It is noteworthy that the PE-1 data also indicate that iron and manganese in the deep portion of the aquifer actually decrease over time along with the TDS. This suggests that the shallow zone in the vicinity of PE-1 might have minimal effect with regards to injection well fouling should a shallow infiltration gallery beneath the river be ever be installed. Therefore, revision of the cited text is requested.	PE-1 is completed in a zone of coarse sand and gravel that lies at a depth between 90 and 100 feet just above bedrock. Unlike the shallow sediments near the river, this zone is sufficiently oxic to contain Cr(VI). Thus PE-1 is not representative of the geologic materials or the geochemical reducing conditions in shallow floodplain where an infiltration gallery would be installed. The concentrations of iron and manganese typically found in the shallow floodplain wells (at depths typical of an infiltration trench) would quickly foul an injection well. While it is true that after extended pumping the water quality from an infiltration gallery might improve, PG&E does not agree that one could assume no treatment would be needed for	Resolved. This issue should be studied during remedy operation of extraction wells along the floodplain.			Comment resolved.

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					directly from the river or from beneath the river bed, some type of conditioning system would be needed to make river water usable for injection.”		water sourced from an infiltration gallery. We propose to revise the text be revised as follows: "It is likely that a conditioning system would be needed, <u>at least during the first few years</u>, to remove iron and manganese <u>from groundwater that is extracted from more reduced portions of the aquifer beneath the river such that the potential for fouling of the associated injection wells is minimized</u>."				
267	DTSC-67	Design	Contingencies	3.3.2 Evaluation of Freshwater Supply Sources/Selection of Preferred Source/ Page 3-34	EXHIBIT 3.3-1 “Because of this separation of freshwater storage, the tie-in of Topock-2 and -3 wells has been eliminated in the 90% design.”	It is requested that the tie-in be retained as DTSC believes that the Topock-2 and -3 wells could easily act as an immediate contingency measure to supplement the remedy that would not require delay or added infrastructure.	Topock-2 and -3 wells currently supply freshwater for TCS use for fire protection and operational needs, via the existing 6-inch pipeline. At the 60% design stage, it was decided to separate the freshwater supply for TCS and remedy to ensure that the use of the infrastructure designed and constructed under this project is prioritized for remedy use first (see 60% RTC 168 DTSC-63). Hence the tie-in of Topock-2 and -3 wells was eliminated in the 90% design. To tie in Topock-2 and -3 wells for remedy use, additional infrastructure will be needed within the Compressor Station footprint. In response to DTSC’s request, additional details that describe this tie-in were provided for review during the 90% RTC period and included in **Attachment E** of the final RTC table. Please note that if there is competing need for Topock-2 and -3 water, the first priority for this	**Attachment E** should also include the design of the piping from the gate valves to the remedy fresh water tank in both map and section view. Note that DTSC would consider the Topock 2/3 water as an immediate			**Attachment E** was revised to address DTSC’s comment.

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							water, as noted in 60% RTC 168 DTSC-63, is for fire protection and operational needs at the Station, and that priority cannot be changed.	short term contingency until a longer term solution could be implemented.			
268	DTSC-68	Design	Editorial	3.3.2 Evaluation of Freshwater Supply Sources/Selection of Preferred Source/ Page 3-34	EXHIBIT 3.3-1 "Therefore, any future use of Site B water for the remedy will require blending with other water (HNWR-1, HNWR-1A) or treatment prior to injection."	Revise text as indicated in the adjacent column.	For consistency with RTCs #135 and #267, PG&E suggests additional edits (shown in green) as follows: "Therefore, any future use of Site B water for the remedy will require blending with other water (HNWR-1, HNWR-1A, Topock-2/3) or treatment prior to injection."	Resolved.			Comment resolved.
269	DTSC-69	Design	Contingencies	3.3.2 Evaluation of Freshwater Supply Sources/Selection of Preferred Source/ Page 3-36	"After reviewing the available options for a freshwater supply, PG&E proposes the use of the HNWR-1A well as the primary freshwater source for the groundwater remedy in the 90% design, with the HNWR-1 well as a secondary source and Topock 2/3 and Site B well as a contingent source. To provide maximum flexibility and reliability in remedy freshwater supply, provisions to plumb and operate both HNWR-1, Topock 2/3 and Site B wells if needed in the future are provided in the 90% design."	Revise text as indicated in the adjacent column.	PG&E suggested additional edits (shown in green) as follows: "After reviewing the available options for a freshwater supply, PG&E proposes the use of the HNWR-1A well as the primary freshwater source for the groundwater remedy in the 90% design, with the HNWR-1 well as a secondary source and Topock 2/3 and Site B well as a contingent source. To provide maximum flexibility and reliability in remedy freshwater supply, provisions to plumb and operate both HNWR-1, Topock 2/3 and Site B wells if needed in the future are provided in the ~~90%~~final design."	Resolved.			Comment resolved.
270	FMIT/TRC	Non-design	Request for Information	3.3.2.1 Page 3-37	Also within this radius is a	Please provide specific details on what has been done to characterize this "dump" area to ensure that it is not a source of contamination?	As discussed in RTCs #276 FMIT/TRC, #277			Noted.	

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				Uncertainties and Assumptions - Source Water Assessment	former dump area which DTSC expressed concern about. This area consists of small area of rusty cans and other metal debris scattered on the land surface.		Hualapai/TRC, #278 Cocopah/TRC, and #279 Chemehuevi/TRC, an inspection of the area in question by PG&E showed it to be a scatter of cans and metal debris on the surface of the ground at the top of a slope. It is a thin veneer of debris laying on the natural grade. It was not excavated or otherwise engineered. It does not appear to be a likely source of groundwater contamination and even if it were, it would be captured by the Topock 2 and 3 wells. Topock-2 and -3 wells are currently being sampled and reported by Southwest Water as the water purveyor. As a customer of Southwest Water, PG&E receives the water quality information and will provide it on request.				
271	Hualapai/TRC	Non-design	Request for Information	3.3.2.1 Page 3-37 Uncertainties and Assumptions - Source Water Assessment	Also within this radius is a former dump area which DTSC expressed concern about. This area consists of small area of rusty cans and other metal debris scattered on the land surface.	Please provide specific details on what has been done to characterize this "dump" area to ensure that it is not a source of contamination?	See above			Noted.	
272	Cocopah/TRC	Non-design	Request for Information	3.3.2.1 Page 3-37 Uncertainties and Assumptions - Source Water Assessment	Also within this radius is a former dump area which DTSC expressed concern about. This area consists of small area of rusty cans and other metal debris scattered on the land surface.	Please provide specific details on what has been done to characterize this "dump" area to ensure that it is not a source of contamination?	See above			Noted.	

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273	Chemehuevi/ TRC	Non-design	Request for Information	3.3.2.1 Page 3-37 Uncertainties and Assumptions - Source Water Assessment	Also within this radius is a former dump area which DTSC expressed concern about. This area consists of small area of rusty cans and other metal debris scattered on the land surface.	Please provide specific details on what has been done to characterize this "dump" area to ensure that it is not a source of contamination?	See above			Noted.	
274	DTSC-70	Design	Contingencies	3.3.2.1 Uncertainties and Assumptions/ Page 3-38	EXHIBIT 3.3-2 "Bring Site B well online." Multiple occurrences.	First occurrence: Revise text as follows: "Supplement flow with water from Topock 2/3 or bring Site B well online potentially with a FWPTS for both arsenic and chromium." Second occurrence: Revise text as follows: "Bring on Topock 2/3 to supplement flow or bring Site B well online potentially with a FWPTS for both arsenic and chromium." Last occurrence: Revise text as follows: "Bring Site B well online along with a FWPTS for both arsenic and chromium."	In the event Site B well is needed to be brought on line (after the identified operational actions have been exhausted), PG&E will first collect sample(s) to confirm the Cr(VI) and As concentrations in the well. Site B water will be blended with water from other wells (e.g., HNWR-1, Topock-2 and -3). With the low levels of Cr(VI) (34 ppb) detected in Site B well in 2014, PG&E does not anticipate needing Cr treatment. PG&E will discuss with the Agencies before implementing any contingency measure. PG&E suggests additions edits (shown in green) to DTSC's edits: First occurrence: Revise text as follows: "Supplement flow with water from Topock 2/3 or bring Site B well online. Blend Site B water with water from Topock-2/3 and/or HNWR-1. Potentially implement ~~with~~ a ~~FWPTS~~ contingent ~~for both~~ arsenic ~~and chromium.~~ treatment system per State Water Resources Board letter (SWRCB 2013)[1]" Second occurrence:	See RTC # 135 on potential water quality issues associated with Site B well. Additionally, fresh water chromium concentrations in HNWR-1A/HNWR-1 could trend up over time during the life of the remedy. PG&E should not adversely impact the quality of the aquifer outside of the chromium plume from injection in California. The use of Site B contingency may not be needed, its use, however, may necessitate pre-treatment of the water prior to injection to maintain the water quality at the point of injection. Since chromium in the water from the Site B well has always been higher than the current MCL (10 ppb) and the current receiving water quality (shallow aquifer averages around 16 ppb), pre-treatment of chromium may also be required, not only arsenic.			

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							Revise text as follows: "Bring on Topock 2/3 to supplement flow or bring Site B well online. Blend Site B water with water from Topock-2/3 and/or HNWR-1 Potentially implement ~~with~~ a ~~FWPTS~~ contingent ~~for both~~ arsenic ~~and chromium.~~ treatment system per State Water Resources Board letter (SWRCB 2013)[1]" Last occurrence: Revise text as follows: "Bring Site B well online. Blend Site B water with water from Topock-2/3 and/or HNWR-1. Potentially implement ~~with~~ a ~~FWPTS~~ contingent ~~for both~~ arsenic ~~and chromium.~~ treatment system per State Water Resources Board letter (SWRCB 2013)[1]"	Therefore, it is recommended that this constraint be considered during the O&M phase of the remedy and prior to the use of contingent Site B well as fresh water supply well. PG&E will need to ensure that arsenic and chromium pretreatment, if necessary, could be conducted together within a similar building footprint.			
275	DTSC-71	Design	Remedial design	3.3.2.1 Uncertainties and Assumptions/ Page 3-38	EXHIBIT 3.3-2 "The letter requires that if the leading edge of the arsenic plume, i.e., arsenic concentrations at the concentration in the injected fresh water, extend more than 150 feet away from injection locations, PG&E must immediately reassess its modeling calculations and quickly identify interim actions it can take to limit the migration of the arsenic plume."	Revise text as follows: " "The letter requires that if ~~the leading edge of the arsenic plume, i.e.,~~ arsenic concentrations ~~at the concentration in the injected fresh water, extend more~~ exceed 10 ppb at monitoring wells located ~~than~~ 150 feet away from injection locations, PG&E must immediately reassess its modeling calculations and quickly identify interim actions it can take to limit the migration of the arsenic plume."	PG&E agrees with this comment and offers the following potential alternative edit: "The letter requires that if the leading edge of the arsenic plume above the 10 µg/L water quality objective~~, i.e., arsenic concentrations at the concentration in the injected fresh water,~~ extend more than 150 feet away from injection locations, PG&E must immediately reassess its modeling calculations and quickly identify interim actions it can take to limit the migration of the arsenic plume."	Okay.			Comment resolved.
276	FMIT/TRC	Non-design	Request for Information	3.3.2.1 Page 3-40 Uncertainties and	There are currently no monitoring wells in	Why is this now referred to an area with rusty can and metal debris rather than a dump? It is possible if this area was a former dump that potential impacts to the freshwater source may exist. How has this possibility been eliminated? Also what information is available about potential use changes in areas up gradient along Sacramento wash that could impact the groundwater source?	An inspection of the area in question by PG&E showed it to be a scatter of cans and		DOI cannot comment on potential uses of private lands	To ensure that water quality degradation does not occur in the HNRW1 freshwater	PG&E Response: As discussed in Section 5.4.1 of the Sampling and

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				Assumptions - Source Water Assessment	Sacramento Wash. The property upstream in Sacramento Wash is undeveloped for miles. The ADEQ conducted a survey of water quality in the Sacramento Valley in 1999 (ADEQ 2001). This survey found fluoride, chloride, and TDS to be the only constituents present in slightly elevated concentrations in the Topock area. Considering the lack of existing contaminant sources in the Sacramento Valley (Exhibit 3.3-3), the installation of monitoring wells in Sacramento Wash upstream of HNWR-1 for source water protection is not considered warranted. The Topock-2 and -3 wells are located between HNWR-1A and the former area with rusty cans and other metal debris, so in the unlikely event that groundwater contaminants are migrating from this area, they would be	For example can mining occur there?	metal debris on the surface of the ground at the top of a slope. It is a thin veneer of debris laying on the natural grade. It was not excavated or otherwise engineered. The description in the text is therefore accurate. It does not appear to be a likely source of groundwater contamination and even if it were, it would be captured by the Topock 2 and 3 wells. PG&E assumes that mining could occur in the Sacramento Wash drainage or elsewhere on public or private lands around the Topock area. It would be the responsibility of the federal and state regulating and permitting agencies to insure that any future mine was operated to prevent degradation of groundwater quality.		however the Havasu National Wildlife Refuge (HNWR), which includes the confluence of the Sacramento Wash with the Colorado River, is under federal jurisdiction. HNWR was established by Executive Order 8647 on January 22, 1941, "...as a refuge and breeding ground for migratory birds and other wildlife." Refuge goals and objectives are described in the Lower Colorado River Comprehensive Management Plan. The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 provides authority for establishing policies and regulations governing refuge uses included the authority to prohibit certain harmful activities. All proposed and existing refuge uses must be deemed appropriate and compatible.	source aquifer over the lifetime of the remedy, the Tribe requests that water quality data from Topock wells 2 and 3 are included in future groundwater monitoring reports.	Monitoring Plan (O&M Volume 2), Topock-2 and -3 wells are currently being sampled and reported by Southwest Water as the water purveyor. As a customer of Southwest Water, PG&E receives the water quality information and will provide it to the agencies. DTSC/DOI response: The Agencies can pass on the information received from PG&E to stakeholders and Tribes when available.

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					expected to be detected first at Topock-2 and -3.						
277	Hualapai/TRC	Non-design	Request for Information	3.3.2.1 Page 3-40 Uncertainties and Assumptions - Source Water Assessment	There are currently no monitoring wells in Sacramento Wash. The property upstream in Sacramento Wash is undeveloped for miles. The ADEQ conducted a survey of water quality in the Sacramento Valley in 1999 (ADEQ 2001). This survey found fluoride, chloride, and TDS to be the only constituents present in slightly elevated concentrations in the Topock area. Considering the lack of existing contaminant sources in the Sacramento Valley (Exhibit 3.3-3), the installation of monitoring wells in Sacramento Wash upstream of HNWR-1 for source water protection is not considered warranted. The Topock-2 and -3 wells are located between HNWR-1A and the former area with rusty cans and other metal debris,	Why is this now referred to an area with rusty can and metal debris rather than a dump? It is possible if this area was a former dump that potential impacts to the freshwater source may exist. How has this possibility been eliminated? Also what information is available about potential use changes in areas up gradient along Sacramento wash that could impact the groundwater source? For example can mining occur there?	See above		See above	To ensure that water quality degradation does not occur in the HNRW1 freshwater source aquifer over the lifetime of the remedy, the Hualapai request that water quality data from Topock wells 2 and 3 are included in future groundwater monitoring reports.	See 276 above

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					so in the unlikely event that groundwater contaminants are migrating from this area, they would be expected to be detected first at Topock-2 and -3.						
278	Cocopah/TRC	Non-design	Request for Information	3.3.2.1 Page 3-40 Uncertainties and Assumptions - Source Water Assessment	There are currently no monitoring wells in Sacramento Wash. The property upstream in Sacramento Wash is undeveloped for miles. The ADEQ conducted a survey of water quality in the Sacramento Valley in 1999 (ADEQ 2001). This survey found fluoride, chloride, and TDS to be the only constituents present in slightly elevated concentrations in the Topock area. Considering the lack of existing contaminant sources in the Sacramento Valley (Exhibit 3.3-3), the installation of monitoring wells in Sacramento Wash upstream of HNWR-1 for source water protection is not considered warranted. The Topock-2 and -	Why is this now referred to an area with rusty can and metal debris rather than a dump? It is possible if this area was a former dump that potential impacts to the freshwater source may exist. How has this possibility been eliminated? Also what information is available about potential use changes in areas up gradient along Sacramento wash that could impact the groundwater source? For example can mining occur there?	See above		See above	To ensure that water quality degradation does not occur in the HNRW1 freshwater source aquifer over the lifetime of the remedy, the Tribes request that water quality data from Topock wells 2 and 3 are included in future groundwater monitoring reports.	See 276 above

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					3 wells are located between HNWR-1A and the former area with rusty cans and other metal debris, so in the unlikely event that groundwater contaminants are migrating from this area, they would be expected to be detected first at Topock-2 and -3.						
279	Chemehuevi/ TRC	Non-design	Request for Information	3.3.2.1 Page 3-40 Uncertainties and Assumptions - Source Water Assessment	There are currently no monitoring wells in Sacramento Wash. The property upstream in Sacramento Wash is undeveloped for miles. The ADEQ conducted a survey of water quality in the Sacramento Valley in 1999 (ADEQ 2001). This survey found fluoride, chloride, and TDS to be the only constituents present in slightly elevated concentrations in the Topock area. Considering the lack of existing contaminant sources in the Sacramento Valley (Exhibit 3.3-3), the installation of monitoring wells in Sacramento	Why is this now referred to an area with rusty can and metal debris rather than a dump? It is possible if this area was a former dump that potential impacts to the freshwater source may exist. How has this possibility been eliminated? Also what information is available about potential use changes in areas up gradient along Sacramento wash that could impact the groundwater source? For example can mining occur there?	See above		See above	To ensure that water quality degradation does not occur in the HNRW1 freshwater source aquifer over the lifetime of the remedy, the Tribes request that water quality data from Topock wells 2 and 3 are included in future groundwater monitoring reports.	See 276 above

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					Wash upstream of HNWR-1 for source water protection is not considered warranted. The Topock-2 and -3 wells are located between HNWR-1A and the former area with rusty cans and other metal debris, so in the unlikely event that groundwater contaminants are migrating from this area, they would be expected to be detected first at Topock-2 and -3.						
280	FMIT/TRC	Non-design	Request for Information	3.3.2.1 p. 3-40 Uncertainties and Assumptions - Source Water Assessment	At DTSC's request and per resolution of 60% RTC #161 DTSC-60, the MW-55 well cluster will be sampled periodically as data at this location could have some value in detecting contaminants	Will monitoring data from wells MTS1 and MTS2 be included?	Yes, see Section 5.4 (Monitoring for Domestic/Private Wells) of the Sampling and Monitoring Plan (Volume 2 of the O&M Manual).			Noted.	
281	Hualapai/TRC	Non-design	Request for Information	3.3.2.1 p. 3-40 Uncertainties and Assumptions - Source Water Assessment	At DTSC's request and per resolution of 60% RTC #161 DTSC-60, the MW-55 well cluster will be sampled periodically as data at this location could have some value in detecting contaminants	Will monitoring data from wells MTS1 and MTS2 be included?	See above			Noted.	
282	Cocopah/TRC	Non-design	Request for Information	3.3.2.1 p. 3-40 Uncertainties and	At DTSC's request and per resolution of 60% RTC	Will monitoring data from wells MTS1 and MTS2 be included?	See above			Noted.	

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				Assumptions - Source Water Assessment	#161 DTSC-60, the MW-55 well cluster will be sampled periodically as data at this location could have some value in detecting contaminants						
283	Chemehuevi/ TRC	Non-design	Request for Information	3.3.2.1 p. 3-40 Uncertainties and Assumptions - Source Water Assessment	At DTSC's request and per resolution of 60% RTC #161 DTSC-60, the MW-55 well cluster will be sampled periodically as data at this location could have some value in detecting contaminants	Will monitoring data from wells MTS1 and MTS2 be included?	See above			Noted.	
284	DTSC-72	Design	Contingencies	3.3.3 Design Basis for Freshwater Supply System/ Page 3-41	"Extraction well or well(s) in Arizona (HNWR-1A well is the primary freshwater supply well with HNWR-1 as the secondary supply well, and Topock 2/3 and Site B as ~~the~~ contingent supply wells if needed)"	Revise text as noted in the column to the left.	Text will be revised as requested.	Resolved.			Comment resolved.
285	DTSC-73	Design	Contingencies	3.3.3 Design Basis for Freshwater Supply System/ Page 3-42	EXHIBIT 3.3-4 "As a primary contingency, Topock 2/3 can augment supply. As a secondary contingency, provisions (i.e., additional piping, power supply, and aboveground water infrastructure) are included in the 90% design to allow for Site B to be	Revise text as noted in column to the left. Why would one build significant infrastructure to Site B when infrastructure essentially already exits at Topock2/3 where the water quality is superior?	Revision to text will be made as requested. As mentioned in RTC #135 DTSC-67, in order to separate the freshwater supply for TCS and remedy and ensure that the use of the infrastructure designed and constructed under this project is prioritized for remedy use first, the tie-in of Topock-2 and -3 wells was eliminated in the 90% design (see 60% RTC 168 DTSC-63). However, Topock-2 and -3 wells can be tied in	Resolved.			Comment resolved.

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					brought online to supplement any shortage in flow if needed.”		with added infrastructure within the Compressor Station footprint. In response to DTSC’s request, additional details that describe this tie-in was provided for review during the 90% RTC period and included in **Attachment E** of the final RTC table. If there is a competing need for Topock-2 and -3 water in the future, the first priority for this water, as noted in 60% RTC 168 DTSC-63, is for fire protection and operational needs at the Station, and that priority cannot be changed.				
286	DTSC-74	Design	Remedial design	3-42	Exhibit 3.3-4, Water Pipe Based upon this design approach, no cathodic protection is required.	Conflicting statement issue: App C 5.1 Corrosion Control states above and below ground steel pipe will be coated. Any steel pipe near the point where it emerges from the ground will be coated. Air-to-soil transition piping is any steel piping located 18" below ground or 6" above ground. Cathodic protection equipment will be applied as follows: 1) steel piping and structures will be cathodically protected underground; 2) plastic pipe will be preferentially used when appropriate for corrosion resistance; and 3) steel pipe will be cement mortar-lined to prevent internal corrosion. The text above seems to contradict this revision in Exhibit 3.3-4 from RTC #173. Either change BOD 3.3.3.1 (and other similar sections dealing with corrosion protection for steel pipe) to conform to the requirements for cathodic protection in Appendix C or change the requirements and explain/justify why cathodic protection is not necessary in Appendix C.	The text in section C.5.1 will be revised to clarify where cathodic protection is necessary as opposed to other listed corrosion control needs.	Resolved.			Comment resolved.
287	DTSC-75	Design	Remedial design	3.3.3 Design Basis for Freshwater Supply System/ Page 3-43	“As a result of its evaluation, PG&E recommended modifications to select structural members of the Arched Bridge (see Appendix G). PG&E Gas Transmission, as the entity responsible for the pipe bridge within the PG&E organization, is leading the discussion with Kinder Morgan regarding modifications to the Arched Bridge.”	There is some concern with the lack of progress on the recommended structural modifications as this item has lingered for some time. What are the issues and is there a problem? What is the schedule for completing discussions? Modification of the Arched Bridge will need to be considered in the upcoming CEQA evaluation. Although PG&E does not believe the bridge modification to be remedy related, the bridge will carry remedy components and should be considered, at a minimum, a cumulative impact evaluation.	PG&E and Kinder Morgan are working through the details regarding bridge modification. It is anticipated that the bridge modification will commence in late 2015; completion is scheduled for April 2016. PG&E will keep the agencies updated on the progress. The Arched Bridge modification is a PG&E Gas Transmission project and has independent utility from the Project. The project is being completed to add lateral support to the bridge. PG&E defers to DTSC on how it may consider the modifications in future cumulative impact	Okay.			Comment resolved.

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							analysis under CEQA.				
288	FMIT/TRC 1i	Non-design	Request for Information	3.3.3.1 Freshwater Supply Piping Network	PG&E has also completed its own structural evaluation of the capacity of the Arched Bridge to support the 12-inch water line and to check for current design codes. As a result of its evaluation, PG&E recommended modifications to select structural members of the Arched Bridge (see Appendix G). PG&E Gas Transmission, as the entity responsible for the pipe bridge within the PG&E organization, is leading the discussion with Kinder Morgan regarding modifications to the Arched Bridge.	Please indicate when in the design process will these discussions be finalized? Is there any chance of significant design modifications?	As mentioned in the 60% RTC #468 (FMIT-143, Hualapai-116, Chemehuevi-116, Cocopah-116, CRIT-116), PG&E Gas Transmission is the entity responsible for the pipe bridge within PG&E organization. Any follow-on pipeline bridge improvement project will be a Gas Transmission project, therefore, will not be discussed in the remedy design documents. Consistent with current practice, PG&E will keep the agencies, stakeholders, and Tribes informed of Gas Transmission projects in the Topock area.		Response noted.	Please see response to comment FMIT/TRC RTC #44.	DTSC response: Tribal comment noted.
289	Hualapai/TRC 1i	Non-design	Request for Information	3.3.3.1 Freshwater Supply Piping Network	PG&E has also completed its own structural evaluation of the capacity of the Arched Bridge to support the 12-inch water line and to check for current design codes. As a result of its evaluation, PG&E recommended modifications to select structural members of the Arched Bridge (see	Please indicate when in the design process will these discussions be finalized? Is there any chance of significant design modifications?	See above		See above	See response to comment Hualapai/TRC RTC #83.	DTSC response: Tribal comment noted.

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					Appendix G). PG&E Gas Transmission, as the entity responsible for the pipe bridge within the PG&E organization, is leading the discussion with Kinder Morgan regarding modifications to the Arched Bridge.						
290	Cocopah/TRC 1i	Non-design	Request for Information	3.3.3.1 Freshwater Supply Piping Network	PG&E has also completed its own structural evaluation of the capacity of the Arched Bridge to support the 12-inch water line and to check for current design codes. As a result of its evaluation, PG&E recommended modifications to select structural members of the Arched Bridge (see Appendix G). PG&E Gas Transmission, as the entity responsible for the pipe bridge within the PG&E organization, is leading the discussion with Kinder Morgan regarding modifications to the Arched Bridge.	Please indicate when in the design process will these discussions be finalized? Is there any chance of significant design modifications?	See above		See above	See response to Cocopah RTC #84.	DTSC response: Tribal comment noted.
291	Chemehuevi/ TRC 1i	Non-design	Request for Information	3.3.3.1 Freshwater Supply Piping Network	PG&E has also completed its own structural evaluation of the capacity of the Arched	Please indicate when in the design process will these discussions be finalized? Is there any chance of significant design modifications?	See above		See above	See Chemehuevi/TRC RTC #85.	DTSC response: Tribal comment noted.

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					Bridge to support the 12-inch water line and to check for current design codes. As a result of its evaluation, PG&E recommended modifications to select structural members of the Arched Bridge (see Appendix G). PG&E Gas Transmission, as the entity responsible for the pipe bridge within the PG&E organization, is leading the discussion with Kinder Morgan regarding modifications to the Arched Bridge.						
292	FMIT/TRC 1j	Design	CEQA/EIR	3.3.3.3 Freshwater Injection Wells	Consideration will be given to installation of an additional well to ensure that sufficient injection capacity is available for the life of the remedy. If the low capacity of the well appears to be due to low permeability in the aquifer, the new well should be located some distance away from the existing well in hopes of finding better aquifer materials. Any additional wells needed to achieve this	Please indicate what level of Tribal consultation and collaboration will occur when deciding replacement well locations. While Tribes be consulted in a manner similar to which has occurred during the drafting of the Remedial Design BOD reports?	Please see RTCs #44 FMIT/TRC, #45 Hualapai/ TRC, #46 Cocopah/TRC, and #47 Chemehuevi/ TRC for discussion of communication with Tribes during construction, startup, and O&M. In addition, PG&E will notify and invite Tribal monitors to monitor and observe ground disturbing activities in accordance with the PA, the CHPMP, and the CIMP, e.g., tribal notification prior to certain activities and Tribal monitoring/ observation of ground disturbing activities (PA Appendix B, CHPMP Section 6, and CIMP section 2.10).			Please see response to comment FMIT/TRC RTC #44.	DTSC response: Tribal comment noted.

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					capacity would be installed in the same area as the primary well. Well drilling at any one area would only continue until this target of three times the design capacity was reached. There is also a possibility that the design flow rates for individual well locations could be adjusted to allow for somewhat more injection in the higher permeability locations and somewhat less injection in the lower permeability locations. In sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity						
293	Hualapai/TRC 1j	Design	CEQA/EIR	3.3.3.3 Freshwater Injection Wells	Consideration will be given to installation of an additional well to ensure that sufficient injection capacity is available for the life of the remedy. If the low capacity of the well appears to be due to low permeability in the aquifer, the new well should be located some distance away from the	Please indicate what level of Tribal consultation and collaboration will occur when deciding replacement well locations. While Tribes be consulted in a manner similar to which has occurred during the drafting of the Remedial Design BOD reports?	See above			See response to comment Hualapai/TRC RTC #83.	DTSC response: Tribal comment noted.

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					existing well in hopes of finding better aquifer materials. Any additional wells needed to achieve this capacity would be installed in the same area as the primary well. Well drilling at any one area would only continue until this target of three times the design capacity was reached. There is also a possibility that the design flow rates for individual well locations could be adjusted to allow for somewhat more injection in the higher permeability locations and somewhat less injection in the lower permeability locations. In sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity						
294	Cocopah/TRC A1j	Design	CEQA/EIR	3.3.3.3 Freshwater Injection Wells	Consideration will be given to installation of an additional well to ensure that sufficient injection capacity is available for the life of the remedy. If the low capacity of the well	Please indicate what level of Tribal consultation and collaboration will occur when deciding replacement well locations. While Tribes be consulted in a manner similar to which has occurred during the drafting of the Remedial Design BOD reports?	See above			See response to Cocopah RTC #84.	DTSC response: Tribal comment noted.

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					appears to be due to low permeability in the aquifer, the new well should be located some distance away from the existing well in hopes of finding better aquifer materials. Any additional wells needed to achieve this capacity would be installed in the same area as the primary well. Well drilling at any one area would only continue until this target of three times the design capacity was reached. There is also a possibility that the design flow rates for individual well locations could be adjusted to allow for somewhat more injection in the higher permeability locations and somewhat less injection in the lower permeability locations. In sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity						
295	Chemehuevi/ TRC 1j	Design	CEQA/EIR	3.3.3.3 Freshwater Injection Wells	Consideration will be given to installation of an additional well to ensure	Please indicate what level of Tribal consultation and collaboration will occur when deciding replacement well locations. While Tribes be consulted in a manner similar to which has occurred during the drafting of the Remedial Design BOD reports?	See above			See Chemehuevi/TRC RTC# 85.	DTSC response: Tribal comment noted.

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					that sufficient injection capacity is available for the life of the remedy. If the low capacity of the well appears to be due to low permeability in the aquifer, the new well should be located some distance away from the existing well in hopes of finding better aquifer materials. Any additional wells needed to achieve this capacity would be installed in the same area as the primary well. Well drilling at any one area would only continue until this target of three times the design capacity was reached. There is also a possibility that the design flow rates for individual well locations could be adjusted to allow for somewhat more injection in the higher permeability locations and somewhat less injection in the lower permeability locations. In sum, there may be more than one well installed at the FW or IRL well locations initially to						

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					ensure sufficient capacity						
296	FMIT/TRC	Design	Request for Information	3.3.3.1 Figure 3.3-1 Freshwater Supply Piping Network	In the event that pre-treatment of fresh water is required, all fresh water will be piped to the Compressor Station for treatment, and the treated fresh water will be conveyed along the entrance road prior to joining the freshwater pipeline along	Please discuss how pipeline runs will be modified in the case that pre-treatment is required. How much new pipeline and/or trenching will be required. What will the new flow paths be in the case that pre-treatment is required?	The final design will be changed to accommodate a new 12" pipe parallel to the planned Pipeline B pipe leading to the TCS along PG&E's natural gas pipeline right of way (ROW). The design details were presented during the 90% RTC period and included in **Attachment I** of the final RTC table. This new pipe will be installed concurrent with remedy construction to convey treated freshwater in the event pre-treatment is required. The pipe will be directly buried and installed such that the width of the pipe trench remains about the same as in the 90% (Drawing C-07-103). This new 12" pipe will turn north and connect to the branch that runs north (Pipeline J as shown on Drawing C-07-02) toward National Trails Highway and the uplands freshwater injection wells. The valve box currently shown in the 90% drawings (C-07-69) will be enlarged to allow for the new pipe connections and additional valves to control flow. The text from Section 3.3.3.1 with changes indicated in underline and strikeout. "After crossing the Colorado River into California, the water pipeline will follow PG&E's natural gas pipeline ROW to the remedy freshwater storage tank. Midway along the PG&E's natural gas pipeline ROW, the freshwater pipeline will			The incorporation of design accommodations for possible future additional pipeline runs, while planned for in existing trenches, represents an incremental, and potentially significant, expansion of underground piping that needs to be addressed in the SEIR.	DTSC response: Tribal comment noted.

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							branch to the north to connect to the piping corridor located near NTH and the Compressor Station entrance road. In the event that pre-treatment of fresh water is required, all fresh water will be piped to the Compressor Station for treatment, and the treated fresh water will be conveyed along PG&E's natural gas pipeline ROW ~~entrance road~~ prior to joining the freshwater pipeline ~~along~~ leading to NTH. The treated freshwater pipe will be installed concurrent with construction of the untreated freshwater pipe (i.e., Pipeline B)."				
297	Hualapai/TRC	Design	Request for Information	3.3.3.1 Figure 3.3-1 Freshwater Supply Piping Network	In the event that pre-treatment of fresh water is required, all fresh water will be piped to the Compressor Station for treatment, and the treated fresh water will be conveyed along the entrance road prior to joining the freshwater pipeline along	Please discuss how pipeline runs will be modified in the case that pre-treatment is required. How much new pipeline and/or trenching will be required. What will the new flow paths be in the case that pre-treatment is required?	See above			The incorporation of design accommodations for possible future additional pipeline runs, while planned for in existing trenches, represents an incremental expansion of underground piping that needs to be addressed in the SEIR.	DTSC response: Tribal comment noted.
298	Cocopah/TRC	Design	Request for Information	3.3.3.1 Figure 3.3-1 Freshwater Supply Piping Network	In the event that pre-treatment of fresh water is required, all fresh water will be piped to the Compressor Station for treatment, and the treated fresh water will be conveyed along the entrance road prior to joining the freshwater	Please discuss how pipeline runs will be modified in the case that pre-treatment is required. How much new pipeline and/or trenching will be required. What will the new flow paths be in the case that pre-treatment is required?	See above			The incorporation of design accommodations for possible future additional pipeline runs, while planned for in existing trenches, represents an incremental expansion of underground piping that needs to be addressed in the SEIR.	DTSC response: Tribal comment noted.

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					pipeline along						
299	Chemehuevi/ TRC	Design	Request for Information	3.3.3.1 Figure 3.3-1 Freshwater Supply Piping Network	In the event that pre-treatment of fresh water is required, all fresh water will be piped to the Compressor Station for treatment, and the treated fresh water will be conveyed along the entrance road prior to joining the freshwater pipeline along	Please discuss how pipeline runs will be modified in the case that pre-treatment is required. How much new pipeline and/or trenching will be required. What will the new flow paths be in the case that pre-treatment is required?	See above			The incorporation of design accommodations for possible future additional pipeline runs, while planned for in existing trenches, represents an incremental expansion of underground piping that needs to be addressed in the SEIR	DTSC response: Tribal comment noted.
300	DTSC-77	Design	Contingencies	3-51	Sub-section 3.3.3.2 and 3.3.3.3 As discussed in RTC #168 DTSC-63, to ensure first priority for remedy use and after further evaluation of the additional controls, instrumentation, and tank upgrades that would need to be installed in the existing tanks in order to harmonize various demand for freshwater, PG&E now proposes to separate the freshwater supply storage for the remedy and the Compressor Station in the 90% design. A separate and smaller tank (10,000 gallons) will be installed inside the Compressor	The new storage tank for remedy only use of freshwater is 10,000 gallons. At the maximum total injection rate of 900 gpm the tank will empty in 11 minutes. Even at the nominal injection rate the reserve is severely limited. The issue of reserve capacity was brought up in the 60% RTC. The 60% RTC states 7-27 hours of reserve for injection wells is available based on the then 420,000 gallons of storage (TCS supply tanks for operations). The BOD states injection of freshwater is needed to provide hydraulic control to prevent migration of the chromium plume beyond the identified boundaries. Given the reduction in storage capacity with the modified design, a contingency should be included in the BOD (App L, vol. 3 seems appropriate) to ensure adequate supply to the injection wells in the event the freshwater supply is interrupted.	The provision to tie-in ~~of~~ Topock-2 and 3 wells, via the existing-6-inch supply line, ~~TCS freshwater storage tanks, to the Remedy freshwater storage tank~~ will essentially supplement the remedy freshwater flow by an amount that equals to the supply flow rate from the wells minus any usage by the Compressor Station at that time ~~of increase the total storage capacity of freshwater up to 430,000 gallons (maximum)~~. If there is a short term loss of the freshwater source (on the order of days or weeks) it is not likely hydraulic control of the plume will be lost as the average groundwater velocities are still relatively slow and the natural ambient gradient is still from west to east, which would limit the potential for plume migration beyond the plume boundaries. As this is a long term remedial approach, short term down periods of the freshwater injection wells will not have a significant impact on the longer term	Resolved.			Comment resolved.

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					Station for remedy use only and will be supplied by well HNWR-1A from Arizona.		regional hydraulic gradients. In the case of FW-2, the operational rate of the TCS Injection Loop can also potentially be adjusted to minimize the potential for westward expansion of the plume due to TCS injection. Additional details regarding this tie-in were provided for review during the 90% RTC period and included in **Attachment E** of the final RTC table.				
301	FMIT/TRC	Non-design	Request for Information	3.3.3.2 Page 3-44 Freshwater Supply Storage	An analysis of the fire protection water system hydraulic performed at the 60% design stage suggested that there is adequate storage capacity to meet the fire flow storage requirement that can be shared with the remedy, as long as there is sufficient supply	Please state exactly the quantity needed for fire flow storage, how is this quantity affected if more injection wells are added? What is considered sufficient supply?	The maximum fire water demand is 642 gallons per minute for remedy facilities on the MW-20 Bench and TW Bench (see "MW-20 Bench and TW Bench Carbon Amendment Buildings Fire Suppression Calculations" in Attachment B of Appendix C). Typically, volumetric demand is based on one hour flow, so this would result in 38,520 gallons. This demand is much smaller than the combined storage capacity of 420,000 gallons of the existing TCS freshwater storage tanks, therefore, supply of fire protection water for remedy facilities is adequate. As mentioned in 60% RTC #168 DTSC-163, to ensure first priority for remedy use and after further evaluation of the additional controls, instrumentation, and tank upgrades needed to be installed in the existing TCS tanks in order to harmonize various demand for freshwater, PG&E had proposed to separate the freshwater supply storage for the operation of the remedy and the Compressor		Response noted.	Noted.	

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							Station in the 90% design. As a result, PG&E designed a separate and smaller tank (10,000 gallons) inside the Compressor Station for remedy use only and the tank will be supplied by well HNWR-1A from Arizona. Fire protection water for the remedy facilities will continue to be supplied by the existing TCS freshwater storage tanks. Therefore, the fire protection water storage volume will not be affected if more injection wells are added.				
302	Hualapai/TRC	Non-design	Request for Information	3.3.3.2 Page 3-44 Freshwater Supply Storage	An analysis of the fire protection water system hydraulic performed at the 60% design stage suggested that there is adequate storage capacity to meet the fire flow storage requirement that can be shared with the remedy, as long as there is sufficient supply	Please state exactly the quantity needed for fire flow storage, how is this quantity affected if more injection wells are added? What is considered sufficient supply?	See above		See above	Noted.	
303	Cocopah/TRC	Non-design	Request for Information	3.3.3.2 Page 3-44 Freshwater Supply Storage	An analysis of the fire protection water system hydraulic performed at the 60% design stage suggested that there is adequate storage capacity to meet the fire flow storage requirement that can be shared with the	Please state exactly the quantity needed for fire flow storage, how is this quantity affected if more injection wells are added? What is considered sufficient supply?	See above		See above	Noted.	

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					remedy, as long as there is sufficient supply						
304	Chemehuevi/ TRC	Non-design	Request for Information	3.3.3.2 Page 3-44 Freshwater Supply Storage	An analysis of the fire protection water system hydraulic performed at the 60% design stage suggested that there is adequate storage capacity to meet the fire flow storage requirement that can be shared with the remedy, as long as there is sufficient supply	Please state exactly the quantity needed for fire flow storage, how is this quantity affected if more injection wells are added? What is considered sufficient supply?	See above		See above	Noted.	
305	FMIT/TRC	Design	Remedial Design	3.3.3.3 p. 3-45 Freshwater Injection Wells	If the low capacity of the well appears to be due to low permeability in the aquifer, the new well should be located some distance away from the existing well in hopes of finding better aquifer materials. In sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity.	This seems open-ended and unrestricted. Would there be a limit to how many wells are drilled in one location? Groundwater model pathlines show that it could take 10-15 years for IRL injections to reach the IRZ line. How long would it take to make these decisions? Please describe how the Tribes might be included in the decision-making process.	We are anticipating that only one well per location will be needed. However if geologic conditions are different than anticipated then an additional one or two wells could be required to meet the design injection rate. The decision to install more than one well will be based on the field observations of geology during well installation and the injectivity testing results not on the travel time to the IRZ line of wells. If more than one well is required to meet the design injection rate then communication procedures and protocols presented in Table 2.3-1 of the C/RAWP and Exhibit L2.2-1 of the O&M Manual will be initiated. The communication procedures and protocols in the O&M Manual are intended to be used by the PG&E Topock project team to			If geologic conditions are different, which requires additional injection wells, in order to achieve the greatest remediation efficiency shouldn't the wells be spread out rather than placed in one location? If more than one injection well is needed per injection site, will there be more than one trench, more than one pipeline, more than one electrical line, more than one solar panel, more than one access road, etc.? If more than one injection well is needed per injection site, then it means that the aquifer does not accept injection as readily as presented in the conceptual model, and extreme groundwater mounding could occur nearest to these grouped injection wells, possibly allowing water to escape to the surface through un-	DTSC Response: DTSC agrees that there may be a possibility for additional infrastructures based on site observation as the remedy is constructed. DTSC will consider contingencies in the SEIR. As stated in PG&E's response, communication procedures and protocols in the design document (specifically, the O&M manual) will be followed. PG&E Response: The design for freshwater injection is based on information deemed reliable for determining the likely number of wells needed to achieve and sustain the necessary injection rates. This information includes knowledge of the

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							inform and/or seek input from agencies, stakeholders, and Tribes; to seek approvals from agencies; to resolve issues; and to comply with certain requirements. The communication procedures and protocols in the O&M Manual are a compilation of PG&E's obligations for formal communication to certain parties during this phase of work that is specified in various directives from, and agreements with, State and Federal Agencies, state and federal laws, Memoranda of Understanding ("MOUs") with certain Tribes, the 2006 Settlement Agreement with the FMIT, and other required project documents.			natural springs and arroyos. Proposed placement of multiple injection wells in one location needs to be addressed as part of the Subsequent Groundwater EIR. Comment unresolved.	aquifer materials from borehole data in the uplands and also the performance of freshwater injection as part of the IM-3 system. However, it is common practice to have a contingency for additional wells if aquifer testing associated with new injection well installation indicates that additional wells will be required. If additional wells are required, communication procedures and protocols as previously referenced will be followed, and attempts will be made to minimize additional infrastructure.
306	Hualapai/TRC	Design	Remedial Design	3.3.3.3 p. 3-45 Freshwater Injection Wells	If the low capacity of the well appears to be due to low permeability in the aquifer, the new well should be located some distance away from the existing well in hopes of finding better aquifer materials. In sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity.	This seems open-ended and unrestricted. Would there be a limit to how many wells are drilled in one location? Groundwater model pathlines show that it could take 10-15 years for IRL injections to reach the IRZ line. How long would it take to make these decisions? Please describe how the Tribes might be included in the decision-making process.	See above			If geologic conditions are different, which requires additional injection wells, in order to achieve the greatest remediation efficiency shouldn't the wells be spread out rather than placed in one location? If more than one injection well is needed per injection site, will there be more than one trench, more than one pipeline, more than one electrical line, more than one solar panel, more than one access road, etc.? If more than one injection well is needed per injection site, then it means that the aquifer does not accept injection as readily as presented in the conceptual model, and extreme groundwater mounding could occur nearest to these	DTSC response: See 305 above

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										grouped injection wells, possibly allowing water to escape to the surface through un-natural springs and arroyos. Proposed placement of multiple injection wells in one location needs to be addressed as part of the Subsequent Groundwater EIR. Comment unresolved.	
307	Cocopah/TRC	Design	Remedial Design	3.3.3.3 p. 3-45 Freshwater Injection Wells	If the low capacity of the well appears to be due to low permeability in the aquifer, the new well should be located some distance away from the existing well in hopes of finding better aquifer materials. In sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity.	This seems open-ended and unrestricted. Would there be a limit to how many wells are drilled in one location? Groundwater model pathlines show that it could take 10-15 years for IRL injections to reach the IRZ line. How long would it take to make these decisions? Please describe how the Tribes might be included in the decision-making process.	See above			If geologic conditions are different, which requires additional injection wells, in order to achieve the greatest remediation efficiency shouldn't the wells be spread out rather than placed in one location? If more than one injection well is needed per injection site, will there be more than one trench, more than one pipeline, more than one electrical line, more than one solar panel, more than one access road, etc.? If more than one injection well is needed per injection site, then it means that the aquifer does not accept injection as readily as presented in the conceptual model, and extreme groundwater mounding could occur nearest to these grouped injection wells, possibly allowing water to escape to the surface through un-natural springs and arroyos. Proposed placement of multiple injection wells in one location needs to be addressed as part of the Subsequent Groundwater EIR. Comment unresolved.	DTSC response: See 305 above
308	Chemehuevi/ TRC	Design	Remedial Design	3.3.3.3 p. 3-45 Freshwater Injection Wells	If the low capacity of the well appears to be due to low	This seems open-ended and unrestricted. Would there be a limit to how many wells are drilled in one location? Groundwater model pathlines show that it could take 10-15 years for IRL injections to reach the IRZ line. How long would it take to make these decisions? Please describe how the Tribes might be included in the decision-making process.	See above			If geologic conditions are different, which requires additional injection wells, in order	DTSC response: See 305 above

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					permeability in the aquifer, the new well should be located some distance away from the existing well in hopes of finding better aquifer materials. In sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity.					to achieve the greatest remediation efficiency shouldn't the wells be spread out rather than placed in one location? If more than one injection well is needed per injection site, will there be more than one trench, more than one pipeline, more than one electrical line, more than one solar panel, more than one access road, etc.? If more than one injection well is needed per injection site, then it means that the aquifer does not accept injection as readily as presented in the conceptual model, and extreme groundwater mounding could occur nearest to these grouped injection wells, possibly allowing water to escape to the surface through un-natural springs and arroyos. Proposed placement of multiple injection wells in one location needs to be addressed as part of the Subsequent Groundwater EIR. Comment unresolved.	
309	FMIT/TRC	Design	CEQA/EIR	3.3.3.3 p. 3-45 Freshwater Injection Wells	Consideration will be given to installation of an additional well to ensure that sufficient injection capacity is available for the life of the remedy. If the low capacity of the well appears to be due to low permeability in the aquifer, the new well should be located some distance away	If numerous wells are installed in one location how will this be reflected in the total EIR well count? Will this be considered one well or numerous wells?	The design for the freshwater injection wells only includes one well per location (FW-1 and FW-2), but acknowledges that if sufficient injectivity cannot be achieved at a given location with one well then additional wells may be required. The injection wells will be constructed and operated according to industry best practices to maximize well effectiveness (i.e., injectivity) and lifetime. That said, the geologic conditions at a given location might limit the		DOI defers to DTSC regarding well count.	The Tribe disagrees with the agency rational that replacement wells installed in the vicinity of an abandoned, once operable well do not increase the total remedy well count: It is the additional environmental impact that is potentially significant, not just an abstract numerical increase. The Tribe would like to reiterate that the groundwater remedial infrastructure is being installed in a Sacred landscape and any additional borehole	RTCs related to well count were discussed at the July 23 and August 18 TWG meetings. DTSC response: DTSC has clarified for years that the well count considered in the 2011 FEIR was provide by PG&E during the conceptual stage of the remedy. DTSC has since the 2011 FEIR (as early as August 2013 as comment to the 60% design), clarified in CTF meetings, CWG

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					from the existing well in hopes of finding better aquifer materials. Any additional wells needed to achieve this capacity would be installed in the same area as the primary well. Well drilling at any one area would only continue until this target of three times the design capacity was reached. There is also a possibility that the design flow rates for individual well locations could be adjusted to allow for somewhat more injection in the higher permeability locations and somewhat less injection in the lower permeability locations. In sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity		effectiveness of an injection well, and it might be determined that additional injection wells are required for proper remedy operation. In this scenario, it is expected that these additional wells, which would be identified in the construction or early O&M phase of the project, would be counted as new boreholes. Alternatively, if the initial injection well(s) are determined sufficient for proper remedy operation but become inoperable over time during the O&M period, such as through clogging or damage, then replacement wells might be required. The FEIR defines the process for establishing a replacement well in that the existing well would be abandoned and replaced with an entirely new well. The new well would be located close to the existing well, within the areas currently designated in the EIR (see Exhibit 3-4 of the FEIR). Unless the new well encountered different geologic conditions and/or has significantly smaller capacity than the well it replaced, there would be no net change in the total number of existing wells. If the new well has significantly smaller capacity, it might be necessary to replace an existing well with two new wells under certain conditions. Replacement wells put in the same location as original wells were not counted as additions to the estimated number of wells disclosed in the			placed in the ground is considered a significant impact to cultural resources. All wells regardless of use, name, or placement should be included in the overall well count. In addition, any increased number of allowable wells that may occur in the future SEIR is a continuation of project scope creep that has occurred throughout the groundwater remedy design process without apparent significant concern for the effect on a unique archeological and historically significant resource.	meetings, TWG meetings and in 60% RTCs (see RTC #228 and #632 from 60% design) that the design must be based on identified purpose and need, and not the borehole constraints stated in the FEIR. DTSC has committed to conducting an SEIR for additional wells identified.

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							EIR.				
310	Hualapai/TRC	Design	CEQA/EIR	3.3.3.3 p. 3-45 Freshwater Injection Wells	Consideration will be given to installation of an additional well to ensure that sufficient injection capacity is available for the life of the remedy. If the low capacity of the well appears to be due to low permeability in the aquifer, the new well should be located some distance away from the existing well in hopes of finding better aquifer materials. Any additional wells needed to achieve this capacity would be installed in the same area as the primary well. Well drilling at any one area would only continue until this target of three times the design capacity was reached. There is also a possibility that the design flow rates for individual well locations could be adjusted to allow for somewhat more injection in the higher permeability locations and somewhat less injection in the lower permeability locations. In	If numerous wells are installed in one location how will this be reflected in the total EIR well count? Will this be considered one well or numerous wells?	See above		See above	Hualapai disagree with the agency rational that replacement wells installed in the vicinity of an abandoned, once operable well does not increase the total remedy well count. Hualapai would like to reiterate that the groundwater remedial infrastructure is being installed in a Sacred landscape and any additional borehole placed in the ground is considered a significant impact to cultural resources. All wells regardless of use, name, or placement should be included in the overall well count. In addition, any increased number of allowable wells that may occur in the future SEIR is a continuation of project scope creep that has occurred throughout the groundwater remedy design process.	RTCs related to well count were discussed at the July 23 and August 18 TWG meetings. DTSC Response: See RTC #309 above.

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Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

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					sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity						
311	Cocopah/TRC	Design	CEQA/EIR	3.3.3.3 p. 3-45 Freshwater Injection Wells	Consideration will be given to installation of an additional well to ensure that sufficient injection capacity is available for the life of the remedy. If the low capacity of the well appears to be due to low permeability in the aquifer, the new well should be located some distance away from the existing well in hopes of finding better aquifer materials. Any additional wells needed to achieve this capacity would be installed in the same area as the primary well. Well drilling at any one area would only continue until this target of three times the design capacity was reached. There is also a possibility that the design flow rates for individual well locations could be adjusted to allow for somewhat	If numerous wells are installed in one location how will this be reflected in the total EIR well count? Will this be considered one well or numerous wells?	See above		See above	The Tribes disagree with the agency rational that replacement wells installed in the vicinity of an abandoned, once operable well does not increase the total remedy well count. The Tribes would like to reiterate that the groundwater remedial infrastructure is being installed in a Sacred landscape and any additional borehole placed in the ground is considered a significant impact to cultural resources. All wells, regardless of use, name, or placement should be included in the overall well count. In addition, any increased number of allowable wells that may occur in the future SEIR is a continuation of project scope creep that has occurred throughout the groundwater remedy design process without an apparent concern for the effect on a unique archeological and historically significant resource.	RTCs related to well count were discussed at the July 23 and August 18 TWG meetings. DTSC Response: See RTC #309 above.

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					more injection in the higher permeability locations and somewhat less injection in the lower permeability locations. In sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity						
312	Chemehuevi/ TRC	Design	CEQA/EIR	3.3.3.3 p. 3-45 Freshwater Injection Wells	Consideration will be given to installation of an additional well to ensure that sufficient injection capacity is available for the life of the remedy. If the low capacity of the well appears to be due to low permeability in the aquifer, the new well should be located some distance away from the existing well in hopes of finding better aquifer materials. Any additional wells needed to achieve this capacity would be installed in the same area as the primary well. Well drilling at any one area would only continue until this target of three times the design capacity was reached. There	If numerous wells are installed in one location how will this be reflected in the total EIR well count? Will this be considered one well or numerous wells?	See above		See above	The Tribes disagree with the agency rational that replacement wells installed in the vicinity of an abandoned, once operable well does not increase the total remedy well count. The Tribes would like to reiterate that the groundwater remedial infrastructure is being installed in a Sacred landscape and any additional borehole placed in the ground is considered a significant impact to cultural resources. All wells, regardless of use, name, or placement should be included in the overall well count. In addition, any increased number of allowable wells that may occur in the future SEIR is a continuation of project scope creep that has occurred throughout the groundwater remedy design process without an apparent concern for the effect on a unique archeological and historically significant resource.	RTCs related to well count were discussed at the July 23 and August 18 TWG meetings. DTSC Response: See RTC #309 above.

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					is also a possibility that the design flow rates for individual well locations could be adjusted to allow for somewhat more injection in the higher permeability locations and somewhat less injection in the lower permeability locations. In sum, there may be more than one well installed at the FW or IRL well locations initially to ensure sufficient capacity						
313	DTSC-76	Design	Monitoring	3.4.1 Transportation /3.4.2 Reuse/Disposal Options and Conditioning	Page 3-49 – "Because the characteristics of the rehabilitation wastewater may not be known until it is pumped back out of the well,..." Page 3-50 – "If the water is to be injected back into the plume through the IRZ Injection Wells, it is assumed the water would need to be conditioned to a degree where it would not contribute to the fouling of the injection wells or disruption of the natural geochemistry in the aquifer near the	Injection of conditioned wastewater is stated to be concerned with impacts to 1) well fouling and 2) the natural geochemistry, but not degradation of the aquifer. It is appropriate to understand what the conditioned wastewater contains and develop a monitoring plan to ensure adverse aquifer impacts are not encountered. Revised language is provided below: "If the water is to be injected back into the plume through the IRZ Injection Wells, it is assumed the water would need to be conditioned to a degree where it would not adversely impact the aquifer or contribute to the fouling of the injection wells or disruption of the natural geochemistry in the aquifer near the injection wells (see Section 3.4.2.2 for a discussion of conditioning)." It is noted that Section 3.4.2.2 (first bullet and last paragraph of page 3-54) acknowledges aquifer protection.	Section 5.3 of the Sampling and Monitoring Plan (O&M Manual Volume 2) describes the program that will be implemented to monitor the quality of influent and effluent (or conditioned) water at the Remedy-produced Water Conditioning Plant. Table 5.3-1 lists the sampling analytes and frequency. Exhibit 5.3-1 shows the proposed influent and effluent monitoring locations. Note that the sampling location (SP-372A) will be moved to the effluent of Tank 510 in the final design. The revised exhibit was included in **Attachment J** of the final RTC table. Revision to text will be made as requested.	Resolved.			Comment resolved.

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					injection wells (see Section 3.4.2.2 for a discussion of conditioning).”						
314	DTSC-78	Design	Editorial	3.4.2 Reuse/ Disposal Options and Conditioning/ Page 3-52	EXHIBIT 3.4-2 “The agitator and pumps will be powered by 120/240 VAC generated by a generator operating on natural gas or by direct connection to the compressor station power system. If the generator is installed, it will be in a small building inside the pond fence line that also includes a control panel and a bank of batteries. Natural gas for the generator will be piped from the PG&E transmission line 300B, approximately 500 feet away. A new regulator rack will be installed to reduce the gas line pressure from line pressure down to the operating level of the generator. If the power is supplied directly from the compressor station power system, the new electrical conductors will be installed along the right-of-way that currently	Footnote “a” text will need to be revised to support the selected power supply option.	Footnote “a” text will be revised to reflect the power supply information provided in the revised portion of Table ES-1 included in the Supplemental 90%.	Resolved.			Comment resolved.

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					contains the discharge pipeline that carries water from the compressor station to the ponds. A small control building or panel would be installed to house the pond controls and communications equipment. PG&E is evaluating both options and will include the selected option in the Final (100%) design."						
315	FMIT/TRC	Non-design	Request for Information	EXHIBIT 3.4-2 p. 3-52 Reuse/ Disposal Options and Associated Degree of Conditioning Required	Water accumulated in the ponds will evaporate over time. In the event the ponds are full (i.e., water level in the ponds reaches the maximum level allowed by the RWQCB), water can also be trucked off-site via the truck loading station at the ponds.	What type of storm water plan is in place to ensure that TCS wastewater ponds when full could not overflow during a storm event? Is the storm water plan adequate to address 100-year storm rainfall levels?	The current WDRs for the ponds require a minimum 2 feet of freeboard. In other words, the ponds when full have 2 feet additional capacity. Based on rainfall measurements at Needles Airport, a 100-year 24 hour storm could add up to 3.5 inches of water to the ponds. The ponds are surrounded by berms raised above surrounding grade so the additional volume of rain water introduced to the ponds would be limited to the area of the ponds and a portion of the top surface of the berms. Therefore, the TCS evaporation ponds have adequate capacity to address 100-year storm rainfall levels.			Noted.	
316	Hualapai/TRC	Non-design	Request for Information	EXHIBIT 3.4-2 p. 3-52 Reuse/ Disposal Options and Associated Degree of Conditioning Required	Water accumulated in the ponds will evaporate over time. In the event the ponds are full (i.e., water level in the ponds reaches the maximum level allowed	What type of storm water plan is in place to ensure that TCS wastewater ponds when full could not overflow during a storm event? Is the storm water plan adequate to address 100-year storm rainfall levels?	See above			Noted.	

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					by the RWQCB), water can also be trucked off-site via the truck loading station at the ponds.						
317	Cocopah/TRC	Non-design	Request for Information	EXHIBIT 3.4-2 p. 3-52 Reuse/ Disposal Options and Associated Degree of Conditioning Required	Water accumulated in the ponds will evaporate over time. In the event the ponds are full (i.e., water level in the ponds reaches the maximum level allowed by the RWQCB), water can also be trucked off-site via the truck loading station at the ponds.	What type of storm water plan is in place to ensure that TCS wastewater ponds when full could not overflow during a storm event? Is the storm water plan adequate to address 100-year storm rainfall levels?	See above			Noted.	
318	Chemehuevi/ TRC	Non-design	Request for Information	EXHIBIT 3.4-2 p. 3-52 Reuse/ Disposal Options and Associated Degree of Conditioning Required	Water accumulated in the ponds will evaporate over time. In the event the ponds are full (i.e., water level in the ponds reaches the maximum level allowed by the RWQCB), water can also be trucked off-site via the truck loading station at the ponds.	What type of storm water plan is in place to ensure that TCS wastewater ponds when full could not overflow during a storm event? Is the storm water plan adequate to address 100-year storm rainfall levels?	See above			Noted.	
319	DTSC-79	Design	Request for Information	Section 3.5.1, Electrical Power Supply, page 3-58, 1st paragraph	"Two new natural gas engine-driven generators with associated switchgear and auxiliary systems will be installed in the existing Auxiliary Building, which houses the existing generators and generator switchgear.	Will the two proposed new gas engine generators be used solely for the remedy and removed after remediation is complete? Or will this electrical generation also be used by the Compressor Station for power demand? Please note that PG&E must obtain permits (unless federal permit exemption applies for remediation only) and follow applicable regulations, including those from the APCD for these units, including compliance with emission offset/credit requirements.	The remedy electrical power will be supplied by the Compressor Station. The new natural gas generators will be part of the Compressor Station electrical power generation and will be used to meet the demand for gas operations. PG&E appreciates DTSC's note on permitting, and understand the requirements for these new generators.	Resolved.			Comment resolved.

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320	FMIT/TRC	Design	Infrastructures	3.5.1 p.3-58	Electrical Power Supply First paragraph	While it is possible that the new air compressor building will generate relatively low sound power levels in comparison to the other noise sources at the TCS, and that the new air compressors will generate less noise than the old compressors, the design documentation should inform all of the sound power levels of these new sources in the context of the sound power levels of existing sources at the TCS. These new noise sources should be included and quantified in Table D1-13 of Appendix D. Going forward in time, the TCS should implement a meaningful noise mitigation program to reduce TCS noise impacts on cultural and religious use of adjoining properties and parcels.	The TCS, including its new air compressor building, is not part of the project. Thus, it is not appropriate to include in the table of aboveground non-emergency remedy equipment (Table D1-13 in Appendix D). Although the TCS equipment may increase ambient noise levels, the project's contribution to cumulative noise impacts would remain as disclosed in the EIR. Additional mitigation measures, such as a noise mitigation program, to control noise from the TCS would lack a nexus to the proposed project.		Comment and response noted.	Just because TCS improvements, necessitated by and integral to the remedy project, may have some additional, future utility for TCS operations, it does not follow that the improvements are not included within the remedy project. It is the position of the Tribe that these improvements are indeed part of the remedy project. Therefore, this comment is considered unresolved. See also RTC 48 FMIT/TRC.	DTSC response: DTSC has deliberated on this matter with legal representatives of PG&E and determined that the TCS improvements are not specifically part of remedy infrastructures but must be considered in the cumulative impacts of the SEIR.
321	Hualapai/TRC	Design	Infrastructures	3.5.1 p.3-58	Electrical Power Supply First paragraph	While it is possible that the new air compressor building will generate relatively low sound power levels in comparison to the other noise sources at the TCS, and that the new air compressors will generate less noise than the old compressors, the design documentation should inform all of the sound power levels of these new sources in the context of the sound power levels of existing sources at the TCS. These new noise sources should be included and quantified in Table D1-13 of Appendix D. Going forward in time, the TCS should implement a meaningful noise mitigation program to reduce TCS noise impacts on cultural and religious use of adjoining properties and parcels.	See above		See above	Since TCS improvements, necessitated by and integral to the remedy project, may have some additional, future utility for TCS operations, it does not follow that the improvements are not included within the remedy project. It is the position of the Hualapai that these improvements are indeed part of the remedy project. Therefore, this comment is considered unresolved.	DTSC response: See RTC #320
322	Cocopah/TRC	Design	Infrastructures	3.5.1 p.3-58	Electrical Power Supply First paragraph	While it is possible that the new air compressor building will generate relatively low sound power levels in comparison to the other noise sources at the TCS, and that the new air compressors will generate less noise than the old compressors, the design documentation should inform all of the sound power levels of these new sources in the context of the sound power levels of existing sources at the TCS. These new noise sources should be included and quantified in Table D1-13 of Appendix D. Going forward in time, the TCS should implement a meaningful noise mitigation program to reduce TCS noise impacts on cultural and religious use of adjoining properties and parcels.	See above		See above	Just because TCS improvements, necessitated by and integral to the remedy project, may have some additional, future utility for TCS operations, it does not follow that the improvements are not included within the remedy project. It is the position of the Tribes that these improvements are indeed part of the remedy project. Therefore, this comment is considered unresolved.	DTSC response: See RTC #320

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323	Chemehuevi/ TRC	Design	Infrastructures	3.5.1 p.3-58	Electrical Power Supply First paragraph	While it is possible that the new air compressor building will generate relatively low sound power levels in comparison to the other noise sources at the TCS, and that the new air compressors will generate less noise than the old compressors, the design documentation should inform all of the sound power levels of these new sources in the context of the sound power levels of existing sources at the TCS. These new noise sources should be included and quantified in Table D1-13 of Appendix D. Going forward in time, the TCS should implement a meaningful noise mitigation program to reduce TCS noise impacts on cultural and religious use of adjoining properties and parcels.	See above		See above	Just because TCS improvements, necessitated by and integral to the remedy project, may have some additional, future utility for TCS operations, it does not follow that the improvements are not included within the remedy project. It is the position of the Tribes that these improvements are indeed part of the remedy project. Therefore, this comment is considered unresolved.	DTSC response: See RTC #320
324	FMIT/TRC	Non-design	Editorial	EXHIBIT 3.5 Remedy Buildings and Structures	Security equipment (cameras, intrusion alarms, card readers, etc.)	Please include nighttime lighting if this is intended to be used as a security measure	For the MW-20 Bench, nighttime access is not normally required. Exterior lights will be installed but activated manually. See Appendix C (Design Criteria), Section C.6.7.1 for additional details. For the TW Bench, exterior lighting is provided (for nighttime access) and is activated by photocells.			Noted.	
325	Hualapai/TRC	Non-design	Editorial	EXHIBIT 3.5 Remedy Buildings and Structures	Security equipment (cameras, intrusion alarms, card readers, etc.)	Please include nighttime lighting if this is intended to be used as a security measure	See above			Noted.	
326	Cocopah/TRC	Non-design	Editorial	EXHIBIT 3.5 Remedy Buildings and Structures	Security equipment (cameras, intrusion alarms, card readers, etc.)	Please include nighttime lighting if this is intended to be used as a security measure	See above			Noted.	
327	Chemehuevi/ TRC	Non-design	Editorial	EXHIBIT 3.5 Remedy Buildings and Structures	Security equipment (cameras, intrusion alarms, card readers, etc.)	Please include nighttime lighting if this is intended to be used as a security measure	See above			Noted.	
328	DTSC-80	Design	Request for Information	Section 3.5.3, Buildings/Structures for Major Equipment and Key Supporting Functions, page 3-60	"Major equipment associated with the in-situ remediation system includes… an air compressor,…"	Will PG&E utilize air compressors at the relocated air compressor aux building or a separate compressor located elsewhere for the project as stated? Please clarify and identify its location.	PG&E will not utilize the relocated air compressors for the remedy. There is a separate air compressor dedicated for the remedy. This remedy air compressor is located on the first floor of the Water Conditioning Plant for remedy-	Resolved.			Comment resolved.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							produced water (see 90% drawing M-12-01). The remedy air compressor is designed to meet the noise design criteria stated in Section C.11 of Appendix C.				
329	FMIT/TRC	Non-design	Request for Information	3.5.4 Page 3-64 Site Safety and Security	PG&E's efforts will include coordinating with BLM to install signs that note the designation of the areas as an ACEC owing to its biological and cultural resources, while ensuring that signs are placed in a way that does not draw unwanted attention to specific resources.	What enforceable trespassing laws are created under the placements of these signs? Is there any evidence that the posting of non-enforceable signs decreases visitor pressures? Will the wording and placement of signs be coordinated with the Tribes in anyway?	PG&E defers to DOI for response to the portion of the comment regarding trespassing laws and whether signs decrease visitor pressures on federal lands. Pursuant to Mitigation Measures CUL-1a-3, PG&E is required to enhance existing measures to prevent and reduce incursions from recreational and/or other outside users from affecting unique archeological and historically significant resources, including resources within the Topock Cultural Area. Mitigation Measure CUL-1a-3(c) requires PG&E to coordinate with BLM and San Bernardino County to facilitate an outreach effort to the staff at Moabi Regional Park, requesting that they communicate to visitors the parts of the project area that are off limits to off-road vehicle usage because of health and safety concerns, public lands management plans, or landowner requests. This includes offering to design, develop, and fund the installation of an informational kiosk within Park Moabi that informs visitors of the work being done at the project site. As part of this process, PG&E must make a good faith effort to involve the surrounding tribes in this outreach effort, providing Interested Tribes with the		The ACEC Management Plan will dictate appropriate signage and management of the area. The Tribes will have the opportunity to provide input on the ACEC Management Plan through other consultation efforts with the Federal agencies. BLM has taken measures to reduce potential for incursion by outside parties, e.g., recreational ORVs, and is scheduled to amend the Bullhead Travel Management Plan in FY 2016.	The Tribe looks forward to the timely completion of the ACEC management plan. It is the opinion of the Tribe that the delay in completing this management plan is inappropriate particularly in light of the potential impacts to both environmental and cultural resources that may occur as a result of the remedy infrastructure. It is very likely that delays in finalizing the ACEC management plan will contribute to an increased occurrence of what would have been avoidable impacts to the Topock landscape.	DTSC Response: Tribal comment noted.

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							opportunity to comment on outreach materials or provide a tribal cultural resources specialist the opportunity to participate in the outreach activities. PG&E also must involve the tribes to the maximum extent feasible, as determined by DTSC, in the design and development of the informational kiosk. These information kiosks do not change otherwise applicable trespass laws. In addition to the informational kiosks, Mitigation Measure CUL-1a-3(d) requires PG&E to post signage to indicate those parts of the project area that are off limits to off-road vehicle usage due to possible health and safety concerns and to reduce potential damage to environmental resources. If agreed to by land owners and/or local, state, or federal management entities within the project area, PG&E shall work with the relevant land owner or land management entity to develop, design, and fund the installation of easily visible and clear signage. This may include coordination with BLM to install signage noting the designation of the area as an Area of Critical Environmental Concern owing to its biological and cultural resources, while ensuring that signs are placed in a way that does not draw unwanted attention to specific resources. Additionally, beyond the requirements of EIR Mitigation Measure CUL-1a-3(c) and (d), as				

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							described in BLM's Tribal Access Plan for Federal Properties, public entry to a portion of the northern half of the APE in California is closed by order of BLM dated July 31, 2006. In its Tribal Access Plan, BLM states that it closed portions of roads on public lands within the Topock Remediation Project APE to motorized and mechanical vehicle use, to protect soils, vegetation and cultural resources that have been adversely impacted, or are at risk of being adversely impacted by off-highway vehicle use. BLM states that "[t]he placement of notices, signs, and rock barriers used to block existing roads will be determined after the Federal Government's consultation with regional tribes has been completed. Comments offered by the Tribes will be taken into consideration before any measures are employed to block and sign roads."				
330	Hualapai/TRC	Non-design	Request for Information	3.5.4 Page 3-64 Site Safety and Security	PG&E's efforts will include coordinating with BLM to install signs that note the designation of the areas as an ACEC owing to its biological and cultural resources, while ensuring that signs are placed in a way that does not draw unwanted attention to specific resources.	What enforceable trespassing laws are created under the placements of these signs? Is there any evidence that the posting of non-enforceable signs decreases visitor pressures? Will the wording and placement of signs be coordinated with the Tribes in anyway?	See above			Hualapai look forward to the completion of the ACEC management plan. It is the opinion of the Hualapai that the delay in completing this management plan is inappropriate particularly in light of the potential impacts to both environmental and cultural resources that may occur as a result of the remedy infrastructure. Delays in finalizing the ACEC management plan will contribute to an increased occurrence of what would have been avoidable impacts to the Topock landscape.	DTSC Response: Tribal comment noted.
331	Cocopah/TRC	Non-design	Request for Information	3.5.4 Page 3-64 Site Safety and	PG&E's efforts will include coordinating	What enforceable trespassing laws are created under the placements of these signs? Is there any evidence that the posting of non-enforceable signs decreases visitor pressures? Will the wording and placement of signs be coordinated with the Tribes in anyway?	See above			The Tribes look forward to the completion of the ACEC management	DTSC Response: Tribal comment noted.

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Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
				Security	with BLM to install signs that note the designation of the areas as an ACEC owing to its biological and cultural resources, while ensuring that signs are placed in a way that does not draw unwanted attention to specific resources.					plan. It is the opinion of the Tribes that the delay in completing this management plan is inappropriate particularly in light of the potential impacts to both environmental and cultural resources that may occur as a result of the remedy infrastructure. It is very likely that delays in finalizing the ACEC management plan will contribute to an increased occurrence of what would have been avoidable impacts to the Topock landscape.	
332	Chemehuevi/ TRC	Non-design	Request for Information	3.5.4 Page 3-64 Site Safety and Security	PG&E's efforts will include coordinating with BLM to install signs that note the designation of the areas as an ACEC owing to its biological and cultural resources, while ensuring that signs are placed in a way that does not draw unwanted attention to specific resources.	What enforceable trespassing laws are created under the placements of these signs? Is there any evidence that the posting of non-enforceable signs decreases visitor pressures? Will the wording and placement of signs be coordinated with the Tribes in anyway?	See above			The Tribes look forward to the completion of the ACEC management plan. It is the opinion of the Tribes that the delay in completing this management plan is inappropriate particularly in light of the potential impacts to both environmental and cultural resources that may occur as a result of the remedy infrastructure. It is very likely that delays in finalizing the ACEC management plan will contribute to an increased occurrence of what would have been avoidable impacts to the Topock landscape.	DTSC Response: Tribal comment noted.
333	DTSC-81	Design	Monitoring	3.6 Monitoring Well Design/ Page 3-65	"The proposed monitoring program, monitoring well network (includes 35 new well locations), and data quality objectives are discussed in the Sampling and Monitoring Plan, Volume 2 of the O&M Manual."	DTSC requests clarification regarding the 35 new well location tally. Table 3.6-2 lists at least 38 new well locations. The actual number should be reported.	The cited text will be edited as follows: "The proposed monitoring program, monitoring well network (~~includes 35 new well locations~~), and data quality objectives are discussed in the Sampling and Monitoring Plan, Volume 2 of the O&M Manual." Consistent with the response to comment 335 (DTSC-83), the total number of boreholes/ well locations planned for the remedy is	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							documented in Tables ES-2A and ES-2B, and redundant discussion of the number of boreholes/well locations will be removed from the text in Section 3.6.				
334	DTSC-82	Design	Monitoring	3.6 Monitoring Well Design/ Page 3-65	"Preliminary screen interval estimates for each of the proposed supplemental monitoring locations are provided in Table 3.6-1. However, the details included in this table are estimated and will likely change as additional data are collected during construction.	The preliminary screen interval estimates for each of the proposed monitoring locations were <u>not</u> provided in Table 3.6-1 of the September 2014 90% submittal. An updated Table 3.6-1 for all new monitoring wells was provided in the February 2015 supplemental submittal. See separate comment below regarding screen interval lengths. Some initial concerns with screen intervals for those intervals provided in Table 3.6-1 are identified below and should be addressed: MW-HH/II: Revise the document to have two screened intervals (from 20 to 40' long) at each well location to maximize coverage of the aquifer thickness (also to assess if TDS stratification affects injected water flow). MW-FF/GG: Table 3.6-1 indicates two intervals monitored, yet cross-section D-D' (Figure 3.1-5) illustrates four. Revision is required based on this discrepancy. Obviously, DTSC would prefer four zones to monitor the entire aquifer thickness as depicted in Figure 3.1-5, but recognizes that Tribes would want only one borehole and PG&E would probably propose two boreholes to monitor four zones in this area. Discussion is needed. A number of alternatives/options exist including: utilizing Westbay/Solinist-type wells to screen multiple zones while using one borehole; Utilizing packers to separate two screened intervals; Installing three monitoring zones in one borehole; and Alternating/offsetting dual screened zones in wells MW-GG/MW-FF. Of course, hydrogeological information obtained from nearby/associated wells MW-Q and IRL-4 could assist in the final well design. Aquifer testing at IRL-4 with MW-Q and possibly MW-J and MW-R as observation well clusters (all proposed to be screened with four intervals) is currently requested to assist in assessing more permeable zones in the area which may help guide the number of monitoring intervals in MW-GG/MW-FF. The exact same issues exist for the other Arsenic Monitoring wells (MW-AA to MW-EE) except as the aquifer should thicken to the north, the need for additional screened intervals is further supported towards the north.	See RTC #336 DTSC-84 regarding MW-HH and II. Regarding MW-FF and GG, the cross section that indicates four monitoring intervals pre-dates the finalization of Table 3.6-1 for the 90% design submittal. The cross-section will be revised to show two monitoring intervals in accordance with Table 3.6-1; however, it should be noted that Table 3.6-1 includes estimated design details based on hydrogeologic information collected to date. As indicated in footnote 1, the actual design details are subject to change based on observations in the field. Alternative monitoring well designs are evaluated in Section 3.6 of the design (see also the comment and response to comment 336 [DTSC-84]). Rationale for the collection and use of field data is provided in Section 3.2.1 of the C/RAWP. Also see the response to comment 346 (DTSC-86) regarding the number of screen intervals required at each location.	Resolved.			Comment resolved.
335	DTSC-83	Design	Monitoring	3.6.1 Key Variables and Well Design Considerations Borehole Quantity Constraints/ Page 3-66	"However, the number of available boreholes is limited (DTSC 2011d). No more than 60 boreholes can be installed for the construction of monitoring wells. To date,	This paragraph should be revised to be consistent with DTSC's position on well counts. DTSC has repeatedly clarified that although the total number of wells should be minimized to address tribal concerns, but should be sufficient for proper operation and monitoring of the remedy. The cited monitoring well count was based on an estimate generated by PG&E circa 2009 when the CMS was being developed and when the proposed remedy was highly conceptual. The estimated well count was also established prior to the East Ravine and compressor station evaluations which, at the time, were thought to be uncontaminated by PG&E. However, for clarity of the design, the total number of boreholes planned for the remedy should be documented. According to an August 2, 2014 email from CH2MHill, PG&E is planning to install 53 monitoring well locations and 4 provisional locations that totals to 73 monitoring well boreholes when including the existing 16 wells). Please verify the current count and clearly indicate in the design document.	The "Borehole Quantity Constraints" portion of Section 3.6.1 will be re-written to speak to the design requirement of minimizing the total number of boreholes drilled for construction of the remedy monitoring network and not include discussion of the specific quantity of wells/boreholes. The	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					16 of the allotted 60 boreholes have been installed as part of the investigation activities in the East Ravine area. As a result, 43 boreholes remain available for monitoring well construction associated with the final groundwater remedy.”		total number of boreholes planned for the remedy is documented in Tables ES-2A and ES-2B, and these tables supersede the information provided in the August 2, 2014 email referenced by DTSC in this comment. As stated in Tables ES-2A and ES-2B, the estimated borehole count is 100 for planned monitoring and remediation wells and 70 for future provisional monitoring and remediation wells, which when added to the existing 18 boreholes, totals 188 boreholes. A reference to these tables will be added to the revised text, as indicated below: “**Borehole Quantity Constraints:** Multiple monitoring depths will ~~likely~~ be needed at ~~each~~ <u>the majority of new</u> monitoring location<u>s</u>. Using conventional well design ~~most commonly used at Topock,~~ each monitoring interval would require a separate borehole. However, the number of ~~available~~ boreholes ~~is limited~~ <u>drilled to construct the remedy well network will be minimized to address tribal concerns, yet must be sufficient for proper operation and monitoring of the remedy</u>. ~~No more than 60 boreholes can be installed for the construction of monitoring wells. To date, 16 of the allotted 60 boreholes have been installed as part of the investigation activities in the East Ravine area. As a result, 43 boreholes remain available for monitoring well~~				

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							~~construction associated with the final groundwater remedy.~~ ~~If~~ Therefore, utilizing an alternate well design ~~were used~~ that could monitor multiple zones within a single borehole and meet groundwater monitoring objectives (thereby minimizing the total number of boreholes required)~~, the 19 proposed locations would require 19 total boreholes and 24 boreholes would remain available for future groundwater monitoring requirements. However, if multiple boreholes are required at some or all of the 19 locations, the flexibility to install wells later on to meet future monitoring requirements may be limited. Therefore, monitoring well designs that require fewer boreholes to meet the monitoring objectives are~~ is strongly preferred at the Topock site. Tables ES-2A and ES-2B (Executive Summary of this document) provide a detailed accounting of the planned and future provisional boreholes included in the design of the groundwater remedy for both monitoring wells and remediation wells."				
336	DTSC-84	Design	Monitoring	3.6.3 Well Design Selection/ Page 3-70	"The new monitoring wells are also designed to monitor remedial activities and will generally have longer screen lengths. The exception to this may be the wells designed to monitor the distribution of carbon along	New contaminant plume monitoring wells should be designed just like the hundreds of existing monitoring wells that were used to discretely characterize the plume. These existing monitoring wells are also proposed to be part of the monitoring network. Having two differing designs may lead to additional interpretation problems, diminish the value of the historical data base, and potentially lead to more wells in the future. As a general rule, contaminant plume monitoring wells should be constructed with screen lengths of 10 to 20 feet. Request screen interval changes to 20 feet in the following Table 3.6-1 wells: MW-O, U, V, X, Y, and slant wells. Additionally, two intervals should be monitored at well MW-V. Monitoring wells used to monitor gross changes in water quality (e.g., effects of groundwater injection) can use larger screen lengths similar to that already used at the OW and CW series wells (20 to 50 foot screen intervals). Revision of the section is required. Additionally, low flow purging is currently not proposed for longer screened wells (such as CW	PG&E agrees that plume monitoring wells should be designed for compatibility with the existing monitoring wells since they will be integrated as part of the remedy monitoring program. The screen lengths provided in Section 3.6 of the design were estimated to balance the anticipated data needs (based on estimated aquifer thickness) and the goal of minimizing the total	Resolved.			Comment resolved.

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					the IRZ line, where higher resolution may be desired for optimization of the groundwater remedy."	wells) at the Topock site and might negate its use at new, similar, long screen wells. Data interpretation can be complicated when using different sampling techniques (three volume vs low flow). Other than water quality issues, PG&E will also need to consider the appropriate number of short screened wells to provide discrete hydraulic information to assist with gradient and flow interpretations.	number of boreholes required to construct the new monitoring wells, with the understanding that the decision on final screen lengths will be made in the field based on the observed conditions at each borehole. The following text will be added to the end of the first paragraph in Section 3.6.3: "<u>As a general rule, contaminant plume monitoring wells should be constructed with screen lengths of 10 to 20 feet, and monitoring wells used to monitor gross changes in water quality (e.g., effects of groundwater injection) can use larger screen lengths similar to that already used at the OW and CW series wells (20 to 50 foot screen intervals).</u>" In addition, the estimated design details presented in Table 3.6-1 (and Table 3.2-5 of the C/RAWP) will modified in accordance with this comment, comment 334 (DTSC-82) and comment 346 (DTSC-86). Specifically: • The "Estimated Lengths of Interval(s) to Be Monitored" for plume monitoring wells including MW-, A, B, O, U, V, X, Y, and Z will be changed from "40" to "10-20" feet in length. • The "Estimated Lengths of Interval(s) to Be Monitored" for plume monitoring wells including MW-10D, 11D, C, D, E, F, G, H, K, L, M, N, R, and W will be changed from				

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							"20" to "10-20" feet in length. • The "Estimated Lengths of Interval(s) to Be Monitored" for monitoring wells use to monitor gross changes in water quality including MW-I, J, P, S, Q and AA through II will be changed from "50" to "20-50" feet in length. • The "Estimated Lengths of Interval(s) to Be Monitored" for the future provisional slant wells will be changed from "40" to "10-20" feet in length and the following footnote 3 will be added: "<u>Final number of slant well screens and the lengths will depend on well design and borehole angle.</u>" This footnote will also be referenced in the "Estimated Number of Intervals to be Monitored" field. • The "Estimated Lengths of Interval(s) to Be Monitored" for MW-T (listed as "TBD") and MW-70BR-D will not be changed. • The "Estimated Depths to be Monitored" presented in Table 3.6-1 will be adjusted to indicate a depth range representative of the maximum screened lengths listed in the "Estimated Lengths of Interval(s) to Be Monitored"				

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							(previous bullets). The exception to this will be for MW-HH and II, where the "Estimated Number of Intervals to be Monitored" will be increased to two (in response to comment 334 [DTSC-82]) and the estimated interval will be decreased to a depth range of 40 feet since the estimated saturated thickness is only 90-93 feet. • The following text will be added to the end of footnote 1: "<u>As requested by DTSC, at least three monitoring intervals (shallow-middle-deep) will be utilized to monitor portions of the aquifer that are 250 feet in thickness or greater.</u>" • In response to comment 346 (DTSC-86) the "Estimated Number of Intervals to be Monitored" for MW-AA, BB, and CC will be changed from "2" to "3". Per the fourth bullet in this response, the number of intervals for the slant wells will have a reference to new footnote 3. PG&E agrees that the use of multiple groundwater sampling techniques at monitoring wells across the same site is not ideal. At the time of the design, and in				

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							coordination with DTSC, PG&E is methodically integrating the low flow sampling technique as a replacement for the three volume purge technique, and intends to utilize only the low-flow technique provided the trial data is supportive. Regarding the consideration of the appropriate number of monitoring intervals to assist with hydraulic interpretations, the estimated screen lengths and vertical arrangement within the aquifer will be adequate to assess hydraulic conditions in the shallow, middle, and deep intervals, as is current practice at the site.				
337	FMIT/TRC	Non-design	Editorial	3.6.3 Page 3-70 Well Design Selection	In addition, these well types can generally be decommissioned in place, which is the preferred decommissioning method as it represents the field procedures that are least intrusive and create the least amount of disturbance.	This statement appears not to support the well decommissioning protocol which specifies that wells will be decommissioned on a well by well basis. Please ensure that the language included in the BOD report supports the commitment to address decommissioning on a well by well basis with Tribal stakeholder involvement	The referenced language is consistent with Well-SOP-1 in that decommissioning a well in place is the preferred decommissioning method because over-drilling is not necessary. That said, the 4th paragraph of Section 3.6.2 will be modified as follows: "Key design details associated with conventional, nested, and multi-level well types as they relate to the design constraints are provided below. <u>Well decommissioning considerations for each of the designs are also presented in this section; however, the actual decommissioning methods used will be determined for each well at the time of decommissioning.</u> Monitoring well designs are included in drawings C-16-01 through 03 of Appendix D, Plans			As the Tribe has stated many times throughout the design process Tribal preference is for all remedial infrastructure to be removed from the Sacred Landscape. This includes wells and well casings.	DTSC Response: Revised language provided for a well by well decision on decommissioning. However, in DTSC and DOI's joint direction letter to PG&E on 4/4/2014, the Agencies required PG&E to remove subsurface infrastructures to the extent possible. DTSC is also directing PG&E to consult with landowners for their ultimate preference. For well decommissioning, which is the original comment, PG&E will follow the Standard Operating Procedure in O&M manual Volume 1, Appendix B.

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							(Engineering Drawings)."				
338	Hualapai/TRC	Non-design	Editorial	3.6.3 Page 3-70 Well Design Selection	In addition, these well types can generally be decommissioned in place, which is the preferred decommissioning method as it represents the field procedures that are least intrusive and create the least amount of disturbance.	This statement appears not to support the well decommissioning protocol which specifies that wells will be decommissioned on a well by well basis. Please ensure that the language included in the BOD report supports the commitment to address decommissioning on a well by well basis with Tribal stakeholder involvement	See above			As Hualapai have stated many times preference is for all remedial infrastructure to be removed from the Sacred Landscape. This includes wells and well casings.	DTSC response: See RTC #337
339	Cocopah/TRC	Non-design	Editorial	3.6.3 Page 3-70 Well Design Selection	In addition, these well types can generally be decommissioned in place, which is the preferred decommissioning method as it represents the field procedures that are least intrusive and create the least amount of disturbance.	This statement appears not to support the well decommissioning protocol which specifies that wells will be decommissioned on a well by well basis. Please ensure that the language included in the BOD report supports the commitment to address decommissioning on a well by well basis with Tribal stakeholder involvement	See above			As the Tribes have stated many times throughout the design process, Tribal preference is for all remedial infrastructure to be removed from the Sacred Landscape. This includes wells and well casings.	DTSC response: See RTC #337
340	Chemehuevi/ TRC	Non-design	Editorial	3.6.3 Page 3-70 Well Design Selection	In addition, these well types can generally be decommissioned in place, which is the preferred decommissioning method as it represents the field procedures that are least intrusive and create the least amount of disturbance.	This statement appears not to support the well decommissioning protocol which specifies that wells will be decommissioned on a well by well basis. Please ensure that the language included in the BOD report supports the commitment to address decommissioning on a well by well basis with Tribal stakeholder involvement	See above			As the Tribes have stated many times throughout the design process, Tribal preference is for all remedial infrastructure to be removed from the Sacred Landscape. This includes wells and well casings.	DTSC response: See RTC #337
341	FMIT/TRC 1k	Non-design	Request for Information	3.6.3 Well Design Selection	In addition, angled wells might be required at select monitoring well locations in the	Please indicate which upland monitoring well locations are being considered for slant wells. What level of Tribal participation will occur in determining slant well locations?	Additional details/ specificities developed for select monitoring wells in the Upland subsequent to the submittal of the 90% design, supersede the		DOI concurs with PG&E's response.	Comment noted.	

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					upland (associated with the arsenic monitoring network).		reference text cited in the comment. The subsequent design document (Supplemental 90%) did not propose slant monitoring wells in the upland.				
342	Hualapai/TRC 1k	Non-design	Request for Information	3.6.3 Well Design Selection	In addition, angled wells might be required at select monitoring well locations in the upland (associated with the arsenic monitoring network).	Please indicate which upland monitoring well locations are being considered for slant wells. What level of Tribal participation will occur in determining slant well locations?	See above		See above	Comment noted.	
343	Cocopah/TRC 1k	Non-design	Request for Information	3.6.3 Well Design Selection	In addition, angled wells might be required at select monitoring well locations in the upland (associated with the arsenic monitoring network).	Please indicate which upland monitoring well locations are being considered for slant wells. What level of Tribal participation will occur in determining slant well locations?	See above		See above	Comment noted.	
344	Chemehuevi/ TRC 1k	Non-design	Request for Information	3.6.3 Well Design Selection	In addition, angled wells might be required at select monitoring well locations in the upland (associated with the arsenic monitoring network).	Please indicate which upland monitoring well locations are being considered for slant wells. What level of Tribal participation will occur in determining slant well locations?	See above		See above	Comment noted.	
345	DTSC-85	Design	Remedial design	Table 3.3-1	"Number of wells, total screen intervals, and screen depth placement at each well location ID are for purposes of pre-final (90%) design submittal and are continuing to be evaluated."	The cited text indicates that the total number of Freshwater Injection Wells is continuing to be evaluated. This does not seem appropriate for these two injection wells. Revision or clarification is requested. It is understood that more than one well may be placed at either FW-1 or FW-2 locations (see Section 3.3.3.3 page 3-45), but the "continuing to be evaluated" suggests on going work that is actively being considered behind the scenes. Suggest deleting "and are continuing to be evaluated." Otherwise, please explain and clarify what is being considered and when will decisions be made.	As suggested, the following text will be deleted from Table 3.3-1 "~~and are continuing to be evaluated~~" and replaced with "<u>and may be modified during installation</u>". The intent of this text was to indicate that the specifics of the well design may change during installation.	Resolved.			Comment resolved.

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346	DTSC-86	Design	Remedial design	Table 3.6-1	"Estimated Number of Intervals to be Monitored"	For saturated thicknesses of 250 feet or greater, it is requested that at least three monitoring intervals (shallow-middle-deep) be utilized to adequately monitor the thicker portions of the aquifer. See related DTSC comments above for page 3-65 of the design document.	Based on this DTSC direction, see response to comment 336 (DTSC-84) for changes to Table 3.6-1 (and Table 3.2-5 of the C/RAWP). Based on the changes in these tables, Tables ES-2A and 2B of the final design will be modified to indicate that 2 boreholes (and not one) will be required at monitoring well locations MW-AA, BB, and CC, and the following footnote will be added to the estimated number of boreholes for the future provisional slant wells: "The actual number of boreholes required for future provisional slant wells will depend on well design and borehole angle."	Resolved.			Comment resolved.
347	DTSC-94	Design	Monitoring	Footnote for Table 3.6-2	Basis for type of monitoring can be found in the O&M Manual Volume 2 Table 2.1-1 and 2.6-1	Possible typo. Table 2.1-1 is Data Quality Objectives Table. 2.1-2 is Monitoring Program Wells and Surface Water Sampling Points.	Correct, this is a typo. The footnote for Table 3.6-2 will be edited as follows: "Basis for type of monitoring can be found in the O&M Manual Volume 2 Table ~~2.1-1~~ 2.1-2 (Monitoring Program Wells and Surface Water Sampling Points) and 2.6-1 (Monitoring Program Wells and Surface Water Sampling Points for COPC Monitoring). These tables also provide a detailed accounting of monitoring objectives and associated analytes." See also response to comment 348 (DTSC-95).	Resolved.			Comment resolved.
348	DTSC-95	Design	Monitoring	Table 3.6-2	Plume Monitoring and COPC Monitoring	Table 2.1-2 of O&M Manual has expanded analytes and more detail than Table 3.6-2. What is the purpose of Table 3.6-2 which highlights limited wells and its corresponding analytes. Better to reference Table 2.1-2 for complete monitoring picture.	The header for the second column of Table 3.6-2 will be renamed as "Monitoring Objectives Summary" and will be assigned the footnote 1, as edited by the response to comment 347 (DTSC-94).	Resolved.			Comment resolved.
349	DTSC-87	Non-design	Monitoring	Figure 3.1-2	Figure 3.1-2	The chromium plume should be depicted as extending through well MW-46-175. Revision requested. MW-44 cluster should also be included on the section.	Well MW-46-175 was projected onto cross-	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					"…they are continuing to be evaluated through the design process and will be further modified during field installation."	The cited text suggests that well design details are still "continuing to be evaluated". Suggest revising the language as the design is nearly complete and, to DTSC's knowledge, no further pre-field assessments will occur. If additional work is currently underway or planned prior to field implementation, it should be clearly stated in the document. This comment applies to similar statements contained on other figures.	section A-A' for reference. Although the interpreted Cr(VI) plume does not extend as far north along the A-A' transect as MW-46-175, the plume can be expanded in this area as a conservative delineation. The MW-44 cluster will be projected onto cross-section A-A'. The "continuing to be evaluated" language will be replaced by "and may be modified during installation". The intent of this text was to indicate that the specifics of the well design may change during installation.				
350	DTSC-88	Non-design	Monitoring	Figure 3.1-5	Figure 3.1-5	Wells MW-13 and MW-37D should be removed from the figure as they are located too far from the cross-section line.	MW-13 and MW-37D will be removed from cross-section D-D'.	Resolved.			Comment resolved.
351	DTSC-89	Non-design	Monitoring	Figure 3.1-6	Figure 3.1-6	Well cluster MW-65 should be added to this section.	Well cluster MW-65 will be added to cross-section E-E'.	Resolved.			Comment resolved.
352	DTSC-90	Non-design	Monitoring	Figure 3.1-7	Figure 3.1-7	Well cluster MW-40 should be removed from the section as it is located too far from the cross-section line. MW-09 should be added due to its proximity.	Well cluster MW-40 was included as there were limited data points along this transect, but it will be removed to avoid misinterpretation. MW-09 will be added to cross-section F-F'.	Resolved.			Comment resolved.
353	DTSC-91	Design	Contingencies	Figure 3.3-1	Figure 3.3-1	Add Topock 2/3 and associated pipeline to pipeline schematic.	Addition will be made as requested.	Resolved.			Comment resolved.
354	DTSC-92	Design	Editorial	Figure 3.4-3	Figure 3.4-3	Delete "Conveyed by truck" from the legend as no planned route is currently presented. Otherwise revise the figure.	See revised Figure 3.4-3, included in **Attachment K** of the final RTC table.	Resolved.			Comment resolved.
355	DTSC-93	Design	Infrastructures	Figure 3.4-3	On-Site TU for flush water with pH <2.0 and as described in double asterisks.	Where is this "On-site Treatment Unit" located? Is it within the Remedy Produced Water Conditioning Plant, sounds like a TTU? Where are the specifications of this unit located in the design? Is it just pH adjustment as suggested by this figure?	The on-site treatment unit is a transportable treatment unit that would be located at or near the well that is being rehabilitated. As stated in Exhibit 3.4-3 of the 90% BOD, first flush water from well rehabilitation may be field neutralized and/or field filtered with a transportable treatment unit before disposal at TCS ponds, trucking offsite, or conveyed to the Remedy Produced Water Conditioning Plant.	Resolved.			Comment resolved.
Specific Comments – 90% BOD, Section 4: Integration of Sustainability Practices into Remedial Design and Implementation											

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
356	FMIT/TRC	Design	Remedial Design	Section 4	Entire section	This section is incomplete therefore it is difficult to make any meaningful assessment of this section. Is there a timeline regarding when the various elements of this Sustainability assessment will be completed? What will be the review process for the future elements of this part of the design documents?	This section discusses the framework for and presents the results of the integration of sustainability principles and practices into the design. Ten sustainability factors were identified as applicable for the Topock remedy design and implementation as well as IM decommissioning; these factors are listed on page 4-2 of the 90% BOD. For each sustainability factor, several BMPs were identified and tabulated in the Green Remediation Evaluation Matrix (GREM) (see Table 4.0-1). The BMPs listed in the GREM were incorporated into each design stage (30%, 60%, 90%); the design documents were reviewed and comments on by agencies, Tribes, and stakeholders. The GREM will be scored when implemented during remedy construction, IM decommissioning, and when the system is in operation.				
357	Hualapai/TRC	Design	Remedial Design	Section 4	Entire section	This section is incomplete therefore it is difficult to make any meaningful assessment of this section. Is there a timeline regarding when the various elements of this Sustainability assessment will be completed? What will be the review process for the future elements of this part of the design documents?	See above				
358	Cocopah/TRC	Design	Remedial Design	Section 4	Entire section	This section is incomplete therefore it is difficult to make any meaningful assessment of this section. Is there a timeline regarding when the various elements of this Sustainability assessment will be completed? What will be the review process for the future elements of this part of the design documents?	See above				
359	Chemehuevi/ TRC	Design	Remedial Design	Section 4	Entire section	This section is incomplete therefore it is difficult to make any meaningful assessment of this section. Is there a timeline regarding when the various elements of this Sustainability assessment will be completed? What will be the review process for the future elements of this part of the design documents?	See above				
Specific Comments – 90% BOD, Section 5: Institutional Controls, Anticipated Approvals, Permits, and Agreements											
360	DTSC-96	Design	Process	Section 5 Institutional Controls, Anticipated Approvals, Permits, and Agreements		This section should establish a monitoring procedure to verify appropriate land use to ensure that contaminated groundwater is not being used or influenced by other parties. PG&E should notify agencies immediately if groundwater well installation unrelated to the remedy is noticed on private or federal lands in the vicinity of the plume or remedy infrastructure.	EIR Mitigation Measure Cul-1a-3b requires the preparation of a Site Security Plan outlining instructions for performing inspections of the project site and notifying land owners and DTSC of human-	Resolved.	The DOI 2010 Groundwater Record of Decision addresses institutional controls on page 36 stating that "The institutional controls adopted		Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							caused disturbance to project facilities or significant cultural resources. *See* Sections 2.2 (Inspection) and 2.3 (Notification and Reporting) of the Site Security Plan, Appendix Q to the Construction/ Remedial Action Work Plan. In the course of performing its obligations under the Site Security Plan, if PG&E observes groundwater well installation unrelated to the remedy on private lands in the vicinity of the plume or remedy infrastructure, PG&E will notify DTSC and DOI. PG&E notes that there is limited private land ownership (PG&E, FMIT and BNSF property) within the footprint of the chromium plume and the areas outside the plume where control of groundwater flow directions and gradients is necessary to contain and remediate the chromium plume (see Figure 5.1-1 of the BOD). For the parcel owned by the FMIT, there is a Covenant and Environmental Restriction recorded, which prohibits the construction of water wells unrelated to the remedy until and unless DTSC and all other applicable governmental agencies approve such construction of wells. Additionally, PG&E and DTSC are discussing relevant institutional controls, including potential restrictions on water extraction unrelated to the remedy, at the Topock Compressor Station parcel. PG&E defers to DOI		by the Selected Remedy for the Site are specified in the BLM Lake Havasu Field Office Resource Management Plan issued in May 2007 and in the 1994 Lower Colorado River National Wildlife Refuges Comprehensive Management Plan. These plans restrict surface uses and use of the groundwater. Institutional controls will remain in place for the duration of the remedy until RAOs are achieved."		

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							regarding groundwater well installation on federal lands.				
361	DTSC-97	Non-design	Legal	Section 5, page 5-1, 3rd Paragraph	"It is PG&E's understanding, after discussion with DTSC and DOI, that with respect to the majority of privately-owned lands, access agreements from existing landowners are appropriate IC mechanisms."	Although DTSC agrees that access agreements may provide some protection over the remedy (especially if infrastructure is located within the private parcel or access is needed for further site investigations). Access agreement alone, however, may not be sufficient to meet the objective of preventing interference or degradation of the hydraulic influence from the remedy. Access agreements also will not prevent the installation of new groundwater wells on private properties. PG&E should carefully consider the type of IC or agreement needed for the protection of the remedy at each privately held parcel that may have effect on the remedy and negotiate the appropriate agreements needed.	See RTC #361 DTSC-97. Additionally, the need for and effectiveness of institutional controls for the remedy will continue to be evaluated in the future, including during 5-year reviews to be conducted by DTSC and DOI.	Resolved.			Comment resolved.
362	FMIT/TRC	Design	Remedial Design	Sect. 5.1.1, p. 5-1	Arsenic monitoring wells	The Tribes are aware of the California State Water Board's position related to arsenic in groundwater near the freshwater injection wells. However, the Tribes had no input on the Water Board's decision to construct sentinel wells at proscribed radii to monitor arsenic. The Tribes reiterate their need for consultation in the careful placement of these wells to avoid areas of cultural sensitivity.		Since DTSC is the lead agency for the cleanup project, Tribal concerns regarding the sensitivity of the areas for monitoring wells have been discussed throughout the design process. Also, the Tribes always had the option of providing specific comments on the State Water Board's decision in writing. DTSC recalls that the Tribes were not in favor of pretreating the Arizona water due to footprint of treatment plant, therefore DTSC must balance the need to monitor the effects of the injected water with the desire to not have treatment system on site.		Officials from DTSC assured the Interested Tribes and stakeholders that a waiver would be granted for the slight exceedance of arsenic concentrations in injection water. However, meetings and hearings were held outside of the Topock process, and well sites were selected outside of the stakeholder process that had endeavored for many years for transparency and cooperation. The Water Board apparently was not interested in transparency and cooperation, and did not include input from those that would be injured the most—the Native American Tribes.	DTSC response: DTSC disagrees with the statement that we assured Tribes that a waiver would be granted for the arsenic exceedance as the State Board evaluated PG&E's proposal for arsenic injection in California. DTSC also disagrees with the generalization that the process excluded Tribal input. In particular selection and siting of monitoring wells. Agencies fully discussed each well location and conducted several site walks with Tribal representatives to gather input and preferences on its locations.
363	Hualapai/TRC	Design	Remedial Design	Sect. 5.1.1, p. 5-1	Arsenic monitoring wells	The Tribes are aware of the California State Water Board's position related to arsenic in groundwater near the freshwater injection wells. However, the Tribes had no input on the Water Board's decision to construct sentinel wells at proscribed radii to monitor arsenic. The Tribes reiterate their need for consultation in the careful placement of these wells to avoid areas of cultural sensitivity.		See above		Comment noted. Once the remedy is operational, the issue of pretreating the Arizona water may arise again due to data gaps, and or changes in water components. Hualapai consider this TRC#363 to be un-resolved.	DTSC response: Tribal comment noted.

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364	Cocopah/TRC	Design	Remedial Design	Sect. 5.1.1, p. 5-1	Arsenic monitoring wells	The Tribes are aware of the California State Water Board's position related to arsenic in groundwater near the freshwater injection wells. However, the Tribes had no input on the Water Board's decision to construct sentinel wells at proscribed radii to monitor arsenic. The Tribes reiterate their need for consultation in the careful placement of these wells to avoid areas of cultural sensitivity.		See above		Officials from DTCS assured the Interested Tribes and stakeholders that a waiver would be granted for the slight exceedance of arsenic concentrations in injection water. However, meetings and hearings were held outside of the Topock process, and well sites were selected outside of the stakeholder process that had endeavored for many years for transparency and cooperation. The Water Board apparently was not interested in transparency and cooperation, and did not include input from those that would be injured the most—the Native American Tribes.	DTSC response: See RTC #362
365	Chemehuevi/ TRC	Design	Remedial Design	Sect. 5.1.1, p. 5-1	Arsenic monitoring wells	The Tribes are aware of the California State Water Board's position related to arsenic in groundwater near the freshwater injection wells. However, the Tribes had no input on the Water Board's decision to construct sentinel wells at proscribed radii to monitor arsenic. The Tribes reiterate their need for consultation in the careful placement of these wells to avoid areas of cultural sensitivity.		See above		Officials from DTCS assured the Interested Tribes and stakeholders that a waiver would be granted for the slight exceedance of arsenic concentrations in injection water. However, meetings and hearings were held outside of the Topock process, and well sites were selected outside of the stakeholder process that had endeavored for many years for transparency and cooperation. The Water Board apparently was not interested in transparency and cooperation, and did not include input from those that would be injured the most—the Native American Tribes.	fully discussed each well location
366	DTSC-98	Design	Editorial	5.1 Define Areas for Future Restrictions/ Page 5-2	"…but the recirculation water flowlines will not pass through the area outside of the IC boundary as	As currently modeled, some recirculation water will pass through the area outside the IC boundary shown on Figure 5.1-1 (see flow lines in appendix B). Revision of text is required.	The last sentence of the first bullet under Section 5.1 (Define Areas for Future Restrictions) will be revised as follows in response to this comment (modifications are shown in strikeout				Comment resolved based on proposed language changes.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					shown on Figure 5.1-1, based on the current remedy configuration."		[~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]: The closest potential domestic well location would eventually intercept the simulated freshwater injection flow lines, ~~regardless of the domestic well pumping rate, but the recirculation water flowlines will not pass through the area outside of the IC boundary as shown on Figure 5.1-1, based on the current remedy configuration.~~ <u>and possibly a small portion of recirculation water simulated flow lines, but the concentration of potential byproducts would be at background levels at this distance, based on transport modeling results presented in Section 7 of Appendix B.</u>				
367	DTSC-99	Design	Other	5.1 Define Areas for Future Restrictions/ Page 5-2	"Information obtained from the Topock Marina on Historic Route 66 during the first quarter 2013 indicates that they are planning to conduct exploratory drilling on their property in hope of locating a groundwater supply well that can produce about 2,000 gallons per minute for use as fire protection water at their facility. At the time of the 90% design, a 16-inch well has been	The bullet should be updated to add what is now known about the recently installed Marina well (Is it still in use? - Any plans for more wells? - What are the historic and planned extraction volumes? - etc.).	Information obtained from the Topock Marina on Historic Route 66 in April 2015 indicates that the Marina well is still in use for fire protection water at their facility. The well is capable of producing 1,700 gallons per minute. There is no plan to drill more wells at this time, however, the Marina still maintains this as an option. Text will be updated to reflect this information.	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					installed to supply fire protection water; this well is currently in use."						
368	DTSC-100	Design	Other	5.1 Define Areas for Future Restrictions/ Page 5-2	"Additional simulations will be conducted to verify the Category 1 ICs area if the remediation well configuration changes and as new hydraulic data collected prior to the remedy implementation are incorporated into the groundwater flow model."	This comment supports the need for a reliable groundwater model both during design and after the remedy is implemented. See DTSC general comment of the groundwater model above.	Comment noted.				
369	DTSC-101	Design	Monitoring	Section 5.1, page 5-3, end of first paragraph	"Simulated pumping at HNWR-1A at the nominal design flowrate also suggests that pumping at HNWR-1A also will not substantially adversely affect the production rates of existing nearby wells."	Please note that DTSC is not only concerned with the production rates of existing private wells, but also the quality of the water that is available for the well owners. PG&E should monitor the water quality surrounding freshwater well location to periodically assess if any there are any adverse quality and quantity impacts to existing wells around the area.	Comment noted. PG&E will implement a domestic/private water well monitoring program to evaluate potential effects the remedy could impart to private wells both chemically and hydraulically (see O&M Manual Volume 2, Section 5.4, and 60% RTC #709 DTSC-222).	Resolved.			Comment resolved.
370	DTSC-102	Non-design	Legal	Section 5.3.3, page 5-4, last sentence.	"PG&E plans to coordinate with the RWQCB regarding substantive requirements applicable to the use of the evaporation ponds at PG&E Topock Compressor Station for disposal of certain remedy produced water streams…"	Please note that the RWQCB has existing WDRs for the subject ponds. All material changes to the ponds including improvements and waste discharge will require a modification of the existing WDRs as agreed upon between DTSC, RWQCB, DOI and PG&E. Furthermore, substantive changes may also require CEQA considerations.	Comment noted. PG&E is coordinating with the RWQCB on the substantive requirements for use of the ponds for disposal of remedy-produced water streams. PG&E is currently developing a Report of Waste Discharge for purposes of amending the existing WDRs. PG&E understands further CEQA evaluation would be required if there are new or substantially more severe impacts than those already disclosed in prior	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							environmental review, but does not anticipate such impacts.				
Specific Comments – 90% BOD, Section 6: Compliance with ARARs and EIR Mitigation Measure Monitoring Program											
371	DTSC-103	Non-design	Editorial	Section 6.1, last sentence of 2nd paragraph	"… these reports are available on the project SharePoint site."	SharePoint site is a working repository of documents for reviewing parties. When the design is finalized and approved. This design becomes record as with any document referenced. If PG&E is not expecting to maintain the SharePoint Site in perpetuity, it is recommended that this statement and the hyperlink be removed.	The hyperlink to the SharePoint site was included in the 90% document for ease of retrieval/access to the cited reports by reviewing parties. The cited text will be removed in the Final Design.	Resolved.			Comment resolved.
372	DTSC-104	Non-design	Request for Information	Section 6.1, 3rd paragraph	CIMP	Please reference the location of the CIMP in the design document (i.e. C/RAWP Appendix H).	The following text will be added before the last sentence of the 3rd paragraph of Section 6.1: "The CIMP (with IM-3 Decommissioning Plan) is included in Appendix H of the C/RAWP".	Resolved.			Comment resolved.
373	FMIT/TRC RTC, 60% #260 & #263	Non-design	Monitoring	6.1/6-1		Tribal response was "*The Tribes would request that as sound monitoring details are resolved, the usage of the Topock area as a location of deep spiritual meaning and associated usage would be taken into account to the fullest extent possible.*" This will be an ongoing process and it will be important to continue this dialogue during the construction and operation phases.	Comment noted. See RTC #23 FMIT-9 (addressing noise protocols) and RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/ TRC, and #47 Chemehuevi/TRC (addressing communications generally).		Comment noted.	Comment noted. However, this will be an ongoing dialogue and therefore this comment is considered unresolved.	
374	Hualapai/TRC RTC, 60% #260 & #263	Non-design	Monitoring	6.1/6-1		Tribal response was "*The Tribes would request that as sound monitoring details are resolved, the usage of the Topock area as a location of deep spiritual meaning and associated usage would be taken into account to the fullest extent possible.*" This will be an ongoing process and it will be important to continue this dialogue during the construction and operation phases.	See above		See above	Comment noted. However, this will be an ongoing dialogue and therefore this comment is considered unresolved.	
375	Cocopah/TRC RTC, 60% #260 & #263	Non-design	Monitoring	6.1/6-1		Tribal response was "*The Tribes would request that as sound monitoring details are resolved, the usage of the Topock area as a location of deep spiritual meaning and associated usage would be taken into account to the fullest extent possible.*" This will be an ongoing process and it will be important to continue this dialogue during the construction and operation phases.	See above		See above	Comment noted. However, this will be an ongoing dialogue and therefore this comment is considered unresolved.	
376	Chemehuevi/ TRC RTC, 60% #260 & #263	Non-design	Monitoring	6.1/6-1		Tribal response was "*The Tribes would request that as sound monitoring details are resolved, the usage of the Topock area as a location of deep spiritual meaning and associated usage would be taken into account to the fullest extent possible.*" This will be an ongoing process and it will be important to continue this dialogue during the construction and operation phases.	See above		See above	Comment noted. However, this will be an ongoing dialogue and therefore this comment is considered unresolved.	
377	FMIT/TRC RTC, 60% #261	Non-design	Monitoring	6.1-6-1		Tribal response was "*Tribal concerns regarding noise may be different than applied regulatory standards. The Tribes would like to continue a dialogue with the agencies to further clarify the nature of noise and vibration impacts.*" This will be an ongoing process and it will be important to continue this dialogue during the construction and operation phases.	PG&E defers to the Agencies for response to the Tribes' request to continue a dialogue with the Agencies.	As stated in response to RTC #44, DTSC intent to continue meetings with stakeholders and Tribes throughout the project. If Tribes	Although it is anticipated that ongoing communication will occur during construction & operation, DOI would like to gain	Comment noted. However, this will be an ongoing dialogue and therefore this comment is considered unresolved.	

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
								have specific concerns regarding noise and vibration impacts, DTSC encourages the Tribes to provide input for consideration as part of the CEQA EIR process.	an understanding of the expected outcome of the dialogue.		
378	Hualapai/TRC RTC, 60% #261	Non-design	Monitoring	6.1-6-1		Tribal response was "*Tribal concerns regarding noise may be different than applied regulatory standards. The Tribes would like to continue a dialogue with the agencies to further clarify the nature of noise and vibration impacts*." This will be an ongoing process and it will be important to continue this dialogue during the construction and operation phases.	See above	See above	See above	Comment noted. However, this will be an ongoing dialogue and therefore this comment is considered unresolved.	
379	Cocopah/TRC RTC, 60% #261	Non-design	Monitoring	6.1-6-1		Tribal response was "*Tribal concerns regarding noise may be different than applied regulatory standards. The Tribes would like to continue a dialogue with the agencies to further clarify the nature of noise and vibration impacts*." This will be an ongoing process and it will be important to continue this dialogue during the construction and operation phases.	See above	See above	See above	Comment noted. However, this will be an ongoing dialogue and therefore this comment is considered unresolved.	
380	Chemehuevi/ TRC RTC, 60% #261	Non-design	Monitoring	6.1-6-1		Tribal response was "*Tribal concerns regarding noise may be different than applied regulatory standards. The Tribes would like to continue a dialogue with the agencies to further clarify the nature of noise and vibration impacts*." This will be an ongoing process and it will be important to continue this dialogue during the construction and operation phases.	See above	See above	See above	Comment noted. However, this will be an ongoing dialogue and therefore this comment is considered unresolved.	
381	DOI-5	Non-design	Other	6.2/6-2		A brief description and discussion of the Appropriate Use Analysis and Compatibility Determination (Table 6.2-1A) should be provided.	The following text will be added to Section 6.2: "The National Wildlife Refuge System Administration Act as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 USC §§ 668dd-ee, 50 CFR Part 27) was identified by DOI as a Location-Specific ARAR that is Applicable to the project (Item #7 in Table 2 of the ROD). The ROD states that "This Act governs the use and management of National Wildlife Refuges. The Act requires that FWS evaluate ongoing and proposed activities and uses to ensure that such activities are appropriate and compatible with both the mission of the overall National Wildlife Refuge System, as well as the specific purposes for which the Havasu National Wildlife Refuge		DOI agrees with the additional text.		DOI and USFW will continue to work with PG&E regarding the AUA /CD for the HNWR and associated mitigation.

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							was established . . . ." and that "[a]s the Selected Remedy is designed and implemented, DOI will continue to consult with USFWS to ensure that proposed activities remain appropriate and compatible with the Refuge mission." As requested by DOI during the 60% RTC process, information to facilitate the HNWR's Appropriate Use Analysis and Compatibility Determination is memorialized in Table 6.2-1A. Specific information included in Table 6.2-1A includes the proposed actions/facilities, where, when, and how the use would be conducted, what the anticipated impacts will be, planned mitigation for the loss of functional value of refuge while use is in operation, how and when the actions/facilities will be closed out, and any contingency plans that will be in place."				
382	FMIT/TRC	Non-design	Request for Information	TABLE 6.1-1 Summary of Compliance with EIR Mitigation Measures Biological Resources Bio 3a	No further action is required. The pre-final (90%) design does not include a river water intake structure.	Please indicate if future provisional freshwater sources could include a river water intake or has this been removed from consideration throughout the remedy entirely?	A river water intake is no longer considered as a potential source of freshwater for the remedy.		DOI concurs with PG&E's response.	Noted.	
383	Hualapai/TRC	Non-design	Request for Information	TABLE 6.1-1 Summary of Compliance with EIR Mitigation Measures Biological Resources Bio 3a	No further action is required. The pre-final (90%) design does not include a river water intake structure.	Please indicate if future provisional freshwater sources could include a river water intake or has this been removed from consideration throughout the remedy entirely?	See above		See above	Noted.	
384	Cocopah/TRC	Non-design	Request for Information	TABLE 6.1-1 Summary of Compliance	No further action is required. The pre-final (90%)	Please indicate if future provisional freshwater sources could include a river water intake or has this been removed from consideration throughout the remedy entirely?	See above		See above	Noted.	

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				with EIR Mitigation Measures Biological Resources Bio 3a	design does not include a river water intake structure.						
385	Chemehuevi/ TRC	Non-design	Request for Information	TABLE 6.1-1 Summary of Compliance with EIR Mitigation Measures Biological Resources Bio 3a	No further action is required. The pre-final (90%) design does not include a river water intake structure.	Please indicate if future provisional freshwater sources could include a river water intake or has this been removed from consideration throughout the remedy entirely?	See above		See above	Noted.	
386	DTSC-105	Design	Editorial	Table 6.2-1, Item 1, Page 6-67	"Although concentrations of Cr(VI) and in-situ byproducts (e.g., arsenic, manganese) may fluctuate within the treatment area during remedy implementation, institutional controls will prevent use of affected groundwater as a drinking water source until the remedy is complete."	Request revision of the cited sentence as follows to address fresh water arsenic injection and overall monitoring approach, "Although concentrations of Cr(VI), freshwater arsenic, and in-situ byproducts (e.g., arsenic, manganese) will increase or may fluctuate ~~within the treatment area~~ during remedy implementation, institutional controls will prevent use of affected groundwater as a drinking water source until the remedy is complete and elevated concentrations have reverted back to values below MCLGs, MCLs, RAOs, or background concentrations." Similar edits should be made to Item No. 99 in Table 6.2-1.	PG&E suggests potential edits (in green) to DTSC's edits: "Although concentrations of Cr(VI), ~~freshwater~~ arsenic from freshwater injection, and in-situ byproducts (e.g., arsenic, manganese) should ~~will~~ increase or fluctuate within or immediately adjacent to the plume. ~~within the treatment area~~ During remedy implementation, institutional controls will prevent use of affected groundwater as a drinking water source until the remedy is complete. At the completion of the remedy, any elevated concentrations resulting from PG&E's activities should have reverted back to values below MCLGs that are set at levels above zero, MCLs, RAOs, or background concentrations."	Resolved.			Comment resolved.
387	DTSC-106	Design	Editorial	Table 6.2-1, Item 2, Page 6-68	"Modeling indicates that arsenic concentrations that may temporarily be elevated by the generation from in-situ remediation and freshwater injection are	Edit cited sentence as follows, "Modeling indicates that elevated arsenic concentrations ~~that may temporarily be elevated by the~~ generated from in-situ remediation and freshwater injection are localized, will attenuate under site conditions and will return to preremedy baseline levels several years after the end of active remediation and the cessation of freshwater injection, respectively." Similar edits should be made to ARARs No. 99 100, and 101 in Table 6.2-1. Also, See requested insert language from Table 6.2-1, Item 1 above to extend sentence ending with … "until the remedy is complete."	PG&E proposes potential edits (in green) to DTSC's edits: "Modeling indicates that elevated arsenic concentrations ~~that may temporarily be elevated by the~~ generated from in-situ remediation and freshwater injection are localized, will attenuate	Resolved.			Comment resolved.

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					localized, will attenuate under site conditions and will return to preremedy baseline levels after the end of active remediation and the cessation of freshwater injection, respectively."		under site conditions and will return to preremedy baseline levels ~~several~~ approximately 10 years after the end of active remediation and the cessation of freshwater injection, respectively." Similar edits will be made to ARARs No. 99, 100, and 101.				
388	DOI-6	Non-design	Editorial	Table 6.2-1, Item 40, 90% design compliance status	The Final Groundwater Remedy PBA was prepared to support informal consultations for actions to be conducted under the remedial action, including activities located on BLM and U.S. Fish and Wildlife Service administered lands. Coordination with USFWS, BLM, and DOI on the PBA had occurred. This ESA Section 7 consultation was concluded with receipt of USFWS concurrency letter on July 7, 2014 which preceded the approval of the Construction/Remedial Action Work Plan.	Please modify text to the following: The Final Groundwater Remedy PBA was prepared to support informal consultation for actions to be conducted under the remedial action, including activities located on BLM and U.S. Fish and Wildlife Service administered lands. Coordination with USFWS, BLM, and DOI on the PBA occurred. This ESA Section 7 consultation was concluded with receipt of USFWS concurrence letter on July 7, 2014 which preceded the approval of the Construction/Remedial Action Work Plan.	Text will be modified as requested.		Accepted.		Comment resolved pending DOI review of the final design documents.
389	DOI-7	Non-design	Editorial	Table 6.2-1, Item 41, 90% design compliance status	PG&E submitted the Final Bird Impact Avoidance and Minimization Plan (CH2M Hill, 2014d) on April 30, 2014.	Please modify the text as follows: Regarding decommissioning activities, another Avoidance and Minimization Plan will be based on surveys conducted prior to decommissioning, and during the breeding season; therefore this Plan will be prepared in the future, prior to decommissioning.	Text will be modified as requested.		Accepted.		Comment resolved pending DOI review of the final design documents.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					The plan is also included as an appendix of the Construction/Remedial Action Work Plan, and Appendix I of the IM-3 Decommissioning Work Plan. Regarding decommissioning activities, the Avoidance and Minimization Plan will be based on surveys conducted prior to decommissioning, and during the breeding season; therefore this Plan will be prepared in the future, prior to decommissioning.						
390	DTSC-107	Design	Editorial	Table 6.2-1, Item 52, Page 6-69	"The State MCL for Cr(VI) is 10 µg/L. The RAO has been established based on the regional background concentration of 32 µg/L at the conclusion of remedy implementation."	Edit cited sentence as follows, "The State MCL for Cr(VI) is 10 µg/L, but the RAO has been established based on the regional alluvial aquifer background concentration of 32 µg/L at the conclusion of remedy implementation." Similar edits should be made to ARARs No. 99 in Table 6.2-1. Also, See requested insert language from Table 6.2-1, Item 2 above.	PG&E proposes potential edits (in green) to DTSC's edits: "The State MCL for Cr(VI) is 10 µg/L, but the RAO has been established based on the regional Alluvial Aquifer background concentration of 32 µg/L at the conclusion of remedy implementation." Similar edits will be made to ARARs No. 99 in Table 6.2-1.	Resolved.			Comment resolved.
391	DTSC-108	Design	Editorial	Table 6.2-1, Item 55, Page 6-70	"Groundwater and vadose zone protection standards – Title 22, CCR, Div 4.5, Ch 15, Article 6, §66265.94"	Article 6 regulations (for both ISD and permitted facilities) are only applicable to specific regulated units, such as particular hazardous waste land farms, waste piles, surface impoundments, and landfills. These specific regulations do not apply to the RCRA corrective action that is being conducted at the site. Suggest acknowledging that it does not apply.	Item #55 was identified by DOI as a California Chemical-Specific ARAR that is Applicable to the project (Table 2 of the ROD). PG&E defers to DOI for response to this comment.	Resolved.	These specific regulations do not currently apply to the RCRA corrective action that is being conducted at the site. Table 6.2-1 should be modified to reflect this.		Comment resolved.
392	DTSC-109	Design	Editorial	Table 6.2-1, Item 46, Page	"Construction of wells in	It is believed the cited sentence should be revised to read, "Construction of ~~wells~~ treatment plant in Arizona"	Revision will be made as requested.	Resolved.			Comment resolved.

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				6-77	Arizona"						
393	DTSC-110	Design	Editorial	Table 6.2-1, Item 81, Page 6-84	"Corrective Action - Title 22, CCR, Div 4.5, Ch 14, Article 6, §66264.100 (a) through (d), (f), (g)(1), and (h)"	Article 6 regulations (for both ISD and permitted facilities) are only applicable to specific regulated units, such as particular hazardous waste land farms, waste piles, surface impoundments, and landfills. These specific regulations do not apply to the RCRA corrective action that is being conducted at the site. Suggest acknowledging that it does not apply. Same can be said for Items No. 91, 92, 93, and 94.	Items #81, 91, 92, 93, and 94 were identified by DOI as California Action-Specific ARARs that are Relevant and Appropriate to the project (Table 2 of the ROD). PG&E defers to DOI for response to this comment.	Resolved.	These specific regulations do not currently apply to the RCRA corrective action that is being conducted at the site. Table 6.2-1 should be modified to reflect this.		Comment resolved.
394	DTSC-111	Design	Editorial	Table 6.2-1, Item 83, Page 6-85	"Closure and postclosure care –Title 22, CCR, Div 4.5, Ch 14, Article 7, §66264.111, §66264.112, §66264.115 through 120"	The closure and post-closure regulations (Title 22, Article 7) regulations are only applicable to specific hazardous waste management facilities. These specific regulations do not apply to the RCRA corrective action that is being conducted at the site. Suggest acknowledging that it does not apply.	Item #83 was identified by DOI as a California Action-Specific ARAR that is Applicable to the project (Table 6.2-1 of the 90% BOD). PG&E defers to DOI for response to this comment.	Resolved.	These specific regulations do not currently apply to the RCRA corrective action that is being conducted at the site. Table 6.2-1 should be modified to reflect this.		Comment resolved.
395	DTSC-112	Design	Editorial	Table 6.2-1, Item 86, Page 6-88	"It is not anticipated that long-term storage of soil requiring construction of a waste pile meeting Chapter 14, Article 12 requirements for soil exhibiting RCRA hazardous waste characteristics will occur."	Revise the cited sentence as follows:, "~~It is not anticipated that l~~Long-term storage of soil requiring construction of a waste pile meeting Chapter 14, Article 12 requirements for soil exhibiting RCRA hazardous waste characteristics will not occur." If a RCRA Waste Pile were to be established, it would invoke a number of permitting regulations, including installing new wells to establish a new groundwater monitoring program specific to the regulated unit (i.e., waste pile).	Revision will be made as requested.	Resolved.			Comment resolved.
396	DTSC-113	Design	Editorial	Table 6.2-1A, Page 6-109	"An updated project schedule will be included in the 90% design and the future Remedial Action Work Plan.."	The cited sentence should be deleted.	The cited sentence will be deleted.	Resolved.			Comment resolved.
397	DOI-8	Non-design	Other	Table 6.2-1a, 6-109	The Construction/ Remedial Action Work plan includes a Habitat Restoration Plan in compliance with the CD Appendix C (Scope of Work), Article	While the Habitat Restoration Plan addresses new impacts to federal property (both BLM managed and HNWR) in California, the plan does not address the ongoing impacts from remedy implementation to the HNWR in Arizona. Previous discussions with PG&E indicated a willingness to consider further restoration on the Refuge to mitigate for the ongoing use of the wells in Arizona yet no proposal is provided in the plan. DOI requests that PG&E meet with the federal agencies to reach agreement on these measures and that the resolution be included in the RTCs and revised plans as well as noted in the specified table. A habitat restoration plan exists for the Sacramento Wash area of the HNWR that could be used to assist PG&E and DOI/USFWS in determining appropriate mitigation measures.	PG&E will coordinate with DOI and USFWS regarding mitigation measures to address impacts from remedy implementation to the HNWR in Arizona and will include any agreed upon measures in the Habitat Restoration Plan.		Resolved.		DOI and USFW will continue to work with PG&E regarding the AUA /CD for the HNWR and associated mitigation.

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					3. This plan has been prepared…						
Specific Comments – 90% BOD Section 7: Project Delivery Strategy/Updated Schedule											
398	MWD	Non-design	Editorial	Sect. 7.4/ 7-9	Criteria for Approval of IM-3 Decommissioning	Metropolitan's Comment No. 10 on the 60% Design questioned the need to state that DTSC may decide that decommissioning of IM-3 facilities could occur prior to OPS. In response, DTSC explained that it may consider timing of the decommissioning activities in advance of OPS determination when the remedy demonstrates reasonable success but with clear evidence of protection of the Colorado River. However, DTSC will provide notice to all stakeholders of the intent to decommission the IM-3 plant prior to approval to implement the IM-3 decommissioning plan . . . ." This language is missing from Section 7.4 and should be added as shown to the following text on page 7-9: "b) DTSC determines that the groundwater remedy is 'operating properly and successfully' (OPS) (unless DTSC determines, at its lawful discretion, that such decommissioning can occur prior to DTSC's OPS determination, in which case DTSC will provide notice to all stakeholders of the intent to decommission the IM-3 plant prior to approval to implement the IM-3 decommissioning plan)."	Item b in Section 7.4 text will be revised as requested (modifications are shown in underline [<u>underline</u>; for text addition]) : b) DTSC determines that the groundwater remedy is 'operating properly and successfully' (OPS) (unless DTSC determines, at its lawful discretion, that such decommissioning can occur prior to DTSC's OPS determination, <u>in which case DTSC will provide notice to all stakeholders of the intent to decommission the IM-3 plant prior to approval to implement the IM-3 decommissioning plan</u>).				Comment resolved.
Specific Comments – 90% BOD Section 8 and Appendix H: Updated Cost Estimate (Comments on this Appendix are combined with those on the Construction/Remedial Action Work Plan Appendix E as they are the same cost estimate)											
399	DOI-225	Non-design	Cost estimates	Purpose of Estimate/1		This paragraph should reference the financial assurance/performance guarantee cited in the Consent Decree.	The following modification will be made (modifications are shown in underline [<u>underline</u>; for text addition]): **Purpose of Estimate** PIVOX Corporation has prepared this construction cost estimate for the 90% (Pre-Final) Design of the PG&E Topock Compressor Station (the Site) final groundwater remedy (the Remedy). The estimate is intended to represent the budgetary cost of the Remedy at the 90% Design stage, to support PG&E's financial assurance certification for the Project as required by California Code of Regulations Title 22, Sections 66264 and 22.66265<u>, and to</u>		Accepted.		Comment resolved.

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							address the requirements of Section XIII, Performance Guarantee, of the Remedial Design/Remedial Action Consent Decree, Civil No. 5:13-cv-00074-BRO-OP.				
400	DOI-226	Non-design	Cost estimates	MMRPs/Oversight, and Institutional Controls/12		The text should reference the PA, CHPMP and PBA as well.	The following modification will be made (modifications are shown in underline [underline; for text addition]): **MMRPs, Oversight and Institutional Controls** Implementation of specific biological, cultural, and environmental controls during construction of the remedy is required by the Project EIR, the MMRP, the PA (BLM 2010), the CHPMP (BLM 2012), and the PBA (CH2M HILL 2014). Costs associated with implementation of MMRP were estimated by the design team during development of MMRP activities. The 90% Design estimate primarily compiled these costs as directed by the design team. The estimate for this task includes costs associated with the formation and continued operation of the Technical Review Committee. **References**: Bureau of Land Management. 2010. Programmatic Agreement Among the Bureau of Land Management, Arizona State Historic Preservation Officer, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation for the Topock Remediation Project in San		Accepted.		Comment resolved.

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							Bernardino County, California, and Mohave County, Arizona. October. _______. 2012. Cultural and Historic Properties Management Plan, PG&E Topock Compressor Station, Needles, California. January 20. CH2M HILL. 2014. Programmatic Biological Assessment, Pacific Gas and Electric Company, Topock Compressor Station, Final Groundwater Remedy. April, 28.				
401	DOI-227	Non-design	Cost estimates	Attachment D		The estimate for regulatory oversight during construction appears inadequate. Please provide further detail regarding the estimate assumptions to the agencies to account for this cost.	Based on an analysis of recent regulatory oversight (DTSC and DOI) costs for the Topock remediation program, PG&E estimates that DTSC and DOI oversight will cost approximately $2.4M annually ($1.5M for DTSC, and $0.9M for DOI) for the overall Topock program during the years where GW remedy construction is occurring. This total includes all regulatory oversight, not just oversight associated with the groundwater remedy. PG&E estimates that during GW remedy construction, approximately one third of this total regulatory oversight spend will be associated with specific DTSC and DOI oversight of the GW remedy construction project, or $0.5M for DTSC and $0.3M for DOI, (total $0.8M annually). PG&E will revise this line item of the remedy cost estimate with the updated values. The revised estimate will be based on $800K annual		DOI concurs with the response.		Comment resolved.

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							spent over four years. Spend period assumes a 3 year construction period (as described in C/RAWP), plus 6 months before and after construction to account for oversight activities before mobilization and after completion of construction field activities. This will add approximately $2.9M in costs to the 90%/Supplemental design costs.				
402	DTSC-114	Non-design	Cost estimates	General	Contingency %	The contingency was reduced from the 15% used in the 60% design to 5% in the 90% design. The contingency should be returned to 15%. DTSC guidance is to use a contingency of 10-20%. There is enough uncertainty and the level of effort required for this site justifies the upper portion of this range. We also note the CE does not include costs for provisional wells or contingent actions (FWPTS).	The cost estimate will be revised with an across-the-board contingency factor of 15%. This will add approximately $14.9M in contingency costs to the 90%/Supplemental design costs. The text of Appendix H, Estimate Contingencies and Markups, will also be revised to address this comment.	Resolved.			Comment resolved.
403	DTSC-115	Non-design	Cost estimates	Task 1.3	# of wells	The number of wells included in the back-up documentation provided does not match the number of wells included in the 90% BOD, several IRZ injection wells appear to be missing. Also, the cost estimate should include installation of all contingent wells as that would constitute the worst case scenario, which is required for determining financial assurance.	All new wells are accounted for in the cost estimate. The difference in well counts between Drawing Sheet C-00-03 and the cost estimate is due to the counting method used for Dual-Screen Injection Well Clusters at the IRZ. These are counted as 2 wells on the drawing sheet, but were counted them as single well in the cost estimate. Contingent wells (referred to as future provisional wells in the design) were not included in the original cost estimate. The cost estimate has been revised to include this cost. If counted as a single unit (following the counting method for new intermediate wells	Resolved.			Comment resolved.

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							previously used in the cost estimate), there would be 22 future provisional injection wells and 5 future provisional extraction wells. The total additional cost for these 27 future provisional wells is approximately $18.8M prior to markup/ overhead/profit. The text of Appendix H, Section 1.3 will also be revised to address this comment.				
404	DTSC-116	Non-design	Cost estimates	General	Regulatory oversight	Cost for regulatory oversight included in the MMRP of $300,000 appears inadequate for DTSC oversight over the construction phase of the project. We note oversight costs for O&M activities are included separately.	See RTC #401 DOI-227. This will add approximately $2.9M in costs to the 90%/ Supplemental design costs.				
405	DTSC-117	Non-design	Cost estimates	Discount rate	Discount factor of 3.17% used	This is not consistent with DTSC's method of calculating Present Value using the Real Interest Rate listed in the Office of Management and Budgets (OMB) Circular A-94, Appendix C, currently listed as 1.4%, for all present worth calculations.	Section 8, Exhibit 8.1 will be revised using an interest rate of 1.4% for the 90%/Supplemental design cost estimate. The additional costs discussed in the other comments (i.e.: 4, 5, 6, 7, 9) will be included prior to applying the 1.4% interest rate. This will result in adding $32M to the calculated present value.				
406	DTSC-118	Non-design	Cost estimates	Post-Remedy Closeout		The cost does not include submission of reports to DTSC for review and approval which are necessary to complete close-out.	A line item with a value of $250,000 will be included in the post-remedy closeout estimate to account for close-out reporting preparation, submittal, and review. This task cannot be estimated precisely, as these costs would be incurred up to 50 years after remedy implementation, and reporting requirements, level of effort, and associated labor/materials costs cannot be accurately estimated. The post-remedy closeout estimate also includes a 25% contingency to				

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							reflect the uncertainty of this work.				
Specific Comments – 90% BOD Appendix A3: Mapping of OHWM and USACE/CDFW Jurisdictional Areas											
407	FMIT/TRC	Non-design	Request for Information	Append A3 Mapping of OHWM and USACE/CDFW Jurisdictional Areas	Pursuant to Mitigation Measure AES-2a, "A minimum setback requirement of 20 feet from the water (ordinary high water mark) shall be enforced, except with regard to any required river intake facilities, to prevent substantial vegetation removal along the riverbank."	It appears that the placement of remedial infrastructure is based on being 20 feet back from OHWM. Please discuss if any of the infrastructure will be within the 100-year flood levels and if so how will the infrastructure be designed in the case that it is inundated with water?	Figure 2.4-4 of the BOD overlays the remedial infrastructure on a map of jurisdictional waters and wetlands. The following infrastructure is located in the 100-year floodplain: **Arizona -** Freshwater supply well HNWR-1A, contingent Site B well, associated equipment, and a portion of Pipeline B *All well heads (stick-ups) and equipment pads are designed to be above the regulatory base flood elevation of 465.3 feet NAVD. Pipeline B is belowground and does not require prevention or control of inundation by water.* **California -** Riverbank extraction well RB-5, monitoring well MW-W, a portion of Pipeline C, and a portion of the ring road in the floodplain *The 100-year flood elevation is 464' above MSL. The Riverbank extraction wells are placed at locations where the ground surface is above 464', though portions of the well vault and pipelines are located below that elevation. We do not expect significant volumes of water to enter the well vaults from the bottom of the vault due to rising water levels. The vaults include level switches to discontinue operation of the well if enough water enters the well vault. The southern portion of pipeline C to the crossing under National Trails Hwy (pipeline C Sta.*			Noted.	

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							17+00 to 27+00) will be constructed below ground and below 464 feet. The pipelines do not require any measures to protect the pipes from inundation of water.				
408	Hualapai/TRC	Non-design	Request for Information	Append A3 Mapping of OHWM and USACE/CDFW Jurisdictional Areas	Pursuant to Mitigation Measure AES-2a, "A minimum setback requirement of 20 feet from the water (ordinary high water mark) shall be enforced, except with regard to any required river intake facilities, to prevent substantial vegetation removal along the riverbank."	It appears that the placement of remedial infrastructure is based on being 20 feet back from OHWM. Please discuss if any of the infrastructure will be within the 100-year flood levels and if so how will the infrastructure be designed in the case that it is inundated with water?	See above			Noted.	
409	Cocopah/TRC	Non-design	Request for Information	Append A3 Mapping of OHWM and USACE/CDFW Jurisdictional Areas	Pursuant to Mitigation Measure AES-2a, "A minimum setback requirement of 20 feet from the water (ordinary high water mark) shall be enforced, except with regard to any required river intake facilities, to prevent substantial vegetation removal along the riverbank."	It appears that the placement of remedial infrastructure is based on being 20 feet back from OHWM. Please discuss if any of the infrastructure will be within the 100-year flood levels and if so how will the infrastructure be designed in the case that it is inundated with water?	See above			Noted.	
410	Chemehuevi/ TRC	Non-design	Request for Information	Append A3 Mapping of OHWM and USACE/CDFW Jurisdictional Areas	Pursuant to Mitigation Measure AES-2a, "A minimum setback requirement of 20 feet from the water (ordinary high	It appears that the placement of remedial infrastructure is based on being 20 feet back from OHWM. Please discuss if any of the infrastructure will be within the 100-year flood levels and if so how will the infrastructure be designed in the case that it is inundated with water?	See above			Noted.	

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					water mark) shall be enforced, except with regard to any required river intake facilities, to prevent substantial vegetation removal along the riverbank.”						
Specific Comments – 90% BOD Appendix B: Development of Groundwater Flow, Geochemical, and Solute Transport Models											
411	DTSC-119	Design	Editorial – GW Modeling	General		DTSC is concerned with the numerous groundwater modeling comments prepared by agencies and Tribes that touch on both the flow model as well as the fate and transport component. It is imperative that the model be improved to assist with future project decisions and ensure past ones were appropriate. DTSC concerns with the fate and transport modeling (e.g., byproduct mobility and persistence) have been documented as far back as the 30% and CMS stages of the remedy. Recent comments raise some of the same DTSC concerns from the past. These recent 90% comments coupled with the underestimation of byproduct migration (e.g., manganese) at PG&E Hinkley Compressor Station solidifies agency concerns. It would be a serious detriment to the project, including the schedule, should current conclusions made with the existing model change significantly. PG&E should make resolution of groundwater modeling comments a high priority.	Comment noted. For clarification byproduct Manganese was not discretely modeled at the PGE Hinkley Compressor Station, however the observed Mn at Hinkley was one of the key reasons Mn modeling was incorporated into the PGE Topock modeling.				
412	DOI-9	Non-design	GW Modeling	2.3/7	The groundwater at the Site is a sodium chloride-dominated type with a highly variable total dissolved solid (TDS), varying from about 1,000 milligrams per liter (mg/L) to greater than 10,000 mg/L, with the most frequent values ranging between about 4,000 (33rd percentile) to 7,000 mg/L (66th percentile) and a median value of about 5,000 mg/L based on the most recent site-wide TDS data collected through 12/31/2013In general, higher TDS levels are	A common problem with predicting density dependent flow is that the very high TDS concentrations can lead to errors in the calculations of equivalent freshwater heads due to the density (and even temperature) gradients within the monitoring wells. When the inward gradients created by the capture wells are so low (.001 to .003) please explain how the uncertainties associated with the density corrections are being addressed in the capture zone assessment?	PG&E has been monitoring water levels in the floodplain and applying density corrections (on the basis of salinity as well as temperature) to the data throughout the operation of IM-3. Though it is acknowledged that there are uncertainties associated with any form of density correction, the current method has been accepted by other technical reviewers over the course of the project and the calculated freshwater heads over time were used to calibrate the groundwater model. The inward gradient targets were assigned on the basis of the distribution of these calculated heads, and therefore the modeling and monitoring are internally consistent. Any alteration in freshwater head calculation would simply shift model, monitoring,		Accepted.		Comment resolved pending DOI review of the final design documents.

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					encountered in areas closer to the Colorado River and near the alluvium bedrock interface.		and target metrics in a similar way. See response to comment 733 for more information about density corrections.				
413	FMIT/TRC	Non-design	GW Modeling	Append B 3.3/ Page 15.	"The currently proposed design includes continuous operation of injection wells along the IRZ, which will allow for significantly higher injection volumes and greater radii of influence than could be achieved with the point injection method that was applied during the floodplain ISPT."	Was the seasonal variation in river stage (and associated fluctuations of groundwater in wells near the river) considered in maintaining hydraulic control for the final proposed 6/18 month on/off IRZ cycle (which will likely adjust based on "adaptive" decisions in the OM monitoring decision framework diagrams)? For example, during spring/summer - high river stage will cause heads to rise notably at extraction wells – which will reduce the gradient across the IRZ (even reversing it?). Did any of the optimization or sensitivity simulations consider benefits of maintaining a constant gradient across the IRZ year-round by adjustments to IRL and/or River extraction wells? Could the time to complete remediation be reduced in this way?	As described in Appendix B Section 7.4 the seasonal variation in river stage was considered with respect to the transport modeling and hydraulic control. Despite the seasonal stage fluctuations there was not a significant difference between the transient and the steady state flow and transport modeling. River stage and water levels will still be monitored to gauge relative impacts of local gradient fluctuations. Despite fluctuations in river stage, the groundwater flux through the NTH IRZ is primarily controlled through upgradient injection in IRL and FW injection wells, and to a lesser extent the riverbank extraction wells located downgradient. It is not anticipated that the river stage variation will have a significant impact on the flux through the NTH IRZ during both the on and off cycles of the NTH IRZ. Additionally, the overall remedial timeframe is controlled by the alluvial aquifer upgradient of the NTH IRZ, therefore local gradient fluctuations near the river will not likely have a significant impact on the remedial timeframe. PG&E will review and consider the Tribes' response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated			It is still unclear whether fate/transport was simulated with time-varying river stage for the final proposed remediation design and operation. Time-varying stage only appears to have been simulated in one former (pre-final) design/operation - not similar to 6 month on/18 month off NTH IRZ injection/extraction system. Given the noted errors and issues with the model as outlined in Prucha and Eggers July 15, 2015 mw-x/mw-y whitepaper, we suggest re-assessing the importance/need to include fluctuating river stage, especially related to monitoring (done at specific times of the year, which are influenced by the stage at that time of year) compared to steady state simulated (constant) levels. The model should have been calibrated for all intended uses (i.e., assessing hydraulic gradients as specified in frameworks in OM Vol2, flow directions, capture zones etc.). Calibration results were never shown in an industry standard way (i.e., ASTM), so it's unclear what sort of spatial bias might exist in the current model. Therefore, this comment is considered unresolved.	DTSC response: In deference to Tribal cultural concerns, DTSC will consider various proposal made by the TRC on behalf of the Tribes to further evaluate the hydro- geological understanding , including additional work on the model. The agencies will provide direction to PG&E. It is important to note that DTSC does not completely agree with the technical basis or statements made by the TRC in their white paper and their rebuttal to PG&E's response. However, for the purpose of promoting progress on this project, DTSC will not debate those disagreements here.

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							August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.				
414	Hualapai/TRC	Non-design	GW Modeling	Append B 3.3/ Page 15.	"The currently proposed design includes continuous operation of injection wells along the IRZ, which will allow for significantly higher injection volumes and greater radii of influence than could be achieved with the point injection method that was applied during the floodplain ISPT."	Was the seasonal variation in river stage (and associated fluctuations of groundwater in wells near the river) considered in maintaining hydraulic control for the final proposed 6/18 month on/off IRZ cycle (which will likely adjust based on "adaptive" decisions in the OM monitoring decision framework diagrams)? For example, during spring/summer - high river stage will cause heads to rise notably at extraction wells – which will reduce the gradient across the IRZ (even reversing it?). Did any of the optimization or sensitivity simulations consider benefits of maintaining a constant gradient across the IRZ year-round by adjustments to IRL and/or River extraction wells? Could the time to complete remediation be reduced in this way?	See above			It is still unclear whether fate/ transport was simulated with time-varying river stage for the final proposed remediation design and operation Time-varying stage only appears to have been simulated in one former (pre-final) design/operation - not similar to 6 month on/18 month off NTH IRZ injection/extraction system. Given the noted errors and issues with the model as outlined in Prucha and Eggers July 15, 2015 mw-x/mw-y whitepaper, we suggest re-assessing the importance/need to include fluctuating river stage, especially related to monitoring (done at specific times of the year, which are influenced by the stage at that time of year) compared to steady state simulated (constant) levels. The model should have been calibrated for all intended uses (i.e., assessing hydraulic gradients as specified in frameworks in OM Vol2, flow directions, capture zones etc.). Calibration results were never shown in an industry standard way (i.e., ASTM), so it's unclear what sort of spatial bias might exist in the current model. Therefore, this comment is considered unresolved.	DTSC response: See RTC #413

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PG&E Topock Compressor Station, Needles, California

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415	Cocopah/TRC	Non-design	GW Modeling	Append B 3.3/ Page 15.	"The currently proposed design includes continuous operation of injection wells along the IRZ, which will allow for significantly higher injection volumes and greater radii of influence than could be achieved with the point injection method that was applied during the floodplain ISPT."	Was the seasonal variation in river stage (and associated fluctuations of groundwater in wells near the river) considered in maintaining hydraulic control for the final proposed 6/18 month on/off IRZ cycle (which will likely adjust based on "adaptive" decisions in the OM monitoring decision framework diagrams)? For example, during spring/summer - high river stage will cause heads to rise notably at extraction wells – which will reduce the gradient across the IRZ (even reversing it?). Did any of the optimization or sensitivity simulations consider benefits of maintaining a constant gradient across the IRZ year-round by adjustments to IRL and/or River extraction wells? Could the time to complete remediation be reduced in this way?	See above			It is still unclear whether fate/ transport was simulated with time-varying river stage for the final proposed remediation design and operation Time-varying stage only appears to have been simulated in one former (pre-final) design/operation - not similar to 6 month on/18 month off NTH IRZ injection/extraction system. Given the noted errors and issues with the model as outlined in Prucha and Eggers July 15, 2015 mw-x/mw-y whitepaper, we suggest re-assessing the importance/need to include fluctuating river stage, especially related to monitoring (done at specific times of the year, which are influenced by the stage at that time of year) compared to steady state simulated (constant) levels. The model should have been calibrated for all intended uses (i.e., assessing hydraulic gradients as specified in frameworks in OM Vol2, flow directions, capture zones etc.). Calibration results were never shown in an industry standard way (i.e., ASTM), so it's unclear what sort of spatial bias might exist in the current model. Therefore, this comment is considered unresolved.	DTSC response: See RTC #413
416	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 3.3/ Page 15.	"The currently proposed design includes continuous operation of injection wells along the IRZ, which will	Was the seasonal variation in river stage (and associated fluctuations of groundwater in wells near the river) considered in maintaining hydraulic control for the final proposed 6/18 month on/off IRZ cycle (which will likely adjust based on "adaptive" decisions in the OM monitoring decision framework diagrams)? For example, during spring/summer - high river stage will cause heads to rise notably at extraction wells – which will reduce the gradient across the IRZ (even reversing it?). Did any of the optimization or sensitivity simulations consider benefits of maintaining a constant gradient across the IRZ year-round by adjustments to IRL and/or River extraction wells? Could the time to complete remediation be reduced in this way?	See above			It is still unclear whether fate/ transport was simulated with time-varying river stage for the final proposed remediation design and operation	DTSC response: See RTC #413

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					allow for significantly higher injection volumes and greater radii of influence than could be achieved with the point injection method that was applied during the floodplain ISPT."					Time-varying stage only appears to have been simulated in one former (pre-final) design/operation - not similar to 6 month on/18 month off NTH IRZ injection/extraction system. Given the noted errors and issues with the model as outlined in Prucha and Eggers July 15, 2015 mw-x/mw-y whitepaper, we suggest re-assessing the importance/need to include fluctuating river stage, especially related to monitoring (done at specific times of the year, which are influenced by the stage at that time of year) compared to steady state simulated (constant) levels. The model should have been calibrated for all intended uses (i.e., assessing hydraulic gradients as specified in frameworks in OM Vol2, flow directions, capture zones etc.). Calibration results were never shown in an industry standard way (i.e., ASTM), so it's unclear what sort of spatial bias might exist in the current model. Therefore, this comment is considered unresolved.	
417	DOI-10	Design	Remedial Design	3.4.1/16	Although the maximum concentrations of TOC utilized in the ISPTs were high, the test results indicate that effective Cr(VI) treatment can be achieved with relatively low TOC concentrations. For example, Cr(VI)	It's not clear how this conclusion is being drawn. Figure 3.4-1 shows that the drop in Cr(VI) concentrations follows a large spike in TOC concentrations. Furthermore, the authors' of the of the floodplain ISPT study conclude that a sustained concentration of 100 mg/L is required for successful remediation of the Cr(VI) as noted in Section 5.2.1.3 (p. 14) of the ISPT report: *"Delivery of a sufficient amount of TOC was important for achieving complete Cr(VI) reduction to below the reporting limit of 0.2 mg/L. Reductions of this magnitude occurred only in locations where sufficient TOC was delivered, as indicated by <u>sustained TOC concentrations above 100 mg/L for at least a few weeks.</u> The delivery of sufficient TOC was limited to the injection well during the first three injections. Cr(VI) concentrations following these injections dropped below the reporting limit only in PTI-1D, where TOC concentrations of up to 204 mg/L were observed. In contrast, the decrease in Cr(VI) levels in downgradient wells as a result of the first three injections was notable but not as extensive. <u>Cr(VI) concentrations remained above 450 mg/L in PT-1D and PT-2D, where less TOC was delivered and maximum TOC concentrations reached less than 100 mg/L</u> (the maximum TOC concentrations were 58.4 and 26.9 mg/L, respectively)."* Presumably higher sustained TOC concentrations would be required in the upland areas where the	The "spike" TOC concentrations associated with the first three injections as shown on Figure 3.4-1 are in the 50 mg/L range (please note that the TOC concentrations are shown on the right hand vertical axis). The comment author is correct that the floodplain in situ pilot test (ISPT) concluded that sustained TOC		Accepted		Resolved.

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					concentrations decreased to below 5 ug/L in the floodplain ISPT (monitoring well PT-1D) within the first three of six injection events with observed TOC concentrations between 10 and 50 mg/L (Figure 3.4-1).	prevailing conditions are not as reducing and background TOC concentrations not as high. Since the TOC dosing in the IRL will be a maximum of 50 mg/L please provide additional justification that this dosing rate will be effective.	concentrations over 100 mg/L were needed to stimulate reduction. An amount of electrons/organic carbon equivalent to the 100 mg/L TOC that was sustained for several weeks can be delivered at a lower concentration for a longer period of time with a continuously operating system such as the in situ reactive zone (IRZ) systems for the final remedy. These IRZ systems will be operated continuously for months at a time. Lower dosing amounts are required for the Inner Recirculation Loop (IRL), versus the NTH IRZ, because the primary objective is to treat Cr(VI) that may be present in the extracted groundwater that is being re-injected in the upland areas. This differs from the primary objective of the NTH IRZ—i.e., to distribute enough organic carbon between injection wells to stimulate Cr(VI) reduction. As was discussed in the response to Comment #110 (DTSC-36) on the 30% Design, approximately 3.4 mg/L of TOC from ethanol would be required to reduce 8 mg/L of oxygen, 2 mg/L nitrate as nitrogen, and 13 ppb Cr(VI). The 50 mg/L upper end of the TOC dosing range for the IRL was established above this concentration to allow for additional consumption of TOC for cell growth, promotion of reducing conditions in the subsurface, and to accommodate for uncertainties in field implementation.				
418	DOI-11	Design	GW Modeling	3.4.1/19	The solute	In light of the discussion pertaining to the apparent TOC concentrations required for reduction of	The concentration of		Accepted.		Resolved.

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					transport model (described below; see Section 6) assumes Cr(VI) reduction in the presence of organic carbon above 0.1 mg/L.	CR(VI) (100 mg/L) it is difficult to see why this assumption is made particularly since the reporting limits for the TOC are 1 mg/L. Please provide justification for the 0.1 mg/L TOC assumption.	TOC needed to establish chromium-reducing conditions given a continuous injection system will be different than that needed to establish chromium-reducing conditions during the discrete injection pilot test. The 0.1 mg/L TOC threshold was established as the minimum carbon concentration to support microbial growth and Cr(VI) reduction through a series of sensitivity analyses for other Cr(VI) impacted sites where Cr(VI) reduction using a large-scale recirculation system had been observed (i.e., PG&E Hinkley Compressor Station site). During continuous injections at Hinkley, the 0.1 mg/L threshold was well-correlated to the zone of Cr(VI) reduction. This analysis was done by fitting the chromium reduction data and available TOC data above the reporting limit, which allowed for the determination of the threshold below the reporting limit. The lower 0.1 mg/L also allows the model to account for potential lysis effects where carbon from previous microbial communities is essentially recycled to support further microbial growth. A sensitivity analysis was also performed on the trigger TOC level for Cr(VI) reduction to evaluate potential effects. As discussed in Section 10.15 of Appendix B, the TOC threshold concentration was increased an order of magnitude to 1 mg/L. At this higher TOC				

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							threshold, sufficient Cr(VI) reduction was achieved. The model predicted potential Cr(VI) breakthrough along the NTH IRZ line at the 10-year mark during the IRZ OFF cycle. However, much of this Cr(VI) is treated during the subsequent IRZ ON cycle, and the model results are comparable for the 0.1 and 1 mg/L TOC triggers at 30 years. Potential operational adjustments to address a higher TOC threshold concentration are described in Table 6.6-1 of Appendix B and include the following (primarily applicable to the NTH IRZ): adjust TOC dosing concentration, frequency, and/or duration; and activation of provisional wells to bolster lateral coverage. A memo which provides supporting information regarding the development of the simulated threshold TOC concentration for reduction of Cr(VI) is provided in **Attachment L** of the final RTC table as requested by DOI.				
419	DOI-12	Design	GW Modeling	3.4.3/19	Given this observation, it was possible to derive an arsenic attenuation rate from the ISPT data for use in the solute transport model. Based on these results, an	The tracer test data provides additional insight that suggests a better conceptualization of the arsenic mobility would be similar to that used for chromium in which a certain TOC concentration is assumed to mobilize the arsenic. A concern with using the tracer test data to calculate arsenic attenuation rates is that; as noted on page 11 of the study: "*In contrast, tracer data at PT-2D (Figure 9) indicate breakthrough occurred a period of time after the injection period for all six injections.*" The cause for this apparent anomalous result is never discussed. Furthermore, iodide was injected in May and September of 2006 and in July 2007. The largest iodide peak arrived in PT-2D around May 20, 2007 (Figure 9- main report). Since the last iodide injection before this arrival was in September 2006 apparently it took 8 months for the iodide (a conservative tracer) to arrive. Something does not seem right and it leads some doubt to the interpretation of arsenic attenuation using assumed travel times. Furthermore, the iodide spike was accompanied by a spike in TOC, a sharp increase in dissolved iron, arsenic and hex chrome. It seems pretty clear that the arsenic solubility (as indicated throughout the text in Appendix B) is controlled by how reducing the aquifer conditions are. Please explain why the arsenic is not being modeled in a similar fashion to the manganese and linked to TOC concentrations through proportionality constant. Attenuation rates for the arsenic that are independent of the prevailing geochemistry of the aquifer do not appear to be well supported by the data. As noted in Section 3.4.3 (p. 18); "*The ISPT results demonstrated that the amount of byproducts (manganese, arsenic, iron, and barium) liberated within the IRZ are proportional to the strength of the reducing environment created by TOC injection, which, in turn, is proportional to the concentrations of TOC used.*" Furthermore, the use of a half-life to model potentially reversible reactions also does not fit the geochemical conceptual	The comment author is correct—there was an error in Table 2 of the floodplain ISPT report identifying which tracers were used for the May 2007 and July 2007 injection events. As the analytical data in Table 9 show for injection solution #3, the May 7-8, 2007 injection event did in fact use iodide, which was detected downgradient at PT-2D later in May 2007. The data from the first four volume injection events are still valid for evaluating arsenic attenuation rates.		Accepted.		Resolved.

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					arsenic attenuation half-life of between 20 and 40 days was calculated (base-case half-life assigned as 30 days), assuming a PT-2D arsenic concentration between 2.5 and 5 µg/L.	model. The application of a half-life will permanently remove the arsenic from both the sorbed and mobile phase. In reality, the arsenic is partitioning to the sorbed phase but could be remobilized if the TOC concentrations increase and the conditions become more reducing.	It is important to distinguish between the conceptual models for byproduct generation and byproduct attenuation, which are treated as decoupled processes in the geochemical and solute transport models. Specifically, Section 3.4.3 describes the basis for arsenic generated within the IRZ—it is in fact treated the same way as manganese. Manganese and arsenic are both generated within the IRZ at levels proportional to the TOC concentration, with generation coefficients of 0.016 mg manganese per mg TOC and 0.000108 mg arsenic per mg TOC. Downgradient of the IRZ, within the floodplain, the attenuation of manganese and arsenic are treated differently based on the anticipated geochemical mechanisms controlling uptake. However, manganese and arsenic attenuation processes are not activated within the maximum simulated 1 mg/L TOC footprint; i.e., manganese and arsenic do not attenuate in the model within the IRZ footprint, but only downgradient of it. In this way, arsenic and manganese attenuation are still dependent on the redox conditions within the aquifer. This is consistent with the co-occurrence of elevated TOC, dissolved iron, and arsenic observed at PT-2D during the pilot test. The rate-limited coprecipitation reaction of arsenic with iron oxides, with associated adsorption, is				

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							documented in the literature (Waychunas et al., 1993; Fuller et al., 1993). However, as described in Section 5.4.2, is an attenuation mechanism that cannot be described by a simple adsorption isotherm such as that of manganese. Observed arsenic data from the pilot study support this, yet for simplicity a simpler time-dependent relationship is included in the model to empirically mimic the more complex process that takes place. Although it is true that the half-life relationship is not reversable, this is what would be observed in the aquifer in the absence of a switch to more reducing conditions in the Alluvial Aquifer downgradient of injection (which is not predicted by the conceptual model or geochemical modeling). In summary, arsenic and manganese are modeled in the same way with respect to TOC content (both in terms of generation and lack of attenuation within the IRZ). Because it may not have been explicitly clear that manganese and arsenic attenuation only occur outside of the IRZ, the following text will be added to Section 6.2.7 between the third and fourth paragraphs: "Downgradient of the IRZ within the floodplain, manganese attenuation is modeled via adsorption, whereas arsenic attenuation is modeled via rate-limited co-precipitation according to a given half-life. These processes are assumed				

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							not to occur within the IRZ itself, instead taking effect within the redox recovery zone downgradient of the IRZ. In the solute transport model, this process is captured by activating the manganese and arsenic attenuation mechanisms outside of the maximum simulated 1 mg/L TOC footprint." References: Waychunas, GA, BA Rea, CC Fuller, JA Davis. 1993. Surface chemistry of ferrihydrite: Part 1. EXAFS studies of the geometry of coprecipitated and adsorbed arsenate. *Geochimica et Cosmochimica Acta* 57 (10), 2251-2269 Fuller, CC, JA Davis, and GA Waychunas. 1993. Surface chemistry of ferrihydrite: Part 2. Kinetics of arsenate adsorption and coprecipitation. Geochimica et Cosmochimica Acta 57 (10), 2271-2282				
420	DOI-13	Design	GW Modeling	3.4.4/19	Aquifer mobile porosity estimates were obtained from the floodplain ISPT during tracer injection. These results, which are described in detail and presented in Table 6 of the Floodplain ISPT Final Completion Report (ARCADIS 2008), indicate a mobile porosity of 12%.	ARCADIS (2008) presents two methods for calculating the effective porosity from the tracer test data; the method that they term "Ratio of Velocity" as well as a second method they refer to as a "Radius of Influence" (ROI) method. The ratio of velocity method basically uses the peak arrival time of the tracer in conjunction with the hydraulic gradients and hydraulic conductivities to back out the mobile porosity. The Ratio of Velocity results from the ARCADIS tracer test indicate an effective porosity of 0.02 and 0.005 percent. ARCADIS presents another method "Radius of Influence" which they describe as *"During tracer injection, transport occurred primarily by displacement of the tracer solution away from the injection well screen. As an approximation, radial transport away from the injection well over the length of the screened interval was assumed. As a result, tracer observed in nearby monitoring wells during an injection period can be used to estimate the mobile-phase effective porosity of the aquifer."* The results from this analysis are shown in Table 6 of the report to be 12% for all three wells. The ROI method is based on measuring the injected volume and tracking the tracer concentrations in the dose-response wells. For this method to provide representative results, however, the tracer concentrations at the dose-response wells should be near the injected concentrations. For the wells where mobile porosities were calculated with the ROI method; PT-1D, PT-3D and PT-4D the relative concentrations of the injected tracer was approximately 0.4, 0.4 and less than 0.02, respectively. These relative tracer concentrations suggest that there may be significant issues with the calculated mobile porosities. ARCADIS (2008), however, does not present any of supporting calculations for how the 12% effective porosity was derived. Please provide the actual calculations, and discuss the uncertainty in the results and potential impacts on the predicted range of remediation times.	The Radius of Influence calculations are consistent with methods discussed in Remediation Hydraulics (Payne et al., 2008). The method provides a more measure of mobile porosity and is more accurate as compared to the Ratio of Velocity method. For the first small volume (6000 gallon injection) the ROI was approximately 15 ft, as indicated by strong arrival at PT-3D versus PT-1D. The mobile porosity is computed by dividing the injected volume by the volume of impacted aquifer ($\pi * r^2 * h$) (where r = radius of influence in the aquifer and h = screen		Accepted.		Comment resolved pending DOI review of the final design documents.

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							length). For PT-3D the resultant mobile porosity = 12%. Particle tracking with the groundwater flow model was also indicative of a 12% mobile porosity for the pilot testing in this area (CH2M HILL 2009, CMS/FS Report, Appendix F). For the six large volume injection of 18,000 gallons, the ROI was approximately 25 ft based on the arrival of tracer at PT-4D which yields 12% mobile porosity as well. Arrival concentrations were less than the injected concentrations likely due to heterogeneous advection in the aquifer that may influence the distribution of tracer in the aquifer. Although aspects of the tracer test were not ideal (monitoring frequency, breakthrough concentration), the results of the tracer test are still supportive of a 12% effective porosity which is consistent with effective porosities for similar lithologies. In addition to the ROI calculations from the pilot test, a mobile porosity of 12% was also calculated through the evaluation of the breakthrough of TDS and specific conductivity in deep monitoring wells in the vicinity of the IM-3 wells (CH2M HILL 2009, CMS/FS Report, Appendix F). This analysis showed good correlation between observed and simulated TDS arrival times and the range in effective porosity calculated from three different wells was between 11% and 14%. The observation				

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							wells ranged from approximately 40 ft to 200 ft away from the injection well and the monitoring duration extended up to 200 days yielding a comprehensive data set. This additional support of the 12% mobile porosity will be added to the 100% Design text. As there is uncertainty associated with these mobile porosity calculations, an additional porosity sensitivity analysis will be added to Appendix B Section 10 as described in comment # 441.				
421	FMIT/TRC	Non-design	GW Modeling	Append B 4.0/ Page 21	"Additional modifications to the groundwater flow model include the incorporation of additional hydrogeologic data developed during the installation of the HNWR-1A well, about 75 feet from HNWR-1, and the Site B well located about 3,300 feet to the north of HNWR-1."	A new USGS model "*Fred D Tillman, Bradley D. Garner, and Margot Truini, 2013. Preliminary Groundwater-Flow Model of the Basin-Fill Aquifers in Detrital, Hualapai, and Sacramento Valleys, Mohave County, Northwestern Arizona. Scientific Investigations Report 2013–5122*" includes Sacramento wash and these two wells. Do the modifications (hydraulic property distributions, aquifer thickness etc.) to the MicroFEM model in this area (HNWR-1 and Site B) compare well to the USGS model inputs/results? If not, will the MicroFEM model be updated?	The USGS 2013 Model will be considered in future model updates, but unfortunately due to the scale of the regional USGS model, it has limited utility for providing data on the refined scale needed for our model. The Colorado River forms the western boundary of the USGS model, so the bulk of our area of concern is outside the USGS model domain. Additionally the regional USGS model is only a 1 layer flow model with 1,000 m x 1,000 m grid cells so resolution is limited. The USGS model also uses a single arbitrary bottom elevation for the entire model domain. The USGS model area that contains HNWR-1, HNWR-1A, and Site B well has comparable K values to the Topock model and similar water level patterns. However, reported USGS water level residuals in this area range from -25 ft to 100 ft. Due to the size of the USGS model, the calibration isn't refined in our area of interest.			The USGS model overlaps the regional MicroFEM model domain. Prucha and Eggers (July 15, 2015 whitepaper) point out a number of issues with the model setup & boundary conditions. In particular, simulated ET losses are very likely at least an order of magnitude too low, and the 100 ac-ft/yr inflow prescribed from Sacramento Wash into the MicroFEM model appears at least an order of magnitude too low based on this publication (i.e., this is only ~62 gpm from a watershed that exceeds 1300 square miles) and river-aquifer exchange is incorrectly simulated within Arizona. Instead of focusing on comparing simulated water balances, PG&E consultants focus on modeled residuals, which have not been shown in standard ASTM format for either the MicroFEM or Modlow models (i.e., simulated vs. observed graphs, or residuals plotted spatially by	DTSC response: Agencies will provide direction to PG&E in separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							PG&E will review and consider the Tribes' response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.			layer). Providing this information would increase confidence in the model which was used as THE primary basis designing the proposed remedy. We recommend that PG&E consultants contact Tilman/Truini, et al., at USGS and discuss model parameterization, basis for input, results and see whether the conclusions here are valid. The USGS developed a model of a very large area, with considerable supporting information that PG&E consultants have not considered.	
422	Hualapai/TRC	Non-design	GW Modeling	Append B 4.0/ Page 21	"Additional modifications to the groundwater flow model include the incorporation of additional hydrogeologic data developed during the installation of the HNWR-1A well, about 75 feet from HNWR-1, and the Site B well located about 3,300 feet to the north of HNWR-1."	A new USGS model "*Fred D Tillman, Bradley D. Garner, and Margot Truini, 2013. Preliminary Groundwater-Flow Model of the Basin-Fill Aquifers in Detrital, Hualapai, and Sacramento Valleys, Mohave County, Northwestern Arizona. Scientific Investigations Report 2013–5122*" includes Sacramento wash and these two wells. Do the modifications (hydraulic property distributions, aquifer thickness etc.) to the MicroFEM model in this area (HNWR-1 and Site B) compare well to the USGS model inputs/results? If not, will the MicroFEM model be updated?	See above			The USGS model overlaps the regional MicroFEM model domain. Prucha and Eggers (July 15, 2015 whitepaper) point out a number of issues with the model setup & boundary conditions. In particular, simulated ET losses are very likely at least an order of magnitude too low, and the 100 ac-ft/yr inflow prescribed from Sacramento Wash into the MicroFEM model appears at least an order of magnitude too low based on this publication (i.e., his is only ~62 gpm from a watershed that exceeds 1300 square miles) and river-aquifer exchange is incorrectly simulated within Arizona. Instead of focusing on comparing simulated water balances, PG&E consultants focus on modeled residuals, which have not been shown in standard ASTM format for either the MicroFEM or Modlow models (i.e., simulated vs. observed	DTSC response: Agencies will provide direction to PG&E in separate letter.

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										graphs, or residuals plotted spatially by layer). Providing this information would increase confidence in the model which was used as THE primary basis designing the proposed remedy. We recommend that PG&E consultants contact Tilman/Truini et al at USGS and discuss model parameterization, basis for input, results and see whether the conclusions here are valid. The USGS developed a model of a very large area, with considerable supporting information that PG&E consultants have not considered.	
423	Cocopah/TRC	Non-design	GW Modeling	Append B 4.0/ Page 21	"Additional modifications to the groundwater flow model include the incorporation of additional hydrogeologic data developed during the installation of the HNWR-1A well, about 75 feet from HNWR-1, and the Site B well located about 3,300 feet to the north of HNWR-1."	A new USGS model "*Fred D Tillman, Bradley D. Garner, and Margot Truini, 2013. Preliminary Groundwater-Flow Model of the Basin-Fill Aquifers in Detrital, Hualapai, and Sacramento Valleys, Mohave County, Northwestern Arizona. Scientific Investigations Report 2013–5122*" includes Sacramento wash and these two wells. Do the modifications (hydraulic property distributions, aquifer thickness etc.) to the MicroFEM model in this area (HNWR-1 and Site B) compare well to the USGS model inputs/results? If not, will the MicroFEM model be updated?	See above			The USGS model overlaps the regional MicroFEM model domain. Prucha and Eggers (July 15, 2015 whitepaper) point out a number of issues with the model setup & boundary conditions. In particular, simulated ET losses are very likely at least an order of magnitude too low, and the 100 ac-ft/yr inflow prescribed from Sacramento Wash into the MicroFEM model appears at least an order of magnitude too low based on this publication (i.e., this is only ~62 gpm from a watershed that exceeds 1300 square miles) and river-aquifer exchange is incorrectly simulated within Arizona. Instead of focusing on comparing simulated water balances, PG&E consultants focus on modeled residuals, which have not been shown in standard ASTM format for either the MicroFEM or	DTSC response: Agencies will provide direction to PG&E in separate letter.

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										Modlow models (i.e., simulated vs. observed graphs, or residuals plotted spatially by layer). Providing this information would increase confidence in the model which was used as THE primary basis designing the proposed remedy. We recommend that PG&E consultants contact Tilman/Truini et al at USGS and discuss model parameterization, basis for input, results and see whether the conclusions here are valid. The USGS developed a model of a very large area, with considerable supporting information that PG&E consultants have not considered.	
424	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 4.0/ Page 21	"Additional modifications to the groundwater flow model include the incorporation of additional hydrogeologic data developed during the installation of the HNWR-1A well, about 75 feet from HNWR-1, and the Site B well located about 3,300 feet to the north of HNWR-1."	A new USGS model "*Fred D Tillman, Bradley D. Garner, and Margot Truini, 2013. Preliminary Groundwater-Flow Model of the Basin-Fill Aquifers in Detrital, Hualapai, and Sacramento Valleys, Mohave County, Northwestern Arizona. Scientific Investigations Report 2013–5122*" includes Sacramento wash and these two wells. Do the modifications (hydraulic property distributions, aquifer thickness etc.) to the MicroFEM model in this area (HNWR-1 and Site B) compare well to the USGS model inputs/results? If not, will the MicroFEM model be updated?	See above			The USGS model overlaps the regional MicroFEM model domain. Prucha and Eggers (July 15, 2015 whitepaper) point out a number of issues with the model setup & boundary conditions. In particular, simulated ET losses are very likely at least an order of magnitude too low, and the 100 ac-ft/yr inflow prescribed from Sacramento Wash into the MicroFEM model appears at least an order of magnitude too low based on this publication (i.e., this is only ~62 gpm from a watershed that exceeds 1300 square miles) and river-aquifer exchange is incorrectly simulated within Arizona. Instead of focusing on comparing simulated water balances, PG&E consultants focus on modeled residuals, which have not been shown in standard	DTSC response: Agencies will provide direction to PG&E in separate letter.

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										ASTM format for either the MicroFEM or Modlow models (i.e., simulated vs. observed graphs, or residuals plotted spatially by layer). Providing this information would increase confidence in the model which was used as THE primary basis designing the proposed remedy. We recommend that PG&E consultants contact Tilman/Truini et al at USGS and discuss model parameterization, basis for input, results and see whether the conclusions here are valid. The USGS developed a model of a very large area, with considerable supporting information that PG&E consultants have not considered.	
425	FMIT/TRC	Non-design	GW Modeling	Append B 4.3/ P. 22	"The model contains 232 rows, 256 columns, and five layers for a total of 296,960 active cells (Figure 4.2-1). A uniform cell size of 25 feet by 25 feet occurs throughout the entire sub model domain. The boundaries of the model grid are defined as constant flux cells that reflect the flux of the original groundwater flow model under the same flow conditions."	This suggests constant (steady state) fluxes from the regional MicroFEM model were assigned to the local Modflow model boundaries. If so, simulated mounding from IRL-5 injection clearly shows heads/flow paths change along the boundary. This implies that internal calculations are affected by this western constant flux boundary. What are the implications on model predictions if the time-varying IRL-5 injection influence on the western boundary weren't considered here?	Pumping well locations and rates were incorporated into the regional model to generate the boundary conditions for the submodel in order to account for the influence of pumping. The most sensitive wells in influencing the boundary conditions are FW-1 and HNWR-1 (outside submodel domain) due to the proximity to the submodel extents. However, the effects from the other remedial wells (i.e. IRL wells, FW-2) were considered as well as they influence boundary conditions to a lesser extent. In order to account for potential time variant flow in the steady state model, long term average flow rates were utilized to represent the long term hydraulic impact of pumping wells on the			Regional well production external to the regional model is not likely considered, but could easily affect internal 'regional' flows calculated by microFEM model, which translate to local model. Review of 60% local model files suggests that translation of regional model flows to local model (modflow) is not done through constant flux cells, but rather constant head cells. These are two different types of boundary conditions. Specifying constant head boundary conditions, instead of constant flux, will result in differences in water balance/ inflows/ outflows between the two models. This should be re-evaluated/ restated.	DTSC response: Agencies will provide direction to PG&E in separate letter.

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							local flow field as well as the development of the fluxes along the submodel perimeter. PG&E will review and consider the Tribes' response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.			Consideration should be given for simulating transient simulations, with appropriate regional to local transient boundary conditions to better simulate actual transient system behavior (i.e., flow gradients, magnitudes, levels, fate/transport etc.), especially during NTH IRZ on/off cycles. This should improve estimates of expected gradients, water levels and concentration trends heavily relied upon in decision framework diagrams outlined in O&M Vol 2 report (Tables 2.1-4 and 2.1-5) and Figures 2.2-2 through 2.2-9. This is important, because it will aid interpretations/ understanding and help reduce the potential need for new wells and reducing mistakes (i.e. modifying the wrong operational 'knobs', or adjusting them the wrong way or amount).	
426	Hualapai/TRC	Non-design	GW Modeling	Append B 4.3/ P. 22	"The model contains 232 rows, 256 columns, and five layers for a total of 296,960 active cells (Figure 4.2-1). A uniform cell size of 25 feet by 25 feet occurs throughout the entire sub model domain. The boundaries of the model grid are defined as constant flux cells that reflect the flux of the original groundwater flow model	This suggests constant (steady state) fluxes from the regional MicroFEM model were assigned to the local Modflow model boundaries. If so, simulated mounding from IRL-5 injection clearly shows heads/flow paths change along the boundary. This implies that internal calculations are affected by this western constant flux boundary. What are the implications on model predictions if the time-varying IRL-5 injection influence on the western boundary weren't considered here?	See above			Regional well production external to the regional model is not likely considered, but could easily affect internal 'regional' flows calculated by microFEM model, which translate to local model. Review of 60% local model files suggests that translation of regional model flows to local model (modflow) is not done through constant flux cells, but rather constant head cells. These are two different types of boundary conditions. Specifying constant head boundary conditions, instead of constant flux, will result in differences in water	DTSC response: Agencies will provide direction to PG&E in separate letter.

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					under the same flow conditions."					balance/inflows/outflows between the two models. This should be re-evaluated/restated. Consideration should be given for simulating transient simulations, with appropriate regional to local transient boundary conditions to better simulate actual transient system behavior (i.e., flow gradients, magnitudes, levels, fate/transport etc.), especially during NTH IRZ on/off cycles. This should improve estimates of expected gradients, water levels and concentration trends heavily relied upon in decision framework diagrams outlined in O&M Vol 2 report (Tables 2.1-4 and 2.1-5) and Figures 2.2-2 through 2.2-9. This is important, because it will aid interpretations/ understanding and help reduce the potential need for new wells and reducing mistakes (i.e. modifying the wrong operational 'knobs', or adjusting them the wrong way or amount).	
427	Cocopah/TRC	Non-design	GW Modeling	Append B 4.3/ P. 22	"The model contains 232 rows, 256 columns, and five layers for a total of 296,960 active cells (Figure 4.2-1). A uniform cell size of 25 feet by 25 feet occurs throughout the entire sub model domain. The boundaries of the model grid are defined as constant flux	This suggests constant (steady state) fluxes from the regional MicroFEM model were assigned to the local Modflow model boundaries. If so, simulated mounding from IRL-5 injection clearly shows heads/flow paths change along the boundary. This implies that internal calculations are affected by this western constant flux boundary. What are the implications on model predictions if the time-varying IRL-5 injection influence on the western boundary weren't considered here?	See above			Regional well production external to the regional model is not likely considered, but could easily affect internal 'regional' flows calculated by microFEM model, which translate to local model. Review of 60% local model files suggests that translation of regional model flows to local model (modflow) is not done through constant flux cells, but rather constant head cells. These are two different types of boundary conditions.	DTSC response: Agencies will provide direction to PG&E in separate letter.

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					cells that reflect the flux of the original groundwater flow model under the same flow conditions."					Specifying constant head boundary conditions, instead of constant flux, will result in differences in water balance/inflows/outflows between the two models. This should be re-evaluated/restated. Consideration should be given for simulating transient simulations, with appropriate regional to local transient boundary conditions to better simulate actual transient system behavior (i.e., flow gradients, magnitudes, levels, fate/transport etc.), especially during NTH IRZ on/off cycles. This should improve estimates of expected gradients, water levels and concentration trends heavily relied upon in decision framework diagrams outlined in O&M Vol 2 report (Tables 2.1-4 and 2.1-5) and Figures 2.2-2 through 2.2-9. This is important, because it will aid interpretations/understanding and help reduce the potential need for new wells and reducing mistakes (i.e. modifying the wrong operational 'knobs', or adjusting them the wrong way or amount).	
428	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 4.3/ P. 22	"The model contains 232 rows, 256 columns, and five layers for a total of 296,960 active cells (Figure 4.2-1). A uniform cell size of 25 feet by 25 feet occurs throughout the entire sub model domain.	This suggests constant (steady state) fluxes from the regional MicroFEM model were assigned to the local Modflow model boundaries. If so, simulated mounding from IRL-5 injection clearly shows heads/flow paths change along the boundary. This implies that internal calculations are affected by this western constant flux boundary. What are the implications on model predictions if the time-varying IRL-5 injection influence on the western boundary weren't considered here?	See above			Regional well production external to the regional model is not likely considered, but could easily affect internal 'regional' flows calculated by microFEM model, which translate to local model. Review of 60% local model files suggests that translation of regional model flows to local model (modflow) is not done through	DTSC response: Agencies will provide direction to PG&E in separate letter.

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					The boundaries of the model grid are defined as constant flux cells that reflect the flux of the original groundwater flow model under the same flow conditions.”					constant flux cells, but rather constant head cells. These are two different types of boundary conditions. Specifying constant head boundary conditions, instead of constant flux, will result in differences in water balance/inflows/outflows between the two models. This should be re-evaluated/restated. Consideration should be given for simulating transient simulations, with appropriate regional to local transient boundary conditions to better simulate actual transient system behavior (i.e., flow gradients, magnitudes, levels, fate/transport etc.), especially during NTH IRZ on/off cycles. This should improve estimates of expected gradients, water levels and concentration trends heavily relied upon in decision framework diagrams outlined in O&M Vol 2 report (Tables 2.1-4 and 2.1-5) and Figures 2.2-2 through 2.2-9. This is important, because it will aid interpretations/understanding and help reduce the potential need for new wells and reducing mistakes (i.e. modifying the wrong operational 'knobs', or adjusting them the wrong way or amount).	
429	DOI-14	Design	GW Modeling	4.4/23	In order to properly translate groundwater flow conditions from the regional model to the extracted submodel, constant flux	Apparently, the regional model is being used to establish the flux boundary conditions for both the steady-state and pumping scenarios of the local model. This step is important because of the head changes that are observed at the local grid boundaries due to the pumping/injecting. Flux boundaries calculated from the non-pumping regional model would not adequately simulate the water moving across the boundary under pumping/injection conditions. This process of how the regional model output is being used (for the pumping scenarios) as input to the local model needs to be better described in Appendix B. Please be sure to specify if this handoff of fluxes from the regional model to the local model is <u>not</u> done for any of the pumping simulations or sensitivity analyses.	The regional MicroFEM model was used to generate flux boundaries for the submodel under both ambient (non-pumping) and active pumping scenarios. All of the pumping in the submodel was in the regional model, so the effects of that pumping		Accepted.		

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					boundaries were simulated around the edges of the extracted submodel.		are reflected in the boundary conditions. Text will be clarified to reflect this process.				
430	DOI-15	Design	GW Modeling	4.4/23	In order to properly translate groundwater flow conditions from the regional model to the extracted submodel, constant flux boundaries were simulated around the edges of the extracted submodel.	As described in CH2M HILL 2005 the regional model was calibrated to transient flow data and qualitatively to chromium plume development. Since there is not a good way to directly check that the fluxes from the regional model are being properly integrated into the local model or whether the changes made to the local model have affected the overall calibration there needs to be some quantitative check between the two models. On February 11, 2015 Martin Barackman (CH2MHill) emailed a comparison of the groundwater contours of the local and regional models to David Back (DOI consultant) (attached). Mr. Barackman states "The attached figures show that water level match between the two models is generally within a foot in the area north of the freeway, where most of the plume is present. The match is less good in the southwest corner of the model. In this area of the model, where the alluvium pinches out against bedrock, the MicroFEM grid cells are large and the layer thicknesses are small. Both of these factors add to the imprecision of the interpolation process. In summary, PG&E believes the process of translation between the MicroFEM and MODFLOW models produces two models with hydraulic properties and gradients similar enough to be used for the purposes of remedial design." Although there is a general agreement between the contours, according to Appendix L, the gradients necessary to maintain capture are on the order of 0.003 which is incredibly flat and small differences in the water-level elevations can have a significant impact. Furthermore it is unknown what the impacts of the differences in gradients will have on remediation times and flow directions. Based on the CH2M HILL 2005 report the calibrated regional model provides an excellent match to the monthly water levels in the flood plain wells (Figure B-2). Based on the potentiometric map comparison provided by Mr. Barackman, it does not look like the local model is calibrated nearly as well. Some type of quantitative check needs to be presented on how well the local model is calibrated. The potentiometric maps provided by Mr. Barackman should be included in Appendix B to provide a visual comparison of the regional and local model predictions.	A figure will be provided in Appendix B that compares the regional model simulated water levels to the submodel simulated water levels. Specific calibration targets from future model calibrations will also be evaluated in both the regional and submodel for a more quantitative evaluation, in accordance with the schedule identified in Appendix B Section 12. An additional paragraph will be added to Appendix B Section 12 to discuss the intended future use of the model including updating remediation time frame estimates, supporting capture zone analyses, and analyzing potential remedy design operation changes.		Accepted.		Comment resolved pending DOI review of the final design documents.
431	DOI-16	Design	GW Modeling	4.4/23	In order to properly translate groundwater flow conditions from the regional model to the extracted submodel, constant flux boundaries were simulated around the edges of the extracted submodel.	Moving forward this approach of only calibrating the regional model and using the results to parameterize and set the boundaries on the local model will become more and more problematic as additional data become available. Once the remedial system is up and running additional transient and steady state data sets will become available to fine tune the calibration, optimize the injection/pumping and predict capture zones. A significant degree of the regional model calibration is being lost in translation to the local model. The local model is uniformly spaced at 25 feet with the total number of active cells at less than 300,000. It seems that if a variably spaced grid was employed with additional nodes the local model boundaries could be extended to where the boundary effects would be minimal. This would allow the more traditional approach of using the regional model to set the boundaries on the local model but continue to calibrate only the local model. The boundary conditions could also be changed from the constant flux to General Head Boundaries to further minimize potential boundary effects.	The process for extracting model parameters and boundary conditions from the regional MicroFEM model to the MODFLOW model has been streamlined to allow for a relatively quick conversion between the two models. Further consideration will be given to either expand the submodel domain to minimize boundary effects (be able to change pumping rates in just the submodel, rather the both the regional model and submodel) or possibly convert the full MicroFEM model to MODFLOW to negate the need for future model conversions, at				DTSC response: Agencies will provide direction to PG&E in separate letter.

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							the time of the next model update. There would not be a significant difference with the use of general head boundaries verses constant flux boundaries as the constant flux boundaries were adjusted to account for the hydraulic impacts along the submodel boundary. Both GHBs and constant flux boundaries would represent equivalent fluxes into and out of the submodel domain.				
432	FMIT/TRC	Design	Remedial Design	Append B, Sect. 5.1, p. 24, and Append B Att. 1	Batch simulations were performed with the geochemical modeling software PHREEQC using the default PHREEQC Thermodynamic database.	Chromium species are not available in the PHREEQC data base, and thermodynamic properties for chromium species were not shown in Appendix B Attachment 1. What data base was used for the geochemical modeling? Chromium behavior is difficult to predict through geochemical modeling (D.K. Nordstrom, USGS, verbal commun, 2012); therefore, wouldn't selection of the chromium data base be important in order to run the geochemical model after remedy start up, insert new data collected during construction and monitoring, and use the model for rapid geochemical assessment?	Thermodynamic constants for aqueous Cr(III) and Cr(VI) species, which were not available in the default PHREEQC database, were obtained from Morel and Hering (1993); this reference is cited in Section 5.1 of the text. Solubility products for Cr(III) mineral phases were obtained from Sass and Rai (1987); also cited in the text. It is true that chromium behavior is difficult to predict using geochemical modeling alone; accordingly, it is important to validate model predictions with performance data. In this case, historical plume evolution and the results of pilot tests were used to develop the geochemical and solute transport models, as described in the text. These models will continue to be refined after remedy startup as new information is obtained. This may include review and updating of thermodynamic constants as warranted.			It doesn't appear as though chromium was included in the geochemical model at all. The Sass and Rai (1987) and Morel and Hering (1993) citations are outdated and do not provide adequate information (e.g., enthalpy values) to fully conduct geochemical modeling of chromium species. An important project such as Topock should be using the best available chromium thermodynamic data, and these data can be found in Ball and Nordstrom (1998). Suggest that the geochemical modeling should be conducted without fixing pH at 7. Suggest that geochemical modeling should not restrict arsenic to only reduced arsenic-3 species, but should include all of the possible arsenic complexes. Suggest that the geochemical modeling should be re-done with conditions representative of the upland and floodplain. Solid-phase constraints	PG&E Response: One of the references for chromium thermodynamic constants was inadvertently left out of the references list. Specifically, equilibrium constants for aqueous Cr(III) species and the amorphous chromium hydroxide Cr(OH)3 were taken from Rai et al., Journal of Solution Chemistry, 2004. This reference will be added to Appendix B. Other chromium thermodynamic values taken from Morel and Hering, including the Cr(VI) hydrolysis species and the Cr(III) – Cr(VI) redox couple, were compared against those provided in Ball and Nordstrom (1998). Differences in values between the two sources are sufficiently minor as to not affect the overall results. DTSC/DOI response:

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										should be added to the model to simulate interactions between groundwater and the aquifer. Comment unresolved pending development and improvement of the geochemical model using new data collected during installation and construction of the groundwater remedy.	Agencies will provide direction to PG&E in separate letter.
433	Hualapai/TRC	Design	Remedial Design	Append B, Sect. 5.1, p. 24, and Append B Att. 1	Batch simulations were performed with the geochemical modeling software PHREEQC using the default PHREEQC Thermodynamic database.	Chromium species are not available in the PHREEQC data base, and thermodynamic properties for chromium species were not shown in Appendix B Attachment 1. What data base was used for the geochemical modeling? Chromium behavior is difficult to predict through geochemical modeling (D.K. Nordstrom, USGS, verbal commun, 2012); therefore, wouldn't selection of the chromium data base be important in order to run the geochemical model after remedy start up, insert new data collected during construction and monitoring, and use the model for rapid geochemical assessment?	See above			It doesn't appear as though chromium was included in the geochemical model at all. The Sass and Rai (1987) and Morel and Hering (1993) citations are outdated and do not provide adequate information (e.g. enthalpy values) to fully conduct geochemical modeling of chromium species. An important project such as Topock should be using the best available chromium thermodynamic data, and these data can be found in Ball and Nordstrom (1998). Suggest that the geochemical modeling should be conducted without fixing pH at 7. Suggest that geochemical modeling should not restrict arsenic to only reduced arsenic-3 species, but should include all of the possible arsenic complexes. Suggest that the geochemical modeling should be re-done with conditions representative of the upland and floodplain. Solid-phase constraints should be added to the model to simulate interactions between groundwater and the	DTSC response: See RTC #432

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										aquifer. Comment unresolved pending development and improvement of the geochemical model using new data collected during installation and construction of the groundwater remedy.	
434	Cocopah/TRC	Design	Remedial Design	Append B, Sect. 5.1, p. 24, and Append B Att. 1	Batch simulations were performed with the geochemical modeling software PHREEQC using the default PHREEQC Thermodynamic database.	Chromium species are not available in the PHREEQC data base, and thermodynamic properties for chromium species were not shown in Appendix B Attachment 1. What data base was used for the geochemical modeling? Chromium behavior is difficult to predict through geochemical modeling (D.K. Nordstrom, USGS, verbal commun, 2012); therefore, wouldn't selection of the chromium data base be important in order to run the geochemical model after remedy start up, insert new data collected during construction and monitoring, and use the model for rapid geochemical assessment?	See above			It doesn't appear as though chromium was included in the geochemical model at all. The Sass and Rai (1987) and Morel and Hering (1993) citations are outdated and do not provide adequate information (e.g. enthalpy values) to fully conduct geochemical modeling of chromium species. An important project such as Topock should be using the best available chromium thermodynamic data, and these data can be found in Ball and Nordstrom (1998). Suggest that the geochemical modeling should be conducted without fixing pH at 7. Suggest that geochemical modeling should not restrict arsenic to only reduced arsenic-3 species, but should include all of the possible arsenic complexes. Suggest that the geochemical modeling should be re-done with conditions representative of the upland and floodplain. Solid-phase constraints should be added to the model to simulate interactions between groundwater and the aquifer. Comment unresolved pending development and improvement of	DTSC response: See RTC #432

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										the geochemical model using new data collected during installation and construction of the groundwater remedy.	
435	Chemehuevi/ TRC	Design	Remedial Design	Append B, Sect. 5.1, p. 24, and Append B Att. 1	Batch simulations were performed with the geochemical modeling software PHREEQC using the default PHREEQC Thermodynamic database.	Chromium species are not available in the PHREEQC data base, and thermodynamic properties for chromium species were not shown in Appendix B Attachment 1. What data base was used for the geochemical modeling? Chromium behavior is difficult to predict through geochemical modeling (D.K. Nordstrom, USGS, verbal commun, 2012); therefore, wouldn't selection of the chromium data base be important in order to run the geochemical model after remedy start up, insert new data collected during construction and monitoring, and use the model for rapid geochemical assessment?	See above			It doesn't appear as though chromium was included in the geochemical model at all. The Sass and Rai (1987) and Morel and Hering (1993) citations are outdated and do not provide adequate information (e.g. enthalpy values) to fully conduct geochemical modeling of chromium species. An important project such as Topock should be using the best available chromium thermodynamic data, and these data can be found in Ball and Nordstrom (1998). Suggest that the geochemical modeling should be conducted without fixing pH at 7. Suggest that geochemical modeling should not restrict arsenic to only reduced arsenic-3 species, but should include all of the possible arsenic complexes. Suggest that the geochemical modeling should be re-done with conditions representative of the upland and floodplain. Solid-phase constraints should be added to the model to simulate interactions between groundwater and the aquifer. Comment unresolved pending development and improvement of the geochemical model using new data collected during installation and construction of the	DTSC response: See RTC #432

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										groundwater remedy.	
436	DOI-17	Design	GW Modeling	5.2/25	All geochemical speciation and redox calculations were based on published thermodynamic constants	Please indicate if there was a need to correct the constants (e.g, Pitzer) for the high ionic strengths?	PHREEQC uses the Davies equation to make ionic strength corrections, with Davies equation constants included in the thermodynamic database. This approach is largely recognized as valid for ionic strengths as high as 0.7 M, much higher than the ionic strengths of the groundwater modeled at Topock, which exhibits an ionic strength closer to 0.1 M (e.g., Morel and Hering, 1993; reference cited in Appendix B). Accordingly, use of a database with Pitzer model parameters was not necessary. The following text will be added to Section 5.2: "Activity coefficients for charged aqueous species were calculated using the Davies equation, as described in the PHREEQC manual (Parkhurst and Appelo, 1999)."		Accepted.		Resolved.
437	DOI-18	Design	GW Modeling	5.3.3/31	Oxidation of Mn(II) was incorporated in the Topock solute transport model assuming a half-life of 29 days. This value was obtained by starting with a first-order rate coefficient of 0.083 h^{-1}, representing the slowest rate observed by Harvey and Fuller (1998) at the Pinal Creek, Arizona site, and scaling it back by two orders of magnitude to conservatively account for	Please clarify where in the Harvey and Fuller paper the first-order rate coefficient of 0.083 h^{-1} was obtained and why a rate constant of 0.69 h^{-1} was not used. The Harvey and Fulley text on the bottom of page 632 states "considering the fast timescale of laboratory uptake (<6 hours) for all experiments, the range in rescaled rate constants for unpoisoned sediments from Pinal Creek was 0.28-0.69 h^{-1}." A rate constant of 0.69 h^{-1} is more than 8 times slower than 0.083 h^{-1}. A rate constant of 0.083 h^{-1} is a half-life of 8.4 hours, so a half live scaled back by two orders of magnitude would be 840 hours or 35 days; was something else factored in that resulted in the assignment of a half-life of 29 days (rather than 35)? If the rate constant of 0.083 h^{-1} was increased by two orders of magnitude it would be 8.3 h^{-1} and would result in a half-life of 0.34 days. Harvey and Fuller explain that the manganese precipitation is due to the gas exchange of oxygen within the hyporheic zone at the interface between the sediments and surface water as well as biological processes. This oxygenated area is typically thin and the O_2 gas exchange component needs to be integrated into the current conceptual model because it appears to be inconsistent with the reducing rind concept. This could involve a simple explanation that a well oxygenated zone within the streambed separates the reducing rind from the surface water. The manganese rate constants will also be strongly affected by the reduction of dissolved oxygen caused by the injection of the TOC and resulting increase in biological activity. There needs to be additional justification for the assumption that two orders of magnitude adjustment adequately represents the system. The potential impacts of the uncertainty on the model predictions should be discussed in an uncertainty section.	The objective was to use the most conservative (longest half-life) manganese oxidation rate observed in the study. The range on the bottom of page 632 in the Harvey and Fuller reference was based on the laboratory scale results only. Table 3 in Harvey and Fuller cites the averages and ranges in results applicable to the different scales studied. The 0.083 h^-1 rate constant was based on the observed range in hyporheic flow path-based observations, which exhibited a range in the time constant (inverse of the rate constant) of 1 to 12 hours. Thus the rate of 0.083 h^-1 was obtained as the inverse of 12 hours. Note that a rate		Accepted.		Resolved.

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					potential differences in nutrient status and microbial population.		constant of 0.69 h^-1 (half-life = 1 hour) is more than 8 times faster, not slower, than a rate constant of 0.083 h^-1 (half-life = 8.3 hours), and would therefore be a less conservative assumption on oxidation rate. The following text will be added to Section 5.3.3: "This value was obtained by starting with a first-order rate coefficient of 0.083 h^-1, representing the slowest rate observed by Harvey and Fuller (1998) at the Pinal Creek, Arizona site (time constant range of 1 to 12 hours, Table 3 in Harvey and Fuller [1998]), and scaling it back…" The half-life of 29 days appears to have been a typographical error in the text, possibly due to a round-off error (noting that a rate coefficient of 0.1 h^-1 would yield a half-life of 29 days). The text and model will be corrected. The two order of magnitude increase in half life precludes the need for a sensitivity analysis, as it is not a data-based estimate but rather is a deliberate conservative assumption that reaches far beyond estimates in a similar environment. It is correct that manganese oxidation would not occur in the reducing rind, due to the absence of oxygen in this zone. It would also not occur in zones where TOC is being injected – accordingly, manganese oxidation does not occur (and is not modeled) in the IRZ. The text will be modified as follows: "Oxidation of Mn(II) was incorporated in the Topock solute transport model				

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							assuming a half-life of 35 days in zones where sufficient oxygen is present to yield manganese oxidation."				
438	DOI-19	Design	GW Modeling	5.3.3/32	This rate was used to simulate Mn(II) oxidation in the upland, where Mn(II) oxidation was assumed to be active outside of the TOC footprint (TOC less than 0.1 mg/L) of the remedy.	Since the Mn oxidation rate will be very sensitive to the prevailing geochemical conditions and microbial populations please provide some justification (e.g., DO and/or ORP values) for this assumption.	Historical field measurements of dissolved oxygen in groundwater monitoring wells located in the upland OW wells typically range between approximately 5 and 14 mg/L (which includes field probe measurement variability/uncertainty). This range of measured values will be included as justification in Section 5.3.3.		Accepted.		Comment resolved pending DOI review of the final design documents.
439	DOI-20	Design	GW Modeling	5.3.3/33	Therefore, the hyporheic zone PHT3D results demonstrate that the immobilization reaction used in the site-wide solute transport model adequately accounts for the chemical reactions that take place.	The hyporheic zone provides a geochemical environment that is unique to that area of the site where oxygen from the stream is exchanged with the groundwater leading to the precipitation of manganese minerals. Please provide additional explanation of how these modeling results obtained with PHT3D under these conditions now demonstrate that the same conditions are applicable to the entire site. Obviously, if there are areas within the site that are naturally reducing the same assumptions would not apply and manganese may not be oxidized and immobilized.	The text in this section is intended to make the point that oxidation of manganese (when and where it occurs, which is not everywhere) results in a thermodynamically stable and low-solubility mineral phase which is resistant to re-dissolution; therefore, although the site-wide solute transport model does not include any reactions for the precipitated phase, this is not necessary because the geochemical model demonstrates that these phases are stable. This does not preclude the possibility that manganese oxides can be reductively dissolved in some circumstances (this process is included in the model within the IRZ), and it does not suggest that manganese will oxidize and precipitate in the absence of oxygen (it is made clear in other portions of the text that manganese oxidation is only modeled in zones where oxygen is present, including the upland). The text in Section 5.3.3 will be modified as follows: "Therefore, the		Accepted.		Resolved.

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							hyporheic zone PHT3D results demonstrate that the immobilization reaction used in the site-wide solute transport model adequately accounts for the chemical reactions that take place where oxygen is available for manganese oxidation.”				
440	DOI-21	Design	GW Modeling	6.2.1/37	Solute mass is exchanged between mobile and immobile portions of the aquifer by diffusion. This conceptualization of solute transport is the dual-domain formulation, and is often referred to as advection-diffusion. There is extensive literature on the dual-domain model (Gillham et al. 1984; Molz et al. 2006; Flach et al. 2004; Harvey and Gorelick 2000; Feehley et al. 2000; Julian et al. 2001; Zheng and Bennet 2002) and it is generally considered the most accurate approach for simulating solute transport.	Please explain why the dual domain model was assumed when as noted in ARCADIS (2009, p. 18) the tracer test data did not indicate dual porosity behavior: *Note that the dual-domain mass transfer model of Zheng and Wang (Zheng and Wang, 1999) was not used in the solute transport model because minimal tailing was observed in the actual tracer breakthrough curves and that a dual-domain approach to solute transport was not necessary to closely simulate tracer behavior.* If there is significant dual phase behavior the tracer profile should be more log-normal as opposed to Gaussian. ARCADIS, 2009. Upland Reductive Zone In-Situ Pilot Test Final Completion Report.	The dual-domain model was utilized as a conservative measure to account for the likely interaction of the mobile and immobile fractions in the simulation of this heterogeneous aquifer. While the dual porosity was not clearly indicated by the tracer testing, for the simulation of the full aquifer it was deemed appropriate to utilize the more conservative dual-domain approach. The mass transfer coefficient and mobile/immobile porosities utilized in the final dual domain model did not result in a significant dual phase behavior.		Accepted.		Resolved.
441	DOI-22	Design	GW Modeling	6.2.1/37	The mechanics of deposition and consolidation of unconsolidated materials result in aquifer soils at the Site exhibiting a total porosity of	There really needs to be a basis for the estimate of 35% percent total porosity. Since the mobile porosity is 12% the immobile porosity is 23% (which checks out with the *.btn file). Most of the contaminant mass will be in the immobile porosity and remediation times are typically very sensitive to the immobile porosity. Furthermore, it's difficult to see how the local variability would not have an impact on overall results. As stated above the assumptions regarding immobile porosity and the transfer coefficient will have a significant impact on predicted remediation times. It also seems unusual that the mobile and immobile porosities were not included in the sensitivity analysis since they are both fairly uncertain and the model results will be very sensitive to the values assumed. Please provide a basis for the value of 23% for the immobile porosity. Please provide the rationale for not including the porosities in the sensitivity analysis.	The mobile, immobile, and total porosity values used in the solute transport modeling are consistent with the range of values presented in Attachment A of CH2M Hill 2010 - Methods of Estimating Pore Volume Flushing Efficiency Used in Calculating Mass		Accepted.		Comment resolved pending DOI review of the final design documents and the sensitivity analysis.

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					approximately 35%. Local variability will not have an impact on overall results, and 35% is a reliable estimate for the total porosity of modeled layers 1 through 4.		Removal Rates for CMS/FS Alternatives. This Attachment indicates a range in immobile porosities of 22% to 28%, and a range in total porosities of 29% to 40%. The total porosity range is supported by porosity measurements made on 20 site samples as part of the original draft RFI (E&E, 2004), which ranged between 26.8% and 42.7%, with an average of 35.5%. As the computed mobile porosity from ARCADIS, 2008 support a 12% mobile porosity, an immobile porosity of 23% and a total porosity of 35% were selected as average values for the solute transport modeling exercise. The total porosity of 35% is also consistent with porosity values recorded for similar alluvial and fluvial aquifer materials (Fetter, 2001; Payne et al., 2008). The preceding text and references will be added to Section 6.2.1 to further justify porosity values used in the solute transport modeling. Local variations in porosity due to aquifer heterogeneity are not expected to have a significant impact on remedy performance as the average values are more representative of the entire Site in evaluating remedy performance. In order to evaluate the potential impact of immobile and mobile porosity values on the simulation of the remedy, a sensitivity analysis will be conducted on a representative range of porosities.				

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
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PG&E Topock Compressor Station, Needles, California

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							Reference: Ecology and Environment (E&E). 2004. Draft RCRA Facility Investigation (RFI) Report, Bat Cave Wash Area, Pacific Gas and Electric Company's Topock Compressor Station. February.				
442	FMIT/TRC	Non-design	GW Modeling	Append B Sect. 6.2 P. 37	"6.2 Solute Transport Parameters"	Why weren't more realistic values developed for transport parameters by calibrating the flow and solute transport model against Quarterly IM3 water level and concentration changes (i.e., instead of from publications)? Is there any reason this couldn't be done now, prior to finalization of design/operation/installation/testing etc.? These data seem to be the best available information on how the model (flow/fate/transport) performs in a critical area.	Solute transport parameters were developed using a combination of geochemical modeling based on Site data, observations made during in-situ pilot testing (ISPT), historical plume movement, and literature. The ISPT data are comparable to the proposed remedial strategy, and recent IM-3 data, with respect to overall groundwater flow and Cr(VI) plume movement, were considered and appear to be consistent with the simulated groundwater flow and solute transport parameters utilized. Flow and transport model calibrations will also be conducted during the future model updates.			The last statement of PG&Es comment misses the point . Conducting this analysis BEFORE completion of the 90%BOD is so that all stakeholders can be guaranteed, to the extent possible, that all data have been used to calibrate the model in a key area. The IM-3 data represent years of good quality data in the most contaminated part of the site (vs. the ISPT location). The IM-3 data cover a much larger geographic area and are available for much longer (i.e., 10 years), which might require different assumptions about fate/transport parameters (i.e., floodplain vs. upland etc.), both of which are influenced by IM-3 data. We strongly recommend that IM-3 data are used at a minimum to validate current assumptions used in the fate/ transport model, where relevant (i.e., obviously one can't evaluate Mn and As w/out TOC, which IM-3 doesn't include.	DTSC response: Agencies will provide direction to PG&E in separate letter.
443	Hualapai/TRC	Non-design	GW Modeling	Append B Sect. 6.2 P. 37	"6.2 Solute Transport Parameters"	Why weren't more realistic values developed for transport parameters by calibrating the flow and solute transport model against Quarterly IM3 water level and concentration changes (i.e., instead of from publications)? Is there any reason this couldn't be done now, prior to finalization of design/operation/installation/testing etc.? These data seem to be the best available information on how the model (flow/fate/transport) performs in a critical area.	See above			The last statement of PG&Es comment misses the point . Conducting this analysis BEFORE completion of the 90%BOD is so that all stakeholders can be guaranteed, to the extent possible, that all data have been used to calibrate the model in a	DTSC response: See RTC #442

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										key area. The IM-3 data represent years of good quality data in the most contaminated part of the site (vs. the ISPT location). The IM-3 data cover a much larger geographic area and are available for much longer (i.e., 10 years), which might require different assumptions about fate/transport parameters (i.e., floodplain vs. upland etc.), both of which are influenced by IM-3 data. We strongly recommend that IM-3 data are used at a minimum to validate current assumptions used in the fate/transport model, where relevant (i.e., obviously one can't evaluate Mn and As w/out TOC, which IM-3 doesn't include.	
444	Cocopah/TRC	Non-design	GW Modeling	Append B Sect. 6.2 P. 37	"6.2 Solute Transport Parameters"	Why weren't more realistic values developed for transport parameters by calibrating the flow and solute transport model against Quarterly IM3 water level and concentration changes (i.e., instead of from publications)? Is there any reason this couldn't be done now, prior to finalization of design/operation/installation/testing etc.? These data seem to be the best available information on how the model (flow/fate/transport) performs in a critical area.	See above			The last statement of PG&Es comment misses the point . Conducting this analysis BEFORE completion of the 90%BOD is so that all stakeholders can be guaranteed, to the extent possible, that all data have been used to calibrate the model in a key area. The IM-3 data represent years of good quality data in the most contaminated part of the site (vs. the ISPT location). The IM-3 data cover a much larger geographic area and are available for much longer (i.e., 10 years), which might require different assumptions about fate/transport parameters (i.e., floodplain vs. upland etc.), both of which are influenced by IM-3 data. We strongly recommend that IM-3 data are used at a	DTSC response: See RTC #442

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										minimum to validate current assumptions used in the fate/ transport model, where relevant (i.e., obviously one can't evaluate Mn and As w/out TOC, which IM-3 doesn't include.	
445	Chemehuevi/ TRC	Non-design	GW Modeling	Append B Sect. 6.2 P. 37	"6.2 Solute Transport Parameters"	Why weren't more realistic values developed for transport parameters by calibrating the flow and solute transport model against Quarterly IM3 water level and concentration changes (i.e., instead of from publications)? Is there any reason this couldn't be done now, prior to finalization of design/operation/installation/testing etc.? These data seem to be the best available information on how the model (flow/fate/transport) performs in a critical area.	See above			The last statement of PG&Es comment misses the point . Conducting this analysis BEFORE completion of the 90%BOD is so that all stakeholders can be guaranteed, to the extent possible, that all data have been used to calibrate the model in a key area. The IM-3 data represent years of good quality data in the most contaminated part of the site (vs. the ISPT location). The IM-3 data cover a much larger geographic area and are available for much longer (i.e., 10 years), which might require different assumptions about fate/transport parameters (i.e., floodplain vs. upland etc.), both of which are influenced by IM-3 data. We strongly recommend that IM-3 data are used at a minimum to validate current assumptions used in the fate/transport model, where relevant (i.e., obviously one can't evaluate Mn and As w/out TOC, which IM-3 doesn't include.	DTSC response: See RTC #442
446	DOI-23	Design	GW Modeling	6.2.3/38	The text states "A Kd value of 0.05 L/kg in the aquifer results in a retardation factor of approximately 1.25 for the Cr(VI) plume in the solute transport model."	Please revise the Retardation Factor (RF) calculation and discussion. A kd of 0.05, bulk density of 1.73 (p.30) and a mobile porosity of 12 percent will result in a RF of 1.72 (as opposed to 1.25). It appears that the total porosity (35%) was used for the RF calculation; however, based on a review of the model input files it appears that RF's were calculated for both the mobile and immobile domains. Since the mobile porosity is used to calculate advective transport rates rather than the total porosity. Since MT3D allows a number of options with respect to the treatment of sorption it would be worthwhile to present how it was actually assigned in the model.	In a dual-domain model, MT3DMS automatically fractionates the bulk density into mobile and immobile portions based on the mobile and immobile porosities to ensure a consistent retardation factor in both domains. In order to maintain the same retardation factor in		Accepted.		Resolved.

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							mobile and immobile domains, the basis for the retardation factor should be total porosity. Using total porosity in the calculation results in a retardation factor of 1.25. To check the MT3DMS calculation print flag (IFMTRF flag) located in the Basic Transport file (BTN) was enabled. This flags prints the model computed retardation factor in the MT3DMS output file and a value of 1.25 was reported, which indicates that the retardation factor will be applied consistently in both domains.				
447	DOI-24	Design	GW Modeling	6.2.3/38	The text states "The presence of background Cr(VI) concentrations associated with the naturally occurring mineralogy suggests nominal adsorption (low Kd value) is representative of the aquifer. This assessment is consistent with the literature, which identifies a wide range of Kd values (USEPA 1999) for naturally occurring Cr(VI) in aquifer soils with a normal pH range."	The amount of chromium mass that is initialized in the model as well as the transport velocities and remediation times will be very sensitive to the Kd value. The text indicates that the Kd values are thought to be low due to the background concentrations but goes on to conclude that this is consistent with a wide range of values. Please explain how low Kd values are consistent with a wide range? It is also unclear how high background concentrations by themselves indicate low Kd values. Since the Kd is simply proportionality constant, high background concentrations could also result from high Kd values if the sorbed concentrations of chromium are high enough. Please clarify the text. Although the actual Kd value is not predicted by the solubility modeling described in Section 5 the approach should integrate the information gained from the solubility modeling into the selection of the Kd values.	The text will be clarified to state that the low K_d value falls within the range of reported K_d values. A laboratory study on aerobic core samples from the Site (CH2M Hill, 2005, *Summary of Results—Aerobic Zone Hexavalent Chromium Core Testing*) indicated the range in Kd values from two aerobic core samples collected from the flood plain varied between 0.01 and 0.09 L/kg. This study therefore supports the value of 0.05 L/kg utilized in the baseline hexavalent chromium modeling. A reference to this technical memo will be added to the text. Additionally, the current Cr(VI) plume distribution and the relatively low groundwater flow velocities support the assumption that minimal sorption of Cr(VI) is occurring at the Site. If K_d values for Cr(VI) were high, the current plume footprint would be much more limited in spatial extent. For comparative purposes, an elevated K_d value was assessed in a sensitivity analysis to		Accepted.		Comment resolved pending DOI review of the final design documents.

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							demonstrate potential impact on remedial timeframe and plume distribution. To the extent possible, the Cr(VI) K_d value used will be checked for consistency against other geochemical model parameters developed in Section 5.				
448	DOI-25	Design	GW Modeling	6.2.3/38	The text states "The Cr(VI) Kd value was further adjusted in the bedrock to better simulate the movement of Cr(VI) in the fractured bedrock.	The text indicates that the Kd was fixed to obtain a Rf of 1.25 rather than adjusted to better simulate the movement of Cr(VI). So was it the porosity (rather than the Kd) that was adjusted to better simulate the movement in the fractured bedrock? Since the RF's are calculated separately in MT3D for the mobile and immobile porosity—there really is not a RF of 1.25. So please describe how the matrix and mobile porosities in conjunction with the Kd's are assigned in the fractured bedrock and overlying aquifers.	Porosity was reduced in the bedrock first to better represent the fracture flow. If the K_d value utilized in the alluvial aquifer were held constant in the bedrock, a significantly higher retardation factor would result in the bedrock as the bulk density increased and the total porosity decreased in the computation. This would be inconsistent with respect to the current spatial extent of Cr(VI) in the bedrock. Therefore, the K_d value in bedrock was reduced to yield an equivalent R_f of 1.25 as simulated in the aquifer. This lower K_d value is also supported by the limited fraction of organic carbon in bedrock fractures. As stated in the RTC #446 DOI-23, MT3DMS utilizes total porosity in the calculation of the R_f.		Accepted.		Resolved.
449	DOI-26	Design	GW Modeling	6.2.3/38	The bedrock was simulated with a total porosity of 2% so the Kd value in bedrock was reduced to 0.0029 L/kg to yield an equivalent Rf as calculated in the aquifer to establish a uniform Rf value of 1.25 throughout the entire submodel	For this Kd assumption to be valid the bedrock should have similar geochemical conditions (e.g., ionic strengths, cations, anions, pH, Eh and total organic carbon) to the overlying units. Please provide justification for this Kd assumption.	By reducing the K_d in the bedrock, the assumption is made that geochemical conditions are not similar in the bedrock; however, a similar resultant nominal R_f value of 1.25 was utilized to represent the current Cr(VI) plume distribution in bedrock.		Accepted.		Resolved.

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					domain.						
450	DOI-27	Design	GW Modeling	6.2.5/39	The distribution of the Cr(VI) for model layers 1 through 4 are shown on Figures 6.2-1 through 6.2-4.	Please indicate whether any Cr(VI) was initialized in Layer 5.	Cr(VI) was not initialized in Layer 5. This statement will be added to Section 6.2.5.		Resolved		Resolved.
451	DOI-28	Design	GW Modeling	6.2.7/41	Further, pH buffering to circumneutral values will ensure that most of the inorganic carbon generated will be present as bicarbonate rather than dissolved CO2.	Please clarify whether this is due to natural buffering of the system or whether a buffer will be added to the injectant.	The text will be reworded as follows: "Further, pH buffering to circumneutral values by the aquifer solids will ensure that most of the inorganic carbon generated will be present as bicarbonate rather than dissolved CO2."		Resolved		Resolved.
452	DOI-29	Design	GW Modeling	6.2.7/41	Formation of H2(g) and H2S will be limited by controlling TOC concentrations to limit byproduct generation. Formation of these gases (as well as N2 formation) was not an issue during the pilot testing conducted in the floodplain.	At the planned TOC loading rates it would seem that the generation of methane would be much more likely than H2S and should be mentioned.	The text will be reworded as follows: "Formation of H2(g), H2S, and methane will be limited by controlling TOC concentrations…"		Resolved		Resolved.
453	FMIT/TRC	Non-design	GW Modeling	Append B 6.3/p42	"The regional groundwater flow model was calibrated against (a) long term average groundwater levels, (b) average monthly floodplain levels responding to fluctuating river levels, (c) short- term responses to pump testing events, and (d) plume development	After system startup and operation, will future calibration of the model(s) involve calibrating against data from dewatered conditions and these previous (a to d) calibration data to ensure that the model is properly calibrated? Will new concentration data trends also be used to calibrate the fate/transport model for the first time – it has not been calibrated to date (i.e., to IM-3 Quarterly Monitoring data). An approach/methodology to calibration (including use of PEST) has not been presented in the 90%BOD reports, but is strongly recommended to avoid ambiguity/confusion, especially when critical decisions must be made in a short time period, or proper justification is required for stakeholders when proposing changes to the present proposed design/operation of the system.	Future groundwater flow model calibrations will utilize recent data sets along with historical calibration data sets to further validate the groundwater flow model. Upon completion of the calibration of the groundwater flow model, the solute transport model will be calibrated against recent concentration data and observed trends, in accordance with the schedule in Appendix B Section 12. An additional paragraph			The Tribe requests that the 90% BOD discussion on future calibration groundwater flow (and fate/transport) models be presented in more detail for all stakeholders. For example, what are calibration targets, tolerance, use of PEST, etc.?	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					over time as presented in the Groundwater Model Update (CH2M Hill, 2005b)."		will be added to Appendix B Section 12 to discuss the intended future use of the model including updating remediation time frame estimates, supporting capture zone analyses, and analyzing potential remedy design operation changes.				
454	Hualapai/TRC	Non-design	GW Modeling	Append B 6.3/p42	"The regional groundwater flow model was calibrated against (a) long term average groundwater levels, (b) average monthly floodplain levels responding to fluctuating river levels, (c) short- term responses to pump testing events, and (d) plume development over time as presented in the Groundwater Model Update (CH2M Hill, 2005b)."	After system startup and operation, will future calibration of the model(s) involve calibrating against data from dewatered conditions and these previous (a to d) calibration data to ensure that the model is properly calibrated? Will new concentration data trends also be used to calibrate the fate/transport model for the first time – it has not been calibrated to date (i.e., to IM-3 Quarterly Monitoring data). An approach/methodology to calibration (including use of PEST) has not been presented in the 90%BOD reports, but is strongly recommended to avoid ambiguity/confusion, especially when critical decisions must be made in a short time period, or proper justification is required for stakeholders when proposing changes to the present proposed design/operation of the system.	See above			Hualapai request that the 90%BOD discussion on future calibration groundwater flow (and fate/transport) models be presented in more detail for all stakeholders. For example, what are calibration targets, tolerance, use of PEST etc.?	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.
455	Cocopah/TRC	Non-design	GW Modeling	Append B 6.3/p42	"The regional groundwater flow model was calibrated against (a) long term average groundwater levels, (b) average monthly floodplain levels responding to fluctuating river levels, (c) short- term responses to pump testing events, and (d) plume development over time as presented in	After system startup and operation, will future calibration of the model(s) involve calibrating against data from dewatered conditions and these previous (a to d) calibration data to ensure that the model is properly calibrated? Will new concentration data trends also be used to calibrate the fate/transport model for the first time – it has not been calibrated to date (i.e., to IM-3 Quarterly Monitoring data). An approach/methodology to calibration (including use of PEST) has not been presented in the 90%BOD reports, but is strongly recommended to avoid ambiguity/confusion, especially when critical decisions must be made in a short time period, or proper justification is required for stakeholders when proposing changes to the present proposed design/operation of the system.	See above			Tribes request that the 90% BOD discussion on future calibration groundwater flow (and fate/ transport) models be presented in more detail for all stakeholders. For example, what are calibration targets, tolerance, use of PEST etc.?	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					the Groundwater Model Update (CH2M Hill, 2005b)."						
456	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 6.3/p42	"The regional groundwater flow model was calibrated against (a) long term average groundwater levels, (b) average monthly floodplain levels responding to fluctuating river levels, (c) short- term responses to pump testing events, and (d) plume development over time as presented in the Groundwater Model Update (CH2M Hill, 2005b)."	After system startup and operation, will future calibration of the model(s) involve calibrating against data from dewatered conditions and these previous (a to d) calibration data to ensure that the model is properly calibrated? Will new concentration data trends also be used to calibrate the fate/transport model for the first time – it has not been calibrated to date (i.e., to IM-3 Quarterly Monitoring data). An approach/methodology to calibration (including use of PEST) has not been presented in the 90%BOD reports, but is strongly recommended to avoid ambiguity/confusion, especially when critical decisions must be made in a short time period, or proper justification is required for stakeholders when proposing changes to the present proposed design/operation of the system.	See above			Tribes request that the 90% BOD discussion on future calibration groundwater flow (and fate/ transport) models be presented in more detail for all stakeholders. For example, what are calibration targets, tolerance, use of PEST etc.?	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.
457	FMIT/TRC	Non-design	GW Modeling	Append B 6.5 p. 52	"Figures 6.5-6 through 6.5-8 depict the two potential groundwater conditions that exist with the proposed remedial design. One frame of each figure depicts the contours with the NTH IRZ under operating conditions for a 6-month period, while the second image shows conditions with the NTH IRZ turned off for an 18-month period."	Could the expected simulated change in head be provided during IRZ operation and when it is off? This helps the tribal representatives know what the expected simulated changes in head might be. Could the best estimates of maximum head change (increase/decrease) at each injection/extraction and monitoring well also be provided to the Tribes (and by screen interval/depth). It will be instructive for Tribes to fully understand when 'significant deviations' might occur - as this potentially triggers an internal evaluation (yet to be adequately defined) by PG&E/consultants to decide if this warrants a model update, re-calibration to available information, and simulation of future scenarios to assess if current design/operations continues to meet RAOs/minimum performance threshold criteria.	A new figure will be generated showing the spatial difference in drawdown and mounding between the NTH IRZ ON and NTH IRZ OFF periods. The simulated head changes at NTH IRZ wells will also be presented. Text referencing "significant deviations" will be removed and the model update procedure schedule presented in Appendix B Section 12 will be utilized.			The Tribe also requests that simulated heads at wells also be corrected for model grid cell size and head losses at the well.	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.
458	Hualapai/TRC	Non-design	GW Modeling	Append B 6.5 p. 52	"Figures 6.5-6 through 6.5-8 depict the two	Could the expected simulated change in head be provided during IRZ operation and when it is off? This helps the tribal representatives know what the expected simulated changes in head might be. Could the best estimates of maximum head change (increase/decrease) at each	See above			Hualapai also request that simulated heads at wells also be corrected	DTSC/DOI response: Agencies will provide direction to PG&E in

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					potential groundwater conditions that exist with the proposed remedial design. One frame of each figure depicts the contours with the NTH IRZ under operating conditions for a 6-month period, while the second image shows conditions with the NTH IRZ turned off for an 18-month period.”	injection/extraction and monitoring well also be provided to the Tribes (and by screen interval/depth). It will be instructive for Tribes to fully understand when ‘significant deviations’ might occur - as this potentially triggers an internal evaluation (yet to be adequately defined) by PG&E/consultants to decide if this warrants a model update, re-calibration to available information, and simulation of future scenarios to assess if current design/operations continues to meet RAOs/minimum performance threshold criteria.				for model grid cell size and head losses at the well.	a separate letter.
459	Cocopah/TRC	Non-design	GW Modeling	Append B 6.5 p. 52	“Figures 6.5-6 through 6.5-8 depict the two potential groundwater conditions that exist with the proposed remedial design. One frame of each figure depicts the contours with the NTH IRZ under operating conditions for a 6-month period, while the second image shows conditions with the NTH IRZ turned off for an 18-month period.”	Could the expected simulated change in head be provided during IRZ operation and when it is off? This helps the tribal representatives know what the expected simulated changes in head might be. Could the best estimates of maximum head change (increase/decrease) at each injection/extraction and monitoring well also be provided to the Tribes (and by screen interval/depth). It will be instructive for Tribes to fully understand when ‘significant deviations’ might occur - as this potentially triggers an internal evaluation (yet to be adequately defined) by PG&E/consultants to decide if this warrants a model update, re-calibration to available information, and simulation of future scenarios to assess if current design/operations continues to meet RAOs/minimum performance threshold criteria.	See above			Tribes also request that simulated heads at wells also be corrected for model grid cell size and head losses at the well.	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.
460	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 6.5 p. 52	“Figures 6.5-6 through 6.5-8 depict the two potential groundwater conditions that exist with the proposed remedial design. One frame of each figure depicts the contours	Could the expected simulated change in head be provided during IRZ operation and when it is off? This helps the tribal representatives know what the expected simulated changes in head might be. Could the best estimates of maximum head change (increase/decrease) at each injection/extraction and monitoring well also be provided to the Tribes (and by screen interval/depth). It will be instructive for Tribes to fully understand when ‘significant deviations’ might occur - as this potentially triggers an internal evaluation (yet to be adequately defined) by PG&E/consultants to decide if this warrants a model update, re-calibration to available information, and simulation of future scenarios to assess if current design/operations continues to meet RAOs/minimum performance threshold criteria.	See above			Tribes also request that simulated heads at wells also be corrected for model grid cell size and head losses at the well.	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					with the NTH IRZ under operating conditions for a 6-month period, while the second image shows conditions with the NTH IRZ turned off for an 18-month period.”						
461	FMIT/TRC	Design	GW Modeling	Figs. 6.5-13 to 6.5-20	Injections at FW-1 and IRL wells	Previous model presentations (e.g. Groundwater EIR) showed that the water-table would rise about 28 feet near injection well FW-1, and the current model shows lower water table rises. Cobble layers within the lithology have been noted in drilling logs from the FW-1 injection area (RFI-RI v. 2 App). Do these cobble layers outcrop in the arroyos to the north? If the water table rises due to FW and IRL injections, these cobble layers could transmit injected water to the surface, appearing as unnatural springs in the arroyos. Have threshold water levels been established for monitoring wells? Has a monitoring program been considered for induced seeps and springs?	In the area of FW-1, the vadose zone is approximately 100 ft thick Mounding will be greatest in the immediate vicinity of the injection well and then reduce rapidly as distance from the injection point increases due to the overall thickness of the alluvial aquifer in this area (>350 ft). Even with mounding up to 28 ft, the extent of the hydraulic mound would be limited and there is still substantial vadose zone above the water table. For these reasons it is highly unlikely that water will transmit along potential continuous cobble layers and appear as springs in the arroyos. Therefore threshold water levels for monitoring wells and a monitoring program for induced seeps and springs is not needed.			Reviewer did not answer the question: “Do these cobble layers outcrop in arroyos to the north of FW and IRL wells?” Maintaining the integrity of the maze area is of the utmost importance. For example, when the remedy is operating and nobody is monitoring, a seep appears unnoticed, and the seep grows like a leaking dam, which could cause great destruction to the cultural resources of the area, especially if such a seep goes unnoticed for long periods of time. Volunteers have offered to monitor for unnatural springs in the project area; however, reliance on volunteers for a 30-50 year project does not provide security that a potential disaster could be averted. Comment unresolved.	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.
462	Hualapai/TRC	Design	GW Modeling	Figs. 6.5-13 to 6.5-20	Injections at FW-1 and IRL wells	Previous model presentations (e.g. Groundwater EIR) showed that the water-table would rise about 28 feet near injection well FW-1, and the current model shows lower water table rises. Cobble layers within the lithology have been noted in drilling logs from the FW-1 injection area (RFI-RI v. 2 App). Do these cobble layers outcrop in the arroyos to the north? If the water table rises due to FW and IRL injections, these cobble layers could transmit injected water to the surface, appearing as unnatural springs in the arroyos. Have threshold water levels been established for monitoring wells? Has a monitoring program been considered for induced seeps and springs?	See above			Reviewer did not answer the question: “Do these cobble layers outcrop in arroyos to the north of FW and IRL wells?” Maintaining the integrity of the maze area is of the utmost importance. For example, when the remedy is operating and nobody is	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										monitoring, a seep appears unnoticed, and the seep grows like a leaking dam, which could cause great destruction to the cultural resources of the area, especially if such a seep goes unnoticed for long periods of time. Volunteers have offered to monitor for unnatural springs in the project area; however, reliance on volunteers for a 30-50 year project does not provide security that a potential disaster could be averted. Comment unresolved.	
463	Cocopah/TRC	Design	GW Modeling	Figs. 6.5-13 to 6.5-20	Injections at FW-1 and IRL wells	Previous model presentations (e.g. Groundwater EIR) showed that the water-table would rise about 28 feet near injection well FW-1, and the current model shows lower water table rises. Cobble layers within the lithology have been noted in drilling logs from the FW-1 injection area (RFI-RI v. 2 App). Do these cobble layers outcrop in the arroyos to the north? If the water table rises due to FW and IRL injections, these cobble layers could transmit injected water to the surface, appearing as unnatural springs in the arroyos. Have threshold water levels been established for monitoring wells? Has a monitoring program been considered for induced seeps and springs?	See above			Reviewer did not answer the question: "Do these cobble layers outcrop in arroyos to the north of FW and IRL wells?" Maintaining the integrity of the maze area is of the utmost importance. For example, when the remedy is operating and nobody is monitoring, a seep appears unnoticed, and the seep grows like a leaking dam, which could cause great destruction to the cultural resources of the area, especially if such a seep goes unnoticed for long periods of time. Volunteers have offered to monitor for unnatural springs in the project area; however, reliance on volunteers for a 30-50 year project does not provide security that a potential disaster could be averted. Comment unresolved.	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.
464	Chemehuevi/ TRC	Design	GW Modeling	Figs. 6.5-13 to 6.5-20	Injections at FW-1 and IRL wells	Previous model presentations (e.g. Groundwater EIR) showed that the water-table would rise about 28 feet near injection well FW-1, and the current model shows lower water table rises. Cobble layers within the lithology have been noted in drilling logs from the FW-1 injection area (RFI-RI v. 2 App). Do these cobble layers outcrop in the arroyos to the north? If the water table rises due to FW and IRL injections, these cobble layers could transmit injected water to the surface,	See above			Reviewer did not answer the question: "Do these cobble layers outcrop in arroyos to the north of FW and IRL	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
						appearing as unnatural springs in the arroyos. Have threshold water levels been established for monitoring wells? Has a monitoring program been considered for induced seeps and springs?				wells?" Maintaining the integrity of the maze area is of great importance. For example, when the remedy is operating and nobody is monitoring, a seep appears unnoticed, and the seep grows like a leaking dam, which could cause great destruction to the cultural resources of the area, especially if such a seep goes unnoticed for long periods of time. Volunteers have offered to monitor for unnatural springs in the project area; however, reliance on volunteers for a 30-50 year project does not provide security that a potential disaster could be averted. Comment unresolved.	
465	FMIT/TRC	Non-design	GW Modeling	Append B 6.6 p. 54	"While the model will be updated with new data where applicable as described in Section 12, general initial design considerations can be made relative to design operation if significant deviations in parameters occur."	This is confusing. The meaning of "significant deviations" needs to be made much clearer and based on very specific quantitative performance metrics to avoid ambiguity and confusion. This can only be done with an updated/re-calibrated model. Whether parameter deviations are significant can ONLY be determined using an updated/re-calibrated model and considered 'significant' ONLY if they change system performance to RAOs/OPS by some threshold, yet to be specified. Greater details of how/when all models are updated and re-calibrated should be presented here, given the importance to future decisions on changes to the design/operation that will have to rely heavily on the models.	See response to comment #76. The term "significant differences" will be removed and the model update schedule will be followed as described in Appendix B Section 12. Material changes to the model including update and recalibrations will be noted in the corresponding quarterly report, and presented in detail in the annual report.			The Tribe requests that PG&E consultants keep track of not only all 'Material changes' made to the model(s), which should be defined better here, but should also track adjustments to all 'knobs' that are changed to the currently planned design (i.e., new wells) and operations (TOC injection rates, durations, volumes injected, increases and decreases in injection and extraction flow rates, timing and duration of all stoppages of injection/ extraction of all wells etc.) so that when different models (,i.e., MicroFEM, Modflow, MT3D, Phreeqc, PEST etc.) are updated and re-calibrated to available time-varying heads, 3-d gradients and concentrations, the models can actually be	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										expected to reproduce all of the system flows and fate/transport in a continually changing/ adjusted system. Each 'adjustment' will induce a change that simply translates and adds to other system adjustments, and the Tribes feel that PG&E consultants could easily get confused with which adjustment goes with which change in system response, possibly causing incorrect 'field-based' adjustments that impact overall system performance towards meeting RAOs.	
466	Hualapai/TRC	Non-design	GW Modeling	Append B 6.6 p. 54	"While the model will be updated with new data where applicable as described in Section 12, general initial design considerations can be made relative to design operation if significant deviations in parameters occur."	This is confusing. The meaning of "significant deviations" needs to be made much clearer and based on very specific quantitative performance metrics to avoid ambiguity and confusion. This can only be done with an updated/re-calibrated model. Whether parameter deviations are significant can ONLY be determined using an updated/re-calibrated model and considered 'significant' ONLY if they change system performance to RAOs/OPS by some threshold, yet to be specified. Greater details of how/when all models are updated and re-calibrated should be presented here, given the importance to future decisions on changes to the design/operation that will have to rely heavily on the models.	See above			Hualapai request that PG&E consultants keep track of not only all 'Material changes' made to the model(s), which should be defined better here, but should also track adjustments to all 'knobs' that are changed to the currently planned design (i.e., new wells) and operations (TOC injection rates, durations, volumes injected, increases and decreases in injection and extraction flow rates, timing and duration of all stoppages of injection/extraction of all wells etc.) so that when different models (i.e., MicroFEM, Modflow, MT3D, Phreeqc, PEST etc.) are updated and re-calibrated to available time-varying heads, 3-d gradients and concentrations, the models can actually be expected to reproduce all of the system flows and fate/transport in a continually changing/adjusted	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										system. Each 'adjustment' will induce a change that simply translates and adds to other system adjustments, and the Tribes feel that PG&E consultants could easily get confused with which adjustment goes with which change in system response, possibly causing incorrect 'field-based' adjustments that impact overall system performance towards meeting RAOs.	
467	Cocopah/TRC	Non-design	GW Modeling	Append B 6.6 p. 54	"While the model will be updated with new data where applicable as described in Section 12, general initial design considerations can be made relative to design operation if significant deviations in parameters occur."	This is confusing. The meaning of "significant deviations" needs to be made much clearer and based on very specific quantitative performance metrics to avoid ambiguity and confusion. This can only be done with an updated/re-calibrated model. Whether parameter deviations are significant can ONLY be determined using an updated/re-calibrated model and considered 'significant' ONLY if they change system performance to RAOs/OPS by some threshold, yet to be specified. Greater details of how/when all models are updated and re-calibrated should be presented here, given the importance to future decisions on changes to the design/operation that will have to rely heavily on the models.	See above			Tribes request that PG&E consultants keep track of not only all 'Material changes' made to the model(s), which should be defined better here, but should also track adjustments to all 'knobs' that are changed to the currently planned design (i.e., new wells) and operations (TOC injection rates, durations, volumes injected, increases and decreases in injection and extraction flow rates, timing and duration of all stoppages of injection/extraction of all wells etc.) so that when different models (i.e., MicroFEM, Modflow, MT3D, Phreeqc, PEST etc.) are updated and re-calibrated to available time-varying heads, 3-d gradients and concentrations, the models can actually be expected to reproduce all of the system flows and fate/transport in a continually changing/adjusted system. Each 'adjustment' will induce a change that simply translates and adds to other system	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										adjustments, and the Tribes feel that PG&E consultants could easily get confused with which adjustment goes with which change in system response, possibly causing incorrect 'field-based' adjustments that impact overall system performance towards meeting RAOs.	
468	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 6.6 p. 54	"While the model will be updated with new data where applicable as described in Section 12, general initial design considerations can be made relative to design operation if significant deviations in parameters occur."	This is confusing. The meaning of "significant deviations" needs to be made much clearer and based on very specific quantitative performance metrics to avoid ambiguity and confusion. This can only be done with an updated/re-calibrated model. Whether parameter deviations are significant can ONLY be determined using an updated/re-calibrated model and considered 'significant' ONLY if they change system performance to RAOs/OPS by some threshold, yet to be specified. Greater details of how/when all models are updated and re-calibrated should be presented here, given the importance to future decisions on changes to the design/operation that will have to rely heavily on the models.	See above			Tribes request that PG&E consultants keep track of not only all 'Material changes' made to the model(s), which should be defined better here, but should also track adjustments to all 'knobs' that are changed to the currently planned design (i.e., new wells) and operations (TOC injection rates, durations, volumes injected, increases and decreases in injection and extraction flow rates, timing and duration of all stoppages of injection/extraction of all wells etc.) so that when different models (i.e., MicroFEM, Modflow, MT3D, Phreeqc, PEST etc.) are updated and re-calibrated to available time-varying heads, 3-d gradients and concentrations, the models can actually be expected to reproduce all of the system flows and fate/transport in a continually changing/adjusted system. Each 'adjustment' will induce a change that simply translates and adds to other system adjustments, and the Tribes feel that PG&E consultants could easily get confused with which adjustment goes	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										with which change in system response, possibly causing incorrect 'field-based' adjustments that impact overall system performance towards meeting RAOs.	
469	FMIT/TRC RTC, 60% #382	Non-design	GW Modeling	Append B 6.3	(orig comment #382 response)....” *An additional paragraph will be added to list the parameters that were not adjusted during this solute transport model sensitivity analysis.”*	This additional description does not seem to have been included in the 90% BOD text.	The following text will be added to Appendix B Section 6.3. “<u>As the sensitivity analysis was focused on the solute transport modeling using the submodel, specific sensitivity analyses relevant to the groundwater flow model parameters were not conducted. Parameters that were not adjusted in the sensitivity analyses include: hydraulic conductivity, leakance/ vertical hydraulic conductivity, riverbed conductance, and recharge.</u>” As described in RTC #441, a sensitivity analysis on porosity will be added to Appendix B. PG&E will review and consider the Tribes’ response (dated Sept 18 and 21, 2015) to PG&E’s evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.			Comment noted. The Tribe requests that PG&E consultants consider the various recommendations outlined in the Prucha & Eggers whitepaper on MW-X/MW-Y) , specifically fixing and re-calibrating the model to all available data (including AZ wells MW-54, MW-55 and MW-56) so that additional sensitivity analysis can be performed to evaluate the range of proposed remediation system impacts on flows/fate/ transport in the vicinity of the Colorado River and within Arizona, especially given the high conceptual model uncertainty (i.e., configuration/hydraulic conductivity of the assumed paleo channel, distribution/configuration of high conductivity gravels (500 to 900 ft/d) extending from outlet of Sacramento Wash into the Colorado River Floodplain).	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.
470	Hualapai/TRC RTC, 60% #382	Non-design	GW Modeling	Append B 6.3	(orig comment #382 response)....” *An additional paragraph will be added to list the parameters that were not adjusted during this solute transport model sensitivity analysis.”*	This additional description does not seem to have been included in the 90% BOD text.	See above			Hualapai request that PG&E consultants consider the various recommendations outlined in the Prucha & Eggers whitepaper on MW-X/MW-Y) , specifically fixing and re-calibrating the model to all available data (including AZ wells MW-54, MW-55 and MW-56) so that additional sensitivity	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										analysis can be performed to evaluate the range of proposed remediation system impacts on flows/fate/ transport in the vicinity of the Colorado River and within Arizona, especially given the high conceptual model uncertainty (i.e., configuration/hydraulic conductivity of the assumed paleo channel, distribution/configuration of high conductivity gravels (500 to 900 ft/d) extending from outlet of Sacramento Wash into the Colorado River Floodplain).	
471	Cocopah/TRC RTC, 60% #382	Non-design	GW Modeling	Append B 6.3	(orig comment #382 response)....” *An additional paragraph will be added to list the parameters that were not adjusted during this solute transport model sensitivity analysis.”*	This additional description does not seem to have been included in the 90% BOD text.	See above			Comment noted. The Tribes request that PG&E consultants consider the various recommendations outlined in the Prucha & Eggers whitepaper on MW-X/MW-Y) , specifically fixing and re-calibrating the model to all available data (including AZ wells MW-54, MW-55 and MW-56) so that additional sensitivity analysis can be performed to evaluate the range of proposed remediation system impacts on flows/fate/ transport in the vicinity of the Colorado River and within Arizona, especially given the high conceptual model uncertainty (i.e., configuration/hydraulic conductivity of the assumed paleo channel, distribution/configuration of high conductivity gravels (500 to 900 ft/d) extending from outlet of Sacramento Wash into the Colorado River Floodplain).	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.
472	Chemehuevi/ TRC RTC, 60%	Non-design	GW Modeling	Append B 6.3	(orig comment #382 response)....”	This additional description does not seem to have been included in the 90% BOD text.	See above			Comment noted. The Tribes request that PG&E consultants	DTSC/DOI response: Agencies will provide direction to PG&E in

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	#382				*An additional paragraph will be added to list the parameters that were not adjusted during this solute transport model sensitivity analysis."*					consider the various recommendations outlined in the Prucha & Eggers whitepaper on MW-X/MW-Y) , specifically fixing and re-calibrating the model to all available data (including AZ wells MW-54, MW-55 and MW-56) so that additional sensitivity analysis can be performed to evaluate the range of proposed remediation system impacts on flows/fate/ transport in the vicinity of the Colorado River and within Arizona, especially given the high conceptual model uncertainty (i.e., configuration/hydraulic conductivity of the assumed paleo channel, distribution/configuration of high conductivity gravels (500 to 900 ft/d) extending from outlet of Sacramento Wash into the Colorado River Floodplain).	a separate letter.
473	FMIT/TRC	Non-design	GW Modeling	Append B 7.4 p. 59	“"The initial pumping conditions simulated were NTH IRZ operation for a 6-month period (300 gpm injection and extraction) with active carbon injection, followed by a 3-month period where the NTH IRZ is shutoff and the River Bank Extraction Wells are turned on at 150 gpm and the extracted water is injected into IRL-1 and IRL-2."	Was the effect of seasonal variation in river stage cycle on timing of the actual proposed final remedial system design/operation of the NTH IRZ on/off (6/18 month) cycle evaluated – using the regional flow model? For example, when is the best time to start/stop IRZ cycle, and could IRL injection/Riverbank extraction rates/timing utilize river stage fluctuations to any advantage? Are there any disadvantages to not simulating actual river fluctuations? Any benefits of modeling this now to optimize operations before startup, or at least before changes are proposed to the initial operation schedules?	The transient variation of the river stage was assessed with the solute transport submodel and the analysis was conducted by starting the remedy while the Colorado River was at its lowest stage to maximize flow conditions towards the Colorado River (enhance floodplain flushing). This would be the ideal timing, but in comparing the transient transport to the steady state transport with average conditions, the results were similar. This indicates a low degree of sensitivity to river stage during remedy operation. PG&E will review and consider the Tribes' response (dated Sept 18			It is difficult to believe that the regional MicroFEM model wouldn't have also been used to simulate transient flow conditions, as it is our understanding that boundary conditions are transferred from regional to local submodel. The Prucha & Eggers whitepaper (July, 2015) on MW-X and MW-Y identified several problems with how river-aquifer interaction was specified in the model, especially where no river cells were specified in the submodel. In addition, the 90%BOD Appendix B documentation only suggests one proposed remedial configuration (NOT the one currently	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

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							and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.			proposed) was evaluated in a transient river stage scenario. The Tribe believes it is in the best interest of all stakeholders to simulate a similar transient river stage fluctuation a) using the currently proposed remediation design/ operation, b) conduct the scenario AFTER fixing/re-calibrating the model as per the recommendations made in the Prucha and Eggers July 2015 whitepaper, and c) consider simulating a range of possible outcomes (i.e., a predictive sensitivity analysis) so that all stakeholders can better understand what the range of actual transient system behavior (flows and fate/transport) might actually be.	
474	Hualapai/TRC	Non-design	GW Modeling	Append B 7.4 p. 59	""The initial pumping conditions simulated were NTH IRZ operation for a 6-month period (300 gpm injection and extraction) with active carbon injection, followed by a 3-month period where the NTH IRZ is shutoff and the River Bank Extraction Wells are turned on at 150 gpm and the extracted water is injected into IRL-1 and IRL-2."	Was the effect of seasonal variation in river stage cycle on timing of the actual proposed final remedial system design/operation of the NTH IRZ on/off (6/18 month) cycle evaluated – using the regional flow model? For example, when is the best time to start/stop IRZ cycle, and could IRL injection/Riverbank extraction rates/timing utilize river stage fluctuations to any advantage? Are there any disadvantages to not simulating actual river fluctuations? Any benefits of modeling this now to optimize operations before startup, or at least before changes are proposed to the initial operation schedules?	See above			It is difficult to believe that the regional MicroFEM model wouldn't have also been used to simulate transient flow conditions, as it is our understanding that boundary conditions are transferred from regional to local submodel. The Prucha & Eggers whitepaper (July, 2015) on MW-X and MW-Y identified several problems with how River-Aquifer interaction was specified in the model, especially where no river cells were specified in the submodel. In addition, the 90%BOD Appendix B documentation only suggests one proposed remedial configuration (NOT the one currently proposed) was evaluated in a transient river stage scenario.	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

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										The Tribes believe it is in the best interest of all stakeholders to simulate a similar transient river stage fluctuation a) using the currently proposed remediation design/ operation, b) conduct the scenario AFTER fixing/re-calibrating the model as per the recommendations made in the Prucha and Eggers July 2015 whitepaper, and c) consider simulating a range of possible outcomes (i.e., a predictive sensitivity analysis) so that all stakeholders can better understand what the range of actual transient system behavior (flows and fate/ transport) might actually be.	
475	Cocopah/TRC	Non-design	GW Modeling	Append B 7.4 p. 59	“"The initial pumping conditions simulated were NTH IRZ operation for a 6-month period (300 gpm injection and extraction) with active carbon injection, followed by a 3-month period where the NTH IRZ is shutoff and the River Bank Extraction Wells are turned on at 150 gpm and the extracted water is injected into IRL-1 and IRL-2.”	Was the effect of seasonal variation in river stage cycle on timing of the actual proposed final remedial system design/operation of the NTH IRZ on/off (6/18 month) cycle evaluated – using the regional flow model? For example, when is the best time to start/stop IRZ cycle, and could IRL injection/Riverbank extraction rates/timing utilize river stage fluctuations to any advantage? Are there any disadvantages to not simulating actual river fluctuations? Any benefits of modeling this now to optimize operations before startup, or at least before changes are proposed to the initial operation schedules?	See above			It is difficult to believe that the regional MicroFEM model wouldn't have also been used to simulate transient flow conditions, as it is our understanding that boundary conditions are transferred from regional to local submodel. The Prucha & Eggers whitepaper (July, 2015) on MW-X and MW-Y identified several problems with how River-Aquifer interaction was specified in the model, especially where no river cells were specified in the submodel. In addition, the 90%BOD Appendix B documentation only suggests one proposed remedial configuration (NOT the one currently proposed) was evaluated in a transient river stage scenario. The Tribes believe it is in the best interest of all stakeholders to	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

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										simulate a similar transient river stage fluctuation a) using the currently proposed remediation design/ operation, b) conduct the scenario AFTER fixing/re-calibrating the model as per the recommendations made in the Prucha and Eggers July 2015 whitepaper, and c) consider simulating a range of possible outcomes (i.e., a predictive sensitivity analysis) so that all stakeholders can better understand what the range of actual transient system behavior (flows and fate/ transport) might actually be.	
476	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 7.4 p. 59	“”The initial pumping conditions simulated were NTH IRZ operation for a 6-month period (300 gpm injection and extraction) with active carbon injection, followed by a 3-month period where the NTH IRZ is shutoff and the River Bank Extraction Wells are turned on at 150 gpm and the extracted water is injected into IRL-1 and IRL-2.”	Was the effect of seasonal variation in river stage cycle on timing of the actual proposed final remedial system design/operation of the NTH IRZ on/off (6/18 month) cycle evaluated – using the regional flow model? For example, when is the best time to start/stop IRZ cycle, and could IRL injection/Riverbank extraction rates/timing utilize river stage fluctuations to any advantage? Are there any disadvantages to not simulating actual river fluctuations? Any benefits of modeling this now to optimize operations before startup, or at least before changes are proposed to the initial operation schedules?	See above			It is difficult to believe that the regional MicroFEM model wouldn't have also been used to simulate transient flow conditions, as it is our understanding that boundary conditions are transferred from regional to local submodel. The Prucha & Eggers whitepaper (July, 2015) on MW-X and MW-Y identified several problems with how River-Aquifer interaction was specified in the model, especially where no river cells were specified in the submodel. In addition, the 90%BOD Appendix B documentation only suggests one proposed remedial configuration (NOT the one currently proposed) was evaluated in a transient river stage scenario. The Tribes believe it is in the best interest of all stakeholders to simulate a similar transient river stage fluctuation a) using the	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

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										currently proposed remediation design/ operation, b) conduct the scenario AFTER fixing/re-calibrating the model as per the recommendations made in the Prucha and Eggers July 2015 whitepaper, and c) consider simulating a range of possible outcomes (i.e., a predictive sensitivity analysis) so that all stakeholders can better understand what the range of actual transient system behavior (flows and fate/ transport) might actually be.	
477	DOI-30	Design	GW Modeling	8.1.2/63	[Mn(II) half-life = 8.3 hours for dissolved oxygen greater than 2.5 mg/L], corresponding to the lowest hyporheic zone rate observed by Harvey and Fuller (1998).	Please clarify where in the Harvey and Fuller paper the first-order rate coefficient of 0.083 h^{-1} was obtained. The Harvey and Fulley text on the bottom of page 632 states "considering the fast timescale of laboratory uptake (<6 hours) for all experiments, the range in rescaled rate constants for unpoisoned sediments from Pinal Creek was 0.28-0.69 h^{-1}."	See RTC #437. The text in Section 8.1.2 will be modified as follows: "…corresponding to the lowest hyporheic zone rate observed by Harvey and Fuller (1998), who reported a range of hyporheic zone time constants (inverse of the rate constant) between 1 and 12 hours (see table 3, Harvey and Fuller 1998)."		Resolved.		Resolved.
478	DOI-31	Non-design	GW Modeling	8.1.2/63	Based on the literature observations discussed in Section 5.3, the oxidation rate was assumed first order with respect to Mn(II) concentration above 2.5 mg/L (i.e., independent of dissolved oxygen content above 30% dissolved oxygen saturation) and second order with respect to Mn(II) and dissolved oxygen (first order with	Please explain the origin of the 2.5 mg/L dissolved oxygen and oxidation rate assumptions. Marble et. al. (1999) state "DO concentrations in the hyporheic zone at Pinal Creek typically decrease with depth from about 60 µM at the interface with surface water to the merging groundwater value of about 3 µM." A conversion of 60 µM of DO results in a concentration of 1.92 mg/L [60 µM x32 g/M) = 1920 µg = 1.9 mg/L]. Therefore, the highest DO concentrations and resulting Mn oxidation appear to have been calculated at DO values less than 2 mg/L. Mn oxidation rates as a function of DO concentrations could not be readily identified in the other reference cited for the Mn oxidation assumptions (Harvey and Fuller, 1998).	Marble et al. (1999) state on Page 7 of the text (section entitled Dissolved-O2 Dependence) and on Figure 6 that the net rate of Mn(II) removal is independent of DO above 30% air saturation and first-order with respect to the dissolved oxygen concentration below 30% air saturation. The value of 2.5 mg/L DO was calculated as 30% of 8 mg/L (the approximate concentration of dissolved oxygen at 100% air saturation). The text in Section 5.3.3 (which is cited in Section 8.1.2) will be modified as follows: "Further work (Marble et al. 1999) demonstrated that these				Comment resolved pending DOI review of the final design documents.

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					respect to each) below 2.5 mg/L (Marble et al. 1999).		rates were independent of dissolved oxygen concentration above 30% saturation (approximately 2.5 mg/L assuming an air-saturated dissolved oxygen concentration of 8 mg/L) and first-order with respect to dissolved oxygen concentration below 30%."				
479	DOI-32	Design	GW Modeling	8.1.2/63	Very limited information is available on the actual hyporheic zone thickness for the Colorado River at the Site.	The degree of Mn oxidization will be very sensitive to the thickness of the hyporheic zone. The current assumption of 2 feet appears fairly arbitrary and non-conservative (e.g., redox and mixing conditions indicate that it is less than 6 feet). Harvey and Fuller (1998) use tracers and mathematical equations to provide a means to estimate the hyporheic zone thickness that they consider a good assumption for streams that are much wider than they are deep. It looks like the thickest hyporheic zone depth they predicted or measured was 17 cm. Please explain whether there is any other supporting rationale for assuming a thickness for the hyporheic zone of about 60 cm.	The thickness of the hyporheic zone will be highly specific to the stream or river system, depending on a number of factors related to groundwater discharge and stream dynamics. Although Harvey and Fuller achieved a detailed quantification of the hyporheic zone thickness, their hyporheic zone thickness can only be applied to their particular stream system. For example, other studies have indicated hyporheic zone depths from 50 cm to as high as 10 meters, based upon a publically-available document by the Environment Agency, U.K. (Groundwater-surface water interactions in the hyporheic zone, Science Report SC030155/SR1, 2005; see Hendricks and White, 1991 and Triska et al., 1989 as cited in this document). Justification for the hyporheic zone depth in the final design will also consider the results of sediment porewater temperature measurements collected at Topock during the Porewater and Seepage Study performed by CH2M-Hill in 2006. These and other available literature references will be compiled and provided		Accepted.		Comment resolved pending DOI review of the final design documents.

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							as a basis for the assumed hyporheic zone depth at Topock in the 100% design. In addition, the 100% design will include a sensitivity analysis on the hyporheic zone depth.				
480	DOI-33	Non-design	GW Modeling	8.1.2/63	As a sensitivity test, the model was also run with a rate constant decreased by factors of 5 and 10 (half-lives of 42 and 83 hours for dissolved oxygen greater than 2.5 mg/L, respectively).	Please provide a reference to the section where the results of the sensitivity analysis are discussed.	The following text will be added: "The results of the sensitivity analyses are shown in Table 8.2-1 and discussed in Section 8.2."		Resolved.		Resolved.
481	DOI-34	Design	GW Modeling	8.1.2/63	The assigned dissolved oxygen profile consisted of river water dissolved oxygen concentrations persisting to 1-foot, and then dropping linearly to zero between 1-foot and 2-feet, for a total hyporheic or mixing zone depth of 2 feet (see Figure 8.2-1).	If there is some assumption regarding the oxygen profile with respect to any other parameters or Mn interface calculations it needs to be described. The Mn interface calculation appears to be performed simply by taking the thickness of the hyporheic zone and adjusting the initial concentrations by the half-life and travel time.	It is true that in the ultimate realization of the hyporheic zone model, the Mn interface concentration could have been approximated simply by adjustment of the influent boundary concentration based on the oxidation half-life and travel time (or residence time) within the hyporheic zone. However, the geochemical reactive transport model serves to validate this point; in particular, that other geochemical factors (including thermodynamic stability of the precipitated phase and Mn(II) adsorption) do not impact the result. In addition, the model accounts for the second-order attenuation of manganese for dissolved oxygen concentrations below 30% air-saturation, although this effect is minor. This point will be described in Section 8.1 of Appendix B. There are no other assumptions regarding the oxygen profile with		Resolved.		Resolved.

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							respect to any other parameters, other than what is already described in the text.				
482	DOI-35	Non-design	GW Modeling	8.2 Table 8.2-1/65	2. IRZ Active Conditions 10x half-life: 83 hours	The hyporheic zone is assumed to be 2 feet thick (8.1.2, p. 63), and the groundwater velocity through the hyporheic zone is 0.12 ft/day (8.1.1 p. 64). Therefore, Mn takes approximately 16 days (384 hours) to travel this distance. At a half-life of 83 hours approximately 4.626 half-lives will pass. Since the initial concentration is 2000 ug/L the following equation can be used to estimate river interface concentrations. $2000 \times 0.5^{4.626} = 81$ or 4% Since the calculated value of 81 is also the model prediction (see Table 8.2-1) it appears that the approach outlined above captures the fundamental processes that are simulated by the model. So a key question that strongly controls the predicted Mn concentrations entering the river is; will the Mn residence times in the hyporheic zone really be as long as those assumed in the modeling? Conceptually, the hyporheic zone is supposed to be a relatively thin region where groundwater and surface water are easily exchanged leading to elevated oxygen content that stimulates enhanced biological activity. In fact, the Harvey and Fuller paper cited in Appendix B describes this interchange as also being responsible for removal of the Mn already in the stream. Essentially, the hyporheic zone scrubs the stream of Mn as the Mn and surface water enters the hyporheic zone this exchange may happen multiple times over a basin scale. As further noted in Harvey and Fuller (p. 624) "The cumulative effect of enhanced manganese oxidation in the hyporheic zone was a 20% decrease in the load of manganese flowing out of the drainage basin**."** While the assumptions with the current modeling approach would lead to a 95+% reduction in the Mn loading rates. This may be the case, but the apparent discrepancy between the length of time the Mn is allowed to reside in the hyporheic zone in the model with the high permeabilities that would be required to form the hyporheic zone need to be resolved. Please provide additional justification for the long residence Mn residence times assumed in hyporheic zone in the model.	It is true that in the ultimate realization of the hyporheic zone model, the Mn interface concentration could have been approximated simply by adjustment of the influent boundary concentration based on the oxidation half-life and travel time (or residence time) within the hyporheic zone. However, the geochemical reactive transport model serves to validate this point; in particular, that other geochemical factors (including thermodynamic stability of the precipitated phase and Mn(II) adsorption) do not impact the result. In addition, the model accounts for the second-order attenuation of manganese for dissolved oxygen concentrations below 30% air-saturation, although this effect is minor. This point will be described in Section 8.1 of Appendix B. It is true that the reduction in manganese loading rate described by Harvey and Fuller was smaller (20%) than what is predicted at Topock (95+%). However, as the reviewer points out, it is important to note that Harvey and Fuller were describing oxidative attenuation of manganese that was already in the creek (as well as groundwater manganese), which relies on transfer of creek water dissolved manganese into the hyporheic zone for attenuation. In contrast,				Comment resolved pending DOI review of the final design documents and sensitivity analysis.

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							the Topock hyporheic zone model considers attenuation of manganese that must pass through the hyporheic zone before getting to the river. Accordingly, it may be anticipated that a greater level of attenuation may be achieved. While the depth of the hyporheic zone will be controlled by such factors as river dynamics, streambed geometry, and river sediment permeability, the velocity of the groundwater discharging to the river will more strongly be controlled by the groundwater gradient and aquifer properties within the floodplain upgradient of the hyporheic zone. Groundwater velocities were assigned based on the site-wide solute transport model. Accordingly, because the groundwater flux and the hyporheic zone depth are controlled by different factors, the assumed groundwater velocity which controls the residence time and the 2-ft hyporheic zone depth are not believed to be inconsistent. Literature references that provide a justification for hyporheic zone depths greater than that observed by Harvey and Fuller, as described in Comment #479, will be included in the 100% design. In addition, the 100% design will include a sensitivity analysis on the hyporheic zone depth.				
483	DOI-36	Design	GW Modeling	9.2/p.70	As discussed in Section 3, these parameters [pH] are not	A common issue with organic substrates is the production of H^+ which lowers the pH and in turn has a detrimental effect on the microbial populations which are largely responsible for creating the reducing conditions. Does the aquifer have enough buffering capacity for neutralizing the free hydrogen for many years in the future?	Organic matter consumption will proceed via numerous pathways, including aerobic (coupled to		Resolved.		Resolved.

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					expected to have a significant impact on organic matter biodegradation or Cr(VI) reductive precipitation given the ranges observed within the floodplain.		dissolved oxygen) and anaerobic pathways (coupled to Cr(VI), sulfate, nitrate, iron, etc.). Although it is common for acidity to be produced for fermentation reactions, the same is not the case for aerobic and anaerobic oxidation. In particular, anaerobic oxidation of ethanol and lactate (used in pilot testing) consume rather than generate H+. Complete aerobic oxidation of ethanol (the substrate currently chosen for the final remedy design) yields carbon dioxide (3 moles per mole of ethanol), with no additional H+ generation. Although the aerobic reaction will add dissolved CO2 (carbonic acid) to the solution, it is anticipated that this will be balanced by anaerobic reactions. Example reactions for ethanol are as follows: Aerobic: $C_2H_6O + 3O_2(g) = 2 CO_2(g) + H_2O$ Anaerobic (all alkalinity generating/H+ consuming): $C_2H_6O + 2.4 NO_3^- + 0.4 H^+ = 1.2 N_2(g) + 2 HCO_3^- + 2.2 H_2O$ $C_2H_6O + 1.5 SO_4^{-2} = HS^- + 0.5 H_2S + 2 HCO_3^- + H_2O$ The anaerobic processes and alkalinity production will be the dominant processes and it is anticipated that minimal buffering capacity by the aquifer solids will be required to maintain circumneutral pH. This has thus far been demonstrated at				

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							Hinkley, where remedy operation over a time span exceeding 7 years has not resulted in consumption of aquifer buffering capacity. Likewise, it is anticipated that the aquifer solids at Topock have sufficient buffering capacity.				
484	DOI-37	Non-design	GW Modeling	10.4/p.79	The decreased and increased stoichiometric generation ratios are 0.005 and 0.05, respectively.	Please provide a basis for assigning this range. In particular, could the generation ratios get much higher than 0.05?	The ranges assigned for each model parameter in the sensitivity analysis were based on a best assessment of appropriate levels of uncertainty. Although many of these ranges were difficult to quantify with limited information, the ranges that were chosen fully bracket the actual anticipated level of parameter uncertainty. The manganese generation ratio of 0.016 was estimated based on site-specific pilot testing information that is anticipated to be highly representative of field-scale implementation conditions. The value of 0.05 represents a factor of 3 increase in this ratio, which is believed to be more than sufficient to capture the anticipated level of variability		Resolved.		Resolved.
485	DOI-38	Design	GW Modeling	10.4/p.80	Similar to manganese, arsenic sorption was simulated using the non-linear Freundlich isotherm ($C^* = KC^N$), where K and N are constants that were calibrated to site-specific conditions as described in Section 5.4. In all three sorption scenarios, the N exponent was held	For both manganese and arsenic, if both K and N were calibrated to site data why was the range on K tested in the sensitivity analysis rather than that of N which could have led to a much larger increase in dissolved phase concentrations?	The purpose of the sensitivity analysis was to vary model parameters to capture the reasonable anticipated range in uncertainty and variability of the processes being modeled. Specifically, the model sorption parameter sensitivity ranges were chosen to capture the actual anticipated range in sorption behavior. In the case of manganese and arsenic sorption, these ranges were further constrained by considering known		Resolved.		Resolved.

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					constant at 0.465, while the K multiplier was varied.		variability in aqueous geochemistry (see Section 9.2). Although variability in sorption behavior also could have been captured by varying N, this was not necessary; varying K alone was sufficient to capture the effects of variability in sorption behavior. It is true that, depending on the range applied to N, varying this parameter could have resulted in a larger increase in dissolved phase concentrations; however, that would not represent a realistic scenario given the anticipated extent of variability in sorption behavior.				
486	DOI-39	Non-design	GW Modeling	10.6/p.81	While this increase in Cr(VI) retardation would suggest significantly longer remediation timeframes, this is not a likely scenario as the understanding of groundwater flow and plume development suggests a Cr(VI) Kd of 0.5 L/kg would be excessive. This sensitivity analysis was done for comparative purposes to gauge the relative impact of Cr(VI) sorption.	The remediation times are almost always extremely sensitive to the Kd of the contaminant. Therefore, it is unclear why Kd values would be tested outside of the expected range when a major outcome of the sensitivity analysis should be evaluating the range of potential remediation times. What Kd value is the expected upper range based on the understanding of the plume development?	A laboratory study on aerobic core samples from the Site (CH2M Hill, 2005, *Summary of Results—Aerobic Zone Hexavalent Chromium Core Testing*) indicated the range in Kd values from two aerobic core samples collected from the flood plain varied between 0.01 and 0.09 L/kg. This study therefore supports the value of 0.05 L/kg utilized in the baseline hexavalent chromium modeling. A reference to this technical memo will be added to the text.		Accepted.		Comment resolved pending DOI review of the final design documents.
487	DOI-40	Design	GW Modeling	10.6/p.81	While this increase in Cr(VI) retardation would suggest significantly longer remediation timeframes,	Since the Kds tend to have the greatest uncertainty and most sensitivity to the remediation times, this assumption is one of the most important in the entire modeling analysis. Please provide additional information as to where the plume development was investigated and Kds estimated.	The original regional groundwater flow model was calibrated to 4 data sets: 1. Recovery period after shutdown of TW-2D in November 2004;		Accepted.		Comment resolved pending DOI review of the final design documents.

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					this is not a likely scenario as <u>the understanding of groundwater flow and plume development</u> suggests a Cr(VI) Kd of 0.5 L/kg would be excessive.		2. Average monthly groundwater elevations between 2003 and March 2005; 3. Injection well testing at IW-2 and IW-3 in January 2005; and 4. Evolution of the Cr(VI) plume footprint from 1951 to 1999 (CH2M Hill, 2005). The final calibration period that focused on the plume evolution from 1951 to 1999 was divided into 3 stages to reflect different hydraulic stresses in the system over time. Even though this calibration was only performed with respect to groundwater flow and minimal historical Cr(VI) data were available throughout the Site, the analysis was consistent with the observed evolution and final footprint of the Cr(VI) plume. This result supports the conclusion that Cr(VI) in groundwater not a strongly sorbed compound that travels freely through the general oxidizing conditions of the alluvial area between Bat Cave Wash and the MW-20 cluster. This transport behavior that is similar to advective groundwater flow supports the use of a relatively low Kd value that would translate to a low retardation factor. A retardation factor was integrated into the model as a conservative assumption with respect to remedial timeframe, and a higher Kd value was evaluated in the solute transport model sensitivity analysis. A laboratory study on				

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							aerobic core samples from the Site (CH2M Hill, 2005, *Summary of Results—Aerobic Zone Hexavalent Chromium Core Testing*) indicated the range in Kd values from two aerobic core samples collected from the flood plain varied between 0.01 and 0.09 L/kg. This study therefore supports the value of 0.05 L/kg utilized in the baseline hexavalent chromium modeling. A reference to this technical memo will be added to the text.				
488	DOI-41	Non-design	GW Modeling	12/p. 91	Model Update Procedure	The linkage between the regional model and local model through the flux boundaries will continue to add a complexity to the analysis that may not be necessary. Furthermore, if refinements to the transmissivities are made through model calibration or manually in the local scale model and not in the regional model, the boundary fluxes predicted with the regional model will begin to diverge from the more accurate flow conditions predicted by the local model. It is recommended that PG&E determine how far out boundary effects may be experienced under the most stress-induced conditions and moving the boundaries in the local model to those locations. It is further recommended that only the local model be used in the future.	See RTC #431 DOI-16				
489	DOI-42	Design	GW Modeling	12/p. 91	Model Update Procedure	As the model update text is currently written the decision as to what actually triggers whether the model will every require updating is ambiguous (p. 91) If there are significant differences, the groundwater flow model, geochemical model, and/or the solute transport model will be updated and recalibrated. (p. 91) During the well construction period the groundwater flow and solute transport model will be updated annually, if the data collected suggests that updates are needed. Quantitative criteria need to be developed to determine whether the model needs to be updated and recalibrated. It is currently very unclear of what the model will be used for. It seems that, at a minimum, it should be used to support the capture zone analysis, optimize the remediation system pumping/injection/dosing rates; assist in determining whether the system is performing as designed; and updating remediation time estimates. There should be a section after Section 12 that provides a detailed discussion how the model will be actually be used (including performance metrics) to support these activities.	See RTCs #76 FMIT/TRC, #77 Hualapai/TRC, #78 Cocopah/TRC, and #79 Chemehuevi/TRC The language "if there are significant differences" and "if the data collected suggests that updates are needed" will be removed and the model update schedule discussed in Appendix B Section 12 will be used. An additional paragraph will be added to Appendix B Section 12 to discuss the intended future use of the model including updating remediation time frame estimates, supporting capture zone analyses, and analyzing potential remedy design operation changes.				Comment resolved pending DOI review of the final design documents.
490	FMIT/TRC	Non-design	GW Modeling	Append B 12 p.. 91	"to ensure that the groundwater flow, geochemical, and solute transport models do not	This is confusing. Given the importance to the development of the design and operation of the proposed remedial system, the proposed updates and use of models are confusing and vague and should be clarified. For example, exactly how and when would any differences between these various models and the conceptual site model w/respect to characterization or remedy performance be done?	See RTCs #76 FMIT/TRC, #77 Hualapai/TRC, #78 Cocopah/TRC, #79 Chemehuevi/TRC, and #489 DOI-42. The language "if there are significant			Comment noted. Text in Appendix B, Section 12 doesn't present any discussion at all on how the four models (microfem, modflow, mt3d, phreeqc) will be re-calibrated, or if any	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					differ significantly from the conceptual site model with respect to the hydrogeologic characterization or remedy performance"		differences" and "if the data collected suggests that updates are needed" will be removed and the model update schedule discussed in Appendix B Section 12 will be used. An additional paragraph will be added to Appendix B Section 12 to discuss the intended future use of the model including updating remediation time frame estimates, supporting capture zone analyses, and analyzing potential remedy design operation changes. PG&E will review and consider the Tribes' response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.			calibration or predictive sensitivity analyses might be considered to help guide operation and need for new wells, optimization simulations/constraints to determine the number/ locations/ depths of any new wells required to meet ongoing system performance metrics (i.e., short-/long-term RAOs), or any uncertainty analyses to evaluate impacts of the system, for example in Arizona, or length of time required to clean up the contamination. Finally – PG&E consultants should strongly consider addressing the numerous recommendations provided in the Prucha and Eggers (July 15, 2015) whitepaper on fixing/revising the existing model before the substantial amount of new data becomes available. Our ongoing concern continues to be that ignoring errors/ uncertainties in the current deficient models now eliminates the potential to reconfigure the current design/operation BEFORE considerable efforts/costs have been incurred in a cultural area that is highly sensitive to each and every new borehole or well installed in the system.	
491	Hualapai/TRC	Non-design	GW Modeling	Append B 12 p.. 91	"to ensure that the groundwater flow, geochemical, and solute transport models do not differ significantly	This is confusing. Given the importance to the development of the design and operation of the proposed remedial system, the proposed updates and use of models are confusing and vague and should be clarified. For example, exactly how and when would any differences between these various models and the conceptual site model w/respect to characterization or remedy performance be done?	See above			Comment noted. Text in Appendix B, Section 12 doesn't present any discussion at all on how the four models (microfem, modflow, mt3d, phreeqc) will be re-calibrated, or if any calibration or predictive sensitivity analyses	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					from the conceptual site model with respect to the hydrogeologic characterization or remedy performance"					might be considered to help guide operation and need for new wells, optimization simulations/constraints to determine the number/locations/ depths of any new wells required to meet ongoing system performance metrics (i.e., short-/long-term RAOs), or any uncertainty analyses to evaluate impacts of the system, for example in Arizona, or length of time required to clean up the contamination. Finally – PG&E consultants should strongly consider addressing the numerous recommendations provided in the Prucha and Eggers (July 15, 2015) whitepaper on fixing/revising the existing model before the substantial amount of new data becomes available. Our ongoing concern continues to be that ignoring errors/uncertainties in the current deficient models now eliminates the potential to reconfigure the current design/operation BEFORE considerable efforts/costs have been incurred in a cultural area that is highly sensitive to each and every new borehole or well installed in the system.	
492	Cocopah/TRC	Non-design	GW Modeling	Append B 12 p.. 91	"to ensure that the groundwater flow, geochemical, and solute transport models do not differ significantly from the conceptual site	This is confusing. Given the importance to the development of the design and operation of the proposed remedial system, the proposed updates and use of models are confusing and vague and should be clarified. For example, exactly how and when would any differences between these various models and the conceptual site model w/respect to characterization or remedy performance be done?	See above			Comment noted. Text in Appendix B, Section 12 doesn't present any discussion at all on how the four models (microfem, modflow, mt3d, phreeqc) will be re-calibrated, or if any calibration or predictive sensitivity analyses might be considered to help guide operation	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					model with respect to the hydrogeologic characterization or remedy performance"					and need for new wells, optimization simulations/ constraints to determine the number/locations/depths of any new wells required to meet ongoing system performance metrics (i.e., short-/long-term RAOs), or any uncertainty analyses to evaluate impacts of the system, for example in Arizona, or length of time required to clean up the contamination. Finally – PG&E consultants should strongly consider addressing the numerous recommendations provided in the Prucha and Eggers (July 15, 2015) whitepaper on fixing/revising the existing model before the substantial amount of new data becomes available. Our ongoing concern continues to be that ignoring errors/uncertainties in the current deficient models now eliminates the potential to reconfigure the current design/operation BEFORE considerable efforts/costs have been incurred in a cultural area that is highly sensitive to each and every new borehole or well installed in the system.	
493	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 12 p.. 91	"to ensure that the groundwater flow, geochemical, and solute transport models do not differ significantly from the conceptual site model with	This is confusing. Given the importance to the development of the design and operation of the proposed remedial system, the proposed updates and use of models are confusing and vague and should be clarified. For example, exactly how and when would any differences between these various models and the conceptual site model w/respect to characterization or remedy performance be done?	See above			Comment noted. Text in Appendix B, Section 12 doesn't present any discussion at all on how the four models (microfem, modflow, mt3d, phreeqc) will be re-calibrated, or if any calibration or predictive sensitivity analyses might be considered to help guide operation and need for new wells,	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

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					respect to the hydrogeologic characterization or remedy performance”					optimization simulations/ constraints to determine the number/locations/depths of any new wells required to meet ongoing system performance metrics (i.e., short-/long-term RAOs), or any uncertainty analyses to evaluate impacts of the system, for example in Arizona, or length of time required to clean up the contamination. Finally – PG&E consultants should strongly consider addressing the numerous recommendations provided in the Prucha and Eggers (July 15, 2015) whitepaper on fixing/revising the existing model before the substantial amount of new data becomes available. Our ongoing concern continues to be that ignoring errors/uncertainties in the current deficient models now eliminates the potential to reconfigure the current design/operation BEFORE considerable efforts/costs have been incurred in a cultural area that is highly sensitive to each and every new borehole or well installed in the system.	
494	FMIT/TRC	Non-design	GW Modeling	Append B 12.1 p. 92	“Upon completion of the regional groundwater Flow model update, the submodel extents will be extracted from the regional groundwater flow model for use with the solute	Why wouldn’t there be any effort to calibrate to transport and fate parameters to changing CrVI distributions, so that current and future remedial system performance could be better evaluated, especially with any changes to operations or additional wells brought online? Will the modeling be used to re-optimize the system operation (not the design - as it has already been defined/installed now), and if so how?	Text will be adjusted to reflect that the geochemical model and the solute transport model will be recalibrated as well to observed concentration values and trends and available field parameters. The model will be used to provide recommended optimizations as far as system operation (i.e.			Comment noted. However the response is confusing. The model(s) should be used to simulate optimization scenarios to evaluate proposed system operations. The way this is stated suggests the model will somehow be used to "provide recommended optimizations as far as system operations",	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					transport model. The solute transport model will be updated with the available hexavalent chromium data to reflect updated initial plume conditions. The groundwater flow and solute transport submodel will then be utilized to rerun the initial baseline remedy to see if there are any concerns with the simulated hexavalent chromium transport projections and remediation design. At this point recommendations for changes in planned operational conditions, adjustments in the remedial design and/or the potential need for provisional wells may be considered."		injection/extraction rates and frequency, TOC dosing frequency and concentration, and need for provisional wells).			which is vague and confusing, but it won't be used to do the actual optimization simulations. This optimization step is something that the groundwater community regularly performs. The Tribe highly recommends that PG&E consultants clarify their intentions on how they plan to use all model(s), particularly for any sort of optimization of either design changes (i.e., new wells/ optimum locations) AND/OR optimization of system operations. For the latter case, details on how optimizations will be performed, constraints, targets, key input adjustments, criteria/ values etc. should be clearly described in the 90% BOD documentation to maintain a high level of transparency for the Tribes and all Stakeholders	
495	Hualapai/TRC	Non-design	GW Modeling	Append B 12.1 p. 92	"Upon completion of the regional groundwater Flow model update, the submodel extents will be extracted from the regional groundwater flow model for use with the solute transport model. The solute transport	Why wouldn't there be any effort to calibrate to transport and fate parameters to changing CrVI distributions, so that current and future remedial system performance could be better evaluated, especially with any changes to operations or additional wells brought online? Will the modeling be used to re-optimize the system operation (not the design - as it has already been defined/installed now), and if so how?	See above			Comment noted, however the response is confusing. The model(s) should be used to simulate optimization scenarios to evaluate proposed system operations. The way this is stated suggests the model will somehow be used to "provide recommended optimizations as far as system operations", which is vague and confusing, but it won't be used to do the actual optimization	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

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					model will be updated with the available hexavalent chromium data to reflect updated initial plume conditions. The groundwater flow and solute transport submodel will then be utilized to rerun the initial baseline remedy to see if there are any concerns with the simulated hexavalent chromium transport projections and remediation design. At this point recommendations for changes in planned operational conditions, adjustments in the remedial design and/or the potential need for provisional wells may be considered."					simulations. This optimization step is something that the groundwater community regularly performs. The Tribes highly recommend that PG&E consultants clarify their intentions on how they plan to use all model(s) particularly for any sort of optimization of either design changes (i.e., new wells/optimum locations) AND/OR optimization of system operations. For the latter case, details on how optimizations will be performed, constraints, targets, key input adjustments, criteria/values etc. should be clearly described in the 90%BOD documentation to maintain a high level of transparency for the Tribes and all Stakeholders.	
496	Cocopah/TRC	Non-design	GW Modeling	Append B 12.1 p. 92	"Upon completion of the regional groundwater Flow model update, the submodel extents will be extracted from the regional groundwater flow model for use with the solute transport model. The solute transport model will be updated with the available hexavalent	Why wouldn't there be any effort to calibrate to transport and fate parameters to changing CrVI distributions, so that current and future remedial system performance could be better evaluated, especially with any changes to operations or additional wells brought online? Will the modeling be used to re-optimize the system operation (not the design - as it has already been defined/installed now), and if so how?	See above			Comment noted, however the response is confusing. The model(s) should be used to simulate optimization scenarios to evaluate proposed system operations. The way this is stated suggests the model will somehow be used to "provide recommended optimizations as far as system operations", which is vague and confusing, but it won't be used to do the actual optimization simulations. This optimization step is something that the groundwater	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					chromium data to reflect updated initial plume conditions. The groundwater flow and solute transport submodel will then be utilized to rerun the initial baseline remedy to see if there are any concerns with the simulated hexavalent chromium transport projections and remediation design. At this point recommendations for changes in planned operational conditions, adjustments in the remedial design and/or the potential need for provisional wells may be considered."					community regularly performs. The Tribes highly recommend that PG&E consultants clarify their intentions on how they plan to use all model(s), particularly for any sort of optimization of either design changes (i.e., new wells/ optimum locations) AND/OR optimization of system operations. For the latter case, details on how optimizations will be performed, constraints, targets, key input adjustments, criteria/ values etc. should be clearly described in the 90%BOD documentation to maintain a high level of transparency for the Tribes and all Stakeholders.	
497	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 12.1 p. 92	"Upon completion of the regional groundwater Flow model update, the submodel extents will be extracted from the regional groundwater flow model for use with the solute transport model. The solute transport model will be updated with the available hexavalent chromium data to reflect updated initial plume	Why wouldn't there be any effort to calibrate to transport and fate parameters to changing CrVI distributions, so that current and future remedial system performance could be better evaluated, especially with any changes to operations or additional wells brought online? Will the modeling be used to re-optimize the system operation (not the design - as it has already been defined/installed now), and if so how?	See above			Comment noted, however the response is confusing. The model(s) should be used to simulate optimization scenarios to evaluate proposed system operations. The way this is stated suggests the model will somehow be used to "provide recommended optimizations as far as system operations", which is vague and confusing, but it won't be used to do the actual optimization simulations. This optimization step is something that the groundwater community regularly performs. The Tribes highly recommend that PG&E consultants	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					conditions. The groundwater flow and solute transport submodel will then be utilized to rerun the initial baseline remedy to see if there are any concerns with the simulated hexavalent chromium transport projections and remediation design. At this point recommendations for changes in planned operational conditions, adjustments in the remedial design and/or the potential need for provisional wells may be considered.”					clarify their intentions on how they plan to use all model(s), particularly for any sort of optimization of either design changes (i.e., new wells/ optimum locations) AND/OR optimization of system operations. For the latter case, details on how optimizations will be performed, constraints, targets, key input adjustments, criteria/ values etc. should be clearly described in the 90%BOD documentation to maintain a high level of transparency for the Tribes and all Stakeholders.	
498	FMIT/TRC	Non-design	GW Modeling	Append B 12.2 p.92	“By collecting the aforementioned data, the following parameters can potentially be refined in the groundwater flow and solute transport models:”	All model parameters, both flow and fate/transport, can be adjusted. Is this suggesting that only these parameters would be changed in the model? Why wouldn’t mass transfer coefficients, or mobile/immobile porosity be adjusted? In the July 2005 Model Update memo, page 2-5 it states “Thickness of each model layer (except Layer 5) was assigned at each well location, with breaks between model layers sometimes corresponding to HSU contacts and sometimes dictated by screened intervals in well clusters. It is important to note that model layers often do not correlate with HSU boundaries. A model layer may contain more than one HSU, or an HSU may be split between more than one model layers.” How exactly will new borehole/well information be incorporated into the existing model(s), and does the fact that model layers often don’t correspond to HSU contacts have any implications for fate/transport simulations?	Agreed, all model parameters have the potential to be adjusted/refined. Parameters in Section 12.2 were listed as examples, but model updates are not limited to these parameters. Text will be clarified accordingly. The new borehole/well information will be incorporated by first verifying the model structure in the area (alluvial aquifer and bedrock contact) and then aquifer properties gained from well testing will be assessed. The vertical and lateral distributions of hydraulic conductivity values will be used to guide hydraulic conductivity values during the calibration process. Depending on the distribution, K values			Comment noted. However, it is our understanding that original regional MicroFEM model calibration made extensive use of the parameter estimation code PEST. We felt this code was poorly constrained in key areas, such as beneath the river and within Arizona where no data were available, even though data from MW-54, MW-55 and MW-56 have since been collected and are available. We continue to feel that more explanation is required on how all models (microfem, modflow, mt3d, phreeqc) will be updated and re-calibrated. If re-calibration is done using PEST, the details of how this will be	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							may be averaged or used directly. Although the model layers don't correspond to specific HSU's in the heterogeneous alluvial aquifer, generalizations can still be made using the available K data to produce a representative K distribution. PG&E will review and consider the Tribes' response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.			implemented should be made transparent and very clear to the Tribes and all Stakeholders, so that more confidence is developed in model predictions going forward. Our understanding is that the models will continue to play a critical role in both evaluation of system performance (meeting RAOs) and guiding design changes and remedy operation.	
499	Hualapai/TRC	Non-design	GW Modeling	Append B 12.2 p.92	"By collecting the aforementioned data, the following parameters can potentially be refined in the groundwater flow and solute transport models:"	All model parameters, both flow and fate/transport, can be adjusted. Is this suggesting that only these parameters would be changed in the model? Why wouldn't mass transfer coefficients, or mobile/immobile porosity be adjusted? In the July 2005 Model Update memo, page 2-5 it states "Thickness of each model layer (except Layer 5) was assigned at each well location, with breaks between model layers sometimes corresponding to HSU contacts and sometimes dictated by screened intervals in well clusters. It is important to note that model layers often do not correlate with HSU boundaries. A model layer may contain more than one HSU, or an HSU may be split between more than one model layers." How exactly will new borehole/well information be incorporated into the existing model(s), and does the fact that model layers often don't correspond to HSU contacts have any implications for fate/transport simulations?	See above			Comment noted. However, it is our understanding that original regional MicroFEM model calibration made extensive use of the parameter estimation code PEST. We felt this code was poorly constrained in key areas, such as beneath the river and within Arizona where no data were available, even though data from MW-54, MW-55 and MW-56 have since been collected and are available. We continue to feel that more explanation is required on how all models (microfem, modflow, mt3d, phreeqc) will be updated and re-calibrated. If re-calibration is done using PEST, the details of how this will be implemented should be made transparent and very clear to the Tribes and all Stakeholders, so that more confidence is	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										developed in model predictions going forward. Our understanding is that the models will continue to play a critical role in both evaluation of system performance (meeting RAOs) and guiding design changes and remedy operation.	
500	Cocopah/TRC	Non-design	GW Modeling	Append B 12.2 p.92	"By collecting the aforementioned data, the following parameters can potentially be refined in the groundwater flow and solute transport models:"	All model parameters, both flow and fate/transport, can be adjusted. Is this suggesting that only these parameters would be changed in the model? Why wouldn't mass transfer coefficients, or mobile/immobile porosity be adjusted? In the July 2005 Model Update memo, page 2-5 it states "Thickness of each model layer (except Layer 5) was assigned at each well location, with breaks between model layers sometimes corresponding to HSU contacts and sometimes dictated by screened intervals in well clusters. It is important to note that model layers often do not correlate with HSU boundaries. A model layer may contain more than one HSU, or an HSU may be split between more than one model layers." How exactly will new borehole/well information be incorporated into the existing model(s), and does the fact that model layers often don't correspond to HSU contacts have any implications for fate/transport simulations?	See above			Comment noted. However, it is our understanding that original regional MicroFEM model calibration made extensive use of the parameter estimation code PEST. We felt this code was poorly constrained in key areas, such as beneath the river and within Arizona where no data were available, even though data from MW-54, MW-55 and MW-56 have since been collected and are available. We continue to feel that more explanation is required on how all models (microfem, modflow, mt3d, phreeqc) will be updated and re-calibrated. If re-calibration is done using PEST, the details of how this will be implemented should be made transparent and very clear to the Tribes and all Stakeholders, so that more confidence is developed in model predictions going forward. Our understanding is that the models will continue to play a critical role in both evaluation of system performance (meeting RAOs) and guiding design changes and remedy operation.	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.
501	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 12.2 p.92	"By collecting the aforementione	All model parameters, both flow and fate/transport, can be adjusted. Is this suggesting that only these parameters would be changed in the model? Why wouldn't mass transfer coefficients, or mobile/immobile porosity be adjusted?	See above			Comment noted. However, it is our understanding that	DTSC/DOI response: Agencies will provide direction to PG&E in

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					d data, the following parameters can potentially be refined in the groundwater flow and solute transport models:"	In the July 2005 Model Update memo, page 2-5 it states "Thickness of each model layer (except Layer 5) was assigned at each well location, with breaks between model layers sometimes corresponding to HSU contacts and sometimes dictated by screened intervals in well clusters. It is important to note that model layers often do not correlate with HSU boundaries. A model layer may contain more than one HSU, or an HSU may be split between more than one model layers." How exactly will new borehole/well information be incorporated into the existing model(s), and does the fact that model layers often don't correspond to HSU contacts have any implications for fate/transport simulations?				original regional MicroFEM model calibration made extensive use of the parameter estimation code PEST. We felt this code was poorly constrained in key areas, such as beneath the river and within Arizona where no data were available, even though data from MW-54, MW-55 and MW-56 have since been collected and are available. We continue to feel that more explanation is required on how all models (microfem, modflow, mt3d, phreeqc) will be updated and re-calibrated. If re-calibration is done using PEST, the details of how this will be implemented should be made transparent and very clear to the Tribes and all Stakeholders, so that more confidence is developed in model predictions going forward. Our understanding is that the models will continue to play a critical role in both evaluation of system performance (meeting RAOs) and guiding design changes and remedy operation.	a separate letter.
502	FMIT/TRC	Non-design	GW Modeling	Append B 12.2/ p. 93	"Comparing the simulated point water levels, potentiometric surfaces and hydraulic gradients to the observed field values, the regional groundwater flow model can be recalibrated under active remedy conditions if significant	What are the exact performance metrics (quantitative) that dictate whether significant differences exist and all model(s) needs to be recalibrated? Because the final remedial system model simulations assumed no river fluctuations, observed levels can't be directly compared to simulated levels given the notable diurnal/seasonal river fluctuations and corresponding changes in groundwater levels. As such, why can't plans be to update and re-calibrate all models whenever changes to design/operations are proposed and then re-simulate future conditions to demonstrate long-term remedy performance still meets RAOs? Details on an approach/methodology for how the fate/transport model will be calibrated (for the first time) should be presented.	See RTC #76 FMIT/TRC, #77 Hualapai/TRC, #78 Cocopah/TRC, and #79 Chemehuevi/TRC The language "if there are significant differences" and "if the data collected suggests that updates are needed" will be removed and the model update schedule discussed in Appendix B Section 12 will be used. PG&E will review and consider the Tribes'			Comment noted. However, this response doesn't seem to address concerns raised in the original comment. We continue to emphasize the need to a) fix and re-calibrate the model now; and b) update and re-calibrate the model when new datasets become available, not after all infrastructure has been installed and all data has become available. Key benefits to updating the model	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

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					differences exist. Upon completion of the regional groundwater flow model update, the submodel will be updated accordingly and the solute transport model will be rerun to evaluate longer term remedy performance to evaluate the remedy timeframe."		response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.			and then evaluating previous model predictions while data are being collected would be that any major deviations from what was expected could be addressed through 'adaptive management' adjustments in the design/operation BEFORE the entire system is installed. No details have been provided on exactly how the fate/transport model will be calibrated, calibration targets, allowable target tolerances etc. The Tribe highly recommends that this information be provided in the 90% BOD documentation to maintain a high level of transparency and confidence that the model(s) will be maintained at the highest level. This would ensure the highest level of understanding of the system which would in turn provide confidence to Tribes when/if PG&E consultants determine that new design wells are required in sensitive Tribal areas. All Tribes should feel confident that the best available model predictions have been made. To date, while the model remains a critical design and operational tool, the model predictions are viewed as being highly uncertain.	
503	Hualapai/TRC	Non-design	GW Modeling	Append B 12.2/ p. 93	"Comparing the simulated point water levels, potentiometric surfaces and hydraulic gradients to	What are the exact performance metrics (quantitative) that dictate whether significant differences exist and all model(s) needs to be recalibrated? Because the final remedial system model simulations assumed no river fluctuations, observed levels can't be directly compared to simulated levels given the notable diurnal/seasonal river fluctuations and corresponding changes in groundwater levels. As such, why can't plans be to update and re-calibrate all models whenever changes to design/operations are proposed and then re-simulate future conditions to demonstrate long-term remedy performance still meets RAOs? Details on an approach/methodology for how the fate/transport model will be calibrated (for the first time) should be presented.	See above			Comment noted, however, this response doesn't seem to address concerns raised in the original comment. We continue to emphasize the need to a) fix and	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					the observed field values, the regional groundwater flow model can be recalibrated under active remedy conditions if significant differences exist. Upon completion of the regional groundwater flow model update, the submodel will be updated accordingly and the solute transport model will be rerun to evaluate longer term remedy performance to evaluate the remedy timeframe."					re-calibrate the model now; and b) update and re-calibrate the model when new datasets become available, not after all infrastructure has been installed and all data has become available. Key benefits to updating the model and then evaluating previous model predictions while data are being collected would be that any major deviations from what was expected could be addressed through 'adaptive management' adjustments in the design/operation BEFORE the entire system is installed. No details have been provided on exactly how the fate/transport model will be calibrated, calibration targets, allowable target tolerances etc. The Tribes highly recommend that this information be provided in the 90% BOD documentation to maintain a high level of transparency and confidence that the model(s) will be maintained at the highest level. This would ensure the highest level of understanding of the system which would in turn provide confidence to Tribes when/if PG&E consultants determine that new design wells are required in sensitive Tribal areas. All Tribes should feel confident that the best available model predictions have been made. To date, while the model remains a critical design and operational tool, the model predictions are	

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										viewed as being highly uncertain.	
504	Cocopah/TRC	Non-design	GW Modeling	Append B 12.2/ p. 93	"Comparing the simulated point water levels, potentiometric surfaces and hydraulic gradients to the observed field values, the regional groundwater flow model can be recalibrated under active remedy conditions if significant differences exist. Upon completion of the regional groundwater flow model update, the submodel will be updated accordingly and the solute transport model will be rerun to evaluate longer term remedy performance to evaluate the remedy timeframe."	What are the exact performance metrics (quantitative) that dictate whether significant differences exist and all model(s) needs to be recalibrated? Because the final remedial system model simulations assumed no river fluctuations, observed levels can't be directly compared to simulated levels given the notable diurnal/seasonal river fluctuations and corresponding changes in groundwater levels. As such, why can't plans be to update and re-calibrate all models whenever changes to design/operations are proposed and then re-simulate future conditions to demonstrate long-term remedy performance still meets RAOs? Details on an approach/methodology for how the fate/transport model will be calibrated (for the first time) should be presented.	See above			Comment noted, however, this response doesn't seem to address concerns raised in the original comment. We continue to emphasize the need to a) fix and re-calibrate the model now; and b) update and re-calibrate the model when new datasets become available, not after all infrastructure has been installed and all data has become available. Key benefits to updating the model and then evaluating previous model predictions while data are being collected would be that any major deviations from what was expected could be addressed through 'adaptive management' adjustments in the design/operation BEFORE the entire system is installed. No details have been provided on exactly how the fate/transport model will be calibrated, calibration targets, allowable target tolerances etc. The Tribes highly recommend that this information be provided in the 90% BOD documentation to maintain a high level of transparency and confidence that the model(s) will be maintained at the highest level. This would ensure the highest level of understanding of the system which would in turn provide confidence to Tribes when/if PG&E consultants determine that new design wells are required in	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

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PG&E Topock Compressor Station, Needles, California

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										sensitive Tribal areas. All Tribes should feel confident that the best available model predictions have been made. To date, while the model remains a critical design and operational tool, the model predictions are viewed as being highly uncertain.	
505	Chemehuevi/ TRC	Non-design	GW Modeling	Append B 12.2/ p. 93	"Comparing the simulated point water levels, potentiometric surfaces and hydraulic gradients to the observed field values, the regional groundwater flow model can be recalibrated under active remedy conditions if significant differences exist. Upon completion of the regional groundwater flow model update, the submodel will be updated accordingly and the solute transport model will be rerun to evaluate longer term remedy performance to evaluate the remedy timeframe."	What are the exact performance metrics (quantitative) that dictate whether significant differences exist and all model(s) needs to be recalibrated? Because the final remedial system model simulations assumed no river fluctuations, observed levels can't be directly compared to simulated levels given the notable diurnal/seasonal river fluctuations and corresponding changes in groundwater levels. As such, why can't plans be to update and re-calibrate all models whenever changes to design/operations are proposed and then re-simulate future conditions to demonstrate long-term remedy performance still meets RAOs? Details on an approach/methodology for how the fate/transport model will be calibrated (for the first time) should be presented.	See above			Comment noted, however, this response doesn't seem to address concerns raised in the original comment. We continue to emphasize the need to a) fix and re-calibrate the model now; and b) update and re-calibrate the model when new datasets become available, not after all infrastructure has been installed and all data has become available. Key benefits to updating the model and then evaluating previous model predictions while data are being collected would be that any major deviations from what was expected could be addressed through 'adaptive management' adjustments in the design/operation BEFORE the entire system is installed. No details have been provided on exactly how the fate/transport model will be calibrated, calibration targets, allowable target tolerances etc. The Tribes highly recommend that this information be provided in the 90% BOD documentation to maintain a high level of transparency and confidence that the model(s) will be maintained at the highest level. This	DTSC/DOI response: Agencies will provide direction to PG&E in a separate letter.

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										would ensure the highest level of understanding of the system which would in turn provide confidence to Tribes when/if PG&E consultants determine that new design wells are required in sensitive Tribal areas. All Tribes should feel confident that the best available model predictions have been made. To date, while the model remains a critical design and operational tool, the model predictions are viewed as being highly uncertain.	
Specific Comments – 90% BOD, Appendix C: Design Criteria											
506	DOI-43	Design	Design	C.1/C-2	Codes and Standards	Since a number of the design features pertain to building roads and intrusive activities (e.g, installation of pipelines), there should be some text that refers to the interaction and criteria set forth by the Tribes.	[Intentionally left blank as the comment was withdrawn].		DOI withdraws the comment as this section deals specifically with codes and standards. This is addressed through other documents.		
507	DOI-44	Editorial	Editorial	C.1/C-11	References	Since the California Fire Codes; Mechanical Codes, Wind Codes are cited in the text but not provided in the reference list a web site address should be provided to these codes. Please also check to make sure all cited references are provided in the reference list (e.g., CBC(2010), CBC(2013))	Noted. Cited references will be added to the reference list (Section C.12). Codes will be added to the reference list, or a web site address will be provided.		Resolved.		Comment resolved pending DOI review of the final design documents..
508	FMIT/TRC	Design	Remedial Design	Append C: C.2.1	Attachment C: Geotechnical Analysis	The Units are indicated as International Feet. This should also indicate Horizontal Coordinate Units only. As appropriate, provide the scale factor for the grid to ground distance and coordinate conversion.	Section C.2.1 will be revised to clarify that horizontal coordinates are listed in International feet.			Comment noted.	
509	Hualapai/TRC	Design	Remedial Design	Append C: C.2.1	Attachment C: Geotechnical Analysis	The Units are indicated as International Feet. This should also indicate Horizontal Coordinate Units only. As appropriate, provide the scale factor for the grid to ground distance and coordinate conversion.	See above			Comment noted.	
510	Cocopah/TRC	Design	Remedial Design	Append C: C.2.1	Attachment C: Geotechnical Analysis	The Units are indicated as International Feet. This should also indicate Horizontal Coordinate Units only. As appropriate, provide the scale factor for the grid to ground distance and coordinate conversion.	See above			Comment noted.	
511	Chemehuevi/ TRC	Design	Remedial Design	Append C: C.2.1	Attachment C: Geotechnical Analysis	The Units are indicated as International Feet. This should also indicate Horizontal Coordinate Units only. As appropriate, provide the scale factor for the grid to ground distance and coordinate conversion.	See above			Comment noted.	
512	DOI-45	Design	Remedial Design	C.2.2/C-5	Pipes and conduit will be installed in steel casings when required by BNSF or ADOT…Geotec hnical borings may be	Because there is no trenchless construction under the BNSF railroad, why are there references to BNSF requirements?	Reference to BNSF potentially requiring geotechnical borings will be removed from the text. BNSF may still require piping to be installed in steel carrier casings even if not installed using		Noted.		Comment resolved.

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					required by ADOT or BNSF		trenchless construction. If that is required, the text description for that feature will be copied to the section on below-ground piping.				
513	FMIT	Design	Infrastructures	Appendix D; C-5	CH2MHILL 90% Design Specifications	In C.2.2 Earthwork, design criteria states "at least 3 inches of clearance between directly buried water piping... and may be increased up to 12 inches". "Minimum spacing between directly buried electrical conduits shall be 3 inches or half the diameter of the conduit, whichever is greater." Many Civil design details fail to follow this specification.	The text is correct and drawings will be revised to be consistent. See also RTC #21 FMIT-7.			Resolved.	Resolved.
514	FMIT/TRC	Design	Infrastructures	Append. D	C-5	In C.2.2 Earthwork, design criteria states "at least 3 inches of clearance between directly buried water piping... and may be increased up to 12 inches". "Minimum spacing between directly buried electrical conduits shall be 3 inches or half the diameter of the conduit, whichever is greater." Many Civil design details fail to follow this specification.	The text is correct and drawings will be revised to be consistent. See also RTC #21 FMIT-7.			Comment noted.	
515	Hualapai/TRC	Design	Infrastructures	Append. D	C-5	In C.2.2 Earthwork, design criteria states "at least 3 inches of clearance between directly buried water piping... and may be increased up to 12 inches". "Minimum spacing between directly buried electrical conduits shall be 3 inches or half the diameter of the conduit, whichever is greater." Many Civil design details fail to follow this specification.	See above			Comment noted.	
516	Cocopah/TRC	Design	Infrastructures	Append. D	C-5	In C.2.2 Earthwork, design criteria states "at least 3 inches of clearance between directly buried water piping... and may be increased up to 12 inches". "Minimum spacing between directly buried electrical conduits shall be 3 inches or half the diameter of the conduit, whichever is greater." Many Civil design details fail to follow this specification.	See above			Comment noted.	
517	Chemehuevi/ TRC	Design	Infrastructures	Append. D	C-5	In C.2.2 Earthwork, design criteria states "at least 3 inches of clearance between directly buried water piping... and may be increased up to 12 inches". "Minimum spacing between directly buried electrical conduits shall be 3 inches or half the diameter of the conduit, whichever is greater." Many Civil design details fail to follow this specification.	See above			Comment noted.	
518	DOI-46	Design	Remedial Design	C.2.4/C-7	A perimeter fence will be installed along with a security camera to monitor and prevent unauthorized access.	Add a second bullet that indicates a gate with a lock or card reader will be installed.	Noted. Text will be revised to match C-01-01.		Accepted.		Comment resolved pending DOI review of the final design documents.
519	DOI-47	Design	Remedial Design	C.2.5/C-7	The vaults will vary in depth depending upon use and location, but to the extent possible they will be designed to be shallow enough that entry would not require a confined space entry procedure.	Suggest parenthetically adding four feet and citing the OSHA requirement.	The referenced text will be modified as follows: "The vaults will vary in depth depending upon use and location, but to the extent possible they will be designed to be shallow enough that entry would not require a confined space entry procedure (e.g., no greater than 4 feet in depth per OSHA's Safety and Health Regulations for Construction §1926.21[b][6][ii])."		Resolved.		Comment resolved.
520	DOI-48	Design	Other	C.4/C-11	4,000 psf for CH2M HILL-designed structures on the TCS; 2,000 psf for CH2M HILL designed structure	Please provide the basis for the specified criteria.	The listed design values are based on the geotechnical reports included as Attachment C to Appendix C. The referenced text in the design criteria will be revised to read: "4,000 psf for structures on the		Resolved.		Comment resolved.

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					outside the TCS		TCS; 2,000 psf for structures outside the TCS". As discussed in Section C.2 of Attachment C, to minimize intrusive field data collection during design, supplemental geotechnical data collection effort has been combined with the Soil RFI/RI investigation. As PG&E continues to engage in discussions with transportation agencies, counties, and other property owners/land managers to obtain institutional controls, access agreements, and permits, additional geotechnical data may be required to meet specific requirements of agencies and/or property owners/land managers. If determined to be required, the data will be collected during the construction phase.				
521	FMIT/TRC	Design	Other	Append C C.11 Noise	In this portion of Appendix C, the following text appears. C.11 Noise • The construction noise criteria will conform to San Bernardino Development Code and Mojave County standards, as well as the EIR mitigation measures NOISE-1, -2, and -3. Per San Bernardino County Code Division 3 Chapter 83.01.080, temporary construction, maintenance, repair, or demolition activities between 7:00	This paragraph provides noise-related criteria for the construction period(s) for the life of project. Therein, PG&E adopts the minimum required San Bernardino County noise criteria for facility construction and, in the absence of other clarification of modification, it certainly appears as though PG&E will be able to treat all remedy-related construction activities as EXEMPT FROM NOISE LIMITS during the stipulated hours and on the days stipulated. A higher noise standard should be voluntarily adopted for the project during construction, and that standard should be set in consultation with the impacted Tribes. If the above statement in C.11 Noise is at odds with what is elsewhere in project documents, it should be deleted.	Please see RTC #23 FMIT-9.			The Tribe requests further discussion of this comment.	DTSC Response: Comment noted. Noise impact evaluations are based on established regulatory thresholds. Noise impact is a resource area that DTSC will consider in the upcoming SEIR.

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					a.m. and 7:00 p.m., except Sundays and federal holidays, are exempt from noise limits.						
522	Hualapai/TRC	Design	Other	Append C C.11 Noise	In this portion of Appendix C, the following text appears. C.11 Noise • The construction noise criteria will conform to San Bernardino Development Code and Mojave County standards, as well as the EIR mitigation measures NOISE-1, -2, and -3. Per San Bernardino County Code Division 3 Chapter 83.01.080, temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and federal holidays, are exempt from noise limits.	This paragraph provides noise-related criteria for the construction period(s) for the life of project. Therein, PG&E adopts the minimum required San Bernardino County noise criteria for facility construction and, in the absence of other clarification of modification, it certainly appears as though PG&E will be able to treat all remedy-related construction activities as EXEMPT FROM NOISE LIMITS during the stipulated hours and on the days stipulated. A higher noise standard should be voluntarily adopted for the project during construction, and that standard should be set in consultation with the impacted Tribes. If the above statement in C.11 Noise is at odds with what is elsewhere in project documents, it should be deleted.	See above				
523	Cocopah/TRC	Design	Other	Append C C.11 Noise	In this portion of Appendix C, the following text appears. C.11 Noise • The construction noise criteria will conform to San Bernardino Development Code and Mojave County standards, as well as the EIR mitigation measures	This paragraph provides noise-related criteria for the construction period(s) for the life of project. Therein, PG&E adopts the minimum required San Bernardino County noise criteria for facility construction and, in the absence of other clarification of modification, it certainly appears as though PG&E will be able to treat all remedy-related construction activities as EXEMPT FROM NOISE LIMITS during the stipulated hours and on the days stipulated. A higher noise standard should be voluntarily adopted for the project during construction, and that standard should be set in consultation with the impacted Tribes. If the above statement in C.11 Noise is at odds with what is elsewhere in project documents, it should be deleted.	See above				

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					NOISE-1, -2, and -3. Per San Bernardino County Code Division 3 Chapter 83.01.080, temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and federal holidays, are exempt from noise limits.						
524	Chemehuevi/ TRC	Design	Other	Append C C.11 Noise	In this portion of Appendix C, the following text appears. C.11 Noise • The construction noise criteria will conform to San Bernardino Development Code and Mojave County standards, as well as the EIR mitigation measures NOISE-1, -2, and -3. Per San Bernardino County Code Division 3 Chapter 83.01.080, temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and federal holidays, are exempt from noise limits.	This paragraph provides noise-related criteria for the construction period(s) for the life of project. Therein, PG&E adopts the minimum required San Bernardino County noise criteria for facility construction and, in the absence of other clarification of modification, it certainly appears as though PG&E will be able to treat all remedy-related construction activities as EXEMPT FROM NOISE LIMITS during the stipulated hours and on the days stipulated. A higher noise standard should be voluntarily adopted for the project during construction, and that standard should be set in consultation with the impacted Tribes. If the above statement in C.11 Noise is at odds with what is elsewhere in project documents, it should be deleted.	See above				
525	DOI-49	Design	Editorial	Attachment A p. 2 (of 7)	Carbon Substrate Selection	The discussion focuses on the factors that will be considered in the selection of the carbon substrate. Please include a discussion of the actual substrate that was selected for the injection.	A discussion of the selected carbon substrate (ethanol) will		Accepted.		Comment resolved pending DOI review of the final design

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							be added to this attachment.				documents.
526	DOI-50	Non-design	Editorial	Attachment A p. 6(of 7)	Dosing Design	This section makes a number of references to Appendix B of the 60% design report which should be updated to the Appendix B of the 90% design. Please also indicate where the dosing calculations are found in the 90% design report. Recommend including the dosing design calculations in Appendix B.	References will be updated and dosing calculations will be included in the final design.		Accepted.		Comment resolved pending DOI review of the final design documents..
527	DOI-51	Design	Editorial	Attachment A p. 7(of 7)	However, the amount of EVO required to achieve sufficient distribution can be up to an order of magnitude greater than the amount of oil retention reported in the literature, based on field implementation at a number of sites (Schnobrich et al., 2011). In practice, the required EVO loading must be evaluated on a case by-case basis to confirm the site-specific degree of droplet retention and to ensure sufficient organic carbon distribution for treatment within the targeted area.	Please provide a reference in the 90% design to where the site specific loading rates are calculated that factor in the droplet retention. Recommend including the loading rate calculations in Appendix B.	See also RTC #526 DOI-50. The following references that discuss the retention of oil droplets for EVO distribution will be included in the final design: Solutions-IES, 2006. Protocol for Enhanced In Situ Bioremediation Using Emulsified Edible Oils. Environmental Security Technology Certification Program, Arlington, Virginia. (www.estcp.org) Soo H. and C.J. Radke, 1984. The flow mechanism of dilute stable emulsions in porous media. Ind. Eng. Chem. Fundam., 23: 342-347. Soo H. and C.J. Radke, 1986. A filtration model for the flow of dilute stable emulsions in porous media – I. Theory. Chem. Eng. Sci., 41: 263:272. It should be noted that, in ARCADIS's experience, the EVO requirement calculated based on oil retention typically underestimates the amount of oil needed for adequate distribution/to overcome the electron acceptors present. The final design will include the method to calculate the amount of EVO needed for distribution based on oil retention while acknowledging the potential need for injection of higher amounts of EVO based		Resolved.		Comment resolved.

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							on past experience.				
528	DOI-52	Design	Editorial	Attachment B p. 71	Calculation Cover Sheet	According to the QA Cover Sheet the calculations for the caustic feed usage that were revised on 4/4/2013 have not been independently checked.	Calculations included in Appendix C have been updated where required. In many cases the calculations serve to size vessels and quantify approximate anticipated quantities of reagent use and as such do not require independent verification. Calculations are revised when needed based on engineering judgment. The actual use of chemicals may vary during operations and is difficult to fully predict during the design stage.		Resolved.		Comment resolved.
529	DOI-53	Design	Editorial	Attachment C/Section C.1 p.C-1	The purpose of this geotechnical summary is to provide information on existing site geology and geotechnical data in support of the groundwater remedy design and to propose areas where supplemental geotechnical investigation is needed to verify design parameters.	Since this is the 90% design, please indicate when this work will be completed.	Coordination with the Soil RFI/RI investigation program was conducted in planning of the supplemental geotechnical investigation to minimize the number of boreholes, thereby minimizing ground disturbance. Specific areas are proposed in Section C.2 of Attachment C (Geotechnical Analysis) to Appendix C (Design Criteria). Due to the limited amount of geotechnical data available at the time of this design, assumptions made during the design will be reviewed after receipt of supplemental geotechnical data, currently planned to be collected as part of the forthcoming Soil RFI/RI sampling effort (anticipated in Fall 2015). Any material changes to the design required by this supplemental information will be discussed with the agencies. It is important to note that as PG&E continues to engage in discussions with transportation agencies,		Resolved.		Comment resolved.

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							counties, and other property owners/land managers to obtain institutional controls, access agreements, and permits, additional geotechnical data may be required to meet specific requirements of agencies and/or property owners/land managers.				
530	DOI-54	Design	Editorial	Attachment C/Section C.1 p.C-1	(Full report presented in PDF format as part of this Attachment to Appendix C of the 60% Basis of Design Report on the Appendix C CD ROM).	Reference to 60% Design report needs to be changed to 90% Design and report needs to be attached to this Appendix C.	Reference to the 60% Design will be deleted. The 2004 geotechnical report was attached to Attachment C.		Resolved.		Comment resolved.
531	DOI-55	Design	Editorial	Attachment C/Section C.1.2 p.C-4	Complete results of the 2009 investigation can be found in the 2009 *Geotechnical Investigation, Topock AOC 4 Remediation – Pre Work Plan Data Collection Activities* report, which is included as part of this Attachment to Appendix C on the Appendix C CD ROM.	Unless the WP is going to be included as part of Appendix C, please modify this sentence. There are a number of more instances where attachments are referred to but not included presumably because they were originally attached to the 60% design report but not the 90% design.	The 2009 geotechnical report was attached to Attachment C.		Resolved.		Comment resolved.
532	DOI-56	Non-design	Editorial	Attachment D/Section 1 p. 1(of 5)	DESIGN BULLETIN: Remediation Well Design and Field Construction Approach	Since this is a very general discussion references to the SOPs (where applicable) should be made.	Cross-references to the Construction/Remedial Action Work Plan and/or Standard Operating Procedures will be included as applicable.		Accepted.		Comment resolved pending DOI review of the final design documents.
533	DOI-57	Non-design	Editorial	Attachment D/Section 2 p. 1(of 5)	Therefore, the screened intervals proposed for the remediation wells as shown on Table 3.2.1-1 of the 60% design document are preliminary,	This section needs to be updated to the 90% Design document.	References to the 60% design document will be updated as appropriate.		Accepted.		Comment resolved pending DOI review of the final design documents.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
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PG&E Topock Compressor Station, Needles, California

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					and are based in part on the total vertical thickness of the unconsolidated sediments that are saturated.						
534	DOI-58	Non-design	Editorial	Attachment D/Section 2 p. 1(of 5)	Remediation Well Design General Plan	Should mention whether well material will be PVC (sch. 60 or 80) and how the wells will be completed at the surface – stickup or flush mount.	Details regarding well material and surface completion are included in Section 3.2 of the BOD. References to this section will be added to Section 2 of Attachment D.		Accepted.		Comment resolved pending DOI review of the final design documents.
535	DOI-59	Non-design	SOPs	Attachment D/Section 2 p. 5 (of 5)	Typically it is recommended that turbidity and potentially other field parameters such as conductivity and pH are measured in the extracted fluids during well development to assess progress.	Should revise to indicate that well is generally considered developed when parameters stabilize and meet pre-determined stabilization criteria.	Details regarding well development, including criteria for determining whether a well is developed, are provided in Section 3.2.1 of the Construction/Remedial Action Work Plan (C/RAWP). A reference to the C/RAWP will be added to Attachment D.		Accepted.		Comment resolved pending DOI review of the final design documents.
536	DTSC-120	Design	Remedial design	Appendix C, Attachment D, Section 2	"the screened intervals proposed for the remediation wells as shown on Table 3.2.1-1 of the 60% design document…"	Where is Table 3.2.1-1? Possible typographical error. Is actual reference supposed to be Table 3.2-1?	The reference will be updated to Table 3.2-1 of the 90% design document.	Resolved.			Comment resolved.
537	DOI-60	Non-design	Editorial	Attachment E/Section 1 p. 1	In the areas where as-built information was not available, piping routes were hypothesized based on logical assumptions. If more as-build information becomes available, then the analysis can be refined.	This analysis references the 60% Design for obtaining pipe lengths and elevations, and it is not clear whether the calculations need to be been updated to the 90% Design.	The 90% design did not require significant changes from the 60% design for anticipated fire water use. Therefore the calculations were not updated. However, the attachment will refer to the "final" design in the final design submittal.		Resolved.		Comment resolved.
Specific Comments – 90% BOD, Appendix D: Plans (Engineering Drawings)											

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538	FMIT/TRC	Design	Infrastructures	Append D Table D1-13	Table Heading / Explanation	The table heading/explanation should identify whether these are the items in the new infrastructure that are expected to be the major potential sources of environmental noise, or whether this a subset of such major sources, and how the subset was defined or otherwise determined.	This clarification was obtained from the commenter on April 22, 2015: "What I am looking for is some statement/narrative from the preparers of Table D1-13 that the equipment itemized in the table are those items felt, by the preparers/designers, to be the significant above-ground sources of sound power levels (SPLs) generated by the project during its operation." Response to clarified comment: The levels stated in Table D1-13 are the Sound Pressure Levels (SPLs) that would be expected when measured at the specified distance. They are different from Sound Power Levels (PWL or Lw) which are calculated quantities that are not directly measured. While the preparers/ designers do not find these sound levels to be either substantial or significant, this list summarizes the primary aboveground, non-emergency, remedy equipment that is likely to be a source of audible sound during operation.		Response noted.	Noted.	
539	Hualapai/TRC	Design	Infrastructures	Append D Table D1-13	Table Heading / Explanation	The table heading/explanation should identify whether these are the items in the new infrastructure that are expected to be the major potential sources of environmental noise, or whether this a subset of such major sources, and how the subset was defined or otherwise determined.	See above		See above		
540	Cocopah/TRC	Design	Infrastructures	Append D Table D1-13	Table Heading / Explanation	The table heading/explanation should identify whether these are the items in the new infrastructure that are expected to be the major potential sources of environmental noise, or whether this a subset of such major sources, and how the subset was defined or otherwise determined.	See above		See above		
541	Chemehuevi/ TRC	Design	Infrastructures	Append D Table D1-13	Table Heading / Explanation	The table heading/explanation should identify whether these are the items in the new infrastructure that are expected to be the major potential sources of environmental noise, or whether this a subset of such major sources, and how the subset was defined or otherwise determined.	See above		See above		
542	DTSC-121	Design	Remedial Design	Appendix D, Drawing C-00-05, Detail 6	"To be added later"	Why is the termination of pipeline B detail not included in design? What is meant by later? When will PG&E provide this detail?	The connections at the bridge terminations of pipeline B will be added once negotiations for access agreement have been completed.				
543	FMIT/TRC	Design	Infrastructures	Append D	Sheet M-00-05	The table in this drawing indicates that (horizontal) coordinates and elevations for wells will be provided as the design advances. The design is nearly complete, and these data should be provided	Preliminary well coordinates are			Comment noted.	

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						as part of the 90% RTC process, with a specific estimated location, along with a +/- estimate for each well location.	provided in tables 3.2-1 through 3.2-4. Final well coordinates will be provided after installation and survey of the final well locations.				
544	Hualapai/TRC	Design	Infrastructures	Append D	Sheet M-00-05	The table in this drawing indicates that (horizontal) coordinates and elevations for wells will be provided as the design advances. The design is nearly complete, and these data should be provided as part of the 90% RTC process, with a specific estimated location, along with a +/- estimate for each well location.	See above			Comment noted.	
545	Cocopah/TRC	Design	Infrastructures	Append D	Sheet M-00-05	The table in this drawing indicates that (horizontal) coordinates and elevations for wells will be provided as the design advances. The design is nearly complete, and these data should be provided as part of the 90% RTC process, with a specific estimated location, along with a +/- estimate for each well location.	See above			Comment noted.	
546	Chemehuevi/ TRC	Design	Infrastructures	Append D	Sheet M-00-05	The table in this drawing indicates that (horizontal) coordinates and elevations for wells will be provided as the design advances. The design is nearly complete, and these data should be provided as part of the 90% RTC process, with a specific estimated location, along with a +/- estimate for each well location.	See above			Comment noted.	
547	JDS	Design	Remedial Design	Appendix D; Figure E-00-08		Recommend installing well FW-1 in the access road, eliminate 90 elbows to create off-set, eliminate need to relocate existing underground IM-3 pipeline	FW-1 was placed in its current location to facilitate construction, decommissioning of IM-3 and long-term O&M.			Noted.	
548	JDS	Design	Remedial Design	Appendix D: Figure C-07-23		Provide spec for vertical separation between existing IM-3 piping and full-scale pipe and conduit. Horizontal spacing provided in the notes but not the vertical spacing.	Specifying the vertical separation of IM-3 and remedy piping is not necessary except in the locations where the pipes cross. Remedy pipelines and trenches are to be installed at the depths shown, where ever piping crosses; vertical distances between the piping will be included in the final design drawings.			Noted.	
549	FMIT	Design	Infrastructures	Appendix D; C-07-100, C-07-101, C-07-102, C-07-103	CH2MHILL 90% Design Plans	There appears to be an inconsistent application of the pipe and conduit spacing in the pipe cross sections from the engineering specification. This inconsistent spacing typically results in a wider trench than appears to be necessary. Trench width may be reduced if minimum design spacing of 3-inches between water pipes or sum of half the diameters for pipelines or electrical conduit are used, in some cases up to 1 foot may be eliminated. Optimizing the trenches may result in significant reduction in the volume of excavated materials. Details A2 and A5 have concrete encasement width of 2-feet, while A6 has a 1'-6" encasement. Concrete encasement for 12 kV line varies from 1'-6" to 2'-9". Varying red concrete cap widths, some details cover all electrical conduits, while others do not. Detail A3 has electrical conduits within the 12 inch min. spacing, not protected by a concrete cap, or detection tape. Why is there a 12" min between concrete trench and electrical conduit? Multiple details show a 12" minimum spacing between water pipes, concrete, and various objects (i.e. concrete, electrical pipes, concrete trench for example). Spacing between water lines inconsistent, for example Section H1 depicts 9-inches of spacing between water lines, while Section A10 spacing ranges between 4 and 6 inches between water lines. Narrower trenches are preferred by FMIT. Spacing between conduits should be reexamined for example in Section A8 the space between 2-inch conduits is 6 inches, while in other sections the spacing is 3 inches. A final example is the width of Section H2 is narrower than Section H1. These trenches should contain the same water lines and conduits but vary in width. It should be noted that Section H1, a	See RTC #21 FMIT-7.			Noted.	

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						lateral to one IRL well is only 5-inches narrower than Section A10 the trunk line to Pipeline Segment A.					
550	FMIT/TRC	Design	Infrastructures	Append. D	C-07-100,101, 102,103	There appears to be an inconsistent application of the pipe and conduit spacing in the pipe cross sections from the engineering specification. This inconsistent spacing typically results in a wider trench than appears to be necessary. Trench width may be reduced if minimum design spacing of 3-inches between water pipes or sum of half the diameters for pipelines or electrical conduit are used, in some cases up to 1 foot may be eliminated. Optimizing the trenches may result in significant reduction in the volume of excavated materials. Details A2 and A5 have concrete encasement width of 2-feet, while A6 has a 1'-6" encasement. Concrete encasement for 12 kV line varies from 1'-6" to 2'-9". Varying red concrete cap widths, some details cover all electrical conduits, while others do not. Detail A3 has electrical conduits within the 12 inch min. spacing, not protected by a concrete cap, or detection tape. Why is there a 12" min between concrete trench and electrical conduit? Multiple details show a 12" minimum spacing between water pipes, concrete, and various objects (i.e. concrete, electrical pipes, concrete trench for example). Spacing between water lines inconsistent, for example Section H1 depicts 9-inches of spacing between water lines, while Section A10 spacing ranges between 4 and 6 inches between water lines. Narrower trenches are preferred by FMIT. Spacing between conduits should be reexamined for example in Section A8 the space between 2-inch conduits is 6 inches, while in other sections the spacing is 3 inches. A final example is the width of Section H2 is narrower than Section H1. These trenches should contain the same water lines and conduits but vary in width. It should be noted that Section H1, a lateral to one IRL well is only 5-inches narrower than Section A10 the trunk line to Pipeline Segment A. Please refer to the attached markup of the figure titled "Pipeline Sections" as an example.	See RTC #21 FMIT-7.			Noted.	
551	Hualapai/TRC	Design	Infrastructures	Append. D	C-07-100,101, 102,103	There appears to be an inconsistent application of the pipe and conduit spacing in the pipe cross sections from the engineering specification. This inconsistent spacing typically results in a wider trench than appears to be necessary. Trench width may be reduced if minimum design spacing of 3-inches between water pipes or sum of half the diameters for pipelines or electrical conduit are used, in some cases up to 1 foot may be eliminated. Optimizing the trenches may result in significant reduction in the volume of excavated materials. Details A2 and A5 have concrete encasement width of 2-feet, while A6 has a 1'-6" encasement. Concrete encasement for 12 kV line varies from 1'-6" to 2'-9". Varying red concrete cap widths, some details cover all electrical conduits, while others do not. Detail A3 has electrical conduits within the 12 inch min. spacing, not protected by a concrete cap, or detection tape. Why is there a 12" min between concrete trench and electrical conduit? Multiple details show a 12" minimum spacing between water pipes, concrete, and various objects (i.e. concrete, electrical pipes, concrete trench for example). Spacing between water lines inconsistent, for example Section H1 depicts 9-inches of spacing between water lines, while Section A10 spacing ranges between 4 and 6 inches between water lines. Narrower trenches are preferred by FMIT. Spacing between conduits should be reexamined for example in Section A8 the space between 2-inch conduits is 6 inches, while in other sections the spacing is 3 inches. A final example is the width of Section H2 is narrower than Section H1. These trenches should contain the same water lines and conduits but vary in width. It should be noted that Section H1, a lateral to one IRL well is only 5-inches narrower than Section A10 the trunk line to Pipeline Segment A. Please refer to the attached markup of the figure titled "Pipeline Sections" as an example.	See above				
552	Cocopah/TRC	Design	Infrastructures	Append. D	C-07-100,101, 102,103	There appears to be an inconsistent application of the pipe and conduit spacing in the pipe cross sections from the engineering specification. This inconsistent spacing typically results in a wider trench than appears to be necessary. Trench width may be reduced if minimum design spacing of 3-inches between water pipes or sum of half the diameters for pipelines or electrical conduit are used, in some cases up to 1 foot may be eliminated. Optimizing the trenches may result in significant reduction in the volume of excavated materials. Details A2 and A5 have concrete encasement width of 2-feet, while A6 has a 1'-6" encasement. Concrete encasement for 12 kV line varies from 1'-6" to 2'-9". Varying red concrete cap widths, some details cover all electrical conduits, while others do not.	See above				

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						Detail A3 has electrical conduits within the 12 inch min. spacing, not protected by a concrete cap, or detection tape. Why is there a 12" min between concrete trench and electrical conduit? Multiple details show a 12" minimum spacing between water pipes, concrete, and various objects (i.e. concrete, electrical pipes, concrete trench for example). Spacing between water lines inconsistent, for example Section H1 depicts 9-inches of spacing between water lines, while Section A10 spacing ranges between 4 and 6 inches between water lines. Narrower trenches are preferred by FMIT. Spacing between conduits should be reexamined for example in Section A8 the space between 2-inch conduits is 6 inches, while in other sections the spacing is 3 inches. A final example is the width of Section H2 is narrower than Section H1. These trenches should contain the same water lines and conduits but vary in width. It should be noted that Section H1, a lateral to one IRL well is only 5-inches narrower than Section A10 the trunk line to Pipeline Segment A. Please refer to the attached markup of the figure titled "Pipeline Sections" as an example.					
553	Chemehuevi/ TRC	Design	Infrastructures	Append. D	C-07-100,101, 102,103	There appears to be an inconsistent application of the pipe and conduit spacing in the pipe cross sections from the engineering specification. This inconsistent spacing typically results in a wider trench than appears to be necessary. Trench width may be reduced if minimum design spacing of 3-inches between water pipes or sum of half the diameters for pipelines or electrical conduit are used, in some cases up to 1 foot may be eliminated. Optimizing the trenches may result in significant reduction in the volume of excavated materials. Details A2 and A5 have concrete encasement width of 2-feet, while A6 has a 1'-6" encasement. Concrete encasement for 12 kV line varies from 1'-6" to 2'-9". Varying red concrete cap widths, some details cover all electrical conduits, while others do not. Detail A3 has electrical conduits within the 12 inch min. spacing, not protected by a concrete cap, or detection tape. Why is there a 12" min between concrete trench and electrical conduit? Multiple details show a 12" minimum spacing between water pipes, concrete, and various objects (i.e. concrete, electrical pipes, concrete trench for example). Spacing between water lines inconsistent, for example Section H1 depicts 9-inches of spacing between water lines, while Section A10 spacing ranges between 4 and 6 inches between water lines. Narrower trenches are preferred by FMIT. Spacing between conduits should be reexamined for example in Section A8 the space between 2-inch conduits is 6 inches, while in other sections the spacing is 3 inches. A final example is the width of Section H2 is narrower than Section H1. These trenches should contain the same water lines and conduits but vary in width. It should be noted that Section H1, a lateral to one IRL well is only 5-inches narrower than Section A10 the trunk line to Pipeline Segment A. Please refer to the attached markup of the figure titled "Pipeline Sections" as an example.	See above				
554	FMIT	Design	Infrastructures	Appendix D; C-07-105, C-07-106	CH2MHILL 90% Design Plans	Why is there 12" spacing between electric conduit and water pipelines in underground trenches on previous sheets, but less than 12" spacing in the open air concrete trench? If power and water are so close together in the concrete trench, why is there so much spacing for water lines in concrete trenches and direct bury electrical conduits?	The 12" horizontal/ vertical spacing between conduits and water lines is an engineering approach selected with consideration for future operations and maintenance. By separating the lines, we can excavate and repair/inspect the water lines without needing to move the electrical lines that are installed closer to the surface out of the way. The spacing is reduced in the concrete trenches where the lines can be accessed without excavating around each.			Noted.	
555	FMIT/TRC	Design	Infrastructures	Append. D	C-07-106	Why is there 12" spacing between electric conduit and water pipelines in underground trenches on previous sheets, but less than 12" spacing in the open air concrete trench? If power and water are	See RTC #554 FMIT.			Noted.	

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						so close together in the concrete trench, why is there so much spacing for water lines in concrete trenches and direct bury electrical conduits?					
556	Hualapai/TRC	Design	Infrastructures	Append. D	C-07-106	Why is there 12" spacing between electric conduit and water pipelines in underground trenches on previous sheets, but less than 12" spacing in the open air concrete trench? If power and water are so close together in the concrete trench, why is there so much spacing for water lines in concrete trenches and direct bury electrical conduits?	See above				
557	Cocopah/TRC	Design	Infrastructures	Append. D	C-07-106	Why is there 12" spacing between electric conduit and water pipelines in underground trenches on previous sheets, but less than 12" spacing in the open air concrete trench? If power and water are so close together in the concrete trench, why is there so much spacing for water lines in concrete trenches and direct bury electrical conduits?	See above				
558	Chemehuevi/ TRC	Design	Infrastructures	Append. D	C-07-106	Why is there 12" spacing between electric conduit and water pipelines in underground trenches on previous sheets, but less than 12" spacing in the open air concrete trench? If power and water are so close together in the concrete trench, why is there so much spacing for water lines in concrete trenches and direct bury electrical conduits?	See above				
559	FMIT	Design	Infrastructures	Appendix D; C-07-107	CH2MHILL 90% Design Plans	Why is there 2' of spacing between two separate trenches for water and power lines? Detail L3 and K1 show 480V electrical lines within 12" of water lines.	See RTC #21 FMIT-7.				
560	FMIT/TRC	Design	Remedial Design	Append D AND Supplemental Section 3	Design group "09" Compressor Station Ponds	There appears to have been no effort made to estimate the CUMULATIVE noise impacts resulting from this, or other major segments (e.g., TCS improvements) of this project. This is important considering both the duration of the build-out, and the long-term operation of the remedy. The approach appears to be to design and construct, and then see if complaints arise, and if there are complaints, to then attempt to deal with the issues. Instead, the designers should quantify in advance the projected cumulative noise level impacts resulting from planned improvements at such locations. As an illustration, for the TCS evaporation ponds segment of the project, partial sound level information is provided in Appendix D, Equipment List D1-12 for the natural gas generator that will power the facility.	Certain TCS improvements, such as the new air compressor building, are not part of the project. Improvements to the ponds, however, are part of the project. The cumulative noise analysis for the project can be found on page 6-38 of Volume 2 of the EIR. The analysis accounts for the possibility that the project may be constructed at the same time as unrelated projects at the compressor station, as well as noise from I-40, the railroad, and other existing noise sources in the area. According to this analysis, the project will not make a cumulatively considerable contribution to cumulative noise impacts if the project complies with Mitigation Measures NOISE-1, NOISE-2, and NOISE-3. The approach for this project is to comply with the applicable regulatory standards that are set to protect certain resources and/or receptors and implement the mitigation measures specified in the EIR. The County's noise standards	DTSC has considered cumulative impacts of all known projects in the Certified EIR. Noise impacts are evaluated against regulatory thresholds. DTSC understands that culturally, Tribes may consider noise differently than regulatory thresholds, thus DTSC evaluated the potential cultural impacts of the project and considers it significant and unavoidable.		Now that the design is close to 100% complete, the Subsequent Groundwater EIR should include a comprehensive cumulative noise impact evaluation that considers the project as it now exists, because the project has changed in important ways. Therefore, this comment is considered unresolved.	DTSC Response: Comment noted. Noise impact and cumulative impact are subject areas that DTSC will consider in the upcoming SEIR.

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						However, NO sound level data are provided for the two 3-HP pontoon-mounted pumps that will be installed and operational in each of two lagoons to provide aeration of pond waters. Further there is no analysis or evaluation of noise levels from the aeration/emitter sub-system installed along the top edges of the ponds. This approach to individual equipment items provides no analysis or evaluation of the potential cumulative noise impact that can be anticipated at various locations from the planned facility improvements. The cumulative impacts under consideration here get at the impacts to the larger cultural landscape. It is important not only to quantify the noise impacts, but to provide mitigation of those impacts, especially at this remote location. In the interest of further noise attenuation at the remote pond location, the designers should consider a Cummins Quiet Connect Series RS 30 generator (or equivalent), which offers improved noise attenuation (as compared to the Cummins GGMC R.I.C.E. model) – when specified to include the available sound-attenuating enclosure. This approach, in conjunction with planned placement in the structure, may offer significantly reduced sound levels at the site.	and the EIR mitigation measures limit the amount of noise allowed to be produced. These thresholds are numerical and quantifiable (see Section C.11 of Appendix C). These numerical standards are supplemented by protocols specified in the CIMP to further reduce auditory impacts. These design criteria avoid the need to have to quantify the project's contribution to cumulative noise impacts by ensuring that the project's contribution to cumulative noise will be the same as disclosed in the EIR. Further, the type of equipment proposed is consistent with that assumed in the EIR, indicating that additional mitigation above and beyond what has already been specified is not required. The noise emitted by the two 3-HP pontoon mounted pumps (one pump per pond) satisfy the noise design criteria. Details are provided below. The pontoon pumps utilize totally enclosed fan-cooled (TEFC) 3 Hp motors. The sound pressure level for a standard 3 Hp motor at loaded conditions is predicted to be 60 dB at a distance of 9 meters. The minimum distance from the proposed location of the pontoon mounted pumps to the fence line is approximately 20 meters, therefore a standard motor will be expected to be 54 dB at the fence line. This complies with the applicable noise requirements for the				

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							TCS Evaporation Ponds. In addition, the above calculations are based on standard motors. Higher efficiency motors are being utilized which are quieter than standard motors. In the unlikely event that actual noise levels exceed the criterion of 60 dB at the fence line, additional engineering controls will be installed to achieve compliance. The commenter noted that RICE generator sets may be specified with sound attenuating enclosure. These enclosures provide additional insulation and sound suppression to attenuate sound. Several manufacturers (Cummins, Kohler, Generac) produce natural gas fueled RICE generator sets that meet the noise design criteria at the ponds. PG&E recently learned that Cummins no longer produces the GGMC model. Therefore, we evaluated other models from Cummins and other manufacturers; Cummins RS30, Kohler 30REZG and Generac SGO35. All models, when specified with sound enclosures, will meet the noise design criteria at TCS ponds. In addition to the enclosure, the generator will be housed in a utility building which further attenuate sound levels. The Kohler Model 30REZG was selected because of its certified Prime rating. A Prime rating allows the operational flexibility (in terms of allowed operating hours in a year) needed for the				

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							enhanced evaporation system at the ponds. The Generac SGO35 and Cummins RS30 only have a standby rating, limits the number of hours they can operate and are therefore not viable options. As noted above, generator will be outfitted with an enclosure and located inside a building.				
561	Hualapai/TRC	Design	Remedial Design	Append D AND Supplemental Section 3	Design group "09" Compressor Station Ponds	There appears to have been no effort made to estimate the CUMULATIVE noise impacts resulting from this, or other major segments (e.g., TCS improvements) of this project. This is important considering both the duration of the build-out, and the long-term operation of the remedy. The approach appears to be to design and construct, and then see if complaints arise, and if there are complaints, to then attempt to deal with the issues. Instead, the designers should quantify in advance the projected cumulative noise level impacts resulting from planned improvements at such locations. As an illustration, for the TCS evaporation ponds segment of the project, partial sound level information is provided in Appendix D, Equipment List D1-12 for the natural gas generator that will power the facility. However, NO sound level data are provided for the two 3-HP pontoon-mounted pumps that will be installed and operational in each of two lagoons to provide aeration of pond waters. Further there is no analysis or evaluation of noise levels from the aeration/emitter sub-system installed along the top edges of the ponds. This approach to individual equipment items provides no analysis or evaluation of the potential cumulative noise impact that can be anticipated at various locations from the planned facility improvements. The cumulative impacts under consideration here get at the impacts to the larger cultural landscape. It is important not only to quantify the noise impacts, but to provide mitigation of those impacts, especially at this remote location. In the interest of further noise attenuation at the remote pond location, the designers should consider a Cummins Quiet Connect Series RS 30 generator (or equivalent), which offers improved noise attenuation (as compared to the Cummins GGMC R.I.C.E. model) – when specified to include the available sound-attenuating enclosure. This approach, in conjunction with planned placement in the structure, may offer significantly reduced sound levels at the site.	See above			Now that the design is close to 100% complete, the Subsequent EIR should include a comprehensive cumulative noise impact evaluation that considers the project as it now exists, because the 2011 EIR did not address this, and the project has changed in important ways. Therefore, this comment is considered unresolved.	DTSC response: Tribal comment noted, see RTC #560
562	Cocopah/TRC	Design	Remedial Design	Append D AND Supplemental Section 3	Design group "09" Compressor Station Ponds	There appears to have been no effort made to estimate the CUMULATIVE noise impacts resulting from this, or other major segments (e.g., TCS improvements) of this project. This is important considering both the duration of the build-out, and the long-term operation of the remedy. The approach appears to be to design and construct, and then see if complaints arise, and if there are complaints, to then attempt to deal with the issues. Instead, the designers should quantify in advance the projected cumulative noise level impacts resulting from planned improvements at such locations. As an illustration, for the TCS evaporation ponds segment of the project, partial sound level information is provided in Appendix D, Equipment List D1-12 for the natural gas generator that will power the facility. However, NO sound level data are provided for the two 3-HP pontoon-mounted pumps that will be installed and operational in each of two lagoons to provide aeration of pond waters. Further there is no analysis or evaluation of noise levels from the aeration/emitter sub-system installed along the top edges of the ponds. This approach to individual equipment items provides no analysis or evaluation of the potential cumulative noise impact that can be anticipated at various locations from the planned facility improvements. The cumulative impacts under consideration here get at the impacts to the larger cultural landscape. It is important not only to quantify the noise impacts, but to provide mitigation of those impacts, especially at this remote location. In the interest of further noise attenuation at the remote pond location, the designers should consider a Cummins Quiet Connect Series RS 30 generator (or equivalent), which offers improved noise attenuation (as compared to the Cummins GGMC R.I.C.E. model) – when specified to include the available sound-attenuating enclosure. This approach, in conjunction with planned placement in the structure, may offer significantly reduced	See above			Now that the design is close to 100% complete, the Subsequent EIR should include a comprehensive cumulative noise impact evaluation that considers the project as it now exists, because the 2011 EIR did not address this, and the project has changed in important ways. Therefore, this comment is considered unresolved.	DTSC response: Tribal comment noted, see RTC #560

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						sound levels at the site.					
563	Chemehuevi/ TRC	Design	Remedial Design	Append D AND Supplemental Section 3	Design group "09" Compressor Station Ponds	There appears to have been no effort made to estimate the CUMULATIVE noise impacts resulting from this, or other major segments (e.g., TCS improvements) of this project. This is important considering both the duration of the build-out, and the long-term operation of the remedy. The approach appears to be to design and construct, and then see if complaints arise, and if there are complaints, to then attempt to deal with the issues. Instead, the designers should quantify in advance the projected cumulative noise level impacts resulting from planned improvements at such locations. As an illustration, for the TCS evaporation ponds segment of the project, partial sound level information is provided in Appendix D, Equipment List D1-12 for the natural gas generator that will power the facility. However, NO sound level data are provided for the two 3-HP pontoon-mounted pumps that will be installed and operational in each of two lagoons to provide aeration of pond waters. Further there is no analysis or evaluation of noise levels from the aeration/emitter sub-system installed along the top edges of the ponds. This approach to individual equipment items provides no analysis or evaluation of the potential cumulative noise impact that can be anticipated at various locations from the planned facility improvements. The cumulative impacts under consideration here get at the impacts to the larger cultural landscape. It is important not only to quantify the noise impacts, but to provide mitigation of those impacts, especially at this remote location. In the interest of further noise attenuation at the remote pond location, the designers should consider a Cummins Quiet Connect Series RS 30 generator (or equivalent), which offers improved noise attenuation (as compared to the Cummins GGMC R.I.C.E. model) – when specified to include the available sound-attenuating enclosure. This approach, in conjunction with planned placement in the structure, may offer significantly reduced sound levels at the site.	See above			Now that the design is close to 100% complete, the Subsequent EIR should include a comprehensive cumulative noise impact evaluation that considers the project as it now exists, because the 2011 EIR did not address this, and the project has changed in important ways. Therefore, this comment is considered unresolved.	DTSC response: Tribal comment noted, see RTC #560
Specific Comments – 90% BOD, Appendix E: Specifications											
564	FMIT/TRC	Non-design	Infrastructures	Append E	N/A	Criteria for as-built vertical location precision and datum for all project wells heads (or other portions of wells used for referencing well water levels) should be provided as part of the project specifications. Suggested criteria may be developed with consideration for CSA S250-11 and CI/ASCE 38-02. These standards should also be considered for all surveying (horizontal and vertical) completed to provide as-built (record) information for all underground infrastructure on the project.	As mentioned in RTCs #52 FMIT/TRC, #53 Hualapai/TRC, #54 Cocopah/TRC, and #55 Chemehuevi/TRC, PG&E anticipates establishing temporary survey control points in various locations at the project site to use during and post-construction. Section C.2.1 of Appendix C lists the project vertical and horizontal datum. The surveying control points will be included in the as-built drawings.	PG&E is required to submit a set of "as-built" along with a construction completion report. This information can be made a part of that final report which would include any exceptions to the final design.		Noted awaiting information called for in DTSC response.	PG&E will provide information on the survey control points in the Construction Completion Report required under the 1996 Corrective Action Consent Agreement.
565	Hualapai/TRC	Non-design	Infrastructures	Append E	N/A	Criteria for as-built vertical location precision and datum for all project wells heads (or other portions of wells used for referencing well water levels) should be provided as part of the project specifications. Suggested criteria may be developed with consideration for CSA S250-11 and CI/ASCE 38-02. These standards should also be considered for all surveying (horizontal and vertical) completed to provide as-built (record) information for all underground infrastructure on the project.	See above				
566	Cocopah/TRC	Non-design	Infrastructures	Append E	N/A	Criteria for as-built vertical location precision and datum for all project wells heads (or other portions of wells used for referencing well water levels) should be provided as part of the project specifications. Suggested criteria may be developed with consideration for CSA S250-11 and CI/ASCE 38-02. These standards should also be considered for all surveying (horizontal and vertical) completed to provide as-built (record) information for all underground infrastructure on the project.	See above				
567	Chemehuevi/ TRC	Non-design	Infrastructures	Append E	N/A	Criteria for as-built vertical location precision and datum for all project wells heads (or other portions of wells used for referencing well water levels) should be provided as part of the project specifications. Suggested criteria may be developed with consideration for CSA S250-11 and CI/ASCE 38-02. These standards should also be considered for all surveying (horizontal and vertical)	See above				

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						completed to provide as-built (record) information for all underground infrastructure on the project.					
568	FMIT/TRC RTC, 60% 457a	Design	Infrastructures	Append E 03 30 00 p. 16	(orig comment #457 response) *"PG&E agrees to provide pigment information to the tribe, if requested when it becomes available."*	It is requested that if and when this information becomes available, it be provided to the Tribes.	The requested information is anticipated to become available during construction. When it is, the information can be distributed with other construction data.			Response noted. This comment will be considered unresolved until such time as this information is provided.	PG&E shall provide the pigment information to the Tribes when it is available during construction.
569	Hualapai /TRC RTC, 60% 457a	Design	Infrastructures	Append E 03 30 00 p. 16	(orig comment #457 response) *"PG&E agrees to provide pigment information to the tribe, if requested when it becomes available."*	It is requested that if and when this information becomes available, it be provided to the Tribes.	See above			Response noted. This comment will be considered unresolved until such time as this information is provided	See response to RTC #568
570	Cocopah/TRC RTC, 60% 457a	Design	Infrastructures	Append E 03 30 00 p. 16	(orig comment #457 response) *"PG&E agrees to provide pigment information to the tribe, if requested when it becomes available."*	It is requested that if and when this information becomes available, it be provided to the Tribes.	See above			Response noted. This comment will be considered unresolved until such time as this information is provided	See response to RTC #568
571	Chemehuevi/ TRC RTC, 60% 457a	Design	Infrastructures	Append E 03 30 00 p. 16	(orig comment #457 response) *"PG&E agrees to provide pigment information to the tribe, if requested when it becomes available."*	It is requested that if and when this information becomes available, it be provided to the Tribes.	See above			Response noted. This comment will be considered unresolved until such time as this information is provided	See response to RTC #568
Specific Comments – 90% BOD, Appendix F: Remedy Wastewater Management Technical Memorandum											
572	DOI-61	Design	Process	Table F-5/F-12	Excess capacity of the ponds is estimated to be between 500,000 and 1,000,000 gallons per year.	Does this estimate consider provisions to enhance evaporation as noted in the adjacent column pertaining to infrastructure requirements? Please clarify.	No, it does not. Over the most recent five-year period (2010-2014), the annual flows to the ponds have ranged from 3.7 to 7.5 million gallons (MGs). With an estimated total pond capacity of 5 MGs, there are times where there could be up to 1.4 MG excess capacity and there are times where there is no excess		Resolved.		Comment resolved.

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							capacity (and as a last resort, wastewater may need to be trucked offsite).				
573	DOI-62	Non-design	Editorial	Table F-5 note/F-13	If PG&E proposes to evaluate this option…	"This" should be "either" or the text should reference a specific option.	The word "this" will be replaced by "either".		Resolved.		Comment resolved.
574	FMIT/TRC RTC, 60% 490	Choose an item.	Choose an item.	Append F Table F-5 p. F-13	Regarding possible infiltration gallery in Bat Cave Wash: (orig. comment #490 response): ...." *PG&E proposes to evaluate this option further in the future, PG&E will discuss the option at that time, and will seek further input from the Tribes during the Soil CMS/FS development and review. Text will be added to the 90% BOD to reflect this response*."	The Tribes appreciate that this option is no longer under consideration. The Tribes would prefer that this option be eliminated completely but understand the commitment that : "*If PG&E proposes to evaluate this option further in the future, PG&E will discuss this option with agencies and Tribes at that time.*" If any such project were to be added later, it would undergo public environmental review.	Comment noted.		Comment noted.	Response noted and comment considered resolved.	Comment resolved.
575	Hualapai/TRC RTC, 60% 490	Choose an item.	Choose an item.	Append F Table F-5 p. F-13	Regarding possible infiltration gallery in Bat Cave Wash: (orig. comment #490 response): ...." *PG&E proposes to evaluate this option further in the future, PG&E will discuss the option at that time, and will seek further input from the Tribes during the Soil CMS/FS development and review. Text will be added to the 90% BOD to reflect this response*."	The Tribes appreciate that this option is no longer under consideration. The Tribes would prefer that this option be eliminated completely but understand the commitment that : "*If PG&E proposes to evaluate this option further in the future, PG&E will discuss this option with agencies and Tribes at that time.*" If any such project were to be added later, it would undergo public environmental review.	See above		See above	Response noted and comment considered resolved.	Comment resolved.

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576	Cocopah/TRC RTC, 60% 490	Choose an item.	Choose an item.	Append F Table F-5 p. F-13	Regarding possible infiltration gallery in Bat Cave Wash: (orig. comment #490 response): ....” *PG&E proposes to evaluate this option further in the future, PG&E will discuss the option at that time, and will seek further input from the Tribes during the Soil CMS/FS development and review. Text will be added to the 90% BOD to reflect this response.*”	The Tribes appreciate that this option is no longer under consideration. The Tribes would prefer that this option be eliminated completely but understand the commitment that : “*If PG&E proposes to evaluate this option further in the future, PG&E will discuss this option with agencies and Tribes at that time.*” If any such project were to be added later, it would undergo public environmental review.	See above		See above	Response noted and comment considered resolved.	Comment resolved.
577	Chemehuevi/ TRC RTC, 60% 490	Choose an item.	Choose an item.	Append F Table F-5 p. F-13	Regarding possible infiltration gallery in Bat Cave Wash: (orig. comment #490 response): ....” *PG&E proposes to evaluate this option further in the future, PG&E will discuss the option at that time, and will seek further input from the Tribes during the Soil CMS/FS development and review. Text will be added to the 90% BOD to reflect this response.*”	The Tribes appreciate that this option is no longer under consideration. The Tribes would prefer that this option be eliminated completely but understand the commitment that : “*If PG&E proposes to evaluate this option further in the future, PG&E will discuss this option with agencies and Tribes at that time.*” If any such project were to be added later, it would undergo public environmental review.	See above		See above	Response noted and comment considered resolved.	Comment resolved.
578	DOI-63	Design	Editorial	Table F-6/F-15	Third column	This table is the first occurrence of A-side and B-side references. There needs to be an explanatory footnote.	A footnote will be added to explain that: “To allow for operational flexibility to segregate/manage various produced water streams and to optimize processes in the future,		Resolved.		Comment resolved.

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							the conditioning system will be configured with two parallel trains: 1) A-side Remedy and 2) B-side Freshwater. Both trains will be equipped initially with identical processes/units as illustrated in Figure F-2.”				
579	DOI-64	Design	Editorial	Table F-6/F-15	First note at the bottom of the table	The acronym FWPTS needs to be defined and explained in this appendix.	The acronym FWPTS will be defined and its purpose explained in the first note.		Accepted.		Comment resolved pending DOI review of the final design documents.
580	DOI-65	Design	Other	Figure F-2/F-17	N/A	There needs to be a note added to the figure indicating there will be parallel A-side and B-side systems.	Addition of note will be made as requested.		Accepted.		Comment resolved pending DOI review of the final design documents..
581	DOI-66	Design	Editorial	Figure F-2/F-17	N/A	The placement of the DMRS in the process train would be helpful. It would have a dashed box and the footnote 1 above would reference Figure F-2.	Placement of the DMRS in Figure F-2 will be made as requested.		Accepted.		Comment resolved pending DOI review of the final design documents.
Specific Comments – 90% BOD, Appendix G: Evaluation of Arched Bridge Structural Integrity and Space Availability to Support Freshwater Supply Pipeline											
582	FMIT/TRC RTC, 60% 466a	Non-design	Infrastructures	Append G	(orig comment #457 response) …”*Any follow-on pipeline bridge improvement project will be a Gas Transmission project. Consistent with current practice, PG&E will keep the agencies, stakeholders, and Tribes informed of Gas Transmission projects in the Topock area.” (emphasis added)*	The Tribes appreciate PG&E’s commitment to keeping the Tribes informed of any new, ongoing gas transmission projects.	Comment noted.		Comment noted.	Response noted and comment considered resolved.	Comment resolved.
583	Hualapai/TRC RTC, 60% 466a	Non-design	Infrastructures	Append G	(orig comment #457 response) …”*Any follow-on pipeline bridge improvement project will be a Gas Transmission project. Consistent with current practice, PG&E will keep the agencies,*	The Tribes appreciate PG&E’s commitment to keeping the Tribes informed of any new, ongoing gas transmission projects.	See above		See above	Response noted and comment considered resolved.	Comment resolved.

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					stakeholders, and Tribes informed of Gas Transmission projects in the Topock area." (emphasis added)						
584	Cocopah/TRC RTC, 60% 466a	Non-design	Infrastructures	Append G	(orig comment #457 response) *…"Any follow-on pipeline bridge improvement project will be a Gas Transmission project. Consistent with current practice, PG&E will keep the agencies, stakeholders, and Tribes informed of Gas Transmission projects in the Topock area." (emphasis added)*	The Tribes appreciate PG&E's commitment to keeping the Tribes informed of any new, ongoing gas transmission projects.	See above		See above	Response noted and comment considered resolved.	Comment resolved.
585	Chemehuevi/ TRC RTC, 60% 466a	Non-design	Infrastructures	Append G	(orig comment #457 response) *…"Any follow-on pipeline bridge improvement project will be a Gas Transmission project. Consistent with current practice, PG&E will keep the agencies, stakeholders, and Tribes informed of Gas Transmission projects in the Topock area." (emphasis added)*	The Tribes appreciate PG&E's commitment to keeping the Tribes informed of any new, ongoing gas transmission projects.	See above		See above	Response noted and comment considered resolved.	Comment resolved.
Specific Comments – 90% BOD, Appendix I: Response to Comments											
586	FMIT	Non-design	CEQA/EIR	Appendix I; RTC Item 536		This comment was carried through to the 90%, but it is still not clear as to how/ whether the CEQA process will apply to design changes.		DTSC has committed to evaluate in the final		Noted. And pending further information.	

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								SEIR whether the design changes have new significant impacts from those in the certified 2011 FEIR or increase the severity of the impacts disclosed in that document. DTSC will not complete and certify the SEIR prior to completion of the 90% design response to comments.			
Specific Comments – 90% BOD, Appendix L: O&M Manual – Main Text											
587	DOI-67	Non-design	Editorial	L1/L1-1	A Remedial Design/Remedial Action Consent Decree (CD) between the United States and PG&E, on behalf of the DOI, under CERCLA (DOI 2013) was approved by the United States District Court for the Central District of California in November 2013.	For clarity, please revise this sentence to read: A Remedial Design/Remedial Action Consent Decree (CD) between the United States, on behalf of the DOI, and PG&E, (DOI 2013) was approved by the United States District Court for the Central District of California in November 2013.	Revision will be made as requested.		Accepted.		Comment resolved pending DOI review of the final design documents.
588	MWD	Non-design	Request for Information	Main Text, Sect. L1.1.1/L1-3	"...groundwater remedy becomes OF either one year after construction is complete, or when groundwater remedy is determined concurrently by DOI and DTSC to be functioning properly, whichever is earlier. DOI may grant extensions to the one-year period..."	Provide clarification on whether DTSC would also honor possible extensions, beyond the one year time-frame, for determining the project to be Operational and Functional (OF).	The text will be revised as follows: "...groundwater remedy becomes OF either one year after construction is complete, or when groundwater remedy is determined ~~concurrently~~ by DOI ~~and DTSC~~ to be functioning properly, whichever is earlier. DOI may grant extensions to the one-year period..." Revisions to this sentence will be made throughout the document.	See RTC #96 FMIT-19.	See RTC #96 FMIT-19.		Comment resolved.
589	DOI-68	Non-design	Remedial	Appendix L,	3. Performance	The performance summary should include an evaluation of the hydraulic capture of the plume by	The following text will		Resolved.		Comment resolved.

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			Design	L.2.2. p. L2-10	Summary	the extraction wells near the Colorado River.	be added to Exhibit L2.2-2 of the O&M Manual (added text shown as underline): "**3. Performance Summary** Describe monitoring events and sampling performed during the current reporting period, the sampling results and interpretation of results (including volume of water collected and treated, Cr(VI) mass treated, influent-effluent data, etc.), <u>an evaluation of the hydraulic control of the plume</u>, an interpretation of progress toward RAOs, and any material deviations from design documents, O&M Manual, and Construction/Remedial Action Work Plan (e.g., gaps or inconsistencies in the site conceptual model)."				
590	DOI-69	Non-design	O&M	Appendix L, L.2.2. p. L2-10	6. Recommendations	Another section should be added that discusses whether or not recommendations from the previous quarter were adopted and if not, why not.	PG&E suggests that the requested discussion, if applicable, be included in the same section 6, but under its own subheading such as "Status of recommendations from previous quarter". The following text will added to Section 6: "**6. Recommendations** Provide suggestions for system optimizations or procedural enhancements, as applicable, to improve performance, reduce costs, reduce wastes, etc. Optimizations and/or enhancements could be based on system inefficiencies, technological developments, modified regulations, etc. <u>If applicable, discuss whether or not recommendations from</u>		Resolved.		Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							the previous quarter were adopted and if not, why not."				
591	DOI-70	Non-design	O&M	Appendix L, L.3.1. p. L3-1	…entered into a spreadsheet and/or database periodically.	The onsite lab data should be entered into a central database preferably the same database as the field data and off-site lab data.	As depicted on Exhibit L3.1-1, onsite laboratory data (after QC) will be stored in a database. This is likely the same database or data warehouse that store the validated lab data and field data for use by the project team. Section L3.1 text will be revised as follows (added text shown in underline): "**Onsite Laboratory Data (second paragraph)** The onsite lab data will be recorded in a bench log book and entered into a spreadsheet and/or database periodically. Although the onsite data will not be validated using the same procedures as the offsite lab data, they will be reviewed; anomalous results will be identified and reviewed and, if needed, reanalyzed at the direction of the project chemist. After QC, data will be stored in a database for use by project team. Onsite laboratory samples will periodically be analyzed in conjunction with offsite analysis, and the data will be reviewed/compared for quality and accuracy."		Resolved.		Comment resolved.
592	DOI-71	Non-design	O&M	Appendix L, L.3.1. p. L3-1	Offsite Laboratory Data	There is no mention of the offsite laboratory data being entered into a database. Since electronic reporting requirements placed on laboratories are common it is not clear why the offsite lab data would not be electronically entered in a database to facilitate retrieval.	As depicted on Exhibit L3.1-1, offsite laboratory data will be entered into a database for validation, and then validated data will be stored in a database for use by project team (e.g., analyze data, prepare report tables). Section L3.1 text will be revised as follows (added text shown in underline): "**Offsite Laboratory Data**		Resolved.		Comment resolved.

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							The data flow (electronic and hard copy) from offsite laboratory to the project chemist is tracked to ensure that the data are reviewed and validated in a timely manner. The project chemist will discuss and resolve technical issues, if any, with the laboratory. Electronic data will be entered into a database where they undergo QC checks before being validated. Validated data will be stored in a database for use by project team. The laboratory will maintain electronic and hardcopy records sufficient to re-create each analytical event…”				
593	DOI-72	Non-design	O&M	Appendix L, L.3.1. p. L3-3	Maintenance/ Calibration Records	Although the subsection is titled Maintenance/Calibration there is no mention of calibration records.	In the context of this subsection, preventative maintenance includes calibration. Therefore, the word “Calibration” will be removed from the title of the subsection.		Resolved.		Comment resolved.
Specific Comments – 90% BOD, Appendix L: O&M Manual -- Volume 1: O&M Plan											
594	DTSC-139	Design	Editorial	Section 2.1.1.1, p2-2	Each NTH IRZ Extraction Well will include a sample port upstream of the point where groundwater from that well exits the vault	The text should be revised to note sample ports are included for each screened interval of the extraction well, as shown on I-04-02.	The text will be revised as follows: “Each NTH IRZ Extraction Well screened interval will include a sample port upstream of the point where groundwater from that ~~well~~ screened interval exits the vault.”	Resolved.			Comment resolved.
595	DTSC-140	Non-design	Editorial	Section 2.1.1.3, p2-3	The storage tank will include the following, as shown in Appendix A, Drawing M-06-04	Drawing M-06-04 is not included in App A of vol. 1 as stated.	The referenced drawing (IRZ Carbon Substrate Storage Tank Mechanical Details) will be copied from Appendix D of the BOD report and included in Appendix A of O&M Manual Volume 1 for the final design.	Resolved.			Comment resolved.
596	DTSC-141	Design	Infrastructures	Section 2.1.1.3 p2-3	An integral overfill prevention device, attached to the tank fill line, designed to	In reviewing drawings I-06-02 and M-06-04 for the MW-20 carbon substrate tank, it appears the external connections for the fill line and vapor recovery line are in close proximity and use the same dry-break quick connect fittings. The fill line is equipped with overfill protection but the vapor recovery line is not. Modifications to the design should be made to ensure the tank can only be filled through the fill line (e.g. different fitting on the vapor recovery line, similar to that at the TWB carbon substrate tank). If this is already the case, the drawings should be revised for clarification.	The ethanol tank piping network is designed and constructed by the manufacturer to comply with applicable codes and requirements, including San Bernardino	Resolved.			Comment resolved.

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					prevent filling of the tank beyond 90 percent of the rated capacity		Fire Marshall and MDAQMD requirements, which may dictate the specifications for these connections. The option of installing different types of fittings to minimize potential to connect to the wrong line will be considered with the manufacturer. The lines connected to the tank will also be identified with labels as appropriate. The text will be updated accordingly in the final design.				
597	DOI-73	Non-design	O&M	2.1.1.3: p. 2-3	Carbon Amendment System	Many of the carbon substrates experience phase separation and need to be stirred prior to dosing – if this is potentially an issue the system needs to have a means for this to occur. Often times a recirculating pump is placed in the holding tank.	The carbon amendment system is currently designed for the use of ethanol as the carbon substrate, which will not require mixing. Use of other reagents may require minor modifications to the piping network, tank, valves, fittings, or pumps, depending on the alternative reagent.		Accepted.		Comment resolved.
598	DOI-74	Design	O&M	2.1.1.3: p. 2-3	Carbon Amendment System	There should be some discussion about the frequency and means that the meters are calibrated since they can be affected by different backpressures.	In our control engineers' experience varying backpressures do not significantly affect the error in measurement using magnetic flow meters. Meter calibration will be checked and recalibrated as needed or as often as recommended by the manufacturer.		Resolved.		Comment resolved.
599	DOI-75	Non-design	O&M	2.1.1.3: p. 2-3	Carbon Amendment System	Please specify the range of anticipated dosing rates.	As listed in 90% BOD Exhibit 3.2-1, the MW-20 Bench carbon amendment system is designed based on a target nominal dosing rate of 100 gallons/day TOC and a potential maximum of up to 700 gallons/day TOC.		DOI concurs with the response.		Comment resolved.
600	DTSC-142	Design	Infrastructures	Section 2.1.1.3 p2-4	A vapor recovery system designed to capture any emissions generated during the	We could not find a description of this system or details regarding its operation and maintenance. See comment related comment below also.	The vapor recovery system is an integral component of the carbon substrate storage tank and is not detailed separately. The vapor recovery system design and O&M requirements	Resolved.			Comment resolved.

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					storage tank filling process		will be specified by the manufacturer to match the tank size and flow rates required, and will comply with applicable codes and requirements including San Bernardino Fire Marshall and MDAQMD requirements. System maintenance requirements will be further detailed in the tank ATC permit and inspections are anticipated to be performed, at minimum, during annual certification and testing processes.				
601	DOI-76	Non-design	O&M	2.2/2-8	A schematic of the freshwater supply system is shown in Exhibit 2.2-1.	The paragraph should discuss the contingent arsenic treatment system since it is shown on Exhibit 2.2-1.	Since the contingent arsenic treatment system is discussed in the Contingency Plan (Volume 3), a reference to Volume 3 will be added to Exhibit 2.2-1.		Resolved.		Comment resolved.
602	DOI-77	Non-design	O&M	2.2.1.2/2-10	The new 12-inch-diameter pipeline will cross the Colorado River to California via the Arched Bridge.	The text should describe the pipeline route from HNWR-1A to the Arched Bridge noting that it follows the county road, is underground, and crosses under the railroad track at the existing railroad overpass (trenchless technology not required).	The cited text will be expanded to read as follows: "The new 12-inch-diameter pipeline will <u>follow the county road (underground), cross under the railroad overpass (trenchless technology not required), cross under I-40 (trenchless technology required), and</u> cross the Colorado River to California via the Arched Bridge."		Resolved.		Comment resolved.
603	DOI-78	Design	O&M	2.2.1.2/2-10	Midway along the PG&E Line 300A gas pipeline maintenance road, the freshwater pipeline will branch to the north (i.e., Pipeline J) to connect to the piping corridor located near National Trails Highway and the Compressor Station access	If pre-treatment is required for arsenic removal, this branch could not be used. What is the contingent piping plan to get freshwater to IRL-1 through IRL-4 and FW-1 should treatment be required for freshwater? Such contingent piping is not shown on G-00-08.	Please see RTC #296 FMIT/TRC, #297 Hualapai/TRC, #298 Cocopah/TRC, and #299 Chemehuevi/TRC. The text of O&M Manual Volume 1 Section 2.2.1.2 will be revised to be consistent with RTC #296.		Accepted		Comment resolved pending DOI review of the final design documents.

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					road.						
604	DOI-79	Design	Remedial Design	2.2.3.3/2-11	Freshwater Injection Wells FW-01 and FW-02 are designed to receive up to 200 and 100 gpm, respectively, under gravity flow from the remedy freshwater storage tank (TNK-103) (see Table 2.2-1). Freshwater Injection Well FW-01 receives fresh water directly from the freshwater supply wells and FW-02 receives fresh water from the remedy freshwater storage tank.	FW-01 does not receive gravity flow from TNK-103, as indicated in the second sentence. Please clarify.	FW-01 is capable of receiving gravity flow from TNK-103 by the nature of water flow in the piping system. It does not, however, receive primary flow of freshwater by nature of gravity flow from TNK-103 under normal operating conditions. The referenced text will be revised for clarity.		Accepted pending final review.		Comment resolved pending DOI review of the final design documents.
605	DOI-80	Non-design	O&M	2.3: p. 2-12	They include monitoring well sampling purge water..	Please add monitoring well sampling <u>and development</u> purge water	The suggested edit will be incorporated.		Resolved.		Comment resolved.
606	DOI-81	Non-design	Editorial	2..5: p. 2-18	Remedy SCADA	Should mention if there is a backup power system.	Secondary (backup) power supply is available from photovoltaic solar panels or backup generators as described in Section 2.4 of the O&M Plan (O&M Manual, Volume 1). In addition, an uninterruptible power supply (UPS) is provided for key equipment such as control systems. This information will be added to the first paragraph of Section 2.4.		Resolved.		Comment resolved pending DOI review of the final design documents.
607	DOI-82	Non-design	O&M	2.7.1.1: p. 2-19	Components	Since the water in the TCS Evaporation Ponds may have a high TDS there should be a leak detection system. Please provide a description of the construction of the ponds within this section.	PG&E proposes to include the following text after the first paragraph at the beginning of Section 2.7: "<u>By design, discharge to the TCS ponds is and will continue to be fully</u>		Resolved.		Comment resolved.

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							contained, thereby designed to prevent any leaks. In layers (from top to bottom), each pond has a new 60-mil high-density polyethylene (HDPE) top liner; the original 60-mil HDPE primary liner (with repairs); a leachate collection and removal system (LCRS); and a secondary 40-mil HDPE liner underlain by 2 feet of low-permeability clay. The LCRS functions as an early warning system to prevent leaks by enabling a determination of whether the top liner system has been compromised, prior to a potential release of pond water to the environment. In addition, the area immediately adjacent to the TCS ponds lysimeters were installed underneath the clay base, and seven groundwater monitoring wells were installed to detect leaks. The groundwater and vadose zone monitoring systems are sufficient to allow detection of any potential before any discharge reaches groundwater (groundwater is between approximately 160 and 190 feet below the bottoms of the ponds, as noted earlier)."				
608	DTSC-143	Design	Remedial Design	Section 3.1.1.2 p3-2	At the injection well valve vaults, the Inner Recirculation Loop and freshwater forcemains connect to the smaller diameter injection well piping	Consideration should be given to installing check valves near this connection to prevent inadvertent transfer between the freshwater and IRL forcemains should manual valves be left open.	Check valves will be added to the injection well vaults in the final design.	Resolved.			Comment resolved.
609	DTSC-144	Design	Infrastructures	Section 3.1.1.2 p3-2		A description of the vapor recovery systems in the carbon substrate tanks should be added here along with a discussion on operation. A discussion on maintenance of these systems should be included in section 3.1.5. An SOP should be added to Appendix B and details should be included in	See response to Comment #600 (DTSC-142). As additional	Resolved.			Comment resolved.

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						the mechanical and P&ID drawings as appropriate.	details become available from the manufacturer during the project construction phase, they will be incorporated into the as-builts, O&M Manual, and SOPs, as appropriate. As mentioned in RTC #600 DTSC-142, the vapor recovery system is an integral component of the carbon substrate storage tank and is not detailed separately. The vapor recovery system design and O&M requirements will be specified by the manufacturer to match the tank size and flow rates required, and will comply with applicable codes and requirements including San Bernardino Fire Marshall and MDAQMD requirements. System maintenance requirements will be further detailed in the tank ATC permit and inspections are anticipated to be performed, at minimum, during annual certification and testing processes. As additional details become available from the manufacturer during the construction phase, this information will be incorporated into the as-builts, O&M Manual, and SOPs, etc. Material changes to the SOPs and O&M Manual such as incorporation of the above vapor recovery system will be reported in the progress reports and posted on the SharePoint site for access by agencies, Tribes, and stakeholders.				
610	DOI-83	Design	O&M	3.1.1 p. 3-3	As detailed in the Sampling and Monitoring Plan in Volume 2 of this O&M Manual, carbon substrate	As noted in the text, the carbon substrate amendment concentrations will be determined from monitoring data but the rationale behind the actual dosing rates, frequency and duration needs to be presented somewhere in the O&M manual.	The injected concentration is the main dosing control that will be adjusted, i.e. if not enough carbon is distributed; a higher concentration will be		Resolved.		Comment resolved.

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					amendment concentrations, frequency, and duration will be adjusted based on analytical groundwater data and injection well performance data.		added such that a higher concentration will remain after substrate degrades during distribution in the subsurface. The dosing parameter of frequency may also need to be adjusted to maintain injection capacity. For example, water levels tend to increase during ethanol dosing and decrease following injections. As injected concentration changes, a different frequency of injection may be needed to accommodate the water level changes associated with ethanol injection and maintain injection capacity. The duration of the injection will be adjusted to control the total amount of ethanol being injected. For example, it may be advantageous to store more reducing equivalents within the aquifer, while not changing how far the ethanol is distributed by changing the injection concentration. In this example, the footprint of byproduct generation could be held constant while increasing the stored Cr(VI) reducing capacity while the IRZ is ON. The following text explaining the interplay between concentration, frequency, and duration of injections will be added to the text in the O&M Manual, Volume 2 on page 2-1 to add further detail to this section where adjustments of dosing are discussed: "The injected concentration is the main dosing control that will be adjusted to improve distribution. Frequency may also need to be adjusted to				

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							maintain injection capacity. The duration of the injection will be adjusted to control the total amount of ethanol being injected."				
611	DOI-84	Design	O&M	3.1.3.1 p. 3-6	Continuous or intermittent injection or dosing of the selected carbon substrate, carbon substrate target total organic carbon (TOC) concentrations, and injection frequency and duration will be adjusted based on groundwater analytical data and injection well performance, as summarized in Section 2.1.1.4 and presented in the Sampling and monitoring Plan in Volume 2 of this O&M Manual.	The discussion pertaining to using the monitoring data to establish and optimize dosing rates really does not fit in the "Sampling and Monitoring Plan". The dosing uses the data from the monitoring but has more to do with the operation of the system. Recommend moving the discussion about the dosing to Vol 1.	The most appropriate location for the explanation of how groundwater monitoring data will be used to guide dosing parameters is somewhat subjective. For the 60% Design, the data quality objectives used to guide design of the monitoring program were presented in the Sampling and Monitoring Plan. These data quality objectives, which were requested by the agencies, include decision rules that, in the case of this program, provide the framework for how data will be used to make operational decisions. As such, the operational decision framework based on groundwater monitoring data was presented in the Sampling and Monitoring Plan. For consistency, we would like to retain the operational decision framework for dosing in the Sampling and Monitoring Plan along with the rest of the operational decision frameworks that are part of the data quality objectives.		DOI concurs with the response.		Comment resolved.
612	DOI-85	Non-design	Editorial	3.2.1.2/3-15	Fresh water stored in the Remedy Freshwater Storage Tank (TNK-103) will flow by gravity to the freshwater injection well FW-02 (P&IDs I-02-01 and I-02-02).	On I-02-01, freshwater is coming in as portrayed on I-02-01. The reference should be I-01-01. Also, freshwater is shown going to the future freshwater pre-injection treatment system on I-02-03. The referenced drawing does not exist. Also, on drawing I-01-01, freshwater flows to the freshwater storage tank on I-02-02. The reference should be I-02-01.	Sheet references will be corrected for the 100% submittal. Note that references to I-02-03 (Freshwater Pre-Injection Treatment System) should be updated to I-13-01.		Resolved.		Comment resolved.
613	DOI-86	Design	O&M	3.2.1.2/3-15	TNK-103 level above the low-	Why would water levels below low-level set points prevent operation of the freshwater supply well? Please explain.	The bullet in question will be revised to read: •		Accepted.		Comment resolved.

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					level set point (LSL-155) ▯ A given injection well must have water level greater than the low-level set point (LT-052)		A given injection well must have water level less than the high-level set point (LT-052).				
614	DOI-87	Non-design	Editorial	3.2.1.2/3-15	▯ Backwash pump (PMP-001) is not in RUN mode ▯ Well head pressure is below the high-pressure set point (PI/PIT-062)	These conditions should be prefaced with "A given injection well vault…"	The referenced bullets will be revised as follows: • Backwash pump in a given injection well (PMP-001) is not in RUN mode • Well head pressure is below the high-pressure set point in a given injection well (PI/PIT-062)		Resolved.		Comment resolved.
615	DOI-88	Design	O&M	3.2.1.2/3-16	TNK-103 outlet valve (V-103C) – Open	This valve could be closed if FW-02 was being backwashed. This would allow flow to the other injection wells and the filling of T-103.	Under normal operating conditions V-FWST-103C will always remain open. Actuated valve FV-FW-02-011 at FW-02 will close during the automated backwash sequence.		Resolved.		Comment resolved.
616	DTSC-145	Design	Infrastructures	Section 3.5 3-71		The SCADA system should include offsite backup of the information stored in Historian.	The Historian database, SCADA/HMI programs and PLC logic programs will be backed up off-site to support system continuity and access to data.				
617	DOI-89	Design	O&M	4.1.1.1 p. 4-2 Notes in Table 4.1.1	water level data will be collected from each well and will be used to calculate the specific capacity and specific injectivity once the well is in service	It can often be difficult collecting accurate water levels from pumping and injection wells due to the interference from the pump wires and water spray. Recommend completing the wells with a 1-inch stilling well inside the casing – basically the way water levels were collected before transducers were common.	Stilling wells are part of the existing remediation well design. Please see the well design drawings in Appendix D of the BOD for further details (M-02-02, M-03-01 to M-03-02, M-04-01 to M-04-02, and M-05-01 to M-05-03). Transducers will be installed in the stilling wells to allow for automated water level data collection. The stilling wells will also allow for manual measurement of water levels in the remediation wells.		Accepted.		Comment resolved.
618	DOI-90	Design	O&M	4.1.1.4 p. 4-3	The two baseline samples will be collected	It would seem that the best baseline data would come a week or two after pumping is initiated. Otherwise the water in the vicinity of the well may not have recovered to ambient geochemical conditions due to the introduction of water during drilling etc.	Agreed. We will confirm that we are close to steady state conditions prior to sampling.		Resolved.		Comment resolved.

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					approximately one month apart; however, the time between samples might be shortened if determined necessary to ensure that the collection of these samples doesn't delay startup of the system.		Collection of the samples should not affect operations, so they can be collected at any time.				
619	DOI-91	Design	O&M	4.1.1.4 p. 4-4	Reduction-Oxidation Potential	Please make sure that the electrode method described by the USGS for determining Reduction-Oxidation potential is really necessary. This can be a very tricky test to complete in the field and generally a multicomponent probe is used to determine ORP which can be corrected to eH.	The suggested change will be made. A multi component probe will be used to measure ORP which will then be corrected to eH.		Resolved.		Comment resolved pending DOI review of the final design documents.
620	FMIT	Non-design	Process	Appendix L, p. 4-6	Combined Comments Received from : DOI, DTSC, FMIT, and TRC, Operation and Maintenance Manual September 2014	Tribes believe Absolute Comment Nos. 20, and 24 have not been adequately addressed.	Page 4-6 of Appendix L in the September 2014 90% submittal contains the last paragraph of Section 4.1.2.1 (Well Capacity Monitoring), Sections 4.1.2.2 (Wellhead Inspection and Field Parameter Testing), and the first paragraph of Section 4.2 (Well Maintenance). A cross reference to comments on those sections in the 60% RTC Table point to the following RTCs: 1. #592 DOI-236 2. #593 FMIT-167, Hualapai-121, CRIT-121, Cocopah-121, Chemehuevi-121 3. #594 DOI-237 4. #595 DTSC-176 5. #596 FMIT-168 If this is not fully responsive, please provide additional information on which comments the commenter is referring to and specifically which aspect of the comment has not been adequately addressed.			Noted.	
621	DTSC-146	Design	Contingencies	Operation and Maintenance Manual Volume 1	"Monitoring well maintenance, including	Specific SOPs pertinent to monitoring well maintenance should be listed in this section. A well head inspection checklist developed for the existing Topock wells should be referenced. Specific criteria/triggers related to well redevelopment should be cited including: acceptable turbidity levels, measuring depth to bottom of well casing to assess excessive siltation, and tracking sampling	Specific SOPs associated with monitoring well maintenance will be referenced in this	Resolved.			Comment resolved.

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				4.2.4 Monitoring Well Acceptance Page 4-24	wellhead repair or well screen re-development, will be performed on an as-needed basis as deficiencies are identified. For example, if the well does not yield groundwater samples that meet the sample collection criteria identified in the appropriate SOP (e.g., sustained turbidity above the given criteria), then re-development should be conducted."	purge rates/drawdown over time. DTSC requests that slug tests also be conducted periodically in monitoring wells to evaluate if the initial development was successful as well as to assess if redevelopment is needed in the future.	section. The well inspection checklist developed and reported as part of the routine Topock groundwater monitoring program (Well-SOP-09) will also be added the referenced section for routine application during groundwater remedy operation. As requested, the following specific criteria have been developed and will be added to the referenced section: • Turbidity measurements will be tracked in monitoring wells during routine sampling events. When the final, stabilized turbidity measurement collected during well sampling is consistently measured in the range of approximately 20-30 NTU additional evaluation will be conducted to determine if the well should be re-developed. This evaluation will include review of relevant information including past development records, water quality and hydraulic measurements collected during sampling events, and hydraulic data collected from well testing or longer-term pressure transducer measurement. As re-development events are evaluated and				

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							performed the results will be used to determine if monitoring well re-development should be performed on a more or less frequent basis. • Measurement (SOP-A11, Total Depth Measurements) of infill (siltation) at a depth that corresponds to the bottom of or within the screened interval will trigger re-development. It should be noted that if the well was constructed with a sump (as opposed to a standard threaded cap at the bottom of the well) re-development may be required to remove thicknesses of sediment that collect below the well screen. • Specific capacity measurements will be tracked over time and compared against the baseline measurements and from event-to-event. Decrease in the specific capacity of a monitoring well that precludes groundwater sample collection in compliance with SOP-A18 (minimal drawdown method) will be re-developed. For wells that are sampled in accordance with				

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							SOP-A1 (well-volume method) re-development will be triggered when the specific capacity drops below 70% of the baseline measurement (at the flow rate used for sampling). See response to RTC # 971 DTSC-175 regarding the collection of specific capacity data in monitoring wells.				
622	DOI-92	Design	O&M	4.2.5 p. 4-25	Exhibit 4.2-9	The report should also include a section for monitoring well performance.	A new section will be inserted after existing item 3 (Injection Well Performance) for Monitoring Well Performance with the following outline: 4 Monitoring Well Performance 4.1 Problems Encountered 4.2 Testing and Sampling Table 4-1 Monitoring Well Water Levels, Purging Events, and Specific Capacities Table 4-2 Monitoring Well Inspection Results		Accepted.		Comment resolved pending DOI review of the final design documents.
623	DOI-93	Non-design	Editorial	6.1.3.1/6-4	The conditioning plant is not designed for treatment of RCRA and non-RCRA hazardous waste.	Also indicate that the TCS evaporation ponds cannot take RCRA or non-RCRA hazardous wastes. A discussion should also be added regarding which waste streams may be RCRA or non-RCRA hazardous waste due to the presence of dissolved chromium or arsenic. Exhibit 6.1-2 implies that some waste may be RCRA or non-RCRA hazardous waste because of pH or leaching of metals from suspended solids – thus the plan for pH adjustment and/or filtering.	The following text will be added to the end of the first paragraph in Section 6.1.3.1. "<u>Only non-hazardous waste will be sent to the TCS evaporation ponds. Certain waste streams generated by the remedy (e.g., first flush wastewater from well rehabilitation or purge water from certain monitoring wells) may exhibit hazardous levels of dissolved chromium and/or arsenic, and will be appropriately managed and not sent to the ponds. PG&E's understanding of the</u>		Resolved.		Comment resolved.

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							specific nature of the various wastes in addition to quantity will be further refined through operational experience once the remedy is implemented."				
624	MWD	Non-design	Request for Information	Vol. 1, Sect.6.1.5/6-6		Provide an estimate of generated waste material (RCRA and Non-RCRA hazardous) that is to be stored onsite and/or disposed of offsite.	It is anticipated that the quantity of hazardous wastes generated from remedy operations to be small. This will be confirmed after start of operations.				Comment resolved.
625	DTSC-123	Design	SOPs	Remedy-SOP-03, O&M Volume 1, Appendix B, Page 10	"4.4.6. Reinstall the low level switch."	Typo. Revise to "high" level switch.	Text will be revised as requested.	Resolved.			Comment resolved.
626	DTSC-124	Design	SOPs	Remedy-SOP-03, O&M Volume 1, Appendix B	Sheet I-02-01	The figure shows drywell pits being constructed in association with sand separators for wells HNWR-1A and Site B. Ensure that design text (not an SOP) describes the function and dimensions of these units and what will be discharged into these pits. Design drawings (C-01-01, C-01-02, S-01-07) indicate the drywell pits are quite large and, therefore, may be objectionable to Tribes. As these units were hard to find in the design document, it is suggested that they be brought to the attention of the Tribes. As indicated above, DTSC would like to understand the basic operation of these units. How necessary are these pits? Are there alternative methods to knocking out the sand? Why are these type of pits not utilized with most production wells (e.g., Topock 2 and 3). If constructed, will the pit at HNWR-1A be used for HNWR-1 or Site B should they come online?	The sand separator is located at the wellhead to minimize the amount of sand in the water and thereby minimize solids settle-out at the bottom of the downstream conveyance pipe. Accumulated sands from the sand separator will be contained in the purge water. The purge water from the separator will be allowed to percolate into the ground via the dry well filled with rock located near the well. Sands in the dry well will be periodically removed. Dry well is simple to operate and is located within a sub-grade vault. If HNWR-1 were to be brought online, it will share the dry pit with HNWR-1A. If Site B were to be brought online, it will require a separate dry well near the well head. Other options evaluated to remove sands from the freshwater supply well include: 1) using blow-offs to flush solids from low points in the freshwater conveyance piping, 2) installing filters (large) to remove the solids at the well				

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							head, 3) installing a large tank at the well site to allow the solids to settle. These options were rejected for various reasons including the need for multiple blow-offs needed along the freshwater conveyance piping (Pipeline B)/adjacent to County Road 10, large visible equipment near the well head on the Refuge, or inefficient removal of sands. A brief description of the dry well and associated O&M was included in Section 5.4 of the O&M Plan (O&M Manual Volume 1). The following text will be added to Exhibit 3.3-4 of the BOD in response to this comment: "Item: Solids Removal Design Parameter: Install a sand separator at the well head to minimize the amount of sand in the water and thereby minimize solids settle-out at the bottom of the downstream conveyance pipe. Accumulated sands from the sand separator will be contained in the purge water. The purge water from the separator will be allowed to percolate into the ground via the dry well filled with rock located near the well. Periodic removal of the solids accumulating in the dry well is needed."				
627	DOI-306	Non-design	SOPs	Vol.1; Appendix B, Remedy-SOP-04_Rev0, 4.1.8/4	Contact the Maintenance Supervisor if there are any notes that require further maintenance…	This statement makes more sense if the word require is replaced with the word indicate. The phrase is used in multiple locations in this SOP and others.	The cited text appears in SOPs – Remedy-SOP-04, 07, and 08, PIPE-SOP-02, and RTP-SOP-09. The cited text will be modified as follows (modification shown as strikeout [~~strikeout~~; for text deletion] and underline [underline; for text addition]) in each of		Accepted.		Comment resolved.

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							these SOPs: "Contact the Maintenance Supervisor if there are any notes that <u>indicate</u> ~~require~~ further maintenance <u>is required</u> so parts can be procured and work can be scheduled."				
628	DOI-307	Non-design	SOPs	Vol.1; Appendix B, Remedy-SOP-04_Rev0, 4.3/5	CAUTION: Chemicals in the metering pumps may cause personal harm if procedures aren't followed properly…	This caution statement belongs in the introduction (suggest in bold font) because it has applicability to centrifugal pump (clean-in-place pump - P744), hose pumps for carbon substrate and well maintenance chemicals, and sump pump PMP-907 at the Remedy-produced Water Conditioning Plant. Also, the SOP does not have procedures that adequately address avoidance of personnel harm. Suggest adding appropriate references to the Health and Safety Plan and Hazardous Materials Management Plan. Following 4.3.8 and 4.3.9 without adequate skin protection will result in serious harm to the skin.	• At the end of the second paragraph in Section 1 the following sentence will be added in bold text: "<u>**CAUTION: Chemical contained in pumps covered by this SOP may cause personal harm if procedures are not followed properly.**</u>" • At the beginning of Section 4.3 the following statement will be added: "3. Chemical metering pumps CAUTION: Chemical in the metering pumps may cause personal harm if procedures aren't followed properly. <u>Refer to the Health and Safety Plan for proper safety practices and management of hazardous materials while conducting the following procedure.</u>"		Accepted.		Comment resolved.
629	DOI-308	Non-design	SOPs	Vol.1; Appendix B, Remedy-SOP-04_Rev0, 4.5.6/7	Check that the discharge pressure is within the specified	The SOP does not indicate addition of water in order to check a discharge pressure for a sump pump. Revise accordingly.	The preventative maintenance procedures for sump pumps, as described in Section 4, Item 5 (Sump Pumps) of		Accepted.		Comment resolved.

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					parameters in the O&M manual.		Remedy-SOP-04 will only be performed if liquid is present in the sump. To that end, the following text will be added at the end of Steps 5.6 and 5.7: " <u>(maintenance to be performed when liquid is present in the sump)</u>"				
630	DOI-315	Non-design	SOPs	Vol.1; Appendix B, Remedy-SOP-07_Rev0, 4.5.2/3	If it is suspected that the liquid/solid accumulation in the secondary containment is hazardous material…	This statement is insufficient instruction. Suggest clarifying which secondary containments may have a hazardous material release and how this will be assessed.	Each of the secondary containments listed under Item #1 of Section 4 (Procedure) may contain a hazardous material release. The operator will identify the source of the release by visually inspect the area around storage containers, review liquid level trends for indication of leakage, and review material inventory, as appropriate. Item 4.5.2 will be modified as follows (modification shown as strikeout [~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]): "5.2. If it is suspected that the ~~liquid/solid accumulation in the secondary containment is hazardous material~~ release is hazardous material (e.g., from visual inspection of area around storage containers, after review of liquid level trends, after review of inventory, etc.), reference the Hazardous Materials Business Plan (HMBP) for further direction on storing and handling hazardous materials<u>, and contact the Maintenance Supervisor</u>."		Accepted.		Comment resolved.
631	DOI-316	Non-design	SOPs	Vol.1; Appendix B, Remedy-SOP-07_Rev0, 4.6.2/3	If the sump pump is dysfunctional, remove the liquid/solid accumulation	There is no instruction for disposal of this material? Suggest adding the instruction or referencing another SOP or plan where details can be found.	The following sentence will be added at the end of Section 4.6.2: "<u>Refer to the Waste Management Plan (Section 6 of the O&M</u>		Accepted.		Comment resolved.

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					using the appropriate equipment (shop-vac, vac truck, spare sump pump, etc.).		Plan) for proper handling of the liquid/ solid accumulation.”				
632	DOI-317	Non-design	SOPs	Vol.1; Appendix B, Remedy-SOP-08_Rev0, 1/1	The objective of this Standard Operating Procedure (SOP) is to describe the procedure for inspection and maintenance of frac tanks at the MW-20 Bench and Remedy-produced Water Conditioning Plant	The only tanks labeled as frac tanks in the drawings are at the MW-20 bench. Please clarify.	Frac tanks are located at the Conditioned Water Storage Tank Farm, Influent Tank Farm, and the MW-20 Bench. Text of the SOP which will be revised as follows (modification shown as strikeout [~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]): “The objective of this Standard Operating Procedure (SOP) is to describe the procedure for inspection and maintenance of frac tanks at the MW-20 Bench ~~and Remedy-produced Water Conditioning Plant~~ <u>(Tanks T-720, T-721, and T-723), the Conditioned Water Storage Tank Farm Tanks TNK-401 and TNK-402), and the Influent Tank Farm (Tanks TNK-201 to -204</u>.”		Resolved.		Comment resolved.
633	DOI-318	Non-design	SOPs	Vol.1; Appendix B, Remedy-SOP-08_Rev0, 4.1.1.1/1	Reference the Hazardous Materials Business Plan (HMBP) if the tank contains hazardous materials (acid or caustic)…	Frac tanks would not contain acid or caustic. Please clarify.	Frac tanks could potentially contain an acid or a caustic material as a result of a chemical feed pump failure or a spill in the chemical storage area.		Resolved.		Comment resolved.
634	DOI-319	Non-design	SOPs	Vol.1; Appendix B, Remedy-SOP-08_Rev0, 4.1.1.2/1	Shut down and/or drain the tank if it is warranted	There needs to be an instruction for this operation. Suggest including the instruction or cross referencing to the appropriate SOP.	The cited SOP (Remedy-SOP-08) was updated to reflect this comment. The revised SOP is included in **Attachment M** of the final RTC table.		Resolved.		Comment resolved.
635	DOI-320	Non-design	SOPs	Vol.1; Appendix B, Remedy-SOP-08_Rev0, 4.5/2	Fall protection must also be used when inspecting the lid of the tanks. Set up and connect to fall protection and ascend onto the roof of the	This does not appear to be sufficient instruction. Suggest adding more details or cross referencing to the health and safety plan or other document containing the appropriate details.	The following sentence will be added to Section 4, Item 5 of Remedy-SOP-08: "<u>If fall protection is required pursuant to California Code of Regulations (CCR) Title 8, the operator should review the requirements</u>		Accepted.		Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					tank		in the Health and Safety Plan."				
636	DOI-321	Non-design	SOPs	Vol.1; Appendix B, Remedy-SOP-08_Rev0, 4.12/2	Contact the Maintenance Supervisor if there are any notes that require further maintenance so parts can be procured and work can be scheduled.	There is no instruction for taking notes. Suggest providing the instruction or cross referencing to a document that contains instructions for record keeping. Also, "require" should be "indicate".	PG&E plans to have a maintenance management system that will be used to direct workers to perform tasks and to record the completion of tasks. Completion of tasks would include written notes about observations of equipment performance, notations about unusual results, photographs and documentation regarding future actions initiated to address problems. The system will include the use of wireless devices such as tablets which would be used to make such record keeping efficient and complete. Therefore, in Section 4, step 12 of Remedy-SOP-08, the operator would refer to notes that have been recorded in the wireless device while performing the procedure. Text will be revised as requested.		Accepted.		Comment resolved pending DOI review of the final design documents.
637	DTSC-125	Design	SOPs	Remedy-SOP-08, O&M Volume 1, Appendix B, Page 2		DTSC desires that releases/leakage be photographed so that the extent of a significant release is well documented. Which SOP(s) will remind employees to conduct this activity? Perhaps SOPs related to inspections, releases, and waste management.	Releases/leakage will be photographed, if practical and safe, and documented by the operators using wireless devices, as discussed in RTC #636. This activity will be included in the spill response procedures of the Hazardous Material Business Plans (HMBPs).	Resolved.			Comment resolved.
638	DOI-290	Non-design	SOPs	Vol.1; Appendix B, PIPE-SOP-02_Rev0, 3/3	Equipment list	Suggest adding "Manufacturer's operation and maintenance manuals" to the list.	"Manufacturer's operation and maintenance manuals" will be added to the Equipment List (Section 3) as suggested.		Resolved.		Comment resolved.
639	DOI-291	Non-design	SOPs	Vol.1; Appendix B, PIPE-SOP-02_Rev0, 4.1.5a/3	mechanical process piping non-functioning	This statement seems unclear. Suggest being more specific, like pipe is or has been leaking.	Step 1.5a will be revised as follows: "If any items are noted as non-functioning (e.g., signs of deterioration or		Resolved.		Comment resolved.

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							damage, evidence of leakage) inform the Maintenance Supervisor."				
640	DOI-292	Non-design	SOPs	Vol.1; Appendix B, PIPE-SOP-02_Rev0, 4.1.5b/3	electrical and instrumentation and controls not functioning	There needs to be more instruction on the testing protocol, or reference to the manufacturer's manual to conduct appropriate testing.	Step 1.6 will be revised as follows: "1.6 ~~Visually inspect that~~ Check the electrical and instrumentation and controls ~~are in good working condition~~. a. Visually inspect that these are in good working condition. b. Conduct testing in accordance with the manufacturer's manual as appropriate. If any items are noted as non-functioning inform the Maintenance Supervisor."		Resolved.		Comment resolved.
641	DOI-293	Non-design	SOPs	Vol.1; Appendix B, PIPE-SOP-02_Rev0, 4.2.2c	Determine if the water was from rain water from recent storms or a leak in process piping.	Steps should be provided to the operator as to how they are to determine the source of the water, i.e., probes or sensors, visual examination of surrounding area (ponding in area), examination of valves and piping for staining, moisture, signs of leaks/damage.	Step 2.2c will be revised as follows: "2.2c Determine if the water was from rain water from recent storms or a leak in process piping. Visually inspect the piping for staining, moisture, or other signs of leaks/damage, paying close attention to valves, joints, and connections."		Resolved.		Comment resolved.
642	DOI-294	Non-design	SOPs	Vol.1; Appendix B, PIPE-SOP-02_Rev0, 4.2.3c/3	Lockout/ tagout the well/pipeline, if necessary	There needs to be a reference to a LO/TO procedure.	"Lockout/tagout manual and tags" will be added to the Equipment List (Section 3), and Step 2.3c will reference the manual.		Resolved.		Comment resolved.
643	DOI-295	Non-design	SOPs	Vol.1; Appendix B, PIPE-SOP-02_Rev0, 4.2.3d/3	Drain and evacuate the conveyance lines	Seems too vague to know exactly how to perform this step. Suggest being more specific regarding valving and how it drains.	Step 2.3d will be revised as follows: "2.3d Drain and evacuate the conveyance lines (1) Disassemble the process piping. (2) Drain excess water into buckets." Buckets will be added to the Equipment List (Section 3).		Resolved.		Comment resolved.
644	DOI-296	Non-design	SOPs	Vol.1;	Hydrostacally	Correct spelling to "hydrostatically"	The spelling will be		Resolved.		Comment resolved.

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				Appendix B, PIPE-SOP-02_Rev0, 4.2.3f/3	test the line to verify the leak has been fixed.	Seems too vague to know exactly how to perform this step. Suggest being more specific regarding valving, pump startup, etc.	corrected as appropriate. Step 2.3f-g will be revised as follows: "2.3f Hydrostatically test the line to verify the leak has been fixed. (1) Reassemble the process piping to connect to the in-well pump. (2) Activate the in-well pump to pressurize the line. (3) Examine the line for leakage. 2.3g If the leak persists, repeat steps 2.3c through f."				
645	DOI-297	Non-design	SOPs	Vol.1; Appendix B, PIPE-SOP-02_Rev0, 4.2.3i/3	Inspect the adjacent upstream and downstream conveyance system to see if there is liquid/solid accumulation from the condition that was addressed	This is very vague. Suggest being more specific.	Step 2.3i will be removed as it is not directly applicable to leakage.		Resolved.		Comment resolved.
646	DOI-298	Non-design	SOPs	Vol.1; Appendix B, PIPE-SOP-02_Rev0, 4.3/3	Sump Pump	A sump pump is not shown on any of the drawings. Suggest acknowledging this in the text.	Sump pumps (PMP-FW02-101 and PMP-FW02-102, and PMP-IRL04-650 and PMP-IRL0-651) are shown in the secondary containment pump station vaults for FW-2 and IRL-4, respectively. The associated drawings, Drawing I-02-02 and E-05-04, will be added to Section 2 (Drawing Numbers) of the SOP.		Accepted.		Comment resolved pending DOI review of the final design documents.
647	DOI-299	Non-design	SOPs	Vol.1; Appendix B, PIPE-SOP-02_Rev0, 4.3.3/3	Visually inspect that electrical connections are in good condition	Seems vague. Suggest describing the characteristics of good conditions (or poor conditions).	Step 3.1b will be revised as follows: "3.1b Visually inspect that electrical connections are in good condition. (1) Check that connections are secure. Check for signs of rust or wear."		Resolved.		Comment resolved.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
648	DOI-300	Non-design	SOPs	Vol.1; Appendix B, PIPE-SOP-02_Rev0, 4.3.5/3	Check for excessive noise, vibrations and oil temperatures	Again, vague. Even though the manufacturer's instruction manual is referenced, is water added to the sump? Do you run it without water?	Steps 3.1d-e will be revised as follows to clarify: "3.1d Operate the pump if it is not already running. 3.1e Check for excessive noise, vibrations and oil temperatures while the sump pump is running. Troubleshoot…" Note that water will not be added for this check.		Resolved.		Comment resolved.
649	DOI-322	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-05_Rev0, 1/1	The objective of this Standard Operating Procedure (SOP) is to describe the procedures for (a.) manual and (b.) automated operation of secondary containment within the RTP and associated areas	This SOP does not address managing a spill. Suggest adding a cross reference to the SPCC plan.	The following sentence will be added to the second paragraph of Section 1 of RTP-SOP-05: "In the event of a spill, refer to the spill response procedures included in the HMBPs."		Resolved.		Comment resolved.
650	DOI-323	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-05_Rev0, 5.2.4/4	If the accumulation appears to be from a chemical storage tank, check the pH and conductivity of the accumulation using handheld meters.	If the release is from the coagulant storage tank, pumping the material to the influent storage tanks has the potential of creating considerable sludge. Please clarify if this is the appropriate action to take for a coagulant release.	A coagulant release can be pumped to the influent storage tanks slowly to prevent the formation of significant sludge. Item 5.2.4.5 will be revised as follows: "2.4.5 <u>Slowly</u> transfer liquids/solids from the Influent Tank Farm sump to the influent tanks or TCS waste water tank as instructed in step a.1.4 through a.1.5/a.1.6. <u>Alternatively, if the release is a large quantity (determined by the Maintenance Supervisor), recover the material and store in drums. If the release is a small quantity, use absorbent material to soak up the release</u>."		DOI concurs with the response.		Comment resolved.
651	DOI-324	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-05_Rev0, 5.2.4/4	If the pH is less than or equal to 2 or greater than or equal to 12.5, it is	There is no instruction for containerization or neutralization. Suggest adding the instruction. If containerized, include instructions for waste management.	As stated in RTCs #637 DTSC-125 and #649 DOI-322, instructions for containerization, neutralization, and/or		Resolved.		Comment resolved.

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					considered a corrosive hazardous waste, and will need to be containerized or neutralized before proceeding.		associated waste management will be provided in the spill response procedures (include in the HMBPs).				
652	DOI-309	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-06_Rev0, 5.a.2/2	Make sure there is a non-hazardous waste label showing accumulation "start" date on front end of liquid phase separator	The SOP needs to address the actions to take if a non-hazardous waste label is not present or the accumulation start date is not filled in.	Item 5.a.2 will be revised as follows: "5.a.2 Make sure there is a non-hazardous waste label showing accumulation 'start' date on front end of liquid phase separator. If no label is present, apply a non-hazardous waste label and fill in the accumulation 'start' date."		DOI concurs with the response.		Comment resolved.
653	DOI-310	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-06_Rev0, 5.b.2	Make sure there is a non-hazardous waste label showing accumulation "start" date and "end" date on front end of liquid phase separator	It would seem that the operator should fill in the end date. Please revise accordingly.	Item 5.b.2 will be revised as follows (revision shown as strikeout [~~strikeout~~; for text deletion] and underline [underline; for text addition]): "Make sure there is a non-hazardous waste label showing accumulation 'start' date ~~and 'end' date~~ on front end of liquid phase separator; fill in the accumulation 'end' date on the non-hazardous waste label."		DOI concurs with the response.		Comment resolved.
654	DOI-311	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-06_Rev0, 5.c/3	Loading liquid phase separator to process system:	It would seem that the operator should attach a non-hazardous waste label and fill in the accumulation start date. This step should be added.	Item 5.c.11 will be revised as follows: "5.c.11 *If the new liquid phase separator is to be the primary liquid phase separator*: Move the ladder directly beneath the manual upstream valve, if necessary. Ensure the ladder is secure. Carefully ascend the ladder. Open the manual upstream valve. Apply a non-hazardous waste label and fill in the accumulation 'start' date. Carefully descend the ladder."		DOI concurs with the response.		Comment resolved.
655	DOI-329	Non-design	SOPs	Vol.1; Appendix B,	Plug in the Influent Tank	There should be some instruction on valving to direct discharge from the pumps, e.g., the manual valves are configured to pump liquids/solids from the designated sump pump to its normal	A portable pump is used for removing cleaning		DOI concurs with the response.		Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
				RTP-SOP-07_Rev0, 5.a.2/2	Farm Sump Pump (PMP-205) or Conditioned Water Tank Farm Sump Pump (PMP-407).	pumping destination.	fluids however; the sump pumps are plugged in just in case fluids enter the sump. The valving for PMP-407 (V-463A and V-463B) and PMP-205 (V-265A and V-265B) will be opened as necessary. Item 5.a.2 will be revised as follows: "2. Plug in the Influent Tank Farm Sump Pump (PMP-205) or Conditioned Water Tank Farm Sump Pump (PMP-407). <u>As necessary, open the sump pump valves (V-463A and V-463B of V-265A and V-265B).</u>"				
656	DOI-330	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-07_Rev0, 5.a.4/2	Connect the outlet hose on the portable pump.	What is this portable pump? Please clarify.	This SOP is for cleaning frac tanks with a portable pump. A non-dedicated portable pump will be used to remove liquids from the frac tanks.		Okay.		Comment resolved.
657	DOI-325	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-08_Rev0, 5.3.a.i/2	The operator is to use hand signals to stop the truck when the front trailer axle is at the south end of the containment pad …	A standard set of hand signals for use by truckers and system operators should be included within the procedure to minimize miscommunication potential.	The following item will be added to Section 3 (Equipment) of RTP-SOP-08: "• OSHA suggested spotting signals for vehicles (Attached)". A printout of OSHA suggested spotting signals for vehicles will be attached to the SOP (adapted from the following web page: https://www.osha.gov/doc/topics/backover/spotter.html), and is included as **Attachment N** to the final RTC table. The spotting signals detailed in the printout are not required by any OSHA standard, but are common amongst industry. Additionally, Section 5, step 3, substep a. will be revised as follows (and subsequent steps will be renumbered appropriately):		Resolved.		Comment resolved.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							"~~a. As the truck moves to the loading area, the operator directs the truck driver for the placement of the truck on the containment pad.~~ ~~i. The operator is to use hand signals to stop the truck when the front trailer axle is at the south end of the containment pad (opposite of the entrance). This assures enough room in the containment pad behind the trailer to catch any minor spills. This also provides enough room for the hose to be in the containment pad in case it is dropped during connecting or disconnecting to the trailer.~~ a. When the driver arrives to the entrance of the loading area, the operator will discuss with the driver the preferred orientation of the truck on the loading pad: The truck will be stopped when the front trailer axle is at the south end of the containment pad (opposite of the entrance). This assures enough room in the containment pad behind the trailer to catch any minor spills. This also provides enough room for the hose to be in the containment pad in case				

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							it is dropped during connecting or disconnecting to the trailer. The operator will also discuss with the driver that they will direct the driver onto the containment pad using hand signals. The operator will verify that the OSHA suggested spotting signals for vehicles (Attached to this SOP) are okay to use, and add/modify hand signals as needed." b. As the truck moves to the loading area, the operator directs the truck driver for the placement of the truck on the containment pad using the agreed upon hand signals"				
658	DOI-312	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-08_Rev0, 5.4.g/3	Open the load supply valve	This valve is not shown on the drawing? What about opening valves V-510B and V-501C? Please clarify	The cited text will be clarified as follows (revision shown as strikeout [~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]): "~~Open the load supply valve~~ <u>Open the load-out supply hose valve</u>." In step 5.4.f, the sentence will be revised as follows: "Double check truck valves and vents and confirm with the driver that the truck is ready to receive water before ~~opening load-out hose supply valve~~ <u>opening the load-out supply hose valve</u> (remember that water may gravity-flow out of the hose even if the pump is off)." A typo was also found in the valve number referenced in item 5.4.e. The manual valve downstream of the TCS Truck Fill Pump is actually V-501C, not V-510C. This correction will be made.		DOI concurs with the response.		Comment resolved.
659	DOI-313	Non-design	SOPs	Vol.1;	Confirm that	How will the operator know what are the appropriate forms? Please specify.	A waste manifest will be		Resolved.		Comment resolved.

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				Appendix B, RTP-SOP-08_Rev0, 5.6.b/3	you and the driver have filled out and signed appropriate forms		the appropriate form for off-site trucking. Section 5, step 6.b. of RTP-SOP-08 will be revised as follows: "Confirm that you and the driver have filled out and signed ~~appropriate forms~~ the manifest and that the ~~shipping documentation~~ manifest has been properly filled in and the ~~shipping documentation~~ manifest number recorded.				
660	DOI-314	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-08_Rev0, 5.7.a/3	Work with the driver to inspect that the truck is in a safe condition and that it is not overweight.	Is there a weigh station? Is this a calculation based on volume stored? Please specify.	There is not a weigh station at the Remedy-produced Water Conditioning Plant. The truck will be determined to be safe based on the volume of water being transported and the capacity of the truck. The sentence will be revised as follows: "~~Work~~ Verify with the driver ~~to inspect~~ that the truck is in a safe condition and that it is not ~~overweight~~ overly full."		DOI concurs with the response.		Comment resolved.
661	DTSC-126	Design	SOPs	RTP-SOP-08_Rev0, O&M Volume 1, Appendix B, Page 4	Sheet I-14-02 "Future Infiltration Gallery" "Future Moabi Regional Park"	Piping is improperly depicted on drawing I-14-02 as leaving the Conditioned Water Storage Tank TNK-510 and traveling to Bat Cave Wash and the MW-20 Bench for the Future Infiltration Gallery (2" –TW-PULK-140207) and Future Moabi Regional Park (2" –TW-PULK-140208) respectively. The drawing needs to be updated since these two options have been removed from the remedy design. This drawing is contained in several other SOPs.	References to "Future Infiltration Gallery" and "Future Moabi Regional Park" were removed from Sheet I-14-02, that was included in the 90% design submittal (September 2014).	Resolved.			Comment resolved.
662	DOI-326	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-09_Rev0, 4.1.1.1/1	Shut down and/or drain the tank if it is warranted (e.g. the tank is in danger of a blow out or failure)	Suggest adding an instruction for this operation.	Section 4 of RTP-SOP-09 has been updated to detail procedures for the shutting down and draining the Conditioned Water Storage Tank (see **Attachment O** to the final RTC table).		Accepted.		Comment resolved pending DOI review of the final design documents.
663	DTSC-127	Non-design	SOPs	RTP-SOP-10_Rev0, O&M Volume 1, Appendix B, Page 1	"approximately 10 miles west of Needles"	Change cited text to read, "approximately 12 miles southeast of Needles". Same for RTP-SOP-05.	The cited text was revised as suggested in both SOPs that were included in the 90% design submittal (September 2014).	Resolved.			Comment resolved.
664	DOI-327	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-10_Rev0, 4.a/2	…water level is full or backwash pumps have completed their	It would appear this should be "and/or" rather than "or". Please clarify.	The referenced sentence will be revised as requested: "Designated influent tank(s) (TNK-201; TNK-		DOI concurs with the response.		Comment resolved.

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					designated cycles		202; TNK-203; TNK-204) water level is full and/or backwash pumps have completed their designated cycles."				
665	DOI-328	Non-design	SOPs	Vol.1; Appendix B, RTP-SOP-10_Rev0, 5.b.10/3	Use the HMI to return the conditioned water transfer pumps on the filter system A-side (PMP-310 or PMP-320) to the regular Backwash Schedule, unless otherwise instructed.	It would appear this should be pumps PMP-405 and PMP-406 and not pumps PMP-310 and PMP-320. Also, rather than Backwash Schedule shouldn't this refer to the Transfer Schedule?	Correct, the text will be revised to reference pumps PMP-405 and PMP-406, and the Transfer Schedule.		Accepted.		Comment resolved pending DOI review of the final design documents.
666	DTSC-122	Design	SOPs	PWR-SOP-01, O&M Volume 1, Appendix B, Page 2	"i. If liquid accumulation is present, remove using a shop-vac.."	A determination should be made if the liquid contains contaminants or is a hazardous waste. The SOP should be revised to address this issue.	Besides ponded rainwater, the only other potential liquid accumulation is leaked transformer oil. It is likely that a transformer oil such as "R-Temp" by Cooper Power Systems, which is non-hazardous, will be used onsite. Although it is not likely that a hazardous transformer oil will be used, for flexibility, the cited text will be revised as follows: "i. If liquid accumulation is present, inspect the liquid accumulation to see if it has a sheen and/or petroleum odor. ii. If the liquid accumulation has no sheen and/or petroleum odor, remove using a shop-vac. iii. If the liquid accumulation has a sheen and/or petroleum odor, verify that the transformer oil is a non-hazardous waste by referring to its SDS (in the Health and Safety Plan). • If the leaked transformer oil is a non-hazardous waste, remove using a shop-vac.	Resolved.			Comment resolved.

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							• <u>If the leaked transformer oil is a hazardous waste, remove using absorbent.</u>				
Specific Comments – 90% BOD, Appendix L: O&M Manual -- Volume 2: Sampling and Monitoring Plan											
667	DOI-94	Design	O&M	Appendix L, Vol.2; 2.1 p. 2-2	The Tables 2.1 4 and 2.1 5 include anticipated Cr(VI) concentration trends toward treatment to less than 32 g/L for wells located within the plume boundary. As the remedy progresses, if the observed concentration trends are not consistent with anticipated Cr(VI) attenuation timeframes (i.e., if the monitoring results indicate that Cr[VI] attenuation is actually taking substantially longer than anticipated), then operational changes to the …	The information in Tables 2.1.4 and 2.1.5 simply indicates whether the trend should be increasing or decreasing at each well based on the model results. An important aspect of this approach that is lost is that it's not just whether the trend is decreasing but the rate that the concentrations are decreasing. This approach really makes it difficult, particularly for a third party review, to evaluate the monitoring data against the model predicted attenuation rates. Since the modeling results are being used to establish whether the attenuation is occurring at the anticipate rate the actual model predicted concentration vs. time data at each of the wells should be provided. The means by which the trends will be established should also be mentioned.	The intent of Tables 2.1.4 and 2.1.5 is to provide a basis for looking at well-specific data to see if areas of the site are following the general trends that are anticipated. If the trends are not behaving as anticipated, the implications for the remedy will be evaluated by recalibrating the model to incorporate the observed data and re-predict the remedial timeframe. The changes in predicted timeframe, rather than any individual well trend, will be used to make decisions about whether additional infrastructure is needed. More quantitative descriptions of anticipated trends at individual wells are not recommended, because it would imply greater certainty in the model and imply greater importance in decision making for individual well trends than intended.		Resolved.		Comment resolved.
668	FMIT/TRC	Non-design	GW Modeling	Append L Vol. 2 2.1/p 2.3	"If operational adjustments are implemented, the effects will be assessed in the context of the overall plume remediation using the field data and re-calibrated groundwater modeling projections."	This is unclear: 1) Does it just refer to re-calibration of the GW flow model, or also recalibration of the fate/transport model? What are calibration data and targets? 2) Would this include re-calibration of the regional MicroFEM model 1st, followed by local scale Modflow model updates (i.e. new BC and new parameters)? Using PEST? Optimization runs? 3) This statement suggests the model will be used first to assess changes (i.e. alternatives), and then second to assess effects AFTER operational adjustments have been implemented, but WON'T be used to guide operational adjustments?	1. The groundwater flow model, geochemical model, and solute transport model will all be recalibrated to data collected prior to scheduled model update interval. 2. The regional MicroFEM model recalibration will need to be conducted first and then directly converted to the MODFLOW submodel. The flow model will be calibrated to observed			This PG&E response is still very vague and doesn't appear adequately thought-out. To avoid future confusion to all stakeholders, Hualapai request that PG&E consultants revise such text (throughout the documents) to further clarify a) exactly which models will be updated (i.e., 4 different models described in Appendix B (90%BOD) -	PG&E Response: Additional details on potential model update components will be included consistent with RTC #76. The groundwater flow, solute transport, and geochemical models will all be updated as per the defined model update schedule. All hydrogeologic, water level, groundwater quality, and operational data will

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							water levels and PEST will be used to refine the calibration process. The model will be used to assess proposed remedy design/ operational adjustments to gauge the impact with predictive simulations			MicroFEM, Modflow, MT3D, and Phreeqc), b) what will be updated (i.e., inputs changed, and basis), c) what is involved in re-calibration, d) what will be used as new calibration targets, e) what the calibration tolerances will be - to meet continued use of the model (i.e., Tables 2.1-4 and 2.1-5 and Figures 2.2-2 thru 2.2-9 in O&M Vol2 document) to meet RAO performance evaluations. With respect to the substantial amount of hydrogeologic/chemical data that will be collected during installation/testing/startup - Tribes also request that PG&E consultants make it very clear how these data will be a) interpreted or characterized with existing datasets, How the conceptual site model (CSM) will be updated, c) how these data will be incorporated into the existing model (i.e., will model layers be adjusted to match new well screens instead of stratigraphic boundaries), and d) how exactly will PEST be used (and constrained), given the noted problems with poorly constrained distributions (i.e., for example beneath the river) based on data available from boreholes in California, but ill-constrained because of lack of data beneath the river and throughout AZ. Finally – PG&E	be considered in the recalibration process. Calibration will be conducted in accordance to industry standards (i.e., ASTM). The conceptual site model (CSM) will be updated as additional data is collected and the response to the remedy operations are observed. Specific details on exact model and CSM updates cannot be defined until the data has been collected and analyzed.

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										consultants should also clarify for Hualapai and all stakeholders details associated with any new scenario optimizations, especially optimization criteria and performance metrics.	
669	Hualapai/TRC	Non-design	GW Modeling	Append L Vol. 2 2.1/p 2.3	"If operational adjustments are implemented, the effects will be assessed in the context of the overall plume remediation using the field data and re-calibrated groundwater modeling projections."	This is unclear: 1) Does it just refer to re-calibration of the GW flow model, or also recalibration of the fate/transport model? What are calibration data and targets? 2) Would this include re-calibration of the regional MicroFEM model 1st, followed by local scale Modflow model updates (i.e. new BC and new parameters)? Using PEST? Optimization runs? 3) This statement suggests the model will be used first to assess changes (i.e. alternatives), and then second to assess effects AFTER operational adjustments have been implemented, but WON'T be used to guide operational adjustments?	See above			This PG&E response is still very vague and doesn't appear adequately thought-out. To avoid future confusion to all stakeholders, Hualapai request that PG&E consultants revise such text (throughout the documents) to further clarify a) exactly which models will be updated (i.e., 4 different models described in Appendix B (90%BOD) - MicroFEM, Modflow, MT3D, and Phreeqc), b) what will be updated (i.e., inputs changed, and basis), c) what is involved in re-calibration, d) what will be used as new calibration targets, e) what the calibration tolerances will be - to meet continued use of the model (i.e., Tables 2.1-4 and 2.1-5 and Figures 2.2-2 thru 2.2-9 in O&M Vol2 document) to meet RAO performance evaluations. With respect to the substantial amount of hydrogeologic/chemical data that will be collected during installation/testing/startup - Tribes also request that PG&E consultants make it very clear how these data will be a) interpreted or characterized with existing datasets, How the conceptual	See response 668

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										site model (CSM) will be updated, c) how these data will be incorporated into the existing model (i.e., will model layers be adjusted to match new well screens instead of stratigraphic boundaries), and d) how exactly will PEST be used (and constrained), given the noted problems with poorly constrained distributions (i.e., for example beneath the river) based on data available from boreholes in California, but ill-constrained because of lack of data beneath the river and throughout AZ. Finally – PG&E consultants should also clarify for Hualapai and all stakeholders details associated with any new scenario optimizations, especially optimization criteria and performance metrics.	
670	Cocopah/TRC	Non-design	GW Modeling	Append L Vol. 2 2.1/p 2.3	"If operational adjustments are implemented, the effects will be assessed in the context of the overall plume remediation using the field data and re-calibrated groundwater modeling projections."	This is unclear: 1) Does it just refer to re-calibration of the GW flow model, or also recalibration of the fate/transport model? What are calibration data and targets? 2) Would this include re-calibration of the regional MicroFEM model 1st, followed by local scale Modflow model updates (i.e. new BC and new parameters)? Using PEST? Optimization runs? 3) This statement suggests the model will be used first to assess changes (i.e. alternatives), and then second to assess effects AFTER operational adjustments have been implemented, but WON'T be used to guide operational adjustments?	See above			This PG&E response is still very vague and doesn't appear adequately thought-out. To avoid future confusion to all stakeholders, Tribes request that PG&E consultants revise such text (throughout the documents) to further clarify a) exactly which models will be updated (i.e., 4 different models described in Appendix B (90%BOD) - MicroFEM, Modflow, MT3D, and Phreeqc), b) what will be updated (i.e., inputs changed, and basis), c) what is involved in re-calibration, d) what will be used as new	See response 668

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										calibration targets, e) what the calibration tolerances will be - to meet continued use of the model (i.e., Tables 2.1-4 and 2.1-5 and Figures 2.2-2 thru 2.2-9 in O&M Vol2 document) to meet RAO performance evaluations. With respect to the substantial amount of hydrogeologic/chemical data that will be collected during installation/testing/startup - Tribes also request that PG&E consultants make it very clear how these data will be a) interpreted or characterized with existing datasets, b) how the conceptual site model (CSM) will be updated, c) how these data will be incorporated into the existing model (i.e., will model layers be adjusted to match new well screens instead of stratigraphic boundaries), and d) how exactly will PEST be used (and constrained), given the noted problems with poorly constrained distributions (i.e., for example beneath the river) based on data available from boreholes in California, but ill-constrained because of lack of data beneath the river and throughout AZ. Finally – PG&E consultants should also clarify for Tribes and all stakeholders details associated with any new scenario optimizations, especially optimization criteria and performance metrics.	

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671	Chemehuevi/ TRC	Non-design	GW Modeling	Append L Vol. 2 2.1/p 2.3	"If operational adjustments are implemented, the effects will be assessed in the context of the overall plume remediation using the field data and re-calibrated groundwater modeling projections."	This is unclear: 1) Does it just refer to re-calibration of the GW flow model, or also recalibration of the fate/transport model? What are calibration data and targets? 2) Would this include re-calibration of the regional MicroFEM model 1st, followed by local scale Modflow model updates (i.e. new BC and new parameters)? Using PEST? Optimization runs? 3) This statement suggests the model will be used first to assess changes (i.e. alternatives), and then second to assess effects AFTER operational adjustments have been implemented, but WON'T be used to guide operational adjustments?	See above			This PG&E response is still very vague and doesn't appear adequately thought-out. To avoid future confusion to all stakeholders, Tribes request that PG&E consultants revise such text (throughout the documents) to further clarify a) exactly which models will be updated (i.e., 4 different models described in Appendix B (90%BOD) - MicroFEM, Modflow, MT3D, and Phreeqc), b) what will be updated (i.e., inputs changed, and basis), c) what is involved in re-calibration, d) what will be used as new calibration targets, e) what the calibration tolerances will be - to meet continued use of the model (i.e., Tables 2.1-4 and 2.1-5 and Figures 2.2-2 thru 2.2-9 in O&M Vol2 document) to meet RAO performance evaluations. With respect to the substantial amount of hydrogeologic/chemical data that will be collected during installation/testing/startup - Tribes also request that PG&E consultants make it very clear how these data will be a) interpreted or characterized with existing datasets, b) how the conceptual site model (CSM) will be updated, c) how these data will be incorporated into the existing model (i.e., will model layers be adjusted to match new well screens instead of stratigraphic	See response 668

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										boundaries), and d) how exactly will PEST be used (and constrained), given the noted problems with poorly constrained distributions (i.e., for example beneath the river) based on data available from boreholes in California, but ill-constrained because of lack of data beneath the river and throughout AZ. Finally – PG&E consultants should also clarify for Tribes and all stakeholders details associated with any new scenario optimizations, especially optimization criteria and performance metrics.	
672	DOI-95	Design	O&M	Appendix L, Vol.2; 2.2.2 p. 2-4	In addition, Cr(VI) concentration changes from IRL injection downgradient monitoring wells will be compared to anticipated concentration changes and timeframes predicted from solute transport modeling, as summarized in Table 2.2 1.	Cr(VI) concentrations are not provided in Table 2.2.1. Please revise.	In Table 2.2-1, the “Currently-Anticipated Timeframe for Cr(VI) Concentration Decreases” is the timeframe for Cr(VI) concentrations to decrease to less than 32 parts per billion (ppb) as predicted by the solute transport model. This will be clarified in the table. The referenced text will also be revised to reference Tables 2.1-4 and 2.1-5, which provide snapshots of the model-predicted Cr(VI) concentration trends at certain intervals following remedy start-up.		Resolved.		Comment resolved.
673	DOI-96	Design	O&M	Appendix L, Vol.2; 2.2.2 p. 2-4	If the change in hydraulic gradient and the changes in downgradient monitoring well Cr(VI) concentration trends are not within expectations	Please provide a reference to the discussion of expectations.	The referenced text will be revised as follows: “If the change in hydraulic gradient and the changes in downgradient monitoring well Cr(VI) concentration trends are not within expectations (see Boxes 22-26 on Figure 2.2-4), short-term		Resolved.		Comment resolved.

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							adjustments to improve performance…” Cr(VI) concentration trend expectations for the IRL injection downgradient monitoring wells are presented in Tables 2.1-4, 2.1-5, and 2.2-1 (see also response to RTC #672 [DOI-95]).				
674	DOI-97	Design	O&M	Appendix L, Vol.2; 2.2.2 p. 2-5	If TOC concentrations are less than anticipated and Cr(VI) is not treated to less than 32 g/L in samples collected from dose response wells, then operational adjustments such as increasing TOC injection concentrations or changing dosing parameters will be made.	Please indicate where the expected TOC concentrations are presented. Figure 2.2.6 indicates that they should be included in Table 2.1-4 and 2.1-5 but they are not. It looks like the reference should be to Table 2.2-1. Please resolve.	The referenced text will be revised as follows: “If TOC concentrations are less than anticipated (per Table 2.2-1) and Cr(VI) is not treated to less than 32 µg/L in samples collected from dose response wells, then operational adjustments such as increasing TOC injection concentrations or changing dosing parameters will be made.” Box 3 on Figure 2.2-6 will be updated to reference Table 2.2-1 as well as Tables 2.1-4 and 2.1-5.		Resolved.		Comment resolved.
675	DOI-98	Design	O&M	Appendix L, Vol.2; 2.2.2 p. 2-5	If by product concentrations are above the anticipated range, the TOC concentration will be decreased or dosing parameters will be adjusted.	Please clarify how dosing parameter adjustments are different from changing the TOC concentrations. It appears it should be dosing frequency. Please clarify.	The referenced text will be revised as follows: “If by product concentrations are above the anticipated range, the TOC concentration will be decreased or other dosing parameters (i.e., duration or frequency of dosing) will be adjusted.”		Resolved.		Comment resolved.
676	DOI-99	Design	O&M	Appendix L, Vol.2; 2.2.2 p. 2-7.	Action levels for agency notifications will be established for metals, herbicides, pesticides, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons	Please specify at what point in the process these will be established.	Action levels will be determined once the initial extracted water quality has been established (e.g., within the first six months of operation of the River Bank Extraction Wells). The referenced text will be modified as follows: “Action levels for agency notifications will be		Resolved.		Comment resolved.

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					(PAHs), and radionuclides.		determined once the initial extracted water quality has been established. Action levels ~~for agency notifications~~ will be established for metals, herbicides, pesticides, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and radionuclides…”				
677	FMIT/TRC	Design	Monitoring	Append L Vol. 2 IRL DQO-5 p. 2-7	Six-month baseline and 25% Action Levels	There are significant natural variations of byproduct concentrations exhibited in water from wells in the study area. The 25% Action Levels could be violated due to natural variation, which could trigger regulatory enforcement measures, which in turn could delay the timely completion of the remedy. Rather than setting hard baseline values (numerical standards), the geochemistry that contributes to the exceedance event should be described through modeling and visualization in order to describe impacts on the remedy. Geochemical modeling could then be used to simulate ways to reverse or correct the byproduct exceedances.	The purpose of establishing these action levels is to ensure awareness about what concentrations are being injected into the Uplands, rather than to directly trigger changes to remedy implementation. Note that as stated in this section, these action levels do not apply to byproducts arsenic and manganese which have action levels established elsewhere that are based on geochemical modeling and that are part of a process of understanding geochemical changes that are resulting from the remedy (for example, see the discussion of action levels on page 2-2).			How will you know whether arsenic or manganese in water from IRL monitoring wells comes from the freshwater source or from geochemical reactions within the aquifer near injection zones (especially IRL wells that inject carbon)? Arsenic and other water-quality constituents should be monitored in water from the freshwater source well(s). The wording of the section appears as though regulatory actions could be taken that might affect the operations or outcome of the groundwater remedy. If such actions were to occur, Hualapai would appreciate involvement in the data analysis and discussion of the proposed actions. Comment unresolved pending development of a plan to distinguish between different sources of arsenic and manganese at IRL monitoring wells.	
678	Hualapai/TRC	Design	Monitoring	Append L Vol. 2 IRL DQO-5 p. 2-7	Six-month baseline and 25% Action Levels	There are significant natural variations of byproduct concentrations exhibited in water from wells in the study area. The 25% Action Levels could be violated due to natural variation, which could trigger regulatory enforcement measures, which in turn could delay the timely completion of the remedy. Rather than setting hard baseline values (numerical standards), the geochemistry that contributes to the exceedance event should be described through modeling and visualization in order to describe impacts on the remedy. Geochemical modeling could then be used to simulate ways to reverse or correct the byproduct exceedances.	See above			How will it be known whether arsenic or manganese in water from IRL monitoring wells comes from the freshwater source or from geochemical reactions within the aquifer near injection zones (especially IRL wells that inject	

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										carbon)? Arsenic and other water- quality constituents should be monitored in water from the freshwater source well(s). The wording of the section appears as though regulatory actions could be taken that might affect the operations or outcome of the groundwater remedy. If such actions were to occur, Hualapai would appreciate involvement in the data analysis and discussion of the proposed actions. Comment unresolved pending development of a plan to distinguish between different sources of arsenic and manganese at IRL monitoring wells.	
679	Cocopah/TRC	Design	Monitoring	Append L Vol. 2 IRL DQO-5 p. 2-7	Six-month baseline and 25% Action Levels	There are significant natural variations of byproduct concentrations exhibited in water from wells in the study area. The 25% Action Levels could be violated due to natural variation, which could trigger regulatory enforcement measures, which in turn could delay the timely completion of the remedy. Rather than setting hard baseline values (numerical standards), the geochemistry that contributes to the exceedance event should be described through modeling and visualization in order to describe impacts on the remedy. Geochemical modeling could then be used to simulate ways to reverse or correct the byproduct exceedances.	See above			How will you know whether arsenic or manganese in water from IRL monitoring wells comes from the freshwater source or from geochemical reactions within the aquifer near injection zones (especially IRL wells that inject carbon)? Arsenic and other water-quality constituents should be monitored in water from the freshwater source well(s). The wording of the section appears as though regulatory actions could be taken that might affect the operations or outcome of the groundwater remedy. If such actions were to occur, Tribes would appreciate involvement in the data analysis and discussion of the proposed actions. Comment unresolved pending development of a plan to distinguish between different	

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										sources of arsenic and manganese at IRL monitoring wells.	
680	Chemehuevi/ TRC	Design	Monitoring	Append L Vol. 2 IRL DQO-5 p. 2-7	Six-month baseline and 25% Action Levels	There are significant natural variations of byproduct concentrations exhibited in water from wells in the study area. The 25% Action Levels could be violated due to natural variation, which could trigger regulatory enforcement measures, which in turn could delay the timely completion of the remedy. Rather than setting hard baseline values (numerical standards), the geochemistry that contributes to the exceedance event should be described through modeling and visualization in order to describe impacts on the remedy. Geochemical modeling could then be used to simulate ways to reverse or correct the byproduct exceedances.	See above			How will you know whether arsenic or manganese in water from IRL monitoring wells comes from the freshwater source or from geochemical reactions within the aquifer near injection zones (especially IRL wells that inject carbon)? Arsenic and other water-quality constituents should be monitored in water from the freshwater source well(s). The wording of the section appears as though regulatory actions could be taken that might affect the operations or outcome of the groundwater remedy. If such actions were to occur, Tribes would appreciate involvement in the data analysis and discussion of the proposed actions. Comment unresolved pending development of a plan to distinguish between different sources of arsenic and manganese at IRL monitoring wells.	
681	FMIT/TRC	Non-design	GW Modeling	Append L Vol. 2 2.2.3/p. 2-8	"Monitoring will be conducted to verify the model predictions, and lines of evidence that will be used to evaluate groundwater flow and plume control in the area west of the TCS Injection Wells will include: trends in analytical data (e.g., Cr[VI], byproducts,	If CrVI concentrations increase over the short-term what conclusions and decisions will be made, given increasing concentrations in some wells associated with the IM-3 system over several years, probably due to redistribution of concentration within the plume, which remains somewhat uncertain. Were gradients ever used/evaluated during model calibration? If not, should they have been? Because future decisions on operation/design will depend on how observed and simulated gradients compare, it is important to demonstrate to stakeholders that the current model reproduces existing gradients well enough for such future comparisons and subsequent decisions. How well does the current model reproduce hydraulic gradients, especially around wells, and are corrections considered such as the 25' grid spacing and head loss due to skin/pump losses?	Conclusions and decisions will be made by assessing the concentration trends in individual wells and in wells in the nearby vicinity to determine potential patterns in observed trends that would point to a rational explanation, or if it is an anomalous point that needs to be assessed further. Gradients were not used as a specific calibration target in the calibration of the groundwater flow model, but rather the direct observed water			The Tribe emphasizes that field-based (data-driven) decisions will likely be made over short-term trends (i.e., maybe 1 to 3 years) which could simply be due to redistribution of plume concentrations as a number of IM-3 wells have shown, instead of due to improper design/ operation. The main concern continues to be that PG&E consultants may argue that an ever increasing number of wells are required to fix apparent problems, which are	PGE response: This particular section of the BOD describes the data analysis that will be conducted to evaluate whether the operations of the TCS injection wells and freshwater injection well FW-02 are properly balanced to ensure that the TCS injection does not cause westward plume migration. If it is determined based on multiple lines of evidence that migration is

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					and potentially TOC) collected from the TCS Recirculation Loop by-product monitoring wells located to the west of the TCS Injection Wells (Table 2.1-2); and comparison of groundwater elevation data/observed hydraulic gradients to model-predicted gradients.”		levels were utilized. However, gradients were still assessed for consistency. Monitoring points within active pumping wells have inherent uncertainty due to frictional head loss, but can still be considered for general assessment. Data from monitoring wells and piezometers will be more reliable. Because extraction/injection wells are attributed to the full intercepted grid cell instead of an exact point, models are more representative of the average water level in the area of active pumping wells. This data can still be utilized to assess the relative gradients in areas and gauge the hydraulic impact of different hydraulic stresses from pumping.			potentially just a misinterpretation of actual conditions. Sufficient time needs to be given to observe desired concentration trends before making decisions such as installing new wells in sensitive cultural areas and thereby increasing significant and potentially unmitigable impacts. Based on this response, it is still unclear what steps will be taken to ensure proper interpretations and decisions are made to limit any new wells unnecessarily.	occurring, the short term action described in the O&M manual is to adjust operational flowrates, not to install additional wells. Only if operational adjustments fail would new wells be considered under the contingency plan. Consideration of any new wells under the contingency plan would be done in accordance with the stakeholder communications/outreach procedures and protocols as detailed in RTCs #44 FMIT/TRC, #45 Hualapai/ TRC, #46 Cocopah/TRC, and #47 Chemehuevi/ TRC.
682	Hualapai/TRC	Non-design	GW Modeling	Append L Vol. 2 2.2.3/p. 2-8	“Monitoring will be conducted to verify the model predictions, and lines of evidence that will be used to evaluate groundwater flow and plume control in the area west of the TCS Injection Wells will include: trends in analytical data (e.g., Cr[VI], byproducts, and potentially TOC) collected from the TCS Recirculation Loop by-product monitoring wells located to the west of the TCS Injection Wells (Table	If CrVI concentrations increase over the short-term what conclusions and decisions will be made, given increasing concentrations in some wells associated with the IM-3 system over several years, probably due to redistribution of concentration within the plume, which remains somewhat uncertain. Were gradients ever used/evaluated during model calibration? If not, should they have been? Because future decisions on operation/design will depend on how observed and simulated gradients compare, it is important to demonstrate to stakeholders that the current model reproduces existing gradients well enough for such future comparisons and subsequent decisions. How well does the current model reproduce hydraulic gradients, especially around wells, and are corrections considered such as the 25' grid spacing and head loss due to skin/pump losses?	See above			Hualapai emphasize that field-based (data-driven) decisions will likely be made over short-term trends (i.e., maybe 1 to 3 years) which could simply be due to redistribution of plume concentrations as a number of IM-3 wells have shown, instead of due to improper design/ operation. The main concern continues to be that PG&E consultants may argue that an ever increasing number of wells are required to fix apparent problems, which are potentially just a misinterpretation of actual conditions. Sufficient time needs to be given to observe desired concentration trends before making rash decisions such as needing new wells in sensitive cultural areas. Based on this response,	See response 681

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					2.1-2); and comparison of groundwater elevation data/observed hydraulic gradients to model-predicted gradients."					it is still unclear what steps will be taken to ensure proper interpretations and decisions are made to limit any new wells unnecessarily.	
683	Cocopah/TRC	Non-design	GW Modeling	Append L Vol. 2 2.2.3/p. 2-8	"Monitoring will be conducted to verify the model predictions, and lines of evidence that will be used to evaluate groundwater flow and plume control in the area west of the TCS Injection Wells will include: trends in analytical data (e.g., Cr[VI], byproducts, and potentially TOC) collected from the TCS Recirculation Loop by-product monitoring wells located to the west of the TCS Injection Wells (Table 2.1-2); and comparison of groundwater elevation data/observed hydraulic gradients to model-predicted gradients."	If CrVI concentrations increase over the short-term what conclusions and decisions will be made, given increasing concentrations in some wells associated with the IM-3 system over several years, probably due to redistribution of concentration within the plume, which remains somewhat uncertain. Were gradients ever used/evaluated during model calibration? If not, should they have been? Because future decisions on operation/design will depend on how observed and simulated gradients compare, it is important to demonstrate to stakeholders that the current model reproduces existing gradients well enough for such future comparisons and subsequent decisions. How well does the current model reproduce hydraulic gradients, especially around wells, and are corrections considered such as the 25' grid spacing and head loss due to skin/pump losses?	See above			Tribes emphasize that field-based (data-driven) decisions will likely be made over short-term trends (i.e., maybe 1 to 3 years) which could simply be due to redistribution of plume concentrations as a number of IM-3 wells have shown, instead of due to improper design/ operation. The main concern continues to be that PG&E consultants may argue that an ever increasing number of wells are required to fix apparent problems, which are potentially just a misinterpretation of actual conditions. Sufficient time needs to be given to observe desired concentration trends before making rash decisions such as needing new wells in sensitive cultural areas. Based on this response, it is still unclear what steps will be taken to ensure proper interpretations and decisions are made to limit any new wells unnecessarily.	See response 681
684	Chemehuevi/ TRC	Non-design	GW Modeling	Append L Vol. 2 2.2.3/p. 2-8	"Monitoring will be conducted to verify the model predictions, and lines of evidence that will be used to evaluate	If CrVI concentrations increase over the short-term what conclusions and decisions will be made, given increasing concentrations in some wells associated with the IM-3 system over several years, probably due to redistribution of concentration within the plume, which remains somewhat uncertain. Were gradients ever used/evaluated during model calibration? If not, should they have been? Because future decisions on operation/design will depend on how observed and simulated gradients compare, it is important to demonstrate to stakeholders that the current model reproduces existing gradients well enough for such future comparisons and subsequent decisions. How well does the current model reproduce hydraulic gradients, especially around wells, and are	See above			Tribes emphasize that field-based (data-driven) decisions will likely be made over short-term trends (i.e., maybe 1 to 3 years) which could simply be due to redistribution of plume concentrations as a number of IM-3	See response 681

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					groundwater flow and plume control in the area west of the TCS Injection Wells will include: trends in analytical data (e.g., Cr[VI], byproducts, and potentially TOC) collected from the TCS Recirculation Loop by-product monitoring wells located to the west of the TCS Injection Wells (Table 2.1-2); and comparison of groundwater elevation data/observed hydraulic gradients to model-predicted gradients.”	corrections considered such as the 25' grid spacing and head loss due to skin/pump losses?				wells have shown, instead of due to improper design/ operation. The main concern continues to be that PG&E consultants may argue that an ever increasing number of wells are required to fix apparent problems, which are potentially just a misinterpretation of actual conditions. Sufficient time needs to be given to observe desired concentration trends before making rash decisions such as needing new wells in sensitive cultural areas. Based on this response, it is still unclear what steps will be taken to ensure proper interpretations and decisions are made to limit any new wells unnecessarily.	
685	FMIT/TRC	Non-design	GW Modeling	Append L Vol. 2 2.2.3/p. 2-9	“The decision statement for this DQO is: should extraction system operations or configuration be changed to optimize Cr(VI) migration control?”	This seems different than the actual TCS DQO-2 problem statement above. The question is now posed as an optimization problem and not just removing CrVI mass. If it is truly meant to be an optimization problem - then optimization criteria, constraints, and objectives should be clearly stated and discussed here. One key optimization criteria would be to maximize removal of CrVI in shortest possible time - so a following question is...how serious is the 30 year remedial time constraint in driving any 'optimization' of the TCS operations/configuration? How does the modeling fit into the optimization?	The text for this section was not intended to imply that operation of the TW bench extraction wells is a strong control on overall remedial timeframe, which is not anticipated. To clarify, the decision statement will be modified to match the problem statement: “The decision statement for this DQO is: should extraction system operations or configuration be changed to optimize improve Cr(VI) removal and migration control?”			This response remains unclear. Will all/some model(s) be used to run simulations aimed at optimizing extraction system to maximize removal of CrVI and to minimize plume migration/expansion? This sounds like a modeling optimization problem, which should be further clarified and restated.	PG&E Response: Assessment and optimizations of the performance of the TCS components will be driven by observed hydraulic and groundwater quality data in the field. The model can then be utilized to assess the potential long-term effects of the proposed adjustments or modifications.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
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Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
686	Hualapai/TRC	Non-design	GW Modeling	Append L Vol. 2 2.2.3/p. 2-9	"The decision statement for this DQO is: should extraction system operations or configuration be changed to optimize Cr(VI) migration control?"	This seems different than the actual TCS DQO-2 problem statement above. The question is now posed as an optimization problem and not just removing CrVI mass. If it is truly meant to be an optimization problem - then optimization criteria, constraints, and objectives should be clearly stated and discussed here. One key optimization criteria would be to maximize removal of CrVI in shortest possible time - so a following question is...how serious is the 30 year remedial time constraint in driving any 'optimization' of the TCS operations/configuration? How does the modeling fit into the optimization?	See above			This response remains unclear. Will all/some model(s) be used to run simulations aimed at optimizing extraction system to maximize removal of CrVI and to minimize plume migration/expansion? This sounds like a modeling optimization problem, which should be further clarified and restated.	See response 685
687	Cocopah/TRC	Non-design	GW Modeling	Append L Vol. 2 2.2.3/p. 2-9	"The decision statement for this DQO is: should extraction system operations or configuration be changed to optimize Cr(VI) migration control?"	This seems different than the actual TCS DQO-2 problem statement above. The question is now posed as an optimization problem and not just removing CrVI mass. If it is truly meant to be an optimization problem - then optimization criteria, constraints, and objectives should be clearly stated and discussed here. One key optimization criteria would be to maximize removal of CrVI in shortest possible time - so a following question is...how serious is the 30 year remedial time constraint in driving any 'optimization' of the TCS operations/configuration? How does the modeling fit into the optimization?	See above			This response remains unclear. Will all/some model(s) be used to run simulations aimed at optimizing extraction system to maximize removal of CrVI and to minimize plume migration/expansion? This sounds like a modeling optimization problem, which should be further clarified and restated.	See response 685
688	Chemehuevi/ TRC	Non-design	GW Modeling	Append L Vol. 2 2.2.3/p. 2-9	"The decision statement for this DQO is: should extraction system operations or configuration be changed to optimize Cr(VI) migration control?"	This seems different than the actual TCS DQO-2 problem statement above. The question is now posed as an optimization problem and not just removing CrVI mass. If it is truly meant to be an optimization problem - then optimization criteria, constraints, and objectives should be clearly stated and discussed here. One key optimization criteria would be to maximize removal of CrVI in shortest possible time - so a following question is...how serious is the 30 year remedial time constraint in driving any 'optimization' of the TCS operations/configuration? How does the modeling fit into the optimization?	See above			This response remains unclear. Will all/some model(s) be used to run simulations aimed at optimizing extraction system to maximize removal of CrVI and to minimize plume migration/expansion? This sounds like a modeling optimization problem, which should be further clarified and restated.	See response 685
689	DOI-100	Design	O&M	Appendix L, Vol.2; 2.2.4 Table 2.1-1 1st row p. 1(of 5)	If Cr(VI), arsenic, or manganese concentrations increase in surface water samples and are attributable to the Topock site…	Please add a footnote to this sentence that refers the reader to the discussion of how the determination of whether the Topock site is the source will be made.	The determination of whether the Topock site is the source will be made through a comparison of upstream sampling results with midstream and downstream sampling results, supported by Floodplain groundwater sampling results. This explanation will be added to Section 2.1 and referenced herein Table		Accepted.		Comment resolved pending DOI review of the final design documents.

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							2.1-1.				
690	FMIT/TRC	Non-design	GW Modeling	Append L Vol. 2 Table 2.1-1	"If hexavalent chromium concentrations are not decreasing within expected timeframes, operational changes (potentially including the addition of provisional IRZ wells) will be implemented per the process control decision rules (Figures 2.2-2 through 2.2-9)."	What are the "*expected timeframes*" and what is the basis? If models are updated during installation, startup, initial operation and for any 'operational' adjustments post- startup - will these "*expected timeframes*" also be updated and provided to stakeholders?	The expected timeframes are summarized in Tables 2.1-4 and 2.1-5, referenced herein Table 2.1-1 and were based on modeling results. Yes, updated expectations will be provided with model updates during remedy construction and operations.			Comment noted.	
691	Hualapai/TRC	Non-design	GW Modeling	Append L Vol. 2 Table 2.1-1	"If hexavalent chromium concentrations are not decreasing within expected timeframes, operational changes (potentially including the addition of provisional IRZ wells) will be implemented per the process control decision rules (Figures 2.2-2 through 2.2-9)."	What are the "*expected timeframes*" and what is the basis? If models are updated during installation, startup, initial operation and for any 'operational' adjustments post- startup - will these "*expected timeframes*" also be updated and provided to stakeholders?	See above			Comment noted.	
692	Cocopah/TRC	Non-design	GW Modeling	Append L Vol. 2 Table 2.1-1	"If hexavalent chromium concentrations are not decreasing within expected timeframes, operational changes (potentially including the addition of provisional IRZ wells) will be implemented	What are the "*expected timeframes*" and what is the basis? If models are updated during installation, startup, initial operation and for any 'operational' adjustments post- startup - will these "*expected timeframes*" also be updated and provided to stakeholders?	See above			Comment noted	

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					per the process control decision rules (Figures 2.2-2 through 2.2-9)."						
693	Chemehuevi/ TRC	Non-design	GW Modeling	Append L Vol. 2 Table 2.1-1	"If hexavalent chromium concentrations are not decreasing within expected timeframes, operational changes (potentially including the addition of provisional IRZ wells) will be implemented per the process control decision rules (Figures 2.2-2 through 2.2-9)."	What are the "*expected timeframes*" and what is the basis? If models are updated during installation, startup, initial operation and for any 'operational' adjustments post- startup - will these "*expected timeframes*" also be updated and provided to stakeholders?	See above			Comment noted.	
694	FMIT/TRC	Non-design	GW Modeling	Append L Vol. 2 Table 2.1-4	Model Predicted Cr(VI) Concentration Trend	Based on review of the 3rd quarter 2014 GW monitoring report data trends - several monitoring IM-3 monitoring wells showed increasing CrVI trends for several years (i.e. MW-40D, MW-47-115, MW-62-110, MW-66- 230, MW-69-195 etc.), probably due to redistribution from an imperfectly known plume distribution. Were such changes considered in the predicted trends provided in Table 2.1- 4 here? It seems likely similar redistribution effects will occur for years after starting remedial system operations, which aren't attributed to TOC effects? This table is referred to often and triggers important decisions on operations (and provisional wells) – how will these effects be considered? At a minimum, wouldn't this require updating and re-calibrating all 3 models (MicroFEM, Modflow, mt3d) and re-simulating the baseline 30 year + remediation scenario with new concentration distributions from all of the new data collection obtained during installation/monitoring? Could actual numerical values be indicated by year with some level of uncertainty instead of indicating "increasing/decreasing" to avoid premature and potentially incorrect operational/design changes? Shouldn't this table be updated after installation, when new monitoring data in many new locations/depths will become available? Model updates seem vague throughout 90% documents, occurring only if 'significant deviations' - but it seems essential to plan now to update all models so key decisions are made with the best possible predictions.	Table 2.1-4 was based on the baseline Cr(VI) distribution described in Section 2.2 of the BOD and did not assume any additional mass in areas noted based on recent concentration trends. Yes, there could be changes in Cr(VI) concentrations in the early data set as wells are installed and equilibrate. Yes, the Cr(VI) distribution data is a key part of the data that will go into the model updates during remedy construction and those model updates may change the expectations provided in Table 2.1-4. See comment # 667 for a discussion of numerical refinements of the expectations. More details on model update timing are provided in response to comment # 205.			The Tribes recommends that PG&E consultants quantify the duration of time they will wait to take actions (i.e., new wells, adjustment to extraction/injection rates etc.) and what their basis is. Again, Tribal concerns are that PG&E consultants may conclude that additional injection/ extraction and/or monitoring wells are required after limited and inadequate trend analysis (i.e., 1 to 3 years based on IM-3 data), where concentrations may deviate from currently modeled trends (i.e., increasing vs. decreasing, or changing at a rate much faster than expected) that are based on a flow model that has a number of flaws (i.e., see Prucha and Eggers, July 15, 2015 whitepaper) and are highly uncertain. In	DTSC response: Tribal comment noted. DTSC agrees that careful evaluation of data and trend would be priority.

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							PG&E will review and consider the Tribes' response (dated Sept 18 and 21, 2015) to PG&E's evaluation of the MW-X/Y White Paper (dated August 14, 2015). PG&E anticipates that additional discussion on a proposed path forward (including model improvements and timing) to occur at a future TWG.			reality, deviations may actually occur due to poor characterization of 3-d plume configuration/concentration distributions. No discussion is presented that details how this problem will be addressed.	
695	Hualapai/TRC	Non-design	GW Modeling	Append L Vol. 2 Table 2.1-4	Model Predicted Cr(VI) Concentration Trend	Based on review of the 3rd quarter 2014 GW monitoring report data trends - several monitoring IM-3 monitoring wells showed increasing CrVI trends for several years (i.e. MW-40D, MW-47-115, MW-62-110, MW-66- 230, MW-69-195 etc.), probably due to redistribution from an imperfectly known plume distribution. Were such changes considered in the predicted trends provided in Table 2.1- 4 here? It seems likely similar redistribution effects will occur for years after starting remedial system operations, which aren't attributed to TOC effects? This table is referred to often and triggers important decisions on operations (and provisional wells) – how will these effects be considered? At a minimum, wouldn't this require updating and re-calibrating all 3 models (MicroFEM, Modflow, mt3d) and re-simulating the baseline 30 year + remediation scenario with new concentration distributions from all of the new data collection obtained during installation/monitoring? Could actual numerical values be indicated by year with some level of uncertainty instead of indicating "increasing/decreasing" to avoid premature and potentially incorrect operational/design changes? Shouldn't this table be updated after installation, when new monitoring data in many new locations/depths will become available? Model updates seem vague throughout 90% documents, occurring only if 'significant deviations' - but it seems essential to plan now to update all models so key decisions are made with the best possible predictions.	See above			Hualapai recommend that PG&E consultants quantify the duration of time they will wait to take actions (i.e., new wells, adjustment to extraction/injection rates etc.) and what their basis is. Again, Hualapai concerns are that PG&E consultants rush into concluding that additional injection/extraction and/or monitoring wells are required after limited trend analysis (i.e., 1 to 3 years based on IM-3 data), where concentrations may deviate from currently modeled trends (i.e., increasing vs. decreasing, or changing at a much faster rate than expected), which are based on a flow model that has a number of flaws (i.e., see Prucha and Eggers, July 15, 2015 whitepaper) and is highly uncertain. And in reality, deviations may actually simply occur due to poorly characterization of 3-d plume configuration/ concentration distributions. No discussion is presented that details how this problem will be addressed..	See response 694
696	Cocopah/TRC	Non-design	GW Modeling	Append L Vol. 2 Table 2.1-4	Model Predicted Cr(VI) Concentration	Based on review of the 3rd quarter 2014 GW monitoring report data trends - several monitoring IM-3 monitoring wells showed increasing CrVI trends for several years (i.e. MW-40D, MW-47-115, MW-62-110, MW-66- 230, MW-69-195 etc.), probably due to redistribution from an imperfectly known plume distribution. Were such changes considered in the predicted trends provided in Table	See above			Tribes recommend that PG&E consultants quantify the duration of time they will wait to	See response 694

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					Trend	2.1- 4 here? It seems likely similar redistribution effects will occur for years after starting remedial system operations, which aren't attributed to TOC effects? This table is referred to often and triggers important decisions on operations (and provisional wells) – how will these effects be considered? At a minimum, wouldn't this require updating and re-calibrating all 3 models (MicroFEM, Modflow, mt3d) and re-simulating the baseline 30 year + remediation scenario with new concentration distributions from all of the new data collection obtained during installation/monitoring? Could actual numerical values be indicated by year with some level of uncertainty instead of indicating "increasing/decreasing" to avoid premature and potentially incorrect operational/design changes? Shouldn't this table be updated after installation, when new monitoring data in many new locations/depths will become available? Model updates seem vague throughout 90% documents, occurring only if 'significant deviations' - but it seems essential to plan now to update all models so key decisions are made with the best possible predictions.				take actions (i.e., new wells, adjustment to extraction/injection rates etc.) and what their basis is. Again, Tribal concerns are that PG&E consultants rush into concluding that additional injection/ extraction and/or monitoring wells are required after limited trend analysis (i.e., 1 to 3 years based on IM-3 data), where concentrations may deviate from currently modeled trends (i.e., increasing vs. decreasing, or changing at a much faster rate than expected), which are based on a flow model that has a number of flaws (i.e., see Prucha and Eggers, July 15, 2015 whitepaper) and is highly uncertain. And in reality, deviations may actually simply occur due to poorly characterization of 3-d plume configuration/ concentration distributions. No discussion is presented that details how this problem will be addressed.	
697	Chemehuevi/ TRC	Non-design	GW Modeling	Append L Vol. 2 Table 2.1-4	Model Predicted Cr(VI) Concentration Trend	Based on review of the 3rd quarter 2014 GW monitoring report data trends - several monitoring IM-3 monitoring wells showed increasing CrVI trends for several years (i.e. MW-40D, MW-47-115, MW-62-110, MW-66- 230, MW-69-195 etc.), probably due to redistribution from an imperfectly known plume distribution. Were such changes considered in the predicted trends provided in Table 2.1- 4 here? It seems likely similar redistribution effects will occur for years after starting remedial system operations, which aren't attributed to TOC effects? This table is referred to often and triggers important decisions on operations (and provisional wells) – how will these effects be considered? At a minimum, wouldn't this require updating and re-calibrating all 3 models (MicroFEM, Modflow, mt3d) and re-simulating the baseline 30 year + remediation scenario with new concentration distributions from all of the new data collection obtained during installation/monitoring? Could actual numerical values be indicated by year with some level of uncertainty instead of indicating "increasing/decreasing" to avoid premature and potentially incorrect operational/design changes? Shouldn't this table be updated after installation, when new monitoring data in many new locations/depths will become available? Model updates seem vague throughout 90% documents, occurring only if 'significant deviations' - but it seems essential to plan now to update all models so key decisions are made with the best possible predictions.	See above			Tribes recommend that PG&E consultants quantify the duration of time they will wait to take actions (i.e., new wells, adjustment to extraction/injection rates etc.) and what their basis is. Again, Tribal concerns are that PG&E consultants rush into concluding that additional injection/extraction and/or monitoring wells are required after limited trend analysis (i.e., 1 to 3 years based on IM-3 data), where concentrations may deviate from currently modeled trends (i.e.,	See response 694

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										increasing vs. decreasing, or changing at a much faster rate than expected), which are based on a flow model that has a number of flaws (i.e., see Prucha and Eggers, July 15, 2015 whitepaper) and is highly uncertain. And in reality, deviations may actually simply occur due to poorly characterization of 3-d plume configuration/ concentration distributions. No discussion is presented that details how this problem will be addressed.	
698	DOI-107	Non-design	Process	Section 2.2	Figure 2.2-2 through Figure 2.2-9	The text of Section 2.2 and the referenced flow charts imply that data evaluation per the flow charts and operational changes (if needed) occur whenever data is collected. However, most of the flow charts call for model recalibration or adjustment which seems onerous considering some data is collected on a monthly basis. Please clarify the frequency of data evaluation/operational adjustments including updating of the model.	The flow charts will be updated to clarify the timing of model updates as discussed in modeling Appendix B Section 12 and clarified in response to Comment #205. An additional paragraph will be added to Appendix B Section 12 to discuss the intended future use of the model including updating remediation time frame estimates, supporting capture zone analyses, and analyzing potential remedy design operation changes.		Accepted.		Comment resolved pending DOI review of the final design documents.
699	DTSC-147	Design	Monitoring	Operation and Maintenance Manual Volume 2 Sampling and Monitoring Plan / Appendix I, Page I-15		DTSC requests that the flow chart figures such as Fig 2.2-2, 2.2-4 and 2.2-9 where multiple monitoring aspects are presented on one interrelated figure be blocked out in some similar fashion as was done on the figures during the February 18, 2015 TWG meeting. DTSC had done this independently during the 60% and believes it will make the charts easier to understand, especially for those new or peripherally involved with this aspect of the project. Although the flow charts as presented are a frame work for O&M, these should be considered living documents that would potentially change based on operations. Note: Agencies are still in discussion regarding 60% design RTC 38 – short term goals which may lead to revisions of the Operation and Maintenance Manual Volume 2 Sampling and Monitoring Plan including longer term goals.	Comment noted. Similar blocking will be incorporated into the flow chart figures to provide additional clarity and will be included in the final design document. It is also recognized that the flow charts should be considered living documents.	Resolved.			Comment resolved.
700	FMIT/TRC	Non-design	GW Modeling	Append L Vol. 2 Figures 2.2-2 to 2.2-9		These monitoring decision framework diagrams point to many key decisions which are based on model-derived expected concentration ranges or trends (i.e., Tables 2.1-4, 2.1-5 and 2.2-1), but don't discuss when, how or which models need to be updated, nor whether these tables would then be updated and how long all of these decisions (short-term or long-term) will actually take. Based on Table 2.2-1, some decisions might take up to 30 years. It is recommended that decision time-frames be included in the framework diagrams, and more detail on when, how and which models will be updated. Use of models should be more frequent and iterative with any potential	The timing of model updates is provided in modeling Appendix B Section 12 and is clarified in response to comment 205. The timing of model updates			Noted.	

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
						decisions here – which isn't really described well in Section 12 of Appendix B (model updates). These diagrams presumably show how critical decisions will be made – but don't show how tribal input is incorporated into the process.	will be incorporated into the flowcharts. The tables will be updated as part of the model updates. Although the tables indicate that some locations are expected to take 30 years to be treated, it is not meant to be implied that decisions on making operational changes would take 30 years. The comparison of results to anticipated timeframes and potential remedy changes will be evaluated in the 5 year review reports which will inform tribes, and this timing will be clarified on the flowcharts. Additional details on the avenues and protocols for tribal involvement are discussed in response to the overall comment on this topic, #44.				
701	Hualapai/TRC	Non-design	GW Modeling	Append L Vol. 2 Figures 2.2-2 to 2.2-9		These monitoring decision framework diagrams point to many key decisions which are based on model-derived expected concentration ranges or trends (i.e., Tables 2.1-4, 2.1-5 and 2.2-1), but don't discuss when, how or which models need to be updated, nor whether these tables would then be updated and how long all of these decisions (short-term or long-term) will actually take. Based on Table 2.2-1, some decisions might take up to 30 years. It is recommended that decision time-frames be included in the framework diagrams, and more detail on when, how and which models will be updated. Use of models should be more frequent and iterative with any potential decisions here – which isn't really described well in Section 12 of Appendix B (model updates). These diagrams presumably show how critical decisions will be made – but don't show how tribal input is incorporated into the process.	See above				
702	Cocopah/TRC	Non-design	GW Modeling	Append L Vol. 2 Figures 2.2-2 to 2.2-9		These monitoring decision framework diagrams point to many key decisions which are based on model-derived expected concentration ranges or trends (i.e., Tables 2.1-4, 2.1-5 and 2.2-1), but don't discuss when, how or which models need to be updated, nor whether these tables would then be updated and how long all of these decisions (short-term or long-term) will actually take. Based on Table 2.2-1, some decisions might take up to 30 years. It is recommended that decision time-frames be included in the framework diagrams, and more detail on when, how and which models will be updated. Use of models should be more frequent and iterative with any potential decisions here – which isn't really described well in Section 12 of Appendix B (model updates). These diagrams presumably show how critical decisions will be made – but don't show how tribal input is incorporated into the process.	See above				
703	Chemehuevi/ TRC	Non-design	GW Modeling	Append L Vol. 2 Figures 2.2-2 to 2.2-9		These monitoring decision framework diagrams point to many key decisions which are based on model-derived expected concentration ranges or trends (i.e., Tables 2.1-4, 2.1-5 and 2.2-1), but don't discuss when, how or which models need to be updated, nor whether these tables would then be updated and how long all of these decisions (short-term or long-term) will actually take. Based on Table 2.2-1, some decisions might take up to 30 years. It is recommended that decision time-frames be included in the framework diagrams, and more detail on when, how and which models will be updated. Use of models should be more frequent and iterative with any potential decisions here – which isn't really described well in Section 12 of Appendix B (model updates). These diagrams presumably show how critical decisions will be made – but don't show how tribal input is incorporated into the process.	See above				
704	DOI-101	Design	O&M	Appendix L,	Note, barium	It is not clear from the report whether sulfide is being sampled at the monitoring wells to make this	Laboratory		Resolved.		Comment resolved.

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				Vol.2; 4.1 p. 4-1.	concentrations are not predicted and are not anticipated to be significant unless strong sulfate reducing conditions develop	determination. Sulfate is being measured but it will not be possible to distinguish between iron reducing and sulfate reducing conditions without hydrogen sulfide data. Please clarify.	measurement of hydrogen sulfide to evaluate if sulfate reduction is occurring is not planned. In our experience, decreases in sulfate concentration are sufficient to determine whether sulfate reduction is occurring.				
705	FMIT/TRC	Design	Monitoring	Append L Vol.2 Sect. 4.2 and Table 2.2-1 Process Control Monitoring Program	Analytes	A full suite of cations, anions, and redox sensitive parameters are necessary for rapid geochemical assessment of groundwater remedy progress. For example, upconing of higher density water from the Mohave Basin could occur at the riverbank extraction wells, and chloride analyses could detect this occurrence. However, major ions (including chloride) would only be collected “as needed.”	The key redox sensitive parameters (e.g. nitrate, dissolved iron, dissolved arsenic) have been included in the sampling plan for evaluating the establishment of conditions for Cr(VI) treatment in the IRZ. With regards to cations and anions, previous analysis of density considerations due to salt concentrations for the remedy have not indicated that this is an important consideration for the project. Regardless, specific conductivity data will be collected during groundwater sampling that will be able to detect significant changes in salt concentrations. If this occurs, chloride or other cation/anion analysis can certainly be conducted under the "as needed" frequency designation.			Hexavalent chromium contamination at Topock is a chemistry problem, and the proposed remedy is a chemistry solution. But the chemistry solution is not being fully implemented. As the remedy is implemented, chemistry changes will occur to the aquifer over time that will require detailed analyses, modeling, and interpretation of geochemical changes. For example, ethanol may not be the carbon used for the entire remedy (the aquifer will become weary of ethanol), and there will be subtle changes in aquifer geochemistry that could only be described through persistent sampling and geochemical modeling. However, there seems to be a “seat-of-the-pants” approach being applied here. Such a large and important project should not be operated by seat-of-the-pants methods that can exacerbate significant impacts. Comment unresolved pending development of a plan to analyze major ions on a routine basis.	DTSC/DOI Response: Tribal comment noted.
706	Hualapai/TRC	Design	Monitoring	Append L Vol.2 Sect. 4.2 and Table 2.2-1 Process Control Monitoring Program	Analytes	A full suite of cations, anions, and redox sensitive parameters are necessary for rapid geochemical assessment of groundwater remedy progress. For example, upconing of higher density water from the Mohave Basin could occur at the riverbank extraction wells, and chloride analyses could detect this occurrence. However, major ions (including chloride) would only be collected “as needed.”	See above			Hexavalent chromium contamination at Topock is a chemistry problem, and the proposed remedy is a chemistry solution. But	See Response to RTC &705

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										the chemistry solution is not being fully implemented. As the remedy is implemented, chemistry changes will occur to the aquifer over time that will require detailed analyses, modeling, and interpretation of geochemical changes. For example, ethanol may not be the carbon used for the entire remedy (the aquifer will become weary of ethanol), and there will be subtle changes in aquifer geochemistry that could only be described through persistent sampling and geochemical modeling. Such a large and important project should be operated by the best possible methods. Comment unresolved pending development of a plan to analyze major ions on a routine basis.	
707	Cocopah/TRC	Design	Monitoring	Append L Vol.2 Sect. 4.2 and Table 2.2-1 Process Control Monitoring Program	Analytes	A full suite of cations, anions, and redox sensitive parameters are necessary for rapid geochemical assessment of groundwater remedy progress. For example, upconing of higher density water from the Mohave Basin could occur at the riverbank extraction wells, and chloride analyses could detect this occurrence. However, major ions (including chloride) would only be collected "as needed."	See above			Hexavalent chromium contamination at Topock is a chemistry problem, and the proposed remedy is a chemistry solution. But the chemistry solution is not being fully implemented. As the remedy is implemented, chemistry changes will occur to the aquifer over time that will require detailed analyses, modeling, and interpretation of geochemical changes. For example, ethanol may not be the carbon used for the entire remedy (the aquifer will become weary of ethanol), and there will be subtle changes in aquifer geochemistry that could only be described through persistent sampling and	See Response to RTC &705

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										geochemical modeling. However, there seems to be a seat-of-the-pants approach being applied here. Such a large and important project should not be operated by seat-of-the-pants methods. Comment unresolved pending development of a plan to analyze major ions on a routine basis.	
708	Chemehuevi/ TRC	Design	Monitoring	Append L Vol.2 Sect. 4.2 and Table 2.2-1 Process Control Monitoring Program	Analytes	A full suite of cations, anions, and redox sensitive parameters are necessary for rapid geochemical assessment of groundwater remedy progress. For example, upconing of higher density water from the Mohave Basin could occur at the riverbank extraction wells, and chloride analyses could detect this occurrence. However, major ions (including chloride) would only be collected "as needed."	See above			Hexavalent chromium contamination at Topock is a chemistry problem, and the proposed remedy is a chemistry solution. But the chemistry solution is not being fully implemented. As the remedy is implemented, chemistry changes will occur to the aquifer over time that will require detailed analyses, modeling, and interpretation of geochemical changes. For example, ethanol may not be the carbon used for the entire remedy (the aquifer will become weary of ethanol), and there will be subtle changes in aquifer geochemistry that could only be described through persistent sampling and geochemical modeling. However, there seems to be a seat-of-the-pants approach being applied here. Such a large and important project should not be operated by seat-of-the-pants methods. Comment unresolved pending development of a plan to analyze major ions on a routine basis.	See Response to RTC &705
709	DOI-102	Design	O&M	Appendix L, Vol.2; 4.2.9 p. 4-8.	The use of pressure transducers in monitoring wells will	Manual water levels should be collected occasionally from the wells equipped with the transducers to ensure that the transducer readings have not drifted from the true values.	The first paragraph of Section 4.2.9 will be modified as follows: The measurements will		Resolved.		Comment resolved.

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					facilitate the implementation of this method.		be made either by ~~manual methods or by use of dedicated~~ in-well pressure transducers and/or manual methods ~~in specific wells~~. The wells proposed to have in-well pressure transducers are noted on Tables 2.1-2 and 2.1-3 and selected based on their assigned function within the groundwater remedy (i.e., groundwater monitoring associated with groundwater extraction systems). For these wells, water level measurements will be periodically made by manual methods in addition to continuous pressure transducer readings. The water level measurements will be converted to elevations referenced to sea level so that the water levels can be integrated site-wide for interpretation of potentiometric levels and hydraulic gradients. Corrections to the water levels necessary due to salinity and temperature effects will be made as appropriate following standard operating procedures (SOP-A22, Procedures for Calculation of Freshwater Equivalent Heads Standard Operating Procedures for PG&E Topock Program). Tables 2.1-3 and 4.2-1 indicate the frequency of water level measurements.				
710	DOI-103	Design	O&M	Appendix L, Vol.2; 4.3.3.1 p. 4-11.	MW 33 090 / MW O: 0.0024 ft/ft MW H /MW 46 175: 0.0026 ft/ft MW D /MW 46 175: 0.0034 ft/ft	Please clarify whether transducers are being used to collected this data because if the wells are fairly close together and the gradients are this flat, likely errors in the measurements introduced by manual methods need to be eliminated.	MW-D is the only well listed in the well pairs that is not identified to have transducers in Tables 2.1-2 and 2.1-3.This will be corrected to add MW-D as a transducer well.		Accepted		Comment resolved pending DOI review of the final design documents.
711	DOI-104	Design	O&M	Appendix L, Vol.2; 4.3.3.1 p. 4-11.	MW 33 090 / MW O: 0.0024 ft/ft	The potentiometric maps that depict these gradients should be presented. The interpretation of these flat gradients with respect to the capture zone will also be complicated	The gradients for the well pairs were chosen based on groundwater		Resolved.		Comment resolved.

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					MW H /MW 46 175: 0.0026 ft/ft MW D /MW 46 175: 0.0034 ft/ft	due to the cyclic nature of the water levels that are impacted by the river stage. Please describe how this temporal nature of the water levels will be factored into the capture zone analysis. There should also be some discussion of how often these gradients will be checked and how the operation of the injection/pumping operations will be altered if these gradients are not maintained.	flow model runs as described in Section 4.3.3.1, p. 4-11. Regarding potential system operation changes as a result of observed gradients, the gradient thresholds for the identified monitoring well pairs are only a single line of evidence. As explained in Section 4.3.3, "a single line of evidence is not considered sufficient to demonstrate plume control because the uncertainties inherent to any single method are likely too great. Therefore, plume control is best demonstrated through multiple lines of evidence." Accordingly, injection/pumping operations will not necessarily be altered if the single-line-of-evidence threshold gradients for the identified well pairs are not maintained, which is consistent with DTSC comments during teleconferences discussing potential well pair analysis. Instead, the multiple lines of evidence approach will be employed to determine the potential need for operational changes. Therefore, these well pair gradients will be checked as part of hydraulic control assessments which will incorporate all of the lines of evidence discussed in Section 4.3.3. The method for addressing water level fluctuations due to river stage effects for the purpose of selecting representative water level elevations for hydraulic assessments is described in Section				

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							4.2.9. p. 4-8. Per DOI's request, Figures 711-1 and 711-2 (included in **Attachment P** of the final RTC table) are included to show the location of well pairs for model layers 3 and 4 as described in Appendix L, Volume 2, Section 4.3.3.1 that will be used for gradient analysis. The threshold gradients for the well pairs are in the cited section of the text.				
712	DOI-105	Design	O&M	Appendix L, Vol.2; 4.3.3. p. 4-10.	Interpretation of water levels Groundwater flow direction based on water level pairs / three point gradient analysis Groundwater flow direction based on water level contour maps	Is stream gauge data being used to assist in defining the groundwater surface water interactions? If so, it should be explained and if not, please discuss why not.	Stream gauge data can be useful in comparing river stage elevations to water levels in nearby wells monitoring the shallowest portion of the saturated zone (i.e., near the water table) to assess groundwater/ surface water interaction and to compare to any groundwater elevation contour maps generated to represent the water table. The referenced text will be changed as follows: 1. Interpretation of water levels • Groundwater flow direction based on water level pairs / three point gradient analysis and river stage measurements. • Groundwater flow direction based on water level contour maps (including river stage measurements).		Resolved.		Comment resolved.
713	DOI-106	Design	O&M	Appendix L, Vol.2; 4.3.3.1 p. 4-11.	Second, in lieu of having piezometers immediately adjacent to extraction wells, piezometers will be installed within the filter	This approach of trying to estimate water levels in the pumping wells with piezometers in the sand pack seems really difficult to justify. The actual well loss at a number of pumping rates and at different times would have to be established and even then the uncertainty would be high, particularly at these flat gradients. The EPA guidance cited in O&M Vol. 2 as the basis for the overall approach states: *"If a piezometer is not available near a pumping well, a possible approach (<u>until an appropriately located piezometer is available)</u> is to estimate aquifer water levels at the extraction well by correcting the measured water level for well losses. Bierschenk (1964) and Hantush (1964) presented a graphical method (see Exhibit 4) for determining head loss coefficients for well losses caused by turbulent flow across*	The proposal of having piezometers within the filter pack (outside of the well casing) is a technical solution to minimize the number of boreholes drilled at the site with consideration of the FEIR. If PG&E is directed to install		Resolved.		Comment resolved.

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					pack (outside of the extraction well casing) in some wells, and the difference between the water levels in the piezometer and in the extraction well casing during pumping will also aid in proper correction for well efficiency effects.	*the well screen, based on a plot of specific capacity versus pumping rate developed from a step-drawdown test. However, this approach incorporates the assumption that all well inefficiency results from turbulent flow near the well and in the well screen. Driscoll (1986) points out that other causes of well inefficiency are not accounted for in this approach. Dougherty (2003) presents another well loss estimation technique based on a recovery test in a pumping well. Note that well losses can change over time due to well fouling, further complicating the issue. <u>Again, locating piezometers near extraction wells is much preferred to correcting water levels in extraction wells based on calculated well losses.”</u>* It is DOI's opinion that only piezometer data should be used to establish the water levels in order to predict capture zones.	piezometers in separate boreholes, this will add to the total borehole count for the project. Additionally, even though the filter pack would have associated head loss compared with the aquifer directly adjacent to the borehole, the water level in a piezometer within the filter pack will be more reliable than the operational water level within the well casing, and well testing can still be conducted to assess head loss occurring in the filter pack in order to estimate actual water level within the aquifer material. Also, piezometers located outside of well borings are not going to add any significant reliability to the model which will be used in conjunction with other lines of evidence to assess plume control.				
714	FMIT/TRC	Non-design	O&M	Append L Vol. 2 Section 5		The O&M manual ought to include monitoring of water levels in the Topock #2 & #3 and possibly other wells monitored as part of the 90% BOD Water Supply evaluation, to verify that long-term pumping at HNWR-1a does not cause long-term drawdowns at those wells. This is an issue regarding impacts, rather than an issue regarding protecting water quantity. Volume 2, Section 5, of the O&M plan does identify monitoring of water at wells #2 & #3, however, this is only for water quality. Therein, it stated that there exist co-operative agreements between PG&E and the well owners. The existence of such agreements ought to facilitate water level monitoring.	Topock Wells #2 and #3 are active water supply wells operated by Southwest Water Inc. Appendix N contains a technical memorandum titled *Addendum to the Summary of Findings Associated with the Evaluation of Alternative Freshwater Sources in the Topock Remediation Project Area* dated September 8, 2014. The fourth bullet on page 2 concludes that “72-hour constant-rate-extraction tests conducted during Phase I at both HNWR-1 and the Site B well suggest that neither will substantially adversely affect the production rates of existing nearby wells (see EIR Mitigation Measure WATER-1, Addendum No. 1)…” and “…pumping at HNWR-1A also will not			While the interpretation of test pumping may indicate no substantial future adverse impacts, all should recognize that, due to the various production wells in Arizona, local aquifer depletion is likely occurring and will occur, even if it not monitored or forecast from short-term test pumping. Therefore, This comment is considered unresolved.	DTSC response: Tribal comment noted. That is the reason for having a contingency source for fresh water.

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							substantially adversely affect the production rates of existing nearby wells."				
715	Hualapai/TRC	Non-design	O&M	Append L Vol. 2 Section 5		The O&M manual ought to include monitoring of water levels in the Topock #2 & #3 and possibly other wells monitored as part of the 90% BOD Water Supply evaluation, to verify that long-term pumping at HNWR-1a does not cause long-term drawdowns at those wells. This is an issue regarding impacts, rather than an issue regarding protecting water quantity. Volume 2, Section 5, of the O&M plan does identify monitoring of water at wells #2 & #3, however, this is only for water quality. Therein, it stated that there exist co-operative agreements between PG&E and the well owners. The existence of such agreements ought to facilitate water level monitoring.	See above			While the interpretation of test pumping may indicate no substantial future adverse impacts, all should recognize that, due to the various production wells in Arizona, local aquifer depletion is likely occurring and will occur, even if it not monitored or forecast from short-term test pumping. Therefore, This comment is considered unresolved.	DTSC response: Tribal comment noted. That is the reason for having a contingency source for fresh water.
716	Cocopah/TRC	Non-design	O&M	Append L Vol. 2 Section 5		The O&M manual ought to include monitoring of water levels in the Topock #2 & #3 and possibly other wells monitored as part of the 90% BOD Water Supply evaluation, to verify that long-term pumping at HNWR-1a does not cause long-term drawdowns at those wells. This is an issue regarding impacts, rather than an issue regarding protecting water quantity. Volume 2, Section 5, of the O&M plan does identify monitoring of water at wells #2 & #3, however, this is only for water quality. Therein, it stated that there exist co-operative agreements between PG&E and the well owners. The existence of such agreements ought to facilitate water level monitoring.	See above			While the interpretation of test pumping may indicate no substantial future adverse impacts, all should recognize that, due to the various production wells in Arizona, local aquifer depletion is likely occurring and will occur, even if it not monitored or forecast from short-term test pumping. Therefore, This comment is considered unresolved.	DTSC response: Tribal comment noted. That is the reason for having a contingency source for fresh water.
717	Chemehuevi/ TRC	Non-design	O&M	Append L Vol. 2 Section 5		The O&M manual ought to include monitoring of water levels in the Topock #2 & #3 and possibly other wells monitored as part of the 90% BOD Water Supply evaluation, to verify that long-term pumping at HNWR-1a does not cause long-term drawdowns at those wells. This is an issue regarding impacts, rather than an issue regarding protecting water quantity. Volume 2, Section 5, of the O&M plan does identify monitoring of water at wells #2 & #3, however, this is only for water quality. Therein, it stated that there exist co-operative agreements between PG&E and the well owners. The existence of such agreements ought to facilitate water level monitoring.	See above			While the interpretation of test pumping may indicate no substantial future adverse impacts, all should recognize that, due to the various production wells in Arizona, local aquifer depletion is likely occurring and will occur, even if it not monitored or forecast from short-term test pumping. Therefore, This comment is considered unresolved.	DTSC response: Tribal comment noted. That is the reason for having a contingency source for fresh water.
718	DOI-284	Non-design	SOPs	Vol 2. Appendix A, General SOP Comment	SOPs	Throughout the SOPs there are several instructions of confirming with or contacting management for unusual conditions or operations but the management references are different. For example, there are references to the Site Operations Manager, the Maintenance Supervisor, Sr. Environmental Inspector, Project Manager, and sometimes just TCS Operations or PG&E. It is recommended the procedures are precise as to who to contact to eliminate any ambiguity. There should be a reference to the location of a listing of plant management personnel that includes their contact information.	Contact titles and information will be reviewed for consistency throughout the SOPs.		Resolved.		Comment resolved.

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719	DOI-301	Non-design	SOPs	Vol.2; Appendix A, Remedy-SOP-02_Rev0, 1/2		An equipment list section should be provided for this SOP to include PPE, fire extinguisher, funnel, broom, shovel, scoop, splash pads, etc.	This SOP is intended to provide general guidelines that will be followed during fueling/refueling activities in order to avoid spills and incidents. Each vendor/contractor is required to obtain approval from PG&E Topock Site Operations Manager, and/or Sr. Environmental Inspector of a) the planned fueling and re-fueling methods (including equipment to be used) for the contracted activities to be performed at the site, and b) the commercial fuel supplier prior to first use for contracted activities.		DOI concurs with the response.		Comment resolved.
720	DOI-302	Non-design	SOPs	Vol.2; Appendix A, Remedy-SOP-02_Rev0, 2/2	Inspect fuel conveyance hose/equipment and all connections and fittings for signs of wear or defects prior to the initiation of fuel pumping or pouring.	If hose/equipment show signs of defect, what are the next steps for the operator? It is presumed that the operator should report this to the Maintenance Supervisor.	See RTC #719 DOI-301. PG&E expects the vendor/contractor to propose this level of details in their proposal to be submitted to PG&E Topock Site Operations Manager, and/or Sr. Environmental Inspector for approval.		DOI concurs with the response.		Comment resolved.
721	DOI-303	Non-design	SOPs	Vol.2; Appendix A, Remedy-SOP-02_Rev0, 2/2	Inspect work area for any signs of spills, and remove spill pad(s), as appropriate	Are spill pads place ahead of time? Are these referred to as "splash pad" or "splash containment" elsewhere in the SOP? Consistent terminology should be use.	See RTC #719 DOI-301. PG&E expects the vendor/contractor to propose this level of details in their proposal to be submitted to PG&E Topock Site Operations Manager, and/or Sr. Environmental Inspector for approval.		Resolved.		Comment resolved.
722	DOI-304	Non-design	SOPs	Vol.2; Appendix A, Remedy-SOP-02_Rev0, 3/2	If a spill occurs the appropriate clean-up actions should commence …	Where are the "appropriate cleanup actions" defined?	See RTC #719 DOI-301. PG&E expects the vendor/contractor to propose this level of details in their proposal to be submitted to PG&E Topock Site Operations Manager, and/or Sr. Environmental Inspector for approval.		Resolved.		Comment resolved.
723	DOI-305	Non-design	SOPs	Vol.2; Appendix A, Remedy-SOP-02_Rev0, 3/2	Use a natural fiber push broom and/or a spark resistant shovel or scoop	Suggest either indicating where the equipment is located at the TCS or adding an Equipment section to the SOP and listing these items.	See RTC #719 DOI-301. PG&E expects the vendor/contractor to propose this level of details in their proposal to be submitted to PG&E		Resolved.		Comment resolved.

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							Topock Site Operations Manager, and/or Sr. Environmental Inspector for approval.				
724	DOI-108	Non-design	O&M	Appendix L, Vol.2; Appendix A, SOP -1A, p. 3 (of 7).	Install the pump with the intake 15 feet below the surface of the static water level.	Typically the wells are set at the midpoint of the well screen. The approach described in the SOP assumes that if there is greater than 15 feet of drawdown recovery rates will be relatively rapid. Please clarify if this is the expected case.	The cited text refers to sampling using the three-volume purge method and a temporary (non-dedicated) pump, at a well that does not have a dedicated pump or dedicated sampling tubing (which would already be set at an appropriate pump depth), or has not been previously sampled. In this case, the pump is set at a depth of 15 feet below the static water level (water surface in the well), *or* at a depth prescribed by the project manager or field team manager based on review of available data (e.g., previous sampling records, development log, well completion diagram, drilling log, etc.). If there is drawdown approaching 15 feet, the pumping rate would be adjusted. If necessary due to continued drawdown, the procedures given for “Low Yield and Poor Recovery Wells” on page 5 of this SOP would be followed instead.		Resolved.		Comment resolved.
725	DOI-109	Non-design	O&M	Appendix L, Vol.2; Appendix A, SOP -1A, p. 4(of 7).	Stabilization Criteria +/1 10% NTU units.	It’s not just the stability of the parameters that is important for collecting representative samples, turbidity should be below 50 NTUs (as a rule of thumb) not to adversely affect the dissolved metals concentrations. Please address.	The SOP will be revised to include a turbidity stabilization target of 10 NTU or less before collecting samples, unless other parameters have already stabilized during extended purge, and turbidity, while trending flat, is still above 10 NTU.		Accepted.		Comment resolved pending DOI review of the final design documents.
726	DOI-110	Non-design	O&M	Appendix L, Vol.2; Appendix A, SOP -1A, p. 5(of 7).	Install the pump as previously described and start the purge.	For low recovery wells the pump should be set within the well screen. Please consider this option.	The text will be revised to read as follows: “Install the pump within the well screen or to ~~as~~ a previously ~~described~~ determined depth, and start the purge.”		DOI concurs with the response.		Comment resolved.
727	DOI-111	Non-design	O&M	Appendix L,	Sampling all	Since this method prescribes the use of a peristaltic pump and a peristaltic pump will only work if	Currently, there is no		Accepted.		Comment resolved

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				Vol.2; Appendix A, SOP –A2, p. 1(of 6).	wells with a 1-inch diameter casing	the depth to water is less than 27 feet (at sea level); recommend including the option for a mini-bladder pump for the deeper water levels in the upland alluvial terrace areas (if any small diameter wells are planned).	plan for small diameter wells for the upland alluvial terrace areas. For flexibility, the SOP will be revised to add the option of using a mini-bladder pump in small-diameter wells in addition to peristaltic pump purge.				pending DOI review of the final design documents.
728	DOI-112	Non-design	O&M	Appendix L, Vol.2; Appendix A, SOP –A7, p. 2(of 2).	Required Documents	General recommendation - include each SOP required to complete the task under the Required Documents.	Applicable SOPs will be listed under the Required Documents as recommended.		DOI concurs with the response.		Comment resolved pending DOI review of the final design documents.
729	DOI-113	Non-design	O&M	Appendix L, Vol.2; Appendix A, SOP –A8, p. 2(of 3).	YSI meter	Should mention that the meter should be shielded from direct sunlight.	The following text will be added: "<u>During operation of the WQ meter, the screen on the handheld portion should be shielded from direct sunlight.</u>"		DOI concurs with the response.		Comment resolved.
730	DTSC-128	Non-design	SOPs	SOP-A12, O&M Volume 2, Appendix A, Page 2	"MEASUREME NTMEASUREM ENT PROCEDURES:"	Correct typo. in heading cited	The redundant word "Measurement" will be removed.		Accepted.		Comment resolved.
731	DOI-114	Non-design	O&M	Appendix L, Vol.2; Appendix A, SOP –A18, p. 3(of4).	…the purge rate should equal the well recharge rate so there is limited drawdown in the well.	The SOP should present drawdown criteria – typically less than 1 foot is desired and the protocol if the drawdown targets are not being met.	The SOP will be revised to include a maximum 1-foot drawdown target. When the target drawdown is not met, a second set of criteria of reduced pumping rates at below 0.1 gpm will be added to the SOP.		DOI concurs with the response.		Comment resolved pending DOI review of the final design documents.
732	DOI-115	Non-design	O&M	Appendix L, Vol.2; Appendix A, SOP –A18, p. 3(of4).	HydraSleeve Deployment	The SOP should provide guidance on the diameter of the HydraSleeve to be used which is typically based on the well diameter. The water sample volumes should also be calculated so that it can be determined if multiple HydraSleeves are required.	The following text will be added in the "Preparation & Setup" section of the SOP: "<u>Evaluate the required sample volume and well construction to select the appropriate size (2-inch or 4-inch diameter) and number of HydraSleeve samplers for each well.</u>"		DOI concurs with the response.		Comment resolved.
733	DOI-116	Non-design	O&M	Appendix L, Vol.2; Appendix A, SOP –A22, p. 1(of5).	Procedures for Calculation of Freshwater Equivalent Heads	From a mathematical standpoint the calculations in the SOP are correct. However, using single point values for temperature and specific conductance fails to recognize the influence of density/temperature stratifications within the well. The errors caused by using a single point measurement may not be significant where the hydraulic gradients are relatively steep. In the floodplain, however, it appears even small errors could lead to misinterpretations of groundwater flow since the hydraulic gradients are so flat. Frequently, temperature and salinity profiling is done within the well if density variations are thought to be significant. Please address this concern.	PG&E uses salinity profile data to calculate freshwater equivalent heads for the key gradient control wells (MW-27-85, MW-31-135, MW-33-150, MW-34-100, and MW-45-95a) that are used to establish the landward gradient in the floodplain. There are	DTSC requests that PG&E provides in the next GMP report a technical memorandum/ analysis regarding the salinity correction procedures currently used at the site and describe the			Comment resolved pending DOI review of the final design documents.

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Groundwater Remedy Basis of Design Report/Final (100%) Design

PG&E Topock Compressor Station, Needles, California

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							three well pairs that are used to evaluate the landward gradients. One well (MW-45-95a) is common to two of the pairs, so there are a total of 5 wells where profiling rather than point measurements of SC is used in head calculations. The data for the key gradient wells provides a basis for evaluating the differences between heads calculated using single point measurements and head calculated using the salinity profile data from the same wells. These are all deep zone wells. The magnitude of the salinity adjustment is greater in deeper wells with a longer water column than in shallower wells. Based on recent data from 4th quarter 2014, the differences in freshwater equivalent heads calculated using the conductivity profiling data vs single-point conductivity measurements from samples collected after pumping range from 0.02 feet to 0.14 feet with an average of 0.07 feet. Note that well MW-45-95a is not routinely sampled so there are no recent single-point conductivity measurements available from this well. The differences quoted are from the other four wells, MW-27-85, MW-31-135, MW-33-150, and MW-34-100. Based on data from these four deep wells, it appears that single-point conductivity measurements provide freshwater equivalent head values that are comparable to those	comparison of profiling data vs single-point conductivity measurements at select wells.			

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							calculated using conductivity profiling. The conductivity profiles in the floodplain wells typically show a relatively uniform conductivity within the casing above the screen and a zone of significantly higher conductivity within the well screen or in the lower section of the wells screen (generally 20 foot screens). The single-point samples tend to have an intermediate value between the higher conductivity observed in the deeper screened interval and the lower conductivity within the blank well casing. This results in single-point conductivity measurements from samples collected after pumping being comparable to the average well profile conductivity that is calculated from conductivity profiling. During the past decade while these methods for salinity adjustments have been in use, detailed groundwater contour plots have been produced showing freshwater equivalent heads at three different depths in the floodplain. On these plots, the heads in the key gradient control wells are calculated based on profiling while the heads in the other wells are based on single point measurements. The gradient control wells contour in with the other wells nicely and the overall groundwater gradients have been stable and consistent over this time. The interpreted landward				

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							groundwater flow directions are supported by chromium trends and other geochemical data such the stable isotopes of oxygen and deuterium (See Performance Monitoring Reports from 2004 through 2009 [CH2M HILL] and Interim Measures Performance Monitoring and Site-Wide Groundwater and Surface Water Monitoring Report Reports, [CH2M HILL, 2009 through 2015]). In summary, hydraulic assessments, such as calculating horizontal hydraulic gradients between well pairs, or preparing potentiometric contour maps is always based on data from discretely screened monitoring wells (i.e., a mid-depth well is not compared to a deep well). Based on comparison of recent data for the key gradient control well pairs, the head differences associated with using conductivity profiles vs single-point conductivity measurements are small, averaging less than 0.1 ft. Therefore, using single point values provides a reasonable basis for freshwater equivalent head calculation in most wells.				
734	DTSC-129	Design	SOPs	SOP-A22, O&M Volume 2, Appendix A, Page 5	"It is assumed that: • The salinity of the water column in wells is constant throughout the water column."	Groundwater wells at the Topock site often exhibit salinity stratification. Groundwater well sampling is switching from three volume purge to low flow micropurge. TDS/SC data obtained from the micropurge technique may be less representative of the actual TDS/SC value for the water column as compared to three volume data. Therefore, the water level adjustment/correction may be less accurate and adversely affect groundwater interpretations. PG&E should evaluate this matter in detail and determine if a change in procedure is needed.	As described in response to RTC #733 DOI-116 above, the single-point conductivity measurements from micropurge samples are comparable to the average conductance from the conductivity profiles in the key gradient well pairs. Since the sampling method was switched from the three casing volume	See DTSC response to RTC #733 above. DTSC will continue to evaluate this item.			Comment resolved.

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							purge to micropurge in 2014, only small changes in SC have been observed (see Table 3-1 of the First Quarter 2015 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report [CH2M HILL 2015]). PG&E will continue to compare the point sample SC measurements with the profile measurements in the key gradient wells and provide an evaluation of the data in the 2015 Annual GMP Report (available March 2016).				
735	DOI-285	Non-design	SOPs	Appendix L, Vol.2; Appendix A, SOP –A23, SCOPE/1	This procedure applies to all CH2M HILL personnel and subcontractors engaged in collecting environmental samples for the Topock environmental program.	The SOP should be applicable to all PG&E and PG&E contract personnel engaged in environmental sampling related to the groundwater remedy.	The cited text will be revised to read as follows: "This procedure applies to all PG&E personnel, contractors, and subcontractors engaged in collecting environmental samples related to Topock investigation and remedial activities"		DOI concurs with the response.		Comment resolved.
736	DOI-286	Non-design	SOPs	Appendix L, Vol.2; Appendix A, SOP –A23, Sample Collector/2	The Sample Collector shall be responsible for informing the FTL/SC of sampling conditions.	Sampling conditions should be documented. Where will this occur?	The cited text will be revised to read as follows: "The Sample Collector shall be responsible for informing the FTL/SC of sampling conditions <u>and record sampling conditions on the groundwater sampling log</u>".		DOI concurs with the response.		Comment resolved.
737	DOI-287	Non-design	SOPs	Appendix L, Vol.2; Appendix A, SOP –A23, Sample Custody/3	In some cases, samples may be hand-delivered to the laboratory.	Is this applicable to the Topock project. In which scenario will samples be hand-delivered to the laboratory?	Yes. Occasionally, project personnel already traveling by car to the city (e.g., drive from Needles to Las Vegas to catch a flight out of McCarran Airport) in which a laboratory is located (e.g., Asset Laboratory is located in Las Vegas) may hand-deliver samples to the laboratory to avoid the added expense of a		DOI concurs with the response.		Comment resolved.

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							special lab courier trip to the site, or holding samples for the next routine courier. This is done whenever practical to reduce carbon footprint and save cost.				
738	DOI-288	Non-design	SOPs	Appendix L, Vol.2; Appendix A, SOP –A23, Chain-of-Custody Record/4	• CH2M HILL address	Modify to PG&E/ Contractor address.	Text will be modified as requested.		DOI concurs with the response.		Comment resolved.
739	DTSC-130	Design	SOPs	SOP-A23, O&M Volume 2, Appendix A, Page 4	• "Container type, size and number (recommended*)" • Preservatives used (recommended*)"	The Chain-of-Custody (CoC) Record section indicates that it is only recommended that preservation information and container type, size and number be entered on the CoC form. It seems that the information would be mandatory. An asterisk is associated with the recommendation, but does not appear to link to a footnote or other reference. Revision requested.	The notation of "(recommended*)" will be removed from these entries.				
740	DOI-289	Non-design	SOPs	Appendix L, Vol.2; Appendix A, SOP –A23, Overnight Sample Storage/5	The Topock field office trailer has a refrigerator that is dedicated to short-term sample storage, as well as two freezers that can be used for samples that require freezing.	It is unclear from the text if these freezers are used for other purposes. Samples should not be stored in freezers used for storage of food/items for human consumption. Freezers should be marked appropriately.	The sample storage refrigerator in the Topock field office trailer and two freezers in the temperature controlled storage connex are currently marked as "Samples Only – No Food". Additional freezers that might be used for sample storage will be marked accordingly.		DOI concurs with the response.		Comment resolved.
741	DOI-117	Non-design	O&M	Appendix L, Vol.2; Appendix A, SOP –C1, p. 3(of8).	Install the PT at least 5 feet below current depth to groundwater.	The 5 foot specification is fine but the SOP should make it clear the depths should be minimized (below 5 feet) in order to reduce the problems that arise with calculating freshwater heads when the density/temperature is stratified within the well.	As stated in RTC #733 DOI-116, well profiling data shows that the density/ temperature stratification present within each of the short screen monitoring wells that are instrumented with pressure transducers is not expected to be significant, therefore, problems associated with the depth pressure transducers are installed is not expected. However, to address this concern, SOP –C1, p. 3(of8) #3 will be revised to state: "Install the PT at least 5 feet below the				

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							current depth to groundwater, but no more than 15 feet below the current depth to groundwater, unless the monitoring well is located near a pumping well. If the monitoring well is located near a pumping well, install the transducer at least 5 feet below the maximum expected pumping depth to water see step 4 below."				
742	DTSC-131	Non-design	SOPs	SOP-C1, O&M Volume 2, Appendix A, Page 8	POINTS OF CONTACT FOR QUESTIONS CONCERNING THESE PROCEDURES:	Will the point of contact information remain the same for the 90% design? If there is a change, what will the procedures be to ensure the SOPs stay current at all times through remedy? This applies to other SOPs as well (e.g., SOP-C2).	The POC information is current. It is the responsibility of the PG&E Construction Manager (or designee) and the PG&E Topock Site Operations Manager (or designee) to maintain the SOPs. PG&E staff will have the latest Standard Operating Procedures (SOPs) on file at the site. As stated in Section 1 of the O&M Manual Volume 1, material changes to the SOPs will be reported in the quarterly progress reports and updates will be made in a timely manner for proper implementation. It is anticipated that for administrative changes such as changes in POC information, a log of changes will be maintained by PG&E. For efficiency, administrative changes will be bundled and/or opportunistically combined with updates to incorporate material changes.	DTSC requests that all current SOPs and change logs be made available in the Topock SharePoint for agencies, stakeholders and Tribal information. It is critical for health and safety, as well as project communication that all participants have advance knowledge of the most current SOPs prior to field visits/monitoring events.			Comment resolved.
743	DOI-118	Non-design	O&M	Appendix L, Vol.2; Appendix A, SOP –L02, p. 1(of 2).	Ferrous Iron Analysis	In areas where the TOC has made a significant impact the ferrous iron concentrations can be very high and require several dilutions with the Hach method. Performing multiple dilutions can lead to significant errors. Recommend that after the proper dilution rate (e.g., 1:5, 1:10) is determined that the process be repeated to ensure accuracy.	Agree, this is consistent with current practice at Topock. This step will be emphasized by adding the following text to the SOP (shown in underline): "Common dilutions <u>(once a dilution has</u>		DOI concurs with the response.		Comment resolved.

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							been determined, a duplicate will be analyzed at the dilution determined):				
744	DTSC-132	Design	SOPs	SOP-L02, O&M Volume 2, Appendix A.		The SOPs for chemical methods, including this one, should touch on and document the analytical capabilities of the instrument to ensure that they are appropriate for the task at hand. For example, what are the typical detection limits and optimum analytical concentration range for the instrument? Suggest a section titled “Analytical Capabilities” between the Scope and Equipment sections. Could also add this information to Scope section as done for TDS (SOP-L19).	Agree, a discussion of the practical analytical range of the instrument will be added. However, to be complete, the discussion will also need to include dilutions and sample volume as factors that affect the analytical range.	Resolved.			Comment resolved.
745	DTSC-133	Design	SOPs	SOP-L04, O&M Volume 2, Appendix A, Page 2	“Confirm the calibration by checking the conductivity of the 1000 uS/cm standard at the beginning of each shift.”	The SOP for conductivity should be revised to also include calibration standards that approximate the fluid that will be measured. For example, some saline groundwater will yield much higher conductivities than the 1000 uS/cm standard currently proposed.	Agree. The manufacturer’s manual says the Conductivity probe is shipped with a 1000 µS/cm (at 25 °C) NaCl standard solution. For typical applications with conductivity of 0–10,000 µS (10 mS/cm), calibration will be done with this standard to achieve the accuracy specified for the meter. Outside this range, calibration will be done using a standard that lies closer to the measurement range. Additional steps will be added to the SOP to include a standard of 12,000 – 18,000 us/cm to calibrate for samples that exceed the 10,000 us/cm concentration. In addition, a standard in the general range of 25,000 – 45,000 us/cm will be used as a verification checked whenever a sample with greater than 20,000 us/cm is to be analyzed.	Resolved.			Comment resolved.
746	DTSC-134	Design	SOPs	SOP-L04, O&M Volume 2, Appendix A, Page 3	References	The two references included at the end of the SOP do not appear to be referenced within the document. Please revise appropriately.	There are no direct quotes, the listed references are listed as background reference material.	Resolved.			Comment resolved.
747	DTSC-135	Design	SOPs/*789+450	SOP-L10, O&M Volume 2, Appendix A, Page 1	“Number: IM3-SOP-L10 Rev01” “Turbidimeter kit (small blue tool box located in	Is the reference to IM3 in the number designation necessary for the 90% design? Suggest removing the IM3 reference if not needed. This applies to all similar SOP designations. This may create confusion when IM-3 is operating while remedy construction and sampling are also underway. One might assume the SOP is only for IM3. Details of the current IM3 set up (“blue tool box located in cabinet under counter below mixer”) do not seem appropriate and should be revised.	References to IM3 have been removed in the SOPs included in the 90% design submittal (September 2014). Reference to the “blue tool box located in	Resolved.			Comment resolved.

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					cabinet under counter below mixer)"		cabinet under counter below mixer" will be removed from SOP-L10.				
748	DTSC-136	Design	SOPs	SOP-L13, O&M Volume 2, Appendix A, Page 1	1. If the concentration is greater than 0.25 mg/L call the Project Chemist (Shawn Duffy) at 530-229-3303.	Will the Project Chemist information remain the same for the 90% design? If there is a change, what will the procedures be to ensure the SOPs stay current at all times through remedy? This applies to other SOPs as well. Also update item #2 listing groundwater sampling SOPs. The low flow SOP is not included. This applies to all other applicable SOPs as well (e.g., SOP-L01, -L02, -L03, -L04, -L09, -L14, -L15, -L16, -L17, L18, -L19).	Please see RTC #742 DTSC-131. SOPs A-18 (Minimum Drawdown) and A-19 (Hydrasleeve) will be added as requested.	Resolved.			Comment resolved.
749	DTSC-137	Design	SOPs7	SOP-L14, O&M Volume 2, Appendix A, Page 2	"Note: Turbid or colored samples must be filtered."	Indicate what defines a turbid sample. Greater than 10 NTU??	Samples that have significant color or turbidity (e.g. noticeable by eye) should be filtered. That will be added as a part of the note requiring the filtering.	Resolved.			Comment resolved.
750	DTSC-138	Design	SOPs	SOP-L19, O&M Volume 2, Appendix A, Page 1	"The practical range of the method is 10 mg/L to 20,000 mg/L."	Indicate what the operator should do if the sample is known or suspected to have a TDS concentration greater than 20,000 mg/L.	The cited text will be revised to read: "The practical range is 10 mg/L to 20,000 mg/L. <u>If TDS concentrations are greater than 20,000 mg/L then the sample can be diluted. If the sample is suspected to have a TDS concentration greater than 100,000 mg/L, the site analyst will consult with the Project Chemist.</u>"	Resolved.			Comment resolved.
Specific Comments – 90% BOD, Appendix L: O&M Manual -- Volume 3: Contingency Plan											
751	DOI-119	Non-design	O&M	1.0, p. 1-1	The following types of unacceptable conditions have been identified: **Category B: Schedule** — Failures that cause the schedule to achieving the groundwater remedy RAOs to be extended by more than 5 to 15 years.	Although some of the categories listed are fairly straightforward in assessing whether the conditions are met others are not. For instance, at what interim points in the process are evaluations made to assess whether remediation will be extended by more than 5 years and what are the triggering events? Please explain the overall approach.	In general, this type of evaluation is typically done during the technical assessment of the five-year reviews to be conducted by the agencies, to answer questions such as is the remedy functioning as intended by the decision documents, has any other information come to light that could call into question the protectiveness of the remedy, etc. Based on current projected construction and start-up schedule (Figure ES-2 of the BOD), the first five year review will occur approximately one year after the end of construction and start of				

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							O&M, therefore, in PG&E's opinion, the earliest timeframe for a meaningful evaluation would be during the second five year review. Outside of the five-year reviews, PG&E is obligated under the CD and CACA to report to DOI and DTSC, respectively, discovery of changes or events that might cause a delay to the schedule described in the progress reports. Depends on the nature and extent of the changes/events, such discovery could trigger an evaluation of potential effects to remediation timeframe. PG&E propose to discuss with the agencies on the merit/need for any follow-on evaluation.				
752	DTSC-148	Design	Contingencies	Operation and Maintenance Manual Volume 3 Contingency Plan 2.3 Freshwater Supply Page 2-2		Table 2.3-1 should be revised to include wells Topock 2 and 3 as contingent supply wells as well as potential installation of a new well along the planned HNWR-1A pipeline route. As discussed in other DTSC comments, the priority for Site B as a contingent well should be lowered. Use of Site B could also require chromium treatment as a contingency measure.	Table 2.3-1 is identical to Exhibit 3.3-2 of the 90% BOD. Revision to Exhibit 3.3.2 (RTC #274 DTSC-70) will be carried over to Table 2.3-1.	See response to RTC #274 regarding potential chromium treatment. See RTC #135 regarding possible well locations along the pipeline route.			Comment resolved.
753	DOI-120	Non-design	O&M	Table 2.1-1/9	Rising water levels in Colorado River	Potential flooding causes could include extreme rain events as well and should be considered when identifying mitigation.	Extreme rain events will be added as a potential cause for flooding. Mitigations for flooding caused by extreme rain events would be similar to those identified for flooding caused by rising water levels in Colorado River.		Accepted.		Comment resolved pending DOI review of the final design documents.
754	FMIT/TRC	Non-design	O&M	Append L Vol. 3 Sect. 5		The contingency plan in the O&M manual appears to not include planning for water quantity protection, other than for inadequate well yield at a single well - HNWR-1a in Table 2.3-1. That is, the contingency planning should be more encompassing to consider long-term climatic variations (that we are in the midst of) and water supply vulnerability to climate change. Given the 30-yr (+/-) operational timeline, contingency planning should explicitly consider larger impacts to water quantity, e.g., due to long-term regional drought.	PG&E has recently provided a response to a question regarding the potential effects of a prolonged drought on AZ water supply and the remedy process via an email from Yvonne Meeks/PG&E to Doug Bonamici/CRIT, titled Re; February TWG Action Item and dated March 24, 2015. The questions and responses are stated			Please add the provided note to Table 2.3-1. With that addition, this comment is considered resolved.	Comment resolved.

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							as follows: "1.) Are you saying severe drought will not adversely affect remedy flow characteristics as it operates, and, *PG&E Response:* That's correct, PG&E professional judgment is that potential future drought conditions would not be expected to significantly impact the remedy flow characteristics as it operates, and therefore the remedy performance or simulated timeframes. The remedy doesn't depend on local precipitation for its function. 2) That a prolonged drought is unlikely to reduce/impair the availability of Arizona freshwater supply so much that it would jeopardize the remedy process? *PG&E Response*: Again correct, as long as there is flow in the Colorado River, then the remedy is expected function as designed (including the availability of freshwater from Arizona). The aquifer on both sides of the river Topock is fed by the Colorado River and the river is highly controlled by the dams upstream. So as long as there is some water flowing in the Colorado River, there would be adequate water in the aquifer to support the pumping associated with the remedy. Although it has never happened, in an extreme drought there could possibly be curtailments on water usage in the Colorado River basin. That could cause PG&E,				

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							along with other water users, to have to reduce pumping – although we have water rights well in excess of planned pumping needs. A reduction in pumping would not result in a failure of the remedy. The natural hydraulic gradient would continue to move the plume through the IRZ even in the absence of pumping, just at a slower rate." If helpful, a note can be added to Table 2.3-1 to document the above information.				
755	Hualapai/TRC	Non-design	O&M	Append L Vol. 3 Sect. 5		The contingency plan in the O&M manual appears to not include planning for water quantity protection, other than for inadequate well yield at a single well - HNWR-1a in Table 2.3-1. That is, the contingency planning should be more encompassing to consider long-term climatic variations (that we are in the midst of) and water supply vulnerability to climate change. Given the 30-yr (+/-) operational timeline, contingency planning should explicitly consider larger impacts to water quantity, e.g., due to long-term regional drought.	See above			Please add the provided note to Table 2.3-1. With that addition, this comment is considered resolved.	Comment resolved.
756	Cocopah/TRC	Non-design	O&M	Append L Vol. 3 Sect. 5		The contingency plan in the O&M manual appears to not include planning for water quantity protection, other than for inadequate well yield at a single well - HNWR-1a in Table 2.3-1. That is, the contingency planning should be more encompassing to consider long-term climatic variations (that we are in the midst of) and water supply vulnerability to climate change. Given the 30-yr (+/-) operational timeline, contingency planning should explicitly consider larger impacts to water quantity, e.g., due to long-term regional drought.	See above			Please add the provided note to Table 2.3-1. With that addition, this comment is considered resolved.	Comment resolved.
757	Chemehuevi/ TRC	Non-design	O&M	Append L Vol. 3 Sect. 5		The contingency plan in the O&M manual appears to not include planning for water quantity protection, other than for inadequate well yield at a single well - HNWR-1a in Table 2.3-1. That is, the contingency planning should be more encompassing to consider long-term climatic variations (that we are in the midst of) and water supply vulnerability to climate change. Given the 30-yr (+/-) operational timeline, contingency planning should explicitly consider larger impacts to water quantity, e.g., due to long-term regional drought.	See above			Please add the provided note to Table 2.3-1. With that addition, this comment is considered resolved.	Comment resolved.
Specific Comments – 90% BOD, Appendix L: O&M Manual -- Volume 4: Soil Management Plan (As noted, this Soil Management Plan is the same as the C/RAWP Appendix L: Soil Management Plan. Therefore, comments from the C/RAWP on the same Soil Management Plan are presented here)											
758	FMIT/TRC 1r	Design	CEQA/EIR	1.2 Site Description, Soil Investigation History, and Findings	Specifically, impacts to cultural resources will be minimized by implementing the mitigation measures required by the EIR. In addition, mitigation measures will be implemented in accordance with the Programmatic Agreement (PA), the Cultural and Historic Properties	Many aspects of the final design will be determined using data collected early in the construction period. Please discuss whether a possibility exists that this newly collected data will result in infrastructure locations being changed to locations that are different than locations presented within the BOD reports. Any future deviations from the infrastructure locations as designated in the 100% design should require Tribal involvement at a level that has currently been established. Tribal consultation should not be limited to only the design process. Please change this language here and throughout the revised 90% BOD report to reflect a commitment to Tribal involvement in future design changes.	Please see RTCs #44 FMIT/TRC, #45 Hualapai/ TRC, #46 Cocopah/TRC, and #47 Chemehuevi/ TRC. Text will be revised as follows in response to this part of the comment: "Specifically, impacts to cultural resources will be minimized by implementing the mitigation measures required by the EIR. In addition, mitigation measures will be implemented in	See RTC #44.	DOI concurs with the response.	Please see response to comment FMIT/TRC RTC #44.	DTSC response: Tribal comment noted.

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					Management Plan (CHPMP), and the Cultural Impact Mitigation Program (CIMP), and in consultation with the Tribes throughout the design process.		accordance with the Programmatic Agreement (PA), the Cultural and Historic Properties Management Plan (CHPMP), and the Cultural Impact Mitigation Program (CIMP), and in consultation with the Tribes ~~throughout the design process~~."				
759	Hualapai/TRC 1r	Design	CEQA/EIR	1.2 Site Description, Soil Investigation History, and Findings	Specifically, impacts to cultural resources will be minimized by implementing the mitigation measures required by the EIR. In addition, mitigation measures will be implemented in accordance with the Programmatic Agreement (PA), the Cultural and Historic Properties Management Plan (CHPMP), and the Cultural Impact Mitigation Program (CIMP), and in consultation with the Tribes throughout the design process.	Many aspects of the final design will be determined using data collected early in the construction period. Please discuss whether a possibility exists that this newly collected data will result in infrastructure locations being changed to locations that are different than locations presented within the BOD reports. Any future deviations from the infrastructure locations as designated in the 100% design should require Tribal involvement at a level that has currently been established. Tribal consultation should not be limited to only the design process. Please change this language here and throughout the revised 90% BOD report to reflect a commitment to Tribal involvement in future design changes.	See above	See above	See above	See response to comment Hualapai/TRC RTC #83.	DTSC response: Tribal comment noted.
760	Cocopah/TRC 1r	Design	CEQA/EIR	1.2 Site Description, Soil Investigation History, and Findings	Specifically, impacts to cultural resources will be minimized by implementing the mitigation measures required by the EIR. In addition, mitigation measures will be implemented in accordance with the Programmatic	Many aspects of the final design will be determined using data collected early in the construction period. Please discuss whether a possibility exists that this newly collected data will result in infrastructure locations being changed to locations that are different than locations presented within the BOD reports. Any future deviations from the infrastructure locations as designated in the 100% design should require Tribal involvement at a level that has currently been established. Tribal consultation should not be limited to only the design process. Please change this language here and throughout the revised 90% BOD report to reflect a commitment to Tribal involvement in future design changes.	See above	See above	See above	See response to Cocopah RTC #84.	DTSC response: Tribal comment noted.

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					Agreement (PA), the Cultural and Historic Properties Management Plan (CHPMP), and the Cultural Impact Mitigation Program (CIMP), and in consultation with the Tribes throughout the design process.						
761	Chemehuevi/ TRC 1r	Design	CEQA/EIR	1.2 Site Description, Soil Investigation History, and Findings	Specifically, impacts to cultural resources will be minimized by implementing the mitigation measures required by the EIR. In addition, mitigation measures will be implemented in accordance with the Programmatic Agreement (PA), the Cultural and Historic Properties Management Plan (CHPMP), and the Cultural Impact Mitigation Program (CIMP), and in consultation with the Tribes throughout the design process.	Many aspects of the final design will be determined using data collected early in the construction period. Please discuss whether a possibility exists that this newly collected data will result in infrastructure locations being changed to locations that are different than locations presented within the BOD reports. Any future deviations from the infrastructure locations as designated in the 100% design should require Tribal involvement at a level that has currently been established. Tribal consultation should not be limited to only the design process. Please change this language here and throughout the revised 90% BOD report to reflect a commitment to Tribal involvement in future design changes.	See above	See above	See above	See Chemehuevi/TRC RTC #85.	DTSC response: Tribal comment noted.
762	DOI-121	Non-design	O&M	1/ Table 1.2-1	Constituents Exceeding Interim Screening Levels	Based on TCS-4 data, AOC 1 exceeds screening levels for dioxins and furans. These should be added. Constituents identified for AOC 4 do not include dioxins and furans. These were present in AOC4 prior to the removal action and should be included.	Dioxins and furans will be added to Table 1.2-1, Constituents Exceeding Interim Screening Levels, for AOC 1 and AOC 4. It will be noted that dioxin and furans were recently discovered in September 2013 near TCS-4 well and the extent of dioxin and furans in AOC 1 has not been evaluated.		DOI concurs with the response.		Comment resolved.

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763	DOI-122	Non-design	O&M	1/ Table 1.2-1	Analytical Suites	Based on TCS-4 data, AOC 1 exceeds screening levels for dioxins and furans. It is DOI's expectation that all samples in AOC 1 will now include these analytes. The AOC 4 analytical suite identified in the RFI/RI work plan includes dioxins and furans. Modify the table to include these constituents.	Dioxins and furans analysis will be added to Table 1.2-1, Analytical Suites, for AOC 1 and AOC 4.		DOI concurs with the response.		Comment resolved pending DOI review of the final design documents.
764	FMIT/TRC	Design	Remedial Design	Append L Vol. 4 Sect 2.2 p. 2-2		This section indicates a reasonable method for roll-off bins, however, the method (frequency of) for sampling soil stockpiles utilizes a non-standard reference that is not cited in the reference list. The reference should be provided. Further, the frequency for sampling stockpiles is much too low. For example, how would one obtain a representative and meaningful 4-point composite sample for such large stockpile volumes? This methodology, even if it is not likely to be used on the project, needs revision so that it is technically based.	The stockpile sampling frequency table provided in the text of this document was based on the sampling frequency table for waste characterization presented in the approved Work Plan for the Time-Critical Removal Acton at AOC 4. The reference for this table (Alisto et al., 2009) was provided in Section 2.2 in Volume 4 of the O&M Manual (Soil Management Plan). The following complete reference was included in the reference section of the Soil Management Plan: Alisto, Arcadis, CH2M HILL, NES, and Turnkey. 2009. *Work Plan for Time-Critical Removal Action at AOC 4*, Pacific Gas and Electric Company Topock Compressor Station, Needles, California. December. As noted in Section 2.2 of the SMP, most displaced soil will be pre-characterized following the Baseline SAP. Because stockpiles of soil that has not been pre-characterized greater than 500 CY are not expected the table has been deleted and text for this SMP has been modified as follows: "For stockpiles, one four point composite sample will be collected per 250 cubic yard".				Noted.
765	Hualapai/TRC	Design	Remedial Design	Append L Vol. 4 Sect 2.2 p. 2-2		This section indicates a reasonable method for roll-off bins, however, the method (frequency of) for sampling soil stockpiles utilizes a non-standard reference that is not cited in the reference list. The reference should be provided. Further, the frequency for sampling stockpiles is much too low. For example, how would one obtain a representative and meaningful 4-point composite sample for such large stockpile volumes? This methodology, even if it is not likely to be used on the project, needs revision so that it is technically based.	See above				

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766	Cocopah/TRC	Design	Remedial Design	Append L Vol. 4 Sect 2.2 p. 2-2		This section indicates a reasonable method for roll-off bins, however, the method (frequency of) for sampling soil stockpiles utilizes a non-standard reference that is not cited in the reference list. The reference should be provided. Further, the frequency for sampling stockpiles is much too low. For example, how would one obtain a representative and meaningful 4-point composite sample for such large stockpile volumes? This methodology, even if it is not likely to be used on the project, needs revision so that it is technically based.	See above				
767	Chemehuevi/ TRC	Design	Remedial Design	Append L Vol. 4 Sect 2.2 p. 2-2		This section indicates a reasonable method for roll-off bins, however, the method (frequency of) for sampling soil stockpiles utilizes a non-standard reference that is not cited in the reference list. The reference should be provided. Further, the frequency for sampling stockpiles is much too low. For example, how would one obtain a representative and meaningful 4-point composite sample for such large stockpile volumes? This methodology, even if it is not likely to be used on the project, needs revision so that it is technically based.	See above				
768	FMIT/TRC	Non-design	Request for Information	C/RAWP Append L 2.3 p. 2-3 Screening and Classification of Soil	If a CHHSL is not available, then the lesser of the USEPA residential regional screening level or the ecological comparison value is used.	The source document for the ecological comparison values should be included as an appendix to this section as it is referenced multiple times.	The ARCADIS Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil will be included as a new appendix (Appendix D) of this document.		DOI concurs with the response.	Noted.	
769	Hualapai/TRC	Non-design	Request for Information	C/RAWP Append L 2.3 p. 2-3 Screening and Classification of Soil	If a CHHSL is not available, then the lesser of the USEPA residential regional screening level or the ecological comparison value is used.	The source document for the ecological comparison values should be included as an appendix to this section as it is referenced multiple times.	See above		See above	Noted.	
770	Cocopah/TRC	Non-design	Request for Information	C/RAWP Append L 2.3 p. 2-3 Screening and Classification of Soil	If a CHHSL is not available, then the lesser of the USEPA residential regional screening level or the ecological comparison value is used.	The source document for the ecological comparison values should be included as an appendix to this section as it is referenced multiple times.	See above		See above	Noted.	
771	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP Append L 2.3 p. 2-3 Screening and Classification of Soil	If a CHHSL is not available, then the lesser of the USEPA residential regional screening level or the ecological comparison value is used.	The source document for the ecological comparison values should be included as an appendix to this section as it is referenced multiple times.	See above		See above	Noted.	
772	FMIT/TRC	Design	Remedial Design	Append L Vol. 4 Sect 2.4 p. 2-4		In this section, the definition of a "bed" needs to be specified so that all understand what is meant by a clay bed. For example, the minimum thickness needs to be agreed upon, so that equipment operators and Tribal monitors have a clear understanding of what will trigger the prescribed clay material handling protocol for a clay layer or stratum.	PG&E agrees that additional clarification would be beneficial; however, defining a "bed" based on a			Noted.	

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							specific minimum or maximum thickness is not practicable for the construction project given the various types of excavation that will occur. It is appropriate to define encountering a clay bed, and therefore the application of the clay handling protocol, in terms of being able to physically identify and separate the clay material from the rest of the cuttings or excavation soil. For example, when trenching with a backhoe it will be possible to identify relatively thin beds of clay material (e.g., less than a foot) and separate it from the rest of the excavated soil, but when drilling with a method that doesn't retrieve core that can be closely observed and precisely separated (e.g., hollow-stem auger) a relatively thin clay bed might not be identified or the clay material might become mixed with the rest of the cuttings to the point where it cannot be practicably separated. The text will be modified as follows: "Consistent with the special handling procedures requested by the Hualapai Department of Cultural Resources for displaced material generated from clay beds (this does not include clay-containing sediment mixtures, only clay beds), if clay bed(s) are encountered during construction, the clay material will be set aside on 100% cotton muslin (dye free) for future disposition following discussions with the Tribes. <u>For the purpose</u>				

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							of this project the identification of a "clay bed", and therefore the application of this special handling procedure, will be based on the practicability for the clay material to be separated from other excavated soils or drill cuttings. For example, when trenching with a backhoe it will be possible to identify relatively thin beds of clay material (e.g., less than a foot) and separate it from the rest of the excavated soil, but when drilling with a method that doesn't retrieve core that can be closely observed and precisely separated (e.g., hollow-stem auger) a relatively thin clay bed might not be identified or the clay material might become mixed with the rest of the cuttings to the point where it cannot be practicably separated. PG&E will notify the Agencies and Tribes in the event clay material is encountered and separated for storage.				
773	Hualapai/TRC	Design	Remedial Design	Append L Vol. 4 Sect 2.4 p. 2-4		In this section, the definition of a "bed" needs to be specified so that all understand what is meant by a clay bed. For example, the minimum thickness needs to be agreed upon, so that equipment operators and Tribal monitors have a clear understanding of what will trigger the prescribed clay material handling protocol for a clay layer or stratum.	See above				
774	Cocopah/TRC	Design	Remedial Design	Append L Vol. 4 Sect 2.4 p. 2-4		In this section, the definition of a "bed" needs to be specified so that all understand what is meant by a clay bed. For example, the minimum thickness needs to be agreed upon, so that equipment operators and Tribal monitors have a clear understanding of what will trigger the prescribed clay material handling protocol for a clay layer or stratum.	See above				
775	Chemehuevi/ TRC	Design	Remedial Design	Append L Vol. 4 Sect 2.4 p. 2-4		In this section, the definition of a "bed" needs to be specified so that all understand what is meant by a clay bed. For example, the minimum thickness needs to be agreed upon, so that equipment operators and Tribal monitors have a clear understanding of what will trigger the prescribed clay material handling protocol for a clay layer or stratum.	See above				
776	DOI-123	Non-design	O&M	3./3-1	In addition to these primary hazardous waste storage locations, PG&E may also store hazardous waste at the facilities at Moabi Regional Park.	It is the agencies expectation that storage of hazardous waste will not occur in the area of Park Moabi. Hazardous waste storage should occur on PG&E property. This applies to the language in Section 3.5 as well.	The cited sentence will be deleted in Sections 3.1 and 3.5.		Accepted.		Comment resolved pending DOI review of the final design documents.

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777	DTSC-149	Design	O&M	Operation and Maintenance Manual Volume 4 Soil Management Plan 3.1.2 Stockpiles Page 3-2	**"RCRA and non-RCRA Hazardous Soil.** Stockpiling of RCRA and non-RCRA hazardous waste/soil is not planned. It is anticipated that all soil that is above soil screening levels will be placed in roll-off bins or similar containers. If it is necessary to temporarily stockpile soil classified as RCRA or non-RCRA hazardous waste for up to 90 days to facilitate characterization or staging for offsite transportation … **Non-Hazardous Soil Above Interim Screening Levels.** It is anticipated that all soil that is above soil screening levels will be placed in roll-off bins or similar containers."	DTSC agrees with PG&E's preference to contain all contaminated soil (including hazardous waste) in roll-off bins. However, the third sentence referenced on the adjacent column (highlighted for emphasis) to "temporarily stockpile" hazardous waste is not allowed pursuant to hazardous waste management law. The only authorized methods for accumulating hazardous waste on-site for less than 90 days under generator status are specified in Title 22, Section 66262.34(a)(1). The referenced sentence must be removed from the design. In addition, PG&E should notify and receive agencies approval prior to stockpiling soil above screening levels at other locations than those pre-specified for soil storage and staging areas. Furthermore, proper records must be maintained so that the locations and quantities of soil piles can be tracked.	Under California Health and Safety Code Section 25123.3 (b)(4)(B), a generator is permitted to temporarily stockpile hazardous waste soil for up to 90 days for the purposes of offsite transportation if certain requirements are met. In response to DTSC's comment, Section 3.1.2 (Stockpiles) of the O&M Volume 4, Soil Management Plan, will be revised as follows. After the sentence "Hazardous waste stockpiles shall use a minimum 20-mil liner if constructed on a foundation (e.g., pavement or compacted soil) or a 60-mil liner if constructed in a location without a foundation (e.g., unpaved, un-compacted soil)", the following sentence will be added. "Stockpiled soil will not contain free liquids." The following sentence will be added to the end of Section 3.1.2. "After the final volume of stockpiled soil has been removed, the area will be inspected for visual contamination due to stockpiling activities, and any remaining residual contaminated material will be removed." The following text will be added to Appendix C, Construction and Operations Best Management Practices (BMPs) Plan for Soil Storage, Section 1.3, Stockpile Management Control BMPs: **Non-RCRA Hazardous Soil.** It is anticipated that non-RCRA hazardous soil will be placed in roll-off	DTSC agrees with PG&E's citation of the provision in the California Health and Safety Code for temporary stockpiling (less than 90 days) of non-RCRA hazardous waste. However, the cited requirements for compliance with temporary stockpiling of non-RCRA hazardous waste provision are not fully specified in Section 3.1.2. In particular, 25123.3(b)(4)(B)(ii) and (vi). Furthermore, discussion regarding stockpiling of hazardous waste (RCRA or non-RCRA) is absent from Appendix C, BMP for soil storage, section 1.3, Stockpile Management. Finally, PG&E must comply with H&SC 25123.3 for the purpose of the remedy if carried forward.			Comment resolved.

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							bins or similar containers. If it is necessary to temporarily stockpile non-RCRA hazardous soil the following BMPs will be followed: • Stockpiles will be constructed with liners and perimeter berms to prevent release or infiltration of liquids Minimum 20 mil polyethylene sheeting or equivalent will be used for liners if the stockpile is on a foundation, or minimum 60 mil polyethylene sheeting or equivalent will be used if the stockpile is not on a foundation. • Wind erosion will be prevented by use of a cover, applying SoiltacR or a similar soil stabilization product, or other suitable means. If a cover is employed it will be minimum 6 mil polyethylene sheeting or equivalent. • The perimeter berm will be constructed of clean materials (such as hay bales or straw wattle under the liner). • If a cover is employed, it shall extend over the outer edges of the perimeter berm and liner so that rainfall is prevented from entering the stockpile. • Covers and perimeter berms will be secured in place when not in use and at the end of				

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							each workday and as necessary to prevent wind dispersion or runoff from precipitation events. • Only soil that does not contain free liquids will be stockpiled. • Liquids that accumulate inside the berm will be pumped from the stockpile to a container or tank for characterization and disposal. • If the stockpile is outside of a secured area, the stockpile will be demarcated with barricades, orange cones, and/or caution tape until it is removed from the site. • Erosion control measures will be employed to prevent stockpiled soil from contributing to surface runoff and wind generated particulate matter. • The stockpile will be inspected weekly and after storms to verify that controls for windblown dispersion and prevention of runoff and run-on are functioning properly. • After the stockpile has been removed, the area will be inspected and all residual material shall be removed from the underlying and surrounding areas. • The stockpile location will be certified by a California-registered professional engineer				

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							for compliance with these requirements.				
778	DOI-124	Non-design	O&M	4.9/4-3	If the waste management facility is out-of-state, prior to the first shipment of waste material, PG&E will provide written notice for disposal of waste material at the listed facilities to the appropriate State environmental official in each receiving facility's State and the DOI Project Manager.	For consistency with the CD, please add "and shall comply with State law with regard to providing any further notifications. Additionally, PG&E shall notify the State environmental official referenced above and the DOI Project Manager of any major changes in the shipment plan, such as a decision to ship the Waste Material to a different out-of-state facility. "	Addition will be made as requested.		Accepted		Comment resolved pending DOI review of the final design documents.
779	DOI-125	Non-design	Process	6/ 6-1	The SMP will be a "living document" that will continue to be updated as new information is obtained through the Soil RFI/RI investigations and as the groundwater remedy moves from the 90% design phase to the final design. An addendum to the SMP will also be prepared after the implementation of the Baseline SAP to document sampling results and refine soil classification volumes. And bullet 1: Goal is to	It is our expectation that the SMP be finalized and submitted with the 100% design package. As relevant screening levels are revised and cleanup levels are determined during the soil investigation and soil remedy decision-making process, an addendum to the SMP should be provided to update the screening levels for non-hazardous soil during future O&M activities. It is recommended that a supplemental document to the SMP rather than an addendum be provided to document sampling results and the refined soil classification volumes.	Section 6 text will be revised to read as follows: "The final SMP will be submitted with the final design documents. An addendum to the SMP will be prepared to update the screening levels for non-hazardous soil during future O&M activities. ~~a "living document" that will continue to be updated as new information is obtained through the Soil RFI/RI investigations and as the groundwater remedy moves from the 90% design phase to the final design. An addendum to the SMP~~ A data report will ~~also~~ be prepared after the implementation of the Baseline SAP to document sampling results and refine soil classification volumes." Bullet 1: .....~~Goal is to incorporate new information obtained from soil~~		Resolved.		Comment resolved.

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					incorporate new information obtained from soil investigations, as appropriate, into the SMP submitted for approval.		~~investigations, as appropriate, into the SMP submitted for approval.~~ ~~It is anticipated that soil investigations will commence in early 2015 prior to the start of groundwater remedy construction later in 2015.~~ Bullet 2: Prepare ~~an addendum to the SMP~~ a data report to present ~~incorporate~~ results from implementation of the Baseline SAP (as part of the groundwater remedy construction).				
780	FMIT/TRC	Design	Remedial Design	Append L Vol. 4 Appendix A	Attachment 1 Standard Operating Procedure B4	The procedures in this Standard Operating Procedure for Boring Abandonment appear to be completely at odds with what has been developed for injection/monitoring/ production hole abandonment and sealing. Revise this procedure so that it is consistent with the other procedure(s) and approach(s).	The older Standard Operating Procedure SOP-B4 (Boring Abandonment) will be removed from this document and replaced with Well-SOP-01 (Standard Operating Procedure for Well and Borehole Decommissioning), which is currently included in the C/RAWP. The same replacement will be made in Appendix L of the C/RAWP (Soil Management Plan).			Noted.	
781	Hualapai/TRC	Design	Remedial Design	Append L Vol. 4 Appendix A	Attachment 1 Standard Operating Procedure B4	The procedures in this Standard Operating Procedure for Boring Abandonment appear to be completely at odds with what has been developed for injection/monitoring/ production hole abandonment and sealing. Revise this procedure so that it is consistent with the other procedure(s) and approach(s).	See above				
782	Cocopah/TRC	Design	Remedial Design	Append L Vol. 4 Appendix A	Attachment 1 Standard Operating Procedure B4	The procedures in this Standard Operating Procedure for Boring Abandonment appear to be completely at odds with what has been developed for injection/monitoring/ production hole abandonment and sealing. Revise this procedure so that it is consistent with the other procedure(s) and approach(s).	See above				
783	Chemehuevi/ TRC	Design	Remedial Design	Append L Vol. 4 Appendix A	Attachment 1 Standard Operating Procedure B4	The procedures in this Standard Operating Procedure for Boring Abandonment appear to be completely at odds with what has been developed for injection/monitoring/ production hole abandonment and sealing. Revise this procedure so that it is consistent with the other procedure(s) and approach(s).	See above				
784	FMIT/TRC	Non-design	Monitoring	C/RAWP Append A OF Append L Sect. 2.0 p. A-2 Sampling and Analytical Approach	Because inorganic compounds are present in the fresh water at such low concentrations, soil underlying the pipeline would not be adversely	This conclusion is based on the assumption that groundwater quality from the HNRW wells will not change over time. It is possible however the arsenic or TDS can increase over the remedy duration and it is possible that the pipeline carrying this water will leak. Please comment on why this scenario is not considered a possible future risk.	There will be measures in place to assess quality of the freshwater source. Changes in fresh groundwater quality from Arizona fresh water well (HNWR-1A) will be monitored over time for the duration of the remedy. The monitoring frequency of the fresh			Noted.	

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					impacted by inorganic compounds from incidental releases, spills or leaks from the pipeline.		water source and the suite of analytes (arsenic and TDS included) are defined in O&M Manual Volume 2, Table 5.2-4. Applicable actions when changes in freshwater quality occur are defined as per Freshwater DQO-3 (DQO-3 Problem Statement: *The freshwater source will be monitored for changes in water quality over time.),* Figure 2.2-10 (Action Levels – Injection of Freshwater and Water Extracted from the River Bank), and Figure 2.2-11 (Protocol for Notification of Confirmed Exceedance of Action Level) (the referenced DQO and figures can be found in the O&M Manual Volume 2). Given the purpose of the freshwater in the Topock remedy, if water quality significantly deteriorates, it would no longer be suitable for the remedy and thus, no longer need to be transported via this pipeline. Nonetheless, the fresh water pipeline from the HNWR well will be constructed with HDPE pipe, a material that is highly resistant to leaks. All joints will be fused, and the pipeline will be hydrostatically pressure tested for leaks prior to use. Operational checks will also be in place to assess if leaks occur during remedy operation, such as instantaneous inflow and outflow totalizer readings and pressure measurements at the well head.				
785	Hualapai/TRC	Non-design	Monitoring	C/RAWP Append A OF Append L Sect. 2.0 p. A-2 Sampling and	Because inorganic compounds are present in the fresh water at	This conclusion is based on the assumption that groundwater quality from the HNRW wells will not change over time. It is possible however the arsenic or TDS can increase over the remedy duration and it is possible that the pipeline carrying this water will leak. Please comment on why this scenario is not considered a possible future risk.	See above			Noted.	

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
				Analytical Approach	such low concentrations, soil underlying the pipeline would not be adversely impacted by inorganic compounds from incidental releases, spills or leaks from the pipeline.						
786	Cocopah/TRC	Non-design	Monitoring	C/RAWP Append A OF Append L Sect. 2.0 p. A-2 Sampling and Analytical Approach	Because inorganic compounds are present in the fresh water at such low concentrations, soil underlying the pipeline would not be adversely impacted by inorganic compounds from incidental releases, spills or leaks from the pipeline.	This conclusion is based on the assumption that groundwater quality from the HNRW wells will not change over time. It is possible however the arsenic or TDS can increase over the remedy duration and it is possible that the pipeline carrying this water will leak. Please comment on why this scenario is not considered a possible future risk.	See above			Noted.	
787	Chemehuevi/ TRC	Non-design	Monitoring	C/RAWP Append A OF Append L Sect. 2.0 p. A-2 Sampling and Analytical Approach	Because inorganic compounds are present in the fresh water at such low concentrations, soil underlying the pipeline would not be adversely impacted by inorganic compounds from incidental releases, spills or leaks from the pipeline.	This conclusion is based on the assumption that groundwater quality from the HNRW wells will not change over time. It is possible however the arsenic or TDS can increase over the remedy duration and it is possible that the pipeline carrying this water will leak. Please comment on why this scenario is not considered a possible future risk.	See above			Noted.	
788	DOI-126	Non-design	Other	Appendix A, Table A-1	AOC 1 Suite	Based on TCS-4 data, AOC 1 exceeds screening levels for dioxins and furans. It is DOI's expectation that all samples in AOC 1 will now include these analytes.	Dioxins and furans analysis will be added to the analytical suite on Table A-1.		DOI concurs with the response.		Comment resolved pending DOI review of the final design documents.
789	DOI-127	Non-design	Other	Appendix A, Table A-1		Table 1.2-1 identifies dioxins and furans in the analytical suite for AOCs 19, 14, 21 and 33 however they are not included in this table. Please address this inconsistency.	Table 1.2-1 identifies dioxins and furans in the analytical suite for AOCs 10, 14, 27 and 33. Dioxins and furans are not a COPC for AOC 19 or AOC 21. Table A-1 will be revised to included dioxins and furans in the		DOI concurs with the response.		Comment resolved pending DOI review of the final design documents..

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							analytical suite for AOCs 10, 27, and 33. AOC 14 is not included on this table because there is no planned groundwater remedy infrastructure within 20 feet of AOC 14.				
790	FMIT/TRC	Non-design	Request for Information	C/RAWP Append A OF Append L TABLE A-1 List of RFI/RI Investigation Areas within 20 feet of or that Overlap with Groundwater Remedy Infrastructure and Proposed Analyte Suite	AOC 1 - Area Around Former Percolation Bed Title 22 metals, hexavalent chromium, PAHs, pH, PCBs2	Why are dioxins and furans not included in the soil analysis? These contaminants were identified around TCS well 4 and may be present in the vicinity of this well. Please provide rationale for why these chemicals are not included within the analyte suite for AOC1.	Dioxins and furans were only recently discovered in AOC 1 during the initial assessment of TCS-4 well, and as such, were not included as part of the analytical suite for AOC 1. At DOI's request, Table A-1 will be updated and dioxin and furan analysis will be added as part of the analytical suite for AOC 1 groundwater remedy baseline sampling.		DOI concurs with the response.	Noted.	
791	Hualapai/TRC	Non-design	Request for Information	C/RAWP Append A OF Append L TABLE A-1 List of RFI/RI Investigation Areas within 20 feet of or that Overlap with Groundwater Remedy Infrastructure and Proposed Analyte Suite	AOC 1 - Area Around Former Percolation Bed Title 22 metals, hexavalent chromium, PAHs, pH, PCBs2	Why are dioxins and furans not included in the soil analysis? These contaminants were identified around TCS well 4 and may be present in the vicinity of this well. Please provide rationale for why these chemicals are not included within the analyte suite for AOC1.	See above		See above	Noted.	
792	Cocopah/TRC	Non-design	Request for Information	C/RAWP Append A OF Append L TABLE A-1 List of RFI/RI Investigation Areas within 20 feet of or that Overlap with Groundwater Remedy Infrastructure and Proposed Analyte Suite	AOC 1 - Area Around Former Percolation Bed Title 22 metals, hexavalent chromium, PAHs, pH, PCBs2	Why are dioxins and furans not included in the soil analysis? These contaminants were identified around TCS well 4 and may be present in the vicinity of this well. Please provide rationale for why these chemicals are not included within the analyte suite for AOC1.	See above		See above	Noted.	
793	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP Append A OF Append L TABLE A-1 List of RFI/RI Investigation Areas within 20 feet of or that Overlap with Groundwater Remedy	AOC 1 - Area Around Former Percolation Bed Title 22 metals, hexavalent chromium, PAHs, pH, PCBs2	Why are dioxins and furans not included in the soil analysis? These contaminants were identified around TCS well 4 and may be present in the vicinity of this well. Please provide rationale for why these chemicals are not included within the analyte suite for AOC1.	See above		See above	Noted.	

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
				Infrastructure and Proposed Analyte Suite							
Specific Comments – 90% BOD, Appendix L: O&M Manual -- Volume 5: Health and Safety Plan											
794	FMIT/TRC	Non-design	Request for Information	Append L Vol. 5 HAZ-2	Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil : Soil that is excavated shall be loaded directly into containers such as roll-off bins; dust suppression methods shall be used prior to and during loading of soils into the bins. Suspected contaminated soils shall be segregated from suspected uncontaminated soils.	This statement is not consistent with the soil handling approach that was used during the old TCS-4 well. Please explain why this inconsistency in approach exists.	The approaches in these two documents vary because they describe two different circumstances where soil handling activities are required. The soil handling approach described in the Decommissioning Plan for Topock Compressor Station Well Number 4, (CH2M Hill, 2014) was developed in accordance with the Standard Operating Procedure (SOP) for Well and Borehole Decommissioning. This SOP is applicable during well and <u>borehole decommissioning activities (i.e. existing wells).</u> The SOP does not address soil handling procedures to be used during the drilling of new wells and/or boreholes in areas of suspected soil contamination. Conversely, the soil handling approach described in Appendix L, Volume 5 of the Operation and Maintenance Health and Safety Plan for the Ground Water Remedy,(PG&E, 2014) is specifically stated to be used "in the event that <u>drilling sites (i.e. new wells)</u> must be located within area of suspected soil contamination."			Noted.	
795	Hualapai/TRC	Non-design	Request for Information	Append L Vol. 5 HAZ-2	Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil : Soil that is excavated shall be loaded	This statement is not consistent with the soil handling approach that was used during the old TCS-4 well. Please explain why this inconsistency in approach exists.	See above			Noted.	

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					directly into containers such as roll-off bins; dust suppression methods shall be used prior to and during loading of soils into the bins. Suspected contaminated soils shall be segregated from suspected uncontaminated soils.						
796	Cocopah/TRC	Non-design	Request for Information	Append L Vol. 5 HAZ-2	Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil : Soil that is excavated shall be loaded directly into containers such as roll-off bins; dust suppression methods shall be used prior to and during loading of soils into the bins. Suspected contaminated soils shall be segregated from suspected uncontaminated soils.	This statement is not consistent with the soil handling approach that was used during the old TCS-4 well. Please explain why this inconsistency in approach exists.	See above			Noted.	
797	Chemehuevi/ TRC	Non-design	Request for Information	Append L Vol. 5 HAZ-2	Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil : Soil that is excavated shall be loaded directly into containers such as roll-off bins; dust suppression methods shall be used prior to and during loading of soils into the bins.	This statement is not consistent with the soil handling approach that was used during the old TCS-4 well. Please explain why this inconsistency in approach exists.	See above			Noted.	

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					Suspected contaminated soils shall be segregated from suspected uncontaminated soils.						
Specific Comments – SUPPLEMENTAL 90% Design Documents - Basis of Design Report/C/RAWP											
798	DTSC-178	Non-design	Editorial	Figure ES-14.		Details in Figure ES-14 are inconsistent with details of other figures (e.g. Figure 4.2-2 of the C/RAWP). Please explain the differences. If the differences are duration driven with Figure ES-14, this should be clarified so that it is easily understood that additional structures will be present.	DTSC is correct in that the differences in layout between BOD Figure ES-14 and C/RAWP Figure 4.2-2 are driven by duration—i.e., only long-term remedy support area structures/features are shown on Figure ES-14. This will be clarified on Figure ES-14.	Resolved.			Comment resolved.
799	DTSC-180	Non-design	CEQA/EIR: Cultural	Section 2/p 21 AND Appendix A11/p 124	Because the proposed soil storage and processing facilities are located outside the . . . APE . . .and the . . . (EIR, DTSC 2011) Project Area, additional surveys were completed to support the design. ---- “To comply with these requirements” [referencing EIR Mitigation Measures CUL-1b/c-1 and 1-b/c-2 and CUL-2; also PA and CHPMP].	Section 2 Page 21 correctly states that the proposed Park Moabi facilities are located outside the APE and the 2011 EIR Project Area and that is the reason additional surveys were required. However, Page 124 of supplemental 90% BOD states that archaeological surveys were conducted at Park Moabi in response to mitigation measures in the Groundwater EIR, and the PA and CHPMP. It is incorrect to cite the CEQA mitigation measure or the PA and CHPMP, which reference an APE that does not include the survey area, as the reason this additional survey was undertaken. Survey of potential additional project area is called for by non-project-specific regulations (e.g. PRC 5024 and 36 CFR 800). The wording of the rationale for the necessary survey should be revised.	PG&E undertook the additional surveys outside the current APE to support the design of the groundwater remedy in compliance with the PA, CHPMP, and the Project mitigation measures in the MMRP. To comply with various requirements of the PA and CHPMP, such as the requirement to avoid and/or minimize adverse effects, see PA Section III(B)(3)(b), PG&E needed to conduct the additional surveys in the area of the proposed soil storage and processing facilities. Because of this, it is appropriate to refer to the PA and CHPMP and not the Section 106 regulations (36 C.F.R. Part 800). See PA Recitals at 5:222-224 (“[A]ll Signatories and Invited Signatories agree that BLM, on behalf of the Federal Agencies, shall administer the Undertaking in accordance with the following stipulations to satisfy the Federal Agencies’ Section 106 responsibilities for this Undertaking.”). Similarly, the additional surveys outside the	Resolved.			Comment resolved.

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							current Project Area were completed to support the design in compliance with the Project mitigation measures. These mitigation measures require PG&E to assess the potential for construction to result in significant impacts on historically significant resources (CUL 1b/c 2) and to create a design that would avoid historical and archaeological resources to the maximum extent feasible (CUL 1b/c 1, CUL-2). PG&E could not make the required assessment or create a compliant design without the information provided by the additional surveys. DTSC's comment indicates the text on page 124 of Appendix A11 is ambiguous and needs clarification. PG&E will revise the text as follows: "To <u>support the design of the Project in compliance</u> with these requirements, PG&E retained Applied EarthWorks, Inc. (AE) as its Qualified Cultural Resources Consultant to conduct archaeological and historical field surveys of the additional locations considered for Project features in Moabi Regional Park."				
800	DTSC-181	Design	CEQA/EIR	Section 2.1.1.3/ Page 24	Sewage generated from the CHQ will be collected in two 10,000-gallon buried fiberglass-reinforced plastic tanks...The tanks will be emptied and removed sewage hauled offsite as	At Park Moabi, the proposed treatment for sewage and wastewater is to contain and remove it (water, sewer, fire protection are designed as stand-alone systems). PG&E also noted there may be some opportunity to connect with existing potable water and wastewater systems at Moabi Regional Park (if the County were to approve). Can PG&E provide more information on these potential alternatives to be included in the CEQA analysis?	In response to RTC #803 DOI-333, PG&E will provide a revised design for Park Moabi facilities which will include utility corridor information adequate for CEQA analysis.	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					needed, approximately monthly…						
801	DOI-331	Design	Remedial design	2.1.1.3/2-5	A booster pump and 15,000-gallon water storage tank located on the utility pad in the northwest portion of the CHQ yard will provide fire suppression water for the sprinkler system as well as to a fire hydrant located near the vehicle entrance to the long-term remedy support area.	Please indicate whether the electrical source for the booster pump will be outside of the area for potential fires.	While it is unlikely that a fire would occur near the booster pump electrical feeds, it is not possible to say that any area of the CHQ yard is outside of the area for potential fires. The booster pump is served by the main electrical feed provided by the City of Needles. A backup diesel-fueled electric generator located on the utility pad is also available to power the booster pump in the event of a failure of service on the City of Needles power line.		Noted.		Comment resolved.
802	DOI-332	Non-design	Process	2.1.2/2-6	Water will be transported to the soil processing area in portable tanks as needed…	Please discuss whether any additives, such as brine solutions (sodium and/or magnesium chloride), will be used for dust control and if so, potential impacts on revegetation efforts and groundwater quality.	While fugitive dust control will be conducted using mainly water, PG&E may also apply approved commercial dust control or soil stabilizing agents such as SoilTac (approved for use during and after the AOC 4 Time Critical Removal Action), PM10-50 (used at Hinkley Compressor Station), Gorilla-Snot, etc. Future commercially available products with comparable functionality may also be used, as appropriate.		Resolved.		Comment resolved.
803	DOI-333	Design	Infrastructures	2.1.3/2-6	The soil storage area, also comprising approximately 1.55 acres, will serve as the primary storage area for excavated soils…	Based on discussions with San Bernardino County, the adjacent leasee of Park Moabi Regional Park, and internal discussions between the Bureau of Land Management and the Department of the Interior, PG&E must find an alternate location for storage of waste soil above screening levels.	Based on further clarifications from DOI and BLM, PG&E understands that storage of waste soil above screening levels will not be allowed on federal lands. The remaining potential storage locations are private properties owned by FMIT and PG&E. Given the remedy facilities already planned to be located on the TCS and the Station's own operational needs for		Resolved.		This RTC was discussed at the July 23, August 19, and August 26 TWG meetings. Comment resolved.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							the property for its natural gas compressor operations, there is only space on PG&E property to temporarily store soil bins while awaiting analysis prior to final disposition. There is not adequate space on PG&E property to store waste soil on a long term basis. PG&E also contacted local TSDFs and was told that the TSDFs would accept the waste soil for disposal, not for storage. Given the above, at this time, PG&E has not been able to identify an alternate location for storing the waste soil. PG&E defers to the FMIT regarding its views on potential use of the Tribe's property within the project area for this purpose. In the meantime, in response to this comment, PG&E will eliminate the proposed soil storage area at Moabi Regional Park and move the proposed CHQ into that area. Note that displaced soils that are below screening levels may still be stored at the currently proposed soil processing area and the CHQ (subject to space availability). The management protocol for handling and disposition of displaced site materials (Appendix C to the CIMP, Appendix B to the Soil Management Plan) was revised to reflect that the materials above screening levels will be disposed of offsite. The revised protocol was provided in this 90% RTC period and included in **Attachment Q** of the final RTC table.				
804	DOI-335	Non-design	Editorial	2.2/2-7	Water from this tank will be trucked to the	This section is entitled Operation & Maintenance Provisions. It may be assumed that the Agencies will have determined that the remedy is Operational and Functional and Operating Properly and Successfully prior to considering it in the O&M phase. Consequently, referencing the IM-3 facility	Reference to using IM-3 facility in this section was intended for		Resolved.		Comment resolved.

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					appropriate location (e.g., the existing IM-3 treatment plant or TCS evaporation ponds during remedy construction…	as an option for waste water management may be inappropriate in this section	remedy construction. Text will be revised to read as follows: "Decontamination/other wastewater management system – Decontamination of construction vehicles and equipment, including drill rigs; management of rainwater collected in the secondary containment; inspection/ maintenance of the sump pump; and offsite hauling of wastewater from the decontamination water storage tank. Water from this tank will be trucked to the appropriate location (e.g., the ~~existing IM-3 treatment plant or~~ TCS evaporation ponds ~~during remedy construction~~, or the Remedy-produced Water Conditioning Plant during and following remedy startup, or offsite) for management in accordance with the Waste Management Plan, Section 6 of ~~(Appendix R of the C/RAWP) and~~ Volume 1 of the O&M Manual." The following text will be added to Section 2.3 (Construction Approaches): "Water from the decontamination water storage tank will be trucked to the appropriate location (e.g., the existing IM-3 treatment plant, the TCS evaporation ponds, or offsite) for management in accordance with the Waste Management Plan, (Appendix R of the C/RAWP)."				
805	DOI-334	Design	Remedial design	2.3/2-8	The need for and final placement,	Provide additional detail regarding the provision that would trigger installation of a sound barrier adjacent to the construction zone (i.e, applicable standards for area next to Park Moabi).	As indicated in Section C.11 of Appendix C (Design Criteria), "the		Reference Appendix C and NOISE-2 MM in the		Comment resolved pending DOI review of the final design

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
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					orientation, size, and density of the noise barrier will be determined by a qualified acoustical consultant in accordance with the requirements of EIR Mitigation Measure NOISE-2 (DTSC 2011).		construction noise criteria will conform to San Bernardino Development Code and Mojave County standards, as well as the EIR mitigation measures NOISE-1, -2, and -3. Per San Bernardino County Code Division 3 Chapter 83.01.080, temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and federal holidays, are exempt from noise limits." Regarding construction, NOISE-2 requires a sound barrier under the following conditions: "When construction activities are conducted within . . . 1,850 feet and 5,830 feet from California receptors and 330 feet and 735 feet from Arizona receptors for daytime and nighttime noise, respectively[,] relative to noise-sensitive uses in the project area, noise measurements shall be conducted by a qualified acoustical consultant at the nearest noise-sensitive land use relative to the construction activities with a sound level meter that meets the standards of the American National Standards Institute (ANSI Section S14 1979, Type 1 of Type 2) to ensure that construction noise associated with the project component complies with applicable daytime and nighttime noise standards. If noise levels are still determined to exceed noise standards, temporary barriers shall be erected as close to the construction		text and note the establishment of the disturbance coordinator Okay.		documents.

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							activities as feasible, breaking the line of sight between the source and receptor where noise levels exceed applicable standards.” The Moabi Regional Park mobile home area is considered a noise-sensitive use. The applicable daytime and nighttime noise standards are found in the San Bernardino Development Code. The Code states that the noise standard for residential uses is 55 dB(A) from 7:00 am to 10:00 pm and 45 dB(A) from 10:00 pm to 7:00 am. The noise standard for residential uses from adjacent mobile noise sources is 60 dB(A) on the exterior and 45 dB(A) on the interior. If ambient noise exceeds the noise standards, the noise standards are increased to reflect ambient noise levels. In addition, under the Code, certain sources of noise are exempt from regulation, including noise from temporary construction, maintenance, repair, and demolition activities that occur between 7:00 am and 7:00 pm, except Sundays and federal holidays. In compliance with Mitigation Measure NOISE-2, the evaluation and installation of sound barriers near construction activities is triggered by the distance between the activity and noise sensitive receptors, the applicable noise standard depending on the time of day of the activity, and the sound level attributable to the activity. In addition,				

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							PG&E has established a disturbance coordinator and commits to constructing the remedy in a manner that is safe, compliant with the law, respectful, and expedient. Consistent with this commitment, PG&E will also consider comments/inputs received regarding the construction activities in the decision to install sound barrier. Text will be added referencing the mitigation measure NOISE-2 and the noise disturbance coordinator.				
806	FMIT/TRC	Non-design	Request for Information	BOD Supp. 2.3 Construction Approaches p.2-8	Supplemental Section 2 If a temporary noise barrier is determined to be required during the construction phase (see C/RAWP Section 4.6.3 for details), it will comply with the EIR Noise Mitigation Measure NOISE-2c (DTSC 2011).	Please describe how visual impacts have addressed features such as a sound barrier.	As listed in BOD Supp. 2.3 the final size and location of the noise barrier will not be known until it is deemed necessary and designed by a qualified acoustical consultant. The noise barrier will be designed in accordance with EIR Mitigation Measure NOISE-2.	DTSC does not anticipate the need to erect noise barrier as a long term structure for the remedy; this may be a temporary solution as a result of a specific construction activity. If a longer term barrier is needed, DTSC and PG&E may evaluate the different options to minimize visual impacts once the need is defined or known.		A long term noise barrier within the Park Moabi area was not included in the original design and is considered a substantial design change not yet analyzed for potentially significant impacts. If a long term barrier is needed, the Tribes expects that it will be included and appropriately addressed within the future SEIR document	DTSC response: Tribal comment noted.
807	Hualapai/TRC	Non-design	Request for Information	BOD Supp. 2.3 Construction Approaches p.2-8	Supplemental Section 2 If a temporary noise barrier is determined to be required during the construction phase (see C/RAWP Section 4.6.3 for details), it will comply with the EIR Noise Mitigation Measure NOISE-2c (DTSC 2011).	Please describe how visual impacts have addressed features such as a sound barrier.	See above			A long term noise barrier within the Park Moabi area was not included in the original design and is considered a substantial design change. If a long term barrier is needed, Hualapai expects that it will be included and appropriately addressed within the future SEIR document.	DTSC response: Tribal comment noted.
808	Cocopah/TRC	Non-design	Request for Information	BOD Supp. 2.3 Construction Approaches	Supplemental Section 2 If a temporary	Please describe how visual impacts have addressed features such as a sound barrier.	See above			A long term noise barrier within the Park Moabi area was not	DTSC response: Tribal comment noted.

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				p.2-8	noise barrier is determined to be required during the construction phase (see C/RAWP Section 4.6.3 for details), it will comply with the EIR Noise Mitigation Measure NOISE-2c (DTSC 2011).					included in the original design and is considered a substantial design change. If a long term barrier is needed, the Tribes expect that it will be included and appropriately addressed within the future SEIR document.	
809	Chemehuevi/ TRC	Non-design	Request for Information	BOD Supp. 2.3 Construction Approaches p.2-8	Supplemental Section 2 If a temporary noise barrier is determined to be required during the construction phase (see C/RAWP Section 4.6.3 for details), it will comply with the EIR Noise Mitigation Measure NOISE-2c (DTSC 2011).	Please describe how visual impacts have addressed features such as a sound barrier.	See above			A long term noise barrier within the Park Moabi area was not included in the original design and is considered a substantial design change. If a long term barrier is needed, the Tribes expect that it will be included and appropriately addressed within the future SEIR document.	DTSC response: Tribal comment noted.
810	DTSC-179	Non-design	CEQA/EIR	Section 2.4/ Page 29	Entire Section 2.4: Anticipated Approvals, Authorization, and Permitting	No mention of potential issues with local (e.g. County of San Bernardino) authorities. If uses of Park Moabi for the remedy are not allowed, what are the alternatives for PG&E?	Based on discussions with BLM, DOI, and San Bernardino to date, with the exception of proposed soil storage, PG&E is not aware of any objections of local authorities to PG&E's proposal to using the areas for the CHQ and for soil processing.				
811	FMIT/TRC	Non-design	Request for Information	BOD Supp. 2.4 Anticipated Approvals, Authorization, and Permitting p.2-9	Supplemental Section 2 If a temporary noise barrier is determined to be required during the construction phase (see C/RAWP Section 4.6.3 for details), it will comply with the EIR Noise Mitigation	Please discuss why groundwater CEQA updates and approvals are not included within the anticipated approvals authorizations and permitting section. Also please indicate the decision matrix that will be used to determine if the previous groundwater FEIR adequately and completely addresses the groundwater remedy as presented within the 90% BOD.	As stated in Section 1 of the Supplemental 90%, for brevity, information presented in the September 2014 90% submittal that also applies to the components covered in this Supplemental 90% submittal is not repeated in the supplemental document. This includes CEQA review of the design by DTSC.	As announced, DTSC is proposing to complete a Subsequent EIR to evaluate potential impacts from design modifications between the 2011 EIR to the final design.		The Tribe looks forward to participating in the review of the SEIR	DTSC response: Tribal comment noted.

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					Measure NOISE-2c (DTSC 2011).		PG&E defers to DTSC for response to the second part of this comment.				
812	Hualapai/TRC	Non-design	Request for Information	BOD Supp. 2.4 Anticipated Approvals, Authorization, and Permitting p.2-9	Supplemental Section 2 If a temporary noise barrier is determined to be required during the construction phase (see C/RAWP Section 4.6.3 for details), it will comply with the EIR Noise Mitigation Measure NOISE-2c (DTSC 2011).	Please discuss why groundwater CEQA updates and approvals are not included within the anticipated approvals authorizations and permitting section. Also please indicate the decision matrix that will be used to determine if the previous groundwater FEIR adequately and completely addresses the groundwater remedy as presented within the 90% BOD.	See above	See above		Hualapai looks forward to participating in the review of the SEIR	DTSC response: Tribal comment noted.
813	Cocopah/TRC	Non-design	Request for Information	BOD Supp. 2.4 Anticipated Approvals, Authorization, and Permitting p.2-9	Supplemental Section 2 If a temporary noise barrier is determined to be required during the construction phase (see C/RAWP Section 4.6.3 for details), it will comply with the EIR Noise Mitigation Measure NOISE-2c (DTSC 2011).	Please discuss why groundwater CEQA updates and approvals are not included within the anticipated approvals authorizations and permitting section. Also please indicate the decision matrix that will be used to determine if the previous groundwater FEIR adequately and completely addresses the groundwater remedy as presented within the 90% BOD.	See above	See above		Tribes look forward to participating in the review of the SEIR.	DTSC response: Tribal comment noted.
814	Chemehuevi/ TRC	Non-design	Request for Information	BOD Supp. 2.4 Anticipated Approvals, Authorization, and Permitting p.2-9	Supplemental Section 2 If a temporary noise barrier is determined to be required during the construction phase (see C/RAWP Section 4.6.3 for details), it will comply with the EIR Noise Mitigation Measure NOISE-2c (DTSC 2011).	Please discuss why groundwater CEQA updates and approvals are not included within the anticipated approvals authorizations and permitting section. Also please indicate the decision matrix that will be used to determine if the previous groundwater FEIR adequately and completely addresses the groundwater remedy as presented within the 90% BOD.	See above	See above		Tribes look forward to participating in the review of the SEIR.	DTSC response: Tribal comment noted.
815	DTSC-182	Design	Infrastructures	3.1 Description, Design Basis,	"Updated Figures ES-4C	It does not appear that any of the figures illustrate the complete gas supply line run for the pond generators. Revision requested.	An inset will be added to these figures to show	Resolved.			Comment resolved.

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				and Assumptions. Page 3-1.	and 3.4-1 from the 90% BOD Report, Exhibit 2.7-1 from the O&M Volume 1, and Figure 3.1-4 of the C/RAWP…"		the southern extent of the gas supply line that connects to PG&E's natural gas Line 300B. The figures were revised during the 90% RTC period and included in **Attachment R** of the final RTC table.				
816	DTSC-183	Design	Infrastructures	3.4 Anticipated Approvals, Authorization, and Permitting Page 3-3.	"Rule 1160 applies to emergency, portable, standby, or stationary internal combustion engines with a rating equal to or greater than 500 brake horsepower (bhp). This rule is not anticipated to be applicable to the RICE. The applicability of Rule 219 section (E)(2)(a)3 will be further evaluated during the 100% design process."	It does not appear that applicability of Rule 219 has been completely assessed. Will significant design changes be required should it apply?	The generation equipment proposed for the TCS evaporation ponds is not subject to Rule 219 (b) (1) due to the generator having a maximum power rating of 49 Hp at the rated rpm. Rule 219 exempts internal combustion engines with a rating of 50 horsepower or less. Text will be revised to reflect the above.	Resolved.			Comment resolved.
817	FMIT/TRC	Design	Infrastructures	BOD Supp.	Supplemental Section 4	This evaluation and quite possibly the outcome thereof needs to be revised to seriously consider the option of utilizing the crossing that presently exists (a vented ford) with the underground utilities buried in the upstream channel adjacent to the crossing, together with limited improvements, such as grouted rip rap on the upstream and downstream faces of the crossing, and, possibly, a Portland Cement Concrete (PCC) slab to facilitate stability of the roadway during overtopping events.	As stated in RTC #19 FMIT-5, after further deliberation and consideration of all 90% comments received on this topic, PG&E changed the design of the northern BCW crossing to involve a) keeping the existing access road and b) burying the piping/ conduits within BCW and up-gradient of the existing access road. Similarly and concurrently, PG&E also changed the design of the southern BCW crossing to remove the aerial crossing and bury piping/conduit within BCW **(see Attachment C)**.			Comment resolved.	Comment resolved.
818	Hualapai/TRC	Design	Infrastructures	BOD Supp.	Supplemental	This evaluation and quite possibly the outcome thereof needs to be revised to seriously consider	See above				

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					Section 4	the option of utilizing the crossing that presently exists (a vented ford) with the underground utilities buried in the upstream channel adjacent to the crossing, together with limited improvements, such as grouted rip rap on the upstream and downstream faces of the crossing, and, possibly, a Portland Cement Concrete (PCC) slab to facilitate stability of the roadway during overtopping events.					
819	Cocopah/TRC	Design	Infrastructures	BOD Supp.	Supplemental Section 4	This evaluation and quite possibly the outcome thereof needs to be revised to seriously consider the option of utilizing the crossing that presently exists (a vented ford) with the underground utilities buried in the upstream channel adjacent to the crossing, together with limited improvements, such as grouted rip rap on the upstream and downstream faces of the crossing, and, possibly, a Portland Cement Concrete (PCC) slab to facilitate stability of the roadway during overtopping events.	See above				
820	Chemehuevi/ TRC	Design	Infrastructures	BOD Supp.	Supplemental Section 4	This evaluation and quite possibly the outcome thereof needs to be revised to seriously consider the option of utilizing the crossing that presently exists (a vented ford) with the underground utilities buried in the upstream channel adjacent to the crossing, together with limited improvements, such as grouted rip rap on the upstream and downstream faces of the crossing, and, possibly, a Portland Cement Concrete (PCC) slab to facilitate stability of the roadway during overtopping events.	See above				
821	FMIT/TRC	Non-design	Request for Information	BOD Supp. 4.1 Description, Design Basis, and Assumptions p.4-1	Supplemental Section 4 Improved drainage in the area will allow more flow, and thereby would both protect the road and embedded infrastructure and return BCW to a more natural state over time.	Please provide a detailed description of how improved drainage using the preferred design proposal will "return BCW to a more natural state over time". In addition within this description please indicate how the preferred alternative does a better job at returning BCW to a more natural state than any of the other options.	As stated in RTC #19 FMIT-5, after further deliberation and consideration of all 90% comments received on this topic, PG&E changed the design of the northern BCW crossing to involve a) keeping the existing access road and b) burying the piping/ conduits within BCW and up-gradient of the existing access road. Similarly and concurrently, PG&E also changed the design of the southern BCW crossing to remove the aerial crossing and bury piping/conduit within BCW. Therefore, this comment is considered moot given this proposed design change.			Noted.	
822	Hualapai/TRC	Non-design	Request for Information	BOD Supp. 4.1 Description, Design Basis, and Assumptions p.4-1	Supplemental Section 4 Improved drainage in the area will allow more flow, and thereby would both protect the road and embedded infrastructure and return BCW to a more natural state over time.	Please provide a detailed description of how improved drainage using the preferred design proposal will "return BCW to a more natural state over time". In addition within this description please indicate how the preferred alternative does a better job at returning BCW to a more natural state than any of the other options.	See above			Noted.	
823	Cocopah/TRC	Non-design	Request for	BOD Supp. 4.1	Supplemental	Please provide a detailed description of how improved drainage using the preferred design	See above			Noted.	

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			Information	Description, Design Basis, and Assumptions p.4-1	Section 4 Improved drainage in the area will allow more flow, and thereby would both protect the road and embedded infrastructure and return BCW to a more natural state over time.	proposal will "return BCW to a more natural state over time". In addition within this description please indicate how the preferred alternative does a better job at returning BCW to a more natural state than any of the other options.					
824	Chemehuevi/ TRC	Non-design	Request for Information	BOD Supp. 4.1 Description, Design Basis, and Assumptions p.4-1	Supplemental Section 4 Improved drainage in the area will allow more flow, and thereby would both protect the road and embedded infrastructure and return BCW to a more natural state over time.	Please provide a detailed description of how improved drainage using the preferred design proposal will "return BCW to a more natural state over time". In addition within this description please indicate how the preferred alternative does a better job at returning BCW to a more natural state than any of the other options.	See above			Noted.	
825	DOI-336	Design	Infrastructure	4.1/4-2 & 4.2/4-2	…the riprap and metal guard rails will also be stained to more closely match the surrounding natural colors. New riprap would be stained to match adjacent riprap.	It is unclear why stained riprap would be necessary if local materials are used.	Staining may be needed because the use of locally-sourced materials may not guarantee identical coloring. The colors may differ if the (locally-available) riprap source rock has a different color(s) than the existing soil and rock at the site. Even if they are from the same source material, the colors may differ because the newly-excavated riprap will have fresh cut faces, while the soil and rock exposed at the site has been subject to erosion and other weathering processes that affect color. PG&E recognizes that it is the preference of the land owner and/or manager as to whether the riprap is stained. PG&E will coordinate with land owner and/or manager on this item.		Resolved.		Comment resolved. This will be addressed by the individual landowner(s)/land manager.
826	DOI-337	Non-design	Editorial	4.1/4-2	In addition, in	Correction: CFDW should be CDFW	Correction will be made		Resolved.		Comment resolved.

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					compliance with the CFDW AMMs implemented …		as requested.				
827	DTSC-184	Design	Infrastructures	4.4 Evaluation of the TRC's Proposed Concept for BCW Crossing. Page 4-4.	• The proposed unvented ford would drastically alter the road profile which would violate PG&E's design criterion to keep the elevation and profile of the road surface at or near existing. - The design criterion was developed so that the features of the new crossing (such as elevation, width, slopes, etc.) would be similar to those of the existing service/access road to allow continued use by PG&E and other entities. Drastically altering the road parameters could negatively affect all users.	The cited bullet should be deleted or significantly revised. The bullet discusses the ford altering existing road profile, yet the section states, "*Both options of the ford concept, a vented ford and an unvented ford, would be similar to existing or past conditions at the Topock site.*" and "*the end result would look much like the unimproved ford that was used to cross the wash before the existing culverts were installed.*" Both statements indicate that little change would be expected from the ford design in direct contrast to the cited bullet. The RCB design seems to yield the greatest profile change.	As stated in RTC #19 FMIT-5, after further deliberation and consideration of all 90% comments received on this topic, PG&E changed the design of the northern BCW crossing to involve a) keeping the existing access road and b) burying the piping/ conduits within BCW and up-gradient of the existing access road. Similarly and concurrently, PG&E also changed the design of the southern BCW crossing to remove the aerial crossing and bury piping/conduit within BCW. Therefore, this comment is considered moot given this proposed design change.	Resolved.			Comment resolved.
828	DTSC-185	Design	Infrastructures	4.4 Evaluation of the TRC's Proposed Concept for BCW Crossing. Page 4-4.	"The fords would be overtopped by the 25-year 24-hr design storm event, which would violate PG&E's hydraulic design criterion. In other words, the fords	Regarding the latter highlighted sentence: As storm events are of short duration at the site, the cited bullet does not appear significant, especially since alternative access roads exist and could suffice for short durations. Are there any other design or operational justification that should be considered?	As stated in RTC #19 FMIT-5, after further deliberation and consideration of all 90% comments received on this topic, PG&E changed the design of the northern BCW crossing to involve a) keeping the existing access road and b) burying the piping/ conduits within BCW	Resolved.			Comment resolved.

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					would be impassable during the design storm event."		and up-gradient of the existing access road. Similarly and concurrently, PG&E also changed the design of the southern BCW crossing to remove the aerial crossing and bury piping/conduit within BCW. Therefore, this comment is considered moot given this proposed design change.				
829	DOI-338	Non-design	Process	Section 4.4/4-4	The ability of the proposed vented ford to pass vehicles during flood events would likely be less than that provided by the existing culverts.	Please provide rationale for this assertion.	As stated in RTC #19 FMIT-5, after further deliberation and consideration of all 90% comments received on this topic, PG&E will change the design of the northern BCW crossing to involve a) keeping the existing access road and b) burying the piping/ conduits within BCW and up-gradient of the existing access road. Similarly and concurrently, PG&E will also change the design of the southern BCW crossing to remove the aerial crossing and bury piping/conduit within BCW. Therefore, this comment is considered moot given this proposed design change.				
830	FMIT/TRC	Design	Request for Information	BOD Supp. 4.4 Evaluation of the TRC's Proposed Concept for BCW Crossing p.4-4	Supplemental Section 4 A ford would require burying the remedy infrastructure underground in the bottom of the wash, which would violate Agency direction and Tribal preference provided at the 30% phase of design. - PG&E was directed to eliminate trenches in Bat	Please indicate the amount of soil removal within Bat Cave Wash that will be required for the current constructed bridge alternative vs utilizing the crossing that presently exists (a vented ford) with the underground utilities buried in the upstream channel adjacent to the crossing, or replacing the existing structure with a ford, and again placing the utilities in the upstream channel	As stated in RTC #19 FMIT-5, after further deliberation and consideration of all 90% comments received on this topic, PG&E changed the design of the northern BCW crossing to involve a) keeping the existing access road and b) burying the piping/ conduits within BCW and up-gradient of the existing access road. Similarly and concurrently, PG&E also changed the design of the southern BCW crossing to remove the			Noted.	

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					Cave Wash after the 30% phase of design.		aerial crossing and bury piping/conduit within BCW. Therefore, this comment is considered moot given this proposed design change.				
831	Hualapai/TRC	Design	Request for Information	BOD Supp. 4.4 Evaluation of the TRC's Proposed Concept for BCW Crossing p.4-4	Supplemental Section 4 A ford would require burying the remedy infrastructure underground in the bottom of the wash, which would violate Agency direction and Tribal preference provided at the 30% phase of design. - PG&E was directed to eliminate trenches in Bat Cave Wash after the 30% phase of design.	Please indicate the amount of soil removal within Bat Cave Wash that will be required for the current constructed bridge alternative vs utilizing the crossing that presently exists (a vented ford) with the underground utilities buried in the upstream channel adjacent to the crossing, or replacing the existing structure with a ford, and again placing the utilities in the upstream channel	See above			Noted.	
832	Cocopah/TRC	Design	Request for Information	BOD Supp. 4.4 Evaluation of the TRC's Proposed Concept for BCW Crossing p.4-4	Supplemental Section 4 A ford would require burying the remedy infrastructure underground in the bottom of the wash, which would violate Agency direction and Tribal preference provided at the 30% phase of design. - PG&E was directed to eliminate trenches in Bat Cave Wash after the 30% phase of design.	Please indicate the amount of soil removal within Bat Cave Wash that will be required for the current constructed bridge alternative vs utilizing the crossing that presently exists (a vented ford) with the underground utilities buried in the upstream channel adjacent to the crossing, or replacing the existing structure with a ford, and again placing the utilities in the upstream channel	See above			Noted.	
833	Chemehuevi/ TRC	Design	Request for Information	BOD Supp. 4.4 Evaluation of the TRC's Proposed Concept for BCW Crossing	Supplemental Section 4 A ford would require burying the remedy infrastructure	Please indicate the amount of soil removal within Bat Cave Wash that will be required for the current constructed bridge alternative vs utilizing the crossing that presently exists (a vented ford) with the underground utilities buried in the upstream channel adjacent to the crossing, or replacing the existing structure with a ford, and again placing the utilities in the upstream channel	See above			Noted.	

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				p.4-4	underground in the bottom of the wash, which would violate Agency direction and Tribal preference provided at the 30% phase of design. - PG&E was directed to eliminate trenches in Bat Cave Wash after the 30% phase of design.						
834	DTSC-192	Non-design	Editorial	Section 5.1.1/ Page 38	The purpose of MW-BB and MW-CC is to provide arsenic monitoring data...from the IRL-2 injection well.... ALSO The purpose of MW-DD and MW-EE is to provide arsenic monitoring data...from the IRL-2 injection well....	Typo? MW-DD and MW-EE is for IRL-3.	Text will be changed to reference IRL-3.	Resolved.			Comment resolved.
835	DTSC-193	Design	CEQA/EIR	Section 5.1.1/ Page 38	Southwest Gas reserves final concurrence pending the review of final construction plans and their direct observations in the field during construction.	What will PG&E do if Southwest Gas does not concur?	PG&E will work to diligently to resolve comments, if any, from Southwest Gas at the time of their review. If a resolution cannot be reached, PG&E will discuss with the agencies or if during construction, PG&E will formally submit a work variance request.	Resolved.			Comment resolved.
836	DOI-339	Non-design	Editorial	Section 5.1.1/5-2	The purpose of MW-DD and MW-EE is to provide arsenic monitoring data 150 feet and 225 feet, respectively, from IRL-2 injection well.	The text should reference IRL-3, not IRL-2.	Text will be changed to reference IRL-3.		Resolved.		Comment resolved.
837	DOI-340	Design	Remedial design	5.1.2/5-3	It is assumed that the Southwest	Whether the gas pipeline is in the road or 2 feet outside of the road could affect Pipeline A design and construction. It is suggested that a simple utility locate be conducted as soon as practical to remove this uncertainty in the design.	The approximate location of the pipe, shown on DWG C-07-22,		Resolved.		Comment resolved.

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					pipeline is 2 feet outside of the road…		was determined during design with a simple utility locate and a site walk with the utility representatives. The location is considered assumed and approximate because the pipe was not exposed by potholing in this exact spot. The location of the pipe is considered known with enough certainty to allow construction of the designs shown in 90% and supplemental 90% submittals. To minimize ground disturbance prior to construction, potholing of this pipe will be sequenced at the beginning of construction to determine its precise location. The text will be revised as follows: "It is assumed, <u>based on existing utility locate information</u>, that the Southwest pipeline is 2 feet outside of the road…"				
838	DOI-341	Non-design	Editorial	5.1.2/5-3	This compromise would represent slightly more risk since IRL-1 must be constructed outside of the plume…	It should be clarified that this compromise represents installation of IRL-1 infrastructure partially in the north (not south) shoulder of the road. Second, the statement "slightly more risk" seems to be referencing the alternative location for IRL-1 completely in the road. This does not make sense because the two road locations are so close to each other. Is "slightly more risk" in reference to the original location for IRL-1? Please clarify.	The first two sentences in the last paragraph of Section 5.1.2 will be modified as follows: "An alternative to constructing the IRL-1 well and associated infrastructure completely within the road is to shift the IRL-1 infrastructure as far into the road as possible with the understanding that some will extend into the <u>north</u> shoulder of the road, similar to plans for the construction of IRL-3. This compromise would present slightly more risk since IRL-1 must be constructed outside of the plume and a shift to the south-southeast <u>from the originally planned location</u> is closer to the		Resolved.		Comment resolved.

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							plume (if the well is constructed within the plume, a replacement well might be required).”				
839	DTSC-194	Design	CEQA/EIR	Section 5.3 Page 40	The new air compressor building is for the Topock Compressor Station and is not part of the remedy project.	Moving of the air compressors are necessitated by the need to create space for new generators, which are part of the remedy. Therefore the moving of the air compressors into a new structure at a different location must be considered as part of the remedy even though the ultimate use of the air compressors would not be for the remedy.	For reasons unrelated to the remedy, the Compressor Station needs to upgrade its air compressors and decided to relocate them into a new building as part of the upgrade. The new air compressor building gives the Compressor Station better access to the upgraded compressors for maintenance and other purposes and makes operation easier than it is in the existing building. Accordingly, moving the air compressors is desired by the Compressor Station for its own independent purposes. Under CEQA case law, proposals (such as the moving of the air compressors) that have independent utility from the project being analyzed (here, the remedy) do not have to be included as part of the CEQA analysis for a project, although to the extent possible based on known and reasonably foreseeable information, would be considered in a cumulative analysis as was done in the 2011 EIR (see page 6-4).	Resolved.			Comment resolved.
840	DTSC-186	Design	Other	5.4 Potential Revegetation and Mitigation Planting Areas, Page 5-4		See comments below on Appendix V.	Noted.	Noted.			
841	DTSC-187	Design	Infrastructures	5.5 Construction, Staging, and Soil Storage Areas, Page 5-7		Summary and conclusion of Appendix W is needed in section 5.5 as the section currently just references the reader to the appendix.	A table will be added in Section 5.5 to summarize and present the conclusions of Appendix W.	Resolved.			Comment resolved.
842	DTSC-195	Design	CEQA/EIR	Section 5.6 Page 43	...to facilitate the maintenance of groundwater pipelines by allowing for	The meaning of this phrase appears to be defined further down the page as “continuous dosing of hydrochloric or other acids at low concentrations...” Is this maintenance technique already in use on the site? What impact would this have on geochemistry and effectiveness of remedy? Further discussion of the anticipated long term effects is needed.	Yes, this maintenance technique has been applied at IM3. Since 2010, acidification of the effluent from IM3 (to about pH 7) to control	Resolved.			Comment resolved.

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					addition of maintenance additives...		calcium carbonate scaling (in the mineral form of calcite) has continued to decrease the risk of well fouling and precipitation of solids in the injection well filter packs and formation. Injection well performance has been monitored and reported in Section 3 of the Performance Assessment Reports (these reports are available for download on the project website www.dtsc-topock.com). Based on this experience, PG&E plans to continue to acidify the effluent water at IM3 and proposes to apply same technique for the remedy.				
843	DTSC-188	Non-design	Editorial	BOD Appendix A10 Technical Memorandum: Assessment of Biological Resources for the Proposed Soil Management Areas	Attachment 1 Representative Site Photographs	Some photographs indicate dates of March 14, 2013 and November 19, 2013. The November 2013 date does not correlate with the dates in the text of the technical memorandum (see page 2) and casts doubt on which year is correct. Revise with correct year(s).	The dates on the first two photographs should be March 14, 2013 and November 19, 2014, respectively, so the second date needs to be corrected, The November 2014 date was incorrectly reported as November 10, 2014 in the first paragraph of the Flora and Fauna Subsection of the Methods Section and will also be corrected to read November 19, 2014.	Resolved.			Comment resolved.
844	DTSC-189	Design	Other	BOD Appendix A10 Technical Memorandum: Assessment of Biological Resources for the Proposed Soil Management Areas	Park Moabi Water Supply Well	DTSC does not believe the Park Moabi Water Supply Well located in between the soil processing area and bin storage yard is called out in the design. The well is adjacent to the bin yard access road. It seems that the well should be better protected from potential truck collision and be made more apparent and isolated via design. There is also potential public perception issues related to having contaminated soils storage adjacent to a water supply well.	The Park Moabi Water Supply Well is located along the soil storage yard access road. The well's existing protective features will be evaluated and any additional protective measures or measures taken to enhance visibility and warning of the well's location will be discussed and approved with San Bernardino County staff and BLM to the extent necessary, prior to construction.	Okay.			Comment resolved.
845	DTSC-190	Non-design	Editorial	Appendix	EIR Mitigation	Since MMRP refers to “Mitigation, Monitoring and Reporting Program.” it’s best to reference	Revision will be made as	Resolved.			Comment resolved.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

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				A11/p 124	Measures CUL-1b/c-1 and 1-b/c-2 and CUL-2 are referred to as "MMRP CUL-1b/c-1 and 1-b/c-2" and "MMRP CUL-2."	individual measures as "Mitigation Measure ___."	suggested.				
846	DTSC-197	Non-design	CEQA/EIR	Appendix A11/p 125	HQSSS-A is an 8.1-acre rectangular tract of land....	The report states that HQSSS-B and HQSSS-C are owned and managed by BLM. Is the ownership/jurisdiction of HQSSS-A unclear?	HQSSS-A is owned by the federal government, managed by BLM and leased to San Bernardino County. Text will also be clarified in the BOD and C/RAWP.	Resolved.			Comment resolved.
847	DTSC-196	Non-design	CEQA/EIR	Appendix A11/p 126	HQSSS-C...The area does not show up as graded in aerial maps prior to 2010, indicating....the the disturbance to the area is recent.	The report states that HQSSS-C is owned and managed by BLM. Does BLM have land use records that provide a more definitive statement about this very large excavated area?	PG&E defers to BLM for response to this comment.		On January 20, 1934, a right-of-way for a material site was issued to BLM in Section 6, Lot 7 and 8 (which covers the HQSSS-C area) by an Act of Congress 11/9/1921.		
848	DTSC-191	Non-Design	CEQA/EIR: Cultural	Section 2.1.3/p 27 AND in Appendix A11 (page 126).	Access to the soil storage area will be via National Trails Highway.... ...tracking control BMPs... may be implemented by improving road entrance and exits, installation of temporary tracking pads... A previously unrecorded concrete post road marker . . . association with Route 66.	Please clarify the National Register status of the existing roadbed referenced in Section 2.1.3 / Page 27. Is it a remnant of National Old Trails Highway, Route 66, or both? If this road segment is part of a NRHP property, please describe (in the survey report) all elements of the property (within the expanded project area) that may contribute to its significance. Then, recommend measures to avoid or mitigate potential project impacts to those contributing elements, for the agencies' and SHPOs' review and to facilitate the CEQA analysis.	The existing roadway is a segment of the former 1947-1966 Route 66 alignment (not the original NOTH as implied by the current road name). In the past the California SHPO made several consensus determinations of National Register eligibility for the various remaining segments of Route 66 (CA-SBR-2910H) including those in the Project Area. To determine possible effects posed by the proposed remedy design, PG&E performed an integrity assessment of historic road segments in the Project Area pertaining to the NOTH and Route 66. This remaining segment (Segment X) of Route 66 was found to retain historical integrity. The assessment included the portion of the roadway in the expanded project area (see Map 3 of the				DTSC response: Comment resolved

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						Does PG&E recommend any protections other than the two measures described? (1) Incorporate Best Management Practices to prevent tracking sediment onto the public road [that appears to be National Old Trails Highway]. (2) Avoid the concrete road marker identified on the boundary of the expanded project area [that appears to be associated with an historic Route 66 alignment].	2012 *Integrity Evaluation of National Old Trails Highway/U.S. Highway 66* assessment report). A draft letter has been prepared by the BLM for transmittal to the SHPOs addressing potential project effects to all NOTH/Route 66 segments that retain historic integrity. **(Please note the description in Appendix A11 has been revised given more recent field surveys in the area; the updated information is included in *Addendum 12: Annual Report of Archaeological and Historical Resources Investigations During 2014*)** Based on the integrity assessment mentioned above, a draft *Treatment Plan* was submitted in conjunction with the proposed 90% Design to DTSC DOI and BLM for comment in September 2014. The BLM transmitted the Plan to the Tribes at that time as well for review. The Plan identifies the character-defining elements of this Segment X and proposed mitigation measures. Those measures are equally applicable to this portion of Segment X which was recently re-inspected with expansion of project area. PG&E is still anticipating comments on the draft Plan from the agencies. BLM has received comments on the draft Plan from certain Tribes.				
849	DTSC-198	Design	Infrastructures	BOD Appendix C: Calculations	Park Moabi Construction Headquarters Structural Calculations, Arcadis	The document does not appear final as hand written notes, typos, and mark-out corrections occur on many pages. Email messages (some partially highlighted) have also been directly copied into the document and it seems that they should be replaced with formal text as part of the design report.	Calculation documents may include hand-written calculations and notes if appropriate. Re-writing or other transposing of	Resolved.			Comment resolved.

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					02/02/2015		calculations may be completed by the professional engineer verifying the calculations in question.				
850	FMIT/TRC	Design	Infrastructures	BOD Supp.	Supplemental Sheet C-05-03	Fills on the north side of the road to IRL-2 should be re-evaluated and possibly eliminated and replaced with retaining walls and guard rails – to minimize disturbance of adjoining areas.	Installation of a retaining wall, guard rail, and sufficient foundation to support those structures will be a significant disruption to the adjoining areas.			Requires further discussion and explanation.	PG&E Response: As previously discussed in a similar RTC (60% RTC #442), PG&E does not recommend installation of a retaining wall because of the required amount of earthwork and associated disturbance, as well as the construction challenges in this general area. See also the associated visualization in Attachment J to the 60% RTC Table.
851	Hualapai/TRC	Design	Infrastructures	BOD Supp.	Supplemental Sheet C-05-03	Fills on the north side of the road to IRL-2 should be re-evaluated and possibly eliminated and replaced with retaining walls and guard rails – to minimize disturbance of adjoining areas.	See above				
852	Cocopah/TRC	Design	Infrastructures	BOD Supp.	Supplemental Sheet C-05-03	Fills on the north side of the road to IRL-2 should be re-evaluated and possibly eliminated and replaced with retaining walls and guard rails – to minimize disturbance of adjoining areas.	See above				
853	Chemehuevi/ TRC	Design	Infrastructures	BOD Supp.	Supplemental Sheet C-05-03	Fills on the north side of the road to IRL-2 should be re-evaluated and possibly eliminated and replaced with retaining walls and guard rails – to minimize disturbance of adjoining areas.	See above				
854	DTSC-199	Design	SOPs	O&M Plan Appendix B: Standard Operating Procedures Title: Conveyance System Inspection and Maintenance Number: PIPE-SOP-01_Rev0 Creation Date: 2/2/2015	4.6 Pig Receiver (Discharge) 1. Stage receiving tank(s) near the location where the pig receiver will be connected 5.5 Receiving tank staging 1. Stage receiving tank(s) near the retrieval point 6.4 Receiving tank staging 1. Stage secondary containment vinyl sheeting prior to tank setup 7.5 Receiving tank staging	Shouldn't portable secondary containment set up be called out while staging receiving tanks? For item 6.4 and 7.5, it is not clear if a secondary containment unit has been set up prior to the vinyl sheeting (see 6.3, #1). Is vinyl sheeting in addition to a plastic secondary containment unit/structure for 6.3 and 7.4 as well as 6.4?	Step 2.3 requires that plastic/vinyl sheeting be set up around the work area and under equipment (including receiving tanks) for all maintenance methods and this sheeting will serve as secondary containment. Sub-step #1 (under Steps 6.3 and 7.4) – "Verify that solution tank(s) has appropriate secondary containment" – is specific to the chemical solution tanks and was added to allow for mounting of these tanks on trucks with dedicated secondary containment as a preferred option.	Resolved.			Comment resolved.

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					1. Stage secondary containment vinyl sheeting prior to tank setup						
855	DTSC-200	Design	Other	C/RAWP Appendix V Technical Memorandum: Preliminary Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts. Page 2.	"Further, it is intended that mitigation plantings would mimic the natural spacing and patterns of the surrounding vegetation, therefore, mitigation plantings are located within the sparsely vegetated areas between existing perennial vegetation."	The technical memorandum discusses revegetation and restoration and details how plantings would mimic natural spacing and patterns. However, Table 1 indicates one area (i.e., RHR-1) has not been previously disturbed. If so, why would one "revegetate" a pristine area, especially if revegetation has some level of impact/disturbance. Clarification and revision is requested.	In the case of RHR-1, there was no readily apparent ground surface evidence of previous disturbance. The intent of planting in this area would be to enrich the sparsely vegetation cover of native perennial shrubs beyond what is currently present. This site will be withdrawn from future consideration and still leave enough riparian mitigation area for projected plantings. We identified more riparian mitigation planting areas than needed in case a proposed site was disqualified during review. The terms 'revegetation' and 'restoration' as they apply to the proposed plantings are described in the 4th paragraph of the Introduction section of this appendix.	Assuming that planting would have some associated impacts, DTSC is not in favor of using area RHR-1.			Comment resolved.
856	DTSC-201	Non-design	Editorial	C/RAWP Appendix V Technical Memorandum: Preliminary Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts. Page 3.	"Impacted mature plants on the historical floodplain (29 individual plants) were primarily composed of non-native tamarisk (Tamarix ramosissima) but also included two creosote bush (Larrea tridentata) plants."	Revise as indicated in the adjacent column to the left (see Table 2 for plant count)	Edit will be made as directed.	Resolved.			Comment resolved.
857	DTSC-202	Design	Other	C/RAWP Appendix V Technical Memorandum: Preliminary Assessment of	"The approximate extent of the hexavalent chromium groundwater	As Figure 1 also illustrates areas HFR-3, HFR-5 and, HFR-6 are within the chromium plume (blue line), additional text will be needed to explain that the groundwater contamination in the floodplain is currently located at depth with clean water above at the water table. However, after remedy start up, the chromium plume will be pushed through the IRZ and portions of the shallow zone in the floodplain could become contaminated. The section should also discuss this and the potential for plant uptake of IRZ byproducts, such as arsenic and manganese, expected along the	Text will be modified as directed to indicate that freshwater overlies the contaminated groundwater under current conditions. As	Arsenic and manganese are already present in the shallow floodplain and we anticipate that			Comment resolved.

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				Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts. Page 4.	plume (areas where the groundwater contains hexavalent chromium above background levels) is shown with a blue line in Figure 1. Based on that mapping, every proposed planting area, except UHR-3, is located well outside the known hexavalent chromium plume. For this reason, the potential for increased plant uptake of chromium from the groundwater would not be an issue at these locations.”	entire floodplain after the remedy is implemented. Additional discussion and revision are requested.	the remedy is designed to reduce Cr(VI) along the NTH IRZ to prevent the migration of Cr(VI) into the floodplain, and there is a shallow naturally occurring reducing rind present in the shallow floodplain, it is unlikely that elevated Cr(VI) concentrations in the shallow floodplain groundwater will occur. Geochemical and solute transport modeling of the proposed remedial strategy indicate that the simulated arsenic and manganese byproducts already present in the shallow floodplain groundwater will remain within the range of the naturally occurring average observed manganese and arsenic concentrations in the shallow floodplain groundwater. Therefore it is anticipated the proposed remedy will not result in an increase in the average manganese or arsenic concentrations in the shallow floodplain groundwater. During remedy implementation manganese and arsenic concentrations will be monitored in the floodplain to confirm the magnitude and extent of byproduct concentrations. If byproduct concentrations increase beyond maximum observed concentrations, further evaluation of plant uptake of IRZ byproducts will be considered as part of the upcoming risk assessment activities.	more will be generated as byproducts of the remedy. It is likely that the average manganese and arsenic concentrations in the shallow floodplain groundwater will increase. DTSC is concerned with soluble constituents, such as arsenic, that may become bio-available for uptake by plants. DTSC wants to make sure that contaminants in the groundwater do not become available to receptors. If they are available to receptors via plant uptake, then the associated risk should be understood. This section should discuss the potential for plant uptake of IRZ byproducts, such as arsenic and manganese, expected along the entire floodplain after the remedy is implemented, and provide consideration for its impacts.			
858	DTSC-203	Design	Other	C/RAWP Appendix V Technical	“The sole proposed planting area	Other than being located near highly contaminated groundwater (e.g., well MW-20), location UHR-3 is located adjacent to the main IRZ line – the heart of the remedy. Therefore, the potential for the land to be used during the life of the remedy increases significantly as well as for incursions into the	This planting area was chosen because it was believed that the land	Resolved.			Comment resolved.

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				Memorandum: Preliminary Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts. Page 4.	above the known groundwater plume, UHR-3, is located on a filled area adjacent to the BNSF railroad bridge."	area. UHR-3 is also adjacent to an active railroad and in its right of way. Earlier in the Introduction section (page 2) it was indicated that the planting areas were to be located away from infrastructure. Discussion is requested to see if UHR-3 area is appropriate or whether it should be dropped or replaced. Any changes would need to be reflected in the Conclusions section.	would not be needed for future remedy operations. A slightly larger amount of mitigation planting areas were identified in case a proposed site was disqualified during the 90% review. The proposed mitigation planting area UHR-3 will be dropped from further assessment of mitigation planting areas from the 90% Design.				
859	DTSC-204	Design	Other	C/RAWP Appendix W 3.3 Evaluation of Alternative Approaches to Staging Areas Pages 6-8.		PG&E has recently indicated that bin storage in Area 4 is no longer desired by them. Therefore, Area 4 space would now be available for alternative uses, and, at a minimum, could reduce use at other areas where the Tribes desire less impact. The Tribes (12/1/14) have noted a potential staging location around MW-25, yet PG&E has not responded to the potential to use that specific location. PG&E should provide a discussion based on Tribes recommendation as a response.	As discussed in RTC #803 DOI 333, in response to that comment, PG&E will eliminate the proposed soil storage area (Area 4) at Moabi Regional Park and move the proposed CHQ into Area 4. Therefore, Area 4 is no longer available for other use. The potential use of the area around MW-25 was brought up by Tribes in the March 2014 letters (see attachments to Appendix I of the 90% BOD). PG&E responded to the Tribes' question in an email dated March 11, 2014 as follows: "For Area #19, the Tribes also had the following question: There is a better place to the west (down the slope) where there already exists a large level place with a well (MW25). Why not go there instead? Proposed IRL-7 nearby. Also N (?). **Response:** The level place to the west of Area #19 serves as an access road used by BNSF, Southwest Gas Company, and PG&E gas transmission department. The access to their facilities cannot be impeded by PG&E's remediation work. Although a small portion	Resolved.			Comment resolved.

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							of this area may be periodically useful and available for PG&E remediation work, these other utility constraints and limited access using a steep driveway and tight turning radius led PG&E to conclude that this potential staging area has little value to the project." To date, PG&E has not received feedback from the Tribes on this response or an explanation as to why Tribes think this area is useful as a potential staging area.				
860	FMIT/TRC	Design	Infrastructures	Append W Table 1	C/RAWP Supplemental	Tribes have specifically expressed objections to the use of areas 6, 7, 12 and 13. Supplemental BOD information contains alternatives to these areas. The Tribes would like these alternatives to be utilized and assurance that areas 6,7,12, and 13 will be avoided. In addition, there should be a process to track and verify that the soil staging and construction work and temp storage areas AS IMPLEMENTED DURING CONSTRUCTION are actually consistent with Tribal input and the final lists extent of each area and its designated appropriate use of as ultimately determined.	Section 3.4 of the technical memorandum presents the following conclusion of the alternatives analysis: "All of the alternative approaches evaluated to avoid the use of the proposed Upland areas would have adverse effects on worker safety, public safety and nuisance, environmental impacts, and construction schedule duration that in PG&E's view would outweigh the benefits of eliminating those areas. Location of support zones for staging of construction-related equipment in close proximity to the actual construction activities is critical to PG&E's proposed approach for construction at the Topock site, and specifically in the Upland. This will allow for the safe and effective installation of all remedial facilities, as well as the subsequent decommissioning of IM-3, while protecting the surrounding sensitive resources, minimizing the overall construction footprint and use of			Comment noted. The Tribe continues to emphasize the unsuitability of these areas for use as work/storage areas during construction. If such use is allowed to occur, every effort should be made to limit the actual area used, and to minimize impacts on these areas and their surroundings. Comment is considered unresolved.	DTSC response: Tribal comment noted. Agencies will provide direction to PG&E regarding use of these areas.

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							undisturbed areas to the extent practicable, and minimizing the overall environmental impacts associated with the work activities." PG&E reiterates that the current proposed use of the Upland areas (Areas #6, 7, 12, and 13), which are in close proximity to the remedial infrastructure in the Upland, is required for efficient, successful and safe implementation of construction activities as they will result in the following benefits: • Providing the minimum number of practical locations to temporarily stage the required quantity of equipment and materials necessary to safely construct Pipelines A and H, the Upland monitoring and remediation wells, Bat Cave Wash crossing, and supporting infrastructure. • Increasing worker safety (e.g., reduces onsite construction traffic, vehicle congestion at primary work zones, and the overall mileage required to complete the work). • Increasing public safety and reducing nuisance to the public by decreasing the density of construction vehicle traffic on public roads (e.g., between Moabi Regional Park and				

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							the staging areas in the Upland), and reducing both the trip frequency and trip duration for construction vehicles (typically have relatively poor visibility) traveling between primary work zones and distant staging areas. • Reducing environmental impacts associated with execution of the work, including dust, noise, and GHG emissions. • Reducing the total construction schedule by allowing for the most efficient construction approach. In general, increasing the distance between an active primary work zone and its supporting staging area has several adverse impacts. Travel time increases significantly due to the greater distance between these locations, especially given the generally slow rate of travel of construction vehicles. To adequately supply a primary work zone from distant staging areas also requires use of either more frequent or larger, higher-capacity support vehicles to deliver required construction materials. Primary work zones then become more congested due to either the larger quantity of smaller vehicles or having larger vehicles unloading their materials at the already tightly-constrained primary work zones. The support vehicles will thus be more likely to				

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							become backed up at the primary work zone, impacting traffic at and near the work area and potentially traffic on nearby public roads (such as National Trails Highway). Congestion in primary work zones will also result in increased safety hazards associated with construction vehicles, which typically have relatively poor visibility, in close proximity to equipment and construction personnel. Increased traffic will increase dust, noise, and GHG emissions. Regarding the process for tracking and verification of the use of soil staging areas during remedy construction, PG&E refers the commenter to CIMP section 2.16 (Protocols for the inspection of remediation facilities and/or staging areas throughout the construction phase), CIMP section 2.12 (Protocols for Tribal Monitors to observe ground disturbing activities), and PA Appendix C – Monitoring Protocol/CHPMP §§ 6.6.4 (Protocols for Tribal Monitors to observe ground disturbing activities).				
861	Hualapai/TRC	Design	Infrastructures	Append W Table 1	C/RAWP Supplemental	Tribes have specifically expressed objections to the use of areas 6, 7, 12 and 13. Supplemental BOD information contains alternatives to these areas. The Tribes would like these alternatives to be utilized and assurance that areas 6,7,12, and 13 will be avoided. In addition, there should be a process to track and verify that the soil staging and construction work and temp storage areas AS IMPLEMENTED DURING CONSTRUCTION are actually consistent with Tribal input and the final lists extent of each area and its designated appropriate use of as ultimately determined.	See above			Comment noted. Hualapai continue to emphasize the unsuitability of these areas for use as work/ storage areas during construction. Comment is considered unresolved.	DTSC response: Tribal comment noted. Agencies will provide direction to PG&E regarding use of these areas.
862	Cocopah/TRC	Design	Infrastructures	Append W Table 1	C/RAWP Supplemental	Tribes have specifically expressed objections to the use of areas 6, 7, 12 and 13. Supplemental BOD information contains alternatives to these areas. The Tribes would like these alternatives to be utilized and assurance that areas 6,7,12, and 13 will be avoided. In addition, there should be a process to track and verify that the soil staging and construction work and temp storage areas AS IMPLEMENTED DURING CONSTRUCTION are actually consistent with Tribal input and the final lists extent of each area and its designated appropriate use of as ultimately determined.	See above			Comment noted. The Tribes continue to emphasize the unsuitability of these areas for use as work/ storage areas during construction. If such use is allowed to occur,	DTSC response: Tribal comment noted. Agencies will provide direction to PG&E regarding use of these areas.

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										every effort should be made to limit the actual area used, and to minimize impacts on these areas and their surroundings. Comment is considered unresolved.	
863	Chemehuevi/ TRC	Design	Infrastructures	Append W Table 1	C/RAWP Supplemental	Tribes have specifically expressed objections to the use of areas 6, 7, 12 and 13. Supplemental BOD information contains alternatives to these areas. The Tribes would like these alternatives to be utilized and assurance that areas 6,7,12, and 13 will be avoided. In addition, there should be a process to track and verify that the soil staging and construction work and temp storage areas AS IMPLEMENTED DURING CONSTRUCTION are actually consistent with Tribal input and the final lists extent of each area and its designated appropriate use of as ultimately determined.	See above			Comment noted. The Tribes continue to emphasize the unsuitability of these areas for use as work/ storage areas during construction. If such use is allowed to occur, every effort should be made to limit the actual area used, and to minimize impacts on these areas and their surroundings. Comment is considered unresolved.	DTSC response: Tribal comment noted. Agencies will provide direction to PG&E regarding use of these areas.
General Comments – Construction/Remedial Action Work Plan											
864	DOI-128	Non-design	Editorial	C/RAWP TOC/ Appendix B	SOPs	The TOC does not list titles of the SOPs contained in Appendix B. The titles should be included in the TOC or at the beginning of Appendix B.	Titles of the SOPs will be included at the beginning of Appendix B.		Accepted.		Comment resolved pending DOI review of the final design documents.
865	DOI-129	Non-design	Editorial	Main text. Acronyms and Abbreviations/ ix-xi		Please include the following: NRC – National Response Center, EMA – California (?) Emergency Management Agency [consider using CalEMA], SWPPP – Stormwater Pollution Prevention Plan, and CUPA – Certified Unified Program Agency	Additions will be made as requested. The reference in the C/RAWP is to California Emergency Management Agency. However, California EMA has changed its name to California OES, therefore, references to EMA will be replaced by OES in the Final Design.		Accepted.		Comment resolved pending DOI review of the final design documents.
Specific Comments – Construction/Remedial Action Work Plan, Section 1: Introduction											
866	DTSC-150	Non-design	Request for Information	Figure 1.2-2 and similar figures in design	+ notation for existing water supply wells	It is DTSC's understanding that the locations of PGE 1&2 are not where depicted. Since this is supposed to be a standalone document that would guide the remedy until completion, those well locations should be accurately plotted.	Applicable figures in the BOD, O&M Manual, and C/RAWP will be revised as requested. See also RTC #142 DTSC-26.	Resolved.			Comment resolved.
Specific Comments – Construction/Remedial Action Work Plan, Section 2: Project Organization and Management/Project Management Plan											
867	DOI-130	Non-design	Editorial	2.1/2-1	Exhibit 2.1-1 presents the project team organization chart for the construction and startup phase.	The Program Quality Assurance Manager and Health and Safety Manager are conspicuously absent from Exhibit 2.1-1. Please include these individuals in this Exhibit and in Table 2.1-1.	Exhibit 2.1-1 was updated to reflect current project team organization and to address this comment (see **Attachment S** of the final RTC table). Table 2.1-1 and Section 2 text will be updated in accordance with the exhibit.		Accepted.		Comment resolved pending DOI review of the final design documents.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
868	DOI-131	Non-design	Process	2.1/2-1	The project organization is intended to be a "living" element throughout the construction and startup, meaning that it can be updated as new information becomes available as the project proceeds or as site circumstances change.	Please clarify whether it is the organization, the personnel in the organization, or both that may change. Also, note how changes will be communicated to the stakeholders.	Both the organization and personnel may change as the project proceeds or as site circumstances change. Key changes to the organization or personnel will be included in the monthly progress reports during construction (see Section 2 of Exhibit 2.6-2, Monthly Progress Report Template). The monthly reports will be formally submitted to DTSC and DOI, and will be posted on a SharePoint site for access for Tribes and stakeholders.		Resolved.		Comment resolved.
869	DOI-132	Non-design	Editorial	2.2/2-1	These principles as described briefly…	"as" should be "are". Please revise.	Revision will be made as requested.		Resolved.		Comment resolved.
870	DOI-133	Non-design	Editorial	Exhibit 2.1-1/2-3	Dashed lines	Dashed lines appear to be lines of communication. Please define dashed and solid lines.	Correct, dashed lines are lines of communication. Solid lines are lines of authority, responsibility, and communication.		Resolved.		Comment resolved.
871	DOI-134	Non-design	Editorial	Table 2.1-1/2-19	Column titled "Project Role, Summary of Qualifications, and Lines of Communication"	Qualifications are not shown and this word should be eliminated from the column title and replaced with "Responsibilities". Lines of authority should be addressed and added to the column title.	Table 2.1-1 will be updated as requested.		Accepted.		Comment resolved pending DOI review of the final design documents.
872	DOI-135	Non-design	Process	2.3.3/2-5	General Comment	Provide some summary level discussion on how training will be documented and available for review by stakeholders.	The following text will be added at the end of the first paragraph under Section 2.3.3: "Attendees to each training will be required to sign a training roster. Copies of training rosters will be kept at the CHQ and available for review by stakeholders upon request."		Resolved.		Comment resolved.
873	DOI-136	Non-design	Editorial	2.3.3.1/2-5	The training occurs before field work and design submittal.	Please clarify meaning of training "before design submittal'.	This portion of the cited text is intended to note that key PG&E project staff and contractors that are involved in the design, have received cultural and historical resources sensitivity training, during the remedy design process		Resolved.		Comment resolved.

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							and before design submittal.				
874	DOI-137	Non-design	Editorial	2.4.2.1/2-8	Remedial infrastructure are planned on federal lands, including lands administered by U.S. Bureau of Reclamation (BOR) (managed by BLM) and HNWR (managed by USFWS)…	The implication in this paragraph is that there are federal agencies other than BLM, BOR and USFWS associated with the project. This is not the case. Additionally, the ponds and two storage areas are located on BLM lands.	Text will be revised to read as follows: "Remedial infrastructures are planned on federal lands, for example lands managed by BLM, ~~including~~ lands administered by U.S. Bureau of Reclamation (BOR) (managed by BLM), and the HNWR (managed by USFWS)…"		Resolved.		Comment resolved.
875	DOI-138	Non-design	Process	2.4.2.2 and 2.4.2.3/2-8 and 2-9	General Comment	Provide some discussion of the timing to acquire all the non-federal lands access approvals and to resolve RWQCB requirements for the evaporation ponds.	The following text will be added: "PG&E is working towards obtaining all non-federal access agreements within 30 days of DTSC's approval of the Final Design and C/RAWP and within 90 days of DOI's request for such access agreements, consistent with the timing requirements in the Corrective Action Consent Agreement between PG&E and DTSC and the Remedial Design/Remedial Action Consent Decree between PG&E and the United States, on behalf of DOI. PG&E is coordinating with the RWQCB on the substantive requirements for use of the ponds for disposal of remedy-produced water streams. Goal is to obtain appropriate WDRs prior to agencies' approval of the Final Design and C/RAWP."		DOI concurs with the response.		Comment resolved.
876	DOI-139	Non-design	Legal	2.4.2.3/2-9	In addition to the above, PG&E has and will continue to coordinate with the California Regional Water Quality Board (RWQCB)	PG&E shall provide updated language that documents agreements made with the RWCQB regarding the process to be followed in modifying the current permit for acceptance of the remedy waste stream. Additional, it shall be noted that the BLM ROW for the ponds will be made consistent with the agreements made with the RWCQB.	PG&E is coordinating with the RWQCB on the substantive requirements for use of the ponds for disposal of remedy-produced water streams. PG&E is currently developing a Report of Waste Discharge (ROWD) that		Accepted.		Comment resolved pending review of the final design documents.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment (Please provide sufficient detail, include specifically what you are looking for)	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					regarding the substantive requirements applicable to the use of the evaporation ponds at the TCS for disposal of certain remedy-produced water streams.		is required by the RWQCB for purposes of amending the existing WDRs for the ponds to accept remedy-produced wastewater. The amended WDRs will include the requirements for discharging the remedy-produced wastewater into the existing ponds. PG&E understands further CEQA evaluation by DTSC would be required if there are new or substantially more severe impacts than those already disclosed in prior environmental review, but does not anticipate such impacts (see RTC #370). PG&E's regarding the BLM ROW is pending discussion with DOI. Updated language regarding the above process will be provided in the final design document and the C/RAWP.				
877	DOI-140	Non-design	Legal	2.4.3/2-9	PG&E welcomes DOI's input as to how DOI would like to receive this information (for example, as a standalone submittal, as an attachment to the progress reports, etc.).	It is DOI's preference to receive the ARAR compliance documentation as a standalone document. ARAR tables shall be updated to include actions taken to satisfy the ARAR and/or corrective measures taken if non-compliance occurs. Quarterly documentation shall continue through the first 5-year review period and then shall be submitted annually thereafter.	Text will be added to Item 1 of Section 2.4.3 to reflect DOI's stated preference.		Accepted.		Comment resolved pending DOI review of the final design documents.
878	DOI-141	Non-design	Legal	2.5/2-10	For purposes of this milestone, the duration of remedy construction will begin with DOI approval of the 100 percent design, and will end with PG&E's submittal of the Construction Completion	Revise the text to note that the duration period for the milestone shall continue through DOI's determination that the remedy is Operational and Functional.	Milestone #1 and Milestone #2 will be revised as suggested.		DOI concurs with the response.		Comment resolved pending DOI review of the final design documents.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					Report.						
879	DOI-142	Non-design	Legal	2.5/2-10		Submittal of the Construction Completion Report shall be included as a compliance milestone.	The Construction Completion report will be added to Section 2.5, consistent with CD Section 71 b(4).		DOI concurs with the response.		Comment resolved pending DOI review of the final design documents.
880	FMIT/TRC	Non-design	CEQA/EIR	C/RAWP Sect.2.5 p. 2-10 Compliance Milestones	Annual monitoring reports for specified archaeological and historic properties pursuant to Section 6.6.5 of the CHPMP. Annual monitoring reports are proposed to be submitted to BLM by December 31 of each year for the duration of remedy construction. For purposes of this milestone, the duration of remedy construction will begin with DOI approval of the 100 percent design, and will end with PG&E's submittal of the Construction Completion Report.	It is not clear why monitoring would not occur over the entire remedy duration as it is possible that impacts will occur during routine maintenance of the system. Please explain how monitoring and maintenance activities will be conducted in a way to ensure that impacts to archeological resources do not occur after remedy start up. In addition please explain how integrity of cultural resources will be ensured post remedy start up.	EIR mitigation measure CUL-1a-3 requires annual monitoring throughout the duration of the Project. CHPMP Sections 6.6.4, 6.6.5, and 6.8 call for construction monitoring and periodic monitoring during and after the construction period. Integrity of resources will be ensured through continued Tribal Consultation as required by the Programmatic Agreement, including the PA's Appendix B Consultation Protocol and CHPMP (Section 6), CUL-1a-8(a), protocol for continued Tribal communication, CUL-1a-8(j), protocol for advanced notification of project-related activities, and CUL-1a-8(l), provisions affording sufficient tribal monitors to observe ground-disturbing activities and/or other scientific surveying (e.g., biological surveys) that may occur in preparation for construction activities.			Through discussions with Tribal representatives, terrestrial (ground-based) and low-altitude aerial LIDAR surveys should be considered/ reconsidered for documenting both existing conditions, and changed conditions resulting from remedy construction, operation, maintenance and decommissioning.	DTSC response: Tribal comment noted. PG&E Response: As requested by stakeholders and as noted by PG&E at the August 18-19 TWG meeting, PG&E will continue to evaluate low-altitude aerial LIDAR surveys for potential application to the groundwater remedy.
881	Hualapai/TRC	Non-design	CEQA/EIR	C/RAWP Sect.2.5 p. 2-10 Compliance Milestones	Annual monitoring reports for specified archaeological and historic properties pursuant to Section 6.6.5 of the CHPMP. Annual monitoring reports are proposed to be submitted to BLM by December 31 of each year for the duration of	It is not clear why monitoring would not occur over the entire remedy duration as it is possible that impacts will occur during routine maintenance of the system. Please explain how monitoring and maintenance activities will be conducted in a way to ensure that impacts to archeological resources do not occur after remedy start up. In addition please explain how integrity of cultural resources will be ensured post remedy start up.	See above			Through discussions with Tribal representatives, terrestrial (ground-based) and low-altitude aerial LIDAR surveys should be considered / reconsidered for documenting both existing conditions, and changed conditions resulting from remedy construction, operation, maintenance and decommissioning.	See response 880

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					remedy construction. For purposes of this milestone, the duration of remedy construction will begin with DOI approval of the 100 percent design, and will end with PG&E's submittal of the Construction Completion Report.						
882	Cocopah/TRC	Non-design	CEQA/EIR	C/RAWP Sect.2.5 p. 2-10 Compliance Milestones	Annual monitoring reports for specified archaeological and historic properties pursuant to Section 6.6.5 of the CHPMP. Annual monitoring reports are proposed to be submitted to BLM by December 31 of each year for the duration of remedy construction. For purposes of this milestone, the duration of remedy construction will begin with DOI approval of the 100 percent design, and will end with PG&E's submittal of the Construction Completion Report.	It is not clear why monitoring would not occur over the entire remedy duration as it is possible that impacts will occur during routine maintenance of the system. Please explain how monitoring and maintenance activities will be conducted in a way to ensure that impacts to archeological resources do not occur after remedy start up. In addition please explain how integrity of cultural resources will be ensured post remedy start up.	See above			Through discussions with Tribal representatives, terrestrial (ground-based) and low-altitude aerial LIDAR surveys should be considered / reconsidered for documenting both existing conditions, and changed conditions resulting from remedy construction, operation, maintenance and decommissioning.	See response 880
883	Chemehuevi/ TRC	Non-design	CEQA/EIR	C/RAWP Sect.2.5 p. 2-10 Compliance Milestones	Annual monitoring reports for specified archaeological and historic properties	It is not clear why monitoring would not occur over the entire remedy duration as it is possible that impacts will occur during routine maintenance of the system. Please explain how monitoring and maintenance activities will be conducted in a way to ensure that impacts to archeological resources do not occur after remedy start up. In addition please explain how integrity of cultural resources will be ensured post remedy start up.	See above			Through discussions with Tribal representatives, terrestrial (ground-based) and low-altitude aerial LIDAR surveys should be considered /	See response 880

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					pursuant to Section 6.6.5 of the CHPMP. Annual monitoring reports are proposed to be submitted to BLM by December 31 of each year for the duration of remedy construction. For purposes of this milestone, the duration of remedy construction will begin with DOI approval of the 100 percent design, and will end with PG&E's submittal of the Construction Completion Report.					reconsidered for documenting both existing conditions, and changed conditions resulting from remedy construction, operation, maintenance and decommissioning.	
884	FMIT/TRC	Design	Process	C/RAWP, Sect. 2.6, p. 2-10	The data will be maintained in a database and will be reviewed by experienced field staff or chemist. Historic trends, water quality data, and well construction details will also be made available.	In order to ensure transparency throughout the remedy installation and operation, the Tribes request that field data and subsequent data analyses be audited by tribal representatives as the data are generated. For example, Tribes would like to be provided with all data that might result in installation of more wells, and data related to progress and success of the groundwater remedy. This process will ensure project transparency and allow the Tribes continued participation in the protection of the Cultural Spiritual Landscape.	PG&E will describe the data collected (generated or received) in the monthly progress reports to be prepared during construction (see C/RAWP Exhibit 2.6-2 (Monthly Progress Report Template) under "Description of Activities and Work Completed"). A summary of the lithologic and water quality data collected during well installation will be provided in the monthly progress reports (see C/RAWP Section 3.2.1.3, Approach to Finalizing Well Design and/or Siting). PG&E will submit the reports to DTSC and DOI, and will also post them on a SharePoint site (see C/RAWP Section 2.6.2.4). Information posted on the SharePoint site can be viewed or downloaded by Tribes and stakeholders for		DOI concurs with the response.	It is understood that agencies, especially federal, have a trust responsibility to the Tribes to implement a rigorous quality assurance review program in order the assure that the data are collected and analyzed with the utmost of care and professionalism. Comment resolved pending development of plans for outside quality assurance reviews of information and data related to laboratory analyses, water levels, surveys, operations, maintenance, safety, and mitigation.	DTSC and DOI response: The Agencies agree that careful review and evaluation of data is necessary throughout the life of the project. That is part of our role as the lead agencies to provide oversight of this project. The Agencies will ensure that PG&E follows the QA/QC programs currently in place for construction, remedy operation and groundwater monitoring. Regulatory oversight will continue throughout remedy implementation. No independent (outside) plans are necessary .However, DTSC does not agree that there is a need to develop plans for outside quality assurance review.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							review. This practice will allow data to be provided prior to installation of more wells (i.e., more than currently planned wells).				
885	Hualapai/TRC	Design	Process	C/RAWP, Sect. 2.6, p. 2-10	The data will be maintained in a database and will be reviewed by experienced field staff or chemist. Historic trends, water quality data, and well construction details will also be made available.	In order to ensure transparency throughout the remedy installation and operation, the Tribes request that field data and subsequent data analyses be audited by tribal representatives as the data are generated. For example, Tribes would like to be provided with all data that might result in installation of more wells, and data related to progress and success of the groundwater remedy. This process will ensure project transparency and allow the Tribes continued participation in the protection of the Cultural Spiritual Landscape.	See above		See above	It is understood that agencies have a trust responsibility to Hualapai and interested tribes, to implement a rigorous quality assurance review program in order the assure that the data are collected and analyzed with the utmost of care and professionalism. Comment resolved pending development of plans for outside quality assurance reviews of information and data related to laboratory analyses, water levels, surveys, operations, maintenance, safety, and mitigation.	DTSC Response: See comment to RTC #884
886	Cocopah/TRC	Design	Process	C/RAWP, Sect. 2.6, p. 2-10	The data will be maintained in a database and will be reviewed by experienced field staff or chemist. Historic trends, water quality data, and well construction details will also be made available.	In order to ensure transparency throughout the remedy installation and operation, the Tribes request that field data and subsequent data analyses be audited by tribal representatives as the data are generated. For example, Tribes would like to be provided with all data that might result in installation of more wells, and data related to progress and success of the groundwater remedy. This process will ensure project transparency and allow the Tribes continued participation in the protection of the Cultural Spiritual Landscape.	See above		See above	It is understood that agencies have a trust responsibility to the Tribes to implement a rigorous quality assurance review program in order the assure that the data are collected and analyzed with the utmost of care and professionalism. Comment resolved pending development of plans for outside quality assurance reviews of information and data related to laboratory analyses, water levels, surveys, operations, maintenance, safety, and mitigation.	DTSC Response: See comment to RTC #884
887	Chemehuevi/ TRC	Design	Process	C/RAWP, Sect. 2.6, p. 2-10	The data will be maintained in a database and will be reviewed by experienced field staff or chemist. Historic trends, water quality	In order to ensure transparency throughout the remedy installation and operation, the Tribes request that field data and subsequent data analyses be audited by tribal representatives as the data are generated. For example, Tribes would like to be provided with all data that might result in installation of more wells, and data related to progress and success of the groundwater remedy. This process will ensure project transparency and allow the Tribes continued participation in the protection of the Cultural Spiritual Landscape.	See above		See above	It is understood that agencies have a trust responsibility to the Tribes to implement a rigorous quality assurance review program in order the assure that the data are collected and analyzed with the utmost of care	DTSC Response: See comment to RTC #884

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					data, and well construction details will also be made available.					and professionalism. Comment resolved pending development of plans for outside quality assurance reviews of information and data related to laboratory analyses, water levels, surveys, operations, maintenance, safety, and mitigation.	
888	DTSC-151	Non-design	Process	2.6.1.2 Onsite Laboratory Data, Page 2-12	"Onsite laboratory samples will periodically be analyzed in conjunction with offsite analysis, and the data will be reviewed/ compared for quality and accuracy."	The frequency of comparative analysis should be stated. More frequent comparisons should be made early on during the program and relaxed after adequate assessment. The comparative analysis should be documented and periodically reported to agencies. Revision requested.	The text will be updated as follows: "Onsite laboratory samples will ~~periodically~~ be analyzed in conjunction with offsite analysis <u>at a rate of 10% for Cr(VI), Cr(T), ferrous iron, conductivity, turbidity, pH, nitrate, sulfate, alkalinity, total organic carbon, orthophosphate, manganese, and total dissolved solids.</u> Data will be reviewed/compared for quality and accuracy <u>and reported to the agencies</u>. <u>The frequency of comparative analysis will be evaluated after assessment of data.</u>"	Resolved.			Comment resolved.
889	FMIT/TRC 60% BOD RTC-730, -731	Design	Process	C/RAWP, Sect. 2.6.1.2, p. 2-12	Onsite Laboratory Data	Dissolved sulfide analyses are again not mentioned. In the 60% BOD response to comments RTC-730 and 731, PG&E's Response regarding dissolved sulfide, as follows: "Hydrogen sulfide will be periodically monitored in the on-site lab as a means to monitor subsurface conditions and understand how the process of reducing the Cr(VI) is progressing."	Because hydrogen sulfide is not currently monitored as part of groundwater monitoring at Topock, comparison samples will need to be collected and analyzed in an offsite laboratory and the onsite laboratory. Once the comparison data verifies the onsite laboratory's ability to achieve usable results, onsite analysis can be performed as needed to further the understanding of the subsurface conditions and the progress of Cr(VI) reduction. The following sentence will be added to the first paragraph of Section 2.6.1.2: "<u>Samples will also be</u>			Hexavalent chromium contamination at Topock is a chemistry problem with a chemistry solution. Also the Tribe suggests analyses for hydrogen gas. These data are critical for the safe and successful implementation of the groundwater remedy. Comment unresolved pending development of a plan to analyze hydrogen gas concentrations in water and soil within the IRZ.	PGE Response: As stated in RTC #730 (Hualapai-140 Chemehuevi-140, Cocopah-140, CRIT-140) from the 60% design, generation of hydrogen gas is not anticipated to be an issue and is therefore not planned for monitoring. For reference, here is the response that was provided to resolve that comment in the 60% design, "When in situ treatment was first being introduced as a treatment for groundwater contamination, the fear of excess

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							analyzed for hydrogen sulfide at an offsite laboratory and the onsite laboratory to establish the onsite laboratory's ability to achieve useable results, so that onsite analysis can be performed as needed."				hydrogen gas being produced at explosive levels was common. However, over time it has been shown that although hydrogen gas is produced it is not typically produced at explosive levels. Extra care needs to be taken in cases where hydrogen gas and hydrogen sulfide can displace air such as confined space (e.g. well vaults)."
890	Hualapai/TRC 60% BOD RTC-730, -731	Design	Process	C/RAWP, Sect. 2.6.1.2, p. 2-12	Onsite Laboratory Data	Dissolved sulfide analyses are again not mentioned. In the 60% BOD response to comments RTC-730 and 731, PG&E's Response regarding dissolved sulfide, as follows: "Hydrogen sulfide will be periodically monitored in the on-site lab as a means to monitor subsurface conditions and understand how the process of reducing the Cr(VI) is progressing."	See above			Hexavalent chromium contamination at Topock is a chemistry problem with a chemistry solution. Also suggest analyses for hydrogen gas. These data are critical for the safe and successful implementation of the groundwater remedy. Comment unresolved pending development of a plan to analyze hydrogen gas concentrations in water and soil within the IRZ.	See response 889
891	Cocopah/TRC 60% BOD RTC-730, -731	Design	Process	C/RAWP, Sect. 2.6.1.2, p. 2-12	Onsite Laboratory Data	Dissolved sulfide analyses are again not mentioned. In the 60% BOD response to comments RTC-730 and 731, PG&E's Response regarding dissolved sulfide, as follows: "Hydrogen sulfide will be periodically monitored in the on-site lab as a means to monitor subsurface conditions and understand how the process of reducing the Cr(VI) is progressing."	See above			Hexavalent chromium contamination at Topock is a chemistry problem with a chemistry solution. Also suggest analyses for hydrogen gas. These data are critical for the safe and successful implementation of the groundwater remedy. Comment unresolved pending development of a plan to analyze hydrogen gas concentrations in water and soil within the IRZ.	See response 889
892	Chemehuevi/ TRC 60% BOD RTC-730, -731	Design	Process	C/RAWP, Sect. 2.6.1.2, p. 2-12	Onsite Laboratory Data	Dissolved sulfide analyses are again not mentioned. In the 60% BOD response to comments RTC-730 and 731, PG&E's Response regarding dissolved sulfide, as follows: "Hydrogen sulfide will be periodically monitored in the on-site lab as a means to monitor subsurface conditions and understand how the process of reducing the Cr(VI) is progressing."	See above			Hexavalent chromium contamination at Topock is a chemistry problem with a chemistry solution. Also suggest analyses for hydrogen gas. These data are critical for the safe and successful implementation of the groundwater remedy. Comment unresolved pending development of a plan to analyze hydrogen gas concentrations in water and soil within the IRZ. These data are critical for the safe and	See response 889

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										successful implementation of the groundwater remedy. Comment unresolved pending development of a plan to analyze hydrogen gas concentrations in water and soil within the IRZ.	
893	DTSC-152	Non-design	Process	2.6.1.3 Offsite Laboratory Data, Page 2-12	"Hardcopy and electronic versions of analytical data will be archived in project files, on electronic archive tapes, and/or on other electronic storage media for the duration of remedy operation as specified in Section 2.6.2 of this C/RAWP. Electronic laboratory data will be subject to routine backup until it is archived for long-term retention."	Data Reporting: For clarity, the BOD and/or CRAWP should indicate what laboratory analytical data will be submitted with agency reports.	In general, a Level 1 laboratory analytical data package will be submitted with reports to the agencies. This is similar to the data packages that are included in the current monitoring reports. Full data packages will be available upon request.	Resolved.			Comment resolved.
894	DTSC-153	Non-design	Request for Information	Section 2.6.2.2, Records of Soil, Water, and Waste Materials…	Last sentence of first paragraph. "Soil accumulation areas will be inspected routinely, and inspection report will also be retained."	Please specify timing for "routinely." If cited elsewhere in document (O&M manual or SOP), please reference location.	The following citation will be added: "Soil accumulation areas will be inspected routinely, and inspection report will also be retained <u>(see Sections 2.1, 2.2, and 2.4 of Appendix C of the Soil Management Plan [included as Appendix L of the CRAWP])</u>."				
895	DOI-143	Non-design	Process	2.6.2.3/2-14	Records from above activities may be hardcopy or may be incorporated in an electronic database system. Hardcopy field records and/or inspection forms will be	Please note where agency representatives may access records for review.	The CHQ will serve as the primary repository for records during construction. Records kept in hard copies or electronic can be made available for review upon request. This information will be added to the text.		Accepted.		Comment resolved pending DOI review of the final design documents.

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					scanned for electronic storage.						
896	DOI-144	Non-design	Process	Exhibit 2.6-2/2-15		Section 2. This section should identify which deviations from the design have been approved by the agencies, those that are pending, and potential schedule impacts from the review/approval process. Section 4. It is recommended that the planned community activities be moved to Section 3.	**Section 2**: The following text will be added (<u>underline</u>; for addition): "…, and <u>work variance requests (i.e., material</u> deviations from…..), <u>agencies' actions on those requests, and potential schedule impacts.</u>" **Section 4**: Text related to planned community activities will be moved to Section 3 as requested.		Resolved.		Comment resolved.
897	FMIT/TRC 1m	Non-design	Request for Information	2.6.3.2 Construction Completion Report	The Construction Completion Report will be prepared by a registered professional engineer, will be submitted to DTSC and DOI, and will include: Explanation and description of modifications to the final design plans and specifications and why the modifications were necessary	Please clearly indicate what level of involvement the Tribes will have in modification decisions made to the design post submission of the 100% BOD reports.	Please see RTCs #44 FMIT/TRC, #45 Hualapai/ TRC, #46 Cocopah/TRC, and #47 Chemehuevi/ TRC. Note also that PG&E will submit the Construction Completion Report to DTSC and DOI, and will also post it on a SharePoint site for access by Tribes and stakeholders (see C/RAWP Section 2.6.2.4).		DOI concurs with the response.	Please see response to comment FMIT/TRC RTC #44.	DTSC response: Tribal comment noted.
898	Hualapai/TRC 1m	Non-design	Request for Information	2.6.3.2 Construction Completion Report	The Construction Completion Report will be prepared by a registered professional engineer, will be submitted to DTSC and DOI, and will include: Explanation and description of modifications to the final design plans and specifications and why the modifications were necessary	Please clearly indicate what level of involvement the Tribes will have in modification decisions made to the design post submission of the 100% BOD reports.	See above		See above	See response to comment Hualapai/ TRC RTC #83	DTSC response: Tribal comment noted.

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899	Cocopah/TRC 1m	Non-design	Request for Information	2.6.3.2 Construction Completion Report	The Construction Completion Report will be prepared by a registered professional engineer, will be submitted to DTSC and DOI, and will include: Explanation and description of modifications to the final design plans and specifications and why the modifications were necessary	Please clearly indicate what level of involvement the Tribes will have in modification decisions made to the design post submission of the 100% BOD reports.	See above		See above	See response to Cocopah RTC #84.	DTSC response: Tribal comment noted.
900	Chemehuevi/ TRC 1m	Non-design	Request for Information	2.6.3.2 Construction Completion Report	The Construction Completion Report will be prepared by a registered professional engineer, will be submitted to DTSC and DOI, and will include: Explanation and description of modifications to the final design plans and specifications and why the modifications were necessary	Please clearly indicate what level of involvement the Tribes will have in modification decisions made to the design post submission of the 100% BOD reports.	See above		See above	See Chemehuevi/TRC RTC #85	DTSC response: Tribal comment noted.
901	DTSC-154	Non-design	Process	2.6.3.3 Additional Reporting During Remedy Construction, Page 2-16		The section must clarify that groundwater and surface water monitoring data will be collected and reported to agencies periodically during the construction period. Please specify the reporting period as well.	The following bullet will be added (<u>underline</u>; for addition): "<u>Quarterly groundwater and surface water monitoring reports</u>."	Resolved.			Comment resolved.
902	DTSC-155	Non-design	Process	Table 2.3-1, Page 2-21	"Notify DOI 28 days in advance of sample collection activities, unless shorter notice is agreed to by DOI (CD 24)."	Please revise to notify "regulatory agencies" as opposed to just "DOI"	The cited text is in reference to a specific requirement in the CD. The following text will be added in response to this comment: "Notify DOI 28 days in advance of sample collection activities, unless shorter notice is agreed to by DOI (CD 24). <u>Notify DTSC at least</u>	Resolved.			Comment resolved.

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							7 days in advance of sample collection activities (CACA X[3])". Also add CACA X(3) in the "Required By" column. These changes will be transferred to Exhibit L2.2-1 of the O&M Manual for consistency.				
903	DTSC-156	Non-design	Other	Table 2.3-1, Page 2-21/Figure 2.3-1.	"Figure 2.3-1 presents a template for the Monthly Progress Reports."	Figure 2.3-1 is a Work Variance Request Form and needs to be replaced with the appropriate template.	The cited text will be revised to read (revisions are shown in strikeout [~~strikeout~~; for deletion] and underline [underline; for addition]): "~~Figure 2.3-1~~ Exhibit 2.6-2 presents a template for the Monthly Progress Reports."	Resolved.			Comment resolved.
904	DTSC-157	Non-design	Process	Table 2.3-1, Page 2-22.	"Submit a Work Variance Request Form (exhibit 2.3-3 to agencies for approval 5 calendar days before the anticipated work occurs or unless agreed to otherwise with agencies."	Exhibit 2.3-3 appears to be Figure 2.3-1. Revision needed. The note must also clarify that 5 day approvals will not be possible for complicated requests.	Text will be revised to read: "(~~exhibit 2.3-3~~ Figure 2.3-1) to agencies for approval 5 working days before the anticipated work occurs ~~or unless agreed to otherwise with agencies~~. Agencies will act on the request or notify PG&E that more time is required.	Resolved.			Comment resolved.
905	DOI-145	Non-design	Process	Table 2.3-1		Page 2-20. Add BLM to the "Party Communication is Addressed to" column. Page 2-23. Add DTSC to the "Discovery of changes…" party communication column. Pages 23 & 24. Order of communication should be DOI PM, DOI alt-PM, then responsible bureau for emergency and release events. Notifications under the PBA shall remain intact. Page 2-25. Included notification to DOI in the 3rd row (USDOT-regulated haz mat) Page 2-26. Included notification to DOI in the first row (human-caused disturbance) Page 2-26. Delete "interested" prior to all references to the Tribes. (Discovery of human remains or burials) Page 2-27. Included notification to DOI in the first row (previously unidentified resources) Please ensure that the changes identified above are transferred to Exhibit L2.2-1 of the O&M plan for consistency.	Page 2-20. BLM will be added as requested. Page 2-23. Addition will be made as requested. Also add CACA under the "Required By" column. Pages 23 and 24. The order of communication will be revised to reflect this comment. Page 2-25. Addition will be made as requested. Also add CD 52 under the "Required By" column. Page 2-26. Addition will be made as requested. Notification to DOI will also be added to the Site Security Plan. Page 2-26. Deletion will be made as requested. Page 2-27. Notification to DOI will be added to the 2nd sentence, under "BLM will then notify…"	Page 2-25. Also include notification to DTSC.	Resolved.		Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							These changes will be transferred to Exhibit L2.2-1 of the O&M Manual as requested.				
906	DOI-146	Non-design	Editorial	Table 2.3-1/2-22	Submit a Work Variance Request Form (exhibit 2.3-3 to agencies for approval	The reference should be Figure 2.3-1. Please revise.	See RTC #904 DTSC-157.		Resolved.		Comment resolved.
907	JDS-1	Non-design	Editorial	Table 2.3- 1; p. 2-22	Material Deviation from Workplans....	Add tribes to party communication is addressed to for changes on FMIT property	The following text will be added in response to this comment: Under the "Party Communication is Addressed To" column: "<u>FMIT (for material deviation on FMIT property)</u>" Under the "General Communication Procedures/Protocols" column: "<u>Notify FMIT that a Work Variance Request has been submitted to the agencies for a material deviation on FMIT property.</u>"			Comment resolved.	Comment resolved.
908	FMIT/TRC	Non-design	Request for Information	C/RAWP TABLE 2.3-1 Communication Framework during Construction and Startup		Within the "numerous triggering events (e.g. Progress reporting Material Deviations from Work Plan and design documents, MMRP, action-specific and location-specific ARARs" category it indicates that the only parties addressed in communications are the DTSC and DOI. The Tribes would like to know specifically why they are not on this list and would like the revised report to include Tribes under Party Communication Addressed to.	As explained in RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/TRC, Table 2.3-1 of the C/RAWP summarizes PG&E's obligation for formal communication to certain parties during the construction and startup phase. The required formal communication stems from various directives and agreements with, State and Federal Agencies, state and federal laws, MOUs with certain Tribes, the 2006 Settlement Agreement with the FMIT, and other required project documents. The table clearly spells out the parties (including Tribes in certain instances) to receive the formal communication from PG&E and the general			The Tribe reiterates the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape. PG&E should remain mindful of its independent legal obligations under the 2006 Settlement Agreement to consult with FMIT and to	DTSC response: Tribal comment noted.

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							communication procedures and protocols in accordance with the requirements. In addition, as described in RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/TRC, certain of the communications in Table 2.3-1 will be posted on a SharePoint site for access by Tribes and stakeholders.			provide all non-attorney-client privileged material information, documentary or otherwise, to the Tribe contemporaneously with its receipt or development by PG&E.	
909	Hualapai/TRC	Non-design	Request for Information	C/RAWP TABLE 2.3-1 Communication Framework during Construction and Startup		Within the "numerous triggering events (e.g. Progress reporting Material Deviations from Work Plan and design documents, MMRP, action-specific and location-specific ARARs" category it indicates that the only parties addressed in communications are the DTSC and DOI. The Tribes would like to know specifically why they are not on this list and would like the revised report to include Tribes under Party Communication Addressed to.	See above			Hualapai reiterates the need to be included (along with DOI and DTSC) as a primary party in communications regarding all project design changes, or work variance requests including material deviations from the design documents and/or C/RAWP due to discovery of changed site conditions as discussed in these earlier comments (at left). Communicating these changes needs to occur as soon as it is known that a change needs to be made. Hualapai needs to be included in those discussions via informing a tribal monitor, or email or telephone calls to designated points of contact. Once the change has been approved then a formal document can be forwarded to Hualapai.	DTSC response: Tribal comment noted.
910	Cocopah/TRC	Non-design	Request for Information	C/RAWP TABLE 2.3-1 Communication Framework during Construction and Startup		Within the "numerous triggering events (e.g. Progress reporting Material Deviations from Work Plan and design documents, MMRP, action-specific and location-specific ARARs" category it indicates that the only parties addressed in communications are the DTSC and DOI. The Tribes would like to know specifically why they are not on this list and would like the revised report to include Tribes under Party Communication Addressed to.	See above			The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs	DTSC response: Tribal comment noted.

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										occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape.	
911	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP TABLE 2.3-1 Communication Framework during Construction and Startup		Within the "numerous triggering events (e.g. Progress reporting Material Deviations from Work Plan and design documents, MMRP, action-specific and location-specific ARARs" category it indicates that the only parties addressed in communications are the DTSC and DOI. The Tribes would like to know specifically why they are not on this list and would like the revised report to include Tribes under Party Communication Addressed to.	See above			The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape.	DTSC response: Tribal comment noted.
912	DOI-147	Non-design	Process	Figure 2.3-1/2-29	General Comment	Consider adding approval signature lines for the PG&E Project Manager, the PG&E QA Manager, and the approving agency.	In response to this comment, Figure 2.3-1 was updated to include the approval signature lines for the approving agency, the PG&E Construction Manager or designee (who will sign in consultation with the Construction Steering Committee), and the PG&E QA Manager. It is recognized that approval via email can be made in lieu of signature.		Resolved.		Comment resolved.
913	FMIT/TRC 60% BOD RTC-526	Non-design	Request for Information	C/RAWP FIGURE 2.3-1 Work Variance Request Form		Please indicate what level of notification the Tribes will receive when a work variance request form is submitted. At what point in the variance review process will Tribes be notified? This is a follow-on from 60% RTC #526.	As stated in RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/TRC, PG&E will formally submit work variance request(s) to DTSC and DOI. In response to comment #907 JDS-1, PG&E will also notify the FMIT			he Tribe reiterates the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs	DTSC response: Tribal comment noted.

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							when a work variance request for material deviation on the FMIT property, is submitted to the agencies. Further, PG&E will include a description of work variance requests and/or agencies' actions in the monthly progress reports (see C/RAWP Exhibit 2.6-2 [Monthly Progress Report Template] under "Description of Activities and Work Completed"). The monthly progress reports will be submitted to DTSC and DOI, and also posted on a SharePoint site for access by Tribes and stakeholders (see C/RAWP Section 2.6.2.4).			occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape. PG&E should remain mindful of its independent legal obligations under the 2006 Settlement Agreement to consult with FMIT and to provide all non-attorney-client privileged material information, documentary or otherwise, to the Tribe contemporaneously with its receipt or development by PG&E.	
914	Hualapai/TRC 60% BOD RTC-526	Non-design	Request for Information	C/RAWP FIGURE 2.3-1 Work Variance Request Form		Please indicate what level of notification the Tribes will receive when a work variance request form is submitted. At what point in the variance review process will Tribes be notified? This is a follow-on from 60% RTC #526.	See above			Hualapai reiterates the need to be included (along with DOI and DTSC) as a primary party in communications regarding all project design changes, or work variance requests including material deviations from the design documents and/or C/RAWP due to discovery of changed site conditions as discussed in these earlier comments (at left). Communicating these changes needs to occur as soon as it is known that a change needs to be made. Hualapai needs to be included in those discussions via informing a tribal monitor, or email or telephone calls to designated points of contact. Once the change has been approved then a formal document can be forwarded to Hualapai.	DTSC response: Tribal comment noted.

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915	Cocopah/TRC 60% BOD RTC-526	Non-design	Request for Information	C/RAWP FIGURE 2.3-1 Work Variance Request Form		Please indicate what level of notification the Tribes will receive when a work variance request form is submitted. At what point in the variance review process will Tribes be notified? This is a follow-on from 60% RTC #526.	See above			The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape.	DTSC response: Tribal comment noted.
916	Chemehuevi/ TRC 60% BOD RTC-526	Non-design	Request for Information	C/RAWP FIGURE 2.3-1 Work Variance Request Form		Please indicate what level of notification the Tribes will receive when a work variance request form is submitted. At what point in the variance review process will Tribes be notified? This is a follow-on from 60% RTC #526.	See above			The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape.	DTSC response: Tribal comment noted.
Specific Comments – Construction/Remedial Action Work Plan, Section 3: Construction Methods and Sequencing											
917	DTSC-158	Design	Editorial	3.1 Key Remedy Features for Construction, Page 3-1	"An inner recirculation loop (IRL) comprising: – Extraction wells near the Colorado River (referred to as the River Bank [RB] extraction wells) to provide hydraulic capture of	Revise the cited sentence to better capture the intent of remedy features: "Extraction wells near the Colorado River (referred to as the River Bank [RB] extraction wells) to provide hydraulic capture of Cr(VI) groundwater concentrations, ~~accelerate~~ cleanup ~~of~~ the floodplain downgradient of the IRZ, enhance the flow of contaminated groundwater through the IRZ line, and control migration of IRZ-generated byproducts ~~to~~to~~ward~~ the ~~Colorado River~~ east."	The cited text will be edited as indicated with one modification such that the statement is consistent with IRL DQOs 3 and 4 (O&M Manual Volume 2): "Extraction wells near the Colorado River (referred to as the River Bank [RB] extraction wells) to provide hydraulic capture of	Resolved.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					Cr(VI) groundwater concentrations, accelerate cleanup of the floodplain, enhance the flow of contaminated groundwater through the IRZ line, and control migration of IRZ-generated byproducts toward the Colorado River.”		Cr(VI) groundwater concentrations, ~~accelerate~~ cleanup ~~of~~ the floodplain downgradient of the IRZ, enhance the flow of contaminated groundwater through the IRZ line, and control migration of IRZ-generated byproducts ~~toward the Colorado River east~~.”				
918	DOI-148	Non-design	Editorial	Exhibit 3.1-1/3-2	Five East Ravine extraction wells…	Consider adding conversion of MW-70BR-225 (ER-6) for completeness and modify text as appropriate.	The first bullet in the “TCS recirculation loop” section of Exhibit 3.1-1 will be revised as follows: “Five East Ravine extraction wells (plus up to six future provisional wells) and conversion of one existing monitoring well (MW-70BR-225, to be renamed ER-6) downgradient of the TCS in the southeast portion of the plume existing in bedrock”		Resolved.		Comment resolved.
919	DOI-149	Non-design	Editorial	Exhibit 3.1-1/3-3	Other ancillary facilities…	Bullet one will need to be modified based on the selected alternative BCW crossing.	In response to 90% comments (see RTC #19 FMIT-5), the northern and southern BCW crossing design were changed to direct bury pipes/conduits in BCW. Therefore, the first bullet would be removed.		Resolved.		Comment resolved.
920	DTSC-159	Design	Contingencies	Exhibit 3.1-1. Freshwater source/supply well/storage, Page 3-2	“Freshwater supply will be primarily from the existing well HNWR-1A, located on the HNWR in Arizona. Freshwater can also be supplied form the existing nearby well HNWR-1 as a secondary source ~~and~~	Deletion of the cited sentence is requested. If desired, more reasonable alternatives such as Topock 2/3 could be cited as contingent sources. Figure 3.1-3 should label Topock 2/3 as well as the Topock 1 location.	Since Exhibit 3.1-1 (Summary of Engineering Design Parameters and Key Remedy Features) of the C/RAWP is intended to present the planned remedy features, reference to Site B well will be removed from the exhibit. Topock-2/3 wells will be labeled in Figure 3.1-3.	Resolved.			Comment resolved.

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					~~from the existing Site B well approximately 0.9 mile north of the HNWR-1 as a contingent source~~."						
921	DTSC-160	Design	Contingencies	Exhibit 3.1-1. Supporting facilities during remedy O&M, Page 3-3		Add bullet describing the Contingent Freshwater Pre-injection Treatment System illustrated in Figure 3.1-1 and others.	The C/RAWP Exhibit 3.1.-1 is intended to list planned and future provisional features of the remedy. Contingency items are listed in Section 5 (Contingency Plan). If helpful, the following text can be added to the note for Exhibit 3.1-1: "Contingency items such as the Contingent Freshwater Pre-injection Treatment System and the Contingent Dissolved Metals Recovery System are not included in this table; they are listed in the Contingency Plan (see Section 5)."	Resolved.			Comment resolved.
922	DTSC-161	Design	Monitoring	EXHIBIT 3.1-2A. Estimated Borehole Count Associated with Well Construction: Summary, Page 3-4 to 3-8		Well CW-2S should be added to this list as per 60% design comments.	The addition of monitoring well CW-2S was originally requested for inclusion in the groundwater remedy monitoring well network by DTSC in 60% design comment 656 (DTSC-202). Through discussion with DTSC and DOI subsequent to the 60% response to comments in development of the 90% design submittal, it was determined that monitoring well CW-2S could be excluded from the design pending installation of MW-EE (formerly referred to as IRL-3-As-225), which is included in the design as a future provisional monitoring well location.	Resolved.			Comment resolved.
923	JDS-4	Design	Remedial Design	Exhibit 3.3- 3	Schedule Constraints	Construction of FW-1, IRL-3 will constrain construction of Pipeline A because it will reduce access along the access roads and may be noted.	The construction of FW-1 and IRL-3 will be a constraint in terms of access and space available for construction. However, the construction of FW-1 and IRL-3 will not be a			Noted.	

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							constraint in terms of schedule because these elements can all be built in different work packages or even simultaneously, albeit with more congestion. Exhibit 3.3-3 was intended to include only key schedule constraints related to pipelines, not space constraints.				
924	FMIT/TRC	Non-design	CEQA/EIR	C/RAWP PAGE 3- 10 3.2.1.1 Borehole Drilling and Decommissioning	Crew Vehicles and Facilities. Vehicles used by the crew to access the work zone will range from standard highway vehicles to smaller off-highway vehicles. The exact number of vehicles will change depending on location and crew size at a given time but would typically be less than five. Temporary bathroom facilities will typically be in the work zone unless the work zone is within a jurisdictional area such as drainage and washes.	Please indicate where in the Groundwater EIR the placement of toilets on the Cultural landscape was addressed. Also indicate whether Tribal input will be requested regarding the placement of toilets.	The EIR addresses the impacts of construction on the Topock Cultural Area. (See EIR, Vol. 2, pp. 4.4-60–4.4-68.) The EIR also disclosed that during construction and operations, personnel would be on site all day, and that there would be staging areas with field trailers and other places associated with accommodating the needs of field workers. (See EIR, Vol. 2, pp. 3-20–3-26.) While toilet locations are not specifically addressed in the EIR, temporary facilities including portable toilets are widely used in construction projects, and their impact was accounted for in the EIR's programmatic analysis of construction and operation impacts. Portable toilets are provided for sanitary purpose and to keep the construction areas clean. In general, these facilities are mobilized to the site prior to construction and their placement is determined during the site preparation and demarcation activities for specific construction areas, as described in C/RAWP Section 4.2.3. Tribal monitors are invited to participate in/observe the site preparation and demarcation activities.			Noted.	
925	Hualapai/TRC	Non-design	CEQA/EIR	C/RAWP PAGE	Crew Vehicles	Please indicate where in the Groundwater EIR the placement of toilets on the Cultural landscape	See above			Noted.	

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				3- 10 3.2.1.1 Borehole Drilling and Decommissioning	and Facilities. Vehicles used by the crew to access the work zone will range from standard highway vehicles to smaller off-highway vehicles. The exact number of vehicles will change depending on location and crew size at a given time but would typically be less than five. Temporary bathroom facilities will typically be in the work zone unless the work zone is within a jurisdictional area such as drainage and washes.	was addressed. Also indicate whether Tribal input will be requested regarding the placement of toilets.					
926	Cocopah/TRC	Non-design	CEQA/EIR	C/RAWP PAGE 3- 10 3.2.1.1 Borehole Drilling and Decommissioning	Crew Vehicles and Facilities. Vehicles used by the crew to access the work zone will range from standard highway vehicles to smaller off-highway vehicles. The exact number of vehicles will change depending on location and crew size at a given time but would typically be less than five. Temporary bathroom facilities will typically be in the work zone	Please indicate where in the Groundwater EIR the placement of toilets on the Cultural landscape was addressed. Also indicate whether Tribal input will be requested regarding the placement of toilets.	See above			Noted.	

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					unless the work zone is within a jurisdictional area such as drainage and washes.						
927	Chemehuevi/ TRC	Non-design	CEQA/EIR	C/RAWP PAGE 3- 10 3.2.1.1 Borehole Drilling and Decommissioning	Crew Vehicles and Facilities. Vehicles used by the crew to access the work zone will range from standard highway vehicles to smaller off-highway vehicles. The exact number of vehicles will change depending on location and crew size at a given time but would typically be less than five. Temporary bathroom facilities will typically be in the work zone unless the work zone is within a jurisdictional area such as drainage and washes.	Please indicate where in the Groundwater EIR the placement of toilets on the Cultural landscape was addressed. Also indicate whether Tribal input will be requested regarding the placement of toilets.	See above			Noted.	
928	DTSC-162	Design	Remedial design	3.2.1.1 Borehole Drilling and Decommissioning, Hollow-stem Auger. Page 3-12	"…however, it is possible that the method might prove useful for the installation of some wells such as the shallower wells near the southern end of the NTH IRZ, where the thickness of the unconsolidated material above bedrock is relatively thin and the depth	Revise the text to further indicate that HSA is not recommended at the site as it can lead to misinterpretation of the bedrock contact. The presence of a boulder can halt drilling with HSA. DTSC does not recommend HSA in most situations at the Topock site.	PG&E agrees that hollow-stem auger (HSA) is not a preferred method of borehole drilling at the site when the determination of the depth to bedrock is included as an objective for the borehole. It is anticipated that the majority of borehole drilling will be conducted using the rotary drilling with casing advance and rotosonic methods. However, HSA may be appropriate for constructing infrastructure that is not	Resolved.			Comment resolved.

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					to water is shallow."		designed based on the depth to bedrock, such as a conductor casing (i.e., carrier casing) or a relatively shallow, small diameter well. The first sentence of the second paragraph in the "Hollow-stem Auger" portion of Section 3.2.1.1 will be revised as follows: "This method is typically not used at Topock because of the rocky lithology throughout the site, which can lead to misinterpretation of the bedrock contact.".				
929	DTSC-163	Design	Remedial design	3.2.1.1 Borehole Drilling and Decommissioning, Drilling Fluid. Page 3-12	"Examples of potential additives include foaming agents (Baroid Quik Foam), bentonite-based products, and fluid control additives (soda ash, Baroid Quik Gel, Quik-Trol, EZ-Mud, Penetrol, and N-Seal). The function of some example drilling additives and the example ingredients are included in Exhibit 3.2-1."	Exhibit 3.2-1 indicates that a variety of drilling additives are organic based (e.g., ethanol, light petroleum distillate, polysaccharide). Add a discussion to the section addressing what the affects the fluids could have on the representativeness of groundwater sampling results. DTSC is concerned that the mud additives could become entrained via the filter cake/skin along the borehole wall and become lodged in the formation for some time. Adding such organics as ethanol additives to a monitoring well environment at the site could alter the redox and geochemistry and provide misleading laboratory results. The discussion should conclude that additives should be avoided and that if utilized, they should be well documented in logs, yet also discussed in the text of reports so as to alert a reviewer.	The following text will be added to the end of the referenced section: "The use of some drilling fluid additives (e.g., organic based additives), if not completely removed during the drilling and well development process, could alter the redox and geochemical environment in the aquifer proximate to the given borehole. This could lead to misleading laboratory results for groundwater samples collected during the time these additives persist in the aquifer. For this reason, in addition to the general objective of trying to minimize the amount of foreign material introduced to the subsurface during drilling, well construction and development, additives should be avoided to the extent possible. If additives are utilized the types and volumes used as well as the volumes of drilling fluid returned during drilling and the volume of groundwater removed during well	Resolved.			Comment resolved.

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							development will be documented in field logs and associated reports, and the potential effects of the additives on groundwater sample laboratory results will be presented along with the data."				
930	DTSC-164	Design	Remedial design	3.2.1.1 Borehole Drilling and Decommissioning, Borehole Decommissioning. Page 3-13 and 3-14.	"PG&E will propose to temporarily backfill the boreholes by allowing it to either naturally collapse or with the placement of clean granular material (sand)." "It is assumed that temporarily backfilled boreholes will be overdrilled within 3 to 4 months for well construction."	DTSC does not support collapse of boreholes as a planned backfill procedure as a collapse does not meet decommissioning standards for protecting aquifers. Returning to a collapsed hole, potentially 3 to 4 months later, offers no guarantee that an overdrill will stay plumb and on target and chase the collapse to total depth so that it can be completed as a well or be properly decommissioned. Of course, collapses in areas that are contaminated can exacerbate environmental conditions. Further discussion is requested to see if alternatives exist and what can be done to eliminate or minimize this practice.	The proposed practice of temporarily decommissioning a borehole as proposed in the reference section is seen by PG&E as an approach to remedy construction that is critical to both the performance of the remedy and the minimization of the total number of boreholes drilled during the project. If these boreholes are not permitted to naturally collapse, then the borehole must either be sealed using sealing material, or backfilled with clean (i.e., imported) granular material. As discussed in this section, if sealing material is used to backfill these boreholes, there is risk that a new borehole would be needed for the planned well to function properly. PG&E prefers to avoid backfilling with imported material to the extent possible because upon over-drilling it will not be practicable to separate the imported material from the formation material. If this material is ultimately reused on site (determined to be clean) then the practice will result in an increased volume of imported material being disposed onsite. The second paragraph of the referenced text will be modified as follows	DTSC is directing PG&E to eliminate or minimize the proposed practice of temporarily backfilling boreholes that will be overdrilled at a later date. The practice could lead to creating aquifer interconnections and potentially allow for mixing of contaminated or geochemically dissimilar waters. After discussion with PG&E consultants, it is understood that this practice is only being proposed along the IRZ line where select, large diameter, IRZ wells will be installed after a smaller diameter pilot boring has first been completed. DTSC is not allowing this practice to be used at any monitoring well installations. DTSC believes the proposed practice can be overcome by carefully planned drill rig scheduling and quick turnaround times for any critical laboratory data. For example, after a smaller diameter sonic rig completes the pilot boring and			DTSC response: comment resolved pending revision of document in final design.

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							to more clearly indicate that PG&E will only implement this approach if a permit variance is approved by the appropriate permitting agency prior to construction: "…however, prior to drilling, PG&E will seek a variance to this approach with the appropriate permitting agency (San Bernardino County or Arizona Department of Water Resources) when a borehole is only to be temporarily backfilled.	rush lab data are obtained, IRZ well design could then be finalized At that point the sonic rig would pull off the hole (without encouraging borehole collapse) and the large diameter drill rig could move over and complete the large diameter borehole and well. In the event that the proposed borehole collapse/temporary backfill method is desired by PG&E (e.g., due to unforeseen events such as drill rig failure), PG&E must first notify DTSC and obtain approval to proceed. This way DTSC will be more informed regarding site specific details and understand the entire scope of the proposal at the time it is proposed to be implemented. It is recommended that the document be revised to capture the salient points above.			
931	DOI-150	Non-design	Remedial Design	3.2.1.1/3-13	Borehole Stabilization.	A discussion should be provided within this section regarding the potential use of cement bentonite grout in the event of a surface slumping event, such as the event that occurred during FW HNWR-B construction.	The referenced text will be modified as follows: "During drilling, as was experienced during the installation of the freshwater supply well at Site B in Arizona, field conditions might require that a borehole be stabilized to prevent an unsafe working condition or limit the amount of formation material that is removed during drilling. This is typically addressed by using the drill rig to		Resolved.		Comment resolved.

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							install a temporary or permanent conductor casing in the shallower portion of the borehole, or by filling the borehole with drilling fluid (as described in the previous section) to control borehole pressure. Temporary conductor casings, which could simply be larger-diameter sections of drilling pipe, are removed when drilling is complete, whereas permanent casings are incorporated into the design of a given well construction. <u>As was the case at Site B, if void space around the borehole which can lead to slumping of the ground surface must be stabilized, then an appropriate material like cement bentonite grout must be used to fill the void created by the unstable borehole.</u>				
932	DTSC-165	Design	Remedial design	3.2.1.2 Borehole Groundwater Sample Collection. Page 3-15 and 3-16.	"Borehole groundwater samples will be collected from specific intervals of select boreholes drilled within the unconsolidated aquifer. When the water table is reached, samples will be collected from the borehole approximately every 30 to 50 feet…One exception to this frequency is when borehole groundwater samples are being collected to support the design of a well	PG&E needs to define "select boreholes". The document should be revised to clearly list the boreholes currently planned for sampling. DTSC assumes most monitoring, IRZ and FW-2 area boreholes would be included in this sampling. It will probably be easier to list those wells to be excluded. DTSC requests that samples also be collected at potentially repetitive horizons, but at lesser frequencies (e.g., every 75 feet). These samples could assess aquifer heterogeneity and assist in plume delineation and the development of the CSM.	A table will be added to the referenced section that defines which planned boreholes will be used for groundwater sample collection during drilling. This table will include a note that the plan is subject to change based on observations in the field. The table was developed during the 90% RTC process ad included in **Attachment T** of the final RTC table. In all likelihood, field observation will lead to more boreholes being utilized for groundwater sample collection as opposed to less. In addition, the text in Section 3.2.1.2 (Data Collection During Well Construction), Borehole Groundwater Sample Collection subsection, 2nd paragraph, 3rd sentence, will be modified to explicitly	DTSC requests that the following wells be added to Attachment T: H, L, M, N, and Y. These wells are generally located in areas with sparse well density and larger aquifer thicknesses. Finally, it is recommended that MW-U be identified as a Category 1 well as results from the well might alter the location of IRL-4 and associated wells.			**Attachment T** was revised to incorporate DTSC's request.

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					that will supplement an existing well. For example, if a well is being installed to evaluate deeper water quality where a water table well already exists, samples will typically only be collected from depths deeper than the existing well screen interval(s)."		indicate the referenced sample collection frequency will only be modified at existing MW locations: ~~One~~ The only exception to this frequency is when borehole groundwater samples are being collected to support the design of a well that will supplement an existing well (i.e. "twinned" wells at the same location). It is PG&E's opinion that collecting borehole groundwater samples at the same depths as existing monitoring well screens with the intent of comparing the results of the borehole samples with that from the monitoring wells will not provide particularly useful information. The primary reason for this is that samples from the borehole might not be representative of the same depth interval or the same flow condition that is effectively sampled from an established monitoring well screen. Different sampling purge methods are also used for the two sample types. It is understood that DTSC would like to use this information to try and determine if borehole samples are biasing higher or lower than the well samples, but this comparison could be misleading for the reason mentioned in the previous sentence. PG&E appreciates DTSC's consideration to increase the distance between borehole groundwater samples to offset the additional samples collected at existing screened depths, but would prefer				

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							to maintain the frequency currently included in the C/RAWP (approximately every 30-50 feet) without collecting samples at existing screened depths, or with the addition of specific existing screened depths directed by DTSC.				
933	DTSC-166	Design	Remedial design	3.2.1.2 Borehole Geophysical Logging. Page 3-16.	"The determination to conduct borehole geophysical logging will be made in the field when drilling conditions are appropriate and as needed to finalize design details for the remedy well network."	Plans to conduct geophysical logging should also be planned as part of this document. Revision requested. Additionally, for all bedrock wells, the document should be revised to indicate that a standard suite of geophysical logs (e.g., caliper, acoustic televiewer, video, borehole flow tests) will be used.	While this section identifies the types of geophysical logging that might be conducted during the construction of the remedy well network, geophysical logging is not anticipated to be conducted regularly. It is estimated that the majority if not all of the boreholes drilled for pilot data collection or well construction in the unconsolidated aquifer will be installed using casing advance methods (e.g., rotosonic and rotary drilling with casing advance), which will result in a steel-cased borehole to total depth. The steel casing precludes the use of the majority of the listed geophysical logging techniques with the exception of natural gamma ray logging, which is primary used to log clay units (clays have only been very sparsely logged in the unconsolidated aquifer based on review of existing boring logs). Further, continuous core will be collected from many of the boreholes drilled for remedy well construction, which will provide better lithologic data than geophysical logging. Based on lithologic logging of bedrock core, geophysical logging, and borehole flow testing conducted during	Okay.			Comment resolved.

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							investigation of the bedrock aquifer in the East Ravine area, the geophysical logging data was only of marginal value. Although geophysical logging data was collected early in the investigation it was later discontinued when it was determined that observation of the bedrock core in combination with borehole flow testing provided the best data set to determine which intervals of fractured rock were responsible for groundwater flow. The only planned bedrock boreholes that will be installed for the groundwater remedy includes the line of East Ravine extraction wells and MW-70BR-D. As discussed in Sections 3.2.1.1 and 3.2.1.4, MW-70BR-D will be used to provide vertical characterization of Cr(VI) in bedrock and will be installed like other boreholes used for East Ravine characterization with the collection of bedrock core and the use of borehole flow testing, as determined necessary (if depth-specific concentration data is determined necessary based on groundwater sample results collected from the open borehole). As discussed in Section 3.2.1.4, the line of East Ravine injection wells will be constructed to provide hydraulic capture of Cr(VI)-impacted groundwater in bedrock. It is PG&E's opinion that geophysical logging and borehole flow testing is not necessary to meet this objective; however, should questions arise				

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							about the performance of these wells after they are constructed and operational then the full suite of geophysical logging is available to the project at that time. See RTC 951 (DTSC-172) where text has been added to the end of the "Well performance" bullet within the "East Ravine (ER) Extraction Wells" section of Section 3.2.1.4 of the C/RAWP to clarify the potential application of geophysical logging at the East Ravine extraction wells. Text will be added to Section 3.2.1.4 (Well Construction and Development), East Ravine Extraction well subsection, to indicate that caliper and borehole tele-viewer logs will be conducted in these wells following development to assess the baseline physical borehole condition.				
934	FMIT/TRC	Non-design	Monitoring	C/RAWP Page 3-16 3.2.1.2 Data Collection during Well Construction - Borehole Ground-water Sample Collection	Water quality measurements will be monitored on the pump effluent at the surface (for example, specific conductance, pH, and oxidation-reduction potential), and the temporary screen will be considered developed (ready for sample collection) once measurements are indicative of estimated aquifer conditions as compared to	Please indicate if water temperature will be evaluated and if not provide an explanation why this measurement is not important.	Temperature is a standard field parameter that is measured and recorded when collecting water quality measurements. The referenced text will be modified to explicitly include temperature, as follows: "Water quality measurements will be monitored on the pump effluent at the surface (for example, specific conductance, pH, <u>temperature,</u> and oxidation-reduction potential), and the temporary screen will be considered developed (ready for sample collection) once measurements are indicative of estimated aquifer conditions as compared to the water			Noted.	

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					the water used for drilling (for example, elevated specific conductance when compared to lower specific conductance drilling water).		used for drilling (for example, elevated specific conductance when compared to lower specific conductance drilling water)."				
935	Hualapai/TRC	Non-design	Monitoring	C/RAWP Page 3-16 3.2.1.2 Data Collection during Well Construction - Borehole Ground-water Sample Collection	Water quality measurements will be monitored on the pump effluent at the surface (for example, specific conductance, pH, and oxidation-reduction potential), and the temporary screen will be considered developed (ready for sample collection) once measurements are indicative of estimated aquifer conditions as compared to the water used for drilling (for example, elevated specific conductance when compared to lower specific conductance drilling water).	Please indicate if water temperature will be evaluated and if not provide an explanation why this measurement is not important.	See above			Noted.	
936	Cocopah/TRC	Non-design	Monitoring	C/RAWP Page 3-16 3.2.1.2 Data Collection during Well Construction - Borehole Ground-water Sample Collection	Water quality measurements will be monitored on the pump effluent at the surface (for example, specific conductance, pH, and oxidation-	Please indicate if water temperature will be evaluated and if not provide an explanation why this measurement is not important.	See above			Noted.	

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					reduction potential), and the temporary screen will be considered developed (ready for sample collection) once measurements are indicative of estimated aquifer conditions as compared to the water used for drilling (for example, elevated specific conductance when compared to lower specific conductance drilling water).						
937	Chemehuevi/ TRC	Non-design	Monitoring	C/RAWP Page 3-16 3.2.1.2 Data Collection during Well Construction - Borehole Ground-water Sample Collection	Water quality measurements will be monitored on the pump effluent at the surface (for example, specific conductance, pH, and oxidation-reduction potential), and the temporary screen will be considered developed (ready for sample collection) once measurements are indicative of estimated aquifer conditions as compared to the water used for drilling (for example, elevated specific conductance when	Please indicate if water temperature will be evaluated and if not provide an explanation why this measurement is not important.	See above			Noted.	

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					compared to lower specific conductance drilling water).						
938	DTSC-167	Design	Remedial design	3.2.1.2 Well Sampling. Page 3-17.	"Groundwater samples will be collected from select wells to guide decisions during construction of the well network. For example, as detailed in Section 3.2.1.3, water quality samples will be collected and analyzed from key wells (referred to as Category 1) to determine proper siting of key extraction, injection, and monitoring wells."	The document should also discuss sampling new wells to develop baseline data for each well. This should consist of a wide suite of constituents (e.g., general mineral, metals scan). These data will be needed as the remedy progresses and will assist in understanding plume movement. The baseline data should be collected before the remedy becomes operational and should be conducted for several quarters as it may take certain wells extended periods of time to equilibrate with the aquifer.	A new Section 3.2.1.6, Baseline Well Sampling, will be added to the C/RAWP. This section will detail the plans and methods to collect initial baseline samples from all new extraction, injection, and monitoring wells constructed as part of the groundwater remedy. The analytical suite for baseline groundwater samples collected from injection and extraction wells will be consistent with the analytes listed in Exhibit 4.1-1 (Biological and Geochemical Analytical Monitoring Parameters) of the O&M Manual (Volume 1). The analytical suite for baseline groundwater samples collected from monitoring wells will include: total organic carbon, total dissolved solids, title 22 metals (total and dissolved), Cr(VI), iron and manganese (total and dissolved), cations (total calcium, potassium, magnesium, and sodium), and anions (chloride, fluoride, bromide, nitrate, nitrite, and sulfate). The new Section 3.2.1.6 was developed during the 90% RTC period and included in **Attachment U** of the final RTC table.	Resolved.			Comment resolved.
939	DTSC-168	Design	Remedial design	3.2.1.2 Data Collection during Well Construction. Page 3-17.		The document should also discuss conducting aquifer tests (either injection or pumping) to assist in selecting monitoring well screen locations in hydraulically connected portions of the aquifer. See the DTSC comment above regarding citing well screens for wells MW-FF and GG based on an aquifer test conducted at IRL-4. Hydraulic parameters obtained from aquifer tests would also be used to update the groundwater model and make future modeled estimates more reliable.	PG&E agrees that the hydraulic parameters obtained from aquifer tests will be useful for updating the groundwater model. The approach to aquifer testing is presented in Section 3.2.1.5 of the C/RAWP.				DTSC Response: Resolved. Agencies will provide direction to PG&E regarding aquifer testing.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

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							It is PG&E's technical opinion that aquifer testing is not necessary or appropriate for designing monitoring wells as specified in the comment. The unconsolidated aquifer at Topock is one continuous water bearing unit with no confining units, and given the depositional environment of the sediments (as confirmed by existing boring logs), is heterogeneous. The drawdown observed in monitoring wells screens at one location during an aquifer test will not conclusively identify preferential groundwater flow pathways that will correlate to another monitoring location, especially one that is a greater distance from the given pumping well. It is PG&E's understanding the DSTC is most interested in using aquifer testing to design monitoring wells for the arsenic monitoring wells; however, these wells, like other wells with the objective to monitor gross changes in water quality within the aquifer, will be designed with relatively long screened intervals (20-50 feet in length). This will result in the monitoring of a relatively large percentage of the overall aquifer saturated thickness and minimize the potential for "missing" key portions of the aquifer. The screen intervals chosen for arsenic monitoring wells, and all other monitoring wells, will be based on lithologic core and depth-specific borehole groundwater				

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							samples from the same or nearby boreholes. This process for using borehole data to select monitoring well screen intervals has been successfully utilized for years at the Topock site to construct the majority of the existing monitoring well network and will be effective for the expansion of the monitoring network as part of groundwater remedy construction.				
940	DTSC-169	Design	Remedial design	3.2.1.3 Approach to Finalizing Well Design and/or Siting Page 3-17.		The intent of the well categories is not clear in the introduction. It appears the intent is to sequence Category 1 wells first and so on as mentioned on page 3-18. The rationale for designating the wells as Category 1 should be made more explicit. (e.g., install wells in IRL area to confirm chromium plume location –see Table 3.2-6). Not quite certain why MW-70BR-D is included as Category 1. It was assumed NTH IRZ wells would be Category 1 to confirm bedrock depths and plume distribution via borehole grab samples. Associated IRZ monitoring wells and downgradient monitoring wells could then be adjusted based on that data. MW-A might be replaced by IRZ-1 pilot boring. Could adjust River Bank extractors as well if needed. DTSC wants the arsenic monitoring wells to go in last (Category 3) to ensure they are properly screened using all other sources of data because the proposed plan has limited the number of screened intervals. Wells MW-10D and 11D should be Category 1 of 2 as they are a trigger for Well V which needs to be added to Figure 3.2-1.	Given the additional data that will be collected and considered in the process of finalizing well designs, the intent of the well categories is to group well locations as defined by the types of decisions that will be made related to well design (all categories) and in some cases well siting (Category 1). Please note that the well category (1, 2, or 3) is not necessarily indicative of when in the schedule a well will be constructed. For example, while Category 1 wells will be sequenced early in the project, the pilot boreholes for select Category 3 locations will also be installed early in the schedule (ahead of data collection at some Category 2 well locations). As defined in Exhibit 3.2-2 data that will be collected at Category 1 well locations will be used to finalize the locations and/or design of other remedy wells. In the case of MW-70BR-D, as presented on Table 3.2-6, data collected at this location will be used to determine if East Ravine extraction wells will function properly at	Okay.			Comment resolved.

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							the designed total depth; this will not affect East Ravine extraction well siting but could affect design (i.e., depth). In the case of the NTH IRZ well locations, they have been largely designated as Category 3 locations because while data collected from these locations will be used to finalize the design of these and other nearby wells, the location of these and other wells is not dependent on the data. PG&E agrees that bedrock depth and plume distribution data (collected from borehole groundwater samples) is important to finalize the design of these wells, and this data will be collected from an initial group of pilot boreholes (see RTC #945, DTSC-170). Planned monitoring well locations on the flood plain, including MW-A are located with specific objectives given the planned location of remediation wells and would not be expected to move. Regarding the adjustment of planned River Bank extraction well locations, it is PG&E's opinion that the wells are currently located in the appropriate locations to achieve their objectives. While data collected from these and nearby boreholes will be used to finalize extraction well design, the data is not anticipated to require changes in well location. If operational data suggest that additional River Bank extraction wells are required to achieve the stated objectives then				

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							future provisional wells will be sited and constructed as informed by data collected during system operation. See RTC #939 (DTSC-168) for additional discussion related to the design of arsenic monitoring wells. Given the planned proximity to planned injection wells, in some cases the arsenic monitoring well locations provide an opportunity to confirm key assumptions prior to construction of the larger footprint remediation wells and associated pipelines (MW-BB, MW-DD, and MW-FF; see Table 3.2-6); therefore, they are considered for installation early in construction. In light of discussion with DTSC and proximity to sensitive cultural resources, MW-DD will be sequenced as late as possible in the Category 1 well locations. Arsenic monitoring wells that aren't as well located to confirm these assumptions would be sequenced later in the construction once the associated injection well location is finalized (e.g., MW-AA, CC, GG, HH, and II). As requested by DTSC, monitoring wells MW-Z, MW-10D, and MW-11D will be reclassified as Category 1 well locations given the results of data collected from these wells will be used to determine if monitoring well location MW-V should be constructed.				
941	FMIT/TRC	Non-design	Request for Information	C/RAWP 3.2.1.2 p. 3-17 Data Collection	Groundwater samples will be collected from select wells to	What level of review will the Tribes have of the groundwater samples that are collected and used to guide decisions during construction of the well network?	As stated in C/RAWP Exhibit 2.6-2 (Monthly Progress Report Template) under			The Tribe reiterates the desire to be included along with DOI and DTSC as primary parties	DTSC response: Tribal comment noted.

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				during Well Construction - Well Sampling.	guide decisions during construction of the well network.	The Tribes request continued involvement at the level that has currently existed through the design stage during and post the construction phase of the groundwater remedy system. Please discuss in detail PG&E's and DTSC's intent on Tribal involvement post the design phase of the project.	"Description of Activities and Work Completed", data collected (generated or received) will be described in the monthly progress reports during construction. A summary of the lithologic and water quality data collected during well installation will be provided in the monthly progress reports (see C/RAWP Section 3.2.1.3, Approach to Finalizing Well Design and/or Siting). The monthly progress reports will be submitted to DTSC and DOI, and also posted on a SharePoint site for access by Tribes and stakeholders (see C/RAWP Section 2.6.2.4). PG&E also currently holds monthly meetings with Tribes to address current issues and provide a forecast of upcoming activities. Other communications may take place depending on purpose of the communication and type of information to be exchanged. Tribes are welcome to request discussions of specific topics or information that are of interest to the Tribes during these information exchanges. The nature and pace of activities during the construction phase will be very different from those experienced during the design, and will be more field focused. Table 2.3-1 presents the proposed communication framework for construction and startup, including communication of data collected during construction of the groundwater remedy			to which communication is addressed if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape. PG&E should remain mindful of its independent legal obligations under the 2006 Settlement Agreement to consult with FMIT and to provide all non-attorney-client privileged material information, documentary or otherwise, to the Tribe contemporaneously with its receipt or development by PG&E.	

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							well network. As shown in Table 2.3-1, PG&E will send routine notification to Tribes and others of planned construction and field activities. PG&E also commits to conduct outreach with the Tribes under the terms of any MOUs in effect with various Tribes, the 2006 Settlement Agreement with the FMIT, and protocols specified in the EIR, CIMP, the PA, and the CHPMP, many of which are listed in RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, and #47 Chemehuevi/TRC.				
942	Hualapai/TRC	Non-design	Request for Information	C/RAWP 3.2.1.2 p. 3-17 Data Collection during Well Construction - Well Sampling.	Groundwater samples will be collected from select wells to guide decisions during construction of the well network.	What level of review will the Tribes have of the groundwater samples that are collected and used to guide decisions during construction of the well network? The Tribes request continued involvement at the level that has currently existed through the design stage during and post the construction phase of the groundwater remedy system. Please discuss in detail PG&E's and DTSC's intent on Tribal involvement post the design phase of the project.	See above			Hualapai reiterates the need to be included (along with DOI and DTSC) as a primary party in communications regarding all project design changes, or work variance requests including material deviations from the design documents and/or C/RAWP due to discovery of changed site conditions as discussed in these earlier comments (at left). Communicating these changes needs to occur as soon as it is known that a change needs to be made. Hualapai needs to be included in those discussions via informing a tribal monitor, or email or telephone calls to designated points of contact. Once the change has been approved then a formal document can be forwarded to Hualapai.	DTSC response: Tribal comment noted.
943	Cocopah/TRC	Non-design	Request for Information	C/RAWP 3.2.1.2 p. 3-17 Data Collection during Well Construction - Well Sampling.	Groundwater samples will be collected from select wells to guide decisions during construction of	What level of review will the Tribes have of the groundwater samples that are collected and used to guide decisions during construction of the well network? The Tribes request continued involvement at the level that has currently existed through the design stage during and post the construction phase of the groundwater remedy system. Please discuss in detail PG&E's and DTSC's intent on Tribal involvement post the design phase of the project.	See above			The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work	DTSC response: Tribal comment noted.

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					the well network.					plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape.	
944	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP 3.2.1.2 p. 3-17 Data Collection during Well Construction - Well Sampling.	Groundwater samples will be collected from select wells to guide decisions during construction of the well network.	What level of review will the Tribes have of the groundwater samples that are collected and used to guide decisions during construction of the well network? The Tribes request continued involvement at the level that has currently existed through the design stage during and post the construction phase of the groundwater remedy system. Please discuss in detail PG&E's and DTSC's intent on Tribal involvement post the design phase of the project.	See above			The Tribes reiterate the desire to be included along with DOI and DTSC as primary parties communication is addressed to if material deviation from work plan and design documents, MMRP action specific, and location specific ARARs occur. The current proposed use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape.	DTSC response: Tribal comment noted.
945	DTSC-170	Design	Remedial design	3.2.1.3 Approach to Category 3 Locations. Page 3-19.	"Borehole data will be collected from pilot boreholes at an initial group of Category 3 well locations to finalize well design at these locations: IRZ-1, -5, -9, -13, -15, -20, -27, and -35."	Add IRZ-11 and IRZ-17 to the list if the plan remains to do the IRZ line last. However, DTSC recommends pilot borings for most IRZ wells and that they should be done early to guide monitoring well design.	IRZ-11 and IRZ-17 will be added to the list of IRZ well locations where pilot boreholes will be initially conducted. The referenced text will be modified as follows: "Borehole data will be collected from pilot boreholes at an initial group of Category 3 well locations to finalize well design at these locations: IRZ-1, -5, -9, -11, -13, -15, -17, -20, -27, and -35." Please note that the well category (1, 2, or 3) is not necessarily indicative of when in the schedule a well will be constructed, and that it	Resolved.			Comment resolved.

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							is not accurate that the IRZ line will be constructed last, as indicated in the comment. Regardless, pilot boreholes will be drilled to collect data that will be used to finalize IRZ well design (and potentially other nearby wells). It is possible that based on this initial pilot borehole dataset from the IRZ line that PG&E will determine additional pilot boreholes are needed at other planned well locations to finalize the design of IRZ wells for a given area.				
946	FMIT/TRC 1n	Non-design	Request for Information	3.2.1.3 Approach to Finalizing Well Design and/or Siting	Category 1 wells have been designated in areas where existing uncertainties in the current conceptual site model may drive final well siting and/or design, as well as the other associated remedy infrastructure (pipelines). These areas include the northern area of the NTH IRZ, the IRL injection area in the uplands, the southern freshwater injection well (FW-2) area, and the East Ravine area. In each of these areas, an already planned monitoring well has been designated as the Category 1 well location. Data collection	Much collaborative been invested on the part of the Tribes to locate exact well locations. The text however appears to indicate that the well locations have not been finalized and final locations will be decided at a later date. Please indicate what level of continued involvement the Tribes will have in both the review of collected data and in decision process for the locations "other wells and remedy infrastructure". Please also state why the Tribes are not directly included in the review of the monthly progress reports.	Please see RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, #47 Chemehuevi/TRC, #180 FMIT/TRC-1c, #181 Hualapai/TRC-1c, #182 Cocopah/TRC-1c, #183 Chemehuevi/TRC-1c, #201 FMIT/TRC-1d, #202 Hualapai/TRC-1d, #203 Cocopah/TRC-1d, #204 Chemehuevi/TRC-1d, #941 FMIT/TRC, #942 Hualapai/TRC, #943 Cocopah/TRC, and #944 Chemehuevi/TRC. The comment is inaccurate. As stated in Section 2.6.2.4 (Retention and Reporting), deliverables during the groundwater construction and startup, such as the monthly progress reports and the Construction Completion Report, will be submitted to DTSC and DOI in electronic format. Deliverables will also be posted to a SharePoint site for DTSC, DOI, and/or stakeholder review.			Please see response to comment FMIT/TRC RTC #44.	DTSC response: Tribal comment noted.

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					at these locations will be scheduled early in the construction schedule to confirm the assumptions in the basis of design for these areas prior to moving forward with the construction of other wells and remedy infrastructure. This approach will minimize the potential for uncertainties in the conceptual site model to cause unnecessary disturbance (that is, avoid constructing unnecessary infrastructure). If the borehole data collected confirm the key assumptions used in the basis of design, the Category 1 monitoring well will be constructed consistent with the design detailed in Table 3.2-6 as a design basis and as appropriate based on the borehole data collected. A summary of the lithologic and water quality data collected will be communicated to the agencies via monthly						

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					progress reports as defined in Section 2 of this C/RAWP.						
947	Hualapai/TRC 1n	Non-design	Request for Information	3.2.1.3 Approach to Finalizing Well Design and/or Siting	Category 1 wells have been designated in areas where existing uncertainties in the current conceptual site model may drive final well siting and/or design, as well as the other associated remedy infrastructure (pipelines). These areas include the northern area of the NTH IRZ, the IRL injection area in the uplands, the southern freshwater injection well (FW-2) area, and the East Ravine area. In each of these areas, an already planned monitoring well has been designated as the Category 1 well location. Data collection at these locations will be scheduled early in the construction schedule to confirm the assumptions in the basis of design for these areas prior to moving forward with the construction of	Much collaborative been invested on the part of the Tribes to locate exact well locations. The text however appears to indicate that the well locations have not been finalized and final locations will be decided at a later date. Please indicate what level of continued involvement the Tribes will have in both the review of collected data and in decision process for the locations "other wells and remedy infrastructure". Please also state why the Tribes are not directly included in the review of the monthly progress reports.	See above			See response to comment Hualapai/TRC RTC #83.	DTSC response: Tribal comment noted.

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					other wells and remedy infrastructure. This approach will minimize the potential for uncertainties in the conceptual site model to cause unnecessary disturbance (that is, avoid constructing unnecessary infrastructure). If the borehole data collected confirm the key assumptions used in the basis of design, the Category 1 monitoring well will be constructed consistent with the design detailed in Table 3.2-6 as a design basis and as appropriate based on the borehole data collected. A summary of the lithologic and water quality data collected will be communicated to the agencies via monthly progress reports as defined in Section 2 of this C/RAWP.						
948	Cocopah/TRC 1n	Non-design	Request for Information	3.2.1.3 Approach to Finalizing Well Design and/or Siting	Category 1 wells have been designated in areas where existing uncertainties in the current conceptual site model may drive final well	Much collaborative been invested on the part of the Tribes to locate exact well locations. The text however appears to indicate that the well locations have not been finalized and final locations will be decided at a later date. Please indicate what level of continued involvement the Tribes will have in both the review of collected data and in decision process for the locations “other wells and remedy infrastructure”. Please also state why the Tribes are not directly included in the review of the monthly progress reports.	See above			See response to Cocopah RTC #84.	DTSC response: Tribal comment noted.

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					siting and/or design, as well as the other associated remedy infrastructure (pipelines). These areas include the northern area of the NTH IRZ, the IRL injection area in the uplands, the southern freshwater injection well (FW-2) area, and the East Ravine area. In each of these areas, an already planned monitoring well has been designated as the Category 1 well location. Data collection at these locations will be scheduled early in the construction schedule to confirm the assumptions in the basis of design for these areas prior to moving forward with the construction of other wells and remedy infrastructure. This approach will minimize the potential for uncertainties in the conceptual site model to cause unnecessary disturbance (that is, avoid constructing unnecessary						

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					infrastructure). If the borehole data collected confirm the key assumptions used in the basis of design, the Category 1 monitoring well will be constructed consistent with the design detailed in Table 3.2-6 as a design basis and as appropriate based on the borehole data collected. A summary of the lithologic and water quality data collected will be communicated to the agencies via monthly progress reports as defined in Section 2 of this C/RAWP.						
949	Chemehuevi/ TRC 1n	Non-design	Request for Information	3.2.1.3 Approaching to Finalizing Well Design and/or Siting	Category 1 wells have been designated in areas where existing uncertainties in the current conceptual site model may drive final well siting and/or design, as well as the other associated remedy infrastructure (pipelines). These areas include the northern area of the NTH IRZ, the IRL injection area in the uplands, the southern freshwater	Much collaborative been invested on the part of the Tribes to locate exact well locations. The text however appears to indicate that the well locations have not been finalized and final locations will be decided at a later date. Please indicate what level of continued involvement the Tribes will have in both the review of collected data and in decision process for the locations "other wells and remedy infrastructure". Please also state why the Tribes are not directly included in the review of the monthly progress reports.	See above			See Chemehuevi/TRC RTC #85.	DTSC response: Tribal comment noted.

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					injection well (FW-2) area, and the East Ravine area. In each of these areas, an already planned monitoring well has been designated as the Category 1 well location. Data collection at these locations will be scheduled early in the construction schedule to confirm the assumptions in the basis of design for these areas prior to moving forward with the construction of other wells and remedy infrastructure. This approach will minimize the potential for uncertainties in the conceptual site model to cause unnecessary disturbance (that is, avoid constructing unnecessary infrastructure). If the borehole data collected confirm the key assumptions used in the basis of design, the Category 1 monitoring well will be constructed consistent with the design detailed in Table 3.2-6 as a design basis						

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					and as appropriate based on the borehole data collected. A summary of the lithologic and water quality data collected will be communicated to the agencies via monthly progress reports as defined in Section 2 of this C/RAWP.						
950	DTSC-171	Design	Remedial design	3.2.1.4 Well Construction and Development East Ravine (ER) Extraction Wells. Page 3-23.	"Each of the wells will be constructed using up to a 6-inch-nominal-diameter conductor casing to the top of competent bedrock or a minimum of 20 feet bgs."	Large diameter conductor casings (e.g., 10 to 14 inches) should be considered to allow overdrilling in the future (to remedy fouling or increase yield/storage reservoir). This could negate drilling a new well. References of "up to" should be replaced with planned diameters. This also applies to similar uses throughout the document including the sentence following the cited sentence. The sentence also needs to be revised as, currently written, it can lead to improperly constructed conductors.	The primary reasons to implement this change would be if the actual well yield warrants a pump diameter larger than 4-inches in diameter, or if an alternative well design (e.g., nest well casings) was determined appropriate. While neither of these scenarios is included in the current design, implementing this change would decrease the likelihood that a well would need to be replaced should they ever be warranted. In accordance with the comment, the diameter of the conductor casing will be increased to 12-inch to allow for the potential to ream the bedrock borehole to a larger diameter at a future date, but the primary borehole/well casing will remain as currently designed. The referenced text will be revised as follows: "Each of the wells will be constructed using ~~up to~~ a ~~6~~12-inch-nominal-diameter conductor casing to the top of competent bedrock ~~or a minimum of 20 feet bgs~~."	Okay.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							The initial borehole diameters will be added to the final design document. However, it is PG&E's opinion that the use of "up to" is appropriate elsewhere in this section as it preserves the flexibility to utilize smaller diameter boreholes and well casings as determined appropriate based on actual field conditions. In accordance with the EIR, PG&E will continuously work to identify opportunities to decrease the size and footprint of the remedy infrastructure, including wells. For example, If it is determined that the saturated thickness at a given southern IRZ well location only warrants one well screen as opposed to two, or a smaller well casing due to smaller in-well equipment, then the decision to down-size will be appropriate.				
951	DTSC-172	Design	Remedial design	3.2.1.4 Well Construction and Development East Ravine (ER) Extraction Wells. Well performance. Page 3-23.	"Following the development of a given well, the specific capacity will be compared to assumptions used in the design. Lower-than-predicted flow will not necessarily indicate that additional wells are required. Sustainable flow rates will be considered in the context of the conceptual site model, which will be continually updated as needed during remedy	The section should be rewritten to explain what will be done if lower-than-predicted flow is obtained from any given well. Tangible examples are requested. This comment applies to all other occurrences throughout the document.	The "Well Performance" bullet for this section will be revised as follows: "**Well performance.** Following the development of a given well, the specific capacity will be compared to assumptions used in the design. <u>Specifically, the combined extraction rates from each of the East Ravine extraction wells will be compared to total nominal flow rate of 5 gpm that was used in the design.</u> Lower-than-predicted flow <u>from a specific well</u> will not necessarily indicate that additional wells are required. Sustainable <u>average</u> flow rates<u> for the line of</u>	Okay.			Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					implementation and used to assess the potential need to replace, deepen, or add wells to the East Ravine extraction well network."		extraction wells will be considered in the context of the conceptual site model, which will be continually updated as needed during remedy implementation and used to assess the potential need to replace, deepen, or add wells to the East Ravine extraction well network. For example, if the total average sustainable flow rate is only 4.5 gpm, then the model will be updated with the most current field data (using the update frequencies presented in Appendix B) to determine if this flow rate is expected to maintain the objectives of the extraction well line, or if wells are need to be replaced, deepened, or added. The application of geophysical logging, including borehole flow testing, might be appropriate to evaluate the hydrogeologic conditions within East Ravine extraction well(s) prior to deciding to replace, deepen, or add a well."				
952	FMIT/TRC 1o	Non-design	Request for Information	3.2.1.4 Well Construction and Development	EIR Well performance. Following the development of a given well, the specific injectivity will be compared to assumptions used in the design. Lower-than-predicted injection rates will not necessarily indicate that additional wells are required. Sustainable flow rates will be considered in the context	This is very vague and should be more specific so stakeholders can fully understand when additional wells are needed. In addition how will Tribes be involved in the review of the conceptual model updates and decisions regarding the need to replace or add new wells?	The "Well Performance" bullet for this section will be revised as follows: "**Well performance.** Following the development of a given well, the specific capacity will be compared to assumptions used in the design. Specifically, the injection rates from each of the IRL injection wells will be compared to the nominal flow rates that were used in the design. Lower-than-predicted flow at a specific well will not necessarily indicate that additional wells are required.			Please see response to comment FMIT/TRC RTC #44.	DTSC response: Tribal comment noted.

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					of the conceptual site model, which will be continually updated as needed during remedy implementation and used to assess the potential need to replace or add wells to the IRL injection well network.		Sustainable flow rates <u>for each of the injection wells</u> will be considered in the context of the conceptual site model, which will be continually updated as needed during remedy implementation and used to assess the potential need to replace or add wells to the IRL injection well network. <u>For example, if the sustainable flow rate is less than that used in the design, then the model will be updated with the most current field data (using the update frequencies presented in Appendix B) to determine if this flow rate is expected to maintain the objectives of the given injection well in the context of the performance of the entire line of IRL injection wells. The decision to add wells will only be made after this analysis, which is based on well and aquifer testing data collected during construction, is performed.</u>" For model updates, please see RTC #76. For Tribal involvement in decisions regarding more wells (i.e., more than currently planned wells) please see RTCs #884-887. For communications with Tribes during construction and O&M generally, please see RTCs #44-47.				
953	Hualapai/TRC 1o	Non-design	Request for Information	3.2.1.4 Well Construction and Development	EIR Well performance. Following the development of a given well, the specific injectivity will be compared to	This is very vague and should be more specific so stakeholders can fully understand when additional wells are needed. In addition how will Tribes be involved in the review of the conceptual model updates and decisions regarding the need to replace or add new wells?	See above			See response to comment Hualapai/TRC RTC #83.	DTSC response: Tribal comment noted.

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					assumptions used in the design. Lower-than-predicted injection rates will not necessarily indicate that additional wells are required. Sustainable flow rates will be considered in the context of the conceptual site model, which will be continually updated as needed during remedy implementation and used to assess the potential need to replace or add wells to the IRL injection well network.						
954	Cocopah/TRC 1o	Non-design	Request for Information	3.2.1.4 Well Construction and Development	EIR Well performance. Following the development of a given well, the specific injectivity will be compared to assumptions used in the design. Lower-than-predicted injection rates will not necessarily indicate that additional wells are required. Sustainable flow rates will be considered in the context of the conceptual site model, which will be continually updated as needed during	This is very vague and should be more specific so stakeholders can fully understand when additional wells are needed. In addition how will Tribes be involved in the review of the conceptual model updates and decisions regarding the need to replace or add new wells?	See above			See response to Cocopah RTC #84.	DTSC response: Tribal comment noted.

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					remedy implementation and used to assess the potential need to replace or add wells to the IRL injection well network.						
955	Chemehuevi/ TRC 1o	Non-design	Request for Information	3.2.1.4 Well Construction and Development	EIR Well performance. Following the development of a given well, the specific injectivity will be compared to assumptions used in the design. Lower-than-predicted injection rates will not necessarily indicate that additional wells are required. Sustainable flow rates will be considered in the context of the conceptual site model, which will be continually updated as needed during remedy implementation and used to assess the potential need to replace or add wells to the IRL injection well network.	This is very vague and should be more specific so stakeholders can fully understand when additional wells are needed. In addition how will Tribes be involved in the review of the conceptual model updates and decisions regarding the need to replace or add new wells?	See above			See Chemehuevi/TRC RTC #85.	DTSC response: Tribal comment noted.
956	FMIT/TRC 1p	Non-design	Request for Information	3.2.1.4 Well Construction and Development	While the final location of FW-2 is subject to additional data collection, the location for FW- 1 is unlikely to change based on additional data from nearby wells.	It is stated that the location of FW-1 is unlikely to change. This however suggests that there is a possibility for well location change. Please indicate how the Tribes will be involved any future modifications to the remedy design post finalization of the BOD report.	Please see RTCs #44 FMIT/TRC, #45 Hualapai/TRC, #46 Cocopah/TRC, #47 Chemehuevi/TRC, #180 FMIT/TRC-1c, #181 Hualapai/TRC-1c, #182 Cocopah/TRC-1c, #183 Chemehuevi/TRC-1c, #201 FMIT/TRC-1d, #202 Hualapai/TRC-1d, #203 Cocopah/TRC-1d, #204			Please see response to comment FMIT/TRC RTC #44.	DTSC response: Tribal comment noted.

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							Chemehuevi/TRC-1d, #941 FMIT/TRC, #942 Hualapai/TRC, #943 Cocopah/TRC, and #944 Chemehuevi/TRC.				
957	Hualapai/TRC 1p	Non-design	Request for Information	3.2.1.4 Well Construction and Development	While the final location of FW-2 is subject to additional data collection, the location for FW- 1 is unlikely to change based on additional data from nearby wells.	It is stated that the location of FW-1 is unlikely to change. This however suggests that there is a possibility for well location change. Please indicate how the Tribes will be involved any future modifications to the remedy design post finalization of the BOD report.	See above			See response to comment Hualapai/TRC RTC #83.	DTSC response: Tribal comment noted.
958	Cocopah/TRC 1p	Non-design	Request for Information	3.2.1.4 Well Construction and Development	While the final location of FW-2 is subject to additional data collection, the location for FW- 1 is unlikely to change based on additional data from nearby wells.	It is stated that the location of FW-1 is unlikely to change. This however suggests that there is a possibility for well location change. Please indicate how the Tribes will be involved any future modifications to the remedy design post finalization of the BOD report.	See above			See response to Cocopah RTC #84.	DTSC response: Tribal comment noted.
959	Chemehuevi/ TRC 1p	Non-design	Request for Information	3.2.1.4 Well Construction and Development	While the final location of FW-2 is subject to additional data collection, the location for FW- 1 is unlikely to change based on additional data from nearby wells.	It is stated that the location of FW-1 is unlikely to change. This however suggests that there is a possibility for well location change. Please indicate how the Tribes will be involved any future modifications to the remedy design post finalization of the BOD report.	See above			See Chemehuevi/TRC RTC# 85.	DTSC response: Tribal comment noted.
960	FMIT/TRC 1q	Non-design	Request for Information	3.2.1.4 Well Construction and Development	Four provisional monitoring well locations (MW-V, MW-EE, and an area for two potential slant well locations) are identified in the 90% BOD Report; however, it is understood that the effectiveness of the monitoring network will be continuously assessed over the course of	Please indicate if the specific locations of these additional wells and boreholes have been presented within the BOD report. Also please indicate what level of involvement the Tribes will have in modifications that occur to the remedy design post finalization of the BOD reports.	The cited text from the 90% BOD is outdated. Locations for future provisional monitoring wells MW-V and MW-EE were identified after submittal of the 90% and are included in the Supplemental 90%. Slant monitoring wells in the Upland are no longer considered and are removed from the 90%. The assumed additional 10 monitoring wells is retained in the Supplemental 90% and their locations will be determined if needed to supplement the monitoring well network			The tribe reiterates the desire to be included in any discussions associated with proposed additional monitoring wells or new well locations. The use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape. PG&E should remain mindful of its independent legal	DTSC response: Tribal comment noted.

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					remediation and that additional wells will be installed, as needed. It is assumed that an additional 10 monitoring well locations, which might require multiple boreholes at each, could be required to supplement the monitoring well network during remedy operation as aquifer conditions change.		during remedy operation as aquifer conditions change. As previously mentioned, O&M information will be presented in quarterly progress reports to be submitted to the agencies and posted on a SharePoint site (or other venues) for access by Tribes and stakeholders. The need for and proposed locations for additional monitoring wells, if any, will be included the quarterly reports. The siting of additional wells, if needed, will be coordinated with the agencies, Tribes, and stakeholders.			obligations under the 2006 Settlement Agreement to consult with FMIT and to provide all non-attorney-client privileged material information, documentary or otherwise, to the Tribe contemporaneously with its receipt or development by PG&E.	
961	Hualapai/TRC 1q	Non-design	Request for Information	3.2.1.4 Well Construction and Development	Four provisional monitoring well locations (MW-V, MW-EE, and an area for two potential slant well locations) are identified in the 90% BOD Report; however, it is understood that the effectiveness of the monitoring network will be continuously assessed over the course of remediation and that additional wells will be installed, as needed. It is assumed that an additional 10 monitoring well locations, which might require multiple boreholes at each, could be required to supplement the	Please indicate if the specific locations of these additional wells and boreholes have been presented within the BOD report. Also please indicate what level of involvement the Tribes will have in modifications that occur to the remedy design post finalization of the BOD reports.	See above			Hualapai reiterates the need to be included (along with DOI and DTSC) as a primary party in communications regarding all project design changes, or work variance requests including material deviations from the design documents and/or C/RAWP due to discovery of changed site conditions as discussed in these earlier comments (at left). Communicating these changes needs to occur as soon as it is known that a change needs to be made. Hualapai needs to be included in those discussions via informing a tribal monitor, or email or telephone calls to designated points of contact. Access tp SharePoint sites are not always easy for Hualapai to access due to limited types of computer stations. Once the change has been approved then a	DTSC response: Tribal comment noted.

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					monitoring well network during remedy operation as aquifer conditions change.					formal document can be forwarded to Hualapai.	
962	Cocopah/TRC 1q	Non-design	Request for Information	3.2.1.4 Well Construction and Development	Four provisional monitoring well locations (MW-V, MW-EE, and an area for two potential slant well locations) are identified in the 90% BOD Report; however, it is understood that the effectiveness of the monitoring network will be continuously assessed over the course of remediation and that additional wells will be installed, as needed. It is assumed that an additional 10 monitoring well locations, which might require multiple boreholes at each, could be required to supplement the monitoring well network during remedy operation as aquifer conditions change.	Please indicate if the specific locations of these additional wells and boreholes have been presented within the BOD report. Also please indicate what level of involvement the Tribes will have in modifications that occur to the remedy design post finalization of the BOD reports.	See above			The tribes reiterate the desire to be included in any discussions associated with proposed additional monitoring wells or new well locations. The use of monthly progress reports and periodic uploads to SharePoint is not a sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape	DTSC response: Tribal comment noted.
963	Chemehuevi/ TRC 1q	Non-design	Request for Information	3.2.1.4 Well Construction and Development	Four provisional monitoring well locations (MW-V, MW-EE, and an area for two potential slant well locations) are identified in the 90% BOD	Please indicate if the specific locations of these additional wells and boreholes have been presented within the BOD report. Also please indicate what level of involvement the Tribes will have in modifications that occur to the remedy design post finalization of the BOD reports.	See above			The tribes reiterate the desire to be included in any discussions associated with proposed additional monitoring wells or new well locations. The use of monthly progress reports and periodic uploads to SharePoint is not a	DTSC response: Tribal comment noted.

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					Report; however, it is understood that the effectiveness of the monitoring network will be continuously assessed over the course of remediation and that additional wells will be installed, as needed. It is assumed that an additional 10 monitoring well locations, which might require multiple boreholes at each, could be required to supplement the monitoring well network during remedy operation as aquifer conditions change.					sufficient level of involvement when it comes to decisions that could result in permanent disturbance to the Sacred landscape	
964	FMIT/TRC	Non-design	Request for Information	C/RAWP 3.2.1.4 p. 3-25 Well Construction and Development	Four provisional monitoring well locations (MW-V, MW-EE, and an area for two potential slant well locations) are identified in the 90% BOD Report; however, it is understood that the effectiveness of the monitoring network will be continuously assessed over the course of remediation and that additional wells will be installed, as needed. It is assumed that an additional	Please indicate if the specific locations of these additional wells and boreholes have been presented within the BOD report.	Additional details/ specificities developed for select monitoring wells in the Upland subsequent to the submittal of the 90% design, supersede the first portion of the reference text cited in the comment. The subsequent design document (Supplemental 90%) showed the locations for the future provisional monitoring wells MW-V and MW-EE in Figure ES-4A, but did not propose slant monitoring wells in the Upland (see also RTCs #341-344). As indicated in the cited text, additional monitoring wells could be required to supplement the proposed monitoring well network. These			Noted.	

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					10 monitoring well locations, which might require multiple boreholes at each, could be required to supplement the monitoring well network during remedy operation as aquifer conditions change.		wells will be located after they are determined to be needed.				
965	Hualapai/TRC	Non-design	Request for Information	C/RAWP 3.2.1.4 p. 3-25 Well Construction and Development	Four provisional monitoring well locations (MW-V, MW-EE, and an area for two potential slant well locations) are identified in the 90% BOD Report; however, it is understood that the effectiveness of the monitoring network will be continuously assessed over the course of remediation and that additional wells will be installed, as needed. It is assumed that an additional 10 monitoring well locations, which might require multiple boreholes at each, could be required to supplement the monitoring well network during remedy operation as aquifer conditions change.	Please indicate if the specific locations of these additional wells and boreholes have been presented within the BOD report.	See above				
966	Cocopah/TRC	Non-design	Request for	C/RAWP	Four	Please indicate if the specific locations of these additional wells and boreholes have been	See above				

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			Information	3.2.1.4 p. 3-25 Well Construction and Development	provisional monitoring well locations (MW-V, MW-EE, and an area for two potential slant well locations) are identified in the 90% BOD Report; however, it is understood that the effectiveness of the monitoring network will be continuously assessed over the course of remediation and that additional wells will be installed, as needed. It is assumed that an additional 10 monitoring well locations, which might require multiple boreholes at each, could be required to supplement the monitoring well network during remedy operation as aquifer conditions change.	presented within the BOD report.					
967	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP 3.2.1.4 p. 3-25 Well Construction and Development	Four provisional monitoring well locations (MW-V, MW-EE, and an area for two potential slant well locations) are identified in the 90% BOD Report; however, it is understood that the effectiveness of the monitoring network will be	Please indicate if the specific locations of these additional wells and boreholes have been presented within the BOD report.	See above				

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					continuously assessed over the course of remediation and that additional wells will be installed, as needed. It is assumed that an additional 10 monitoring well locations, which might require multiple boreholes at each, could be required to supplement the monitoring well network during remedy operation as aquifer conditions change.						
968	DOI-151	Non-design	Process	3.2.1.4/3-26	A gyroscope survey will be conducted to verify that the well casing is plumb and straight, as determined necessary.	Since there are not too many options besides redrilling the borehole, if the well casing is not plumb – consider running the gyroscope down the sonic casing prior to setting the well.	Plumbness data collected from within the drill casing would be of very limited use since it would not directly correlate to the plumbness of the well casing itself. In general, a benefit of the casing advance methods that will be used for the majority of borehole drilling for well construction, including rotosonic, is that the boreholes are typically very straight compared to other methods (e.g., direct rotary, hollow-stem auger, etc.). In addition, the estimated maximum drilling depths for this project are relatively shallow (approximately 400 feet) and would not be expected to deviate significantly. More significant factors that could lead to well plumbness problems include defective well casing sections, uneven welded joints, or improper vertical		Resolved.		Comment resolved.

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							loading of the well casing during construction.				
969	DTSC-173	Design	Remedial design	3.2.1.4 Well Construction and Development Annular Seals. Page 3-27.	"Concrete. … and is typically reserved for large volume/diameter borehole or well decommissioning."	Concrete is not typically used as an annular seal in well construction and should be removed.	The following clarifying statement will be added to the end of the "Concrete" bullet: Concrete is typically only used in the shallowest portion of the borehole as a construction component of the wellhead protection.	Resolved.			Comment resolved.
970	DTSC-174	Design	Remedial design	3.2.1.4 Well Construction and Development Well Development. Page 3-28.	"The well will be considered developed (that is, ready for subsequent hydraulic testing and/or sample collection) when turbidity measurements are low and stable (typically 50 nephelometric turbidity units or less), specific capacity is stable, and the well is yielding groundwater that exhibits water quality measurements indicative of aquifer conditions as compared to the water used for drilling."	Revise to indicate that 5 to 10 NTUs is the goal for monitoring wells. Also add that a well will be considered developed after water has been removed during development that is greater in volume than any imported water added during well installation. Also add that all development activities will be documented and reported to agencies.	A target turbidity goal of 5 to 10 NTU is typically not practical for well development, but will be added to the groundwater sampling SOPs (for monitoring wells) as a target (O&M Manual Volume 2, SOP-A1, A2, A18); however, it is understood that this is not a hard criterion that must be met prior to sample collection. The referenced text will be modified as follows: "The well will be considered developed (that is, ready for subsequent hydraulic testing and/or sample collection) when turbidity measurements are low and stable (typically 50 nephelometric turbidity units or less), specific capacity is stable, <u>a minimum volume greater than the volume of any water introduced during drilling and well construction has been removed,</u> and the well is yielding groundwater that exhibits water quality measurements indicative of aquifer conditions as compared to the water used for drilling. The following text will be added to the end of Section 3.2.1.4 (well development subsection) of the	Okay.			Comment resolved.

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							C/RAWP: "Well development activities will be documented in accordance with the SOP and reported to the agencies via monthly progress reports as defined in Section 2 of the C/RAWP."				
971	DTSC-175	Design	Remedial design	3.2.1.5 Well Testing Page 3-29-30.		Revise the section to indicate that a series of slug tests will be conducted on new monitoring wells soon after well development to assess sufficient well development. As part of long term O&M, slug testing should be included as they can again be conducted periodically to see if significant changes have occurred from this baseline reading. Also refer the reader to the appropriate O&M section discussing well redevelopment standards.	This information will be collected following development of new monitoring wells by pumping the monitoring wells and assessing specific capacity. While Section 4.2.4 (Monitoring Well Acceptance) of the O&M Manual (Volume 1) addressed the collection of this data during routine sampling events, the collection of specific capacity data in monitoring wells will explicitly be added to the Baseline Assessment section of the O&M Manual. The following sentence will be added to the end of the third paragraph in Section 4.1.1.2 (baseline assessment of well performance, flow testing) of Volume 1 of the remedy O&M Manual: "An abbreviated version of baseline specific capacity testing will be conducted at all new monitoring wells. Monitoring wells, which are not designed for target extraction rates, will be pumped at one to three different rates following development such that specific capacity information can be compared to that collected during subsequent monitoring and/or re-development events (see Section 4.2.4). The use of slug test may also be appropriate to assess changes in well	Okay.			Comment resolved.

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							hydraulics over time. Consistent with this addition to the O&M Manual, the following text will be added to the end of the second paragraph of Section 3.2.1.5 of the C/RAWP: "An abbreviated version of baseline specific capacity testing will be conducted at all new monitoring wells. Monitoring wells, which are not designed for target extraction rates, will be pumped at one to three different rates following development such that specific capacity information can be compared to that collected during subsequent monitoring and/or re-development events (see Section 4.2.4 of the O&M Manual (Volume 1) regarding monitoring well acceptance standards. The use of slug test may also be appropriate to assess changes in well hydraulics over time."				
972	DOI-152	Non-design	Editorial	3.2.2/3-31		A bullet will need to be added for the alternative BCW crossing.	In response to 90% comments (see RTC #19 FMIT-5), the crossing design was changed to direct bury pipes/conduits in BCW. This new design would be covered under the "Direct Burial" bullet and therefore, a separate bullet is not necessary.		Resolved.		Comment resolved.
973	DOI-153	Non-design	Editorial	3.2.2/3-31	Bullets	It would be helpful to the reader to provide examples of where these types of pipeline configurations are anticipated, even if it is subject to change.	The following text will be added at the end of the following bullets in response to this comment: • **Direct burial**: For example, pipes/ conduits in the floodplain. • **Concrete trenches:** For example, pipes/ conduits along TCS entrance road. • **Trenchless**		Resolved.		Comment resolved.

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							technologies: For example, segment of freshwater pipe under I-40. • **Installed aboveground**: For example, segment of freshwater pipe on the Arched Bridge. • **Installed on pipe bridges**: For example, segment of freshwater pipe on the Arched Bridge.				
974	DOI-154	Non-design	Editorial	3.2.2.1/3-31	Similarly, any pavement will be segregated from the soil as required and managed.	Revise this sentence to note that pavement will be "transported offsite for recycling or disposal".	Text will be revised to read as follows: "Similarly, any pavement will be segregated from the soil as required and ~~managed~~ transported offsite for recycling or disposal."		Resolved.		Comment resolved.
975	DOI-155	Design	Remedial Design	3.2.2.1/3-31	The contractor(s) will select and implement the method used to prevent trench cave-ins and that selection will meet regulatory construction safety requirements.	DOI recognizes that the methodology for trench stabilization is based on site/soil conditions and engineering factors and that the contractor will have the ultimate decision on steps implemented to prevent collapse. However, given the sensitivity regarding excavation within the Topock cultural area, it is recommended that the preference for shoring over increased excavation be discussed within the design documents.	As presented in the 90% design, the majority of the trenches are shallow trenches (about 3 feet deep). With the exception of the floodplain, PG&E does not anticipate cave-ins to be an issue and most trenches will probably have near vertical walls based on soil type. Sloping or shoring may be required on the flood plain. PG&E will require and incentivize the construction contractors via contracting mechanism to limit excavation and not over-excavating. We found this method to be fairly effective without prescribing or restricting the means and methods for construction. The following text will be added (shown as underline): "The contractor(s) will select and implement the method used to prevent trench cave-ins and that selection will meet regulatory		Resolved.		Comment resolved.

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							construction safety requirements as well as limiting excavation and not over-excavating."				
976	FMIT/TRC	Non-design	Request for Information	C/RAWP p. 3-31 3.2.2.1 Direct Burial	Hand work, as well as soft dig methods, may also be required when trenching near existing underground utilities. Soft dig techniques include hydrovacuum excavation, and air lancing. With hydrovacuuming the soil is loosened by spraying the ground with high-pressure water. The loose soil and water is then vacuumed into a truck for transport and disposal.	The Tribes request that handwork as well as soft dig methods, be required when trenching near existing cultural resources. In addition please provide a detailed explanation of how protection will be ensured of unearthed cultural resources when soil loosening techniques such as spraying the ground with high-pressure water are used.	PG&E intends to use "soft dig" methodologies (primarily hydrovac) when the presence of underground utilities warrant the technique (mostly within the Topock Compressor Station and occasionally outside the station). Because the hydrovac system has a large footprint, it would not be suitable for use near identified cultural resources that need protection. For such resources, hand work or backhoe may be used. CIMP CUL-1a-8n protocols were developed for locations requiring specific protective devices, such as temporary fencing, flagging, or other type of demarcation during construction. According to the CIMP, protective measures may include, but are not limited to, protective coverings of soil or riprap, onsite personnel to prevent access to sensitive areas, use of flagging, blaze orange mesh fencing secured to steel posts, bollards, natural barriers of rocks or piled brush, cables suspended between secure posts, and/or signage (e.g., "This Area Closed" or "Exclusion Zone: Keep Out"). Any such measures will be temporary (only as needed during construction), and will, to the extent practicable, not call undue attention to the nature of the resource being protected. In the event that previously unidentified potentially			Noted.	

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							significant cultural resources are discovered during ground-disturbing activities, the Qualified Cultural Resources Consultant will have the authority to divert or temporarily halt ground-disturbing activities in the area of discovery to allow evaluation of the potentially significant cultural resources. See EIR mitigation measure CUL-1b/c-4 for additional details.				
977	Hualapai/TRC	Non-design	Request for Information	C/RAWP p. 3-31 3.2.2.1 Direct Burial	Hand work, as well as soft dig methods, may also be required when trenching near existing underground utilities. Soft dig techniques include hydrovacuum excavation, and air lancing. With hydrovacuuming the soil is loosened by spraying the ground with high-pressure water. The loose soil and water is then vacuumed into a truck for transport and disposal.	The Tribes request that handwork as well as soft dig methods, be required when trenching near existing cultural resources. In addition please provide a detailed explanation of how protection will be ensured of unearthed cultural resources when soil loosening techniques such as spraying the ground with high-pressure water are used.	See above			Noted.	
978	Cocopah/TRC	Non-design	Request for Information	C/RAWP p. 3-31 3.2.2.1 Direct Burial	Hand work, as well as soft dig methods, may also be required when trenching near existing underground utilities. Soft dig techniques include hydrovacuum excavation, and air lancing. With hydrovacuumin	The Tribes request that handwork as well as soft dig methods, be required when trenching near existing cultural resources. In addition please provide a detailed explanation of how protection will be ensured of unearthed cultural resources when soil loosening techniques such as spraying the ground with high-pressure water are used.	See above			Noted.	

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					g the soil is loosened by spraying the ground with high-pressure water. The loose soil and water is then vacuumed into a truck for transport and disposal.						
979	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP p. 3-31 3.2.2.1 Direct Burial	Hand work, as well as soft dig methods, may also be required when trenching near existing underground utilities. Soft dig techniques include hydrovacuum excavation, and air lancing. With hydrovacuuming the soil is loosened by spraying the ground with high-pressure water. The loose soil and water is then vacuumed into a truck for transport and disposal.	The Tribes request that handwork as well as soft dig methods, be required when trenching near existing cultural resources. In addition please provide a detailed explanation of how protection will be ensured of unearthed cultural resources when soil loosening techniques such as spraying the ground with high-pressure water are used.	See above			Noted.	
980	DOI-187	Non-design	Editorial	Figure 3.2-1	Highlighting	The figure legend should define the significance of the highlighting and should cross reference back to Section 3.2.1.3 for more details.	The additional information requested will be added to the figure legend.		Accepted		Comment resolved pending DOI review of the final design documents.
981	FMIT/TRC	Design	Remedial Design	C/RAWP Fig. 3.2-1	Estimated Approach to Well Network Construction	Category 1 needs to include MW-L, MW-M, and MW-N in order to better define the boundaries of the plume.	Based on the review of existing groundwater monitoring data, the following monitoring well locations will be reclassified as Category 1 well locations: MW-L, M, R, U, and Z. These locations will be added to Table 3.2-6 and Exhibit 3.3-2 (Key Well Schedule Constraints) and the following text will be added to the introductory paragraph of the Category 1 portion of Section			Considering the changes in construction scheduling (per TWG Handout 082715) where different phases of the construction sequencing were described, it is requested that wells in culturally sensitive areas of the upland (e.g. MW's AA, BB, CC, DD, EE, FF, GG, I, J, P, and V) should be installed as late as possible as part of phase 2.	Comment resolved pending verification of the procedure within 100% design.

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							3.2.1.3: **"Approach to Category 1 Locations.** Category 1 wells have been designated in areas where existing uncertainties in the current conceptual site model may drive final well siting and/or design, as well as the other associated remedy infrastructure (pipelines). These areas include the northern area of the NTH IRZ, the IRL injection area in the uplands, the southern freshwater injection well (FW-2) area, and the East Ravine area. In each of these areas, an already planned monitoring well<u>(s)</u> ~~has~~ <u>have</u> been designated as ~~the~~ Category 1 well location<u>(s)</u>. Data collection at these locations will be scheduled early in the construction schedule to confirm the assumptions in the basis of design for these areas prior to moving forward with the construction of other wells and remedy infrastructure. <u>In the Upland, where multiple Category 1 locations are planned, an "east to west" approach to Category 1 well installation will generally be applied (see Exhibit 3.3-2 for more detail).</u> This approach will minimize the potential for uncertainties in the conceptual site model to cause unnecessary disturbance (that is, avoid constructing unnecessary infrastructure)." Based on review of existing groundwater monitoring data it is PG&E's opinion is that MW-N will be within the			Comment resolved pending verification of the procedure within 100% design.	

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							plume and that data from this location will not be used to confirm the locations of other remedy infrastructure (particularly to the west); therefore, MW-N will remain classified as a Category 3 location.				
982	Hualapai/TRC	Design	Remedial Design	C/RAWP Fig. 3.2-1	Estimated Approach to Well Network Construction	Category 1 needs to include MW-L, MW-M, and MW-N in order to better define the boundaries of the plume.	See above			Considering the changes in construction scheduling (per TWG Handout 082715) where different phases of the construction sequencing were described, it is requested that wells in culturally sensitive areas of the upland (e.g. MW's AA, BB, CC, DD, EE, FF, GG, I, J, P, and V) should be installed as late as possible as part of phase 2. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
983	Cocopah/TRC	Design	Remedial Design	C/RAWP Fig. 3.2-1	Estimated Approach to Well Network Construction	Category 1 needs to include MW-L, MW-M, and MW-N in order to better define the boundaries of the plume.	See above			Considering the changes in construction scheduling (per TWG Handout 082715) where different phases of the construction sequencing were described, it is requested that wells in culturally sensitive areas of the upland (e.g. MW's AA, BB, CC, DD, EE, FF, GG, I, J, P, and V) should be installed as late as possible as part of phase 2. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
984	Chemehuevi/ TRC	Design	Remedial Design	C/RAWP Fig. 3.2-1	Estimated Approach to Well Network Construction	Category 1 needs to include MW-L, MW-M, and MW-N in order to better define the boundaries of the plume.	See above			Considering the changes in construction scheduling (per TWG Handout 082715) where different phases of the construction sequencing were described, it is requested that wells in culturally sensitive	Comment resolved pending verification of the procedure within 100% design.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
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										areas of the upland (e.g. MW's AA, BB, CC, DD, EE, FF, GG, I, J, P, and V) should be installed as late as possible as part of phase 2. Comment resolved pending verification of the procedure within 100% design.	
985	DOI-156	Design	Remedial Design	3.2.2.1/3-32	An alternative to stabilization is to redesign the pipe.	Further discussion on the purported redesign of the pipe should be provided.	Any redesign of piping required due to the referenced text would not be known until construction is underway. At that time any required redesign will be completed in accordance with the established field change procedures.		Resolved.		Comment resolved.
986	DOI-157	Non-design	Editorial	3.2.2.1/3-33	A material haling vehicle would then move into the space vacated by the spoil-hauling vehicle. After competing installation, the excavation equipment could then forward along the pipe alignment	Replace "haling" with "hauling". Replace "competing" with "completing". Add "move" after "then".	Revision will be made as requested.		Resolved.		Comment resolved.
987	FMIT/TRC	Non-design	Request for Information	C/RAWP 3.2.2.2 p. 3-24 Concrete Trench	Install Concrete Trenches. Box-like sections of concrete trench will be placed into the excavation using construction equipment.	Please indicate what dictates the use of a concrete trench box versus simple trenching? Also what level of detail has been provided regarding the exact locations where trench boxes will be placed?	The selection of concrete trench or direct buried (traditional) trenching is specified in Section C.2.2 (page C-5) of Appendix C. The locations of the trench boxes are depicted in the Appendix D design drawings.			Noted.	
988	Hualapai/TRC	Non-design	Request for Information	C/RAWP 3.2.2.2 p. 3-24 Concrete Trench	Install Concrete Trenches. Box-like sections of concrete trench will be placed into the excavation	Please indicate what dictates the use of a concrete trench box versus simple trenching? Also what level of detail has been provided regarding the exact locations where trench boxes will be placed?	See above			Noted.	

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					using construction equipment.						
989	Cocopah/TRC	Non-design	Request for Information	C/RAWP 3.2.2.2 p. 3-24 Concrete Trench	Install Concrete Trenches. Box-like sections of concrete trench will be placed into the excavation using construction equipment.	Please indicate what dictates the use of a concrete trench box versus simple trenching? Also what level of detail has been provided regarding the exact locations where trench boxes will be placed?	See above			Noted.	
990	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP 3.2.2.2 p. 3-24 Concrete Trench	Install Concrete Trenches. Box-like sections of concrete trench will be placed into the excavation using construction equipment.	Please indicate what dictates the use of a concrete trench box versus simple trenching? Also what level of detail has been provided regarding the exact locations where trench boxes will be placed?	See above			Noted.	
991	DOI-158	Non-design	Editorial	3.2.3/3-43	Excavation in hard soil or rock may require special excavation techniques such as road mining, grinding, and/or hoe-ramming.	Is the technique noted as “road mining” meant to be “road milling”?	No. We did not use the term “road milling” because it could be mistaken for an operation where relatively thin layers of existing pavement are ground from a road surface. Here, the term “road mining” was used to mean a deeper and bulk rock grinding operation using surface mining equipment.		Resolved.		Comment resolved.
992	DOI-159	Design	Remedial design	3.2.4.2/3-46, 2nd ¶	Typically, there will be at least one way to access each well, but there will not be a dedicated route to each well.	The implication here is that multiple access routes to wells may be considered. Given the biological and cultural constraints in the area, a single access route to a well is preferred.	The design is configured so that there is one access route to each well. However, by chance there will be more than one way to access select wells. For example, wells in the flood plain can be accessed from the ring road by driving clockwise around the ring road or counterclockwise around the ring road.		Resolved.		Comment resolved.
993	DOI-160	Non-design	Other	3.2.6/3-46, 3rd ¶	Improvements will be made to the road that leads into Bat Cave Wash from the west (to the west of TCS).	It is unclear from the description if the referenced road leads from the TCS to BCW or if it is the E-W pipeline road across from BCW. If it is the latter, further discussion regarding the specified improvements must occur considering the proximity to the Topock Maze.	The referenced road is the steep and heavily eroded portion of the access road leading into Bat Cave Wash and to well FW-2 from the west. Refer to drawings C-07-201 and C-07-202.		Resolved.		Comment resolved.
994	DOI-161	Design	Remedial	3.2.4.2/3-46,	Details are	It is presumed that this information will be provided in the supplemental design.	PG&E notes that the		Resolved.		Comment resolved.

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			design	3rd ¶	being developed and will be presented to agencies and stakeholders shortly after submittal of the 90% design.		cited text is in Section 3.2.6, and not Section 3.2.4.2. The details referenced in the cited text were developed and included in the Supplemental 90%.				
995	DOI-162	Non-design	Process	3.3/3-48	A more detailed construction schedule will be prepared following approval of the 100% design and selection of contractors.	The detailed construction schedule should identify important project points along the critical path for construction activities, as well as dates or frequency of inspections/audits or other planned quality activities. The accompanying discussion should identify any potential resource and/or time constraints at these points, if applicable, and mitigation of these constraints.	A detailed construction schedule will be prepared following approval of the final design and selection of construction contractors. In addition, as discussed in RTCs #72-75, PG&E will submit additional details on the construction and start-up sequence in anticipation of construction activity in 2016, during the 90% RTC period (see **Attachment D** of the final RTC table). This sequencing plan provides for start-up of system elements while construction proceeds. This approach will provide more time for data analysis and adaptive design changes while still completing the overall program within the originally planned schedule. Specifically the sequencing will allow time to assess and accommodate, as appropriate, changes to the remedial system footprint; including the number and location of the Uplands IW, MWs and the associated pipeline alignment, and the Riverbank wells, in coordination with tribal stakeholders and agencies.		Resolved.		Comment resolved.
996	FMIT/TRC	Non-design	Request for Information	C/RAWP 3.3.1.3 p. 3-49 Overall Project Starting Conditions	This construction sequence shown in the preliminary	Please provide a schedule of when this EIR will be drafted and reviewed.		A preliminary schedule for the Supplemental EIR was presented at the July 22, 2015		Noted.	

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					construction schedule starts when the groundwater remedy design is ready to construct. For purposes of sequencing, the design is considered ready to construct when the activities listed below are completed: DTSC's environmental review (EIR) on the design is complete.			CWG meeting.			
997	Hualapai/TRC	Non-design	Request for Information	C/RAWP 3.3.1.3 p. 3-49 Overall Project Starting Conditions	This construction sequence shown in the preliminary construction schedule starts when the groundwater remedy design is ready to construct. For purposes of sequencing, the design is considered ready to construct when the activities listed below are completed: DTSC's environmental review (EIR) on the design is complete.	Please provide a schedule of when this EIR will be drafted and reviewed.		See above		Noted.	
998	Cocopah/TRC	Non-design	Request for Information	C/RAWP 3.3.1.3 p. 3-49 Overall Project Starting Conditions	This construction sequence shown in the preliminary construction schedule starts when the groundwater remedy design is ready to construct. For purposes of sequencing, the design is	Please provide a schedule of when this EIR will be drafted and reviewed.		See above		Noted.	

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					considered ready to construct when the activities listed below are completed: DTSC's environmental review (EIR) on the design is complete.						
999	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP 3.3.1.3 p. 3-49 Overall Project Starting Conditions	This construction sequence shown in the preliminary construction schedule starts when the groundwater remedy design is ready to construct. For purposes of sequencing, the design is considered ready to construct when the activities listed below are completed: DTSC's environmental review (EIR) on the design is complete.	Please provide a schedule of when this EIR will be drafted and reviewed.		See above		Noted.	
1000	DOI-163	Non-design	Legal	Exhibit 3.3.1/3-50	Preliminary Construction Schedule	In accordance with the Consent Decree, the projects schedule should identify the anticipated date for submittal of the Construction Completion Report.	Exhibit 3.3.1 will be revised to note that the line item TC.CC shown in the schedule graphic includes preparation and submittal of the Construction Completion Report, and the Construction Completion Report will be explicitly mentioned in Section 3.2.6 and Section 3.3.6.		Accepted.		Comment resolved pending DOI review of the final design documents.
1001	DOI-164	Non-design	Editorial	3.3.3.3/3-51	Some wells require installation of the respective pipeline to provide access to the well and for management of water generated during well development	Do you mean the road to install the pipeline must be installed to access the well location? Please clarify. Also, according to Exhibit 3.3-1, most of the wells are installed before completion of the remedy produced water conditioning plant. Please clarify how the existence of the pipeline allows management of generated water.	Yes, in some cases the road needed to install the pipeline will also be needed for well drilling equipment to access the well location. As a result, the road and associated pipeline will be constructed before drilling the well in select locations (for example, Pipeline H and Well IRL-4).		Resolved.		Comment resolved.

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					and testing.		In some cases (e.g., wells on the flood plain), the pipeline installed prior to well drilling may be used to convey water associated with well drilling, development, and testing. This could reduce the need to transport water to/from the well site with a water truck.				
1002	DOI-165	Non-design	Process	3.3.3/3-52	Exhibit 3.3-2. Further, advance construction of the pipelines will provide for the ability to convey water generated during well construction, development, and testing; thus limiting the associated equipment footprint.	It seems the logistics of transporting drill cuttings and well development water to a remote location is impractical. Finding a suitable remote location may also be difficult. Please provide an example of this scenario.	Pipeline H may be used to convey water associated with the construction, development, and testing of well IRL-4. Similarly, wells on the flood plain, which can be difficult to access, could be constructed with less footprint (i.e., traffic to the work areas) if pre-constructed pipelines were utilized. Also refer to response to comment DOI-164.		Resolved.		Comment resolved.
1003	DOI-166	Design	Infrastructures	3.3.3/3-52	Exhibit 3.3-2. Temporary IM-3 injection piping may be constructed before IRL-3 and FW-1 so the drilling work does not interfere with IM-3 injection activities.	This statement implies that the current IM-3 injection piping will be removed to access IRL-3 and FW-1. Please provide additional clarifying text as to how this piping interferes with access and what the anticipated configuration is for temporary piping. For example, is the underground piping in the vicinity of IW-2 and IW-3 to be removed and replace with temporary above ground piping?	The existing IM-3 injection piping will be in proximity to Pipeline B and likely interfere with construction. The existing piping lies on the ground surface on the north side of the IM-3 access road (DWGs C-07-20 and -21) and the edge of the Pipeline B trench will be very close to the IM-3 piping. The existing pipeline also runs directly through the planned work areas for multiple planned well locations including FW-1, IRL-3, MW-BB, and MW-CC. It is possible that the injection piping may fall into the trench or be struck by construction equipment. This piping must remain in service to allow continued operation of IM-3. The construction contractor is required to protect the piping in-place but they may also install temporary		Resolved.		Comment resolved.

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							"jumper" pipes so that the piping may be temporarily shifted during construction. C/RAWP 4.1.2 contains additional clarifying text. Temporary jumper used for construction are typically designed, installed, and maintained by the construction contractor and not shown on design drawings. It is likely that the jumper pipes will only be used to provide service for above-ground portions of the existing piping between (STA 14+00 and STA 27+50 on DWGs C-07-20 and -21, respectively).				
1004	DOI-167	Non-design	Editorial	3.3.3/3-52	Exhibit 3.3-2. Once the FW-2 location is confirmed, the access road will be constructed before installing FW-2, MW-S, MW-HH, and MW-II.	The sentence previous to this statement indicates MW-S is initially installed to locate FW-2. Please clarify.	The cited sentence will be revised as follows: "Once the FW-2 location is confirmed, the access road will be constructed before installing FW-2, ~~MW-S,~~ MW-HH, and MW-II"		Resolved.		Comment resolved.
1005	DOI-168	Non-design	Other	3.3.4/3-53	Construction of several pipelines could begin soon after completion of the relevant preconstruction activities. As shown on Exhibit 3.3-1, this includes Pipelines A, B, C, I, and E.	Please provide a figure in this section identifying the locations of all pipelines.	See NEW Figure 3.3-1 included in **Attachment V** of the final RTC table.		Resolved.		Comment resolved.
1006	DOI-169	Non-design	Editorial	3.3.4/3-53	Exhibit 3.3-3.	In general, additional explanation of how installation of monitoring wells and certain pipelines constrain the timing of installation of other pipelines is needed throughout this exhibit. Examples are noted below.	See responses below.		Resolved.		Comment resolved.
1007	DOI-170	Non-design	Infrastructures	3.3.4/3-53	For example, Pipeline G cannot start construction until a portion of Pipeline C has been constructed in the floodplain.	Please provide additional explanation of how Pipeline C constrains the timing of installing Pipeline G. Are you saying the tie in "T" on Pipeline C has to be installed before Pipeline G can be properly located?	The construction of the northern and southern portions of Pipeline C near the pipeline G connections will create the road needed for personnel and equipment to access the pipeline G construction area (refer also to Pipeline G portion of		Resolved.		Comment resolved.

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							Exhibit 3.3-3). In addition, Pipeline C may be used to convey water used for leak testing Pipeline G and nearby wells.				
1008	DOI-171	Non-design	Infrastructures	3.3.4/3-53	Exhibit 3.3-3. Construction of Pipeline C in the IRZ North/River Bank area may begin after completion of monitoring well MW-A.	Please provide additional explanation of how installation of monitoring well MW-A constrains the timing of installing Pipeline C. What are you expecting to learn from installation of MW-A that influences the installation of Pipeline C. Would IRZ-1 and IRZ-2 not be installed?	As indicated on Table 3.2-6 of the C/RAWP, the construction of MW-A is intended to confirm the assumption that the northern margin of the groundwater plume is defined and the northern extent of the NTH IRZ and River Bank extraction wells are adequate. Planned well IRZ-1 and future provisional well IRZ-2 are sited based on this assumption holding true, but data collected from MW-A (primarily in the deeper portion of the unconsolidated aquifer) might indicate that additional IRZ wells are needed to the north; therefore, it would be prudent to construct Pipeline C after it is confirmed that the northern margin of the groundwater plume is defined.		Resolved.		Comment resolved.
1009	DOI-172	Non-design	Infrastructures	3.3.4/3-53	Exhibit 3.3-3. Construction of Pipeline C in the East Ravine area may begin after completion of monitoring well MW-70BR-D.	It appears this statement refers to pipeline C-18. Please revise. Also, please provide additional explanation of how installation of well MW-70BR-D constrains the timing of installing Pipeline C-18. What are you expecting to learn from installation of MW-70BR-D that influences the installation of Pipeline C-18. Please clarify.	The statement refers primarily to the portion of Pipeline C along the river bank that will serve the East Ravine extraction wells. As indicated on Table 3.2-6 of the C/RAWP, the construction of MW-70BR-D is intended to confirm the assumption that the East Ravine extraction wells will function properly at the designed total depth (i.e., confirm that concentrations decrease with depth at this location). While this information is not expected to change the siting of the wells, it could affect the well design (i.e., depth). Therefore, the extraction wells would		Resolved.		Comment resolved.

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							not be drilled and constructed until the designed depth is confirmed, and it would follow that that pipeline may not be constructed until the wells were constructed. Pipeline C-18 will be plumbed to existing well MW-70BR-200 and this pipeline might also be useful for conveying water associated with the construction of MW-70BR-D into/out of the East Ravine without the use of a water truck (see also responses to comments DOI-164 and DOI-165).				
1010	DOI-173	Non-design	Infrastructures	3.3.5/3-55	Exhibit 3.3-4. Cannot start until TWB-02 well installed….	It is not clear why construction cannot start on the TW Bench until well TWB-02 is installed. The well is not within the TW bench footprint. Please clarify.	TWB-02 is located within the TW bench footprint (see C/RAWP Figures 3.1-1 and 3.2-1, and BOD Appendix D Drawing C-08-04). Construction of the TW Bench facilities before drilling TWB-02 would likely limit access to and constrain space at the drilling site. With the TW Bench being a heavily trafficked and constrained work area even before the addition of remedy facilities, the TW Bench facilities well construction will be made easier, safer, and less expensive to install by sequencing the construction of other constraining facilities them after drilling well TWB-02.		Resolved.		Comment resolved.
Specific Comments – Construction/Remedial Action Work Plan, Section 4: Site Management Plan											
1011	DOI-174	Non-design	Process	4.1.3/4-3	Soil investigation activities are expected to include drilling and soil sampling, potential plant or other biota sampling, pilot testing, equipment staging and decontaminati	The soil investigation does not currently include pilot testing. It may be assumed that this would be considered after the investigation is complete and remedial alternatives are being considered, if necessary. Delete the reference to pilot testing.	Reference to pilot testing has been deleted from the text. The sentence will be revised as follows: "Soil investigation activities are expected to include drilling and soil sampling, potential plant or other biota sampling, ~~pilot testing,~~ equipment staging and decontamination, and investigation-derived		Resolved.		Comment resolved.

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					on, and investigation-derived waste management.		waste management."				
1012	DOI-175	Non-design	Infrastructures	4.2.3/4-7	The location of access routes and staging areas are depicted on Figure 4.2-3.	On Figure 4.2-3, please demark new remedy access routes that require construction of a road (e.g., grading, adding bedding, etc.). Also, please identify the location of County Highway 10 on the figure. Please identify the purpose of the road to the north of the NTH. Lastly, why is there a new remedy access road down to the Topock Marina? The access to the well should be an existing road.	Additional details will be added to Figure 4.2-3 as requested (A revised Figure 4.2-3 will be prepared for review during the 90% RTC period and included in **Attachment W** of the final RTC table). The spur road north of the NTH is not currently used nor planned for remedy use. It will be removed from Figure 4.2-3. The same change will apply to Figure 3.5-9A in the BOD. The access road to the well in Topock Marina is an existing road. Color will be changed from green to purple.		accepted		Comment resolved pending DOI review of the final design documents.
1013	DTSC-176	Design	Remedial Design	4.2.5 Construction Water Supply Page 4-8.	"Treated water from IM-3. Excess treated water from IM-3 will be accessed by the existing IM-3 storage and distribution system, or utilizing a temporary storage and supply system."	It is not certain if utilizing treated IM-3 water for construction water supply is appropriate. The text should discuss limitation associated with the elevated TDS of the treated water (approximately 4,500 mg/L). Can it adversely impact plants or threaten the shallow aquifer? Concurrence from the Water Board is also suggested.	Excess treated water from IM-3 is one of several options identified for construction supply water (see Section 4.2.5 of C/RAWP). PG&E will obtain concurrence from the Water Board and DOI prior to using IM-3 treated water for dust suppression during remedy construction in areas within the Uplands. Having access to a local source of water would reduce construction truck traffic and congestion to/from the Uplands. Most construction areas in the Uplands are limited to the access road and previously disturbed areas, with very minimal vegetation. Biological clearance (including vegetation) will be obtained prior to the start of construction. It is anticipated that protective measures for sensitive plants that may occur near construction	Text in the design document should discuss potential limitations associated with the elevated TDS of the treated water. In addition to potential impact of TDS to the shallow aquifer, repeated applications when used as construction water supply could raise total salt build up in soil. This could limit potential restoration and reuse of the soil in the future (e.g., affect future vegetation planting) Best management practice may be to inject the saltier waters to the deeper, saltier, portions of the aquifer. Again, the text should discuss limitations and any needed action(s).			Without further evaluation by PG&E of impacts from TDS, this use should be removed from the remedy as an option for disposing treated IM-3 water. PG&E Response: PG&E understands the agency's concern, and will conduct further evaluation of potential TDS impacts associated with the use of IM 3 treated water for dust suppression during remedy construction. The evaluation will be submitted to DTSC for CEQA evaluation. If useful, this language can be added to the CRAWP.

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							areas (e.g., demarcate plants as being outside of allowed work areas) would preclude those plants from being sprayed with dust suppression water or being watered with runoff, if any, from dust suppression water.	Without proper consideration by PG&E of impacts, this use should be removed from the remedy as an option for disposing treated IM-3 water.			
1014	DOI-176	Non-design	Process	4.3.1/4-10	Should a designated inspector observe disturbance to the environment, notification will be provided to DTSC and the corresponding landowner.	Should a "disturbance to the environment" occur, PG&E shall also notify DOI and BLM.	Text will be revised to read: "Should a designated inspector observe disturbance to the environment, notification will be provided to DTSC, <u>DOI</u>, and the corresponding landowner<u>/ land manager</u>." Text will also be revised in the Site Security Plan consistent with RTC #905 DOI-145.		Resolved.		Comment resolved.
1015	DOI-177	Non-design	Editorial	4.3.2/4-11	Consistent with EIR Mitigation Measure CUL-1a-8l, as formulated in Section 2.12 of the CIMP, Protocols for Tribal Monitors to Observe Ground Disturbing Activities; and in the sections "Tribal and Archaeological Monitoring Protocol" in the PA and CHPMP, PG&E will notify the Interested Tribes of planned ground-disturbing activities and other scientific surveying being conducted in anticipation of construction activities.	The Tribal and Archaeological Monitoring Protocol does not refer to "Interested Tribes" but rather the Tribes. Delete the word "interested".	The word "interested" will be deleted.		Resolved.		Comment resolved.
1016	JDS-5	Non-design	Monitoring	Section 4.3.2	Protocols for Visitors and Monitors Last Paragraph	With regard to prohibiting monitors from exclusion zones in primary work areas, the text should indicate that monitors would be generally allowed except under exceptional conditions. The provision for alternative methods for accommodating monitors should indicate that this is not the typical method of observation.	Safety is of paramount importance around working heavy equipment and exclusion zones are always established to			Requires further discussion as to circumstances under which access by TMs might be granted.	DTSC/DOI response: PG&E will comply with Protocol for TM to observe ground disturbing activities. Tribes can request

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							keep all but necessary personnel safely out. Monitoring locations will be established as close as possible to all work as guided by the CUL-1a-8l protocol.				additional access on a case by case bases if needed.
1017	JDS-6	Non-design	Monitoring	Section 4.3.2	Protocols for Visitors and Monitors	Tribal Monitors report to PG&E, available to tribes on request. Change to be copied to tribes.	When provided to PG&E, Tribal monitor's daily reports can be copied and given back to the monitor for distribution as determined by their tribe.			Noted.	
1018	DOI-178	Non-design	Other	4.3.3/4-12		This section should emphasize the need to minimize the effects of the project on Park Moabi residents, their recreational activities, and their safety.	The following text will be added to Section 4.3.3 to address this comment (underline; for text addition): "After check in, arrangements will be made for meeting the specific contact person for the specific load at the designated work area. To control onsite traffic and minimize disruptions to existing operations (including but not limited to operations at Moabi Regional Park, operations by property owners/land managers/utility companies/BNSF Railroad, and operations related to IM-3) and activities (by Moabi Regional Park residents and/or recreational users of the area) —depending on the quantity and type of equipment/materials—designated onsite trucks may be used to shuttle materials from the check-in point to individual staging areas/ construction zones. This approach of using designated vehicles may also apply to transporting personnel to and from the construction zones. Personnel vehicles will typically be parked at the CHQ."		Resolved.		Comment resolved.
1019	DOI-179	Non-design	Editorial	4.4.2/4-13	Air and	Please provide Exhibit 4.4-1. It is missing from the document.	Exhibit 4.4-1 is a typo,		Resolved.		Comment resolved.

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					meteorological monitoring will be performed for construction activities within the boundaries of soil investigation areas that overlap with or are located within 20 feet of groundwater remedy infrastructure, as identified in Exhibit 4.4-1.		and will be revised to refer to Exhibit 4.1-1 (Soil RFI/RI SWMUs, AOCs, and Undesignated Areas).				
1020	DOI-180	Non-design	Editorial	4.4.3/4-13	Where a designated decontamination pad is not available and/or not conveniently located, a temporary equipment decontamination facility will be constructed to properly decontaminate equipment by mechanical means as well as with the use of high pressure, low-volume hot water when necessary.	At which primary work zones and/or under what conditions would high pressure, low-volume hot water be necessary? Please clarify.	Decontamination using high pressure, low volume hot water may be used, in combination with using wire or stiff brushes, to dislodge dirt that is attached to heavy equipment (e.g., drilling rigs, drilling rods/tools, and backhoe). This method could be used in any primary work zones when necessary to effectively decontaminate equipment between locations and to prevent tracking of muds or dirt out of primary work zones and onto public or private roads.		Resolved.		Comment resolved.
1021	DOI-181	Non-design	Editorial	4.5.1		All waste streams are found under the subsection Wastewater. This section should be divided into additional waste categories.	The section will be subdivided into Wastewater, Displaced Site Material, General Construction Waste, and Other Waste.		Accepted.		Comment resolved pending DOI review of the final design documents.
1022	DOI-182	Design	Process	4.5.1.1/4-15	It is expected that some of this wastewater stream will be conveyed to temporary staging areas (for example, the MW-20 Bench) and subsequently disposed onsite at the existing	What would be an appropriate well that could receive untreated groundwater? Please clarify.	The reference to injection into an appropriate well pertains only to injection of well testing/sampling water (no chemical additives will be used during well testing activities) consistent with the requirements of the California State Water Resources Control Board Water Quality Order No. 2003-0003-		Resolved.		Comment resolved.

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					IM-3 treatment plant and TCS evaporation ponds or injected into an appropriate well subject to availability and in accordance with the substantive requirements.		DWQ. The cited text will be clarified to read as follows: "**Wastewater generated from well installation, development, and testing/sampling**. The current estimated total volume of wastewater generated over the entire construction period is 25 million gallons. It is expected that some of this wastewater stream will be conveyed to temporary staging areas (for example, the MW-20 Bench) and subsequently disposed onsite at the existing IM-3 treatment plant and TCS evaporation ponds. <u>In addition, water from well testing/sampling</u> ~~or~~ will be injected into an appropriate well <u>(through a filter to remove particulate matter)</u> <u>of similar aquifer water quality</u> subject to availability and in accordance with the substantive requirements. Excess or hazardous wastewater will be transported offsite for treatment/disposal.				
1023	DTSC-177	Design	Remedial design	4.5.1.1 Wastewater Page 4-15.	"**• Wastewater generated from well installation, development, and testing/ sampling.** The current estimated total volume of wastewater generated over the entire construction period is 25 million gallons. It is expected that some of this wastewater	Waste water injection into onsite injection wells will require periodic monitoring of those waste constituents injected into the aquifer. For clarity, the "appropriate well" should be defined / referenced as should the "substantive requirements" cited.	See RTC #1022 DOI-182.		Resolved.		Comment resolved.

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					stream will be conveyed to temporary staging areas (for example, the MW-20 Bench) and subsequently disposed onsite at the existing IM-3 treatment plant and TCS evaporation ponds or injected into an appropriate well subject to availability and in accordance with the substantive requirements. Excess or hazardous wastewater will be transported offsite for treatment/disposal. • **Remedy-produced water generated during remedy startup such as backwashing of wells.** This wastewater stream will be transported onsite via piping or trucking to the remedy-produced water conditioning plant (inside the TCS), conditioned by removing solids and pH adjustment, and transported via piping to the IRZ wells for re-injection….”						
1024	FMIT/TRC	Non-design	Request for Information	C/RAWP 4.6.2.1 p. 4-21	Curtail or reduce	Please provide rationale for the 25 mph limit. When the soil is dry, it doesn't take much to get them moving; the threshold wind velocity only needs to be at about 9 miles per hour (14.5 kilometers per	The 25 mph limit is per the EIR mitigation	DTSC believes the second part of the		The Tribe agrees with DTSCs response and	DTSC response: Tribal comment

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				Dust Control	nonessential earth moving activity under high-wind conditions (greater than 25 miles per hour), or develop a plan to control dust during high-wind conditions.	hour) to disrupt the surface. It is suggested that the limit be reduced to 15 mph or rationale be provided on why 25 mph is appropriate and will not result in localized increases in suspended particles.	measure AIR-1e which states: "e) Curtail nonessential earth-moving activity under high wind conditions (greater than 25 miles per hour) or develop a plan to control dust during high wind conditions. For purposes of this rule, a reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance." Mojave County Air Quality Management District (MAQMD) guidance for "Fugitive Dust Control for the Mojave Desert Planning Area" included in the FEIR (page 4.2-15), defines "High Winds" as "When wind gusts exceed 40 kilometers (25 miles) per hour or, on an hourly average, when wind speeds exceed 24 kilometers (15 miles) per hour. The average wind speed determination shall be on a 15 minute average at the nearest meteorological station or by wind instrument on site." Therefore, while the EIR mitigation measure AIR-1e correctly references <u>the maximum wind speed of 25 mph</u>, the MAQMD definition of high winds further clarifies the applicability of <u>the hourly average wind speed of 15 mph</u>. From an implementation standpoint, PG&E's practice has been to conduct dust suppression to minimize the generation of visible dust during high wind conditions in compliance with the EIR mitigation measure. PG&E defers	EIR mitigation measure AIR-1e condition for which dust control is necessary (i.e. when visible dusting occurs from moist and dry surfaces due to wind erosion) is less onerous than a continuously measured wind speed as proposed by the MAQMD. However, this does not limit PG&E from conducting air monitoring by following MAQMD's guidance to determine "high wind" conditions.		support a curtailment or reduction in nonessential earthmoving activity when visible dusting occurs from moist and dry surfaces due to wind erosion) rather than a dependence on a measured wind speed value of 25 mph.	noted. PG&E Response: PG&E reiterates that our practice at the Topock site has been to conduct dust suppression to minimize the generation of visible dust generated by PG&E activities during high wind conditions (greater than 25 miles per hour) in compliance with the EIR mitigation measure AIR-1e.

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							to DTSC for further clarification on the 25 mph limit stated in EIR mitigation measure AIR-1e, as needed.				
1025	Hualapai/TRC	Non-design	Request for Information	C/RAWP 4.6.2.1 p. 4-21 Dust Control	Curtail or reduce nonessential earth moving activity under high-wind conditions (greater than 25 miles per hour), or develop a plan to control dust during high-wind conditions.	Please provide rationale for the 25 mph limit. When the soil is dry, it doesn't take much to get them moving; the threshold wind velocity only needs to be at about 9 miles per hour (14.5 kilometers per hour) to disrupt the surface. It is suggested that the limit be reduced to 15 mph or rationale be provided on why 25 mph is appropriate and will not result in localized increases in suspended particles.	See above			Hualapai agree with DTSCs response and support a curtailment or reduction in nonessential earthmoving activity when visible dusting occurs from moist and dry surfaces due to wind erosion) rather than a dependence on a measured wind speed value of 25 mph.	See response 1024
1026	Cocopah/TRC	Non-design	Request for Information	C/RAWP 4.6.2.1 p. 4-21 Dust Control	Curtail or reduce nonessential earth moving activity under high-wind conditions (greater than 25 miles per hour), or develop a plan to control dust during high-wind conditions.	Please provide rationale for the 25 mph limit. When the soil is dry, it doesn't take much to get them moving; the threshold wind velocity only needs to be at about 9 miles per hour (14.5 kilometers per hour) to disrupt the surface. It is suggested that the limit be reduced to 15 mph or rationale be provided on why 25 mph is appropriate and will not result in localized increases in suspended particles.	See above			The Tribes agree with DTSCs response and support a curtailment or reduction in nonessential earthmoving activity when visible dusting occurs from moist and dry surfaces due to wind erosion) rather than a dependence on a measured wind speed value of 25 mph.	See response 1024
1027	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP 4.6.2.1 p. 4-21 Dust Control	Curtail or reduce nonessential earth moving activity under high-wind conditions (greater than 25 miles per hour), or develop a plan to control dust during high-wind conditions.	Please provide rationale for the 25 mph limit. When the soil is dry, it doesn't take much to get them moving; the threshold wind velocity only needs to be at about 9 miles per hour (14.5 kilometers per hour) to disrupt the surface. It is suggested that the limit be reduced to 15 mph or rationale be provided on why 25 mph is appropriate and will not result in localized increases in suspended particles.	See above			The Tribes agree with DTSCs response and support a curtailment or reduction in nonessential earthmoving activity when visible dusting occurs from moist and dry surfaces due to wind erosion) rather than a dependence on a measured wind speed value of 25 mph.	See response 1024
1028	FMIT/TRC	Non-design	Other	C/RAWP Section 4.6	Figure 4.6-2	The legend in this figure is incorrect. The purple-line indicates Noise-Sensitive Receptors, rather than, as labelled, Noise Monitoring Station	The figure legend will be revised as noted.		Noted.		
1029	Hualapai/TRC	Non-design	Other	C/RAWP Section 4.6	Figure 4.6-2	The legend in this figure is incorrect. The purple-line indicates Noise-Sensitive Receptors, rather than, as labelled, Noise Monitoring Station	See above			Comment noted.	
1030	Cocopah/TRC	Non-design	Other	C/RAWP Section 4.6	Figure 4.6-2	The legend in this figure is incorrect. The purple-line indicates Noise-Sensitive Receptors, rather than, as labelled, Noise Monitoring Station	See above			Comment noted.	
1031	Chemehuevi/ TRC	Non-design	Other	C/RAWP Section 4.6	Figure 4.6-2	The legend in this figure is incorrect. The purple-line indicates Noise-Sensitive Receptors, rather than, as labelled, Noise Monitoring Station	See above			Comment noted.	
Specific Comments – Construction/Remedial Action Work Plan, Section 5: Construction Contingency Plan/Procedures											
1032	DOI-183	Non-design	Editorial	Table 5.1-2	Likely Causes for Failure -	Page 5-5. The first failure mode discusses major breakdowns but only identifies "Acts of God" as the cause. Expand the causes to include human error and various construction and startup	The following text will be added under the		Resolved.		Comment resolved.

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					Acts of God	activities.	"Likely Causes for Failure": • Human error • Construction and startup activities				
Specific Comments – Construction/Remedial Action Work Plan, Section 6: Post Construction and Startup Activities											
1033	DOI-184	Non-design	Other	6.1/6-1	In general, the revegetation approach will be informed by the preconstruction condition, as documented through ground photographic records, topographic/aerial maps, disturbed area map, archaeological surveys, historical resource surveys, and biological surveys. The goal is to restore the areas affected by construction as close as possible to preconstruction conditions.	The preconstruction conditions for the revegetation should also consider conditions prior to the groundwater interim measure(s) implementation.	This is exactly what is implied in the beginning of the sentence. The term 'pre-construction condition' means before the implementation of the groundwater interim measure and final remedy.		Resolved.		Comment resolved.
1034	FMIT/TRC	Non-design	Request for Information	C/RAWP 6.1.1.2 p. 6-2 Approaches for Restoration and Revegetation	When the trees are too large to be reliably transplanted, the lost trees will be replaced with new trees of the same species grown in containers within a commercial plant nursery from locally collected seeds, if available.	What will be done if these seeds/plants are not available?	It is considered highly unlikely that there would be no individual plants on the site that produce any seed in any year. The backup plan to locally collected seeds will be to use the same species of plants already being produced by the commercial nursery that specialize in them.			Noted.	
1035	Hualapai/TRC	Non-design	Request for Information	C/RAWP 6.1.1.2 p. 6-2 Approaches for Restoration and	When the trees are too large to be reliably transplanted, the lost trees will be replaced	What will be done if these seeds/plants are not available?	See above			Noted.	

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				Revegetation	with new trees of the same species grown in containers within a commercial plant nursery from locally collected seeds, if available.						
1036	Cocopah/TRC	Non-design	Request for Information	C/RAWP 6.1.1.2 p. 6-2 Approaches for Restoration and Revegetation	When the trees are too large to be reliably transplanted, the lost trees will be replaced with new trees of the same species grown in containers within a commercial plant nursery from locally collected seeds, if available.	What will be done if these seeds/plants are not available?	See above			Noted.	
1037	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP 6.1.1.2 p. 6-2 Approaches for Restoration and Revegetation	When the trees are too large to be reliably transplanted, the lost trees will be replaced with new trees of the same species grown in containers within a commercial plant nursery from locally collected seeds, if available.	What will be done if these seeds/plants are not available?	See above			Noted.	
1038	DOI-185	Non-design	Editorial	6.1.1.6/6-3	Tree and shrub protectors will be maintained until the plants are large enough to withstand herbivory or before the growth of the plant being impacted by the barrier.	Revise text to: Tree and shrub protectors will be maintained until the plants are large enough to withstand herbivory or before the growth of the plant is impacted by the protector.	Text will be revised as directed.		Accepted.		Comment resolved pending DOI review of the final design documents.
1039	FMIT/TRC	Non-design	Request for Information	C/RAWP 6.2.2 p. 6-6 Remedy Startup,	Upon DTSC concurrence that the system is ready to be	Specifically does this suggest that the groundwater startup date is officially considered the day IM-3 is turned off?	The IM3 system will be turned off when the groundwater remedy equipment and facilities			The most recent information provided in the August, 2015 TWGs indicates a change per	DTSC response: Tribal comment noted. Discussion on construction phasing

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				Including Shutdown and Layup of IM	turned off, PG&E will turn off the IM-3 system, and this date will be the "startup date."		are in place and are ready to begin start-up. The remedy equipment and facilities may include the wells for the IRZ along the NTH, the River Bank Extraction wells, the freshwater wells, monitoring wells, the East Ravine/TCS wells, and the pipelines, controls, and electrical and mechanical systems needed to operate these wells. This is consistent with Article 5(B) of the 2012 Settlement Agreement between DTSC and FMIT.			a "Proposed Final Design Construction Sequence". It is understood that the IRZ will commence operation, and IM3 will be turned off, before ALL portions of the remedy are constructed. Elements such as the East Ravine wells and TCS elements will be constructed/ incorporated into the remedy infrastructure afterward. As this particular scheduling element seems to be fluid, this comment is considered unresolved.	and planning will continue.
1040	Hualapai/TRC	Non-design	Request for Information	C/RAWP 6.2.2 p. 6-6 Remedy Startup, Including Shutdown and Layup of IM	Upon DTSC concurrence that the system is ready to be turned off, PG&E will turn off the IM-3 system, and this date will be the "startup date."	Specifically does this suggest that the groundwater startup date is officially considered the day IM-3 is turned off?	See above			The most recent information provided in the August, 2015 TWGs indicates a change per a "Proposed Final Design Construction Sequence". It is understood that the IRZ will commence operation, and IM3 will be turned off, before ALL portions of the remedy are constructed. Elements such as the East Ravine wells and TCS elements will be constructed/ incorporated into the remedy infrastructure afterward. As this particular scheduling element seems to be fluid, this comment is considered unresolved.	DTSC response: Tribal comment noted. Discussion on construction phasing and planning will continue.
1041	Cocopah/TRC	Non-design	Request for Information	C/RAWP 6.2.2 p. 6-6 Remedy Startup, Including Shutdown and Layup of IM	Upon DTSC concurrence that the system is ready to be turned off, PG&E will turn off the IM-3 system, and this date will be the "startup date."	Specifically does this suggest that the groundwater startup date is officially considered the day IM-3 is turned off?	See above			The most recent information provided in the August, 2015 TWGs indicates a change per a "Proposed Final Design Construction Sequence". It is understood that the IRZ will commence operation, and IM3 will be turned off, before ALL portions of the remedy are constructed. Elements such as the East Ravine wells and TCS elements will be constructed/ incorporated into the	DTSC response: Tribal comment noted. Discussion on construction phasing and planning will continue.

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										remedy infrastructure afterward. As this particular scheduling element seems to be fluid, this comment is considered unresolved.	
1042	Chemehuevi/ TRC	Non-design	Request for Information	C/RAWP 6.2.2 p. 6-6 Remedy Startup, Including Shutdown and Layup of IM	Upon DTSC concurrence that the system is ready to be turned off, PG&E will turn off the IM-3 system, and this date will be the "startup date."	Specifically does this suggest that the groundwater startup date is officially considered the day IM-3 is turned off?	See above			The most recent information provided in the August, 2015 TWGs indicates a change per a "Proposed Final Design Construction Sequence". It is understood that the IRZ will commence operation, and IM3 will be turned off, before ALL portions of the remedy are constructed. Elements such as the East Ravine wells and TCS elements will be constructed/ incorporated into the remedy infrastructure afterward. As this particular scheduling element seems to be fluid, this comment is considered unresolved.	DTSC response: Tribal comment noted. Discussion on construction phasing and planning will continue.
Specific Comments – Construction/Remedial Action Work Plan, Section 7: References											
1043	DOI-186	Non-design	Editorial	7/7-1		Add: DOI/DTSC. 2011. Memorandum of Understanding between United States Department of the Interior and California Department of Toxic Substances Control concerning Coordination in Overseeing Implementation of Groundwater Response Actions at PG&E Topock Compressor Station Site. November 22.	Addition will be made as requested. Text will also be added to the Executive Summary and Section 1 (Introduction) of the BOD, Section L1 of the O&M Manual, and Section 1 of the C/RAWP regarding the MOU between DTSC and DOI.		Accepted.		Comment resolved.
Specific Comments – Construction/Remedial Action Work Plan, Appendix A: Construction Quality Assurance Project Plan											
1044	DOI-188	Non-design	Editorial	Acronyms/ ix	Department of Interior	Modify to: Department of the Interior.	Edit will be made as requested.		Accepted.		Comment resolved.
1045	DOI-189	Non-design	Editorial	Certification Page	NA	Ensure that the certification page will be provided with the Final Construction/Remedial Action Work Plan	The certification page will be provided with the Final Construction/ Remedial Action Work Plan.				
1046	DOI-190	Non-design	Editorial	1.1.2/1-5	The USFWS and BOR Comprehensive Management Plan calls for protection of endangered and threatened species and the marsh and wetland habitat, as well	Delete the reference to BOR.	Edit will be made as requested.		Accepted.		Comment resolved.

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					as habitat for migratory, wintering, and nongame avian species (CH2M HILL 2007).						
1047	DOI-191	Non-design	Editorial	1.1.3/1-5	Federal Government: Federal agencies include the DOI, BLM, BOR, USFWS …	Modify this paragraph to the following: Federal agencies include the DOI, BLM, BOR, USFWS, ACHP and USEPA. DTSC and DOI coordinate their oversight activities in accordance with their Memorandum of Understanding (DOI/DTSC 2011). The Federal agencies actively participate in the Consultative Working Group (CWG).	Edit will be made as requested.		Accepted.		Comment resolved.
1048	DOI-192	Non-design	Editorial	1.1.3/1-6	State and Local Governments: The State of California …	This paragraph should be modified to reference the participation of ADEQ, MWD and the RWQCB, CRB, and Mohave County in the CWG. It should also reference the CA and AZ SHPO.	The subject paragraph will be modified as follows in response to this comment (modifications are shown in strikeout [~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]): "**State and Local Governments:** The State of California and local governments<u>, including the Regional Water Quality Control Board, Colorado River Basin Region (RWQCB), the Colorado River Board of California (CRB), and San Bernardino County, as well as the Metropolitan Water District of Southern California</u>, have local resources that are affected or could be affected by former activities and the remedial project. ~~Many of these agencies participate in the CWG.~~ DTSC also works closely with its counterpart in Arizona, the Arizona Department of Environmental Quality <u>(ADEQ)</u>, because it is affected by the groundwater system and draws on the Colorado River for water. <u>Other State of Arizona and local governments including Mohave County are also key stakeholders. Additionally, both the California State Historic</u>		Accepted.		Comment resolved.

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							Preservation Officer (SHPO) and the Arizona SHPO are involved in the remedial project. Many of these agencies participate in the CWG."				
1049	DOI-193	Non-design	Editorial	1.1.3/1-6	Tribal Governments: A number of Native American Indian Tribes …	This paragraph is inaccurate and needs significant modification to include the Federal Section 106 and government-to-government consultation process, the Programmatic Agreement, reference to the nine federally-recognized tribes, and the previously used language regarding the Traditional Cultural Property.	The subject paragraph will be modified as follows in response to this comment (modifications are shown in strikeout [~~strikeout~~; for text deletion] and underline [underline; for text addition]: "**Tribal Governments**: ~~A number of Native American Indian Tribes have lands that border the Colorado River. These tribes are federally recognized sovereign nations that are historically and spiritually rooted in the land and who are economically reliant on the Colorado River. Five tribes located along the river (from north to south): Fort Mojave Indian Tribe, Chemehuevi Indian Tribe, Colorado River Indian Tribes (CRIT), Fort Yuma-Quechan Indian Tribe, and the Cocopah Indian Tribe; together they form the Five Lower River Tribes Coalition. DTSC also communicates regarding the project with other interested~~ the Tribes ~~in southern California and Arizona, including the Hualapai Indian Tribe, Torres-Martinez Desert Cahuilla Indian Tribe, Havasupai Indian Tribe, Twenty-Nine Palms Indian Tribe, and the Yavapai-Prescott Indian Tribe~~. Nine federally-recognized Native American tribes - the		Resolved.		Comment resolved.

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							Chemehuevi Indian Tribe, Cocopah Tribe of Arizona, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Havasupai Indian Tribe, Hualapai Indian Tribe, Quechan Tribe of the Fort Yuma Indian Reservation, Twenty-Nine Palms Band of Mission Indians, and Yavapai-Prescott Tribe - have ties to the area in which the groundwater remedy will be implemented. The Fort Mojave Indian Tribe also owns a parcel of land in this area. The federal government has a trust responsibility to these tribes and has consulted with the tribes, including on a government-to-government basis, throughout the remedy process. The BLM also represents the Federal Agencies for purposes of consulting with the tribes pursuant to Section 106 of the National Historic Preservation Act (NHPA), and other federal laws and Executive Orders, concerning potential adverse effects on cultural and historic properties that may result from the remedy. Pursuant to the NHPA and its implementing regulations (36 CFR 800), the BLM, the U.S. Fish and Wildlife Service, the State Historic Preservation Officers (SHPO) of California and Arizona, the Advisory Council on Historic Preservation (ACHP), and PG&E entered into a Programmatic Agreement (PA) for the Project in 2010. The Hualapai Tribe signed the PA as an Invited Signatory on July 20, 2011. The BLM also				

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							completed and is implementing a Cultural and Historic Properties Management Plan (CHPMP), an overarching treatment plan for the Project, on January 19, 2012. As a state agency, the California Department of Toxic Substances Control (DTSC) respects the sovereignty of tribal governments and "has solicited comments from tribal members throughout the CEQA review and administrative decision-making process" for the Project (EIR; DTSC 2011d). During the CEQA process to study the Project, six tribes "substantially participated in the various administrative processes surrounding remediation of the site with DTSC, PG&E, and DOI, including throughout development of the final remedy." *Id.* The EIR defines these six tribes as the "Interested Tribes." *Id.* The Interested Tribes are "the Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Fort Yuma-Quechan Indian Tribe, and Hualapai Indian Tribe." *Id.* The term "Interested Tribes" is used throughout the EIR and the mitigation measures required for the Project through DTSC's adoption of the Mitigation Monitoring and Reporting Program (MMRP). The MMRP includes mitigation measures intended to reduce the severity of the Project's				

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							<u>impacts, including the impacts to the Topock Cultural Area, which the EIR defines as the Topock Maze and "the area surrounding the Topock Maze" (EIR; DTSC 2011d). One of the mitigation measures addressing potential impacts to the Topock Cultural Area requires PG&E to submit a Cultural Impact Mitigation Program (CIMP) as part of the final design of the Project. PG&E completed the CIMP and submitted it to DTSC in May 2014 for DTSC's review and approval. DTSC is undertaking additional environmental review pursuant to CEQA to inform its decision on additional Project approvals.</u> <u>The Area of Potential Effects (APE) for the Topock site is contained within what the Fort Mojave Indian Tribe and other Native American Tribes have identified as a larger area of traditional and cultural importance. The Tribes believe that the environmental, cultural, and spiritual resources may not be physically perceptible. DTSC has concluded within the January 2011 certified Environmental Impact Report (EIR; DTSC 2011d) that the 779.2-acre project site "appears to qualify as a historic resource under CEQA [California Environmental Quality Act] as an area that is significant in the social and cultural annals of California," and the BLM also has determined that a traditional cultural property or property of</u>				

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							traditional religious and cultural significance that is eligible for listing on the National Register of Historic Places exists in the area of the Topock project, within the current APE, consisting of 1,600 acres of surface area and a section of the Colorado River.				
1050	JDS-7	Non-design	Editorial	Appendix A; p. 1-6	Tribal Government	Acknowledge that FMIT is landowner in the Site	See text edit above in response to this comment (first paragraph, 2nd sentence).		Noted.	Noted.	
1051	DOI-194	Non-design	Editorial	1.2/1-7	Identification of construction QA objectives…	Specific construction QA objectives are not provided in the CQAPP. Please add these objectives.	The following text will be added to the first paragraph of Section 3 (Plan for Quality): The objectives of the Topock Construction QA program are to 1) verify the implementation and effectiveness of the Contractor's QC program, 2) ensure that the constructed work products comply with the quality requirement established in the contract documents, 3) ensure communication of changes to the approved CQAPP are made to the contractors, and 4) establish and maintain quality records that verify conformance to contract requirements and the CQAPP.		Resolved.		Comment resolved.
1052	JDS-8	Non-design	Editorial	Appendix A; p. 1-7	Quality Program Overview	Use consistent terms QA manager is term of used on Appendix A while main body text uses QC Contractor on organization chart exhibit 2.1-1. Attempt to use consistent terms throughout.	Comment noted. In general, the construction contractor and its subcontractors are responsible for QC of constructed work products as well as the necessary inspections and tests required to ensure that the work complies with the contract documents. The QC personnel and related QC support services are independent from PG&E's QA organization.			Noted.	

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							The QA Manager and QA personnel ensure that the contractor's QC is working effectively and that the resultant construction complies with the quality requirements established by the contract.				
1053	DOI-195	Non-design	Editorial	2.1.2/2-1	The DOI, BOR, and BLM are the federal agencies overseeing response actions for land under their jurisdiction …	Modify this paragraph to the following: The DOI is the lead federal agency overseeing response actions for land under its jurisdiction, custody, or control near the Compressor Station pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In July 2005, PG&E and the federal agencies (DOI, U.S. Bureau of Land Management (BLM), U.S. Fish and Wildlife Services (USFWS), and U.S. Bureau of Reclamation [BOR]) entered into an Administrative Consent Agreement (DOI 2005). In addition, PG&E and the United States executed a Remedial Design/Remedial Action Consent Decree (CD), on behalf of DOI, under CERCLA in 2012, which was approved by the U.S. District Court for the Central District of California in November 2013. These federal agencies will review the Construction/Remedial Action Work Plan as well as this CQAPP and DOI will approve these documents on behalf of the bureaus. Additionally the Federal agencies will oversee, review, and verify the remedy is constructed in accordance with the final design, performance standards (including ARARS) and related QA/QC requirements.	The subject paragraph will be modified as requested.		Accepted.		Comment resolved.
1054	DOI-196	Non-design	Editorial	2.1.3/2-2	PG&E is also responsible for formal communications with and submittals to DTSC, DOI, Tribes, and other stakeholders, as required.	PG&E is responsible for formal communication with the agencies. DTSC and DOI are responsible for formal communications with the Tribes and stakeholders.	The subject sentence will be modified as follows in response to this comment (modifications are shown in underline [<u>underline</u>; for text addition]): "PG&E is also responsible for formal communications with and submittals to DTSC~~,~~ and DOI. <u>DTSC and DOI are responsible for formal communications and submittals with the</u> Tribes and other stakeholders, as required."		Resolved.		Comment resolved.
1055	DOI-197	Non-design	Editorial	2.2/2-3	Figure 2-1	Please identify the significance of dashed and solid lines. If dashed lines mean a line of communication, it would appear that the line between the Corporate Quality Assurance Official and the Quality Assurance Manager would be a solid line, i.e., a line of authority. Furthermore, the Quality Assurance Manager should not be under the authority of the Topock Project Manager. The Quality Assurance Manger must be independent and therefore the line should be dashed. Please clarify and edit accordingly.	Dashed lines are lines of communication. Solid lines are lines of authority, responsibility, and communication. Figure 2-1 was revised to reflect current organization for construction and in response to this comment (see **Attachment X** of the final RTC table). Text will also be revised to reflect the figure.		Resolved.		Comment resolved.
1056	DOI-198	Non-design	Editorial	2.3/2-4	Given that personnel assignments	DOI understands that personnel assignments are subject to change; however, a table should be provided in the Final CQAPP showing planned CQAPP personnel assignments, their role, a summary of their responsibilities, their contact information, and a brief summary of their education and	As DOI noted, personnel assignments are subject to change. Key changes		Resolved.		Comment resolved.

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					are subject to change during construction, the Topock Project Manager will maintain a staffing list of CQAPP personnel assignments, including each person's role and responsibilities.	experience qualifications that verifies they meet the qualification shown in Table 2-1.	to the organization or personnel will be included in the monthly progress reports during construction (see Section 2 of Exhibit 2.6-2, Monthly Progress Report Template). The monthly reports will be formally submitted to DTSC and DOI, and will be posted on a SharePoint site for access for Tribes and stakeholders. In addition, the QA manager will keep on file in the CHQ, the information requested by the comment.				
1057	DOI-199	Non-design	Editorial	2.3.1.9/2-9	PG&E will specify what aspect or aspects of the construction process (e.g., wells and building envelopes) will require third-party testing services.	Given this is the 90% design, the construction areas requiring third-party testing services should be known. Please provide a description of the expected services.	A draft third-party testing and inspection plan by QA was developed based on the testing frequencies included in the 90% technical specifications (see **Attachment Y** of the final RTC table). PG&E will continue to refine the plan so this information should be considered preliminary.		Resolved.		Comment resolved.
1058	DOI-200	Non-design	Editorial	2.5/2-11	PG&E personnel will receive ongoing training to maintain and improve their technical skills and level of competence to perform the work in their assigned roles.	Please identify any specialized training or certifications required for this project and discuss how this training will be provided. This discussion should include site- and project-specific training for personnel new to the site.	As mentioned in the second paragraph of Section 2.5 (Competence, Awareness, and Training), prior to the start of project, the Chromium Remediation Director and the Topock Project Manager will assess the project-specific staffing needs and implement training, as necessary. For remedy construction, this assessment will be done with inputs from the PG&E Construction Manager and the QA Manager. In general, implementation of training will be conducted by the PG&E Construction Manager or designee. Training for QA activities will be implemented by the QA Manager. PG&E will provide updates on		Resolved.		Comment resolved.

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							personnel training to the agencies as construction planning progress.				
1059	DOI-201	Non-design	Editorial	Appendix A, Section 2.5, Page 2-11	Records of qualifications, training, indoctrination, briefings, and project-specific training are documented and maintained.	Please indicate where and by whom records of qualifications, training, indoctrination, briefings, and project-specific training are documented and maintained.	The PG&E Construction Manager, or designee, is responsible for ensuring that records of qualification, training, indoctrination, briefings, and project-specific training are documented and maintained. The CHQ will serve as the primary repository for records during construction.		Resolved.		Comment resolved.
1060	DOI-202	Non-design	Editorial	3.1/3-1	…when changes to the CQAPP are planned and implemented… Needed CQAPP changes are planned and controlled to ensure that the integrity of the CQAPP is maintained. All responsible and relevant members of the team and support personnel, including all relevant contractors, subcontractors, and sub-consultants will be informed of the changes in details to ensure conformance to the CQAPP.	Please discuss what actions require a revision to the CQAPP (e.g. changes in project scope, personnel, lessons learned, etc.) and include a distribution list of individuals that will receive a copy of the revised, approved CQAPP.	The following edits will be made to Section 3.1 in response to this comment (edits are shown in underline [underline; for text addition]): "This QA Program is based on the concept that work performance is a process that can be planned, performed, assessed, and improved. The QA Manager implements and maintains this CQAPP throughout the course of the project. PG&E Management ensures that the processes outlined in this plan are implemented in order to meet project requirements, and that the integrity of the quality management system is maintained when changes to the CQAPP are planned and implemented. Changes in the project scope or organization structure, and lessons learned from implementation of the CQAPP are monitored and discussed among all team members. When a revision to the CQAPP is deemed necessary by the QA Manager, ~~N~~ needed CQAPP changes ~~are~~ will be planned, controlled,		Accepted.		Comment resolved.

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							and approved by the QA Manager to ensure that the integrity of the CQAPP is maintained. All responsible and relevant members of the team and support personnel, including all relevant contractors, subcontractors, and sub-consultants will be informed of the changes in details to ensure conformance to the CQAPP. At a minimum the following individuals or their designee will receive a copy of the revised, approved CQAPP: Topock Project Manager QA Field Supervisor QA Field Inspectors Construction Manager Site Operations Manager Engineer of Record DTSC Project Manager DOI Project Manager Contractors Project Manager Subcontractors Project Manager Sub-consultants Project Manager".				
1061	DOI-203	Non-design	Editorial	3.2/3-1	The Construction Manager administers and controls the processing of supplier/ contractor submittals…	Please provide examples of supplier and contractor submittals.	An example of Supplier submittal is a HDPE pipe material submittal, which comprises of a manufacturer cut sheet showing materials properties in compliance with the specifications. An example of Contractor submittal is the training records for contractor personnel, documenting that contractor's proposed personnel have received the required training required in the technical specifications.		Resolved.		Comment resolved.
1062	DOI-204	Non-design	Editorial	3.4/3-5	Procedures will be established to define the controls needed for the following tasks…	These procedures should be defined and included in Final CQAPP.	Procedures will be defined and included in the final CQAPP.		Accepted.		Comment resolved pending DOI review of the final design documents.
1063	DOI-205	Non-design	Editorial	3.4.1.2/3-6	A daily	Is this the same report identified as a Daily Quality Surveillance Report in Appendix B? Please clarify	Yes, the Daily Quality		Resolved.		Comment resolved.

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					construction report is prepared by the QC Inspectors….	and revise accordingly.	Surveillance Report in Appendix B is provided as an example daily construction report prepared by the QC inspectors. Construction contractors will be allowed to use a form at its own choosing, so long as the content meets the CQAPP requirements as outlined in Section 3.4.1.2 (Daily Construction report).				
1064	DOI-206	Non-design	Editorial	3.4.1.4/3-7	These are referred to as red-line drawings. If there is a change to a specified material, dimension, location, or other feature, the as-built drawing indicates the work performed.	The title of this section is Record Drawings but this term is not used in the section, but rather, red-line and as-built drawings are used. Please clarify. Also, before the word "change" please insert "Owner-approved".	The final as-built drawings, after incorporating the markups, are the Record Drawings. The word "Owner-approved" will be inserted before the word "change" as requested.		Accepted.		Comment resolved.
1065	DOI-207	Non-design	Editorial	3.4.2.2/3-8	Daily construction QA logs	Is this the same report identified as a Daily Quality Surveillance Report in Appendix B? Please clarify and revise accordingly	No, the daily construction QA log records the daily events for QA. The daily quality surveillance report records material inspection and testing for the day. Text will be clarified.		Accepted pending final review.		Comment resolved pending DOI review of the final design documents.
1066	DOI-208	Non-design	Editorial	3.5/3-8	The type and extent of control applied to the supplier and the purchased products/services depends on the effect of the products/ services on subsequent product realization of the final product/service.	This statement is confusing. Please clarify and revise accordingly	The degree of control over contractor-purchased supplies or services depends on how critical that purchased supply or service is on successful construction of the remedy, or the complexity of that supply or service, in the professional judgment of the Owner and/or Engineer. For example, the Owner or Engineer would specify a higher level of contractor procurement oversight and control for highly complex remedy well construction services compared to relatively straightforward		Accepted.		Comment resolved pending DOI review of the final design documents.

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							procurement such as temporary construction fencing. Text will be clarified to reflect this response.				
1067	DOI-209	Non-design	Editorial	3.5/3-8	The Owner evaluates and selects contractors based on their ability to supply products and/or services in accordance with the organization's requirements. Criteria for selection, evaluation, and reevaluation are established and will be implemented for this groundwater remedy.	Please reference where these criteria are defined. Also, is the organization cited here PG&E or the contractor?	Contractor selection requirements are typically defined in the project specifications and contractor procurement documents. Contractor procurement documents, such as Requests for Proposals, will reference the relevant project specifications that describe contractor qualification requirements and the technical requirements for the work, and the Requests for Proposal will also detail the non-technical criteria for contractor selection. Examples of non-technical contractor selection criteria to be included in a Request for Proposal include contractor organization financial requirements, insurance and bonding requirements, contractor organization health and safety performance metrics, diversity classification, etc. The organization referenced in this sentence refers to the Owner's organization. The Owner would be PG&E or their contracted designee who is given contractual authority to evaluate and select contractors.		Resolved.		Comment resolved.
1068	DOI-210	Non-design	Editorial	3.5.4/3-9	When required, QA personnel must develop, review, and approve source inspection plans	Please provide examples of when source inspection plans are required.	Examples where source inspection plans may be required include internal surge suppressors, coating surfaces, and tanks. The need for source inspection will depend on the level of complexity and review		Accepted.		Comment resolved pending DOI review of the final design documents.

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							of vendor submittals. These examples will be added to the text of the CQAPP.				
1069	DOI-211	Non-design	Editorial	4.1.5/4-5	The contractor/ subcontractor will submit to the Resident Engineer the sources of supply and item material types that will be used in the work in accordance with contract requirements.	Approval of sources of supply is a QA function. It seems this requirement should be handled by the QA Manager to avoid responsibility confusion and possible breakdown of the QA process. Please clarify.	The submittal of sources of supply by the Construction Contractor should be made to the Resident Engineer in accordance with the document submittal process administered by the Construction Manager (see Section 3.2). The Resident Engineer will provide the submittal to the QA Manager for review and approval. The QA Manager will also develop source inspection criteria and QA personnel will conduct source inspection as deemed necessary (See Sections 4.1.6 and 4.1.7). For clarity, the following edits will be made (edits are shown in strikeout [~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]): • 3rd paragraph of Section 4.1.5: "…The ~~PG&E Resident Engineer/~~QA Manager will approval select sources of supply…" • 1st paragraph of Section 4.1.6: "…Material certification is documented from the source that the materials conform to contract specifications and the ~~Resident Engineer or~~ QA Manager's approved suppliers/vendors list…"		Resolved.		Comment resolved.

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							• 2nd paragraph of Section 4.1.6: "Substitution of specified materials cannot occur without prior approval by the Construction Manager/Resident Engineer, who will consult with <u>the QA Manager and</u> the appropriate Engineer of Record…"				
1070	DOI-212	Non-design	Editorial	4.2/4-7	The Contractor must establish a program for inspection of activities affecting quality and must cover all construction activities, including both onsite and offsite operations.	In Section 4.2.1 and 4.2.3 the text states that the Contractor and/or Owner's QA designee performs inspections, and in Section 4.2.2, it states the Contractor performs the inspection. Since it is the Contractor's responsibility to perform the four phase inspections, it seems the Contractor should always be responsible for the inspections. Please clarify.	The Construction Contractor is responsible for performing the four phase inspections. QA personnel will conduct surveillance and audit of the contractor's four phase inspections in coordination with the Construction Manager (see Sections 2.3.1.6 through 2.3.18). For clarity, the following edits will be made (modifications are shown in strikeout [~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]): • 1st paragraph of Section 4.2.1: "The Contractor ~~and/or Owner's QA designee~~ performs preparatory inspections prior to…" • 1st paragraph of Section 4.2.3: "The Contractor ~~and/or Owner's QA designee~~ perform follow-up inspections periodically during…"		Accepted.		Comment resolved.
1071	DOI-213	Non-design	Editorial	4.3/4-12	Table 4-3 Title	Please add "Nonconformance" before "Findings".	Edit will be made as requested.		Accepted.		Comment resolved.
1072	DOI-214	Non-design	Editorial	4.4/4-12	NA	Please provide discussion of audit frequency in Section 4.4.	Audits are scheduled based on risk and complexity of the activities and processes being implemented. As a guideline, one audit will		Accepted.		Comment resolved pending DOI review of the final design documents.

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							be conducted by a qualified Lead Auditor each year for each of Definable Features of Work (DFOW). Examples of DFOW listed in C/RAWP Table 4-1 are: • Earthwork (grading, excavation, compaction, backfill) • Subgrade Concrete (footings, foundations) • Structural (slab on grade, fabricated steel, tank erection, welding) • Architectural (wall construction and finishes, paintings and coatings, roof coverings) • Plumbing (domestic piping, drain-waste-vent, natural gas supply piping) • Electrical (conduit cable trays, distribution systems, protection systems) • Mechanical and Piping (equipment installation, pumps, valves, compressors, piping assemblies, heating equipment, cooling equipment, ductwork) • Controls and Instrumentation (installation and commissioning). Audits may be conducted more frequently based on risk and complexity. Audits may also incorporate several DFOW into one audit. After construction contractors are selected and construction schedules identified, on-site and off-site (shop fabrication) audits can be determined and scheduled. Text will be added to Section 4.4 to document				

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							this response.				
1073	DOI-215	Non-design	Editorial	4.5.1/4-17	Bullets	Throughout these bullets, the phrase "as determined by the QSR" is used. It appears the phrase should be "and documented in the QSR". Please clarify and revise accordingly.	The following edit will be made to bullets #8, 10, 12, and 13 in response to this comment (edits are shown in underline [underline; for text addition]): "…as determined by and documented in the QSR."		Accepted.		Comment resolved.
1074	DOI-216	Non-design	Editorial	5.2/5-1	The Construction Manager notifies the Contractor of noncompliance with any of the foregoing requirements.	The Contractor is also responsible to identify and report non-conforming items using its own QA process. Please revise this statement accordingly.	The first paragraph of Section 5.2 will be modified as follows in response to this comment (modifications are shown in underline [underline; for text addition]): "The Contractor is responsible for QC of constructed work products as well as the necessary inspections and tests required to ensure that the work complies with the contract documents. When material, performed work, or installation is found deficient through the Contractor's own QA/QC process and/or PG&E's QA process, the Contractor must ensure that the nonconforming material, work, or installation is identified and controlled to prevent unintended use or delivery. The Construction Manager notifies the Contractor of noncompliance with any of the foregoing requirements. The Contractor must, after receipt of such notice, immediately take corrective action".		Accepted.		Comment resolved.
1075	DOI-217	Non-design	Editorial	5.3/5-2	Project personnel identify and document the nonconforming product	Please clarify the NCR process. It seems this statement should indicate Contractor personnel, but it could also be the QA Manager or designee. Please revise accordingly.	Bullet #1 in Section 5.3 will be clarified as follows in response to this comment (edits are shown in underline [underline; for text addition]): "1. Project (Contractor		Accepted.		Comment resolved.

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							and/or QA) personnel identify and document the nonconforming product on an NCR (Appendix B)…"				
Specific Comments – Construction/Remedial Action Work Plan, Appendix B: Standard Operating Procedures											
1076	FMIT/TRC	Non-design	SOPs	C/RAWP Append B SOP-A7	Water Level Measurements	Because of the importance of water-level measurements for determination of OPS and OF, it is not specified in the 90% BOD whether transit/level surveys would be conducted to determine altitude of water-level measuring points at wells. Altitude of wells determined by GPS is not accurate enough when measuring water levels to 0.01 ft.	All monitoring wells are surveyed to 0.01-foot for water level measuring point (typically 'top of casing') and to 0.1 foot for ground surface at wellhead (and for stick-up wells, the top of protective monument). This work has been done by PG&E land survey crews, not determined by GPS. This information will be included in the design criteria in Appendix C (Section C.2.1).			There appears to be an anomaly in the PG&E topographic map when comparing the California and Arizona sides of the Colorado River. If you stand on the western river bank on contour 475 ft and look perpendicular to the flow across the river, you should be looking at contour 475 on the other side because it is a man-made trapezoidal channel with engineered banks. However, the corresponding topographic contours on the Arizona side do not match up. Causes of the anomaly are uncertain, but could be related to differences in elevation of benchmarks on the California and Arizona sides that were used for the photogrammetric survey. As these possible benchmark elevation differences could be causing confusion over water levels in MW- 54 and MW-55, it would be most helpful to have the surveys checked and verified. Checking with differential GPS (within +1 to 3 cm) would be a good starting point. Comment unresolved pending development of a plan to resurvey the altitudes of wells located on the Arizona side.	PG&E Response: The mapping on both sides of the river was based on the same High Precision Geodetic Network (HPGN) benchmark. The well elevations are also tied to this same single benchmark. It's not clear from the comment exactly what is thought to be an anomaly, but if there is a discrepancy in a topo map it is likely due to some slight imprecision in the positioning of features on the figure and not due to the use of different benchmarks on different sides of the river.
1077	Hualapai/TRC	Non-design	SOPs	C/RAWP Append B SOP-A7	Water Level Measurements	Because of the importance of water-level measurements for determination of OPS and OF, it is not specified in the 90% BOD whether transit/level surveys would be conducted to determine altitude of water-level measuring points at wells. Altitude of wells determined by GPS is not accurate	See above			There appears to be an anomaly in the PG&E topographic map when	See response 1076

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						enough when measuring water levels to 0.01 ft.				comparing the California and Arizona sides of the Colorado River. If you stand on the western river bank on contour 475 ft and look perpendicular to the flow across the river, you should be looking at contour 475 on the other side because it is a man-made trapezoidal channel with engineered banks. However, the corresponding topographic contours on the Arizona side do not match up. Causes of the anomaly are uncertain, but could be related to differences in elevation of benchmarks on the California and Arizona sides that were used for the photogrammetric survey. As these possible benchmark elevation differences could be causing confusion over water levels in MW- 54 and MW-55, it would be most helpful to have the surveys checked and verified. Checking with differential GPS (within +1 to 3 cm) would be a good starting point. Comment unresolved pending development of a plan to resurvey the altitudes of wells located on the Arizona side.	
1078	Cocopah/TRC	Non-design	SOPs	C/RAWP Append B SOP-A7	Water Level Measurements	Because of the importance of water-level measurements for determination of OPS and OF, it is not specified in the 90% BOD whether transit/level surveys would be conducted to determine altitude of water-level measuring points at wells. Altitude of wells determined by GPS is not accurate enough when measuring water levels to 0.01 ft.	See above			There appears to be an anomaly in the PG&E topographic map when comparing the California and Arizona sides of the Colorado River. If you stand on the western river bank on contour 475 ft and look perpendicular to the flow across the river, you should be looking at contour 475	See response 1076

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										on the other side because it is a man-made trapezoidal channel with engineered banks. However, the corresponding topographic contours on the Arizona side do not match up. Causes of the anomaly are uncertain, but could be related to differences in elevation of benchmarks on the California and Arizona sides that were used for the photogrammetric survey. As these possible benchmark elevation differences could be causing confusion over water levels in MW-54 and MW-55, it would be most helpful to have the surveys checked and verified. Checking with differential GPS (within +1 to 3 cm) would be a good starting point. Comment unresolved pending development of a plan to resurvey the altitudes of wells located on the Arizona side.	
1079	Chemehuevi/ TRC	Non-design	SOPs	C/RAWP Append B SOP-A7	Water Level Measurements	Because of the importance of water-level measurements for determination of OPS and OF, it is not specified in the 90% BOD whether transit/level surveys would be conducted to determine altitude of water-level measuring points at wells. Altitude of wells determined by GPS is not accurate enough when measuring water levels to 0.01 ft.	See above			There appears to be an anomaly in the PG&E topographic map when comparing the California and Arizona sides of the Colorado River. If you stand on the western river bank on contour 475 ft and look perpendicular to the flow across the river, you should be looking at contour 475 on the other side because it is a man-made trapezoidal channel with engineered banks. However, the corresponding topographic contours on the Arizona side do not match up. Causes	See response 1076

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										of the anomaly are uncertain, but could be related to differences in elevation of benchmarks on the California and Arizona sides that were used for the photogrammetric survey. As these possible benchmark elevation differences could be causing confusion over water levels in MW-54 and MW-55, it would be most helpful to have the surveys checked and verified. Checking with differential GPS (within +1 to 3 cm) would be a good starting point. Comment unresolved pending development of a plan to resurvey the altitudes of wells located on the Arizona side.	
1080	FMIT/TRC	Non-design	SOPs	C/RAWP Append B SOP-A8, p. 2	pH measurement using flow-through chamber	Because of the importance of pH to protect the organic rind, pH measurement in flow-through chambers can be affected by the streaming potential, and can be avoided by pH measurement in quiescent water (Wilde and others, 2006, USGS TWRI Book 9, Chapter A6).	If a pH measurement is measured under static conditions, the pH meter will continuously drift, that is caused by a state of equilibrium forming across surface of the glass sensing electrode. By deploying a flow-thru-cell and a flow of about 0.2 gallons/min the water in contact with the pH probe is constantly refreshed. The pH will stabilize very quickly and maintain a constant pH far longer than if measured under static conditions. In the case of multi-parameter probes used during sampling, the probes are calibrated everyday they are used. Calibration is performed to compensate for changes in potential within the measuring and reference electrodes, as well as any change of potential between them. The			pH values by electrometric methods are determined by an iterative and asymptotic approach to the actual pH value. Therefore, the pH probe must be allowed to stabilize, and the final pH value determined when the measured pH shows change of 0.01 unit over a minute. By expecting the asymptotic approach, 95% of the final value can be captured within a shorter time period; however, pH measurement takes time. The pH probe will drift in response to temperature changes and the streaming potential of water flowing past the glass membrane. If pH is measured in quiescent water, probe drift due to the streaming potential is eliminated.	DTSC Response: Tribal comment noted. DTSC will accept pH "flow through" measurements that are consistent with standard industry practice and follow manufacturer instructions (e.g., properly calibrated). Should pH data become critical and suspect at the Topock site, this method can be re-evaluated.

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							calibration also involves checking the slope of the measuring electrode. Slope defines the ability of the measuring electrode to change its output by 59.16 mV per pH unit at 25°C. Virtually all pH instruments use a slope adjustment to compensate for the inability of the measuring electrode to accurately produce its output signal. If the slope falls outside the manufactures' recommended range, the probe is replaced. This information will be included in SOP-A8.			Please consider that accurate and precise measurement of pH in the field is just as great a priority as accurate laboratory measurements of contaminants of concern (e.g. hexavalent chromium); therefore, the time it takes to accurately measure pH in the field should not be compromised. Comment unresolved pending development of a plan to compare pH measurements in flowing and quiescent water.	
1081	Hualapai/TRC						See above			pH values by electrometric methods are determined by an iterative and asymptotic approach to the actual pH value. Therefore, the pH probe must be allowed to stabilize, and the final pH value determined when the measured pH shows change of 0.01 unit over a minute. By expecting the asymptotic approach, 95% of the final value can be captured within a shorter time period; however, pH measurement takes time. The pH probe will drift in response to temperature changes and the streaming potential of water flowing past the glass membrane. If pH is measured in quiescent water, probe drift due to the streaming potential is eliminated. Please consider that accurate and precise measurement of pH in the field is just as great a priority as accurate laboratory measurements of contaminants of	DTSC response: See RTC #1080 above.

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										concern (e.g. hexavalent chromium); therefore, the time it takes to accurately measure pH in the field should not be compromised. Comment unresolved pending development of a plan to compare pH measurements in flowing and quiescent water.	
1082	Cocopah/TRC						See above			pH values by electrometric methods are determined by an iterative and asymptotic approach to the actual pH value. Therefore, the pH probe must be allowed to stabilize, and the final pH value determined when the measured pH shows change of 0.01 unit over a minute. By expecting the asymptotic approach, 95% of the final value can be captured within a shorter time period; however, pH measurement takes time. The pH probe will drift in response to temperature changes and the streaming potential of water flowing past the glass membrane. If pH is measured in quiescent water, probe drift due to the streaming potential is eliminated. Please consider that accurate and precise measurement of pH in the field is just as great a priority as accurate laboratory measurements of contaminants of concern (e.g. hexavalent chromium); therefore, the time it takes to accurately measure pH in the field should not be compromised. Comment unresolved	DTSC response: See RTC #1080 above.

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										pending development of a plan to compare pH measurements in flowing and quiescent water.	
1083	Chemehuevi/ TRC						See above			pH values by electrometric methods are determined by an iterative and asymptotic approach to the actual pH value. Therefore, the pH probe must be allowed to stabilize, and the final pH value determined when the measured pH shows change of 0.01 unit over a minute. By expecting the asymptotic approach, 95% of the final value can be captured within a shorter time period; however, pH measurement takes time. The pH probe will drift in response to temperature changes and the streaming potential of water flowing past the glass membrane. If pH is measured in quiescent water, probe drift due to the streaming potential is eliminated. Please consider that accurate and precise measurement of pH in the field is just as great a priority as accurate laboratory measurements of contaminants of concern (e.g. hexavalent chromium); therefore, the time it takes to accurately measure pH in the field should not be compromised. Comment unresolved pending development of a plan to compare pH measurements in flowing and quiescent water.	DTSC response: See RTC #1080 above.
1084	FMIT/TRC	Non-design	SOPs	C/RAWP Append B SOP-A9, p. 2	Dissolved Oxygen Measurements	Because dissolved oxygen is important to measuring the progress of the remedy, amperometric dissolved oxygen cells, such as used by the YSI-556 multimeter, are prone to fouling and drift when exposed to hydrogen sulfide, and the groundwater remedy is expected to produce hydrogen sulfide	As mentioned in the SOP, the In-Situ Troll 9500 is also used for			It is most helpful to calibrate the DO meter to a zero-DO calibration	DTSC response: Comment noted.

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						as a byproduct. Use of an optical or luminescence-based sensor is recommended for measurement of dissolved oxygen concentrations in groundwater at the site.	monitoring purge water quality at Topock. The 9500 In-Situ Smart-Troll Sonde uses an optical O2 sensor. The SOP will be clarified to state that instruments with optical DO sensors (such as the In-Situ Troll) are the primary DO measurement instruments, and the YSI-556 will be used as a back-up.			standard, which can be made up in the field lab by adding sodium sulfite to deionized water until saturation. Sulfite oxidizes to sulfate and scavenges oxygen from the water. Use a tightly sealed glass bottle for transport of the zero-DO calibration standard. Comment resolved pending verification of the procedure within 100% design.	
1085	Hualapai/TRC						See above			It is most helpful to calibrate the DO meter to a zero-DO calibration standard, which can be made up in the field lab by adding sodium sulfite to deionized water until saturation. Sulfite oxidizes to sulfate and scavenges oxygen from the water. Use a tightly sealed glass bottle for transport of the zero-DO calibration standard. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1086	Cocopah/TRC						See above			It is most helpful to calibrate the DO meter to a zero-DO calibration standard, which can be made up in the field lab by adding sodium sulfite to deionized water until saturation. Sulfite oxidizes to sulfate and scavenges oxygen from the water. Use a tightly sealed glass bottle for transport of the zero-DO calibration standard. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1087	Chemehuevi/ TRC						See above			It is most helpful to calibrate the DO meter to a zero-DO calibration standard, which can be made up in the field lab	Comment resolved pending verification of the procedure within 100% design.

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										by adding sodium sulfite to deionized water until saturation. Sulfite oxidizes to sulfate and scavenges oxygen from the water. Use a tightly sealed glass bottle for transport of the zero-DO calibration standard. Comment resolved pending verification of the procedure within 100% design.	
1088	FMIT/TRC	Non-design	SOPs	C/RAWP Append B SOP-A12	Sample transferred to bucket for measurement	Because dissolved oxygen is important to measuring the progress of the remedy, if the amperometric measurement method is being used to determine dissolved oxygen, there needs to be at least a 1 foot per second velocity of water passing the DO membrane (USGS, 2013, Chapter A6, Field Measurements); therefore, measurement of DO in a bucket is not recommended. Measurement in the flowing stream is recommended, or the DO probe can be moved back and forth in the bucket to achieve the 1 fps requirement.	Water quality measurements are typically not collected from a bucket but rather from a flow-thru-cell with a flow of 0.2 gallons/min. This SOP covers collection of water quality measurements when a flow-through cell cannot be used, for example, surface water sample collection, active extraction well sampling, screening samples collected during drilling operations, grab samples from a well using a bailer, groundwater sample using a Hydrasleeve sampler, etc. The sampler is instructed to note in the field forms that the dissolved oxygen and oxidation-reduction potential results are approximate because a flow-through cell could not be used (see Item 4 under Measurements in the SOP). The following sentence will be added at the end of Item 2 under Measurement: "Move the probe back and forth."			It is most helpful to calibrate the DO meter to a zero-DO calibration standard, which can be made up in the field lab by adding sodium sulfite to deionized water until saturation. Sulfite oxidizes to sulfate and scavenges oxygen from the water. Use a tightly sealed glass bottle for transport of the zero-DO calibration standard. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1089	Hualapai/TRC						See above			It is most helpful to calibrate the DO meter to a zero-DO calibration standard, which can be made up in the field lab	Comment resolved pending verification of the procedure within 100% design.

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										by adding sodium sulfite to deionized water until saturation. Sulfite oxidizes to sulfate and scavenges oxygen from the water. Use a tightly sealed glass bottle for transport of the zero-DO calibration standard. Comment resolved pending verification of the procedure within 100% design.	
1090	Cocopah/TRC						See above			It is most helpful to calibrate the DO meter to a zero-DO calibration standard, which can be made up in the field lab by adding sodium sulfite to deionized water until saturation. Sulfite oxidizes to sulfate and scavenges oxygen from the water. Use a tightly sealed glass bottle for transport of the zero-DO calibration standard. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1091	Chemehuevi/ TRC						See above			It is most helpful to calibrate the DO meter to a zero-DO calibration standard, which can be made up in the field lab by adding sodium sulfite to deionized water until saturation. Sulfite oxidizes to sulfate and scavenges oxygen from the water. Use a tightly sealed glass bottle for transport of the zero-DO calibration standard. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1092	FMIT/TRC	Design	SOPs	C/RAWP Append B SOP-A16	Access Routes	The category "Access By Foot Traffic Only" needs to be added for extremely sensitive sites or areas. For example, visitors to the Nazca Lines wear foot protection, why couldn't this be done for the sensitive Topock Cultural Landscape, which remarkably resembles the features exhibited at Nazca? Environmental equipment is readily available for backpack sampling of monitoring wells. In some cases, site visitation could be reduced by the use of remote technology; for example, remotely monitored ion-selective electrodes as surrogates for target analytes.	Refer to RTC #20 FMIT-6. Currently all monitoring wells have existing vehicle access. Other than IRL-4, no new vehicle access paths are anticipated to new wells.			It seems that the definition of "vehicle access path" requires grading, bedding, and road building. There are many sites (e.g. MW-	DTSC response: The agencies will provide direction to PG&E, see DTSC response to comment 69.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										DD, MW-EE) where vehicles will drive across former maze areas to access the well, yet this doesn't appear to qualify as vehicle access path. Just because a vehicle can access a site by driving doesn't mean that it should be done, particularly if there are impacts that can be avoided by allowing only foot traffic. Foot traffic must be utilized to the fullest extent possible. Comment unresolved pending development of a rigorous site access plan that considers protocols for cultural heritage areas.	
1093	Hualapai/TRC	Design	SOPs	C/RAWP Append B SOP-A16	Access Routes	The category "Access By Foot Traffic Only" needs to be added for extremely sensitive sites or areas. For example, visitors to the Nazca Lines wear foot protection, why couldn't this be done for the sensitive Topock Cultural Landscape, which remarkably resembles the features exhibited at Nazca? Environmental equipment is readily available for backpack sampling of monitoring wells. In some cases, site visitation could be reduced by the use of remote technology; for example, remotely monitored ion-selective electrodes as surrogates for target analytes.	See above			It seems that the definition of "vehicle access path" requires grading, bedding, and road building. There are many sites (e.g. MW-DD, MW-EE) where vehicles will drive across former maze areas to access the well, yet this doesn't appear to qualify as vehicle access path. Just because a vehicle can access a site by driving doesn't mean that it should be done. Foot traffic must be utilized to the fullest extent possible. Comment unresolved pending development of a rigorous site access plan that considers protocols for cultural heritage areas.	The agencies will provide direction to PG&E, see DTSC response to comment 69.
1094	Cocopah/TRC	Design	SOPs	C/RAWP Append B SOP-A16	Access Routes	The category "Access By Foot Traffic Only" needs to be added for extremely sensitive sites or areas. For example, visitors to the Nazca Lines wear foot protection, why couldn't this be done for the sensitive Topock Cultural Landscape, which remarkably resembles the features exhibited at Nazca? Environmental equipment is readily available for backpack sampling of monitoring wells. In some cases, site visitation could be reduced by the use of remote technology; for example, remotely monitored ion-selective electrodes as surrogates for target analytes.	See above			It seems that the definition of "vehicle access path" requires grading, bedding, and road building. There are many sites (e.g. MW-DD, MW-EE) where vehicles will drive across former maze areas to access the well, yet this doesn't appear to	The agencies will provide direction to PG&E, see DTSC response to comment 69.

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										qualify as vehicle access path. Just because a vehicle can access a site by driving doesn't mean that it should be done. Foot traffic must be utilized to the fullest extent possible. Comment unresolved pending development of a rigorous site access plan that considers protocols for cultural heritage areas.	
1095	Chemehuevi/ TRC	Design	SOPs	C/RAWP Append B SOP-A16	Access Routes	The category "Access By Foot Traffic Only" needs to be added for extremely sensitive sites or areas. For example, visitors to the Nazca Lines wear foot protection, why couldn't this be done for the sensitive Topock Cultural Landscape, which remarkably resembles the features exhibited at Nazca? Environmental equipment is readily available for backpack sampling of monitoring wells. In some cases, site visitation could be reduced by the use of remote technology; for example, remotely monitored ion-selective electrodes as surrogates for target analytes.	See above			It seems that the definition of "vehicle access path" requires grading, bedding, and road building. There are many sites (e.g. MW-DD, MW-EE) where vehicles will drive across former maze areas to access the well, yet this doesn't appear to qualify as vehicle access path. Just because a vehicle can access a site by driving doesn't mean that it should be done. Foot traffic must be utilized to the fullest extent possible. Comment unresolved pending development of a rigorous site access plan that considers protocols for cultural heritage areas.	The agencies will provide direction to PG&E, see DTSC response to comment 69.
1096	FMIT/TRC	Design	SOPs	C/RAWP Append B SOP-A16	Access Routes	The SOP describes three access procedures, one of which implies that cultural resources are only a concern in upland areas (procedure C). Does this mean that access procedures are not necessary for cultural resources in other areas? The Tribes disagree with the assertion that cultural resources are only a concern in the upland areas.	Procedure C will be clarified to indicate that cultural resources are a concern in all areas of the project.			Access issues will remain a concern, and it is hopeful that the SOP can be updated as the project progresses. Comment unresolved pending development of a more rigorous site access plan that considers protocols for cultural heritage areas.	DTSC response: Tribal comment noted.
1097	Hualapai/TRC	Design	SOPs	C/RAWP Append B SOP-A16	Access Routes	The SOP describes three access procedures, one of which implies that cultural resources are only a concern in upland areas (procedure C). Does this mean that access procedures are not necessary for cultural resources in other areas? The Tribes disagree with the assertion that cultural resources are only a concern in the upland areas.	See above			Access issues will remain a concern, and it is hopeful that the SOP can be updated as the project progresses. Comment unresolved pending development of a more rigorous site access plan that considers protocols for cultural heritage areas.	DTSC response: Tribal comment noted.

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1098	Cocopah/TRC	Design	SOPs	C/RAWP Append B SOP-A16	Access Routes	The SOP describes three access procedures, one of which implies that cultural resources are only a concern in upland areas (procedure C). Does this mean that access procedures are not necessary for cultural resources in other areas? The Tribes disagree with the assertion that cultural resources are only a concern in the upland areas.	See above			Access issues will remain a concern, and it is hopeful that the SOP can be updated as the project progresses. Comment unresolved pending development of a more rigorous site access plan that considers protocols for cultural heritage areas.	DTSC response: Tribal comment noted.
1099	Chemehuevi/ TRC	Design	SOPs	C/RAWP Append B SOP-A16	Access Routes	The SOP describes three access procedures, one of which implies that cultural resources are only a concern in upland areas (procedure C). Does this mean that access procedures are not necessary for cultural resources in other areas? The Tribes disagree with the assertion that cultural resources are only a concern in the upland areas.	See above			Access issues will remain a concern, and it is hopeful that the SOP can be updated as the project progresses. Comment unresolved pending development of a more rigorous site access plan that considers protocols for cultural heritage areas.	DTSC response: Tribal comment noted.
1100	FMIT/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 2	Fresh water equivalent head calculated using Salinity (%) = TDS/10,051.1	Because of the importance of freshwater equivalent heads for the determination of Operating Properly and Successfully (OPS) and Operational and Functional (OF), this fixed relation does not account for variable densities at the site.	The criteria for measuring OPS are currently under development by the agencies. However, it should be noted that laboratory certified data for analytical parameters, rather than field data, will be used as needed for OPS determinations. This equation does account for variable densities site-wide. The equation uses well-specific SC or TDS value obtained from field parameter at the end of well purging and/or laboratory data collected from discretely screened well to estimate a single salinity value for each monitoring well. The salinity measurement for each well is then used to calculate freshwater equivalent head. See also RTCs #733 and 734.			The response is unclear. Will freshwater equivalent heads be used to determine OPS and OF? If the freshwater equivalent heads do not represent the natural system, but represent an average condition. The Tribe believes that using data representative of the natural system is a better technical approach to making the OPS/OF determination. Comment unresolved pending development of a procedure to accurately represent freshwater equivalent heads.	DTSC response: Tribal comment noted.
1101	Hualapai/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 2	Fresh water equivalent head calculated using Salinity (%) = TDS/10,051.1	Because of the importance of freshwater equivalent heads for the determination of Operating Properly and Successfully (OPS) and Operational and Functional (OF), this fixed relation does not account for variable densities at the site.	See above			The response is unclear. Will freshwater equivalent heads be used to determine OPS and OF? If the freshwater equivalent heads do	DTSC response: Tribal comment noted.

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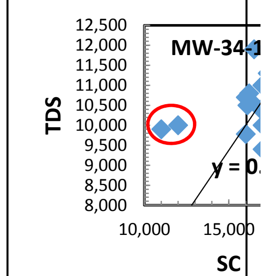
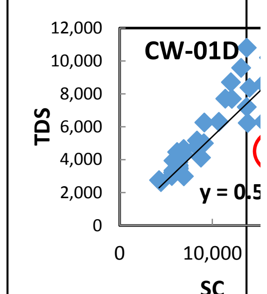
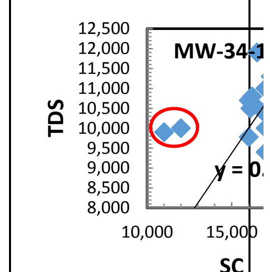
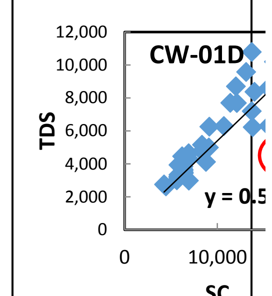
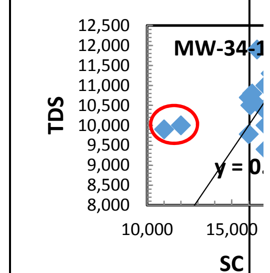
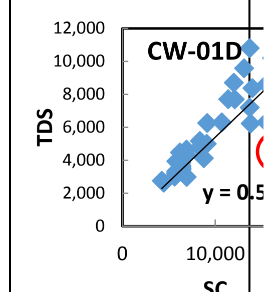
										not represent the natural system, but represent an average condition, then OPS and OF determination using non-representative data is not in the best interest of the Tribes. Comment unresolved pending development of a procedure to accurately represent freshwater equivalent heads.	
1102	Cocopah/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 2	Fresh water equivalent head calculated using Salinity (%) = TDS/10,051.1	Because of the importance of freshwater equivalent heads for the determination of Operating Properly and Successfully (OPS) and Operational and Functional (OF), this fixed relation does not account for variable densities at the site.	See above			The response is unclear. Will freshwater equivalent heads be used to determine OPS and OF? If the freshwater equivalent heads do not represent the natural system, but represent an average condition, then OPS and OF determination using non-representative data is not in the best interest of the Tribes. Comment unresolved pending development of a procedure to accurately represent freshwater equivalent heads.	DTSC response: Tribal comment noted.
1103	Chemehuevi/ TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 2	Fresh water equivalent head calculated using Salinity (%) = TDS/10,051.1	Because of the importance of freshwater equivalent heads for the determination of Operating Properly and Successfully (OPS) and Operational and Functional (OF), this fixed relation does not account for variable densities at the site.	See above			The response is unclear. Will freshwater equivalent heads be used to determine OPS and OF? If the freshwater equivalent heads do not represent the natural system, but represent an average condition, then OPS and OF determination using non-representative data is not in the best interest of the Tribes. Comment unresolved pending development of a procedure to accurately represent freshwater equivalent heads.	DTSC response: Tribal comment noted.
1104	FMIT/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22,	Freshwater equivalent head calculated	Because of the importance of freshwater equivalent heads for determination of OPS and OF, use of the fixed 0.65 conversion factor can introduce error and uncertainty into calculation of fresh water equivalent heads. Suggest measuring specific gravity by field or laboratory method, and calculate	The criteria for measuring OPS are currently under			As new data are collected, aquifer chemistry will change	DTSC response: Tribal comment noted.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
				p. 3	using TDS = SC * 0.65	freshwater equivalent head by reference density.	development by the agencies. However, it should be noted that laboratory certified data for analytical parameters, rather than field data, will be used as needed for OPS determinations. As presented in Hem, J.D. (1985) Study and Interpretation of the Chemical Characteristics of Natural Waters, USGS Water-Supply Paper 2254, the use of the fixed 0.65 value for the conversion factor provides a reasonable estimate of TDS, with most natural waters having factors that fall between 0.55 - 0.75. Use of the mid-point of the range noted for natural waters as an approximation for the Topock site has not yielded any noticeable issues with the hydraulic gradients calculated from freshwater equivalent heads (see RTC #733). However, where sufficient laboratory TDS data currently exists, a conversion factor will be calculated for each well and the SOP will be modified to reflect this change. In PG&E's opinion, adding the suggested additional step of measuring specific gravity by field or laboratory methods would not likely result in a significant improvement of density estimates for the calculation of freshwater equivalent heads. It is not common practice to measure specific gravity in the field, so the potential measurement error of field measured specific gravity could			due to injection of foreign water. There may be outliers in the data (see examples below), and statistical correlations will shift, causing uncertainty and rendering historical data less useful. Below are examples of conversion factor slopes that might be affected by outlier data (in red circles).   Determination of TDS by residual on evaporation (ROE) would be the most representative method because other methods (i.e. lab sum of major ions) does not include metals and carbon. It is anticipated that samples from the groundwater remedy will have elevated concentrations of metals (Fe, Mn) and carbon.	

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							introduce greater error than using a well specific conversion factor and field measured specific conductance to estimate TDS. See also RTC #733.				
1105	Hualapai/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 3	Freshwater equivalent head calculated using TDS = SC * 0.65	Because of the importance of freshwater equivalent heads for determination of OPS and OF, use of the fixed 0.65 conversion factor can introduce error and uncertainty into calculation of fresh water equivalent heads. Suggest measuring specific gravity by field or laboratory method, and calculate freshwater equivalent head by reference density.	See above			As new data are collected, aquifer chemistry will change due to injection of foreign water. There may be outliers in the data (see examples below), and statistical correlations will shift, causing uncertainty and rendering historical data less useful. Below are examples of conversion factor slopes that might be affected by outlier data (in red circles).   Determination of TDS by residual on evaporation (ROE) would be the most representative method because other methods (i.e. lab sum of major ions) does not include metals and carbon. It is anticipated that samples from the groundwater remedy will have elevated	DTSC response: Tribal comment noted.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										concentrations of metals (Fe, Mn) and carbon.	
1106	Cocopah/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 3	Freshwater equivalent head calculated using TDS = SC * 0.65	Because of the importance of freshwater equivalent heads for determination of OPS and OF, use of the fixed 0.65 conversion factor can introduce error and uncertainty into calculation of fresh water equivalent heads. Suggest measuring specific gravity by field or laboratory method, and calculate freshwater equivalent head by reference density.	See above			As new data are collected, aquifer chemistry will change due to injection of foreign water. There may be outliers in the data (see examples below), and statistical correlations will shift, causing uncertainty and rendering historical data less useful. Below are examples of conversion factor slopes that might be affected by outlier data (in red circles).   Determination of TDS by residual on evaporation (ROE) would be the most representative method because other methods (i.e. lab sum of major ions) does not include metals and carbon. It is anticipated that samples from the groundwater remedy will have elevated concentrations of metals (Fe, Mn) and carbon.	DTSC response: Tribal comment noted.

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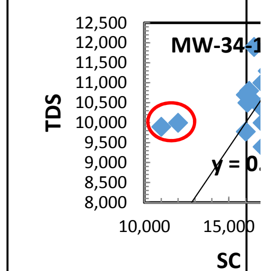
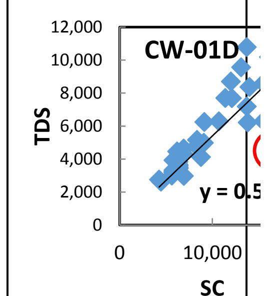
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
1107	Chemehuevi/ TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 3	Freshwater equivalent head calculated using TDS = SC * 0.65	Because of the importance of freshwater equivalent heads for determination of OPS and OF, use of the fixed 0.65 conversion factor can introduce error and uncertainty into calculation of fresh water equivalent heads. Suggest measuring specific gravity by field or laboratory method, and calculate freshwater equivalent head by reference density.	See above			As new data are collected, aquifer chemistry will change due to injection of foreign water. There may be outliers in the data (see examples below), and statistical correlations will shift, causing uncertainty and rendering historical data less useful. Below are examples of conversion factor slopes that might be affected by outlier data (in red circles).   Determination of TDS by residual on evaporation (ROE) would be the most representative method because other methods (i.e. lab sum of major ions) does not include metals and carbon. It is anticipated that samples from the groundwater remedy will have elevated concentrations of metals (Fe, Mn) and carbon.	DTSC response: Tribal comment noted.
1108	FMIT/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 5	Bottom of the well is the measurement	Because of the importance for determination of OPS and OF, fresh water equivalent head should be calculated from discretely screened intervals on a site-specific basis, and determination of freshwater equivalent heads from wells with fully-penetrating well screens should be avoided	PG&E currently calculates fresh water equivalent heads with			Groundwater contour maps in the 90% design and quarterly	DTSC response: Tribal comment noted. DTSC

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
					point	(Post, Kooi, and Simmons, 2007, Ground Water 45:6).	methods that address the concerns raised by this comment. Only discretely screened wells are used for freshwater equivalent head calculations. Fully-penetrating well screens are not used for freshwater equivalent head calculations, nor is this planned during the final remedy.			monitoring reports show data from older monitoring wells (e.g. MW-10, 14, 15, 16, 25, 26, etc.) that have single well screens. These wells need to be evaluated for their appropriateness in determining groundwater flow directions and velocities using freshwater equivalent head. Comment unresolved pending verification of the procedure within 100% design.	concurs that freshwater equivalent heads are an important and fundamental technical concept and will continue to be further evaluated (see RTC # 733 and 734) and may request further refinement to the conversion process.
1109	Hualapai/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 5	Bottom of the well is the measurement point	Because of the importance for determination of OPS and OF, fresh water equivalent head should be calculated from discretely screened intervals on a site-specific basis, and determination of freshwater equivalent heads from wells with fully-penetrating well screens should be avoided (Post, Kooi, and Simmons, 2007, Ground Water 45:6).	See above			Groundwater contour maps in the 90% design and quarterly monitoring reports show data from older monitoring wells (e.g. MW-10, 14, 15, 16, 25, 26, etc.) that have single well screens. These wells need to be evaluated for their appropriateness in determining groundwater flow directions and velocities using freshwater equivalent head. Comment unresolved pending verification of the procedure within 100% design.	DTSC response: See response to RTC #1108
1110	Cocopah/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 5	Bottom of the well is the measurement point	Because of the importance for determination of OPS and OF, fresh water equivalent head should be calculated from discretely screened intervals on a site-specific basis, and determination of freshwater equivalent heads from wells with fully-penetrating well screens should be avoided (Post, Kooi, and Simmons, 2007, Ground Water 45:6).	See above			Groundwater contour maps in the 90% design and quarterly monitoring reports show data from older monitoring wells (e.g. MW-10, 14, 15, 16, 25, 26, etc.) that have single well screens. These wells need to be evaluated for their appropriateness in determining groundwater flow directions and velocities using freshwater equivalent head. Comment unresolved pending verification of the procedure within	DTSC response: See response to RTC #1108

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										100% design.	
1111	Chemehuevi/ TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 5	Bottom of the well is the measurement point	Because of the importance for determination of OPS and OF, fresh water equivalent head should be calculated from discretely screened intervals on a site-specific basis, and determination of freshwater equivalent heads from wells with fully-penetrating well screens should be avoided (Post, Kooi, and Simmons, 2007, Ground Water 45:6).	See above			Groundwater contour maps in the 90% design and quarterly monitoring reports show data from older monitoring wells (e.g. MW-10, 14, 15, 16, 25, 26, etc.) that have single well screens. These wells need to be evaluated for their appropriateness in determining groundwater flow directions and velocities using freshwater equivalent head. Comment unresolved pending verification of the procedure within 100% design.	DTSC response: See response to RTC #1108
1112	FMIT/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 5	Correct Elev (ft AMSL) = Raw Elev + SalCorr + TempCorr	Because of the importance of corrected water-level measurements for determination of OPS and OF, incorporation of fixed conversion factors into this equation introduces error and uncertainty. Suggest using site-specific conversion factors.	As noted in RTC #1104 FMIT/TRC, to reduce potential errors associated with using the fixed conversion factor of 0.65 for the equation of TDS = SC * 0.65, PG&E will calculate a unique conversion factor for each well where sufficient laboratory TDS data are available.			Density is important for the Topock project. It is hopeful that the concept will be fully embraced and incorporated into every aspect of the groundwater remedy. Consider that increased density means higher pumping costs. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1113	Hualapai/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 5	Correct Elev (ft AMSL) = Raw Elev + SalCorr + TempCorr	Because of the importance of corrected water-level measurements for determination of OPS and OF, incorporation of fixed conversion factors into this equation introduces error and uncertainty. Suggest using site-specific conversion factors.	See above			Density is important for the Topock project. It is hopeful that the concept will be fully embraced and incorporated into every aspect of the groundwater remedy. Consider that increased density means higher pumping costs. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1114	Cocopah/TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 5	Correct Elev (ft AMSL) = Raw Elev + SalCorr + TempCorr	Because of the importance of corrected water-level measurements for determination of OPS and OF, incorporation of fixed conversion factors into this equation introduces error and uncertainty. Suggest using site-specific conversion factors.	See above			Density is important for the Topock project. It is hopeful that the concept will be fully embraced and incorporated into every aspect of the groundwater remedy. Consider that increased	Comment resolved pending verification of the procedure within 100% design.

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Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

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										density means higher pumping costs. Comment resolved pending verification of the procedure within 100% design.	
1115	Chemehuevi/ TRC	Non-design	SOPs	C/RAWP Append B SOP-A22, p. 5	Correct Elev (ft AMSL) = Raw Elev + SalCorr + TempCorr	Because of the importance of corrected water-level measurements for determination of OPS and OF, incorporation of fixed conversion factors into this equation introduces error and uncertainty. Suggest using site-specific conversion factors.	See above			Density is important for the Topock project. It is hopeful that the concept will be fully embraced and incorporated into every aspect of the groundwater remedy. Consider that increased density means higher pumping costs. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1116	FMIT/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP- L01_rev3	CrVI analysis by Hach Method 1560	Because of the need for quality assurance and support of OPS and OF, reagent blanks must be analyzed using trace deionized water (DI), and the baseline value subtracted from instrument readings, especially for dilutions.	It should be noted that laboratory certified data for analytical parameters, rather than field data, will be used as needed for OPS determinations. When using colorimetric analysis such as CrVI analysis by HACH method 1560, it is important to use the sample (diluted if the sample needs dilution for the analysis) as the blank. Otherwise, any color associated with the native sample can cause significant interference and give a false positive reading. Using DI water would immediately bias the sample results. No changes proposed as a result of this comment.			Reviewer misunderstood the comment. Some reagents impart slight color or turbidity to the sample which is interpreted by the spectrophotometer as low concentration. Therefore, after zeroing the instrument on the sample blank, then run DI with reagent, and see if you get a reading baseline noise). That reading is then subtracted from all readings for the batch of analyses. Comment unresolved pending verification of the procedure within 100% design.	DTSC response: Tribal comment noted. PG&E response: The SOPs for analytes using HACH test kits address the issue of color or turbidity imparted from the reagents to the sample. For some analytes, this issue is addressed by filtering the post reaction sample prior to introducing it to the spectrophotometer. For others, the issue is addressed by analyzing a reagent blank to determine (by lot number) the effect of color and apply a correction factor, if needed, to all subsequent analyses done using that lot of reagent
1117	Hualapai/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP- L01_rev3	CrVI analysis by Hach Method 1560	Because of the need for quality assurance and support of OPS and OF, reagent blanks must be analyzed using trace deionized water (DI), and the baseline value subtracted from instrument readings, especially for dilutions.	See above			Reviewer misunderstood the comment. Some reagents impart slight color or turbidity to the sample which is interpreted by the spectrophotometer as low concentration. Therefore, after zeroing the instrument on the	See response 1116

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										sample blank, then run DI with reagent, and see if you get a reading (baseline noise). That reading is then subtracted from all readings for the batch of analyses. Comment unresolved pending verification of the procedure within 100% design.	
1118	Cocopah/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP- L01_rev3	CrVI analysis by Hach Method 1560	Because of the need for quality assurance and support of OPS and OF, reagent blanks must be analyzed using trace deionized water (DI), and the baseline value subtracted from instrument readings, especially for dilutions.	See above			Reviewer misunderstood the comment. Some reagents impart slight color or turbidity to the sample which is interpreted by the spectrophotometer as low concentration. Therefore, after zeroing the instrument on the sample blank, then run DI with reagent, and see if you get a reading (baseline noise). That reading is then subtracted from all readings for the batch of analyses. Comment unresolved pending verification of the procedure within 100% design.	See response 1116
1119	Chemehuevi/ TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP- L01_rev3	CrVI analysis by Hach Method 1560	Because of the need for quality assurance and support of OPS and OF, reagent blanks must be analyzed using trace deionized water (DI), and the baseline value subtracted from instrument readings, especially for dilutions.	See above			Reviewer misunderstood the comment. Some reagents impart slight color or turbidity to the sample which is interpreted by the spectrophotometer as low concentration. Therefore, after zeroing the instrument on the sample blank, then run DI with reagent, and see if you get a reading (baseline noise). That reading is then subtracted from all readings for the batch of analyses. Comment unresolved pending verification of the procedure within 100% design.	See response 1116
1120	FMIT/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP- L01_rev4	CrVI analysis by Hach Method 1561	Because of the need for quality assurance and support of OPS and OF, reagent lot number and expiration date need to be written down and recorded.	It should be noted that laboratory certified data for analytical parameters, rather than			The moment the water sample is collected, it starts to change; therefore, the sooner it	Comment resolved pending verification of the procedure within 100% design.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							field data, will be used as needed for OPS determinations. For the remedy, reagent lot number and expiration date will be recorded.			is analyzed, the better representation of actual conditions. Field analyses, when collected and analyzed carefully, are the most representative of actual conditions, especially with waters that change properties rapidly (e.g. IRZ and carbon injection areas). Field and laboratory analyses need to be performed and compared. Comment resolved pending verification of the procedure within 100% design.	DTSC response: Tribal comment noted.
1121	Hualapai/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP- L01_rev4	CrVI analysis by Hach Method 1561	Because of the need for quality assurance and support of OPS and OF, reagent lot number and expiration date need to be written down and recorded.	See above			The moment the water sample is collected, it starts to change; therefore, the sooner it is analyzed, the better. Field analyses, when collected and analyzed carefully, are the most representative of actual conditions, especially with waters that change properties rapidly (e.g. IRZ and carbon injection areas). Field and laboratory analyses need to be performed and compared. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design. DTSC response: Tribal comment noted.
1122	Cocopah/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP- L01_rev4	CrVI analysis by Hach Method 1561	Because of the need for quality assurance and support of OPS and OF, reagent lot number and expiration date need to be written down and recorded.	See above			The moment the water sample is collected, it starts to change; therefore, the sooner it is analyzed, the better. Field analyses, when collected and analyzed carefully, are the most representative of actual conditions, especially with waters that change properties rapidly (e.g. IRZ and carbon injection areas). Field and laboratory analyses need to be performed and compared. Comment resolved pending verification of	Comment resolved pending verification of the procedure within 100% design. DTSC response: Tribal comment noted.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
										the procedure within 100% design.	
1123	Chemehuevi/ TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP- L01_rev4	CrVI analysis by Hach Method 1561	Because of the need for quality assurance and support of OPS and OF, reagent lot number and expiration date need to be written down and recorded.	See above			The moment the water sample is collected, it starts to change; therefore, the sooner it is analyzed, the better. Field analyses, when collected and analyzed carefully, are the most representative of actual conditions, especially with waters that change properties rapidly (e.g. IRZ and carbon injection areas). Field and laboratory analyses need to be performed and compared. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design. DTSC response: Tribal comment noted.
1124	FMIT/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L04_rev01	Conductivity analysis	Because of the need for quality assurance and support of OPS and OF, the highest specific conductance standard shown is 15,000 us/cm, which is not high enough for the full range of SC values at the site.	It should be noted that laboratory certified data for analytical parameters, rather than field data, will be used as needed for OPS determinations. A standard in the general range of 25,000 – 45,000 us/cm will be used for calibration of the Hach sensION 378 Multiparameter Meter (or equivalent) whenever a sample with greater than 20,000 us/cm is to be analyzed. Text will be revised to add a stepped calibration procedure that includes calibration standards that cover the higher range of conductivity in some samples.			As with pH probes that have a "memory" of the fluid that was last measured or stored in, other probes similarly have memory of the last water measured. Therefore, recalibration is necessary when sampling sites with different water types within the same day. Time could be saved by dedicating field meters for low, medium, and high TDS conditions. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design. DTSC response: Tribal comment noted.
1125	Hualapai/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L04_rev01	Conductivity analysis	Because of the need for quality assurance and support of OPS and OF, the highest specific conductance standard shown is 15,000 us/cm, which is not high enough for the full range of SC values at the site.	See above			As with pH probes that have a "memory" of the fluid that was last measured or stored in, other probes similarly have memory of the last water measured. Therefore, recalibration is necessary when sampling sites with different water types within the same day.	Comment resolved pending verification of the procedure within 100% design. DTSC response: Tribal comment noted.

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										Time could be saved by dedicating field meters for low, medium, and high TDS conditions. Comment resolved pending verification of the procedure within 100% design.	
1126	Cocopah/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L04_rev01	Conductivity analysis	Because of the need for quality assurance and support of OPS and OF, the highest specific conductance standard shown is 15,000 us/cm, which is not high enough for the full range of SC values at the site.	See above			As with pH probes that have a "memory" of the fluid that was last measured or stored in, other probes similarly have memory of the last water measured. Therefore, recalibration is necessary when sampling sites with different water types within the same day. Time could be saved by dedicating field meters for low, medium, and high TDS conditions. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design. DTSC response: Tribal comment noted.
1127	Chemehuevi/ TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L04_rev01	Conductivity analysis	Because of the need for quality assurance and support of OPS and OF, the highest specific conductance standard shown is 15,000 us/cm, which is not high enough for the full range of SC values at the site.	See above			As with pH probes that have a "memory" of the fluid that was last measured or stored in, other probes similarly have memory of the last water measured. Therefore, recalibration is necessary when sampling sites with different water types within the same day. Time could be saved by dedicating field meters for low, medium, and high TDS conditions. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design. DTSC response: Tribal comment noted.
1128	FMIT/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L09_rev01	pH measurement	Because of the importance of pH to protect the organic rind, why are a stir bar and stirrer used for the pH measurement? This could cause streaming potential which affects the pH measurement, and can be avoided by pH measurement in quiescent water (Wilde and others, 2006, USGS TWRI Book 9, Chapter A6). Similarly, pH measurements in flow-through chambers can be affected by streaming potential.	See response to a similar comment, RTCs #1080 FMIT/TRC, #1081 Hualapai/TRC, #1082 Cocopah/TRC, #1083 Chemehuevi/TRC.			All waters are different, and a full understanding requires familiarity with the water and the field methods in order to achieve the highest quality data. While experimenting with different pH measurement methods that prove to be successful, SOP's can be updated as the project	DTSC Response: See response to a similar comment, RTCs #1080 FMIT/TRC, #1081 Hualapai/TRC, #1082 Cocopah/TRC, #1083 Chemehuevi/TRC.

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										progresses. Comment unresolved pending development of a plan to compare pH measurements in flowing and quiescent water.	
1129	Hualapai/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L09_rev01	pH measurement	Because of the importance of pH to protect the organic rind, why are a stir bar and stirrer used for the pH measurement? This could cause streaming potential which affects the pH measurement, and can be avoided by pH measurement in quiescent water (Wilde and others, 2006, USGS TWRI Book 9, Chapter A6). Similarly, pH measurements in flow-through chambers can be affected by streaming potential.	See above			All waters are different, and a full understanding requires familiarity with the water and the field methods in order to achieve the highest quality data. While experimenting with different pH measurement methods that prove to be successful, SOP's can be updated as the project progresses. Comment unresolved pending development of a plan to compare pH measurements in flowing and quiescent water.	DTSC Response: See RTC #1128 above.
1130	Cocopah/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L09_rev01	pH measurement	Because of the importance of pH to protect the organic rind, why are a stir bar and stirrer used for the pH measurement? This could cause streaming potential which affects the pH measurement, and can be avoided by pH measurement in quiescent water (Wilde and others, 2006, USGS TWRI Book 9, Chapter A6). Similarly, pH measurements in flow-through chambers can be affected by streaming potential.	See above			All waters are different, and a full understanding requires familiarity with the water and the field methods in order to achieve the highest quality data. While experimenting with different pH measurement methods that prove to be successful, SOP's can be updated as the project progresses. Comment unresolved pending development of a plan to compare pH measurements in flowing and quiescent water.	DTSC Response: See RTC #1128 above.
1131	Chemehuevi/ TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L09_rev01	pH measurement	Because of the importance of pH to protect the organic rind, why are a stir bar and stirrer used for the pH measurement? This could cause streaming potential which affects the pH measurement, and can be avoided by pH measurement in quiescent water (Wilde and others, 2006, USGS TWRI Book 9, Chapter A6). Similarly, pH measurements in flow-through chambers can be affected by streaming potential.	See above			All waters are different, and a full understanding requires familiarity with the water and the field methods in order to achieve the highest quality data. While experimenting with different pH measurement methods that prove to be successful, SOP's can be	DTSC Response: See RTC #1128 above.

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										updated as the project progresses. Comment unresolved pending development of a plan to compare pH measurements in flowing and quiescent water.	
1132	FMIT/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L13_rev00	Hach Nitrate analysis using NitraVer 5	Because of the importance of nitrate and support of OPS and OF, there are known interferences in the analytical method including chloride greater than 100 mg/L and all levels of ferric iron. Chloride concentrations in groundwater from the study area range from about 400 to over 13,000 mg/L. Calibration curves for high chloride concentrations can be prepared using standards with similar chloride ranges; however, corrections to the instrument readings are necessary. Onsite analyses of nitrate are important for monitoring the progress of COPCs at the site (e.g. selenium).	Nitrate analysis by Hach is at best a screening level analysis at this time. Because of the significant variation of the chloride concentrations, PG&E is working to develop multiple calibrations to achieve acceptable results. The SOP will be updated when the calibration results are available. It should be noted that laboratory certified data for analytical parameters, rather than field data, will be used as needed for OPS determinations.			NitraVer 5 reagent consists of a cadmium compound that is particularly harmful to human health and the environment. Care should be exercised when using these reagents. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1133	Hualapai/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L13_rev00	Hach Nitrate analysis using NitraVer 5	Because of the importance of nitrate and support of OPS and OF, there are known interferences in the analytical method including chloride greater than 100 mg/L and all levels of ferric iron. Chloride concentrations in groundwater from the study area range from about 400 to over 13,000 mg/L. Calibration curves for high chloride concentrations can be prepared using standards with similar chloride ranges; however, corrections to the instrument readings are necessary. Onsite analyses of nitrate are important for monitoring the progress of COPCs at the site (e.g. selenium).	See above			NitraVer 5 reagent consists of a cadmium compound that is particularly harmful to human health and the environment. Care should be exercised when using these reagents. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1134	Cocopah/TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L13_rev00	Hach Nitrate analysis using NitraVer 5	Because of the importance of nitrate and support of OPS and OF, there are known interferences in the analytical method including chloride greater than 100 mg/L and all levels of ferric iron. Chloride concentrations in groundwater from the study area range from about 400 to over 13,000 mg/L. Calibration curves for high chloride concentrations can be prepared using standards with similar chloride ranges; however, corrections to the instrument readings are necessary. Onsite analyses of nitrate are important for monitoring the progress of COPCs at the site (e.g. selenium).	See above			NitraVer 5 reagent consists of a cadmium compound that is particularly harmful to human health and the environment. Care should be exercised when using these reagents. Comment resolved pending verification of the procedure within 100% design.	Comment resolved pending verification of the procedure within 100% design.
1135	Chemehuevi/ TRC	Non-design	SOPs	C/RAWP Append B IM3-SOP-L13_rev00	Hach Nitrate analysis using NitraVer 5	Because of the importance of nitrate and support of OPS and OF, there are known interferences in the analytical method including chloride greater than 100 mg/L and all levels of ferric iron. Chloride concentrations in groundwater from the study area range from about 400 to over 13,000 mg/L. Calibration curves for high chloride concentrations can be prepared using standards with similar chloride ranges; however, corrections to the instrument readings are necessary. Onsite analyses of nitrate are important for monitoring the progress of COPCs at the site (e.g. selenium).	See above			NitraVer 5 reagent consists of a cadmium compound that is particularly harmful to human health and the environment. Care should be exercised when using these	Comment resolved pending verification of the procedure within 100% design.

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										reagents. Comment resolved pending verification of the procedure within 100% design.	
Specific Comments – Construction/Remedial Action Work Plan, Appendix C: PG&E Program Quality Assurance Project Plan											
1136	DOI-218	Non-design	Editorial	Approval Page	NA	Please include a signed approval sheet for the Final PQAPP.	A signed approval sheet for the Quality Assurance Project Plan will be included in the final design submittal		Resolved.		Comment resolved pending DOI review of the final design documents.
1137	DOI-219	Non-design	Editorial	1.2.4/1-3	All projects will begin by examining EPA's seven-step DQO process (EPA, 2000); based on the level of project complexity and intended use of the data, the level of detail and applicability of the seven-step process will be assessed.	Please state that the DQO process is documented in the SAP, or in this case, the Sampling and Monitoring Plan.	The PG&E Program QAPP (PQAPP) is an umbrella QAPP that covers multiple sites including Topock. The Addendum to the PQAPP for the Topock Groundwater Remedy is specific to the Topock groundwater remedy. Therefore, response to this comment will apply to the Addendum. Section 3.1 of the Addendum to the PQAPP for the Topock Groundwater Remedy will be revised to read (revisions shown as underline for addition and ~~strikeout~~ for deletion): "Sampling and monitoring activities are needed for compliance purposes and for effective operation and maintenance of the groundwater remedy. The rationale for the sampling design (sampling locations, frequency, and analytes) and the DQO process is documented in the O&M Manual, Volume 2, ~~is included in the~~ Sampling and Monitoring Plan"		Resolved.		Comment resolved.
1138	DOI-220	Non-design	Editorial	2.1/ 2-1	The PG&E Program management team has been structured with a program manager, program quality control manager,	Program Manager and Program Quality Control Manager are not titles that can be found in the C/RAWP Exhibit 2.1-1 or in C/RAWP Appendix A. Please edit accordingly.	The PG&E Program QAPP (PQAPP) is an umbrella QAPP that covers multiple sites including Topock. The Addendum to the PQAPP for the Topock Groundwater Remedy is specific to the Topock groundwater remedy.		Resolved.		Comment resolved.

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					program health and safety manger and a program chemist to ensure that the goals of the PG&E Program are met.		Therefore, response to this comment will apply to the Addendum. Section 2.1 of the Addendum to the PQAPP for the Topock Groundwater Remedy will be revised to read: "For information on project organization refer to the O&M Manual, Main Text Section L2, and the C/RAWP Section 2.1."				
1139	DOI-221	Non-design	Editorial	2.2/2-1	The organization chart and descriptive text identifying task managers and individuals charged with specific responsibilities for each project can be found in project-specific SAPs.	The cited information is actually found in the C/RAWP Section 2 and in Appendix A. Please edit accordingly.	The PG&E Program QAPP (PQAPP) is an umbrella QAPP that covers multiple sites including Topock. The Addendum to the PQAPP for the Topock Groundwater Remedy is specific to the Topock groundwater remedy. Therefore, response to this comment will apply to the Addendum. Section 2.1 of the Addendum to the PQAPP for the Topock Groundwater Remedy will be revised to read: "For information on project organization refer to the O&M Manual, Main Text Section L2, and the C/RAWP Section 2.1."		Resolved.		Comment resolved.
1140	DOI-222	Non-design	Editorial	2.3/2-1	All personnel engaged in field activities will have completed the Occupational Safety Health Administration, 40-hour health and safety training that meet the requirements of Title 29 Code of Federal Regulations Section 1910.120 and	Please indicate who at PG&E is responsible for ensuring training requirements are satisfied and where training certification documentation is maintained.	The PG&E Program QAPP (PQAPP) is an umbrella QAPP that covers multiple sites including Topock. The Addendum to the PQAPP for the Topock Groundwater Remedy is specific to the Topock groundwater remedy. Therefore, response to this comment will apply to the Addendum. The following sentence will be added to Section 5 of the Addendum to the PAQPP for the Topock Groundwater Remedy:		Resolved.		Comment resolved.

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					Title 8 Code of California Regulations Section 5192. All CH2M HILL personnel working on the PG&E Program will read applicable project-specific health and safety plans. Documentation will be maintained to demonstrate that all requirements of the plan are followed.		"The PG&E Construction Manager, or designee, is responsible for ensuring that training and certification requirements of the QAPP are satisfied. The CHQ will serve as the primary repository for records during construction."				
Specific Comments – Construction/Remedial Action Work Plan, Appendix D: Construction Health and Safety Plan											
1141	DOI-223	Non-design	Other	7.4/7-5		This section of the HASP should include a discussion of the spill containment program implemented for the project and reference SOPs pertaining to spill containment and controls. Protocol for notification of releases of hazardous substances or hazardous materials should also be discussed or referenced.	Section 7.4 of the HASP will be revised as follows: <u>7.4.7 Spill Containment</u> <u>7.4.7.1 Fuel Handling</u> <u>During construction activities, there is a potential for spills of fuel during fueling operations for construction equipment. The policy for safe fueling and fuel handling are similar to those that are provided in Remedy Standard Operating Procedure (SOP) -01. Remedy-SOP-01 can be found in Appendix A, Sampling and Monitoring Plan, Operation and Maintenance Manual Volume 2 (CH2M Hill, 2014). In the event of a spill, the PG&E Site Operations Manager/Sr. Environmental Inspector must be notified immediately.</u> <u>7.4.7.2 Well Installation</u> <u>During well installation, there is a potential for spills of liquids used for well drilling and well development. The</u>		Resolved.		Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							procedures for spill prevention, containment, and control to be used during well installation are similar to those that must be used for monitoring well development, purging, and sampling. Those procedures are provided in SOP-A13. SOP-A13 can be found in Appendix A, Sampling and Monitoring Plan, Operation and Maintenance Manual Volume 2 (CH2M Hill, 2014). In the event of a spill, the PG&E Site Operations Manager/Sr. Environmental Inspector must be notified immediately. 7.4.7.3 Hazardous Waste Should any hazardous waste (including contaminated soil) be spilled, the procedures for spill reporting and response outlined in the Sections 4.7 and 4.8 of the Soil Management Plan, Operation and Maintenance Manual Volume 4 (CH2M Hill, 2014), will be followed.				
1142	DOI-224	Non-design	Other	7.5/7-9		Only Level D and Level C PPE are described in this section. An introduction to the anticipated PPE levels should be provided in the beginning of this section	Section 7.5 of the HASP will be revised as follows: 7.5 Personal Protective Equipment Based on an evaluation of the hazards of the site, personal protective equipment (PPE) will be required for all personnel and visitors entering the controlled portion of the site. It is anticipated that PPE requirements will be limited to Level D or Level C protection. It is not anticipated that either Level B or Level A PPE will be required. However, if field		Resolved.		Comment resolved.

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							conditions or site monitoring indicate that a higher level (greater protection) of PPE is required, such work will be temporary halted, and the program will be further evaluated and modified as deemed appropriate. PPE for each level of protection is described in general below. Note that specific tasks, including (but not limited to) work at the Compressor Station, elevated/suspended work, or high-voltage electrical work will require additional PPE.				
Specific Comments – Construction/Remedial Action Work Plan, Appendix E: Cost Estimate (Comments on this Appendix are combined with those on 90% BOD Section 8 and Appendix H as they are the same cost estimate)											
Specific Comments – Construction/Remedial Action Work Plan, Appendix F: IM3 Decommissioning, Removal, and Restoration Work Plan											
1143	DOI-228	Non-design	Editorial		Appendix B IM-3 Decommissioning Plan	The cover sheet for this appendix inappropriately identifies it as Appendix B. Please correct this to read "Appendix F".	The cover sheet for this appendix will be revised.		Resolved.		Comment resolved.
1144	DOI-229	Non-design	Editorial	Acronyms and Abbreviations/ ix-xi		Please include the following: PAMP - perimeter air monitoring plan AMO - Air Monitoring Officer	The acronyms PAMP and AMO will be added to the acronyms page		Resolved.		Comment resolved.
1145	DOI-230	Non-design	Editorial	1.1/1-1	The lay-up period will end, and the decommissioning, removal, and restoration work will begin after agency approval is received.	Please add at the end of this sentence "that the Final Remedy has achieved plume control and is operating properly and successfully in accordance with the 2012 Settlement Agreement between DTSC and the FMIT."	PG&E suggests potential edits to DOI's added sentence: ".. and that the ~~Final~~ groundwater ~~R~~remedy has achieved plume control and is operating properly and successfully in accordance with the 2012 Settlement Agreement between DTSC and the FMIT (see Section 1.2.2 for details)."		Resolved.		Comment resolved.
1146	DOI-231	Non-design	Legal	1.2.1/1-2	The IM-3 system is not part of the selected Final Remedy; therefore, the IM-3 system will be decommissioned and removed after DOI and DTSC determine that the Final Remedy is	DTSC has the legal obligation to determine whether the remedy is operating properly and successfully. Once that determination is made, DOI will provide concurrence on their determination and the decommissioning can proceed in accordance with the approved work plan.	The sentence will be revised to read: "The IM-3 system is not part of the selected Final Remedy; therefore, the IM-3 system will be decommissioned and removed after ~~DOI and~~ DTSC determine[s] that the Final Remedy is operating properly and successfully and DOI provides concurrence on DTSC's determination."		Resolved.		Comment resolved.

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					operating properly and successfully.						
1147	DOI-232	Non-design	Editorial	2.1/2-2	Treat the liquid contents (brine from Step 6 and process/cleaning water from Steps 7 & 8) of the brine storage tanks by either injecting the liquid contents into the in situ system, transporting the liquid contents to the TCS evaporation ponds, or arranging for offsite disposal to a permitted offsite facility(ies)	It seems that the first option of injecting the waste into the in situ system is not prudent if the waste is mostly brine because of the potential negative effects on the in situ microbial population. Please consider qualifying the use of this option when salinity is below a prescribed upper tolerance of the in situ salinity.	Bullet #10 will be revised as follows: "The liquid contents of the brine storage tanks which include brine rinsate from Steps 8 & 9 will be tested to determine which of the following is the appropriate liquid management approach 1) injecting the liquid contents into the in situ system, 2) transporting the liquid contents to the TCS evaporation ponds, or 3) arranging for offsite disposal to a permitted offsite facility(ies). <u>The selection of an option will be affected by the quality of the water (e.g., effects of salinity on in situ microbial population) and regulatory requirements.</u> The most appropriate option will be selected and performed. Using the brine system rinsate in the remedy will only be considered if appropriate for use in the remedy and approval from the Regional Water Quality Control Board's through the Waste Discharge Requirements permit allowing such use." The following sentence will be added to the end of Bullet #7: "<u>The brine will then be hauled offsite to a permitted facility.</u>"		Resolved.		Comment resolved.
1148	DOI-233	Non-design	Other	2.1/2-3	Laboratory waste will be managed in accordance with state and federal regulations.	Please provide further detail regarding the expected waste stream generated from the lab. Laboratory waste should also be identified in Section 5.	Under current operations the IM3 laboratory generates two waste streams. 1) Solids which consist of used/disposable - polypropylene pipette tips, gloves, empty foil reagent powder pillows, empty sample		Resolved.		Comment resolved.

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							containers (polypropylene or glass) and used paper towels which are dealt with as non-hazardous solid waste. 2) Liquid – Waste water (Wash water, samples, analytical waste) is poured into the lab sink that drains to a tank that is then transferred to the treatment system and treated by the system prior to injection. Currently no hazardous waste is produced in the IM3 laboratory. The two waste streams generated are managed real-time during operations and no additional lab wastes would be generated during layup or demolition that are additional to the categories of waste identified in Section 5. Section 2.1, item #24 will be revised as follows: "24. Verify lab equipment is clean and the laboratory is left in a clean and safe condition. ~~Laboratory waste will be managed in accordance with state and federal regulations."~~				
1149	DOI-234	Non-design	Editorial	3.2.2.2/3-3	Workers leaving the exclusion zones will go through decontamination in the contaminant reduction zones consisting of boot washes, PPE removal areas, personal decontamination, and clean clothing area.	The only decontamination zone is at the entrance to the IM-3 facility. The equipment and piping at this facility has been cleaned and rinsed during layup. Although decontamination is a standard practice at a remediation site, this seems inappropriate for decommissioning the IM-3 facility. Please clarify.	The layup activities will remove the majority of the chromium remaining in the IM-3 system, but not all of it. Each of the components will be cleaned as described in Section 4, thus requiring work zones. The following text will be added to Section 3.2.2 after the 9th line: "Contaminant reduction zones are shown only at the iM-3 Treatment Facility on Figure 3-2. The project manager will establish contaminant reduction zones for other areas including the		Resolved.		Comment resolved.

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							MW-20 Bench and along the extraction pipelines as needed to facilitate decommissioning activities and protect worker and public safety. The following sentence will be added to Figures 3-2 to 3-6 as new notes: Contaminant reduction zones will be established as needed in the field by the project manager in accordance with the approved Work Plan.				
1150	JDS-2	Design	Remedial Design	Appendix F; Figure 3-5	Notes 4, 5, 6	The pipe down the slope and under the wash should be removed. IM-3 restoration should address post removal restoration of wash and slope.	There are four water pipes and several conduits in a shared trench under Bat Cave Wash. PG&E intends to abandon these pipes and conduits in place (after cleaning) to avoid disturbance to sensitive habitats in the wash. PG&E recognizes that FMIT as a landowner may have a preference to remove the pipes/conduits. PG&E will discuss this issue with FMIT prior to decommissioning, as part of its development of the final, detailed restoration plan.	PG&E has committed to removing all subsurface infrastructures for remedy to the extent practicable. IM3 should not differ. See PG&E response to comment 8.		Tribe agrees that IM3 should not differ.	DTSC response: Tribal comment noted. PG&E will discuss infrastructure removal with the landowner prior to decommissioning and during the development of the restoration plan.
1151	JDS-3	Design	Remedial Design	Appendix F; Figure 3-6	Notes 2 and 3	The pipe down the slope should be removed. IM-3 restoration should address post removal restoration of slope.	There are 4 conduits and 1 water pipe buried in the steep slope. PG&E intends to abandon the pipe/conduits in place (after cleaning) to minimize soil disturbance, control erosion, and improve safety for workers on the slope. Removing the pipe would increase the volume of earthwork on the project by approximately 30 cubic yards. In addition, pipe removal would disturb the ground surface and nearby biological resources, and potentially create a preferential flow paths that would increase erosion. Finally, working	PG&E has committed to removing all subsurface infrastructures for remedy to the extent practicable. IM3 should not differ. See PG&E response to comment 8.		Tribe agrees that IM3 should not differ.	DTSC/DOI response: The Agencies will provide direction to PG&E. Tribal comment noted.

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							on steep slopes is inherently risky to construction workers. PG&E recognizes that BLM as a land manager and is committed to discussing decommissioning practicality at the time of decommissioning.				
1152	DOI-235	Non-design	Other	4.1.1.2/4-3	In accordance with the California Well Standards, filler material will not be used to decommission IM-3 system wells because they are located in an area of contaminated soil and groundwater; however, this assumption will be confirmed with DTSC, DOI, responsible agency (San Bernardino County), affected land owner, Tribes, and other stakeholders before backfilling the wells.	The discussions should occur now and the decision should be made regarding filler material during comment resolution and included in the final design package for approval.	PG&E assumes that the decision as to whether filler material can be used to decommission all or a subset of the listed wells (TW-2S, TW-2D, TW-3D, PE-1, IW-2, and IW-3) cannot be made until the time of permitting (with San Bernardino County) and decommissioning since it will depend on whether or not the wells are located in an area of contaminated soil and groundwater. Currently the listed wells with the exception of IW-2 and IW-3 are located within the contaminated groundwater plume and on the flood plain of the Colorado River, which represents an area of increased potential for surface water infiltration relative to nearby uplands. It is also understood that IW-2 and IW-3 could be considered in the area of the groundwater plume. Based on this PG&E would anticipate that filler material would not be used to decommission these wells, and that sealing material would be used to seal the well casing from total depth. PG&E will revise the document accordingly unless otherwise directed by the agencies.	Although decommissioning of these wells can be planned for the future and included in the IM3 Decommissioning plan, DTSC is concerned that the wells identified may have potential to be utilized as part of the remedy. For example, the TW wells are located in a contaminated portion of the plume near the IRZ line in close vicinity to a provisional IRZ well. The decision to decommission these wells should be evaluated on a case by case basis when understanding of the subsurface hydraulics is gained after the operational capabilities of the remedy are defined. If decommissioned prematurely, PG&E may have to drill new wells in the same vicinity if deemed technically necessary for the remedy.	Resolved.		Comment resolved.
1153	DOI-236	Non-design	Editorial	4.3.6/4-7	The pipe culvert on the road at Bat Cave Wash will be preserved.	The current plan is to remove the pipe culvert. Please revise accordingly.	In response to 90% comments (see RTC #19 FMIT-5) and subject to concurrence from agencies, the crossing design would be		Resolved.		Comment resolved.

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PG&E Topock Compressor Station, Needles, California

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							changed to direct bury pipes/conduits in BCW. The existing access road and pipe culvert will remain unchanged.				
1154	DOI-237	Non-design	Editorial	4.3.8/4-12	The handling and disposition of displaced material will be in accordance with Management Protocol for Handling and Disposition of Displaced Site Material, Topock Remediation Project, Needles, California (see Appendix F).	Appendix F is entitled "Soil Management Plan". Please revise accordingly.	The sentence will be revised to read: "The handling and disposition of displaced material will be in accordance with [the Soil Management Plan] ~~*Management Protocol for Handling and Disposition of Displaced Site Material, Topock Remediation Project, Needles, California*~~ (see Appendix F)."		Resolved.		Comment resolved.
1155	DOI-238	Non-design	Editorial	Figure 4-1		Please include a legend within this figure that provides descriptions of the waste streams for the grey, light blue and orange sections of the diagram. Also identify the difference between the purple and black arrows.	The figure was revised to include a legend; the revised figure is included in **Attachment Z** of the final RTC table.		Resolved.		Comment resolved.
1156	DOI-239	Non-design	Other	5.1.2.2/5-2		All concrete/asphalt sampling, including in situ sampling, shall be biased toward visible staining.	The second sentence in Section 5.1.2.2 will be revised as follows: "Samples will be collected from locations most likely to have contacted hazardous waste or hazardous materials, such as the inside containment structures for process chemicals and other containment areas exposed to treatment system sludge <u>as well as visually stained areas</u>."		Resolved.		Comment resolved.
1157	DOI-240	Non-design	Editorial	5.1.2.2/5-2	Representative samples of concrete from the plant foundations, floor slabs, vaults, and containment areas will be collected by chipping or coring.	An SOP needs to be prepared for sampling concrete. The depth of penetration of chipping or coring should be representative of the contamination penetration depth so as to not dilute the contamination with underlying non-contaminated material. Although a core through the entire floor slab may seem to be more representative of the debris disposed in a landfill or possibly reused, it is water contact with the surface contaminated material that results in leaching of contaminants.	Sampling and analysis of the stained portion of the concrete is appropriate to determine the nature and magnitude of the contaminants in the stained area. It will be assumed that this sampling for waste classification purposes represents the entire mass of concrete that is being disposed (unless the contaminated		Resolved.		Comment resolved.

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							surface is removed) or otherwise specified by the waste disposal facility. An SOP was prepared for this activity in response to the comment (see **Attachment AA** of the final RTC table).				
1158	DOI-241	Non-design	Editorial	5.1.2.3/5-2	…and soil and waste in cracks, crevices, and pits may be present	The word "be" should be "have been". Please revise.	The language "may be present" is the same as the language in 22 CCR 7383(e)(2).		Resolved.		Comment resolved.
1159	DOI-242	Non-design	Legal	5.1.5/5-5	PG&E proposes use of the following potential disposal facilities for the project as well as others, subject to the communication and approval processes under the Consent Decree outlined above: …	At the time of this writing (12/2014), discussions with EPA Region 9 indicate that the following facilities are approved to receive CERCLA waste: (1) CWM Kettleman Hills (2) US Ecology, NV (3) Clean Harbors, Buttonwillow. Please remove PSC Rancho Cordova from consideration for disposal of CERCLA waste at this time.	The PSC Rancho Cordova facility will be removed from Section 5.1.5.		Accepted.		Comment resolved pending DOI review of the final design documents.
1160	DOI-243	Non-design	Editorial	7.2.1/7-1	The results of the XRF screening will be screened against Topock Specific Background Values (if available), and residential screening levels (screening levels).	Please provide some discussion as to the accuracy/precision of XRF to quantitate metal concentrations at background or residential screening levels.	The following sentence will be added to the end of the Step 1 paragraph in Section 7.2.1: XRF samples will be analyzed for metals in accordance with Standard Operating Procedure (SOP)-B16, *Field-portable X-Ray Fluorescence Soil Sampling*. The XRF SOP describes the calibration process and how to achieve better detection levels (i.e., homogenization of the sample, longer exposure time, and using two or more scan frequencies). In addition, XRF concentrations will be adjusted using linear least square fit equations calculated from the RCRA facility investigation/remedial investigation samples analyzed in the		Resolved.		Comment resolved.

Appendix I – Response to Comments on the 90% Design Documents (Basis of Design Report, O&M Manual, Construction/Remedial Action Work Plan)
Groundwater Remedy Basis of Design Report/Final (100%) Design
PG&E Topock Compressor Station, Needles, California

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							laboratory and by the XRF. The Standard Operating Procedure (SOP)-B16, *Field-portable X-Ray Fluorescence Soil Sampling* is included in Appendix F (Soil Management Plan, Appendix A, Attachment 1)				
1161	DOI-244	Non-design	Editorial	7.2.1/7-2	If XRF metal results exceed applicable screening levels, an additional soil sample will be collected at the same location as the XRF screening location and sent to an offsite laboratory for analysis. If none of the XRF screening samples exceed screening levels, additional soil samples will be collected at the XRF screening locations in operational areas or areas where known releases occurred within each AOC.	The use of the word "additional" is a little confusing and could be deleted for clarity. If XRF results are negative, will soil samples be collected randomly in the operation area (i.e., random selection of grids within the area)? Please clarify. Are there known releases at these AOCs? If not, this statement should be deleted. If so, biased samples should be collected at these locations and 10 random samples be collected outside these locations.	Spills have occurred and have been cleaned up at AOCs 29 and 30. These spills and clean ups are outlined in the Addendum to RCRA Facility Investigation/Remedial Investigation Report, Volume 1 (CH2M HILL, 2014). The text in has been revised as follows: "Step 2 Offsite Laboratory Analysis: If XRF metal results exceed applicable screening levels, a ~~an additional~~ soil sample will be collected at the same location as the XRF screening location and sent to an offsite laboratory for analysis. If none of the XRF screening samples exceed screening levels, ~~additional~~ soil samples will be collected at the XRF screening locations in operational areas or biased to those grid spaces ~~areas~~ where known releases occurred within each AOC. A minimum of 10 soil samples will be collected at each AOC to obtain sufficient data to satisfy the Soil RFI/RI Investigation Data Quality Objectives. Agencies will be notified prior to implementation."		Resolved.		Comment resolved.
1162	DOI-245	Non-design	Editorial	7.3/7-2	If confirmation results are above the site-specific background	There are only three samples each at the injection wells and the MW-20 bench, and only one sample at PE-1. The UCL cannot be calculated at PE-1, and the conclusion drawn from comparison of the calculated UCL to the target level at the other two locations would have considerable uncertainty. Suggest deleting the UCL calculation for this application.	A minimum of 10 soil samples will be collected at each AOC, so there will be sufficient data to calculate the UCL for		Resolved.		Comment resolved.

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					values, then an area-wide average concentration will be calculated as the 95th percent upper confidence limit of the mean, using ProUCL Version 4.0 software (USEPA, 2007). If area-wide average concentrations are below the site-specific background values, then no further evaluation is necessary.		these AOCs. Sample locations outside of the AOCs, including the baseline soil data from along the pipeline alignments, the vaults associated with the injection wells (IW-02 and IW-03) and the injection well support structure in the East Mesa will initially be compared on a point-by-point comparison. If concentrations from these samples are above site-specific background values, a hotspot analysis will be conducted. Any hotspots will be evaluated separately. If no hotspots are identified then the areas located outside of the AOC boundaries will be treated as one area and all of these data will be combined to calculate the area-wide average. The third sentence in the last paragraph in Section 7.3 has been revised as follows: "If confirmation results are above the site-specific background values, a hotspot analysis will be conducted; any hotspots will be evaluated separately. If no hotspots are identified then the areas outside of the AOC boundaries will be treated as one area and will include data from the baseline sampling along the pipeline alignments, the vaults associated with the injection wells, and the injection well support structure in East Mesa. These data will be combined and an area-wide average concentration will be calculated as the 95th percent upper				

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							confidence limit of the mean, using ProUCL Version 4.0 software (USEPA, 2007)."				
1163	DOI-246	Non-design	Editorial	9.2/9-2	A biological evaluation will be performed to outline the IM-3 decommissioning, removal, and restoration activities as they relate to federally listed species in the area. The USFWS issued a concurrence letter on July 7, 2014 for the Final Remedy Programmatic Biological Assessment (PBA) which addressed a variety of activities, including activities identified in this Work Plan. The intent of the PBA is to provide programmatic coverage of these actions and avoid the need for individual project-specific consultations under the federal ESA.	Revise text as follows: PG&E will outline how the IM-3 decommissioning, removal, and restoration activities will affect federally listed species in the area. Since the USFWS issued a concurrence letter on July 7, 2014 for the Final Remedy Programmatic Biological Assessment (PBA) which addressed a variety of activities, including activities identified in this Work Plan, a new, separate consultation may not be necessary. The intent of the PBA was to provide programmatic coverage of all groundwater remedial actions and avoid the need for individual project-specific consultations under the federal ESA. However, if PG&E determines that the PBA needs to be updated or that a separate, individual consultation on the IM-3 decommissioning is necessary, they will work with the BLM and the USFWS to address additional impacts to federally listed species.	PG&E believes that the 2014 PBA adequately addresses the IM-3 Decommissioning and Restoration activities. For that reason, minor text changes for the proposed rewrite are suggested, as follows: "~~A biological evaluation will be performed to outline~~ PG&E will outline how the IM-3 decommissioning, removal, and restoration activities [will affect] ~~as they relate to~~ federally listed species in the area. Since the USFWS issued a concurrence letter on July 7, 2014 for the Final Remedy Programmatic Biological Assessment (PBA) which addressed a variety of activities, including activities identified in this Work Plan, a new, separate consultation is not anticipated]. The intent of the PBA ~~is~~ was to provide programmatic coverage of ~~these actions~~ all groundwater remedial actions and avoid the need for individual project-specific consultations under the federal ESA. However, should PG&E determine that the PBA needs to be updated or that a separate, individual consultation on the IM-3 decommissioning is necessary, then they will work with the BLM and the USFWS to address additional impacts to federally listed species."		Resolved.		Comment resolved.
1164	JDS-9	Non-design	Editorial	Appendix F; Figure 9-1		On page 1 of the schedule please move schedule over so that we can see the beginning of Year 1; activities A1010 through A2090 cannot be viewed.	Appendix F to the IM-3 Decommissioning Plan is the Soil Management Plan Presumably this comment refers to Appendix F to the			Noted.	

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							C/RAWP which is the IM-3 Decommissioning Plan. Figure 9-1 will be revised to view the initial activities				
1165	DOI-247	Non-design	Editorial	Appendix B, Section 2		It is not clear if the organization is entirely the Owner or is Owner and Contractor. Please clarify. If all positions are those of the Owner, what are the QC requirements for the Contractor? Lastly, please provide a brief synopsis of the Project Team member responsibilities.	It is Owner and Contractor. A brief description of the responsibilities will be provided as requested.		Accepted.		Comment resolved pending DOI review of the final design documents.
1166	DOI-248	Non-design	Editorial	Appendix B 3.4/3-1	The Project QC Manager, Construction Manager (CM), other project management personnel, and PG&E representatives will attend this inspection.	The CM is not listed as a team member in Section 2.1.1. Please clarify and edit appropriately.	The Demolition PM is same as the Construction Manager. For clarity, the term Demolition PM will be changed to Construction Manager in this Appendix.		Resolved.		Comment resolved.
1167	JDS-10	Non-design	Editorial	Appendix F; Appendix B – Decommissioning Quality Assurance and Control Plan	3.4 Final Acceptance Inspection	Unclear about the statement.... Notice should be given to PG&E at least 14 days before Final. Since PG&E will schedule the final inspection. Clarify to indicate that land owners, land managers will be given at least 14 days notice prior to Final.	The sentence will be clarified as requested. The last sentence will be clarified to state that inspection will be considered closed when the work has been accepted by land owners, land managers, and regulatory agencies.			Noted.	
1168	JDS-11	Non-design	Editorial	Appendix M; Figure 1-3	Best Management Practices	Erosion Control IM-3 should be updated with based on updated staging areas and work areas presented in the decommissioning plan based on Tribal input	Please see RTCs #860 FMIT/RTC, #861 Hualapai/RTC, #862 Cocopah/TRC, and #863 Chemehuevi/TRC for responses to comments on staging areas.			Noted.	
Specific Comments – Construction/Remedial Action Work Plan, Appendix G: Havasu National Wildlife Refuge, Habitat Restoration Plan											
1169	DOI-249	Non-design	Other	Havasu National Wildlife Refuge, Habitat Restoration Plan, page 2-16	An estimate of 0.787 acres will be impacted by the groundwater remedy construction, operation, and maintenance activities.	Please add 0.787 acres of habitat on the Havasu NWR to include as potential revegetation sites.	Table 1 represented the preliminary plant impact assessment for HNWR and included all mapped plants. There will only be trimming on two mesquite plants; taking of all other whole trees can be avoided. The table footnote indicates that the boldface entries are the only plants that will be transplanted or replaced and the total acreage for just those items is 0.034 acres. While it is recognized that, ultimately, the entire construction footprint on HNWR land will be subject to		Resolved.		Comment resolved.

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							revegetation/ restoration, that process will occur primarily in the final phase of the project after operation, decommissioning, and removal of the groundwater remedy facilities. If there are portions of the construction footprint that can be re-planted in the interim, they will be.				
Specific Comments – Construction/Remedial Action Work Plan, Appendix L: Soil Management Plan (Combined comments with 90% BOD, Appendix L O&M Manual Volume 4: Soil Management Plan as this is the same plan)											
Specific Comments – Construction/Remedial Action Work Plan, Appendix M: Best Management Practices Plan											
1170	DOI-250	Non-design	Editorial	General Comment		Please ensure changes made to the Soil Management Plan are carried over into Section 1.3 for consistency.	Changes made to the Soil Management Plan will be carried over into the BMP Plan		Resolved.		Comment resolved pending DOI review of the final design documents.
1171	DOI-251	Non-design	Editorial	1.1.1/8	Existing vegetation preserved whenever feasible during clearing and grubbing or other soil-disturbing activities.	This sentence is incomplete. Please revise the text accordingly.	The sentence will be revised to read: "Existing vegetation <u>will be</u> preserved whenever feasible during clearing and grubbing or other soil-disturbing activities."		Resolved.		Comment resolved.
1172	DOI-252	Non-design	Other	1.1.1/8	In the event that existing vegetation needs to be disturbed, areas that need to be preserved will be marked with temporary fencing.	It is unclear from the text how it will be determined if areas "need to be preserved". Please expand on the text or reference other documents.	The sentence will be revised to state: "In the event that existing vegetation needs to be disturbed, areas that need to be preserved will be <u>identified by a qualified biologist consistent with Section 4.2.3 of the C/RAWP and</u> marked with temporary fencing. Employees and subcontractors will be informed of the limits of disturbance within the construction site and will be instructed to keep clear of delineated areas."		Resolved.		Comment resolved.
1173	DOI-253	Non-design	Other	1.1.3/8	During road preparation activities, loose sediment will be uniformly compacted, consistent with the substantive San Bernardino County Building and Land Use	Road preparation should also include measures for reducing water erosion (e.g., clearing ditches and culverts of debris).	The second sentence in Section 1.1.3 will be revised as follows: "Ongoing road maintenance—(1) visual inspections to identify areas of erosion, (2) localized road repair and regrading, installation, and maintenance of erosion control features		Resolved.		Comment resolved.

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					Services Department requirements, to aid in reducing wind erosion.		such as berms, silt fences, or straw wattles, ~~and~~ (3) grading for road smoothness, and (4) measures to reduce water erosion such as clearing ditches and culverts of debris —will be performed as needed to reduce potential for erosion.”				
1174	DOI-254	Non-design	Editorial	1.3.1/9	Unless characterized as non-hazardous waste.	This sentence is incomplete. Please revise the text accordingly (presumably part of the previous sentence).	The third sentence in Section 1.3.2 will be revised to read: “Leaks and spills will be cleaned up immediately using proper absorbent materials, which will then be disposed of as hazardous waste, unless characterized as non-hazardous waste.”		Resolved.		Comment resolved.
1175	DOI-255	Non-design	Other	1.3.4/11	Spills will be covered and protected from stormwater runon during rainfall and will not be buried or washed with water.	The intent of this sentence is unclear. Spills should immediately be cleanup up to the extent possible, even during storm events. The practice of covering spills should be implemented only in rare cases where immediate cleanup is not possible. Further detail should be provided on prohibited practices for spills.	The sentence will be revised to state “Leaks and spills will be immediately cleaned up to the extent possible using absorbent materials, which will then be disposed of properly. Leaks and spills shall not be covered and/or buried or washed with water. ~~Spills will be covered and protected from storm water run on during rainfall and will not be buried or washed with water. Spills will be contained and cleaned up immediately and thoroughly.”~~		Resolved.		Comment resolved.
1176	DOI-256	Non-design	Editorial	1.3.7/11	The sanitation subcontractor will monitor onsite sanitary/septic waste storage and disposal procedures weekly basis accordance with the sanitary/septic waste management BMPs.	This sentence is incomplete. Please revise the text accordingly.	The sentence will be revised to read: “The sanitation subcontractor will monitor onsite sanitary/septic waste storage and disposal procedures on a weekly basis in accordance with the sanitary/septic waste management BMPs.		Resolved.		Comment resolved.
1177	DOI-257	Non-design	Other	1.6.4/13	Illicit connections are connections of	It should be clarified that illicit connections are connections that could convey anything not composed entirely of surface and storm water directly to the storm drainage system or a water body.	The sentence will be revised to state: “Illicit connections are		Resolved.		Comment resolved.

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					the sanitary sewers to the storm sewer system.		connections ~~of the sanitary sewers to the storm sewer system~~ that could convey anything not composed entirely of surface and storm water directly to the storm drainage system or a water body or are illegally dumped."				
1178	DOI-258	Non-design	Other	2.1/14	If an inspection day (except those required relative to a rainfall event) falls on a Saturday or holiday, the inspection may be conducted on the preceding workday.	This section deals specifically with rain events therefore it is unclear under which situation the statement would apply. It is also unclear when an inspection would occur if a rain event occurs during a long holiday weekend.	The sentence will be revised to state: "Rain event inspections shall occur during working hours when it is safe to do so ~~are only required during the normal working hours~~. In the event of rain over a weekend or during a long holiday the inspection can occur prior to or after the weekend. ~~If an inspection day (except those required relative to a rainfall event) falls on a Saturday or holiday, the inspection may be conducted on the preceding workday.~~		Resolved.		Comment resolved.
1179	DOI-259	Non-design	Editorial	Figure 1-2/18	EROSION CONTROAL	Correct to: EROSION CONTROL	The title of Figure 1-2 will be corrected.		Resolved.		Comment resolved.
Specific Comments – Construction/Remedial Action Work Plan, Appendix Q: Site Security Plan											
1180	DOI-260	Non-design	Other	1.2/1-2	PG&E's security standards for remedial facilities at Moabi Regional Park will be established after the design is firmed up.	Please provide security standards for remedial facilities at Moabi Regional Park.	The cited text will be expanded to read: "~~PG&E's~~ Security ~~standards~~ features for remedial facilities at Moabi Regional Park ~~will be established after the design is firmed up~~ includes, but not limited to the following: • Perimeter fencing with gates equipped with chains and locks. Vehicle entrance to certain areas may have sliding/ motorized gate with keypad/card reader entry. • Security alarm system (not connected to the Compressor Station).		Resolved.		Comment resolved.

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							• <u>Security/yard lighting.</u> • <u>Closed-circuit security camera mounted to monitor entry to certain locations.</u>"				
1181	DOI-261	Non-design	Editorial	2.3/2-3	Identified disturbances will be reported to DTSC and the respective landowner.	Please include the DOI PM in the notification of identified disturbances.	The DOI PM will be added to the Notification and Reporting section of the Site Security Plan		Accepted.		Comment resolved pending DOI review of the final design documents.
Specific Comments – Construction/Remedial Action Work Plan, Appendix R: Waste Management Plan											
1182	DOI-262	Non-design	Editorial	Acronyms and Abbreviations/iii	Department of Interior	Correct to: Department of the Interior	The acronyms and abbreviations listed will be revised to read "Department of <u>the</u> Interior."		Accepted.		Comment resolved.
1183	DOI-263	Non-design	Other	3.1/3-1	Liquid wastes containing 0.5 percent or more filterable solids will be analyzed using the toxicity characteristic leaching procedure (TCLP), …	It is unclear from the explanation if the solids will be separated from the liquids prior to testing and if the resulting liquids would then be tested separately. Please clarify.	As specified in EPA Test Method 1311, the Toxicity Characteristic Leaching Procedure, if a waste contains less than 0.5% solids, only the filtered liquid portion is considered to be the TCLP extract and is subjected to chemical analysis. Text in first bullet will be revised to reflect the above. The cited sentence will be revised to read (revisions are shown in strikeout [~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]): "Liquid wastes containing 0.5 percent or more filterable solids, the filtered solids will be analyzed…"		Resolved.		Comment resolved.
1184	DOI-264	Non-design	Other	3.1.2/3-2	Solid wastes will be analyzed for total metals…	Several waste streams identified in Section 2 could fall into the category of solid waste. It would be beneficial for the reader to define "solid waste" either directly or by reference to Section 261.2 of RCRA.	The term "solid waste" used in this section refers to solid materials, as opposed to liquid materials, and does not refer to the RCRA definition of solid waste. Waste generated by construction activities will be classified as hazardous or non-hazardous based on the requirements of the California Hazardous		Resolved.		Comment resolved.

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							Waste Control Law (California Health and Safety Code, Division 20, Chapter 6.5) and regulations (Title 22, California Code of Regulations, Division 4.5). Because EPA authorized California to implement RCRA based on enforcement of California's laws and regulation, the definition of solid waste in 40 CFR 261.2 is not relevant. California' waste classification system does not include a definition of solid waste. The corresponding definition in California regulations is the definition of "waste" in 22 CCR 66261.2. All of the materials being managed under this waste management plan are considered waste under this definition.				
1185	DOI-265	Non-design	Other	3.1.3/3-2	Empty, used 55-gallon drums that formerly contained hazardous materials will be labeled with the word "empty" and the date emptied and will be returned to the original chemical supplier or turned over to a drum reconditioner.	PG&E must ensure that drums containing hazardous materials are emptied in accordance with appropriate regulations prior to storage and shipment. DTSC has developed regulations that set forth a definition of "empty container." The regulations are found in Title 22, California Code of Regulations, Section 66261.7.	This section will be revised to read: "Empty, used 55-gallon drums that formerly contained hazardous materials will be labeled with the word "empty" and the date emptied and will be returned to the original chemical supplier or turned over to a drum re-conditioner. <u>Containers managed as empty will meet the requirements of 22 CCR 66261.7</u>."		Accepted.		Comment resolved.
1186	DOI-266	Non-design	Other	3.2.3/3-2	Concrete and asphalt rubble that exhibits visual evidence of contamination (staining, residue, etc.) will be sampled by chipping or coring.	All concrete/asphalt sampling, including in situ sampling, shall be biased toward visible staining.	The following sentence will be added. "<u>Samples will be collected from the stained areas to identify the nature of the contaminants. For waste disposal purposes samples will be collected, in accordance with procedures that are acceptable to the disposal site</u>."		Accepted.		Comment resolved.

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							An SOP was prepared for this activity (see **Attachment AA** of the final RTC table).				
1187	DOI-267	Non-design	Editorial	3.2.3/3-2	Classified as nonhazardous unless visual evidence of contamination observed.	The first sentence needs a subject, i.e., Contaminated concrete and asphalt rubble is…	The sentence will be revised to read: "<u>Concrete and asphalt rubble will be</u> classified as nonhazardous unless visual evidence of contamination is observed or generator knowledge suggests that contamination may have occurred."		Accepted.		Comment resolved.
1188	DOI-268	Non-design	Editorial	3.2.3/3-2	Concrete and asphalt rubble that exhibits visual evidence of contamination (staining, residue, etc.) will be sampled by chipping or coring.	An SOP needs to be prepared for sampling this type of debris. The depth of penetration of chipping or coring should be representative of the contamination penetration depth so as to not dilute the contamination with underlying non-contaminated material. Although a core through the entire floor slab may seem to be more representative of the debris disposed in a landfill or possibly reused, it is water contact with the surface contaminated material that results in leaching of contaminants.	See RTC #1186 DOI-266.		Resolved.		Comment resolved.
1189	DOI-269	Non-design	Editorial	3.2.3/3-3	One composite sample will be collected at each location.	How will the number of subsamples to be composited be determined? Please also consider that a large stained area may need to be subdivided into units for composite sampling so that the compositing does not mask hot spots of contamination, and so that identified hot spots that exceed non-RCRA and RCRA hazardous waste limits can be managed separately from other non-hazardous waste debris.	The text will be revised as follows (revisions are shown in strikeout [~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]): "One composite sample <u>consisting of four subsamples</u> will be collected at each ~~location~~ <u>distinct area of demolition. Depending on their size, individual stained areas may be sampled separately</u>."		Resolved.		Comment resolved.
1190	DOI-270	Non-design	Editorial	3.2.5/3-3	Concrete washout water will be tested for pH USEPA Methods 9040C or 9045D. A single representative sample will be collected for each batch of waste, or it can be consistently determined that the waste is nonhazardous.	The second sentence does not make sense. Please clarify. The pH of concrete washout water is approximately 12. Although the pH should not exceed 12.5, which would render it a corrosive hazardous waste, the washout water should be recycled to the maximum extent possible.	The text will be revised as follows (edits are shown in strikeout [~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]): "Concrete washout water will be tested for pH USEPA Methods 9040C or 9045D. A single representative sample will be collected for each batch of waste, ~~or it can be consistently determined that the~~		Accepted.		Comment resolved.

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							~~waste is nonhazardous~~ until several representative samples test below the hazardous waste limit of 12.5, after which time the washout water will be presumed to be non-hazardous. Washout water will be recycled to the maximum extent feasible.”				
1191	DOI-271	Non-design	Editorial	3.2.6/3-3	Testing will not be necessary in cases where contaminants could not reasonably be expected to occur at hazardous waste concentrations in the decontamination solution.	What decontamination solutions would be expected to have hazardous waste levels of contamination? If none are expected, this section should state this and indicate no testing will be performed. If there are decontamination solutions that could have hazardous waste levels of contamination, please identify them to ensure that testing is performed.	To date, PG&E’s experience from drilling and sampling activities for both groundwater and soil programs, on and off the Compressor Station, is that solutions generated from equipment decontamination used do not exhibit hazardous waste characteristics. Because remedy construction activities will be contacting similar materials we expect that decontamination solutions from remedy construction will also not exhibit hazardous waste characteristics. Testing will be performed to verify that the acceptance criteria for the disposal method being used (e.g., disposal at TCS evaporation ponds, IM3 treatment plant, or offsite disposal) are being met. This section will be revised to read as follows: “Solutions generated by decontaminating equipment are not expected to exhibit hazardous waste characteristics. Testing will be performed initially to profile the solutions and to verify that the acceptance criteria for the disposal method being used (e.g., disposal at TCS evaporation ponds, IM3 treatment plant, or offsite disposal) are being met. ~~that has~~	Please note, it is the generator’s responsibility to ensure proper waste classification and management. Although PG&E may manage subsequent waste steam based on knowledge gathered during initial testing of that waste stream, it is PG&E’s responsibility to retest the waste stream if it is somehow changed or different from the initial sample.	Resolved.		Comment resolved.

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							~~handled hazardous waste or hazardous materials will be tested for the hazardous constituents to which the equipment has been exposed. Testing will not be necessary in cases where contaminants could not reasonably be expected to occur at hazardous waste concentrations in the decontamination solution. Water from rinsing groundwater sampling equipment will not be tested.~~"				
1192	DOI-272	Non-design	Other	3.2.13	Equipment that is visibly contaminated and cannot be decontaminated will take on the same characteristics as the contacted media…	Revise the text to clarify how the equipment will be handled based on the characteristics of the contacted media.	This section will be revised to read as follows: "Equipment that is visibly contaminated and cannot be decontaminated will take on the same characteristics as the contacted media. <u>If the media has been classified as hazardous, the sampling equipment will be classified and managed as hazardous waste. If the media has been classified as non-hazardous, the sampling equipment will be classified and managed as non-hazardous waste.</u> Disposable sampling equipment that shows no visible evidence of contamination will be disposed as nonhazardous waste <u>regardless of the classification of the media to which it has been exposed</u>."		Accepted.		Comment resolved.
1193	DOI-273	Non-design	Editorial	3.2.17/3-4	This collected water will be considered stormwater unless visual evidence of contamination or pollutant sources identified, …	Correct text to: This collected water will be considered stormwater unless visual evidence of contamination or pollutant sources <u>are</u> identified,	The text will be corrected as specified.		Accepted.		Comment resolved.
1194	DOI-274 (Comment	Non-design	Process	3.2.17/3-4		The site may be subject to the substantive portions of the California State Water Board's General Construction (2009-0009-DWQ) and/or General Industrial (2014-0057-DWQ) Permits.	This section will be		Accepted.		Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
	submitted to DOI by CA State Waterboard – Jose Cortez)						revised to read as follows: "This collected water it will be managed in accordance with Best Management Practices (BMP) Plan, <u>which is consistent with the substantive requirements of the General Permit for Stormwater Discharges Associated with Construction Activities (2009-0009-DWQ), and is</u> provided as Appendix M to this C/RAWP." An Industrial Storm Water Pollution Prevention Plan for operation of the Topock Groundwater Remedy consistent with the substantive requirements of Order 2014-0057-DWQ is included as Appendix D to Volume 1 of the Operation and Maintenance Manual.				
1195	DOI-275 (Comment submitted to DOI by CA State Waterboard – Jose Cortez)	Non-design	Process	3.2.18/3-4		This activity may be subject to the CA State Water Board's General Order 2003-0003-DWQ for low threat discharges.	For consistency with text in Section 4.5.3.2 (Onsite Management of Construction Water), Onsite Reuse, this section will be revised to read as follows (revisions are shown in strikeout [~~strikeout~~; for text deletion] and underline [<u>underline</u>; for text addition]): "~~Water from hydrostatic testing of conveyance piping is presumed to be nonhazardous unless it exhibits visual evidence of contamination (sheen, discoloration, or suspended solids). Analytical parameters for water suspected to be contaminated will be selected based on the type of contamination observed.~~ <u>Water from hydrostatic testing of conveyance piping may be reused onsite in a manner that complies with the State Water</u>		Accepted.		Comment resolved.

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							Resources Control Board Water Quality Order No. 2003-003-DWQ, Statewide General Waste Discharge Requirements for Discharges To Land With A Low Threat To Water Quality. The permit states that "The discharge of water main, water storage tank, water hydrant pipeline flushing, or hydrostatic testing water from tanks or pipelines that have been used to store or convey any medium other than potable water is prohibited, unless the Discharger has demonstrated to the Regional Board that all residual pollutant concentrations have been reduced to levels below Regional Board Basin Plan groundwater quality objectives."(Paragraph 7 on page 4). The water generated from hydrostatic testing will be low-volume discharges with minimal pollutant concentrations and will not be reused in a manner that results in a discharge to waters of the United States or waters of the state. The volume and date of each reuse event will be recorded."				
1196	DOI-276	Non-design	Editorial	4.1.2.3/4-2	Accumulation start date	The label shown does not have entry for accumulation start date. Please revise accordingly.	The text will be revised to delete the reference to accumulation start date, which is not required on a non-hazardous waste label.		Accepted.		Comment resolved pending DOI review of the final design documents..
1197	DOI-277	Non-design	Other	4.1.4.2/4-3	Satellite accumulation areas are limited to 55 gallons of each waste type.	Add: or 1 quart of acute hazardous waste. The regulations limit the total volume of hazardous waste at a single Satellite accumulation area (SAA) to 55 gallons (or 1 quart of acute hazardous waste). (See 40CFR § 262.34(c)(1))	California regulations (22 CCR 66262.34(e)(2) specify that a separate 55 gallon limit applies to each waste type if the waste streams are not compatible, or if combining the waste streams is not practical (e.g., prevents recycling or requires unreasonable		Accepted.		Comment resolved.

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							accumulation procedures). This section will be revised to read as follows: “Satellite accumulation areas may be used to store hazardous waste at or near the point of generation at a location under the control of the operator of the process generating the waste. Satellite accumulation areas are limited to 55 gallons of waste or 1 quart of acutely hazardous or extremely hazardous waste. A separate 55 gallon limit applies to each incompatible waste, and to wastes that are not practicable to combine ((e.g., prevents recycling or requires unreasonable accumulation procedures).”				
1198	DOI-278	Non-design	Other	4.1.4.2/4-3	Satellite accumulation areas are not required to maintain the equipment described in Section 4.1.4.1 and are not subject to the inspections described in Section 4.1.8; however, meeting these requirements is still a good practice.	SAA regulations do require that waste containers must be under the control of the operator of the process generating the waste, in good condition (265.171), compatible with its contents (265.172), and closed except when adding or removing waste (265.173). These requirements should be addressed as they aid in achieving the goal of inspections.	The following text will be added: “Containers in satellite accumulation areas must be under the control of the operator of the process generating the waste, in good condition, compatible with the contents, and be kept closed except when adding or removing waste.”		Accepted.		Comment resolved.
1199	DOI-279	Non-design	Editorial	4.2.3.2/4-6	Characterize and classify the gas in accordance with Section X.3.	The cited section does not exist in this document. Please revise accordingly.	This section will be revised to read “Characterize and classify the gas in accordance with Section ~~X.~~3”		Accepted.		Comment resolved.
1200	DOI-280	Non-design	Editorial	4.2.4/4-6	Concrete and asphalt rubble will be managed as non-hazardous waste, …	To rectify the difference between 3.2.3 and 4.2.4, please modify to: Concrete and asphalt rubble which shows no evidence of contamination …	This section will be revised to read as follows: “Concrete and asphalt rubble which is not associated with known hazardous material operations, shows no visible		Accepted.		Comment resolved.

Comment No.	Unique Comment ID (if applicable)*	Comment Type (Design/ Non-Design)	Comment Category	Section/ Page	Reference Text	90% Design Comment *(Please provide sufficient detail, include specifically what you are looking for)*	PG&E Response	DTSC Response	DOI Response	Tribes Response	Final Resolution
							evidence of contamination, or has been tested and found to be non-hazardous, will be managed as non-hazardous waste…" Details of concrete and asphalt sampling are provided in the new SOP (see **Attachment Z** of the final RTC table).				
1201	DOI-281	Non-design	Editorial	4.2.4/4-6	Concrete and asphalt rubble will be managed as non-hazardous waste…	This section needs to acknowledge that some concrete/asphalt rubble may be classified as non-RCRA or RCRA hazardous waste per characterization in accordance with Section 3.2.3, and must be managed as hazardous waste or decontaminated and then managed as non-hazardous waste.	The following sentence will be added: "Concrete and asphalt rubble may be classified as non-RCRA or RCRA hazardous waste per characterization in accordance with Section 3.2.3, and must be managed as hazardous waste or decontaminated and then managed as non-hazardous waste."		Accepted.		Comment resolved.
1202	DOI-282	Non-design	Editorial	4.2.12/4-8	Otherwise, solutions will be disposed at a permitted offsite disposal facility.	Please revise to state – "Otherwise, solutions will be disposed at an offsite disposal facility permitted to receive the type of waste based on characterization and classification.	The section will be revised as specified.		Accepted pending review.		Comment resolved.
1203	DOI-283	Non-design	Legal	5.1.5/5-5	PG&E proposes use of the following potential disposal facilities for the project as well as others, subject to the communication and approval processes under the Consent Decree outlined above: …	At the time of this writing (12/2014), discussions with EPA Region 9 indicate that the following facilities are approved to receive CERCLA waste: (1) CWM Kettleman Hills (2) US Ecology, NV (3) Clean Harbors, Buttonwillow. Please remove PSC Rancho Cordova from consideration for disposal of CERCLA waste at this time.	PSC Rancho Cordova will be removed.		Accepted.		Comment resolved pending DOI review of the final design documents..
Specific Comments – Construction/Remedial Action Work Plan, Appendix U: Programmatic Biological Assessment											
1204	FMIT/TRC	Non-design	Editorial	C/RAWP Append U Programmatic Biological Assessment	FIGURE 7 PROPOSED CONSTRUCTION STAGING, SOIL STORAGE, AND ACCESS ROUTES	This figure does not appear to correctly represent the Undisturbed and Archaeological/ Historical Sites. Please ensure that this is updated to reflect the most recent understanding of the cultural historical properties on the site. The Tribes' position has always been that any prior disturbance to an area does not justify further disturbances.	PG&E agrees that previous disturbance is not a justification for further disturbance. However, the proposed remedy construction footprint represented the minimum for what is required to build the system and has preferentially used previously disturbed			Tribe agrees that decisions as to which areas should preferentially be disturbed should be decided in discussions with the Tribes.	DTSC response: Tribal comment noted.

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							areas over those that were previously undisturbed as required by DTSC. Specifically, Mitigation Measure CUL-1a-9 requires PG&E, "in communication with the Interested Tribes (and subject to their review), and to the maximum extent feasible, as determined by DTSC, give: (1) priority to previously disturbed areas for the placement of new physical improvements; and (2) priority to re-use of existing physical improvements, such as but not limited to wells and pipelines, but not including IM-3 facilities." Under this mitigation measures, "disturbed" areas "means those areas outside of documented archaeological site boundaries that have experienced ground disturbance in the last 50 years." Similarly, the PA requires that "[n]ew facilities or activities will be placed in areas already disturbed by previous grading and other mechanized activities to the extent practicable, consistent with protecting human health and the environment and achieving cleanup in a timely manner." See PA Section III(B)(2)(c); CHPMP Section 7.1.				
1205	Hualapai/TRC	Non-design	Editorial	C/RAWP Append U Programmatic Biological Assessment	FIGURE 7 PROPOSED CONSTRUCTIO N STAGING, SOIL STORAGE, AND ACCESS ROUTES	This figure does not appear to correctly represent the Undisturbed and Archaeological/ Historical Sites. Please ensure that this is updated to reflect the most recent understanding of the cultural historical properties on the site. The Tribes' position has always been that any prior disturbance to an area does not justify further disturbances.	See above				
1206	Cocopah/TRC	Non-design	Editorial	C/RAWP Append U Programmatic Biological Assessment	FIGURE 7 PROPOSED CONSTRUCTIO N STAGING, SOIL STORAGE, AND ACCESS ROUTES	This figure does not appear to correctly represent the Undisturbed and Archaeological/ Historical Sites. Please ensure that this is updated to reflect the most recent understanding of the cultural historical properties on the site. The Tribes' position has always been that any prior disturbance to an area does not justify further disturbances.	See above				

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1207	Chemehuevi/ TRC	Non-design	Editorial	C/RAWP Append U Programmatic Biological Assessment	FIGURE 7 PROPOSED CONSTRUCTIO N STAGING, SOIL STORAGE, AND ACCESS ROUTES	This figure does not appear to correctly represent the Undisturbed and Archaeological/ Historical Sites. Please ensure that this is updated to reflect the most recent understanding of the cultural historical properties on the site. The Tribes' position has always been that any prior disturbance to an area does not justify further disturbances.	See above				
1208	FMIT/TRC	Non-design	Editorial	C/RAWP Append U Programmatic Biological Assessment		Ensure the PBA is updated to include the Townsend Long eared bat	The PBA is a document that deals with Federally Protected Species under the Endangered Species Act. Because the Townsend's big-eared bat is a candidate for State listing, it is not appropriate to include in the PBA.			Noted.	
1209	Hualapai/TRC	Non-design	Editorial	C/RAWP Append U Programmatic Biological Assessment		Ensure the PBA is updated to include the Townsend Long eared bat	See above			Noted.	
1210	Cocopah/TRC	Non-design	Editorial	C/RAWP Append U Programmatic Biological Assessment		Ensure the PBA is updated to include the Townsend Long eared bat	See above			Noted.	
1211	Chemehuevi/ TRC	Non-design	Editorial	C/RAWP Append U Programmatic Biological Assessment		Ensure the PBA is updated to include the Townsend Long eared bat	See above			Noted.	

* Comment ID as appeared in the commenter's original comment letter where applicable. The commenter's affiliation is also added for information purpose.

Roadmap -- Attachments to Final 90% RTC Table			
RTC #	**Subject**	**Revision since June 26 or August 5 submittals?**	**Location**
8, 12	Exec Summary Section on Decommissioning	Yes – to incorporate edits from DTSC.	Attachment A
17	AZ SHPO Correspondence dated February 4, 2008	No	Attachment B
19, 104, 817, 821, 827-833	Revised design for BCW northern and southern crossings	No	Attachment C
27, 72, 995	Construction and startup sequencing details	No	Attachment D
135, 267, 300	Additional details on tie-in with Topock-2 and 3	The final design will reflect response to DTSC's comment and will include the design of the piping from the gate valves to the remedy fresh water tank in both map and section view.	Attachment E
140	BOD Appendix M Figures	No	Attachment F
196	BOD Revised Figure 2.1-1	No	Attachment G
223	Photo of a 500 to 1,000-gallon portable tank being pulled by a pick-up truck	No	Attachment H
296	Additional 12-inch FW pipe (in the event pre-treatment is required)	No	Attachment I
313	O&M Vol 2 Revised Exhibit 5.3-1	No	Attachment J
354	BOD Revised Figure 3.4-3	No	Attachment K
418	Development of the Simulated Threshold TOC Concentrations for Reduction of Cr(VI)	No	Attachment L
634	Revised Remedy-SOP-08 (Inspection of Frac Tanks)	No	Attachment M
657	OSHA Suggested Spotting Signals for Vehicles	No	Attachment N
662	Revised RTC-SOP-09	No	Attachment O
711	Figures 711-1 and 711-2 Proposed Well Pairs In Model Layers 3 and 4	No	Attachment P
803	Revised design for Park Moabi	No	Attachment Q
	Revised Management Protocol for Displaced Materials	Yes – to revise Box 16 (in flowchart) to mention post risk assessment completion and corresponding text in the memo	
867	C/RAWP Revised Exhibit 2.3-1	No	Attachment S
932	New C/RAWP exhibit in Section 3.2.1.2, List of Well Locations for Borehole Groundwater Sample Collection	Yes – to incorporate inputs from DTSC	Attachment T
938	New C/RAWP Section 3.2.1.6, Baseline Well Sampling - plans	No	Attachment U

	and methods to collect initial baseline samples from all new wells		
1055	CQAPP Revised Figure 2-1	No	Attachment X
1057	Third Party Testing and Inspection by QA	No	Attachment Y
1155	IM3 Decommissioning Plan: Revised Figure 4-1	No	Attachment Z
1157, 1186, 1188	New REMEDY-SOP-10 (Sampling of Concrete/Asphalt Demolition Waste	No	Attachment AA
136	TW and MW-20 Bench -- Consolidation of Carbon Storage/ Dosing Design and Operations	The final design will address DTSC's comments and will replace the leach field at TW Bench with a septic tank (specifically drawings C-008-03 and 04).	Attachment BB
4, 17, 22, 32, 41, 43, 126	MW-X and MW-Y	Not applicable. This is a new attachment added after the Aug 5 submittal	Attachment CC
313, 815, 1005, 1012	Miscellaneous revised figures from BOD, O&M Manual, and C/RAWP	Yes to Attachment W (C/RAWP Figure 4.2-3 Access Route) only – to incorporate inputs received at the August 26-27 TWG meeting.	Attachments J, R, W, and V

Attachment A: RTC #8 and #12

New Decommissioning Section of the Executive Summary

ES.6 Remedy Decommissioning Process

As directed by DTSC in comments on the 90% BOD (90% RTCs #8 DTSC-4, #12 DTSC-8 [Appendix I]), this section describes the decommissioning process envisioned for the proposed remedy even though it is understood that ~~a~~ the detailed decommissioning plan will be prepared much later in the remedial process.

In compliance with the Agencies' April 4, 2014 directive letter (DTSC and DOI 2014), PG&E has and will continue to reiterate its commitment to remove all underground utilities and infrastructures to the extent practicable at the time of remedy decommissioning. Per DTSC's request, below is a conceptual list of remedy components that PG&E believes cannot or should not be removed at the end of the remedy (note that this list is based on current information and may be subject to change):

- Freshwater pipeline (and casing) under I-40;
- Piping/conduits located in (e.g., direct buried or in trenches) or under (e.g., jack and bore) paved, public roadways; and
- Subsurface infrastructure that property owner(s) or land manager(s) request not to be removed, and such request is approved by DTSC and DOI.

ES.6.1 Requirements Related to Remedy Decommissioning

Several documents require PG&E to prepare a plan for remedy decommissioning and/or impose requirements that apply to decommissioning activities of the remedy. This section presents the exact language in each of the documents that ~~requiring~~ require a remedy decommissioning work plan/~~,~~ decommissioning activities or that are otherwise applicable to decommissioning activities.

Programmatic Agreement (BLM 2010). Stipulation V of the PA includes the following applicable measures:

> *All facilities and appurtenances related to the Topock Remediation Project are to be removed as soon as practicable upon attainment of cleanup standards and a determination by DOI that removal of such facilities is protective of human health and the environment. PA, § V(A).*
>
> *All such removal will be planned in consultation with the Signatories, Tribes, and Invited Signatories following the guidelines in [PA] Appendix B [the consultation protocol]. PA, § V(A).*
>
> *The removal of such facilities shall be monitored following the monitoring guidelines in [PA] Appendix C [the tribal and archeological monitoring protocol]. PA, § V(B).*
>
> *The removal of such facilities shall take place along existing graded roads to the maximum extent practicable. PA, § V(C).*
>
> *Prior to decommissioning of any remediation facility, the Federal Agencies will consult with all Signatories, Tribes, and Invited Signatories during the development of the closure plan to determine how to best restore the areas affected by the Topock Remediation Project, including, but not limited to, the site of the existing treatment plant and related facilities, but excluding the Topock Compressor Station and related facilities, to ensure that environmental restoration of conditions existing prior to the construction of the Project is achieved to the extent practicable. PA, § V(D).*

Cultural and Historic Properties Management Plan (BLM 2012). The CHPMP also includes provisions applicable to remedy decommissioning:

> *PG&E will remove all other remediation facilities and appurtenances related to the Topock Remediation Project as soon as practicable following the attainment of cleanup standards and a determination by DOI that the removal of these facilities is protective of human health and the environment (BLM et al. 2010:13). CHPMP, § 6.2.3.*
>
> *A Remedy Decommissioning Plan will be drafted that will describe procedures for the removal and decommissioning of the groundwater remedy treatment system and associated infrastructure. The*

Plan will also describe the post-remedy restoration of the site to the conditions existing prior to the implementation of the remedial investigation and remedy construction, including related appurtenances and facilities, to the extent practicable. This Plan will be submitted by PG&E to DOI within 120 days of DOI's certification of completion of the CERCLA Remedial Action and determination by DOI that removal of such facilities is protective of human health and the environment. CHPMP, § 6.3.

PG&E will retain a qualified professional archaeologist to inspect and evaluate any previously unidentified or suspected archaeological or historical remains, including human remains and/or associated funerary objects or graves, uncovered during construction, operation, or decommissioning of the Project. Should any such remains, objects, or features be found, all Project activities will cease immediately within an area extending not less than 5 meters and not more than 50 meters (to be determined in the field on a case-by-case basis) from the potential find. The BLM, and Tribal representatives if the resource is Native American in nature, will be notified immediately of the discovery. No further work will be undertaken until the BLM, in consultation with Tribes and PG&E, has determined the nature of the discovery and developed appropriate measures for its evaluation and/or treatment, consistent with the PA. CHPMP, § 8.1.

The CHPMP also refers to Stipulation V of the PA, as previously outlined.

Consent Decree and Appendix C, Scope of Work to Consent Decree (DOI 2013). Section 9 of the CD states the following:

The Remedy Decommissioning Plan describes procedures for the removal and decommissioning of the groundwater remedy treatment system and associated infrastructure. The Plan will also describe the post-remedy restoration of the site to the conditions existing prior to the implementation of the remedial investigation and remedy construction, including related appurtenances and facilities, to the extent practicable. This Plan will be submitted by PG&E to DOI within 120 days of DOI's certification of completion of the RA and a determination by DOI that removal of such facilities is protective of human health and the environment. Removal of remediation facilities will be consistent with the PA.

Environmental Impact Report and Mitigation Monitoring and Reporting Program (DTSC 2011d). The EIR and the MMRP contain information relevant to decommissioning.

The EIR makes the following statements about decommissioning:

Following completion of the remedial action, when it is determined through monitoring cleanup of contaminated groundwater plume to background levels or 32 µg/l of Cr(VI), and/or following the determination that the remedial structures are no longer needed, the remedial facilities (e.g., in situ reductant storage and delivery systems, foundation material, process controls/instrumentation systems) would be decommissioned. EIR at 3-28.

Standard well decommissioning procedures required by San Bernardino County and the California Water Resources Department would be followed for the decommissioning of all wells (including remediation and monitoring). This would generally include either perforating the well casing and filling the well with cement grout or overdrilling the well. EIR at 3-28.

Decommissioning reductant storage facilities would include removing above grade treatment facilities from the site. Removed materials would be reused, transported to an off-site disposal facility, or sold as scrap material. EIR at 3-29.

While most facilities would be expected to be decommissioned following the completion of the remedial action, it is possible that water supply wells or the surface water intake structure may not be decommissioned and that it could be transferred to another use. EIR at 3-29.

Pipelines would be decontaminated as appropriate. Aboveground piping would be removed and either reused or disposed off-site as scrap material. Subsurface pipelines would likely be abandoned in place following decontamination. EIR at 3-30.

As wells and other infrastructure are removed and it is determined that access roads are no longer necessary, roads would be decommissioned from further use. The efforts involved in decommissioning would be dependent on the type of road (could be paved with asphalt, covered in gravel, or left unpaved) and the location of road (such as in previously disturbed areas or areas that were in a more natural state prior to the proposed project). EIR at 3-30.

The MMRP also contains several mitigation measures pertaining to decommissioning of the remedy.[1]

ES.6.2 Trigger for Remedy Decommissioning

As stated in response to 90% comment #28 FMIT-14, once the completion criteria/performance standards for the groundwater remedy are met to the satisfaction of the agencies, PG&E will submit a plan to decommission the remedy in accordance with the CD and CACA. The completion criteria/ performance standards for the remedy are presented in detail in both the 90% BOD (Sections ES-2 and 1.2.1) and the O&M Manual (Section L.4).

Due to heterogeneity in the aquifer at the Topock site, it is expected that during the decades-long O&M period there will be portions of the site that attain the completion criteria/performance standards at different times. During future evaluations, such as 5-year reviews, distinct geographical areas of the site, where criteria/standards have been attained and/or where it has been determined that Monitored Natural Attenuation (MNA) is appropriate to address residual chromium, could be designated (as appropriate) for Corrective Measure (CM)/Remedial Action (RA) Completion. At that time, PG&E can submit a request for certification of RA completion (CD Appendix C Section 8) and a CM completion report (CACA Attachment 6, Item G) to DOI and DTSC, respectively. Once DTSC and DOI are satisfied and determine that remedy facilities in those geographical areas are no longer needed, PG&E will proceed with decommissioning in accordance with the decommissioning plan.

ES.6.3 Conceptual Narrative of Key Remedy Decommissioning Steps

At this time in the design process and before the remedy is constructed, steps to decommission any remedy components, which will occur decades into the future, will have to be general and conceptual. Descriptions of the conceptual decommissioning steps (below and in the 60% RTC #6) reflects this fact. Any additional details provided herein should be considered speculative best estimates, and are subject to change based on information and conditions that become available prior to and at the time of remedy decommissioning.

- **Site preparation and demarcation** – typical activities include mobilization of resources (personnel, equipment, materials), delineate access/haul routes, demarcate work and support zones including staging areas, and set up temporary facilities. Temporary facilities may include trailers, restroom facilities, safety and security lighting, equipment storage area, and parking area.
- **Utility survey and isolation** – typical activities include locating and marking underground utilities prior to intrusive work, and isolation of identified utilities. Utilities may include water, sewer, gas, phone, and power lines. Underground Service Alert or “Dig Alert” will be contacted to identify public utilities that

---

1 Mitigation measures included in the MMRP that apply during decommissioning include, but are not limited to, Mitigation Measure BIO-2c, which requires the preparation of a Bird Impact Avoidance and Minimization Plan based on surveys conducted prior to decommissioning and during the breeding season (as defined in the EIR for each species or suite of species), and CUL-1a-8e, which requires protocols for the appropriate methods to be used to restore the environment to its preconstruction condition upon decommissioning.

operate within the work areas. Identified utilities will be isolated and disconnected by the utility provider prior to decommissioning and removing portions of a utility.

- **System components decommissioning** – decommissioning renders the components permanently out of service. Typical activities include decontamination and removal ~~or abandonment in place~~. Decontamination will involve cleaning and removing waste materials, and render the components appropriate for reuse, recycle, or disposal. After decontamination, the components will generally be removed ~~or abandoned in place~~.

  PG&E has and will continue to reiterate its commitment to remove ~~of~~ all underground utilities and infrastructures to the extent practicable at the time of remedy decommissioning. Per DTSC's request, below is a conceptual list of remedy components that PG&E believes cannot or should not be removed at the end of the remedy (note that this list is based on current information and may be subject to change):

  - Freshwater pipeline (and casing) under I-40;
  - Piping/conduits located in (e.g., direct buried or in trenches) or under (e.g., via jack and bore) paved, public roadways; and
  - Subsurface infrastructure that property owner(s) or land manager(s) request not to be removed, and such request is approved by DTSC and DOI.

- **Waste characterization and management** – waste generated from decommissioning may include liquid wastes, solid wastes, and sludge. Waste will be characterized and managed appropriately.
- **Soil confirmation sampling, as needed** – subsequent to decommissioning and removal, soil confirmation sampling may be conducted to assess soil conditions as needed.
- **Post-decommissioning restoration** – after decommissioning and confirmation sampling are complete, site restoration will commence. Restoration activities will start with returning the land to a safe condition, backfilling of excavated infrastructure, and compacting uneven areas. Light grading and contouring may be required to provide proper drainage and to control erosion. Revegetation will occur after final grading and contouring.

The above conceptual steps apply to pipelines and vertical infrastructure. Decommissioning of wells will be in accordance with the approach outlined in the project Well Decommissioning SOP (Well-SOP-01) presented in the O&M Manual Volume 1, Appendix B.

Attachment B: RTC# 17

Arizona SHPO Correspondence dated February 4, 2008

EC/NHPA

Arizona State Parks

RECEIVED LAKE HAVASU FIELD OFFICE

2008 FEB -6 A 10: 36

LAKE HAVASU CITY, AZ

February 4, 2008

Steve Politsch, Field Manager
DOI-Bureau of Land Management
Lake Havasu Field Office
2610 Sweetwater Avenue
Lake Havasu City, AZ 86406

Arizona State Parks
1300 W. Washington
Phoenix, AZ 85007

Tel & TTY 602 542 4174
www.azstateparks.com

800.285.3703 from
(520 & 928) area codes

General Fax:
602.542.4180

Director's Office Fax:
602.542.4188

ATTN: Michael Johnson, Archaeologist

Re: Pacific Gas and Electric Company (PG&E) Topock Compressor Station Remedial Investigation; SHPO-2007-0694(35381); DOI-BLM; FWS; ADEQ

Dear Mr. Politsch:

Thank you for consulting with us on the above-proposed undertaking and on your finding of effect. We have reviewed the summary documentation included and concur with the Agency's finding of "no historic properties affected" based upon the level of information obtained in your tribal consultation efforts.

We appreciate your continued cooperation with this office in complying with the historic preservation requirements for federal undertakings. If you have any questions or concerns, please feel free to contact me at 602/542-7138, or e-mail me at ahoward@azstateparks.gov.

Sincerely,

Ann V. Howard

Ann Valdo Howard
Public Archaeology Programs Manager/Archaeologist
State Historic Preservation Office

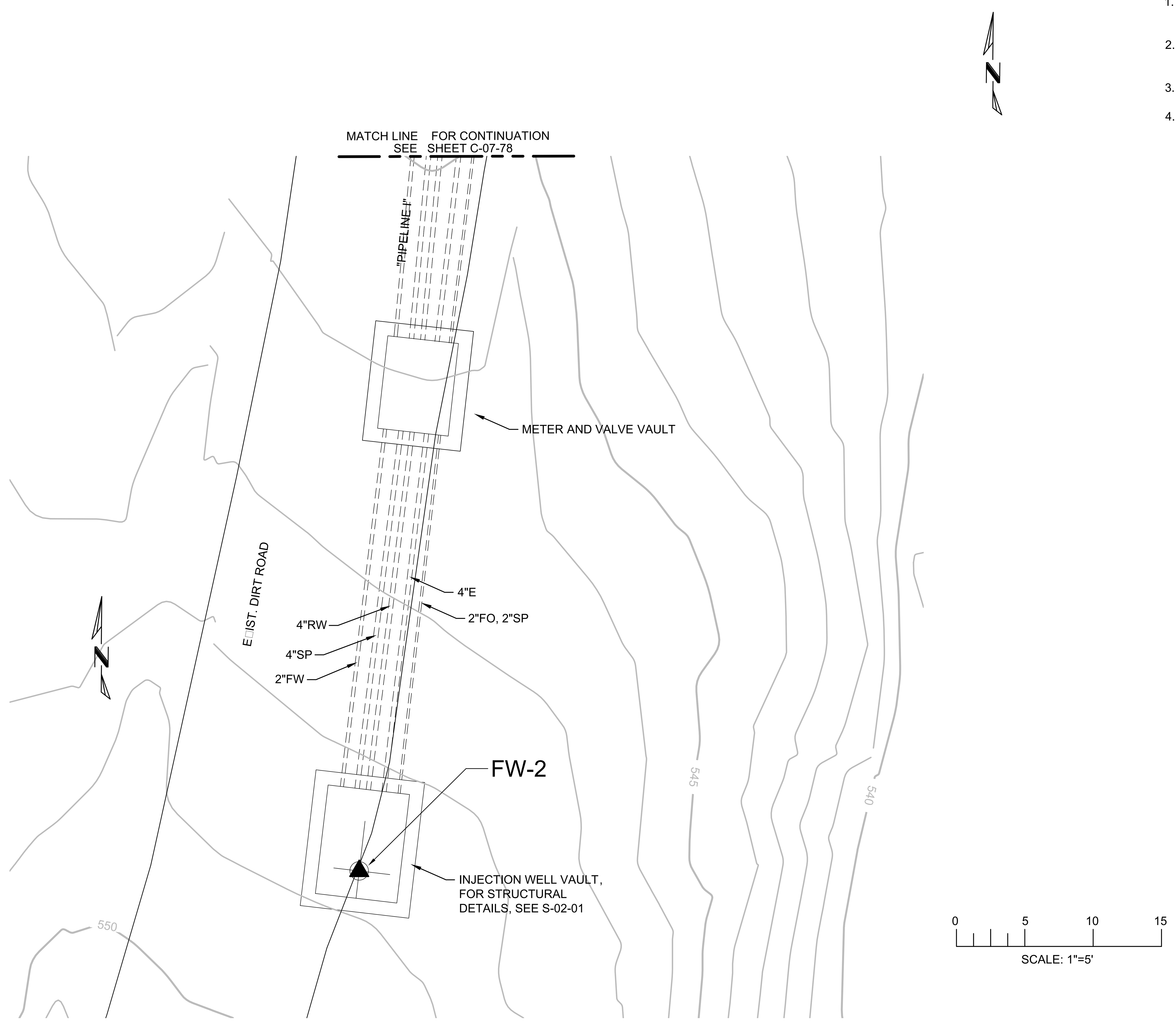
C: John Earle, Fish & Wildlife Service
Jerry Smit, Arizona Department of Environmental Quality

Attachment C: RTCs #19, #104, #817, #821, and #827-833

Revised Design of Northern and Southern Bat Cave Wash Crossings

NOTES:

1. FOR STANDARD PLANS OF WELL VAULT AND METER VAULT, SEE DWG S-02-01.
2. FOR MECHANICAL PLANS OF WELL VAULT AND METER VAULT, SEE DWG M-02-01.
3. FOR PLC PANEL, SEE DWG E-02-01.
4. FOR STRUCTURAL PLANS OF VALVE BO□, SEE DWG S-02-□□



A FW-2 WELL VAULT SITE PLAN
1" = 5'
C-07-78

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING | ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
1	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	PT	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		PC/EE	PT	PT	VMB

REVISIONS

APPROVED BY ...

SO	
SUPV	VMB
DSGN	PT
DWN	PH
CHKD	VMB
OK	VMB
DATE	09/08/14
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

FRESHWATER INJECTION WELL FW-2 - SITE PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

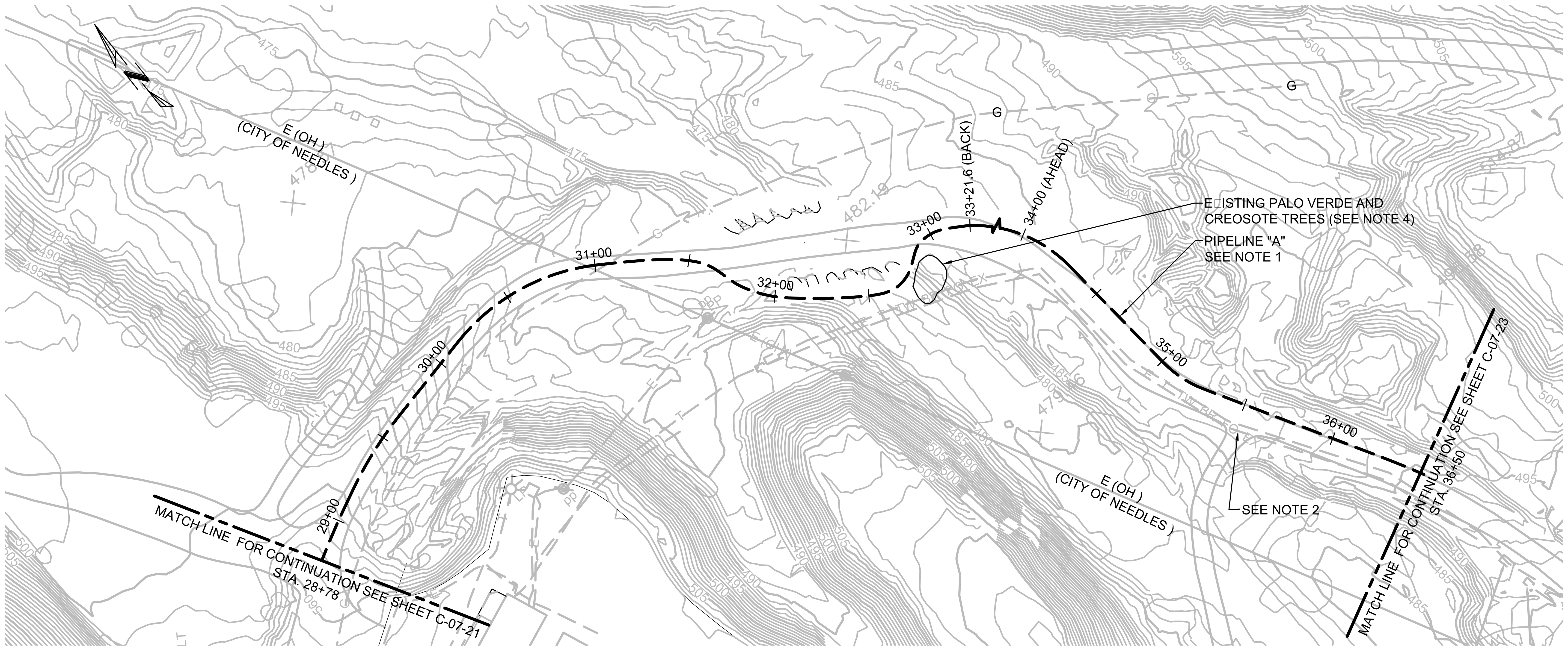
MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
C-02-02 REV 1

08/04/2015, 19:29, G:□Gr□□□□AR□TOPOCK-01 S□□□100% DWG□C-C□□C-02-02.DWG, T□□: C-02-02

H1808

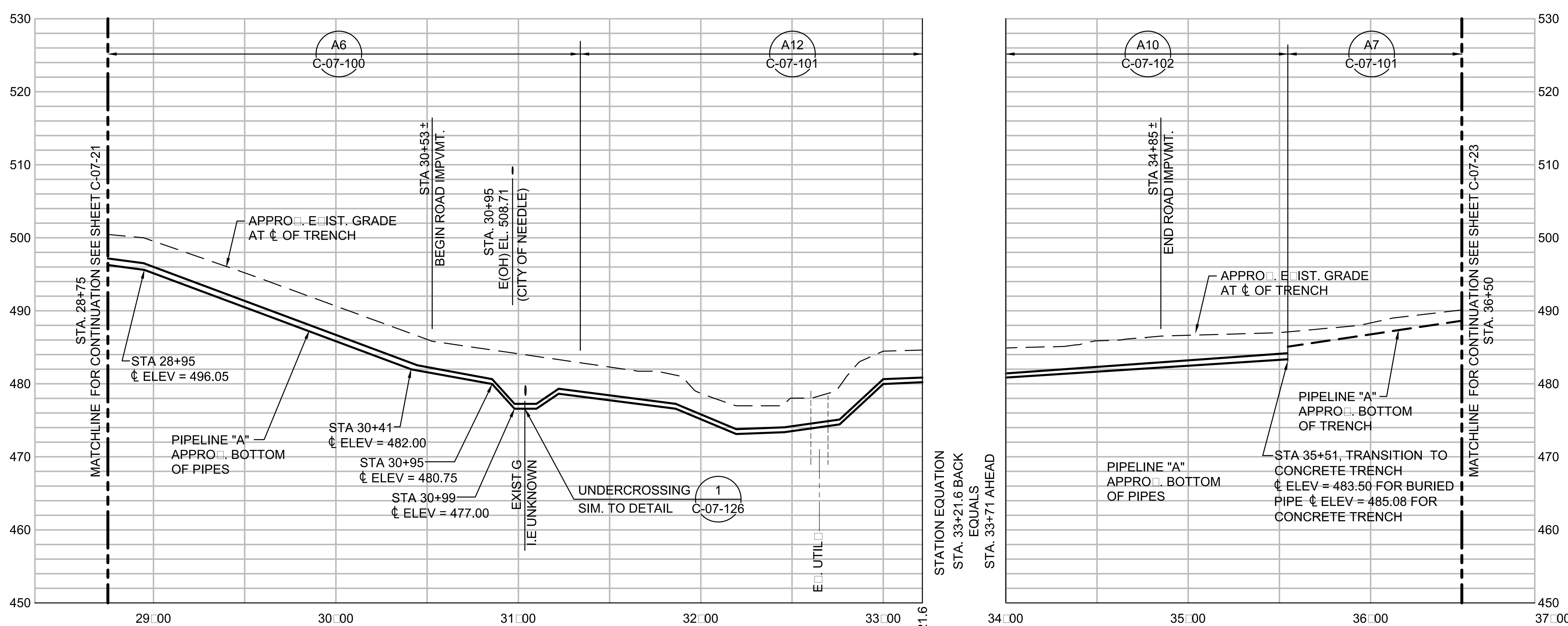
NOTES:

1. THE NEW PIPELINE ALIGNMENT SHOWS CENTER OF TRENCH.
2. PROVIDE VEHICLE ACCESS AT OWNER'S DIRECTION.
3. MAINTAIN 3' MINIMUM HORIZONTAL CLEARANCE FROM EXISTING IM-3 PIPING (E, T, TW, BR & FO)
4. EXCAVATION SHALL AVOID SOIL DISTURBANCE WITHIN DRIP LINE OF MATURE VEGETATION.



PIPELINE "A" - PLAN

(SCALE: 1" = 40' H)



PIPELINE "A" - PROFILE

(SCALE: 1" = 40' H 1" = 10' V)

0 40 80 120

HORZ: SCALE: 1"=40'

0 10 20 30

VERT: SCALE: 1"=10'

- DRAFT -
NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
4	8/5/15	90% RTC RESOLUTION		AJW	KLD	JPB	JEF
3	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		WTH	PT	PT	VMB
2	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	PT	VMB
1	4/5/13	INTERMEDIATE (60%) DESIGN		PC/EE	PT	PT	VMB
0	11/18/11	PRELIMINARY (30%) DESIGN		PC	PT	PT	VMB

REVISIONS

APPROVED BY: JEF

SO	
SUPV	JPB
DSGN	KLD
DWN	AJW
CHKD	JPB
OK	JEF
DATE	8/5/15
SCALES	

ETIC ENGINEERING

ARCADIS

TOPOCK GROUNDWATER REMEDIATION PROJECT

PLAN AND PROFILE
PIPELINE "C"
STA 28+75 TO STA 36+50

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
C-07-22 REV 4

08/04/2015, 19:49, G:\Gr...\AR TOPOCK-01 S...100% DWG\C-C...\C-07-22.dwg

N1806

NOTES
1. VAULT DETAILS SHOWN ON SHEETS M-□-□ AND S-□-□.
2. SEE CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEETS E-00-12 THRU E-00-20.
3. CLEANOUT LOCATIONS PROVIDE CLEANOUT PIPING FOR ALL INJECTION, EXTRACTION, BACKWASH, AND REMEDY-PRODUCED WATER LINES AT INDICATED LOCATIONS (SEE DETAIL C-07-111).

PIPELINE "I" - PLAN

(SCALE: 1" = 20')

PIPELINE "I" - PROFILE

(SCALE: 1" = 20' H, 1" = 10' V)

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY: SO / SUPV / DSGN / DWN / CHKD / OK / DATE 8/5/15 / SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

BATCAVE WASH-
PLAN AND PROFILE - PIPELINE "I"
STA 10+00 TO STA 16+00

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
C-07-78 REV 0

H1808

PIPELINE "I" - PLAN

(SCALE: 1" = 20')

PIPELINE "I" - PROFILE

(SCALE: 1" = 20' H 1" = 10' V)

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW	

REVISIONS

APPROVED BY	
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	8/5/15
SCALES	

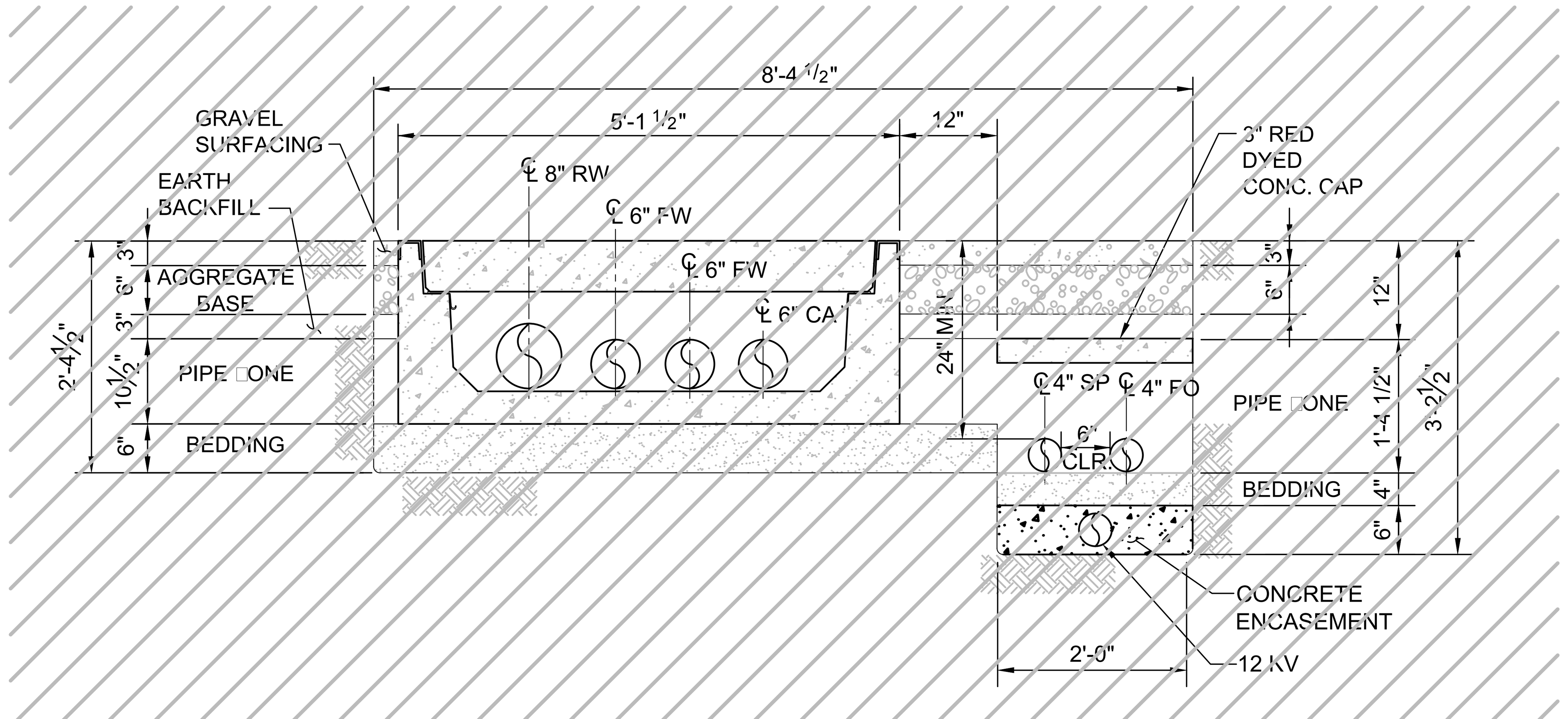
TOPOCK GROUNDWATER REMEDIATION PROJECT

BATCAVE WASH- PLAN AND PROFILE - PIPELINE "I" STA 16+00 TO STA 22+09

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

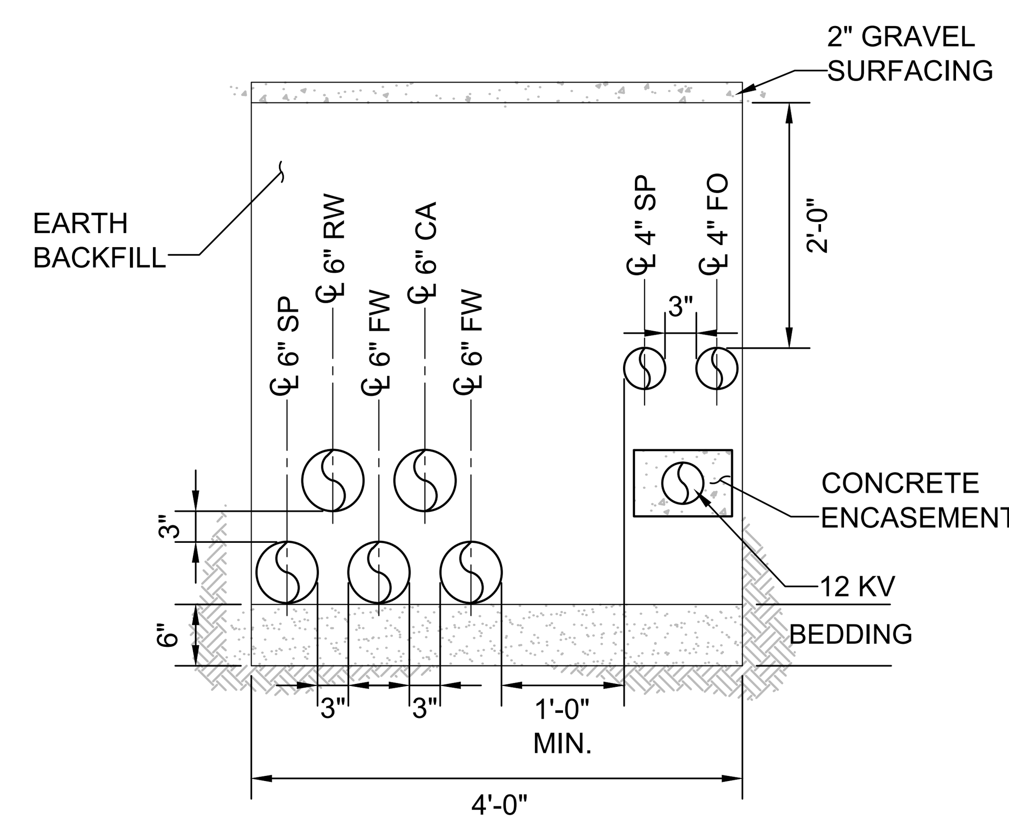
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-07-78A	REV 0

08/04/2015, 2019, 100% DWG, C-07-78A



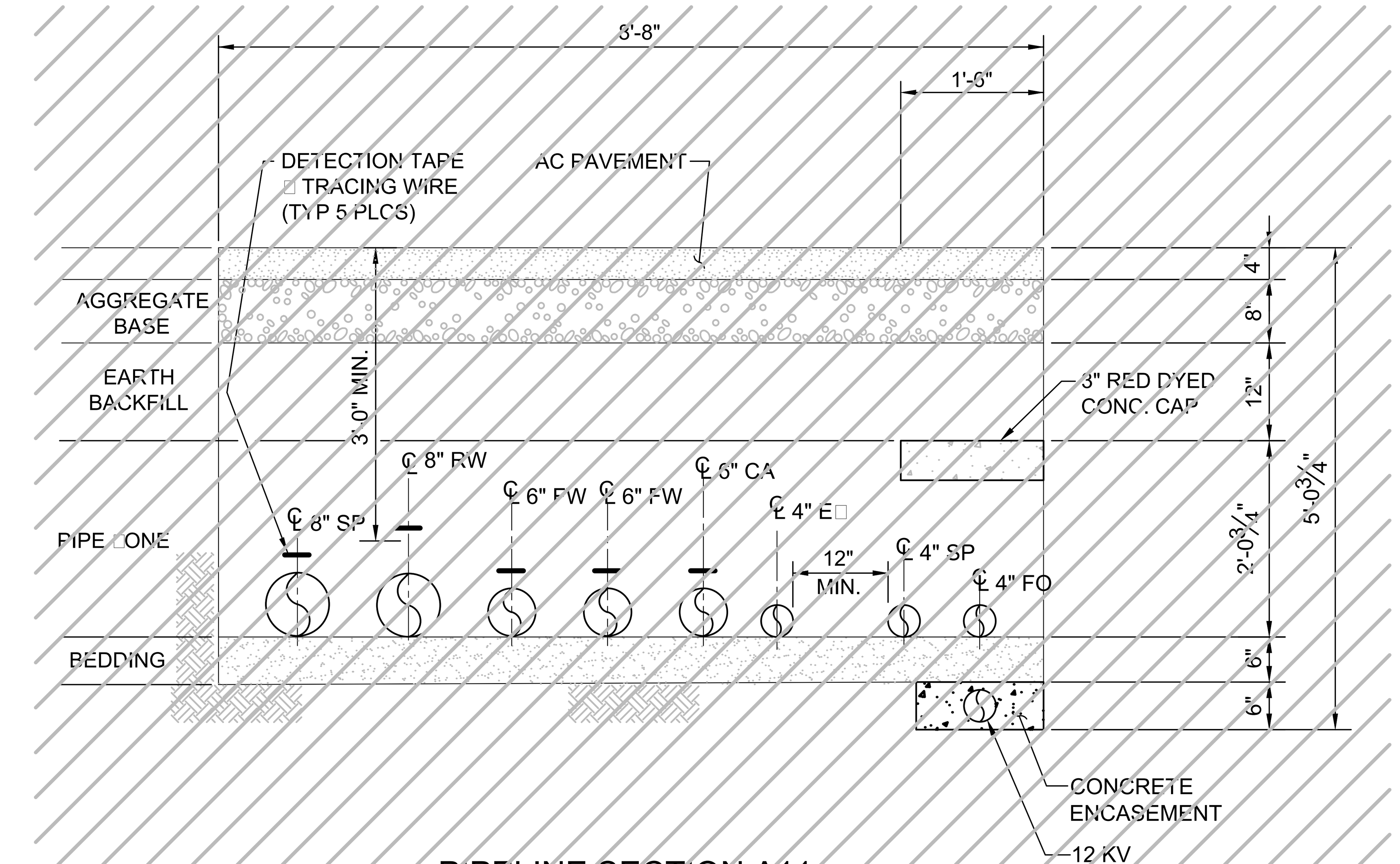
PIPELINE SECTION A7

A7 SECTION
3/4" = 1'-0"
C-07-22
C-07-23



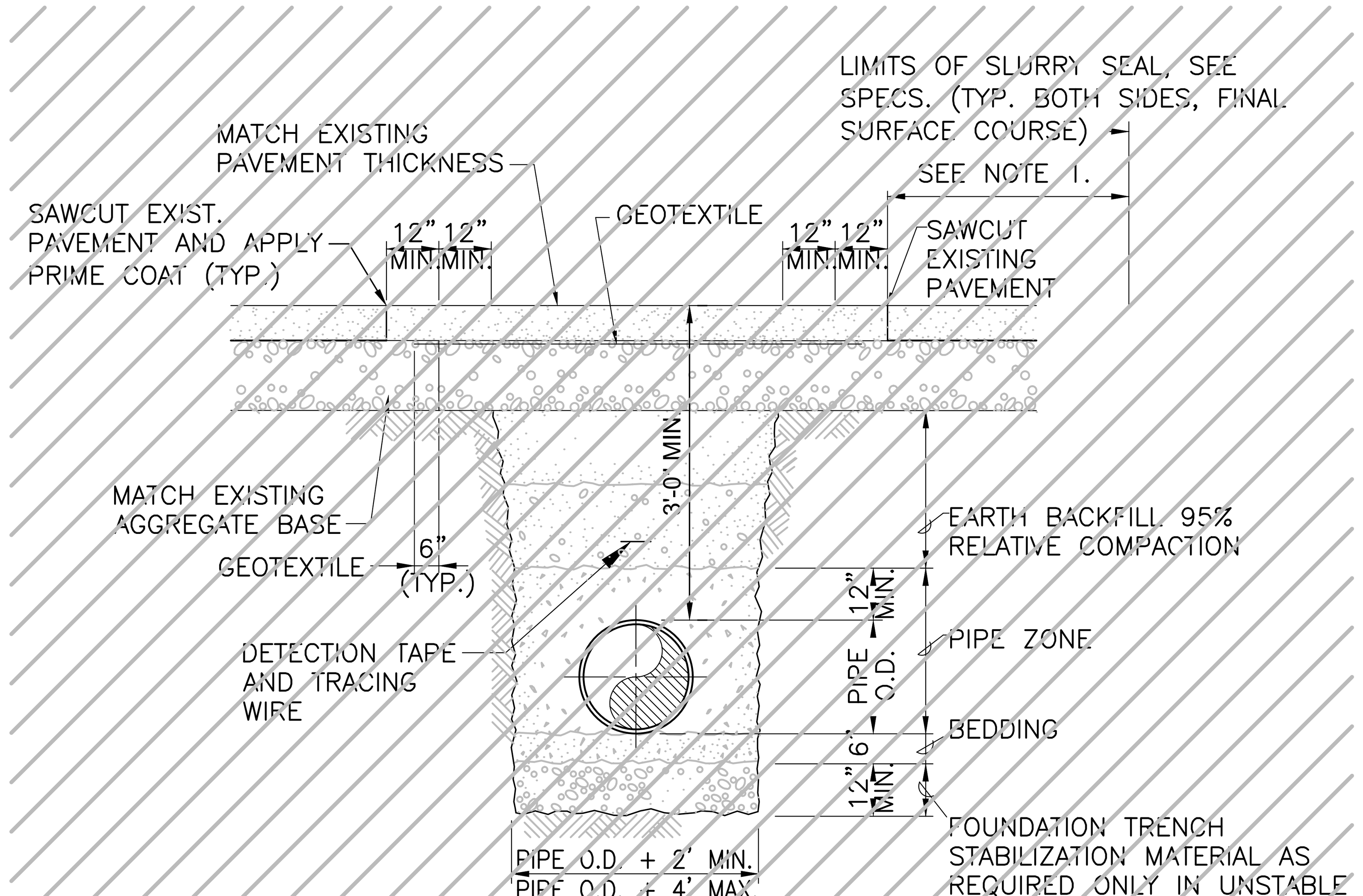
PIPELINE SECTION A12

A12 SECTION
3/4" = 1'-0"
C-07-22



PIPELINE SECTION A11

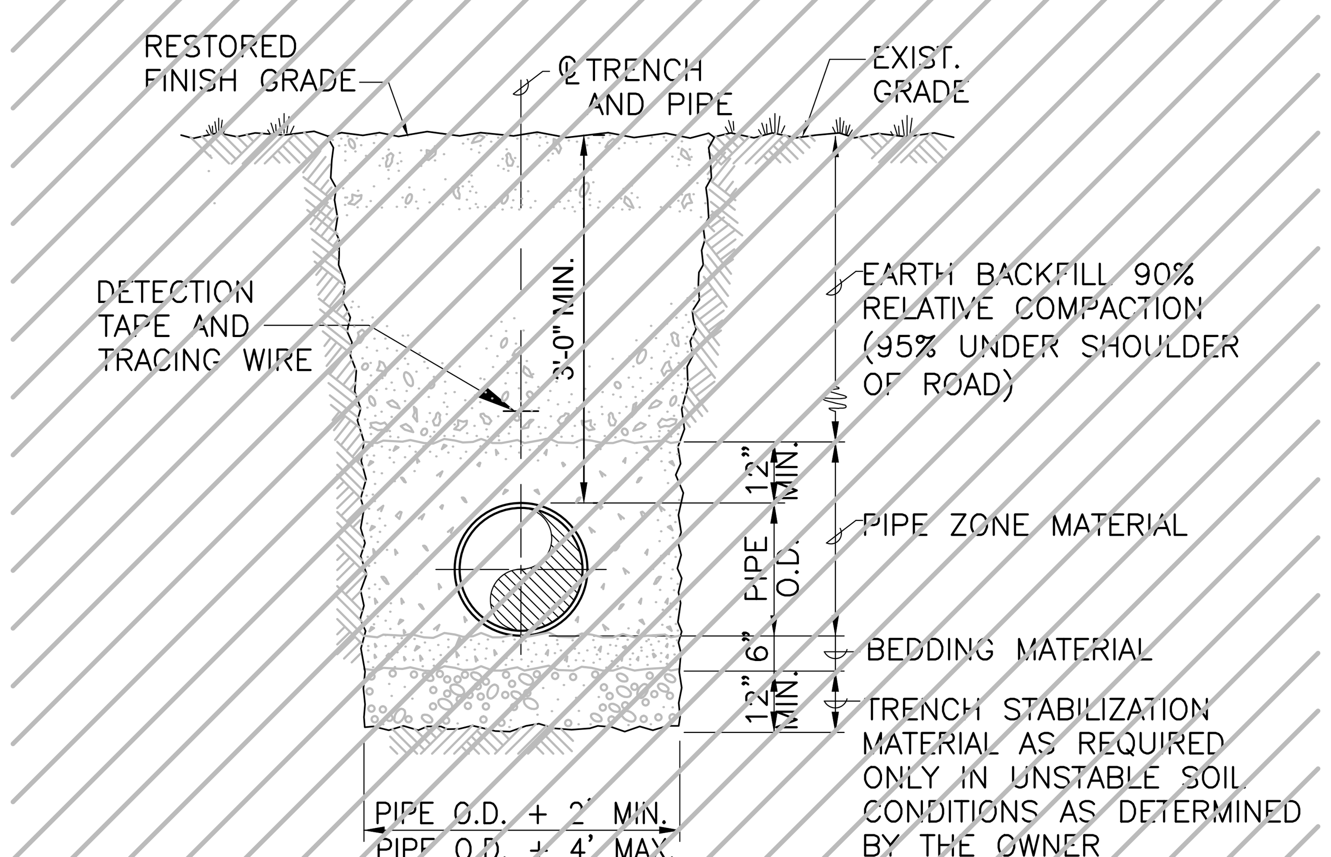
A11 SECTION (PAVED ROAD)
3/4" = 1'-0"
C-07-24



NOTES:

1. ABOVE MIN. APPLIES TO TRENCH TRANSVERSE TO STREET

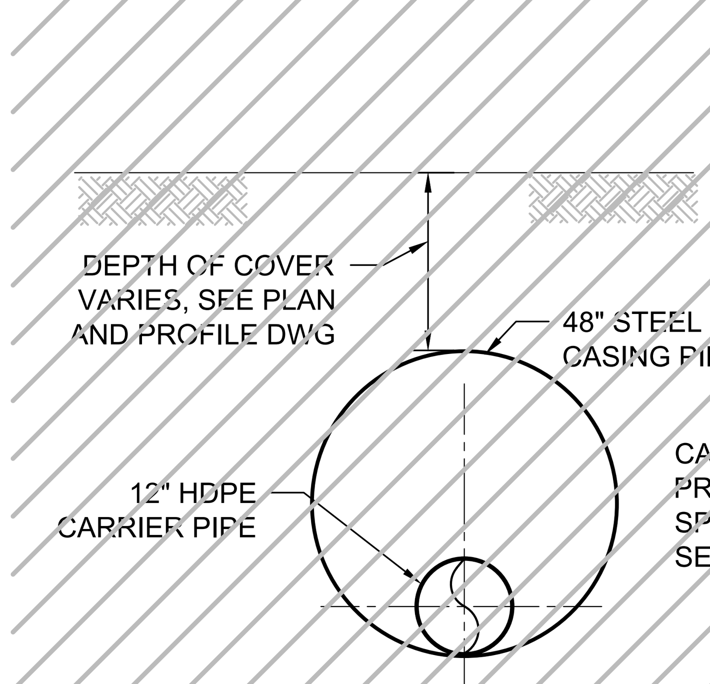
B4 SECTION (IN PAVEMENT)
3/4" = 1'-0"
C-07-30
C-07-31



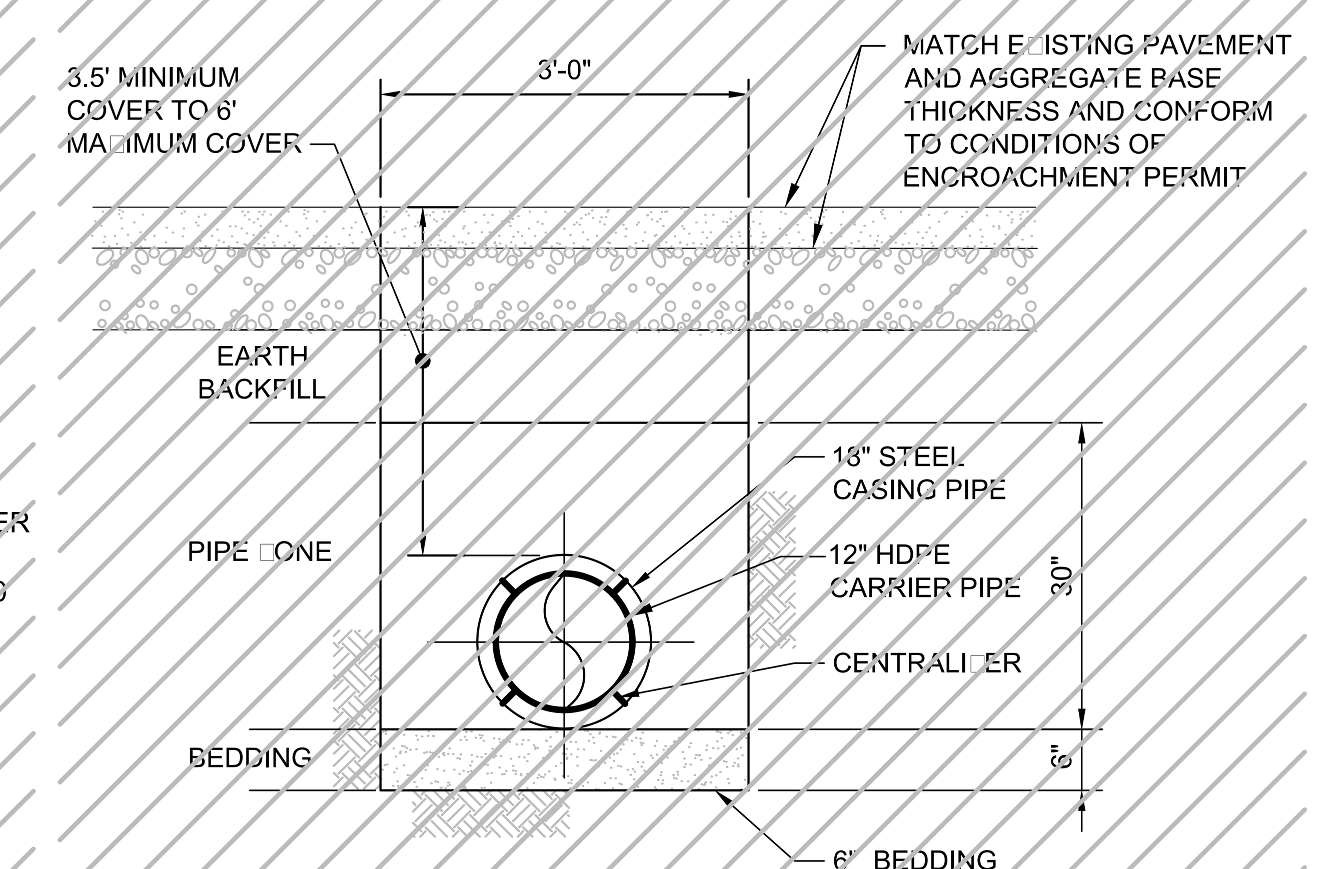
NOTES:

1. IN NON-ROAD AREAS, RESTORE TO MATCH ORIGINAL CONDITION. RESEEDING IS NOT A REQUIREMENT.

B4 SECTION (ROAD SHOULDER OR OPEN FIELD)
3/4" = 1'-0"
C-07-30
C-07-31
C-07-32
C-07-33
C-07-34
C-07-35
C-07-36
C-07-37



B5 SECTION
3/4" = 1'-0"
C-07-30



B6 SECTION
3/4" = 1'-0"
C-07-30

NOTE:

1. REFER TO C-07-03 FOR LOCATION OF EACH PIPELINE SECTION.

90% RESPONSE TO COMMENTS NOTES:

HATCHED SELECTIONS NOT UPDATED FOR THIS SUBMITTAL. TO BE UPDATED FOR 100% SUBMITTAL.

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING
ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		MD	PT	VMB	VMB
1	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	VMB	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		PC	PT	VMB	VMB

REVISIONS

APPROVED BY		
VMB	SO	
	SUPV	VMB
	DSGN	PT
	DWN	PC
	CHKD	VMB
	OK	VMB
	DATE	09/08/14
	SCALES	3/4"=1'-0"

TOPOCK GROUNDWATER REMEDIATION PROJECT

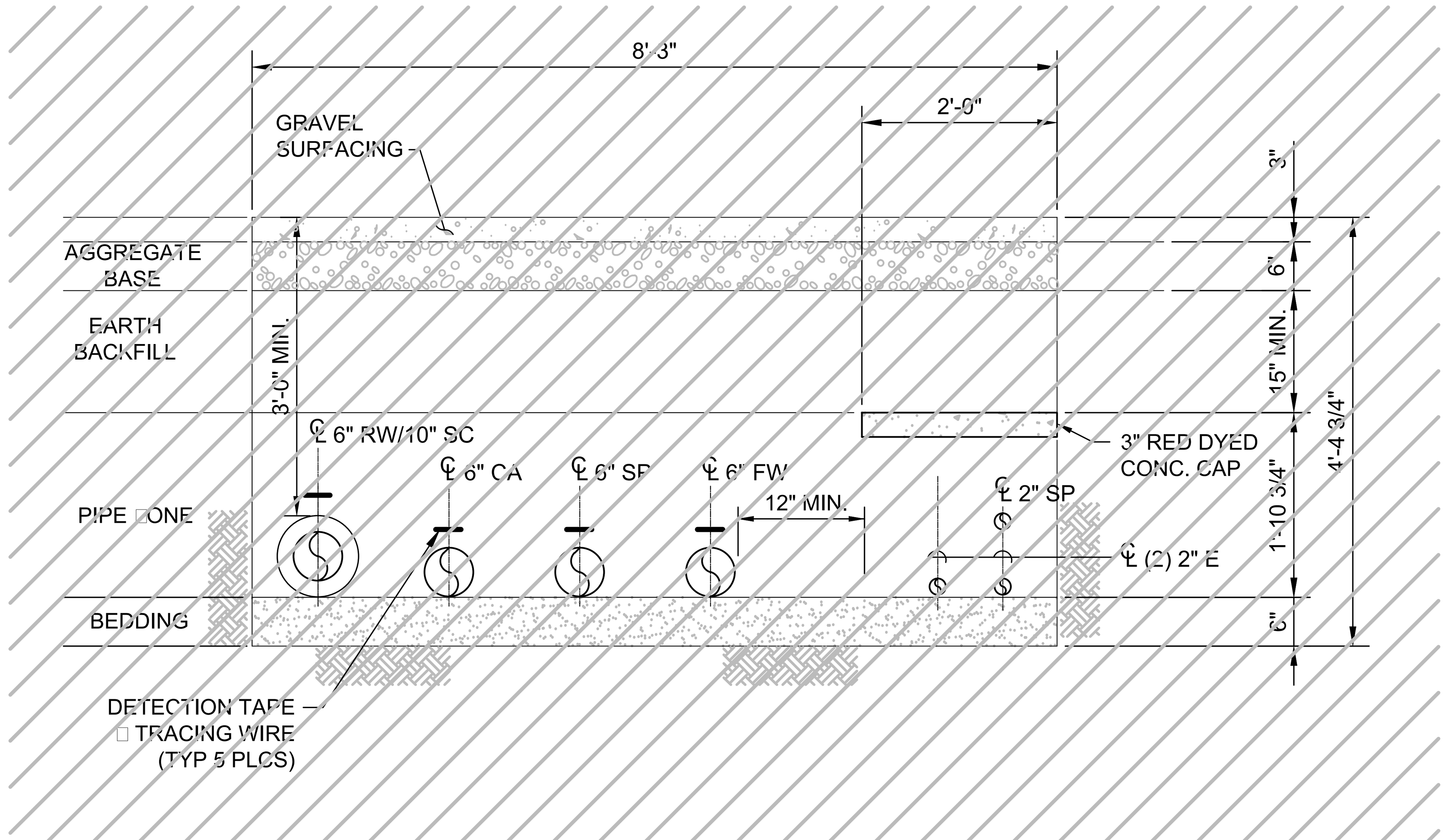
TRENCH SECTIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

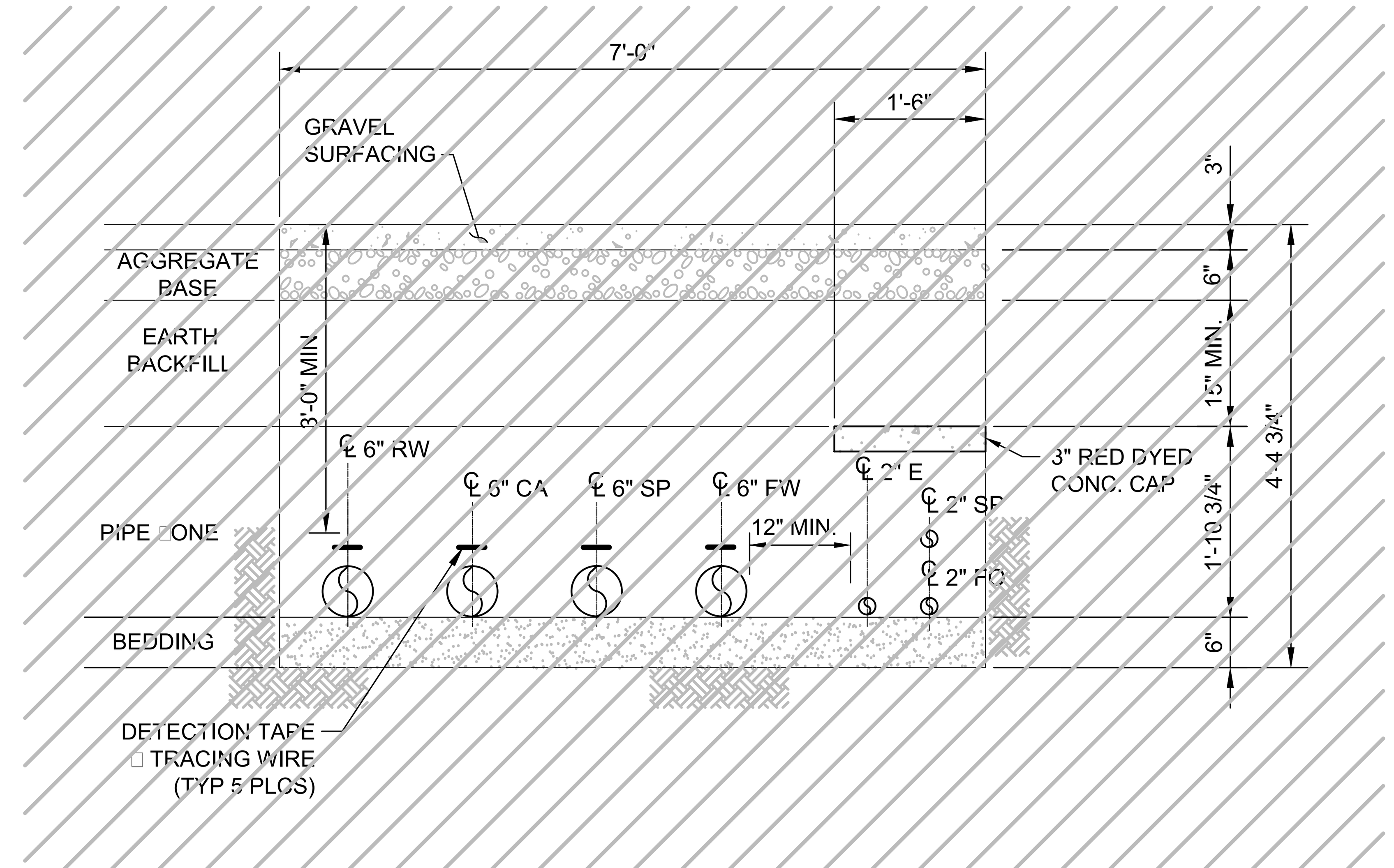
MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
C-07-101 REV 3

N1808

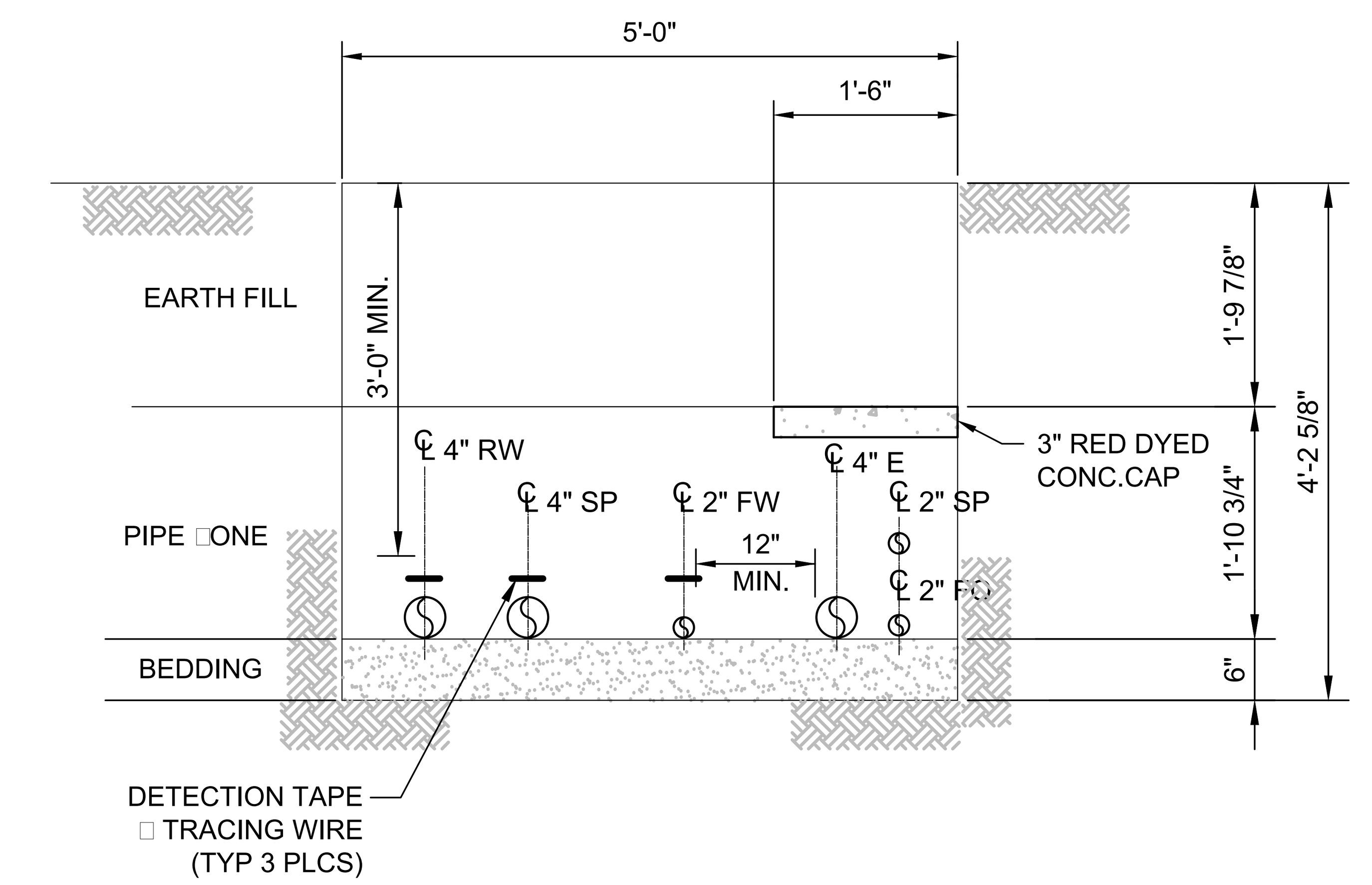
08/05/2015, 11:00, C-07-101.DWG



H1 SECTION
3/4" = 1'-0"
C-07-25

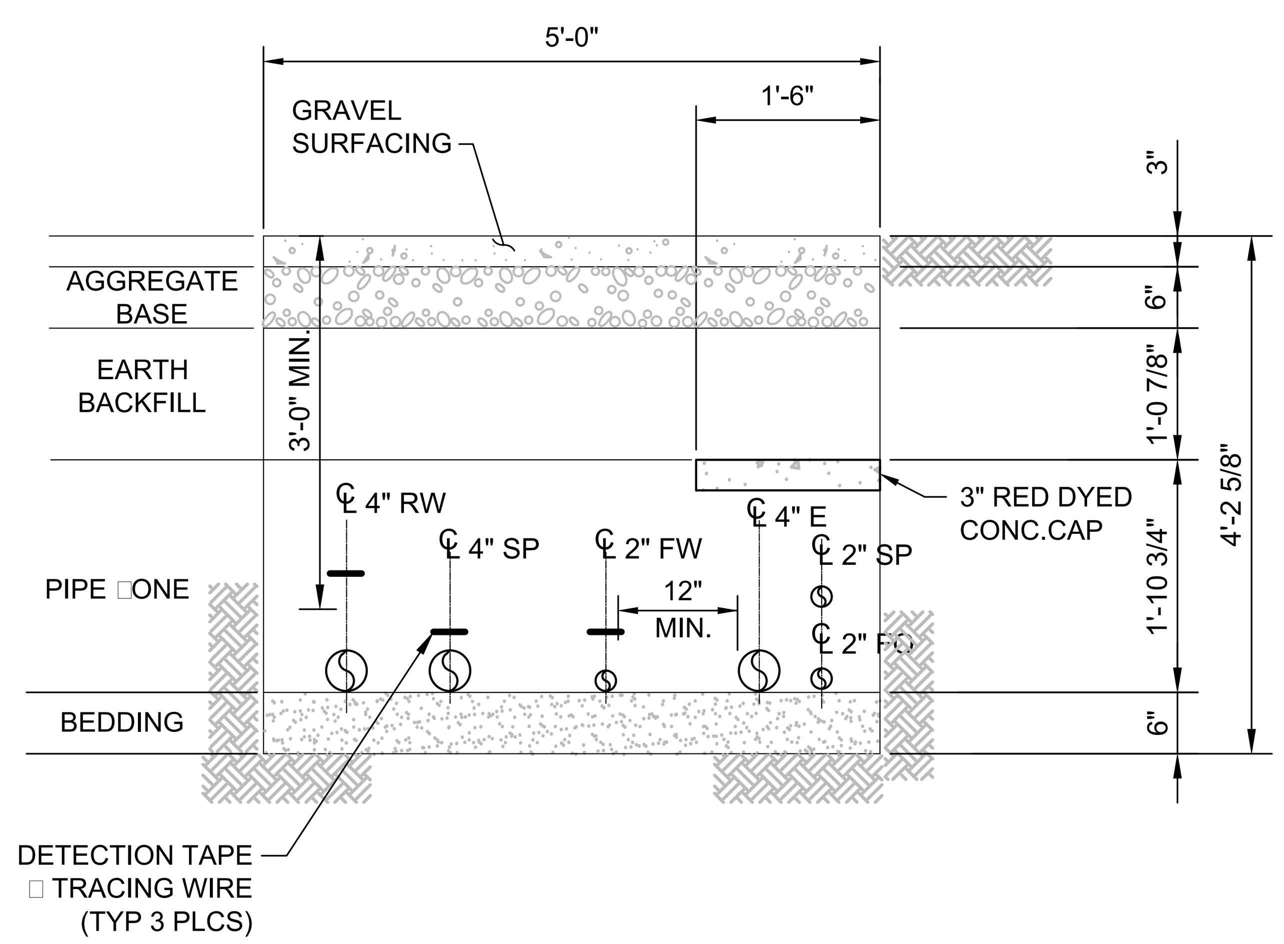


H2 SECTION
3/4" = 1'-0"
C-07-25



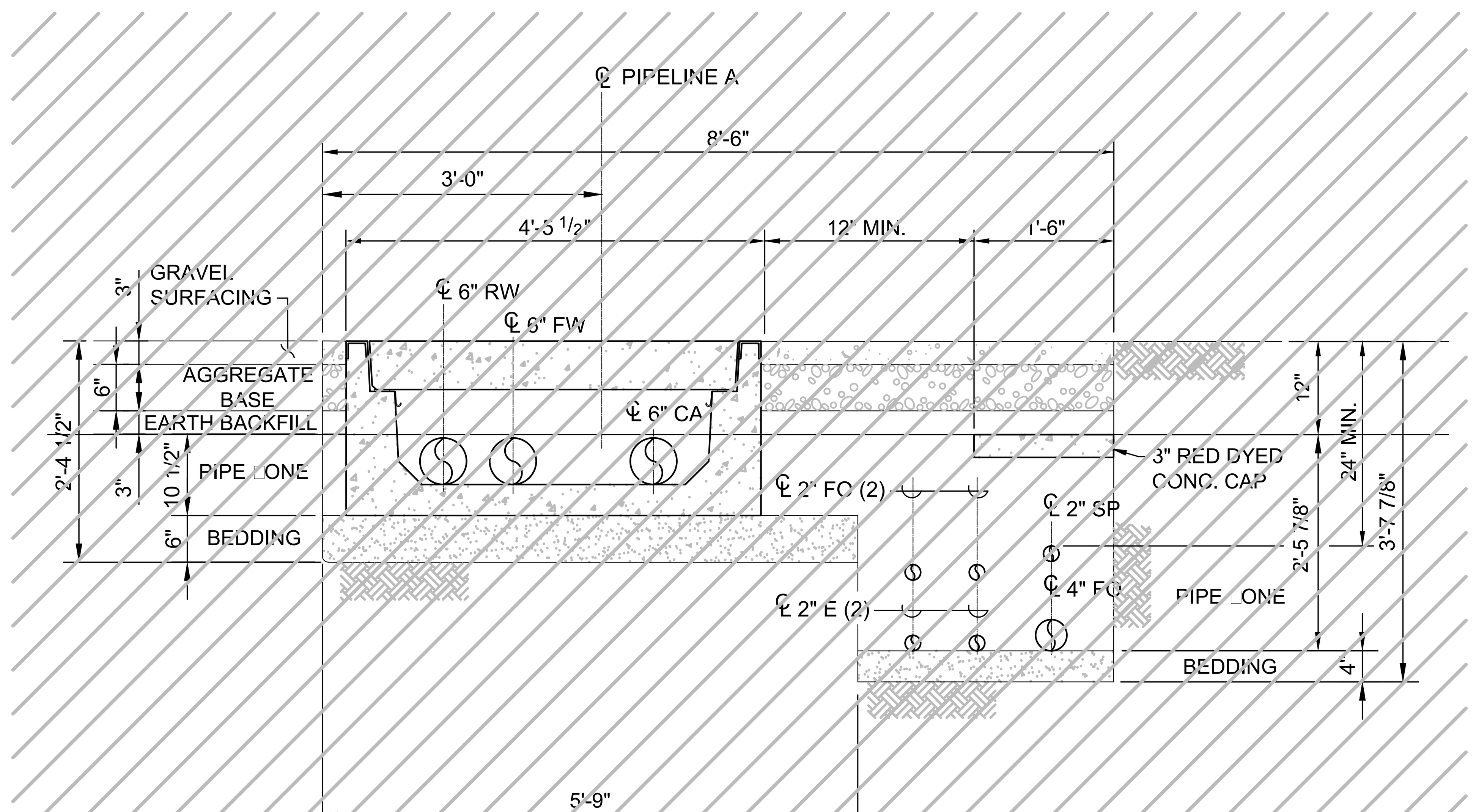
PIPELINE SECTION I1, I3

I1 SECTION (OPEN FIELD)
3/4" = 1'-0"
C-07-79



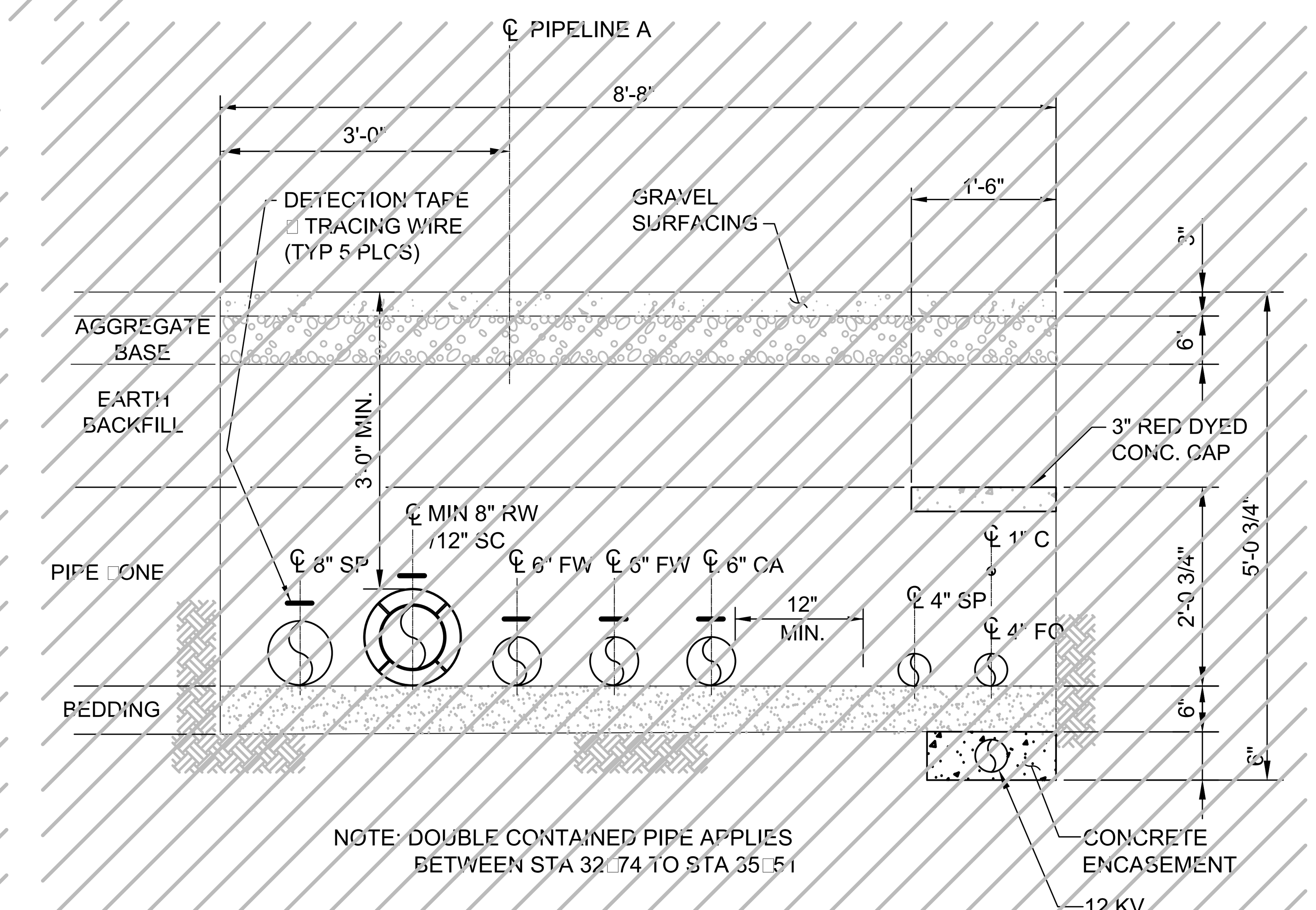
PIPELINE SECTION I1, I3

I1 SECTION (GRAVEL ROAD)
3/4" = 1'-0"
C-07-79



PIPELINE SECTION A8

A8 SECTION
3/4" = 1'-0"
C-07-20
C-07-21



PIPELINE SECTION A10

A10 SECTION
3/4" = 1'-0"
C-07-22
C-07-23

90% RESPONSE TO COMMENTS NOTES:

HATCHED SELECTIONS NOT UPDATED FOR THIS SUBMITTAL. TO BE UPDATED FOR 100% SUBMITTAL.

NOTE:

1. REFER TO C-07-03 FOR LOCATION OF EACH PIPELINE SECTION.

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		MD	PT	VMB	VMB
1	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	VMB	VMB
0	4/5/13	INTERMEDIATE (30%) DESIGN		PC	PT	VMB	VMB

REVISIONS

APPROVED BY	
SO	
SUPV	VMB
DSGN	PT
DWN	PC
CHKD	VMB
OK	VMB
DATE	12/30/14
SCALES	3/4"=1'-0"

TOPOCK GROUNDWATER REMEDIATION PROJECT

PIPELINE SECTIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
C-07-102 REV 3

Attachment D: RTC #72, #995

Construction Sequencing Details

<table>
<tr><th>Year</th><th>2015</th><th colspan="4">2016</th><th colspan="4">2017</th><th colspan="4">2018</th><th colspan="4">2019</th><th colspan="4">2020</th><th colspan="4">2021</th></tr>
<tr><th>Quarter</th><th>4</th><th>1</th><th>2</th><th>3</th><th>4</th><th>1</th><th>2</th><th>3</th><th>4</th><th>1</th><th>2</th><th>3</th><th>4</th><th>1</th><th>2</th><th>3</th><th>4</th><th>1</th><th>2</th><th>3</th><th>4</th><th>1</th><th>2</th><th>3</th><th>4</th></tr>
<tr><td>Current Sequence</td><td>100% Design Complete</td><td colspan="5">Complete SEIR and Outreach/Public Participation Activities</td><td colspan="11">Pre-Construction and System Construction</td><td colspan="4">Shutdown IM-3 and Start-up NTH IRZ</td><td colspan="2">Start-up Freshwater Wells</td><td colspan="2">Start-up Riverbank IRL and TCS/East Ravine Systems</td></tr>
<tr><td>Alternate Sequence</td><td>100% Design Complete</td><td colspan="5">Complete SEIR and Outreach/Public Participation Activities</td><td colspan="7">Pre-Construction and NTH IRZ System Construction</td><td colspan="4">Shutdown IM-3 and Start-up NTH IRZ</td><td colspan="4">Complete Construction of Remaining Systems and Incorporate Data</td><td colspan="2">Start-up Freshwater Wells</td><td colspan="2">Start-up Riverbank IRL and TCS/East Ravine Systems</td></tr>
<tr><td>Quarter</td><td>4</td><td>1</td><td>2</td><td>3</td><td>4</td><td>1</td><td>2</td><td>3</td><td>4</td><td>1</td><td>2</td><td>3</td><td>4</td><td>1</td><td>2</td><td>3</td><td>4</td><td>1</td><td>2</td><td>3</td><td>4</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Year</td><td>2015</td><td colspan="4">2016</td><td colspan="4">2017</td><td colspan="4">2018</td><td colspan="4">2019</td><td colspan="4">2020</td><td colspan="4">2021</td></tr>
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PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

PROPOSED ALTERNATE FINAL GROUNDWATER REMEDY CONSTRUCTION SEQUENCE SCHEDULE

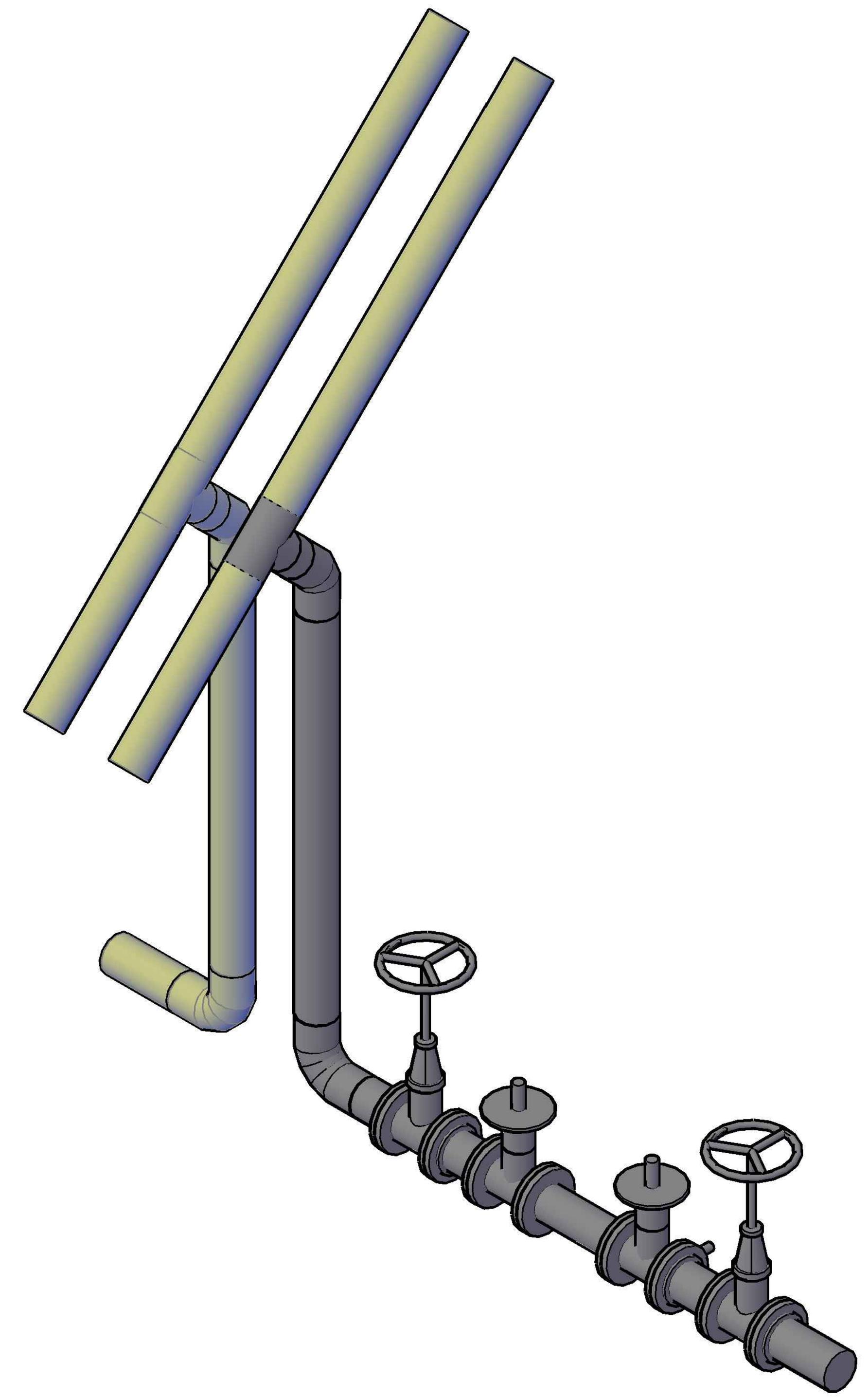
ARCADIS
Infrastructure · Water · Environment · Buildings

FIGURE
1

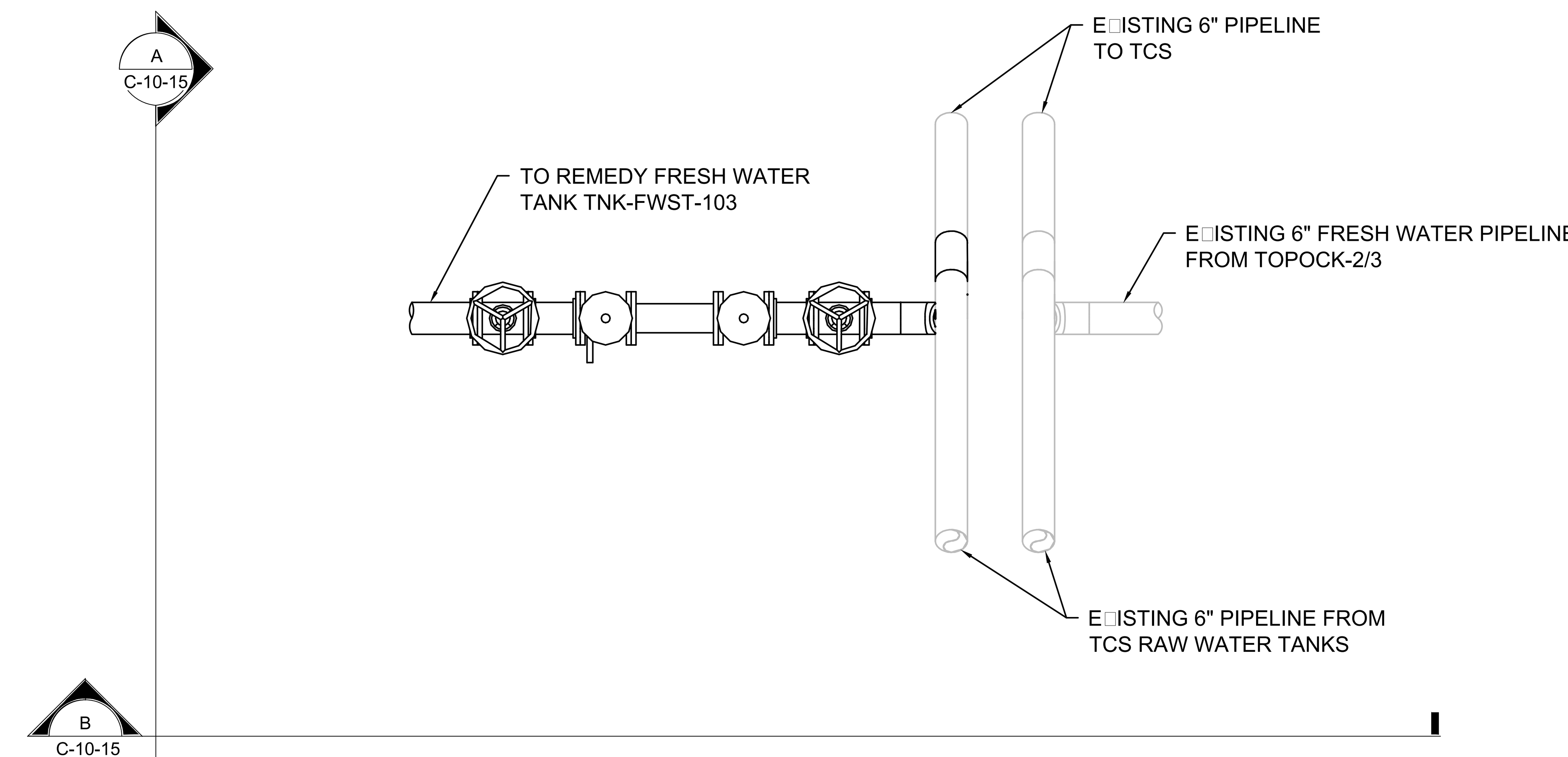
Attachment E: RTCs #135, #267, #300

Details on Tie-in of Topock-2/3 Wells

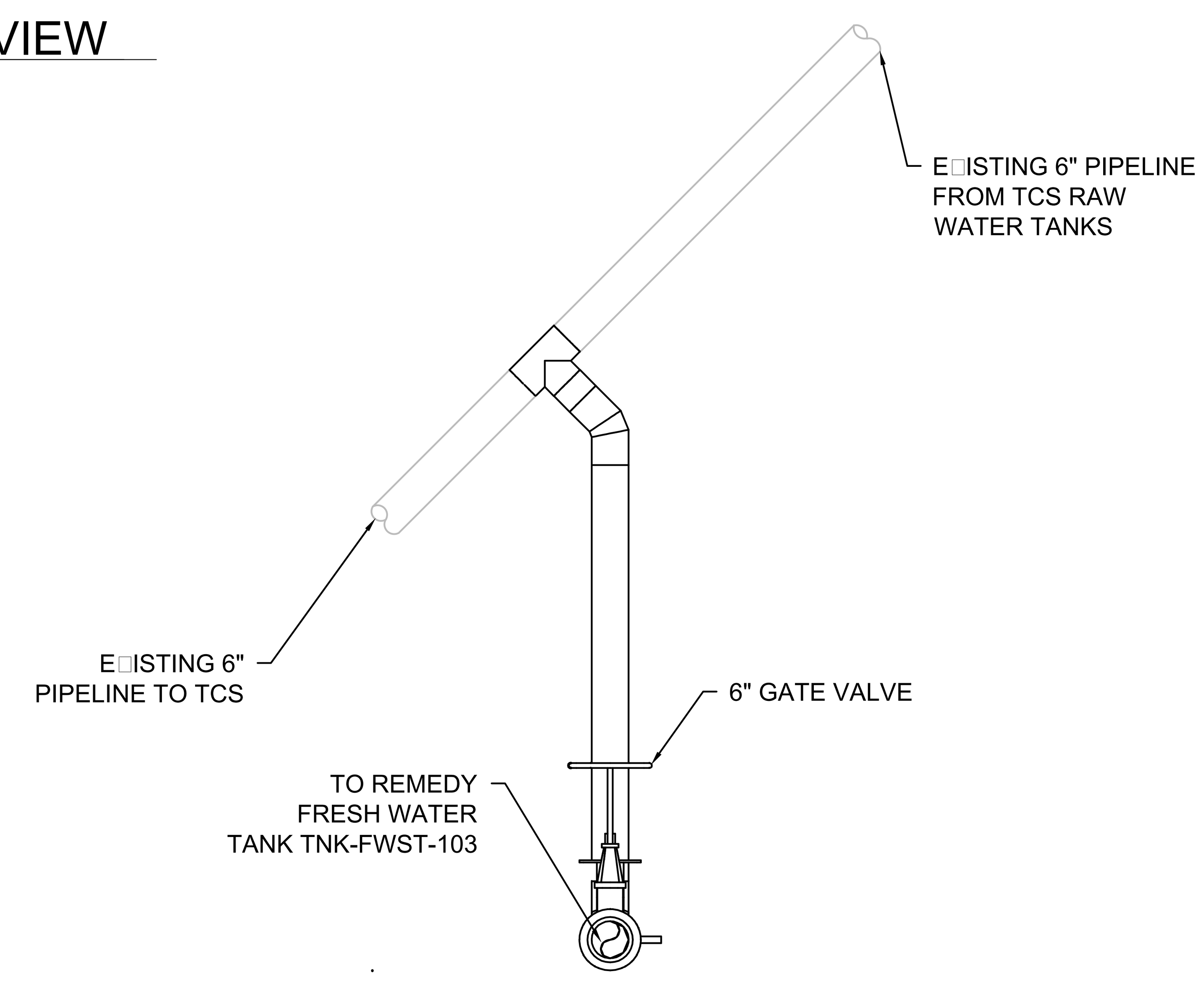
The final design will address DTSC's comment and will include the design of the piping from the gate valves to the remedy fresh water tank in both map and section view.



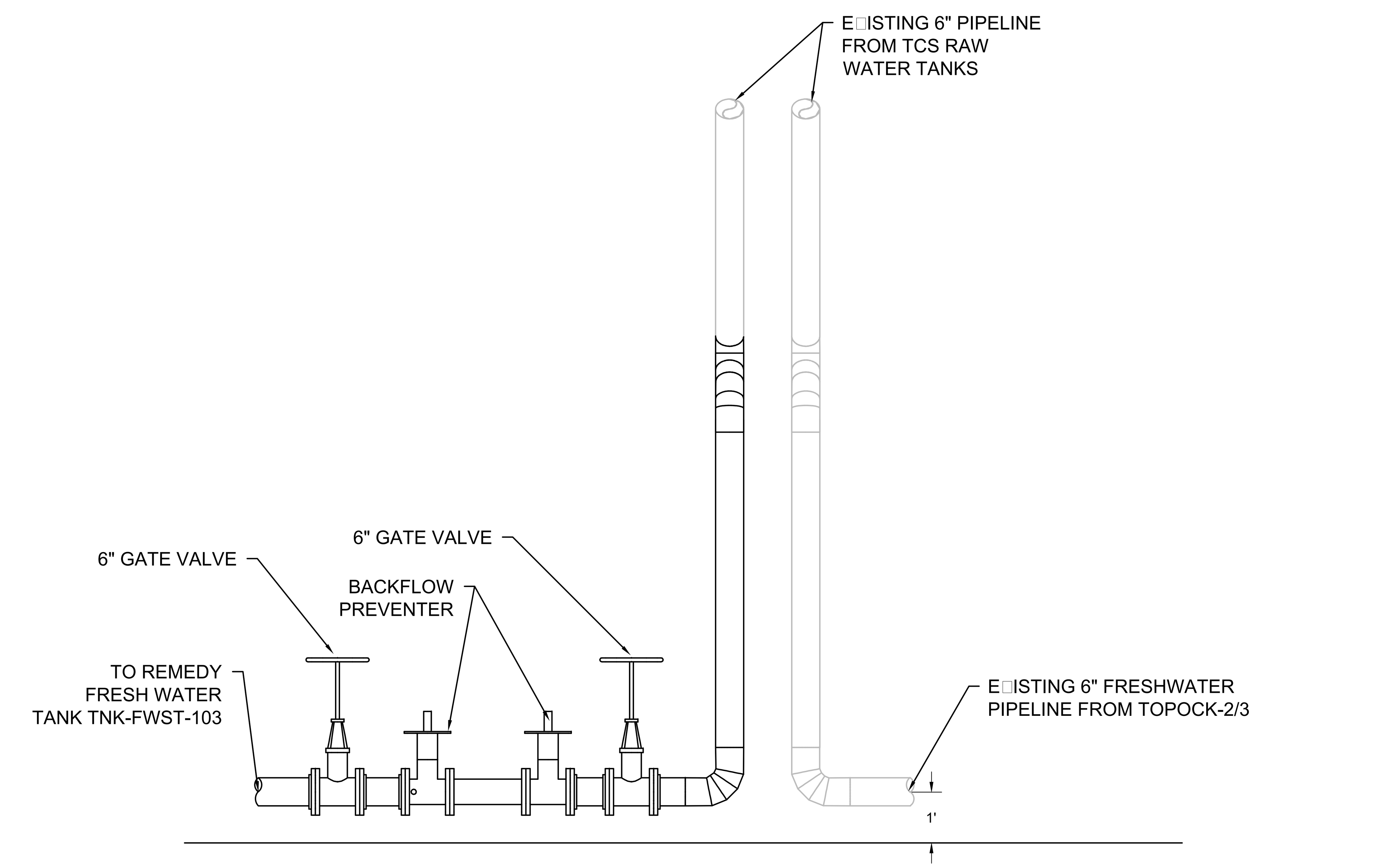
1 PIPING ISOMETRIC VIEW
1/2" = 1'-0"
C-10-11



2 TCS FRESH WATER PIPING TIE-IN PLAN
1/2" = 1'-0"
C-10-15



A SECTION
1/2" = 1'-0"
C-10-15



B SECTION
1/2" = 1'-0"
C-10-15

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY		
	SO	
	SUPV	VMB
	DSGN	PT
	DWN	PH
	CHKD	VMB
	OK	VMB
	DATE	8/5/15
	SCALES	1"=5'-0"

TOPOCK GROUNDWATER REMEDIATION PROJECT

FRESHWATER TIE-IN TO
TOPOCK-2/3 AT TCS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

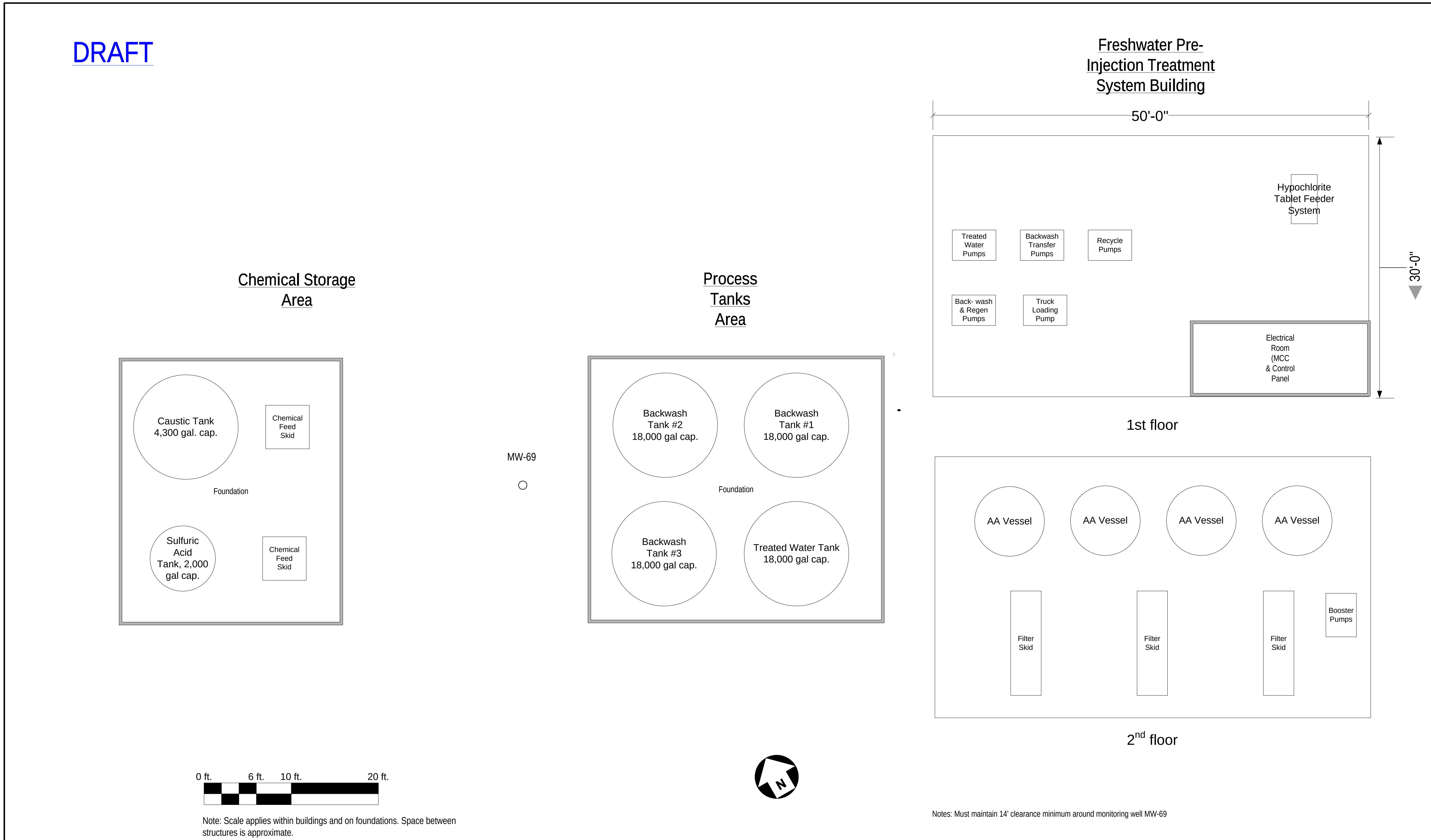
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	REV
C-10-15	0

08/05/2015, 14:10, G:□Gr□□□□AR□TOPOCK-01□S□□□ □□□□100% DWG□C-C□□□C-10-15.d□□, T□□: C-10-15

H1806

Attachment F: RTC #140

Figure 3 of 60% BOD Appendix M and Figure 5 of 90% BOD Appendix M



CH2MHILL

DSGN	ODELL
DR	ODELL
CHK	MARTINEZ
APVD	PORCELLA

NO.	DATE	REVISION	BY	APVD

REUSE OF DOCUMENTS

GROUNDWATER REMEDY PROJECT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CA

GENERAL

FRESHWATER PRE-INJECTION TREATMENT SYSTEM - REGENERABLE ACTIVATED ALUMINA LAYOUT

SHEET
DWG NO.
DATE 4/2/2013 11:43
REV

FEBRUARY 22, 2013 04:47

FIGURE 3
Equipment Layout

60% BOD, Appendix M

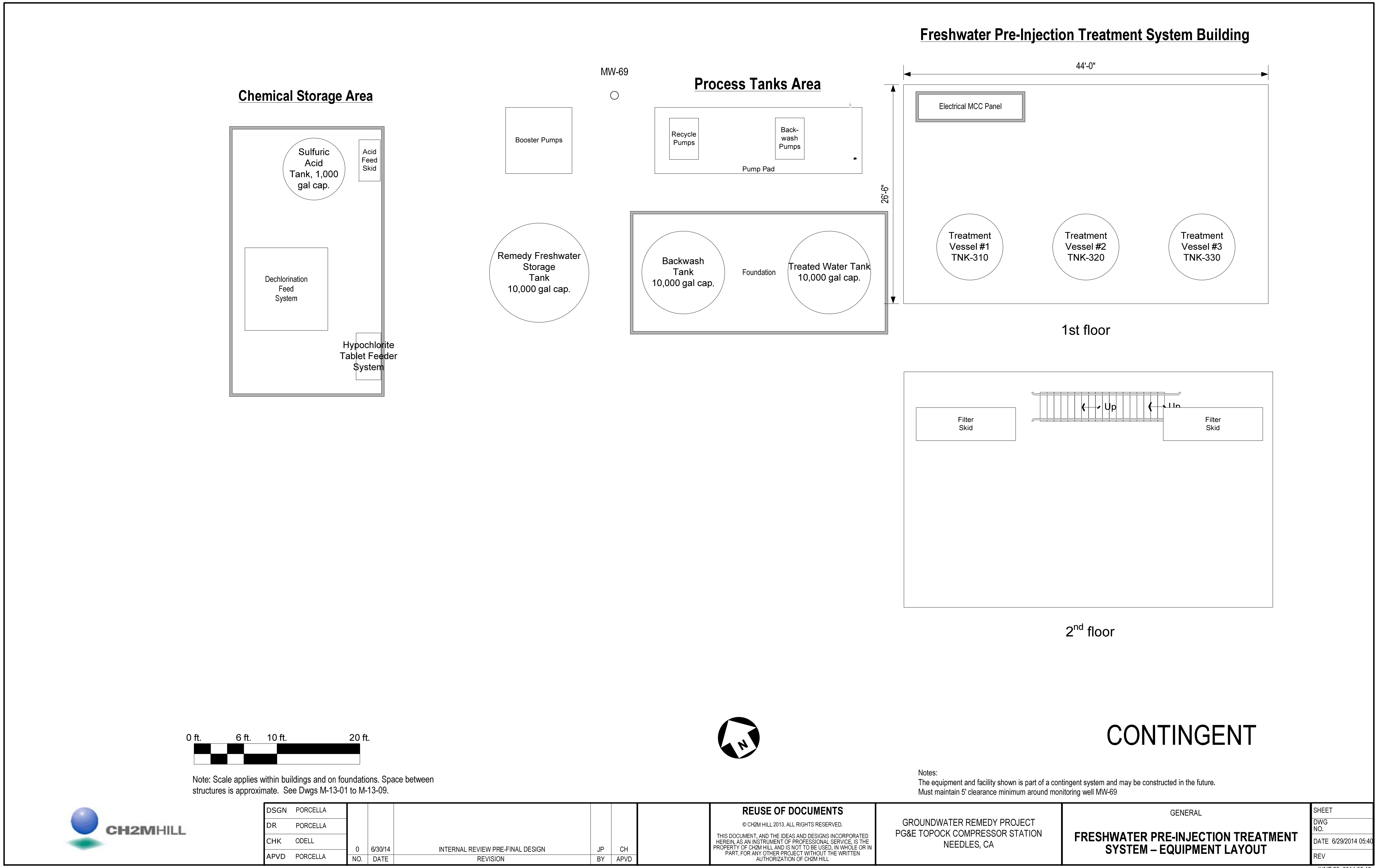


FIGURE 5
Equipment Layout
Addendum to Freshwater Pre-injection Treatment System Design Basis Memorandum
PG&E Topock Compressor Station, Needles, California

90% BOD, Appendix M

Attachment G: RTC #196

Revised Figure 2.1-1 of the 90% BOD Section 2

FIGURE 2.1-1
SITE FEATURES, COMPOSITE CHROMIUM PLUME, AND SHALLOW ZONE WATER LEVELS
GROUNDWATER REMEDY BASIS OF DESIGN REPORT
PRE-FINAL (90%) DESIGN
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL

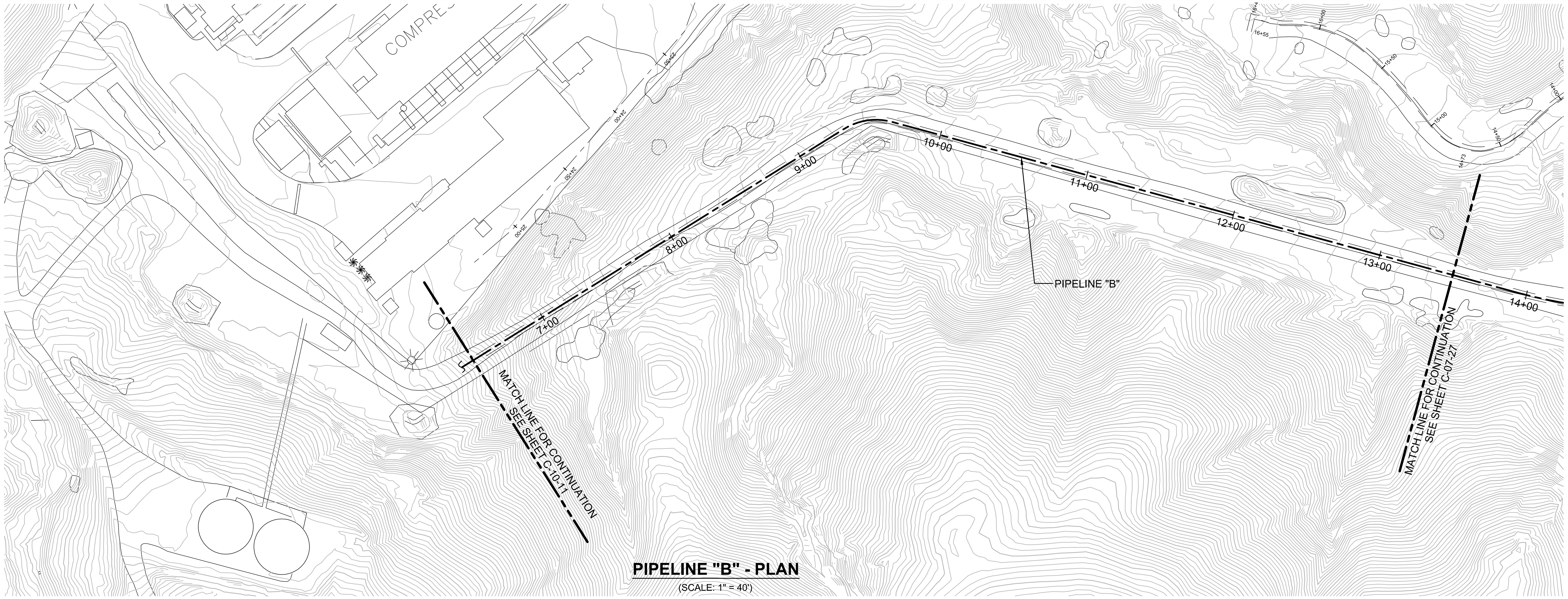
Path: G:\PacificGasElectricCo\TopockProgram\GIS\MapFiles\2014\CMS\Design90\FIG211_GWMR_SiteFeatures_4Q2014.mxd Date Saved: 6/2/2015 8:04:52 PM

Attachment H: RTC #223

Photos of a 500-1,000 gallon portable tank being pulled by a pickup truck

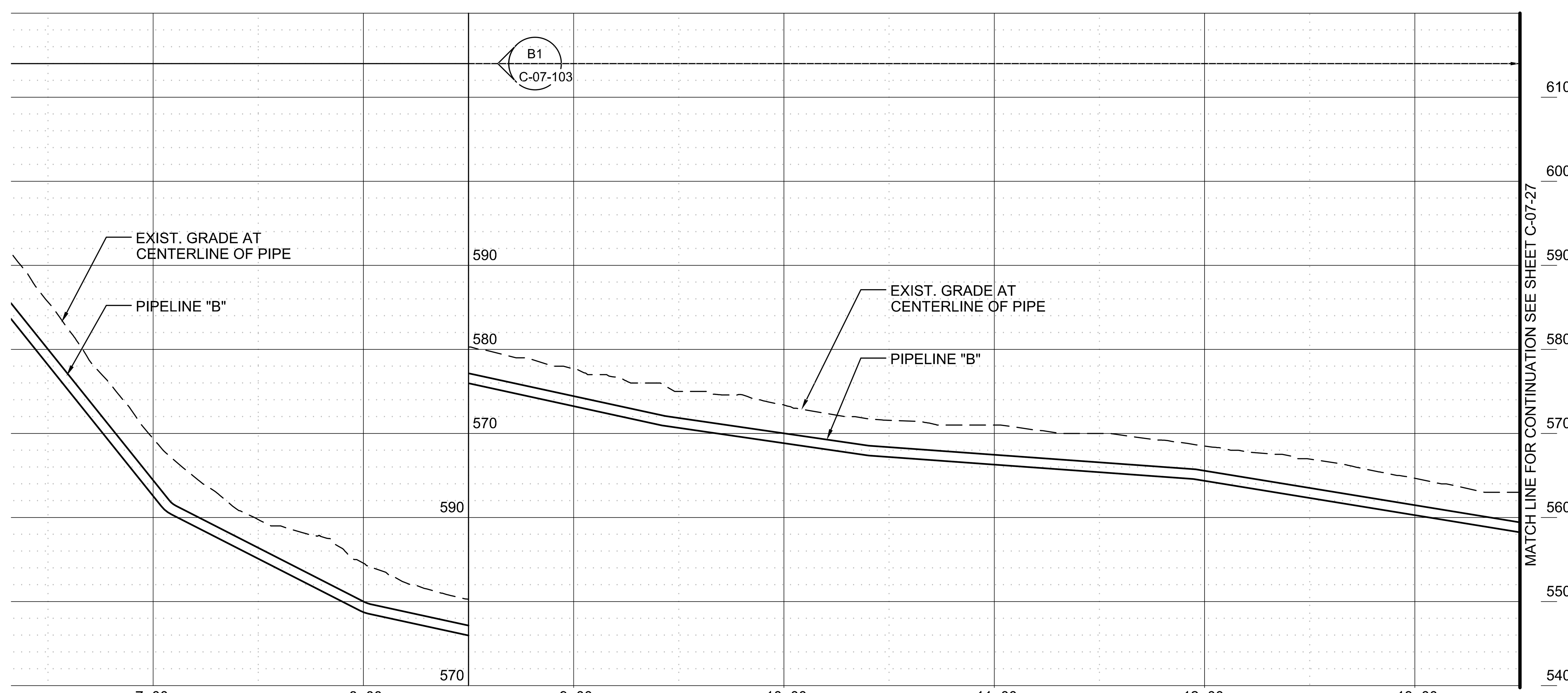
Attachment I: RTC #296

Design of New 12-inch Freshwater Pipe for Use if Pre-treatment is Required



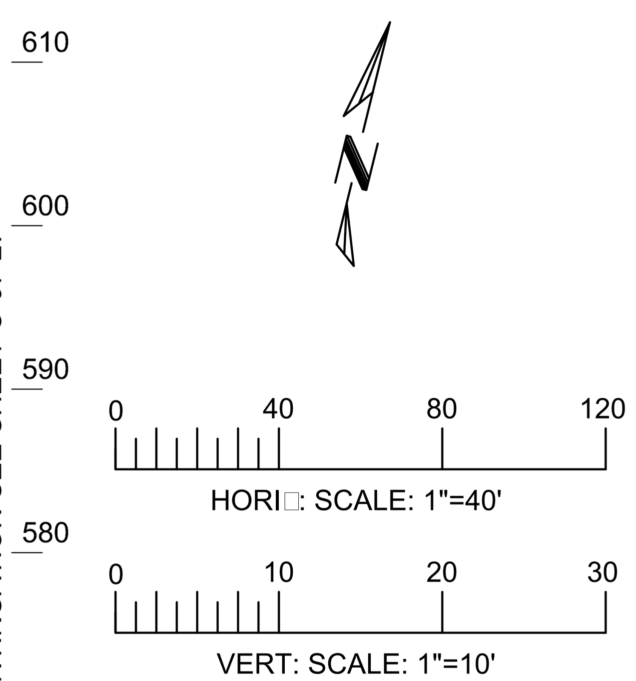
PIPELINE "B" - PLAN

(SCALE: 1" = 40')



PIPELINE "B" - PROFILE

(SCALE: 1" = 40' H; 1" = 10' V)



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NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
1	9/8/14	PRE-FINAL (90%) DESIGN					
0	4/5/13	INTERMEDIATE (60%) DESIGN		-	-	-	-

REVISIONS

APPROVED BY		
-	SO	XXXXX
	SUPV	PD
	DSGN	GO
	DWN	LD
	CHKD	JM
	OK	PD
	DATE	9/8/14
	SCALES	1" = 40'-0"

TOPOCK GROUNDWATER REMEDIATION PROJECT

PLAN AND PROFILE
PIPELINE "B"
STA 3+05 TO STA 13+50

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-07-26	REV 2

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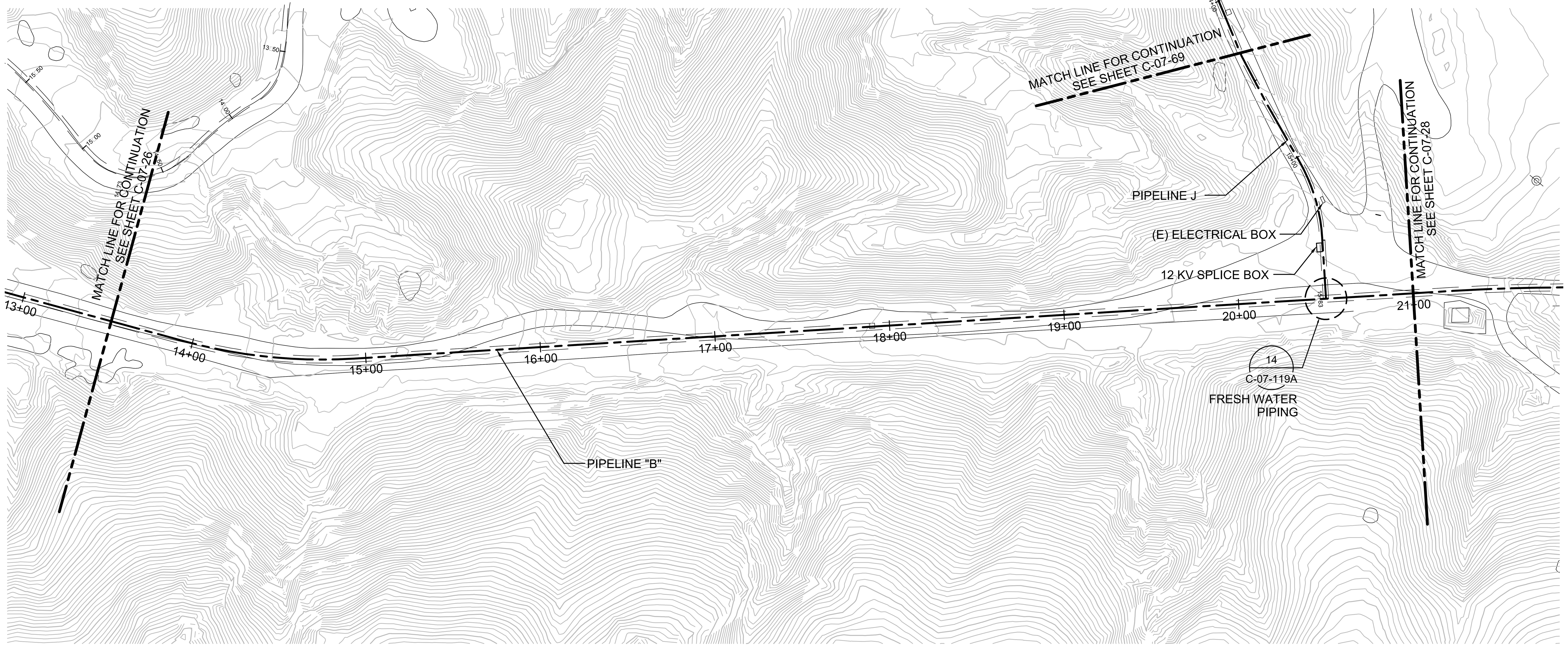
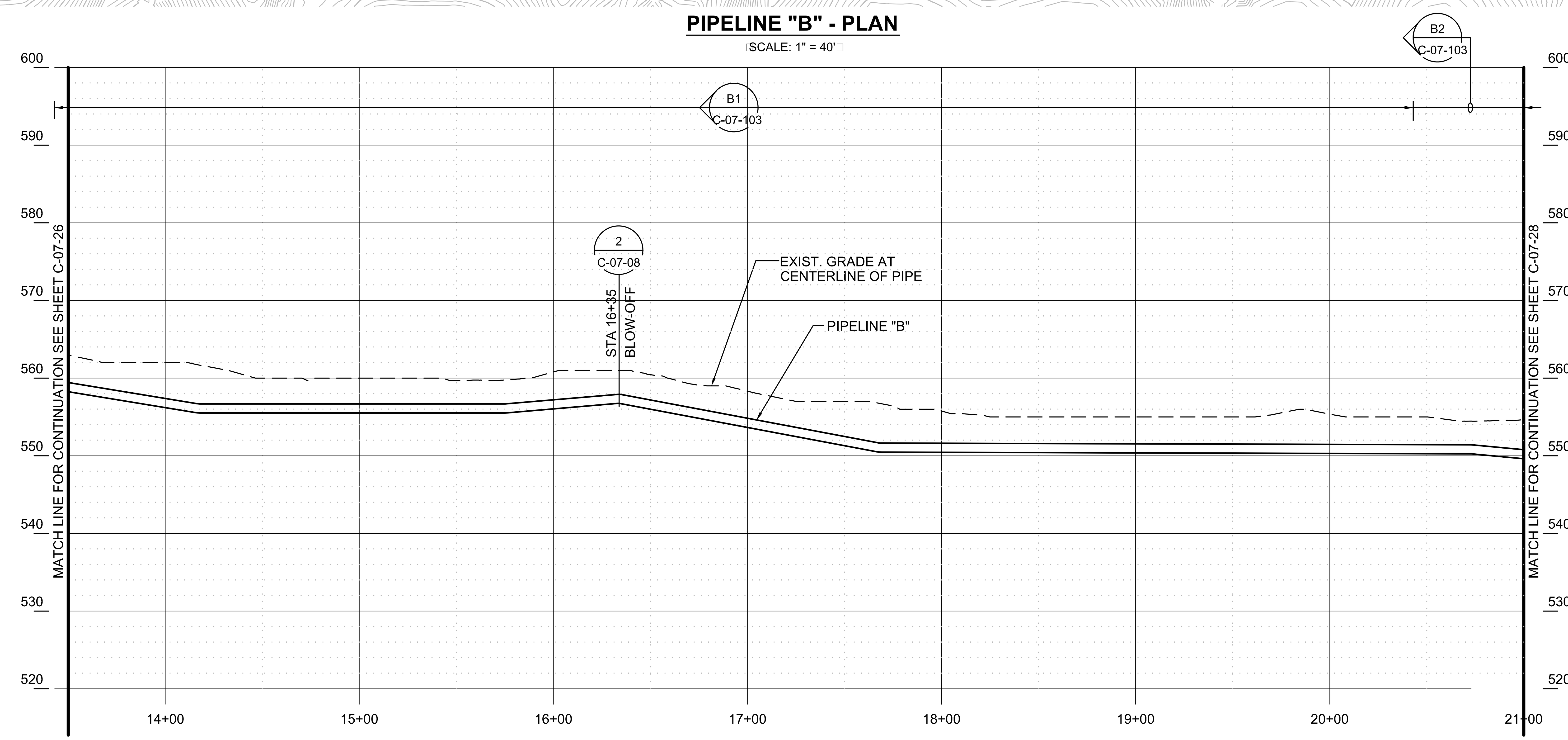
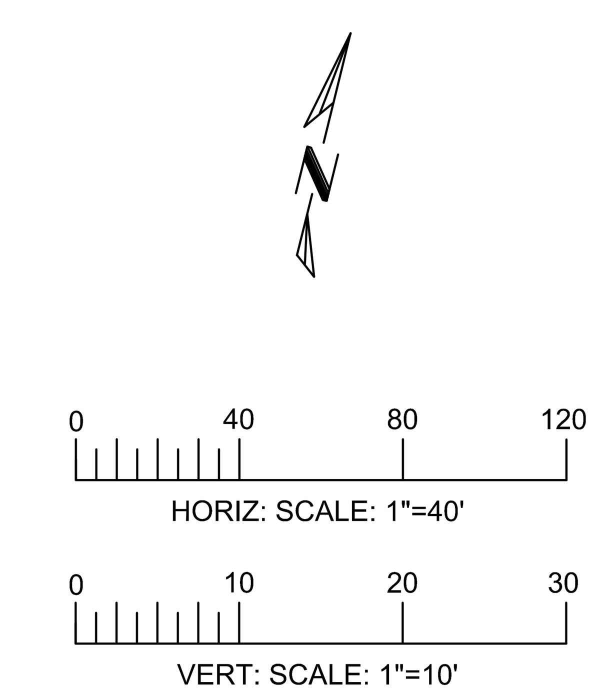


PIPELINE "B" - PLAN

(SCALE: 1" = 40')





PIPELINE "B" - PROFILE

(SCALE: 1" = 40' H, 1" = 10' V)

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
1	9/8/14	PRE-FINAL (90%) DESIGN					
0	4/5/13	INTERMEDIATE (60%) DESIGN		-	-	-	-

REVISIONS

APPROVED BY		
-	SO	XXXXX
	SUPV	PD
	DSGN	GO
	DWN	LD
	CHKD	JM
	OK	PD
	DATE	9/8/14
	SCALES	1" = 40'-0"

TOPOCK GROUNDWATER REMEDIATION PROJECT

PLAN AND PROFILE
PIPELINE "B"
STA 13+50 TO STA 21+00

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-07-27	REV 1

NOTES:
1. 12KV SPLICE BOX PER PG□E STANDARD 062000, HEAV□ FULL TRAFFIC, 3'□4'X4'-6" INSIDE DIMENSIONS.
2. 480V HANDHOLE PER PG□E STANDARD 062000, HEAV□ FULL TRAFFIC, 3'□5'□3'-6" INSIDE DIMENSIONS.

PIPELINE "J" - PLAN

SCALE: 1" = 20'

PIPELINE "J" - PROFILE

SCALE: 1" = 20' H□ 1" = 5' V

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
1	9/8/14	PRE-FINAL 90% DESIGN					
0	4/5/13	INTERMEDIATE 60% DESIGN		-	-	-	-

REVISIONS

APPROVED BY		
-	SO	XXXXX
	SUPV	PD
	DSGN	GO
	DWN	LD
	CHKD	JM
	OK	PD
	DATE	9/8/14
	SCALES	1" = 20'-0"

TOPOCK GROUNDWATER REMEDIATION PROJECT

PLAN AND PROFILE
PIPELINE "J"
STA 10□04 TO STA 15□83

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-07-69	REV 1

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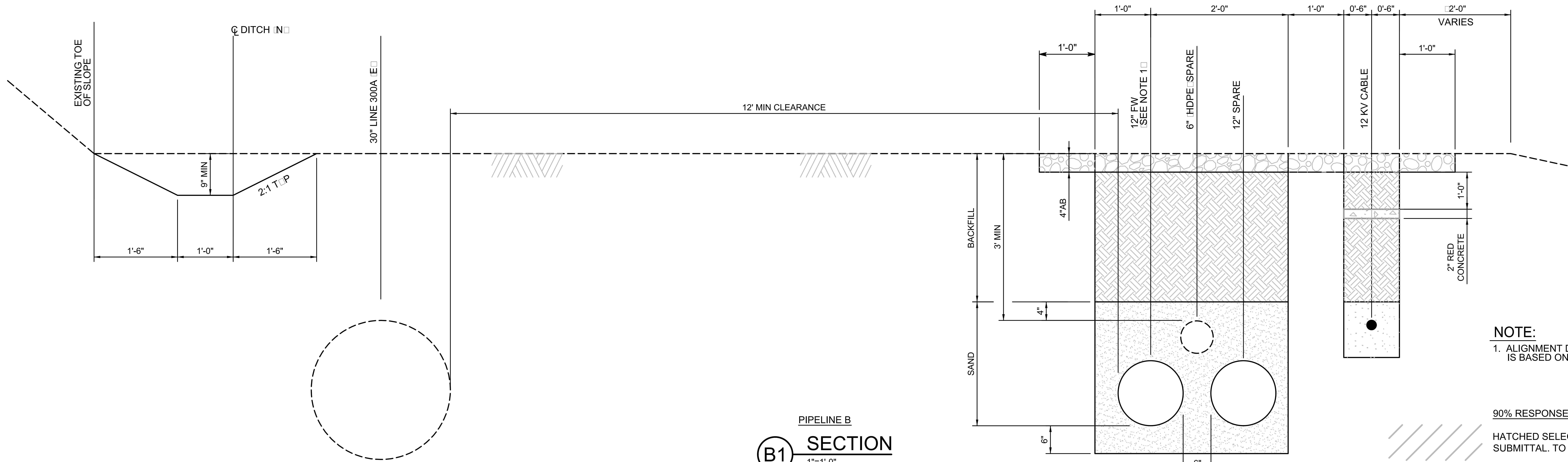


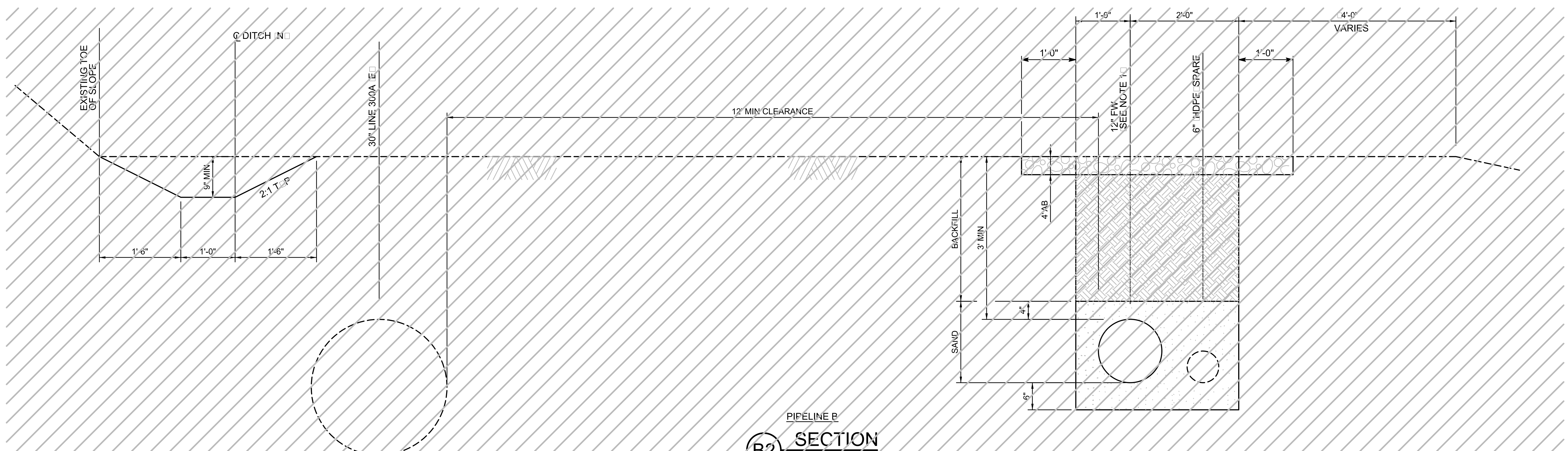
PIPELINE B
B1 SECTION
1"=1'-0"
C-07-26
C-07-27

NOTE:

1. ALIGNMENT DATA SHOWN ON PLAN IS BASED ON THIS PIPE.

90% RESPONSE TO COMMENTS NOTES:

HATCHED SELECTIONS NOT UPDATED FOR THIS SUBMITTAL. TO BE UPDATED FOR 100% SUBMITTAL.



PIPELINE B
B2 SECTION
1"=1'-0"
C-07-28

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
1	9/8/14	PRE-FINAL (90%) DESIGN					
0	4/5/13	INTERMEDIATE (60%) DESIGN		-	-	-	-

REVISIONS

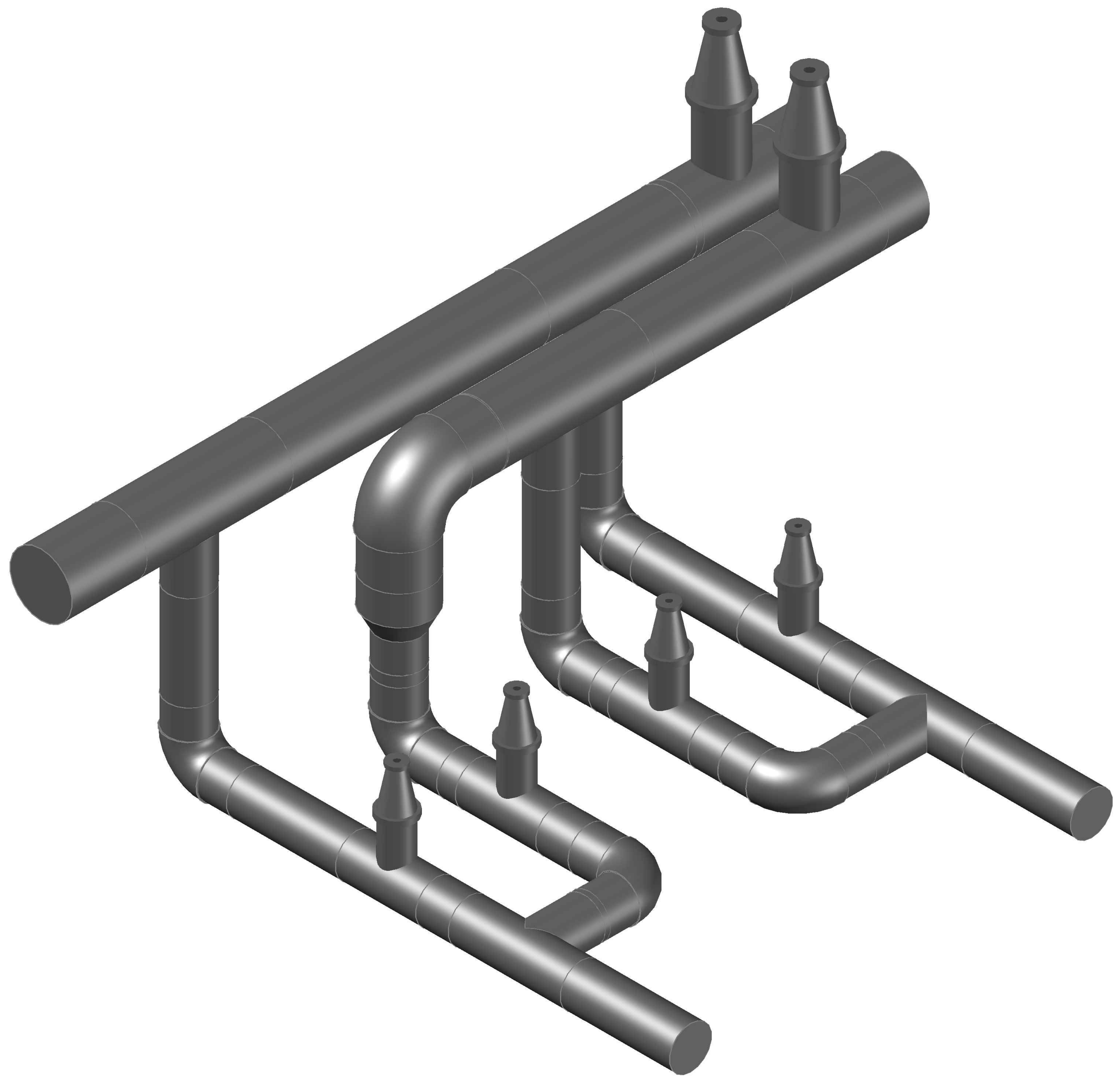
APPROVED BY		
-	SO	XXXXX
	SUPV	PD
	DSGN	TL
	DWN	TL
	CHKD	JM
	OK	PD
	DATE	9/8/14
	SCALES	1" = 1'-0"

TOPOCK GROUNDWATER REMEDIATION PROJECT

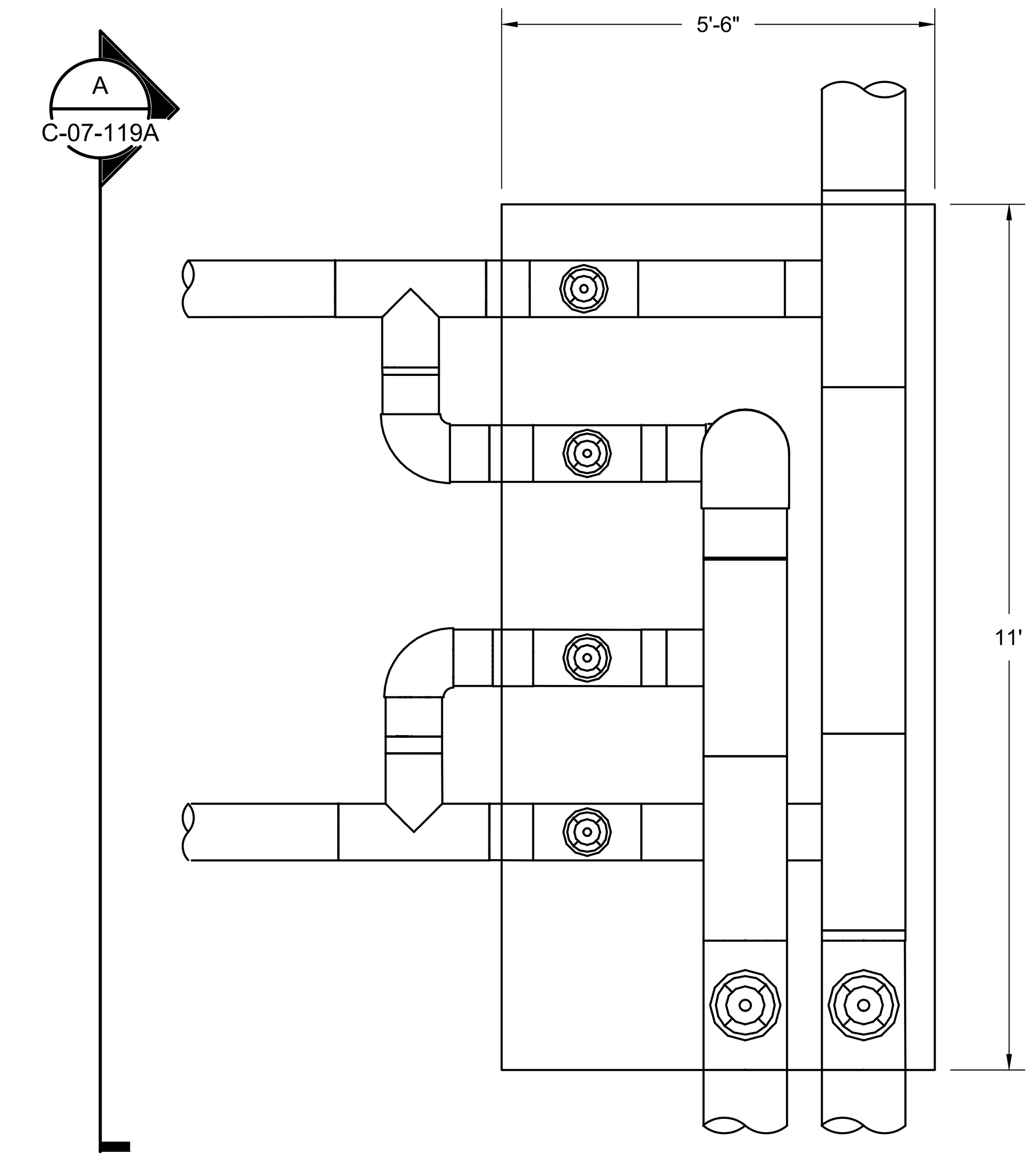
PIPELINE SECTIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

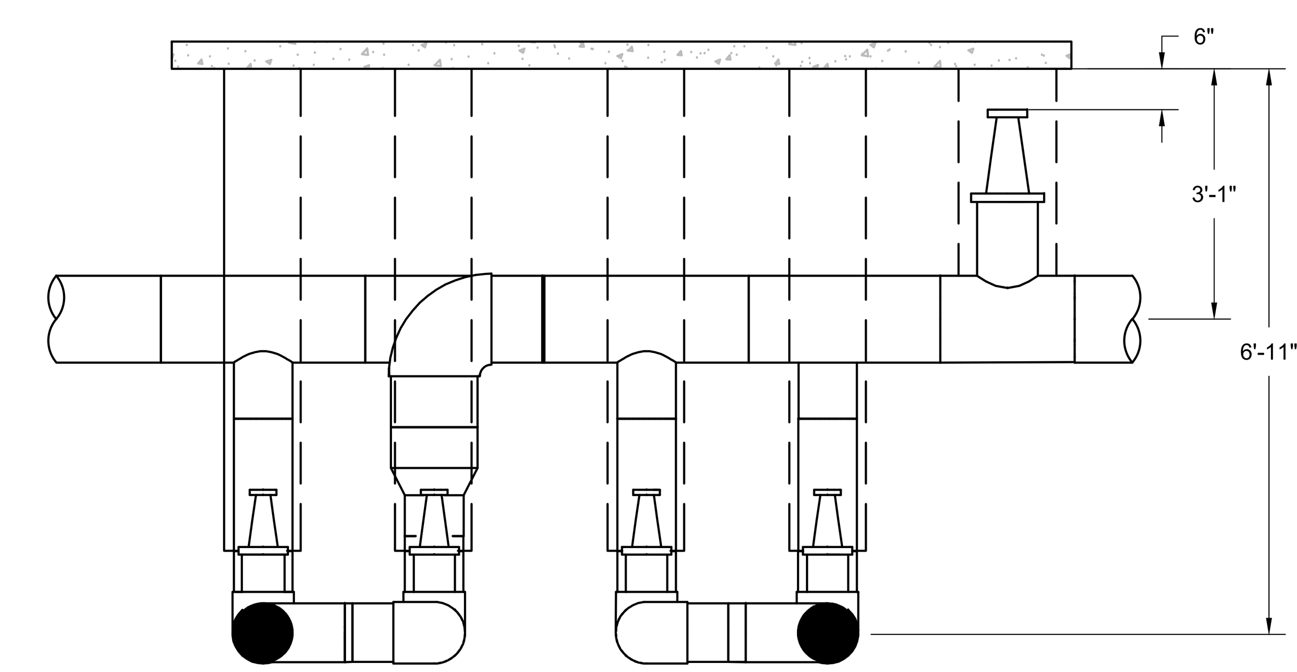
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-07-103	REV 2



14 FRESH WATER PIPING ISOMETRIC VIEW
3/4" = 1'-0"
C-07-119A



FRESH WATER PIPING ENLARGED
1/2" = 1'-0"



A SECTION
1/2" = 1'-0"
C-07-119A

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY

REVISIONS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY	
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	8/5/15
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

DETAIL FOR THE FW CONNECTION

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-07-119A	REV 0

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- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
1	9/8/14	PRE-FINAL (90%) DESIGN					
0	4/5/13	INTERMEDIATE (60%) DESIGN		-	-	-	-

REVISIONS

APPROVED BY		
-	SO	XXXXX
	SUPV	PD
	DSGN	GO
	DWN	GO
	CHKD	JM
	OK	PD
	DATE	9/8/14
	SCALES	1" = 20'-0"

TOPOCK GROUNDWATER REMEDIATION PROJECT

PIPE LAYOUT
SHEET 1 OF 4

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	REV
C-10-11	2

Attachment J: RTC #313

Revised Exhibit 5.3-1 of the 90% O&M Manual Volume 2, Sampling and Monitoring Plan

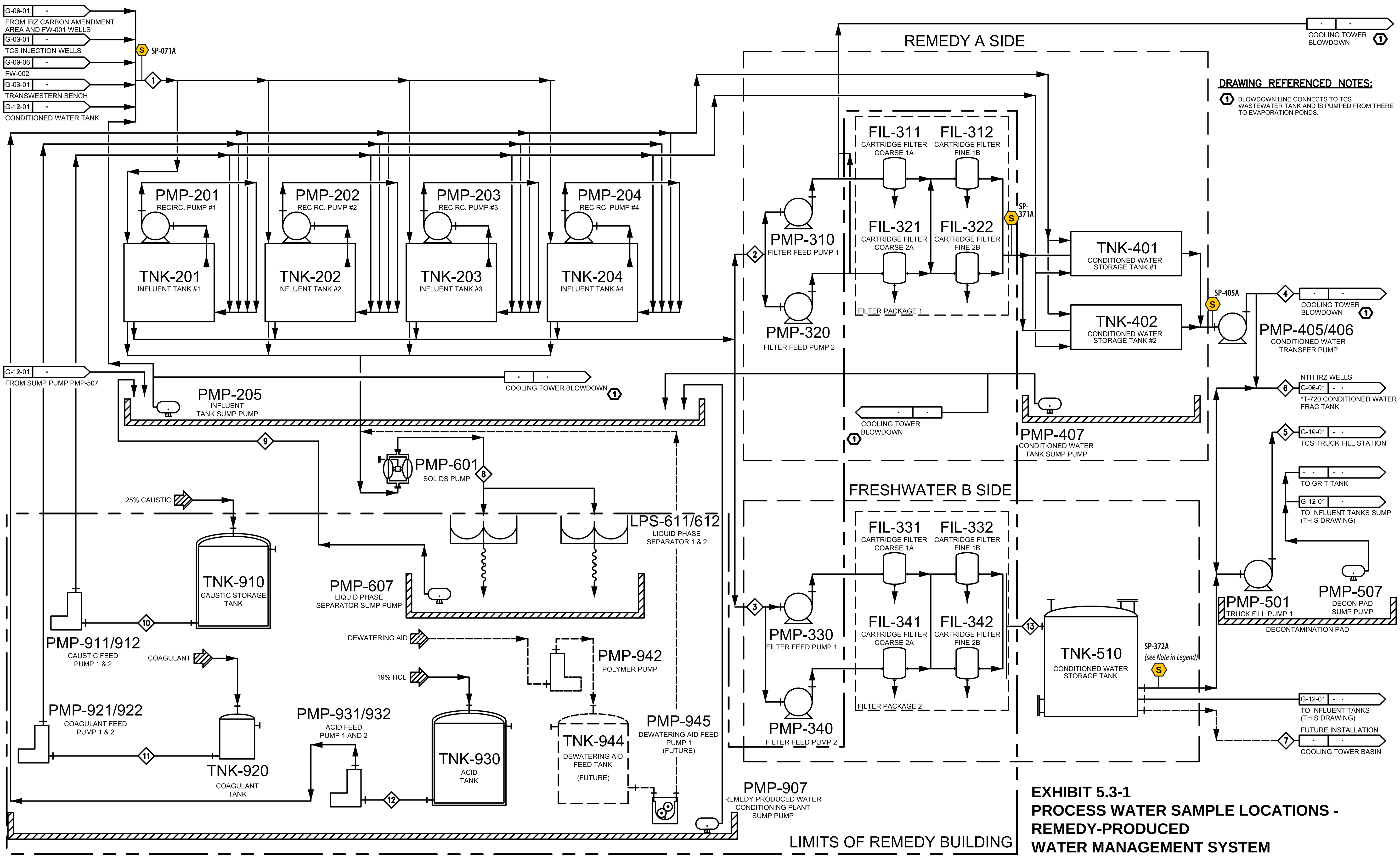


EXHIBIT 5.3-1
PROCESS WATER SAMPLE LOCATIONS -
REMEDY-PRODUCED
WATER MANAGEMENT SYSTEM
GROUNDWATER REMEDY DRAFT OPERATION AND MAINTENANCE MANUAL
VOLUME 2: SAMPLING AND MONITORING PLAN
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

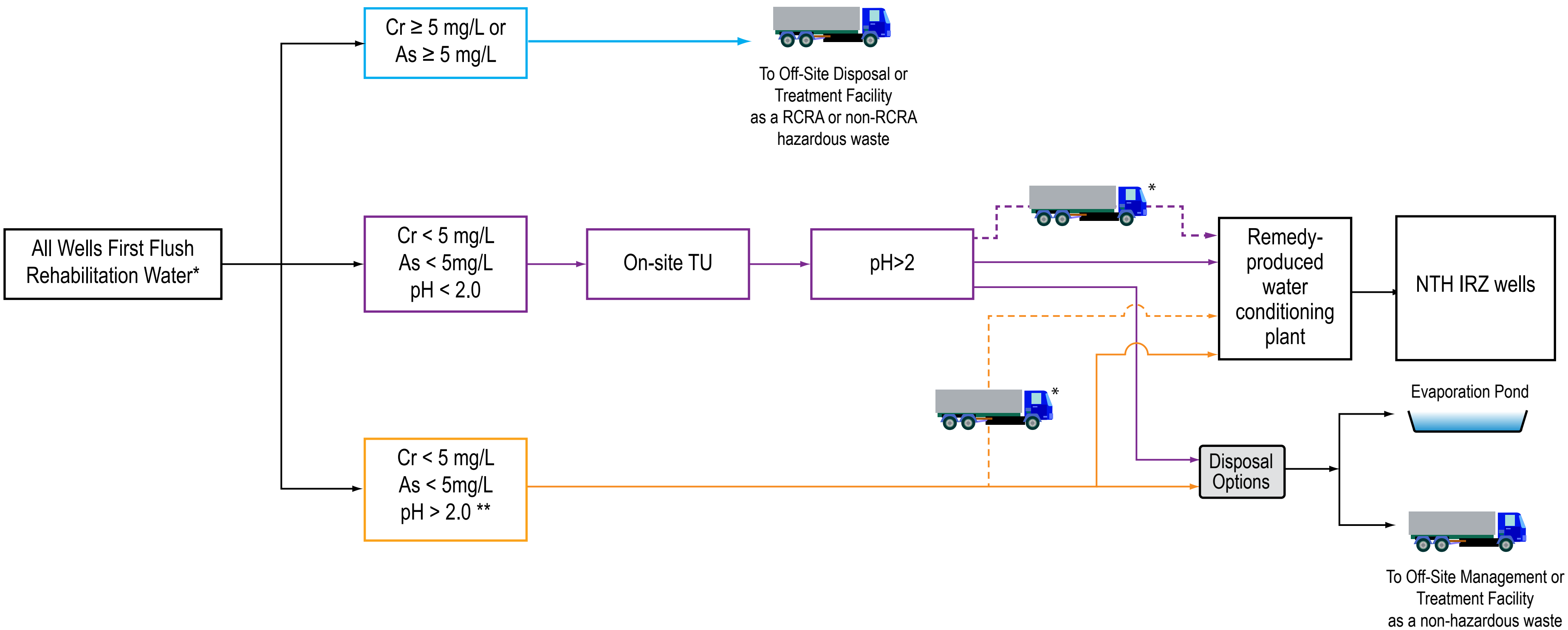
LEGEND S Sampling Port

Note for SP-372A:
A single sampling port will be installed on the common effluent pipe of TNK-510.

UPDATED JULY 2015

Attachment K: RTC #354

Revised Figure 3.4-3 of the 90% BOD, Section 3



LEGEND

Piping

Conveyed by truck

TU Treatment Unit permitted for (pH adjustment) hazardous waste treatment per California Code of Regulations Title 22. TU may be equipped with filters to remove solids.

Cr Chromium (dissolved)

As Arsenic (dissolved)

IRZ In-situ Reactive Zone

* Conveyance by trucking is backup option for IRZ and injection wells. For extraction wells, some trucking may be required.

** An optional approach to pH adjustment at the Remedy-Produced Water Conditioning Plant is to adjust it in the field with an On-Site TU

RCRA Resource Conservation and Recovery Act

FIGURE 3.4-3
REMEDY-PRODUCED WATER SCHEMATIC – FIRST FLUSH REHABILITATION
GROUNDWATER REMEDY BASIS OF DESIGN REPORT
PRE-FINAL (90%) DESIGN
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

Attachment L: RTC #418

Technical Memorandum Regarding the Development of the Simulated Threshold TOC Concentrations for Reduction of Cr(VI)

ARCADIS U.S., Inc.
10 Friends Lane, Suite 200
Newtown
Pennsylvania 18940
Tel 267-685-1800
Fax 267-685-1801

MEMO

To:
DTSC
DOI

Copies:
Yvonne Meeks, PG&E
Richard Orens, ARCADIS
Kristin Mancini, ARCADIS
Christina Hong, CH2M HILL

From:
Margaret Gentile
Jonathan Roller

Date:
June 16, 2015

ARCADIS Project No.:
RC000753.0026

Subject:
Response to 90% BOD Comment #418 with Supporting Data from Hinkley

---

Introduction

This technical memorandum serves as a document to provide supporting information in response to Comment #418 (DOI-11) regarding the development of the simulated threshold total organic carbon (TOC) concentration for reduction of hexavalent chromium (Cr(VI)).

Comment #418 (DOI-11)

Referenced Text: (90% BOD Appendix B Section 3.4.1) "The solute transport model (described below; see Section 6) assumes Cr(VI) reduction in the presence of organic carbon above 0.1 mg/L."

Comment: "In light of the discussion pertaining to the apparent TOC concentrations required for reduction of Cr(VI) (100 mg/L) it is difficult to see why this assumption is made particularly since the reporting limits for the TOC are 1 mg/L. Please provide justification for the 0.1 mg/L TOC assumption."

PG&E Response: The concentration of TOC needed to establish chromium-reducing conditions given a continuous injection system will be different than that needed to establish chromium-reducing conditions during the discrete injection pilot test. The 0.1 mg/L TOC threshold was established as the minimum carbon concentration to support microbial growth and Cr(VI) reduction through a series of sensitivity analyses for other Cr(VI) impacted sites where Cr(VI) reduction using a large-scale recirculation system had been observed (i.e., PG&E Hinkley Compressor Station site). During continuous injections at Hinkley, the 0.1 mg/L threshold was well-correlated to the zone of Cr(VI) reduction. This analysis was done by fitting the chromium reduction data and available TOC data above the reporting limit, which allowed for the determination of the threshold below the reporting limit. The lower 0.1 mg/L also allows the model to account for potential lysis effects where carbon from previous microbial communities is essentially recycled to support further microbial growth.

A sensitivity analysis was also performed on the trigger TOC level for Cr(VI) reduction to evaluate potential effects. As discussed in Section 10.15 of Appendix B, the TOC threshold concentration was increased an order of magnitude to 1 mg/L. At this higher TOC threshold, sufficient Cr(VI) reduction was achieved. The model predicted potential Cr(VI) breakthrough along the NTH IRZ line at the 10-year mark during the IRZ OFF cycle. However, much of this Cr(VI) is treated during the subsequent IRZ ON cycle, and the model results are comparable for the 0.1 and 1 mg/L TOC triggers at 30 years. Potential operational adjustments to address a higher TOC threshold concentration are described in Table 6.6-1 of Appendix B and include the following (primarily applicable to the NTH IRZ): adjust TOC dosing concentration, frequency, and/or duration; and activation of provisional wells to bolster lateral coverage.

DOI Response: **"**Hinkley data which was not provided"

Addendum: Supporting Analysis from Hinkley Site

In order to further support the response to #418, below is a summary of the modeling used for the Hinkley site and the TOC threshold used in the solute transport modeling for that site. Large scale IRZ operations, similar in design to the continuous recirculation systems planned for the Topock site, began at Hinkley in late 2007. A solute transport model was first developed for the Hinkley site in 2008 in support of the feasibility study for the site. In 2014, the solute transport model parameters were further examined in comparison with data collected through 2014 as part of an assessment of remedial timeframes (ARCADIS 2014). The results of these modeling evaluations indicate that the TOC threshold is between 0.1 and 1 mg/L, consistent with the range of values considered in the Topock solute transport modeling (ARCADIS 2014).

The attached figure shows the results of model runs conducted with actual Hinkley site IRZ operations (i.e. actual injection and extraction locations, flowrates over time, and TOC injection concentrations) using 0.1 and 1 mg/L TOC threshold concentrations in comparison to actual groundwater data over the period of large scale IRZ operations from Fourth Quarter 2007 to First Quarter 2014. A comparison of the results for the IRZ areas south of Highway 58 shows that the 0.1 mg/L TOC threshold concentration replicates the downgradient flush of the clean water from IRZ injection points well (Location 3 on **Figure 1**), while the 1 mg/L TOC threshold results in a better agreement with the lateral distribution than the 0.1 mg/L TOC threshold run (see Locations 1 and 2 on **Figure 1**).

Given that the higher TOC threshold value improved prediction of some aspects of actual performance, while underpredicting other aspects of actual performance, remedial timeframe assessment modeling for the Hinkley site was conducted with both TOC thresholds to provide a range of remedial timeframe estimates. These TOC threshold values are consistent with those utilized in the 90% BOD Appendix B and associated sensitivity analyses. The performance of the proposed Topock remedy will be evaluated against the model in future model updates to further support solute transport parameters.

Figures

References

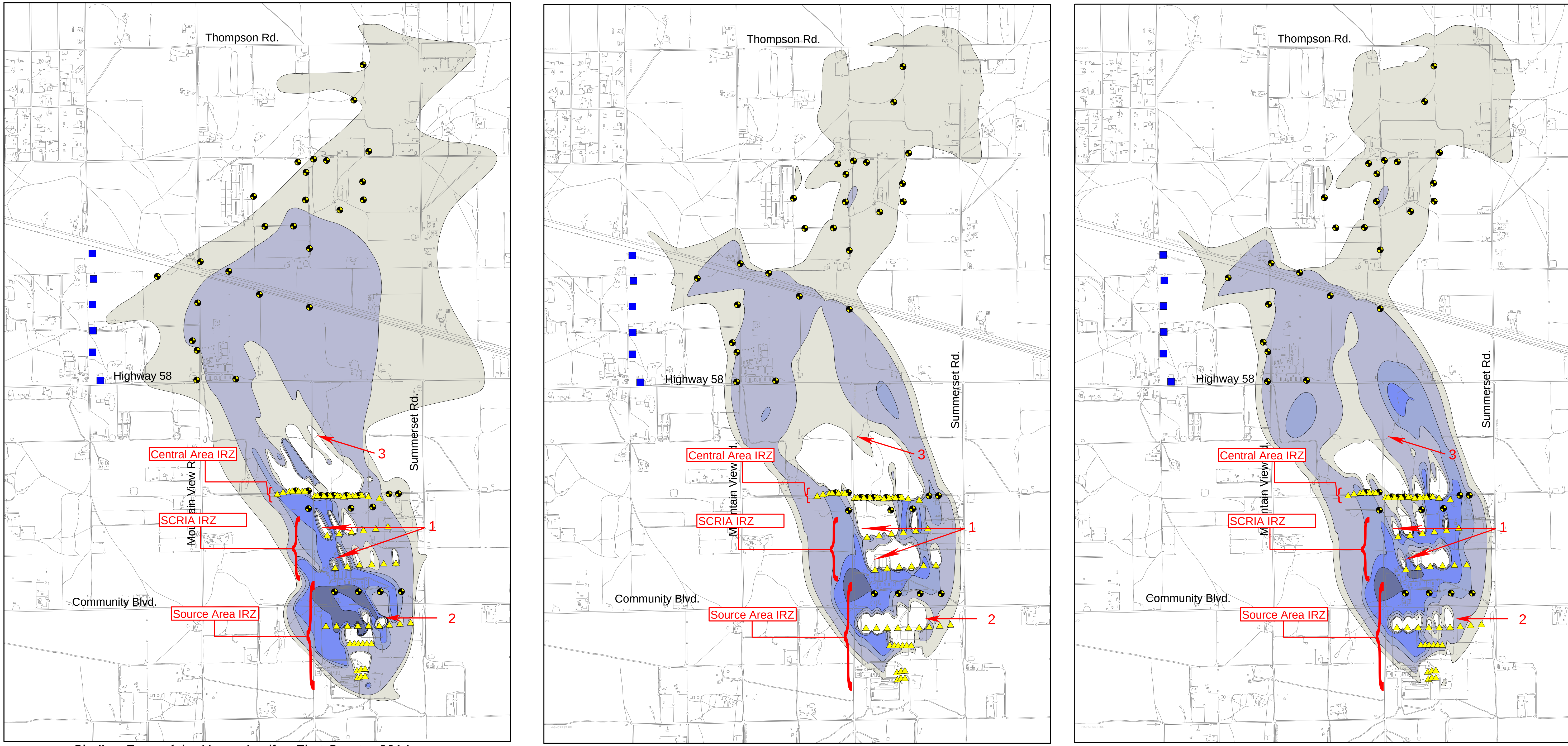
ARCADIS. 2014. *Remedial Timeframe Assessment*. PG&E Hinkley Compressor Station. Hinkley, California. June 30.

CONTOURED FROM MONITORING DATA

SIMULATED 0.1 mg/L TOTAL ORGANIC CARBON THRESHOLD

SIMULATED 1.0 mg/L TOTAL ORGANIC CARBON THRESHOLD

N



Shallow Zone of the Upper Aquifer, First Quarter 2014

Model Layer 1

Model Layer 1

LEGEND

Chromium Concentration (ug/L)

0 | 3.1 | 10 | 50 | 100 | 500

PG&E Remediation Extraction Well

PG&E Remediation Injection Well

Northwest Freshwater Injection Well

Scale in feet

0 | 2,000 | 4,000

Notes:
ug/L- Micrograms per liter
PG&E - Pacific Gas and Electric
Contoured data reference, Figure 4-6 (CH2MHill and ARCADIS 2014), included in Appendix A for reference.
Simulated contour initalized with Fourth Quarter 2007 data and run with actual operating conditions for 7 years

PACIFIC GAS AND ELECTRIC
HINKLEY, CALIFORNIA

COMPARISON OF OBSERVED AND SIMULATED HEXAVALENT CHROMIUM CONCENTRATIONS

ARCADIS

FIGURE
1

Attachment M: RTC #634

Revised REMEDY-SOP-08: Inspection of Frac Tanks

Standard Operating Procedure
PG&E Topock Groundwater Remedy Operation and Maintenance Plan

Title: Inspection of Frac Tanks

Number: Remedy-SOP-08_Rev1~~0~~

~~Creation~~ Revision Date: 5/19/2015~~8/26/2013~~

1 Background and Scope

Pacific Gas and Electric Company (PG&E) is implementing a groundwater remedy near the intersection of Park Moabi Road and Interstate 40, approximately 12 miles southeast of Needles, California at the PG&E Topock Compressor Station (TCS).

The objective of this Standard Operating Procedure (SOP) is to describe the procedure for inspection and maintenance of frac tanks at the MW-20 Bench and Remedy-produced Water Conditioning Plant.

The operator should not break the plane of the tank openings with body parts at any time during this procedure, as it would be considered confined space entry. If confined space entry is necessary for a special procedure, the Health and Safety Plan should be referenced.

2 Drawing Numbers

- IRZ Carbon Amendment Building: I-06-02
- Remedy-Produced Water Conditioining Plant Influent Tank Farm: I-11-01 through I-11-04
- Remedy-Produced Water A-Side Conditioned Water Storage Tanks: I-14-01

3 Equipment/Supplies

- Appropriate personal protective equipment (PPE), including fall protection
- Health and Safety Plan
- Lockout/tagout tags and lockout/tagout manual for frac tank maintenance (if tank shutdown is performed)
- Portable/submersible pump or vac truck (if tank draining is performed)

4 Procedure

~~1.~~ Inspect tanks and associated equipment with reference to the following instructions (steps 2 through 12). ~~.~~

~~2.~~1. If unsuitable tank conditions are observed at any time throughout the procedure:

    1.1. Reference the Hazardous Materials Business Plan (HMBP) if the tank contains hazardous materials (acid or caustic) to determine how the materials should be handled if the chemicals are discharged from the tank.

1.2. Shut down and/or drain the tank if it is warranted (e.g. the tank is in danger of a blow out or failure). Steps a through f below are procedures to shutdown and drain an individual frac tank (If more than one frac tank is to be shutdown and/or drained at the same time, special procedures are required):

a. Influent Tank Farm (TNK-201 through TNK-204), Shutdown Frac Tank

i. Lockout/tagout the frac tank by following instructions in the lockout/tagout manual.
ii. Use the HMI to turn OFF the tank's recirculation pump (PMP-201 for Influent Tank 1, PMP-202 for Influent Tank 2, PMP-203 for Influent Tank 3, PMP-204 for Influent Tank 4).
iii. Close the following manual valves upstream, downstream, and on the chemical recirculation line of the frac tank:
    1. Influent Tank 1: V-201A, V-201F, V-201G, V-201I, V-201K
    2. Influent Tank 2: V-202A, V-202F, V-202G, V-202I, V-202K
    3. Influent Tank 3: V-203A, V-203F, V-203G, V-203I, V-203K
    4. Influent Tank 4: V-204A, V-204F, V-204G, V-204I, V-204K

b. Influent Tank Farm (TNK-201 through TNK-204), Drain Frac Tank

i. Use the HMI to verify that there is sufficient volume in the other influent tanks for the discharge from the influent tank being drained.
    - Proceed to next steps only if there is sufficient volume in the other influent tanks.
ii. Inspect the secondary containment per Remedy-SOP-07 (Secondary Containment Inspection and Maintenance at Buildings).
iii. Proceed to next steps only if the secondary containment is in acceptable condition.Plug in the Influent Tank Farm sump pump (PMP-205).
iv. If the frac tank is not already shutdown, shutdown the frac tank by completing all steps listed for shutting down an Influent Tank Farm Frac Tank (see step a. above).
v. Slowly open the manual drain valve on the frac tank (V-201M for Influent Tank 1, V-202M for Influent Tank 2, V-203M for Influent Tank 3, V-204M for Influent Tank 4):
vi. Ensure that the tank discharge properly drains in the secondary containment to the sump pump.
    - If there is any malfunctioning of the secondary containment and/or sump pump, immediately close the manual drain valve that was opened in Step v.
vii. If the frac tank does not drain completely by gravity, pump out the remaining water using a portable pump or vac truck.
    a. Drain the discharge into the influent tank farm sump (with the portable pump) OR haul to the influent tanks or liquid phase separator (with the vac truck).
viii. After the frac tank has completely drained, close the manual drain valve that was opened in step v.
ix. After all discharge has been pumped from the sump, unplug the Influent Tank Farm Sump Pump (PMP-205).
x. If frac tank is to be cleaned after draining, see RTP-SOP-07 (Manual Cleaning of Frac Tanks).

c. Conditioned Water Tank Farm (TNK-401 and TNK-402), Shutdown Frac Tank

i. Lockout/tagout the frac tank by following instructions in the lockout/tagout manual.
ii. Close the manual valves upstream/downstream of the frac tank:
    1. Conditioned Water Storage Tank 1: V-401A, V-401B
    2. Conditioned Water Storage Tank 2: V-402A, V-402B

d. Conditioned Water Tank Farm (TNK-401 and TNK-402), Drain Frac Tank

i. Use the HMI to verify that there is sufficient volume in the other influent tanks for the discharge from the influent tank being drained.

ii. Proceed to next steps only if there is sufficient volume in the other influent tanks.

iii. Inspect the secondary containment per Remedy-SOP-07 (Secondary Containment Inspection and Maintenance at Buildings).

iv. Proceed to next steps only if the secondary containment is in acceptable condition.Plug in the Conditioned Water Tank Farm sump pump (PMP-407).

v. If the frac tank is not already shutdown, shutdown the frac tank by completing all steps listed for shutting down the Conditioned Water Tank Farm Frac Tanks (see step c. above).

vi. Slowly open the manual drain valve on the frac tank (V-401C for Conditioned Water Storage Tank 1, V-402C for Conditioned Water Storage Tank 2):

vii. Ensure that the tank drainage properly drains in the secondary containment to the sump pump.

- If there is any malfunctioning of the secondary containment and/or sump pump, immediately close the manual drain valve that was opened in step v.

ii. If the frac tank does not drain completely by gravity, pump out the remaining water using a portable pump or vac truck.

- Drain the discharge into the conditioned water tank farm sump (with the portable pump) OR haul to the influent tanks or liquid phase separator (with the vac truck).

viii. After the frac tank has completely drained, close the manual drain valve that was opened in step ~~i~~v.

ix. After all discharge has been pumped from the sump, unplug the Conditioned Water Tank Farm sump pump (PMP-407).

x. If frac tank is to be cleaned after draining, see RTP-SOP-07 (Manual Cleaning of Frac Tanks).

e. MW-20 Bench (T-IRZ00-720, T-IRZ00-721, T-IRZ00-723), Shutdown Frac Tank

i. Lockout/tagout the frac tank by following instructions in the lockout/tagout manual.

ii. Close the manual valves upstream of the frac tank as applicable:

- Backwash Frac Tank (T-IRZ00-721): V-IRZ00-728C, V-IRZ00-728I, V-IRZ00-728K, V-IRZ00-728S
- Clean-in-Place Frac Tank (T-IRZ00-723): V-IRZ00-728A, V-IRZ00-728E, V-IRZ00-728G

f. MW-20 Bench (T-IRZ00-721, T-IRZ00-723), Drain Frac Tank

i. Use the HMI to verify that there is sufficient volume in the Remedy-produced Water Conditioning Plant Influent Tank Farm (TNK-RTP-201 through TNK-RTP-204) for the discharge from the frac tank being drained.

ii. Proceed to next steps only if there is sufficient volume in the Influent Tank Farm.

iii. Close/open valves on discharge line to direct flow to Remedy-produced Water Conditioning Plant.

- V-IRZ00-726B (open, manual), V-IRZ00-726D (open, manual), V-IRZ00-727D (open, manual), V-IRZ00-727E (open, manual)
- Backwash Frac Tank (T-IRZ00-721): V-IRZ00-726O (closed, manual)
- Clean-in-Place Frac Tank (T-IRZ00-723): V-IRZ00-726O (open, manual), V-IRZ00-726F (closed, manual), V-IRZ00-726B (closed, manual), FV-IRZ00-732 (closed, via HMI)

iv. Follow Step 4 of IRZ-SOP-13 to transfer water to the Remedy-produced Water Conditioning Plant.

v. Close the manual valves downstream of the frac tank:

- Backwash Frac Tank (T-IRZ00-721): V-IRZ00-726B
- Clean-in-Place Frac Tank (T-IRZ00-723): V-IRZ00-726C

iii. If the frac tank is not sufficiently drained, pump out the excess water using a vac truck or submersible pump placed in frac tank.

vi. If frac tank is to be cleaned after draining, see RTP-SOP-07 (Manual Cleaning of Frac Tanks).

g. MW-20 Bench (T-IRZ00-720), Drain Conditioned Water Frac Tank

i. Use the HMI to verify that the National Trails Highway (NTH) In-Situ Reactive Zone (IRZ) injection well system is active.

ii. Proceed to next steps only if NTH IRZ injection wells are able to receive water.

iii. Open manual valves on discharge line to direct flow to the NTH IRZ: V-IRZ00-726A, V-IRZ00-727B, V-IRZ00-727H, V-IRZ00-710H

iv. Place FV-IRZ00-728S into the "OPEN" position via the HMI

v. Place PMP-IRZ00-748 (Conditioned Water Injection Pump) into "AUTO"

vi. Visually inspect the lines for signs of leaks

vii. Once T-IRZ00-720 is empty, LT-IRZ00-756 will initiate the programmable logic controller to do the following:

- FV-IRZ00-728S will close
- PMP-IRZ00-748 will automatically shut off

viii. Use HMI to place PMP-IRZ00-748 into "OFF"

ix. Close manual valve V-IRZ00-726A downstream of the frac tank

iv. If the frac tank is not sufficiently drained, pump out the excess water using a vac truck or submersible pump placed in frac tank.

x. If frac tank is to be cleaned after draining, see RTP-SOP-07 (Manual Cleaning of Frac Tanks).

~~1.2. .~~

1.3. ~~-~~Attempt to fix the tank conditions with reference to the manufacturer's instructions, if feasible.

1.4. If the tank conditions cannot be fixed, the operator should contact the Maintenance Supervisor so parts can be procured and work can be scheduled.

~~3.~~2. Inspect the outside of the process tank (including tank walls, anchors, supports, stairs and platforms) for the following:

- No signs of distortion, buckling, denting, or bulging on tank
- No signs of cracks, leakage, or corrosion on tank
- No severe corrosion or damage on staircase

~~4.~~3. Inspect the nozzles, piping and actuated and manual valves for the following:

- No signs of leakage or damage along piping
- No evidence of vibration along piping
- Piping is adequately supported
- No signs of leakage or damage at valves
- Nozzles are adequately sealed and there are no signs of leakage or damage
- Flanged connection bolts are tight and fully engaged with no sign of wear or corrosion

~~5.~~4. Carefully climb the staircase to the top of the tank to inspect the lid of the tank.

~~6.~~5. Fall protection must also be used when inspecting the lid of the tanks. Set up and connect to fall protection and ascend onto the roof of the tank.

~~7.~~6. Do not break the plane of the tank lid with body parts at any time during this procedure, as it would be considered confined space entry. If confined space entry is necessary for a special procedure, the Health and Safety Plan should be referenced

~~8.~~7. Inspect the roof for the following:

- No signs of distortion, buckling, denting, or bulging on roof
- No signs of cracks, leakage, or corrosion on roof

~~9.~~8. Descend from the roof of the tank

~~10.~~9. When it is safe to do so, disconnect from fall protection.

~~11.~~10. Carefully descend the staircase.

~~12.~~11. If applicable, move to next tank for inspection and repeat steps 1 through 10.

~~13.~~12. Contact the Maintenance Supervisor if there are any notes that require further maintenance so parts can be procured and work can be scheduled.

Attachment N: RTC #657

OSHA Suggested Spotting Signals for Vehicles

Preventing Backovers

Backing Safety Solutions

Spotter

Spotters are a proven method of protecting employees on foot behind vehicles with an obstructed view, but spotters themselves can be at risk for injury or even death. Employers can implement the following actions to help keep spotters safe:

- Ensure that spotters and drivers agree on hand signals before backing up.
- Instruct spotters to always maintain visual contact with the driver while the vehicle is backing.
- Instruct drivers to stop backing immediately if they lose sight of the spotter.
- Not give spotters additional duties while they are acting as spotters.
- Instruct spotters not to use personal mobile phones, personal headphones, or other items which could pose a distraction during spotting activities.
- Provide spotters with high-visibility clothing, especially during night operations.

Vehicles Causing the Most Backover Fatalities 2005-2010+

Dump Truck	**67**
Semi/Tractor Trailer	**40**
Truck	**30**
Forklift	**21**
Garbage Truck	**20**
Pick-up Truck	**16**

+OSHA Integrated Management Information System data

Suggested Spotting Signals

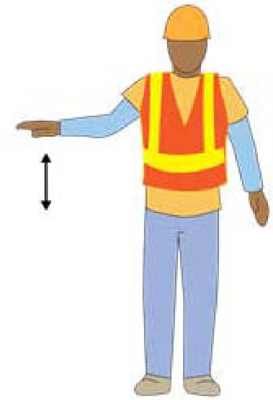
Back up

Back, turn left

Back, turn right

Move forward

Distance left to back



Slow down

Stop

Note: The following list of solutions is not required by any OSHA standard. It is provided for informational purposes only.

Cameras

Most vehicles (and some types of mobile equipment) can accommodate a camera that provides operators with a view to the rear. Some vehicles come equipped with cameras or may be offered with them as optional equipment. Camera systems can also be purchased as after-market equipment for vehicles. Viewing screens may be dash-mounted but must not block the driver's view out the windshield. Harsh environments, such as some construction sites or mines, may require more rugged cameras. Determining where to mount a camera for maximum effectiveness may be difficult, especially on large vehicles. For example, dump trucks may require two or three cameras to monitor the blind spots on the front, rear, and side of the vehicle.

Proximity Detection Systems

Radar and ultrasonic technology both are used in backing safety systems. A radar system transmits a signal, which is bounced off an object. The signal is then received by a receiver. These systems alert the driver with a visual and/or audio warning. These systems must be positioned so that they won't detect harmless objects, such as the concrete slab of a driveway, which can interfere with the detection of an object or person behind the vehicle or mobile equipment. Also, the composition of an object can affect detection, with some materials being virtually invisible to radar. Like cameras, this equipment can be mounted on most vehicles and may be an option from some manufacturers.

Ultrasonic systems, such as sonar, emit bursts of ultrasonic waves in a frequency above the hearing threshold of humans. When the waves strike an object, they generate echoes used to determine the distance to the object. These systems alert the driver with a visual and/or audio warning.

Tag-based Systems

Another type of proximity detection system is an electromagnetic field-based system, which is a type of tag-based system. This system consists of electromagnetic field generators and field detecting devices. One electromagnetic field-based system uses electromagnetic field generators installed on a vehicle and electronic sensing devices (a tag) worn by persons working near the vehicle. Another electromagnetic field-based system uses field generators worn by persons working near the vehicle, with the sensing devices installed on the vehicle. These electromagnetic field-based systems can be programmed to warn affected workers, stop the vehicle, or both, when workers get within the predefined danger zone of the vehicle.

Internal Traffic Control Plans

An internal traffic control plan (ITCP) is another method used to address backover hazards. These are plans that project managers can use to coordinate the flow of moving equipment, workers, and vehicles at a worksite to minimize or eliminate vehicles and employees from crossing paths. These plans can significantly reduce, or possibly eliminate, the need for vehicles to back up on a site.

Attachment O: RTC #662

Revised RTP-SOP-09: Inspection of B-side Conditioned Water Storage Tank

Standard Operating Procedure

PG&E Topock Remedy-produced Water Conditioning Plant Operation and Maintenance Plan

Title: Inspection of B-Side Conditioned Water Storage Tank

Number: RTP-SOP-09_Rev1~~0~~

~~Creation~~ Revision Date: ~~8/26/2013~~5/19/2015

1 Background and Scope

Pacific Gas and Electric Company (PG&E) is implementing a groundwater remedy near the intersection of Park Moabi Road and Interstate 40, approximately 12 miles southeast of Needles, California at the PG&E Topock Compressor Station (TCS).

The objective of this Standard Operating Procedure (SOP) is to describe the procedure for inspection of the Freshwater B-Side Conditioned Water Storage Tank.

The operator should not break the plane of the tank openings with body parts at any time during this procedure, as it would be considered confined space entry. If confined space entry is necessary for a special procedure, the Health and Safety Plan should be referenced.

2 Drawing Numbers

- Freshwater B-Side Conditioned Water Storage Tank (TNK-510): I-14-02
- Conditioned Water Storage Tank Mechanical Plans and Details: S-14-01 through S-14-05

3 Equipment/Supplies

- Appropriate personal protective equipment (PPE), including fall protection
- Health and Safety Plan
- Lockout/tagout tags and lockout/tagout manual for B-Side Conditioned Water Storage Tank maintenance (if tank shutdown is performed)
- Portable pump and water hauling truck OR vac truck (if tank draining is conducted)

4 Procedure

~~14.~~ Inspect tank and associated equipment with reference to the following instructions (steps 2 through 11).

1. If unsuitable tank conditions are observed at any time throughout the procedure:

   1.1 Shut down and/or drain the tank if it is warranted (e.g. the tank is in danger of a blow out or failure).

      1.1.1 Shutdown Tank

         i. Lockout/tagout the tank by following instructions in the lockout/tagout manual for B-Side Conditioned Water Storage Tank maintenance.

ii. Use the HMI to turn OFF the B-Side Filter Feed Pumps (PMP-330 and PMP-340).

iii. Close the manual valve upstream (V-510A) and downstream (V-510B) of the Conditioned Water Storage Tank.

~~1.1.1~~1.1.2 Drain Tank

i. Use the HMI to verify that there is sufficient volume in the influent tanks for the discharge from the B-Side Conditioned Water Storage Tank.

a. Proceed to next steps only if there is sufficient volume in the influent tanks.

ii. If the tank is not already shutdown, shutdown the tank by completing all steps listed for shutting down the tank (see step a. above).

iii. Slowly open the manual drain valve on the tank (V-510G).

iv. Ensure that the tank discharge properly drains into the influent tanks.

a. If there is any malfunctioning of the tank discharge draining to the influent tanks, immediately close the manual drain valve that was opened in step iii.

v. If the tank does not drain completely by gravity, pump out the remaining water using a portable pump and water hauling truck OR ~~,~~vac truck.

a. Close V-510G.

b. Connect the portable pump or vac truck to the connection downstream of V-501D.

c. If using a portable pump, ensure the water flows to the water hauling truck.

d. Initiate pumping using the portable pump or vac truck.

e. After TNK-510 is completely drained, terminate pumping from the portable pump or vac truck.

f. Close V-501D.

g. Disconnect the portable pump or vac truck.

h. The discharge in the water hauling truck or vac truck may be drained in the influent tanks or liquid phase separator.

vi. After the tank has completely drained, verify V-510G is closed.

1.2 Attempt to fix the tank conditions, if feasible.

1.3 If the tank conditions cannot be fixed, the operator should contact the Maintenance Supervisor so parts can be procured and work can be scheduled.

2. Inspect the outside of the tank (including tank walls, anchors, supports, stairs and platforms) for the following:

- No signs of distortion, buckling, denting, or bulging on tank
- No signs of cracks, leakage, or corrosion on tank
- No severe corrosion or damage on staircase
- Grating at flush cleanout catch basin is intact
- Flush cleanout catch basin is free of standing water

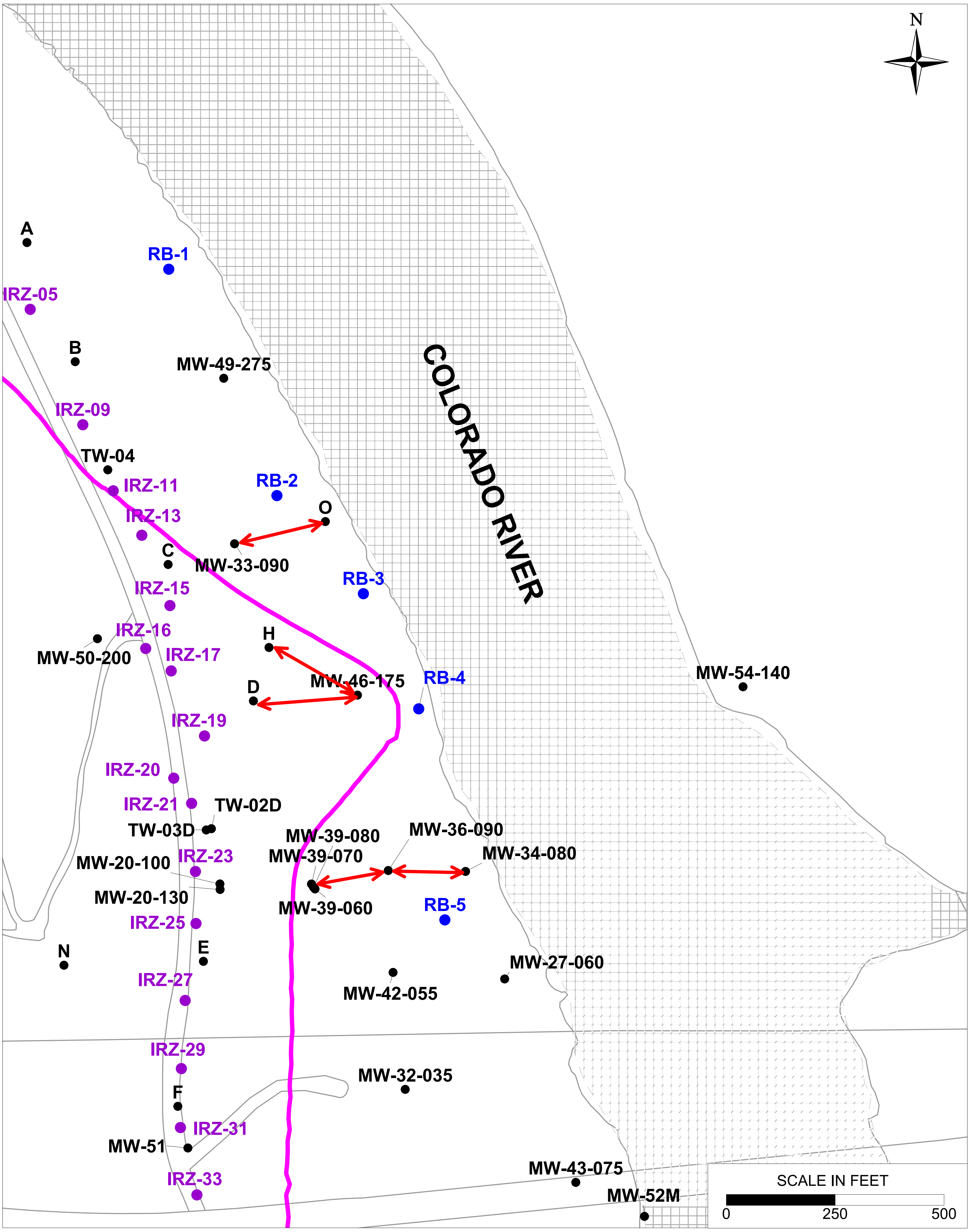
3. Inspect the nozzles, piping and actuated and manual valves for the following:

- No signs of leakage or damage along piping
- No evidence of vibration along piping
- Piping is adequately supported
- No signs of leakage or damage at valves
- Nozzles are adequately sealed and there are no signs of leakage or damage
- Flanged connection bolts are tight and fully engaged with no sign of wear or corrosion
- Bird screen on overflow line is intact

4. Carefully climb the staircase to the top of the tank to inspect the lid of the tank.
5. Fall protection must also be used when inspecting the lid of the tanks. Set up and connect to fall protection and ascend onto the roof of the tank.
6. Do not break the plane of the tank lid with body parts at any time during this procedure, as it would be considered confined space entry. If confined space entry is necessary for a special procedure, the Health and Safety Plan should be referenced
7. Inspect the roof for the following:
    - No signs of distortion, buckling, denting, or bulging on roof
    - No signs of cracks, leakage, or corrosion on roof
8. Descend from the roof of the tank
9. When it is safe to do so, disconnect from fall protection.
10. Carefully descend the staircase.
11. Contact the Maintenance Supervisor if there are any notes that require further maintenance so parts can be procured and work can be scheduled.

Attachment P: RTC #711

Figures 711-1 and 711-2: Proposed Well Pairs in Model Layers 3 and 4



LEGEND

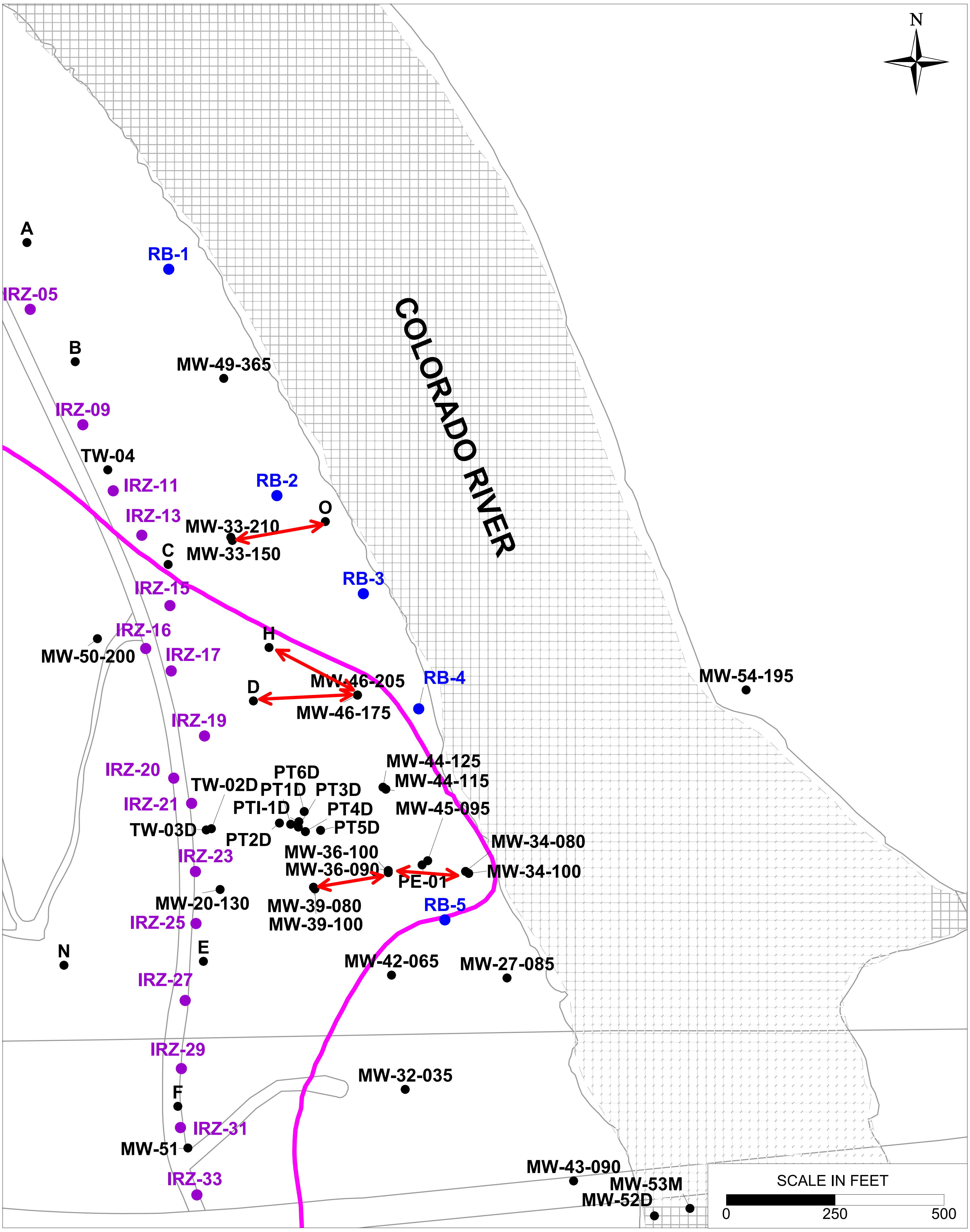
- IRZ WELLS
- EXTRACTION WELLS
- MONITORING WELLS
- ESTIMATED HEXAVALENT CHROMIUM 32 ug/L CONTOUR
- PROPOSED WELL PAIR

PG&E
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA
APPENDIX L

PROPOSED WELL PAIRS
SCREENED IN MODEL LAYER 3

ARCADIS

FIGURE
711-1



LEGEND

- IRZ WELLS
- EXTRACTION WELLS
- MONITORING WELLS
- ESTIMATED HEXAVALENT CHROMIUM 32 ug/L CONTOUR
- PROPOSED WELL PAIR

PG&E
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA
APPENDIX L

PROPOSED WELL PAIRS
SCREENED IN MODEL LAYER 4

ARCADIS

FIGURE
711-2

Attachment Q: RTC #803

Revised Management Protocol for Handling and Disposition of Displaced Site Material and Park Moabi Design

Management Protocol for Handling and Disposition of Displaced Site Material, Topock Remediation Project, Needles, California

PREPARED FOR: Topock Remediation Project Files

PREPARED BY: Pacific Gas and Electric Company

DATE: October 3, 2012, rev. July 2015

This document presents the general approach and management protocol required for the handling and disposition of soil and/or rock (referred to as "material" throughout the document) that is displaced as a result of past (as practical), present, and future activities associated with the Pacific Gas and Electric Company (PG&E) Topock Remediation Project, Needles, California. Specifically, this includes material removed from the Earth (i.e., displaced) as a result of drilling, excavation, sampling, testing, construction, grading, and other remedial activities. The management of material that may be disturbed as a result of remedial activities but not displaced from its natural location, such as soil disturbed by foot or vehicle traffic along a pathway, is not within the scope of this protocol. This protocol is applicable to the handling and disposition of displaced materials only. Further, materials that were not part of the natural site condition (e.g., building materials, equipment, waste, debris, or imported fill[1]) are not included in this protocol.

A draft of this protocol (dated October 3, 2012) was included in the Soil Management Plan associated with the Basis of Design Report/Pre-Final (90%) Design Submittal and Construction/Remediation Action Work Plan (September 8, 2014). Subsequent to agency review of the design submittal, this protocol has been revised per comment from the Department of the Interior (DOI) (Comment #803, DOI-333). The October 3, 2012 draft of this protocol included a provision for the long-term storage of material that is determined to be non-hazardous waste but unsuitable for a final disposition decision on-site because contaminants are present above the interim screening level. The 90% design submittal identified an area (located on federal land) for the long-term storage of material that is generated during construction of the final groundwater remedy and is characterized to meet this profile; however, the DOI comment indicates that based on discussions with San Bernardino County, the adjacent leasee of Moabi Regional Park, and internal discussions between the U.S. Bureau of Land Management (BLM) and the DOI, PG&E must find an alternate location for storage. Based on further clarifications from DOI and BLM, PG&E understood that storage of waste soil above screening levels would not be allowed anywhere on federal lands within the project area. The remaining potential storage locations are private properties owned by the Fort Mojave Indian Tribe (FMIT) and PG&E. Given the groundwater remedy facilities already planned to be located on the Topock Compressor Station (TCS) and the TCS's operational needs for the property for natural gas compressor operations, there is space on PG&E property only to temporarily store a small number of soil bins at a time while awaiting analysis prior to final disposition. There is no available space on PG&E property to store waste soil on a longer term basis. Nor have the FMIT identified any locations on the Tribe's property within the project area for this purpose. PG&E also contacted treatment storage and disposal facilities (TSDFs) and was told that the TSDFs would accept the waste soil for disposal, but not storage.

Given the above, PG&E determined that there was no available alternate location for the long-term storage of material with concentrations above the interim screening levels. Therefore, this protocol has been revised to exclude this provision.

---

1 For the purpose of this protocol, imported fill is defined as unconsolidated mixtures of sand, silt, and gravel (engineered gradations, or otherwise) that were not originally derived from inside the defined project boundary. Specific examples of imported fill material may include road base material, shading material used in pipeline trenches, or crushed rock used for railroad ballast.

1.0 Introduction

PG&E carefully plans Topock Remediation Project activities to minimize both the disturbance and displacement of site material. The land and soils are to be handled and managed with care and respect. Therefore, the protocol established in this plan is intended to minimize the amount of displaced material that leaves the site and instead, provide for eventual return, reuse, or restoration of the material onto the lands from which it was displaced. Through the application of this protocol and its incorporation into future work plans involving material displacement, it is anticipated that the goal of careful and respectful handling of soil material will be fulfilled.

In addition to addressing Tribal requests, this protocol was developed to comply with Mitigation Measure CUL-1a-8 as set forth in the certified Environmental Impact Report (EIR) and Mitigation Monitoring and Reporting Plan (MMRP) adopted by the California Department of Toxic Substances Control (DTSC). This measure requires PG&E to develop a Cultural Impact Mitigation Program (CIMP) as part of the final design of the approved groundwater remedy, and specifically subparagraph (g) requires the CIMP to include protocols for handling soil cuttings[2]. DTSC adopted this measure following its determination that the project area is a significant historical resource for California Environmental Quality Act (CEQA) purposes (Final EIR, p. 4.4-57). Similarly, as part of the consultation process for the Programmatic Agreement (PA) under Section 106 of the National Historic Preservation Act (NHPA), ~~the U.S. Bureau of Land Management (~~BLM~~)~~ determined that a traditional cultural property (TCP) eligible for inclusion on the National Register of Historic Places exists within the Area of Potential Effect (APE). Throughout this document, the term “site” refers to the project area~~ within the APE~~.

[2] Mitigation Measure CUL-1a-8(g) states the following: Protocols for the repatriation of clean soil cuttings generated during construction activities and during drilling associated with repair/replacement activities during operations and maintenance phases. The soil cuttings shall be managed in compliance with applicable laws and regulations on site.

2.0 Statement from Fort Mojave Indian Tribe

The following statement was made by the Fort Mojave Indian Tribe regarding the site background and cultural significance:

> *The Topock site and adjacent lands are part of a larger geographical area referred to as a Traditional Cultural Landscape (TCL). The TCL is the ancestral home of the Fort Mojave Indian Tribe and other Native American Tribes including the Hualapai Nation, Colorado River Indian Tribes, Quechan Nation, Cocopah Tribe, and Yavapai-Prescott Nation. This entire TCL is of tribal religious significance. In some areas and at certain times, tribal members carry out various cultural activities and religious ceremonies.*
>
> *The very nature of the remedial activities being performed at the Topock Compressor Station involve disturbance to the TCL. Such activities as drilling, soil sampling, excavation, construction, monitoring, testing, vehicle movement, foot traffic, geophysical and other surveys, emplacement of markers, and discharge of water, solids, and other material disturb the sanctity of the land that is held in the hearts of Native Americans.*
>
> *In particular, the removal and disturbance of soils, both surficially and from the subsurface, is of concern to the Tribes because such actions are regarded as profound disruptions of the sacred landscape. While the nature and significance of this concern is not easily understood by non-Native Americans, perhaps the following excerpt, attributed to the Duwamish Chief Sealth, begins to aid in the understanding:*
>
>> *Every part of this country is sacred to my people. Every hillside, every valley, every plain and grove has been hallowed by some fond memory or some sad experience of my tribe. Even the rocks that seem to lie dumb as they swelter in the sun along the silent seashore in solemn grandeur thrill with memories of past events connected with the fate of my people, and the very dust under your feet responds more lovingly to our footsteps than to yours, because it is the ashes of our ancestors, and our bare feet are conscious of the sympathetic touch, for the soil is rich with the life of our kindred. (Chief Sealth, 1854)*
>
> *The Pacific Gas & Electric Company (PG&E), in its implementation of the remedial actions required by the United States Department of the Interior (DOI) and the California Department of Toxic Substances Control (DTSC) must commit to performing these actions in a manner that is respectful of Native American values.*

3.0 General Protocol for Management of Displaced Material (Mitigation Measure: CUL-1a-8[g])

This section presents each element of the protocol for the management of displaced material, including work planning, handling and short-term storage, contamination assessment, ~~long-term storage,~~ and final disposition. A graphical presentation of key elements of this process, and associated decision points, is presented on Figure 1 at the end of this document.

Commented [CM1]: Note – This figure has been revised (not in redline) to remove the long-term storage pathway. Other elements of the figure are unchanged.

3.1 Work Planning

PG&E is required to prepare a work plan whenever a field activity is performed at the Topock site in support of a regulatory requirement or action. Through the established federal regulatory review process, these work plans are made available for review by process stakeholders and by the governments of affected Native American Indian Tribes (referred to as "Tribes" throughout this document) via the consultation process set forth in the PA's Consultation Protocol, consistent with Section 106 of the NHPA. In addition to the information describing the scope of work, field logistics and other implementation details, work plans that involve activities that displace site material also describe the process for the management and disposition of the materials. Work plans finalized subsequent to the development of this protocol will include specific description of the process for involving the input of Tribe(s) regarding the management of the material that will be displaced as a result of the work. Key procedural information to be included in the work plan will include, but not be limited to, the following:

- Summary of measures planned to minimize the amount of disturbance that will be incurred.
- Notification procedures to inform the Tribe(s), involved regulatory agencies, and affected land owner(s) regarding the proposed activities that will disturb/displace soil or other materials.
- The location of proposed disturbance activities (e.g. access pathways) and displacement activities (e.g. drilling or sampling locations), including maps.
- Estimation of the volume and type(s) of material that will be displaced.
- The location and methodology for short-term storage of displaced material (see Section 3.2).
- Methods that will be used to assess whether contaminants are present (see Section 3.3).
- Methods that will be used to minimize the volume of material that may be displaced during work including specific measures, such as field screening and material segregation strategies, to try and minimize the volume of material that requires disposal. ~~require long-term storage (see Section 3.4)~~.
- ~~The location and methodology for long-term storage (see Section 3.4).~~
- The anticipated location and methodology for final on- or off-site disposition (see Section 3.5).

3.2 Handling and Short-term Storage

Material that is displaced as a result of Topock Remediation Project activities including drilling, excavation, sample collection, testing, construction, grading, or other activities will be handled on-site in accordance with the project-specific work plan. Displaced material that must be characterized for key chemical properties prior to identifying the appropriate final disposition method will be stored for the short term. Short-term storage areas and the protocol for handing material in these areas may vary by project. Depending on the type and volume of material displaced, location, land owner considerations, and other pertinent factors, short-term storage methods may include storage devices (e.g. bins) or properly maintained stockpiles that prevent this material from commingling with other areas of the environment. In some cases, short-term storage for characterization may not be necessary. For example, displaced material that is pre-characterized or characterized rapidly as work is conducted will be managed directly for ~~long-term storage or~~ final disposition~~, as appropriate~~ (see Section~~s~~ ~~3.4 and~~ 3.~~5~~4~~, respectively~~).

Specific material handling and short-term storage details will be defined in the approved work plan for a given activity. Key details to be identified in the work plan include:

- The mode and location of short-term storage.
- The method of transfer from the point of origin to short-term staging area.
- Best management practices/regulatory requirements to prevent releases of the potentially contaminated material during transfer and storage.
- Best management practices to protect the material from weather, erosion, contamination, and vandalism while located in the short-term staging area(s).
- Method for segregation of soils based by location, as practicable and appropriate.

A key element of this handling protocol is the development of an inventory of all material displaced by Topock Remediation Project activities. Key information maintained in this inventory will include:

- Material displacement authorization – Specific work plan under which the work was conducted.
- Material origin – Specific location of the site.
- Material description (e.g., soil, rock, etc.).
- Date(s) of displacement or accumulation.

- Generating activity (e.g., drilling, excavation, etc.).
- Approximate volume of material stored.
- Short-term storage mode and location – Type of storage (including container identification number, as applicable) and location of short-term storage pending material characterization. In some cases, this information may need to be updated as containers are moved between areas of the site.
- Characterization status – Characterization sample information (e.g., date of submittal and laboratory used), date of receipt of results, and the contamination assessment based on comparison to screening criteria (see Section 3.3).
- ~~Long-term storage mode and location – Type of storage (including container identification number, as applicable) and location of long-term storage pending decision regarding final disposition (see Section 3.4). In some cases, this information may need to be updated as containers are moved between areas of the site.~~
- Final disposition information – Indication of the on-site or off-site final disposition action identified through discussion with Tribe(s), agencies, and the affected land owner(s), as appropriate, based on review of material type and the contamination assessment (see Section 3.~~5~~4).

Once the displaced material has been managed through final disposition, it will no longer be tracked in the displaced material inventory.

3.3 Contamination Assessment

Key chemical property information will be used to determine the final disposition method, and specifically, whether displaced material is suitable for retention on-site for eventual return, reuse, or replacement, or if the material must be removed from the site for disposal in accordance with applicable State and Federal laws and regulations. Key information that will be considered to assess whether the material is contaminated, and therefore, whether the material can remain on-site or not, includes:

- Existing information including knowledge of the history of an area, or laboratory analytical results collected during previous phases of work. Use of existing information may preclude the need for additional analytical testing. When available, this information will be included in the work plan.
- Results of characterization samples collected for laboratory analysis, and observation of the physical properties of the material (e.g., white powder, burned material, boulders, etc.), as defined in the approved work plan for a given activity.
- Screening values for various analytes identified for the purpose of determining the appropriate material disposition method. Tables 1 and 2 at the end of this document present a reference list of analytes and associated screening levels that may be applicable for making decisions related to disposition of displaced site materials. The specific analytes applicable for characterization of displaced material will be determined based on the origin of the material and potential disposition locations. Screening values included on Tables 1 and 2 are defined in the following bullets, which will be modified as screening levels are added to these tables:
  - **Interim Screening Levels (Table 1)** – This is predominantly the background value. However, if the background value is not available then the lesser of the DTSC residential California Human Health Screening Level (CHHSL) or the ecological comparison value is used. If a CHHSL is not available, it is the lesser of the United States Environmental Protection Agency (USEPA) residential regional screening level or the ecological comparison value. This value is the most conservative, and it is assumed that the project-specific cleanup goal and/or Tribal screening level will be equal to or greater than this value.

- **Hazardous Waste Toxicity Characteristic Levels (Table 2) –** These values are used to determine if the material should be classified as a State or Federal hazardous waste. Specifically, total constituent concentrations expressed in milligrams per kilogram (mg/kg) will be compared to the hazardous waste characteristic levels in Table 2, and will be evaluated as follows:

  1. If the total constituent concentration exceeds the total threshold limit concentration (TTLC), the soil represented by the sample will be classified as a non-RCRA California hazardous waste. Additional evaluation of the soluble threshold limit concentration (STLC), as described in step 3 below, will not be performed.
  2. If the total constituent concentration exceeds the numeric value of the RCRA toxicity characteristic (TC) level by about 20 times or more, the toxicity characteristic leaching procedure (TCLP) will be performed. If the constituent concentration in the TCLP leachate exceeds the TC level, the soil represented by the sample will be classified as a RCRA hazardous waste. Additional evaluation of the STLC, as described in step 3 below, will not be performed.
  3. If the sample has not been classified as hazardous waste in steps 1 or 2, the total constituent concentration will be compared to the STLC. If the total constituent concentration exceeds the numeric value of the STLC by about 10 times or more, the California Waste Extraction Test (WET) will be performed. If the constituent concentration in the WET exceeds the STLC, the soil represented by the sample will be classified as a non-RCRA California hazardous waste.
  4. If the sample has not been classified as a hazardous waste in steps 1, 2, or 3, or by other applicable hazardous waste standards, the soil represented by the sample will not be classified or managed as hazardous waste.

These values will be used to determine the final disposition of displaced material by comparing the representative concentration of a given volume of material to the screening values. The methodology for determining the representative concentration will be established in the project-specific work plan and should not be limited to a concentration-by-concentration comparison, but could include statistical estimates or averages based on multiple samples. Material that has a representative concentration that is equal to or below the interim screening level is suitable for return, reuse, or replacement on-site. Material that has a representative concentration that is greater than the interim screening level or is characterized as hazardous waste ~~must~~ will be disposed of off-site in accordance with applicable laws and regulations. ~~Material that has a representative concentration that is greater than the interim screening level, but not classified as a hazardous waste, will be stored on-site until the project-specific cleanup goals are established. Until these goals are established, material that falls into this intermediate category will be retained on-site for "long-term storage" (see Section 3.4).~~

The screening levels included in Tables 1 and 2 must be updated as applicable regulations and project-specific decisions are made. PG&E will review this information as remediation work plans are developed and implemented. As changes are determined appropriate, PG&E will submit revisions to the regulatory agencies and Tribe(s) for review and comment. Only agency approved values will be utilized.

Commented [CM2]: Note – Some of the screening levels on Table 1 have been updated (not in redline) as appropriate based on changes to the regulations since October 2012.

~~3.4 Long-Term Storage~~

~~Following contamination assessment, some material may be determined to be non-hazardous waste but unsuitable for final disposition on-site because contaminants are present above the interim screening level. Per DOI comment on this protocol (received in February 2012), this material cannot be returned to the land until project-specific cleanup goals are finalized in the Record of Decision (ROD) and may be stored until that time. Once these goals are established the contamination will be re-assessed based on existing data, or additional data as determined necessary, using the cleanup goals in place of the interim screening level to determine final disposition (see Section 3.5).~~

~~The long-term storage area(s) and the protocol for handling material in these areas may vary by project. Depending on the type and volume of material that must be stored, location, land owner considerations, and~~

~~other pertinent information, long-term storage methods may include storage devices (e.g. bins) or contained stockpiles that prevent this material from migrating away from the designated storage area(s). Coordination with agencies, Tribe(s), and affected land owners regarding the acceptable mode and location of long-term storage is critical in design of the work plan. Further, specific measures should be incorporated into the implementation of the given work plan, such as field screening and material segregation strategies, to try and minimize the volume of material that may require long-term storage.~~

3.~~5~~4 Final Disposition

Final disposition refers to the final action taken on behalf of the Topock Remediation Project as it relates to the management of material displaced during associated activities. This protocol has been designed with the purpose of minimizing the volume of material that is disposed of off-site. Material determined to have a representative concentration that is equal to or less than the interim screening level or project-specific cleanup goal (once established) will be retained on site for return, reuse, and/or restoration. Material determined to have a representative concentration that is greater than this value will be transported off site for disposal in accordance with applicable laws and regulations or treated on site if appropriate based on the selection of the final soil remedy. Material return, reuse, and/or restoration options associated with final disposition on site are discussed in Section 4.

4.0 Return, Reuse, and/or Restoration of Displaced Material

Final on-site disposition alternatives include the return, reuse, and/or restoration of the displaced material. The preferred disposition alternative(s) will be considered on a case-by-case basis with the regulatory agencies, Tribe(s), and affected land owner(s), as suitable material is identified. Material types may differ by physical or chemical properties, and therefore the preferred on-site disposition alternative may also vary. Alternatives that have been preliminarily identified include, but are not limited to:

- Replacement of material into original borings, trenches, or excavations, from which they were removed.
- Replacement of material into borings, trenches, or excavations other than those from which they were removed.
- Creation of topographical or landscape barriers to protect sensitive areas.
- Creation of berms or other structures (e.g., gabions) to prevent erosion.
- On-site road maintenance (this alternative may require sorting the material for different physical sizes).
- Stockpiling in designated areas.

The above list of final on-site disposition alternatives is preliminary, and should not be considered complete. Further, if material is found to contain concentrations of volatile organic compounds it may not be suitable for return, reuse, and/or restoration near buildings where vapor intrusion would be of concern. Coordination with agencies, Tribe(s), and affected land owners is critical in design of the work plan to identify the preferred on-site disposition alternative(s) and communication milestones, so the material can be efficiently managed.

Material displaced as part of past remediation project activities was managed in accordance with project-specific work plans. As a result, some material has been retained at the site because contaminant concentrations were below the Interim Screening Level ~~(previously displaced material that has exceeded these levels was disposed off-site in accordance with the work plans)~~. Therefore, previously displaced material is available for the return, reuse, and/or restoration alternatives included in the bullets above, or as additional uses are developed. As of June 2012, the estimated volume of material that has been retained and stockpiled through past remediation project activities is approximately 30 to 35 cubic yards.

TABLE 1

Reference List of Potentially Applicable Analytes and Associated Screening Levels (rev. July 2015)

Management Protocol for Handling and Disposition of Displaced Material

PG&E Topock Compressor Station, Needles, California

Group	Analyte	Interim Screening Level		Interim Screening Level Source	Hazardous Waste Disposal Criteria
Dioxins and Furans (ng/kg)					
	1,2,3,4,6,7,8-HpCDD	NE		Not Established	NE
	1,2,3,4,6,7,8-HpCDF	NE		Not Established	NE
	1,2,3,4,7,8,9-HpCDF	NE		Not Established	NE
	1,2,3,4,7,8-HxCDD	NE		Not Established	NE
	1,2,3,4,7,8-HxCDF	NE		Not Established	NE
	1,2,3,6,7,8-HxCDD	NE		Not Established	NE
	1,2,3,6,7,8-HxCDF	NE		Not Established	NE
	1,2,3,7,8,9-HxCDD	NE		Not Established	NE
	1,2,3,7,8,9-HxCDF	NE		Not Established	NE
	1,2,3,7,8-PeCDD	4.8		EPA Residential RSL	NE
	1,2,3,7,8-PeCDF	NE		Not Established	NE
	2,3,4,6,7,8-HxCDF	NE		Not Established	NE
	2,3,4,7,8-PeCDF	NE		Not Established	NE
	2,3,7,8-TCDD	4.8		EPA Residential RSL	See Table 2
	2,3,7,8-TCDF	NE		Not Established	NE
	OCDD	NE		Not Established	NE
	OCDF	NE		Not Established	NE
	TEQ Avian	16		Soil Ecological Comparison Value (ECV)	NE
	TEQ Human	50		DTSC HHRA Note 2	NE
	TEQ Mammals	1.6		Soil Ecological Comparison Value (ECV)	NE
Metals (mg/kg)					
	Aluminum	16,400		Background Level	NE
	Antimony	0.285		Soil Ecological Comparison Value (ECV)	See Table 2
	Arsenic	11	*	Background Level	See Table 2
	Barium	410	*	Background Level	See Table 2
	Beryllium	0.672		Background Level	See Table 2
	Cadmium	1.1	*	Background Level	See Table 2
	Calcium	66,500		Background Level	NE
	Chromium, Hexavalent	0.83	*	Background Level	See Table 2
	Chromium, total	39.8	*	Background Level	See Table 2
	Cobalt	12.7	*	Background Level	See Table 2
	Copper	16.8		Background Level	See Table 2
	Cyanide	0.9		Soil Ecological Comparison Value (ECV)	NE
	Iron	55,000		EPA Residential RSL	NE
	Lead	8.39	*	Background Level	See Table 2
	Magnesium	12,100		Background Level	NE
	Manganese	402	*	Background Level	NE
	Mercury	0.0125		Soil Ecological Comparison Value (ECV)	See Table 2
	Molybdenum	1.37	*	Background Level	See Table 2
	Nickel	27.3	*	Background Level	See Table 2
	Potassium	4,400		Background Level	NE
	Selenium	1.47	*	Background Level	See Table 2
	Silver	5.15		Soil Ecological Comparison Value (ECV)	See Table 2
	Sodium	2,070		Background Level	NE
	Thallium	0.78		EPA Residential RSL	See Table 2
	Vanadium	52.2	*	Background Level	See Table 2
	Zinc	58	*	Background Level	See Table 2

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Group	Analyte	Interim Screening Level	Interim Screening Level Source	Hazardous Waste Disposal Criteria
Pesticides (µg/kg)				
	4,4-DDD	2.1	Soil Ecological Comparison Value (ECV)	See Table 2
	4,4-DDE	2	EPA Residential RSL	See Table 2
	4,4-DDT	1.9	EPA Residential RSL	See Table 2
	Aldrin	39	EPA Residential RSL	See Table 2
	alpha-BHC	86	EPA Residential RSL	NE
	alpha-Chlordane	470	Soil Ecological Comparison Value (ECV)	See Table 2
	beta-BHC	300	EPA Residential RSL	NE
	delta-BHC	300	EPA Residential RSL	NE
	Dieldrin	5	Soil Ecological Comparison Value (ECV)	See Table 2
	Endo sulfan I	470,000	EPA Residential RSL	NE
	Endo sulfan II	470,000	EPA Residential RSL	NE
	Endosulfan sulfate	470,000	EPA Residential RSL	NE
	Endrin	19,000	EPA Residential RSL	See Table 2
	Endrin aldehyde	19,000	EPA Residential RSL	NE
	Endrin ketone	19,000	EPA Residential RSL	NE
	gamma-BHC (Lindane)	570	EPA Residential RSL	See Table 2
	gamma-Chlordane	0.43	DTSC-Residential SLs	See Table 2
	Heptachlor	130	EPA Residential RSL	See Table 2
	Heptachlor Epoxide	70	EPA Residential RSL	See Table 2
	Methoxychlor	320,000	EPA Residential RSL	See Table 2
	Toxaphene	490	EPA Residential RSL	See Table 2
Polyaromatic Hydrocarbons (µg/kg)				
	1-Methyl naphthalene	18,000	EPA Residential RSL	NE
	2-Methyl naphthalene	240,000	EPA Residential RSL	NE
	Acenaphthene	3,600,000	EPA Residential RSL	NE
	Acenaphthylene	3,600,000	EPA Residential RSL	NE
	Anthracene	18,000,000	EPA Residential RSL	NE
	B(a)P Equivalent	16	EPA Residential RSL	NE
	Benzo (a) anthracene	160	EPA Residential RSL	NE
	Benzo (a) pyrene	16	EPA Residential RSL	NE
	Benzo (b) fluoranthene	160	EPA Residential RSL	NE
	Benzo (ghi) perylene	1,800,000	EPA Residential RSL	NE
	Benzo (k) fluoranthene	0.39	DTSC-Residential SLs	NE
	Chrysene	3.9	DTSC-Residential SLs	NE
	Dibenzo (a,h) anthracene	16	EPA Residential RSL	NE
	Fluoranthene	2,400,000	EPA Residential RSL	NE
	Fluorene	2,400,000	EPA Residential RSL	NE
	Indeno (1,2,3-cd) pyrene	160	EPA Residential RSL	NE
	Naphthalene	3,800	EPA Residential RSL	NE
	PAH High molecular weight	1,160	Soil Ecological Comparison Value (ECV)	NE
	PAH Low molecular weight	10,000	Soil Ecological Comparison Value (ECV)	NE
	Phenanthrene	1,800,000	EPA Residential RSL	NE
	Pyrene	1,800,000	EPA Residential RSL	NE
Polychlorinated Biphenyls (µg/kg)				
	Aroclor 1016	0.23	DTSC-Residential SLs	See Table 2
	Aroclor 1221	170	EPA Residential RSL	See Table 2

TABLE 1

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PG&E Topock Compressor Station, Needles, California

Group	Analyte	Interim Screening Level	Interim Screening Level Source	Hazardous Waste Disposal Criteria
Polychlorinated Biphenyls (µg/kg)				
	Aroclor 1232	170	EPA Residential RSL	See Table 2
	Aroclor 1242	230	EPA Residential RSL	See Table 2
	Aroclor 1248	230	EPA Residential RSL	See Table 2
	Aroclor 1254	240	EPA Residential RSL	See Table 2
	Aroclor 1260	240	EPA Residential RSL	See Table 2
	Aroclor 1262	240	EPA Residential RSL	See Table 2
	Aroclor 1268	240	EPA Residential RSL	See Table 2
	Total PCBs	204	Soil Ecological Comparison Value (ECV)	See Table 2
Semivolatile Organic Compounds (µg/kg)				
	1,1´-Biphenyl	47,000	EPA Residential RSL	NE
	1,2,4,5-Tetrachlorobenzene	23,000	EPA Residential RSL	NE
	1,4-Dioxane	5,300	EPA Residential RSL	NE
	2,3,4,6-Tetrachlorophenol	1,900,000	EPA Residential RSL	NE
	2,4,5-Trichlorophenol	6,300,000	EPA Residential RSL	See Table 2
	2,4,6-Trichlorophenol	7.5	DTSC-Residential SLs	See Table 2
	2,4-Dichlorophenol	190,000	EPA Residential RSL	NE
	2,4-Dimethylphenol	1,300,000	EPA Residential RSL	NE
	2,4-Dinitrophenol	130,000	EPA Residential RSL	NE
	2,4-Dinitrotoluene	1,700	EPA Residential RSL	See Table 2
	2,6-Dinitrotoluene	360	EPA Residential RSL	NE
	2-Chloro naphthalene	4,800,000	EPA Residential RSL	NE
	2-Chlorophenol	390,000	EPA Residential RSL	NE
	2-Methylphenol (o-Cresol)	3,200,000	EPA Residential RSL	See Table 2
	2-Nitroaniline	630,000	EPA Residential RSL	NE
	3,3-Dichlorobenzidene	1,200	EPA Residential RSL	NE
	3-Nitroaniline	630,000	EPA Residential RSL	NE
	4,6-Dinitro-2-methylphenol	5,100	EPA Residential RSL	NE
	4-Chloro-3-methylphenol	6,300,000	EPA Residential RSL	NE
	4-Chloroaniline	2,700	EPA Residential RSL	NE
	4-Methylphenol (p-Cresol)	500	Soil Ecological Comparison Value (ECV)	See Table 2
	4-Nitroaniline	27,000	EPA Residential RSL	NE
	Acetophenone	7,800,000	EPA Residential RSL	NE
	Atrazine	2,400	EPA Residential RSL	NE
	Benzaldehyde	7,800,000	EPA Residential RSL	NE
	Benzoic acid	250,000,000	EPA Residential RSL	NE
	Benzyl alcohol	6,300,000	EPA Residential RSL	NE
	Bis (2-chloroethoxy) methane	190,000	EPA Residential RSL	NE
	Bis (2-ethylhexyl) phthalate	2,870	Soil Ecological Comparison Value (ECV)	NE
	Butyl benzyl phthalate	290,000	EPA Residential RSL	NE
	Caprolactam	31,000,000	EPA Residential RSL	NE
	Carbazole	1,600,000	EPA Residential RSL	NE
	Dibenzofuran	73,000	EPA Residential RSL	NE
	Diethyl phthalate	51,000,000	EPA Residential RSL	NE
	Dimethyl phthalate	51,000,000	EPA Residential RSL	NE
	Di-N-butyl phthalate	46.9	Soil Ecological Comparison Value (ECV)	NE
	Di-N-octyl phthalate	630,000	EPA Residential RSL	NE
	Hexachlorobenzene	210	EPA Residential RSL	See Table 2

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PG&E Topock Compressor Station, Needles, California

Group	Analyte	Interim Screening Level	Interim Screening Level Source	Hazardous Waste Disposal Criteria
Semivolatile Organic Compounds (µg/kg)				
	Hexachloroethane	1,800	EPA Residential RSL	See Table 2
	N-Nitroso-di-n-propylamine	78	EPA Residential RSL	NE
	N-nitrosodiphenylamine	110,000	EPA Residential RSL	NE
	Pentachlorophenol	1,000	EPA Residential RSL	See Table 2
	Phenol	19,000,000	EPA Residential RSL	NE
Total Petroleum Hydrocarbons (mg/kg)				
	TPH as diesel	240	SF RWQCB ESL for direct exposure (2013)	NE
	TPH as gasoline	770	SF RWQCB ESL for direct exposure (2013)	NE
	TPH as motor oil	10,000	SF RWQCB ESL for direct exposure (2013)	NE
Volatile Organic Compounds (µg/kg)				
	1,1,1,2-Tetrachloroethane	550	DTSC-Residential SLs	NE
	1,1,1-Trichloroethane	1,700	DTSC-Residential SLs	NE
	1,1,2,2-Tetrachloroethane	600	EPA Residential RSL	NE
	1,1,2-Trichloroethane	1,100	EPA Residential RSL	NE
	1,1,2-Trichlorotrifluoroethane (Freon 113)	40,000,000	EPA Residential RSL	NE
	1,1-Dichloroethane	1,600	DTSC-Residential SLs	NE
	1,1-Dichloroethene	230,000	EPA Residential RSL	See Table 2
	1,1-Dichloropropene	1,800	EPA Residential RSL	NE
	1,2,3-Trichlorobenzene	63,000	EPA Residential RSL	NE
	1,2,3-Trichloropropane	5.1	EPA Residential RSL	NE
	1,2,4-Trichlorobenzene	24,000	EPA Residential RSL	NE
	1,2,4-Trimethylbenzene	58,000	EPA Residential RSL	NE
	1,2-Dibromo-3-chloropropane	5.3	EPA Residential RSL	NE
	1,2-Dibromoethane	7.2	DTSC-Residential SLs	NE
	1,2-Dichlorobenzene	1,800,000	EPA Residential RSL	NE
	1,2-Dichloroethane	460	EPA Residential RSL	See Table 2
	1,2-Dichloropropane	1,000	EPA Residential RSL	NE
	1,3,5-Trimethylbenzene	210	DTSC-Residential SLs	NE
	1,3-Dichlorobenzene	1,800,000	EPA Residential RSL	NE
	1,3-Dichloropropane	420	DTSC-Residential SLs	NE
	1,4-Dichlorobenzene	2,600	EPA Residential RSL	See Table 2
	2,2-Dichloropropane	1,600,000	EPA Residential RSL	NE
	2-Chlorotoluene	480	DTSC-Residential SLs	NE
	2-Hexanone	200,000	EPA Residential RSL	NE
	4-Isopropyltoluene	1,900,000	EPA Residential RSL	NE
	Acetone	61,000,000	EPA Residential RSL	NE
	Acrolein	140	EPA Residential RSL	NE
	Acrylonitrile	0.068	DTSC-Residential SLs	NE
	Benzene	0.33	DTSC-Residential SLs	See Table 2
	Bis (2-chloroethyl) ether	230	EPA Residential RSL	NE
	Bis (2-chloroisopropyl) ether	4,900	EPA Residential RSL	NE
	Bromobenzene	290,000	EPA Residential RSL	NE
	Bromochloromethane	150,000	EPA Residential RSL	NE
	Bromodichloromethane	280	DTSC-Residential SLs	NE
	Bromoform	19,000	EPA Residential RSL	NE
	Bromomethane	6,800	EPA Residential RSL	NE

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Management Protocol for Handling and Disposition of Displaced Material

PG&E Topock Compressor Station, Needles, California

Group	Analyte	Interim Screening Level	Interim Screening Level Source	Hazardous Waste Disposal Criteria
Volatile Organic Compounds (µg/kg)				
	Carbon disulfide	770,000	EPA Residential RSL	NE
	Carbon tetrachloride	0.099	DTSC-Residential SLs	See Table 2
	Chlorobenzene	280,000	EPA Residential RSL	See Table 2
	Chloroethane	3.1	DTSC-Residential SLs	NE
	Chloroform	320	EPA Residential RSL	See Table 2
	Chloromethane	110,000	EPA Residential RSL	NE
	cis-1,2-Dichloroethene	19	DTSC-Residential SLs	NE
	cis-1,3-Dichloropropene	1,800	EPA Residential RSL	NE
	Cyclohexane	6,500,000	EPA Residential RSL	NE
	Dibromochloromethane	750	EPA Residential RSL	NE
	Dibromomethane	23,000	EPA Residential RSL	NE
	Dichlorodifluoromethane	87,000	EPA Residential RSL	NE
	Ethylbenzene	5,800	EPA Residential RSL	NE
	Hexachlorobutadiene	1,200	EPA Residential RSL	See Table 2
	Hexachlorocyclopentadiene	1,800	EPA Residential RSL	NE
	Isophorone	570,000	EPA Residential RSL	NE
	Isopropylbenzene	1,900,000	EPA Residential RSL	NE
	m,p-Xylenes	550,000	EPA Residential RSL	NE
	Methyl acetate	24,000	DTSC-Residential SLs	NE
	Methyl ethyl ketone	27,000,000	EPA Residential RSL	See Table 2
	Methyl isobutyl ketone	5,300,000	EPA Residential RSL	NE
	Methyl tert-butyl ether (MTBE)	47,000	EPA Residential RSL	NE
	Methylcyclohexane	6,500,000	EPA Residential RSL	NE
	Methylene chloride	5.5	DTSC-Residential SLs	NE
	N-Butylbenzene	1,200	DTSC-Residential SLs	NE
	Nitrobenzene	5,100	EPA Residential RSL	See Table 2
	N-Propylbenzene	3,800,000	EPA Residential RSL	NE
	o-Xylene	650,000	EPA Residential RSL	NE
	p-Chlorotoluene	440	DTSC-Residential SLs	NE
	sec-Butylbenzene	2,200	DTSC-Residential SLs	NE
	Styrene	6,000,000	EPA Residential RSL	NE
	tert-Butylbenzene	2,200	DTSC-Residential SLs	NE
	Tetrachloroethene	0.6	DTSC-Residential SLs	See Table 2
	Toluene	1,100	DTSC-Residential SLs	NE
	trans-1,2-Dichloroethene	190	DTSC-Residential SLs	NE
	trans-1,3-Dichloropropene	1,800	EPA Residential RSL	NE
	Trichloroethene	940	EPA Residential RSL	See Table 2
	Trichlorofluoromethane (Freon 11)	730,000	EPA Residential RSL	NE
	Vinyl chloride	59	EPA Residential RSL	See Table 2
	Xylenes, total	650,000	EPA Residential RSL	NE

Notes:

This table presents a reference list of analytes and associated screening levels that may be applicable for making decisions related to disposition of displaced site materials. The specific analytes and screening levels applicable for characterization of displaced material will be determined based on the origin of the material and potential disposition locations.

Interim screening level is background value. If background value is not available then the lesser of the DTSC HHRA Note 3 Residential Screening Levels (DTSC Residential SL) or the ecological comparison value is used. If a DTSC Residential SL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

Background	"Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California" (CH2M HIll 2009c)
DTSC-Residential SLs	Human Health Risk Assessment Note 3 – DTSC-Modified Screening Levels, May 2015.
EPA Residential RSL	United States Environmental Protection Agency Residential Soil Regional Screening Level (THQ=1.0), June 2015.
ECV	Ecological Comparison Values; ECV were calculated as needed for constituents detected during the Part A Phase I sampling (Arcadis 2008)
HHRA Note 2	DTSC Human Health Risk Assessment (HHRA) Note 2: Remedial Goals for Dioxins and Dioxin-like Compounds for Consideration at California Hazardous Waste Sites – Interim (May 2009).
SF RWQCB ESL	San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels for residential direct exposure (2013)
*	One or more screening levels (EPA Residential RSL, DTSC-Residential SLs, ECV, or Soil SL) have values lower than the background level.
NE	not established
mg/kg	milligrams per kilogram
ng/kg	nanograms per kilogram
µg/kg	micrograms per kilogram

TABLE 2

Hazardous Waste Toxicity Characteristic Levels

Management Protocol for Handling and Disposition of Displaced Material

PG&E Topock Compressor Station, Needles, California

Group	Analyte	TTLC [a, i]	STLC [b] Screen	RCRA TC [c] Screen	STLC [d, i] (from WET)	RCRA TC [e] (from TCLP)	EPA HW [f]
		mg/kg	mg/kg	mg/kg	mg/L	mg/L	
Asbetos							
	Asbestos	1%	NE	NE	NE	NE	NE
Dioxins and Furans							
	2,3,7,8-TCDD	0.01	0.01	NE	0.001	NE	NE
Metals							
	Antimony	500	150	NE	15	NE	NE
	Arsenic	500	50	100	5	5	D004
	j Barium	10,000	1,000	2,000	100	100	D005
	Beryllium	75	7.5	NE	0.75	NE	NE
	Cadmium	100	10	20	1	1	D006
	Chromium, Hexavalent	500	50	NE	5	NE	NE
	k Chromium, total	2,500	50	100	5	5	D007
	Cobalt	8,000	800	NE	80	NE	NE
	Copper	2,500	250	NE	25	NE	NE
	Lead	1,000	50	100	5	5	D008
	Mercury	20	2	4	0.2	0.2	D009
	l Molybdenum	3,500	3,500	NE	350	NE	NE
	Nickel	2,000	200	NE	20	NE	NE
	Selenium	100	10	20	1	1	D010
	Silver	500	50	100	5	5	D011
	Thallium	700	70	NE	7	NE	NE
	Vanadium	2,400	240	NE	24	NE	NE
	Zinc	5,000	2,500	NE	250	NE	NE
Pesticides							
	4,4-DDD	1	1	NE	0.1	NE	NE
	4,4-DDE	1	1	NE	0.1	NE	NE
	4,4-DDT	1	1	NE	0.1	NE	NE
	Aldrin	1.4	1.4	NE	0.14	NE	NE
	alpha-Chlordane	2.5	2.5	0.6	0.25	0.03	D020
	Dieldrin	8	8	NE	0.8	NE	NE
	Endrin	0.2	0.2	0.4	0.02	0.02	D012
	gamma-BHC (Lindane)	4	4	8	0.4	0.4	D013
	gamma-Chlordane	2.5	2.5	0.6	0.25	0.03	D020
	Heptachlor	4.7	4.7	0.16	0.47	0.008	D031
	Heptachlor Epoxide	4.7	4.7	0.16	0.47	0.008	D031
	Methoxychlor	100	100	200	10	10	D014
	Toxaphene	5	5	10	0.5	0.5	D015
Polychlorinated Biphenyls							
	Aroclor 1016	50	50	NE	5	NE	NE
	Aroclor 1221	50	50	NE	5	NE	NE
	Aroclor 1232	50	50	NE	5	NE	NE
	Aroclor 1242	50	50	NE	5	NE	NE
	Aroclor 1248	50	50	NE	5	NE	NE
	Aroclor 1254	50	50	NE	5	NE	NE
	Aroclor 1260	50	50	NE	5	NE	NE
	Aroclor 1262	50	50	NE	5	NE	NE
	Aroclor 1268	50	50	NE	5	NE	NE

TABLE 2

Hazardous Waste Toxicity Characteristic Levels

Management Protocol for Handling and Disposition of Displaced Material

PG&E Topock Compressor Station, Needles, California

Group	Analyte	TTLC [a, i]	STLC [b] Screen	RCRA TC [c] Screen	STLC [d, i] (from WET)	RCRA TC [e] (from TCLP)	EPA HW [f]
		mg/kg	mg/kg	mg/kg	mg/L	mg/L	
Polychlorinated Biphenyls							
	Total PCBs	50	50	NE	5	NE	NE
Semivolatile Organic Compounds							
	2,4-Dinitrotoluene	NE	NE	2.6	NE	0.13	D030
g	2-Methylphenol (o-Cresol)	NE	NE	4,000	NE	200	D023
g	3-Methylphenol (m-Cresol)	NE	NE	4,000	NE	200	D024
g	4-Methylphenol (p-Cresol)	NE	NE	4,000	NE	200	D025
	Hexachlorobenzene	NE	NE	2.6	NE	0.13	D032
	Hexachloroethane	NE	NE	60	NE	3	D034
	Pentachlorophenol	17	17	2,000	1.7	100	D037
Volatile Organic Compounds							
	1,1-Dichloroethene	NE	NE	14	NE	0.7	D029
	1,2-Dichloroethane	NE	NE	10	NE	0.5	D028
	1,4-Dichlorobenzene	NE	NE	150	NE	7.5	D027
	2,4,5-Trichlorophenol	NE	NE	8,000	NE	400	D041
	2,4,6-Trichlorophenol	NE	NE	40	NE	2	D042
	Benzene	NE	NE	10	NE	0.5	D018
	Carbon tetrachloride	NE	NE	10	NE	0.5	D019
	Chlorobenzene	NE	NE	2,000	NE	100	D021
	Chloroform	NE	NE	120	NE	6	D022
	Hexachlorobutadiene	NE	NE	10	NE	0.5	D033
	Methyl ethyl ketone	NE	NE	4,000	NE	200	D035
	Nitrobenzene	NE	NE	40	NE	2	D036
	Tetrachloroethene	NE	NE	14	NE	0.7	D039
	Trichloroethene	2,040	2,040	10	204	0.5	D040
	Vinyl chloride	NE	NE	4	NE	0.2	D043

Notes:

NE	not established
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
EPA HW	Environmental Protection Agency Hazardous Waste Code
TC	Toxicity Characteristic
TTLC	Total Threshold Limit Concentration
STLC	Soluble Threshold Limit Concentration
RCRA	Resource Conservation and Recovery Act
TCLP	Toxicity Characteristic Leaching Procedure
WET	California Waste Extraction Test

Hazardous waste critiera exist for kepone, 2,4-D, mirex, pyridine, and 2,45-TP (Silvex); however, since they are not contaminants of potential concern at the Topock site, they are excluded from this table.

a Total Threshold Limit Concentration (TTLC) from 22 CCR 66261.24(a)(2). Calculated based on the concentration of the elements, not the compounds.

b Screening level is 10x Soluble Threshold Limit Concentraction (STLC). If screening level is exceeded in total analysis, California Waste Extraction Test (WET) should be run to evaluate whether STLC is exceeded.

c Screening level is 20x RCRA Toxicity Characteristic (TC). If screening level is exceeded in total analysis, Toxicity Characteristic Leaching Procedure (TCLP) should be run to evaluate whether RCRA TC is exceeded.

d Soluble threshold limit concentration from 22 CCR 66261.24(a)(2), measured using the WET. Calculated based on the concentration of the elements, not the compounds.

e RCRA TC level from 22 CCR 66261.24(a)(1), measured using the TCLP.

f A waste is assigned a RCRA waste code for each constituent where the results of the TCLP equal or exceed the RCRA TC level.

g If o-, m- and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/L.

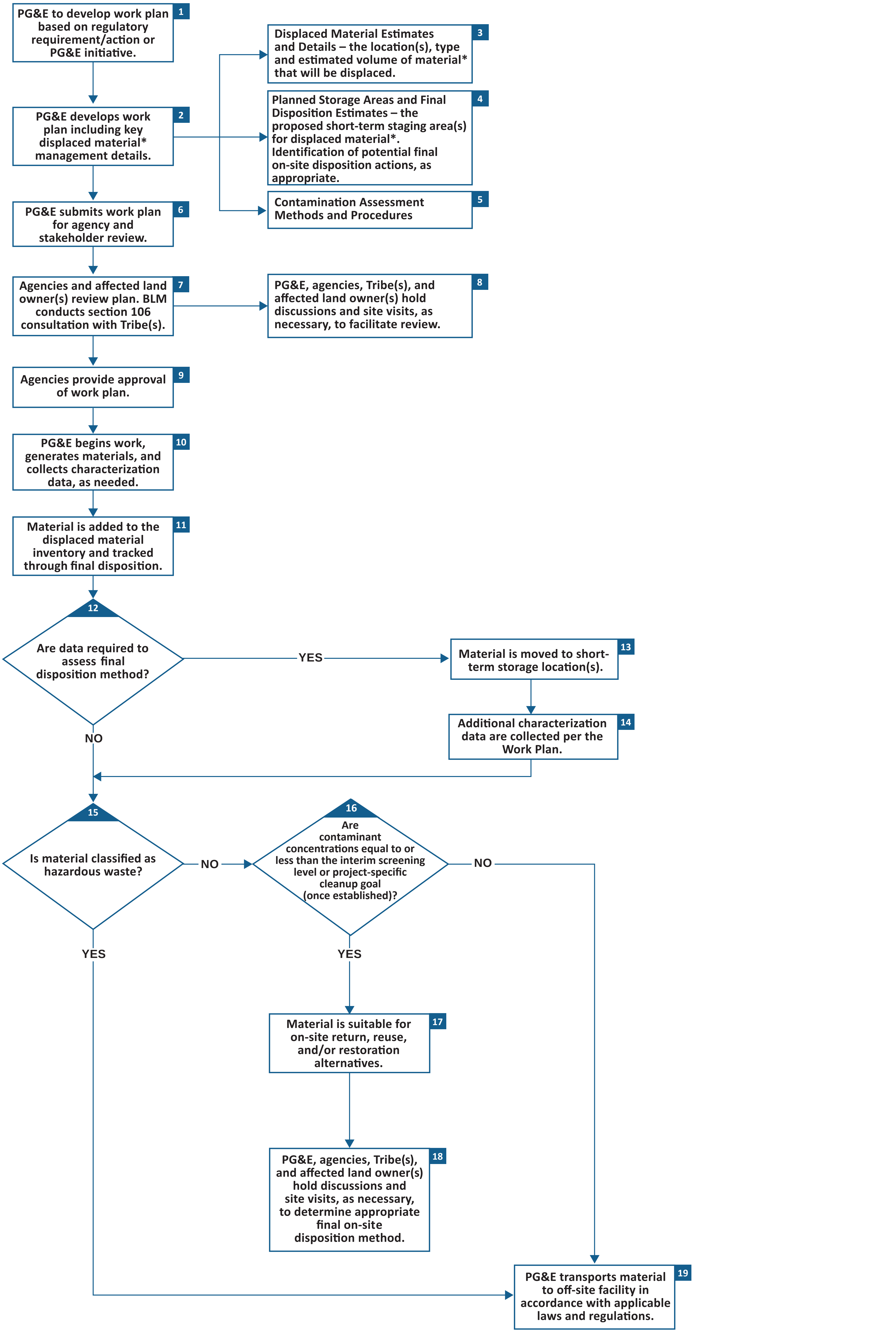
h This footnote letter skipped intentionally.

i In the case of asbestos and elemental metals, the specified concentration limits apply only if the substances are in a friable, powdered or finely divided state. Asbestos includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

j TTLC and STLC exclude barite. TTLC excludes barium sulfate.

k For STLC, if the waste does not exceed the RCRA TC or exhibit another RCRA hazardous characteristic, the STLC is 560 mg/L, not 5 mg/L.

l For TTLC, excludes molybdenum disulfide.



Notes:

* Throughout this figure the term "material" is defined as soil and rock that may be displaced (i.e., removed from the Earth) as a result of work activities including drilling, excavation, sample collection, testing, construction, grading, or other activities. This does not include materials that were not part of the natural site condition (e.g. building materials, equipment, or imported fill).

Throughout this figure, the term “site” refers to the area within the Area of Potential Effect (APE).

FIGURE 1
General Management Protocol for Handling and Disposition of Displaced Site Material
PG&E Topock Remediation Project
Needles, California

LEGEND:

FENCE LINE

NOTES:

1. PARKING SURFACE WILL BE GRAVEL DURING INITIAL CONSTRUCTION, BUT MAY BE PAVED WITH ASPHALT IN THE FUTURE.
2. CONFIGURATION AND COMPOSITION OF THE REMEDY SUPPORT AREA MAY CHANGE OVER THE LIFE OF THE REMEDY. E□PECTED CONFIGURATION DURING CONSTRUCTION IS DEPICTED HERE.
3. FINAL LAYOUT OF TEMPORARY CONSTRUCTION AND LAYDOWN AREAS TO BE DETERMINED BY CONTRACTOR. REPRESENTATIVE USE OF THE AREA IS DEPICTED HERE.

0 30' 60' 90'

SCALE: 1"=30'

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	MSL	JPB	JEF

REVISIONS

APPROVED BY		
JEF	SO	
	SUPV	JPB
	DSGN	MSL
	DWN	AJW
	CHKD	JPB
	OK	JEF
	DATE	6/9/15
	SCALES	1"=30'

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONSTRUCTION
HEAD□UARTERS YARD PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
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LEGEND:

- FENCE LINE
- ELECTRICAL AND TELECOMMUNICATIONS CONNECTION
- FIRE PROTECTION WATER AND SEWER CONNECTION
- WATER CONNECTION

NOTES:

1. CONFIGURATION AND COMPOSITION OF THE REMEDY SUPPORT AREA MAY CHANGE OVER THE LIFE OF THE REMEDY. E□PECTED CONFIGURATION DURING CONSTRUCTION IS DEPICTED HERE.
2. FINAL LAYOUT OF TEMPORARY CONSTRUCTION AND LAYDOWN AREAS TO BE DETERMINED BY CONTRACTOR. REPRESENTATIVE USE OF THE AREA IS DEPICTED HERE.

- DRAFT -
NOT FOR
CONSTRUCTION

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	MSL	JPB	JEF

REVISIONS

APPROVED BY: JEF

SO	
SUPV	JPB
DSGN	MSL
DWN	AJW
CHKD	JPB
OK	JEF
DATE	6/9/15
SCALES	1"=30'

ETIC ENGINEERING

ARCADIS

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONSTRUCTION HEAD□UARTERS
UTILITY CONNECTIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
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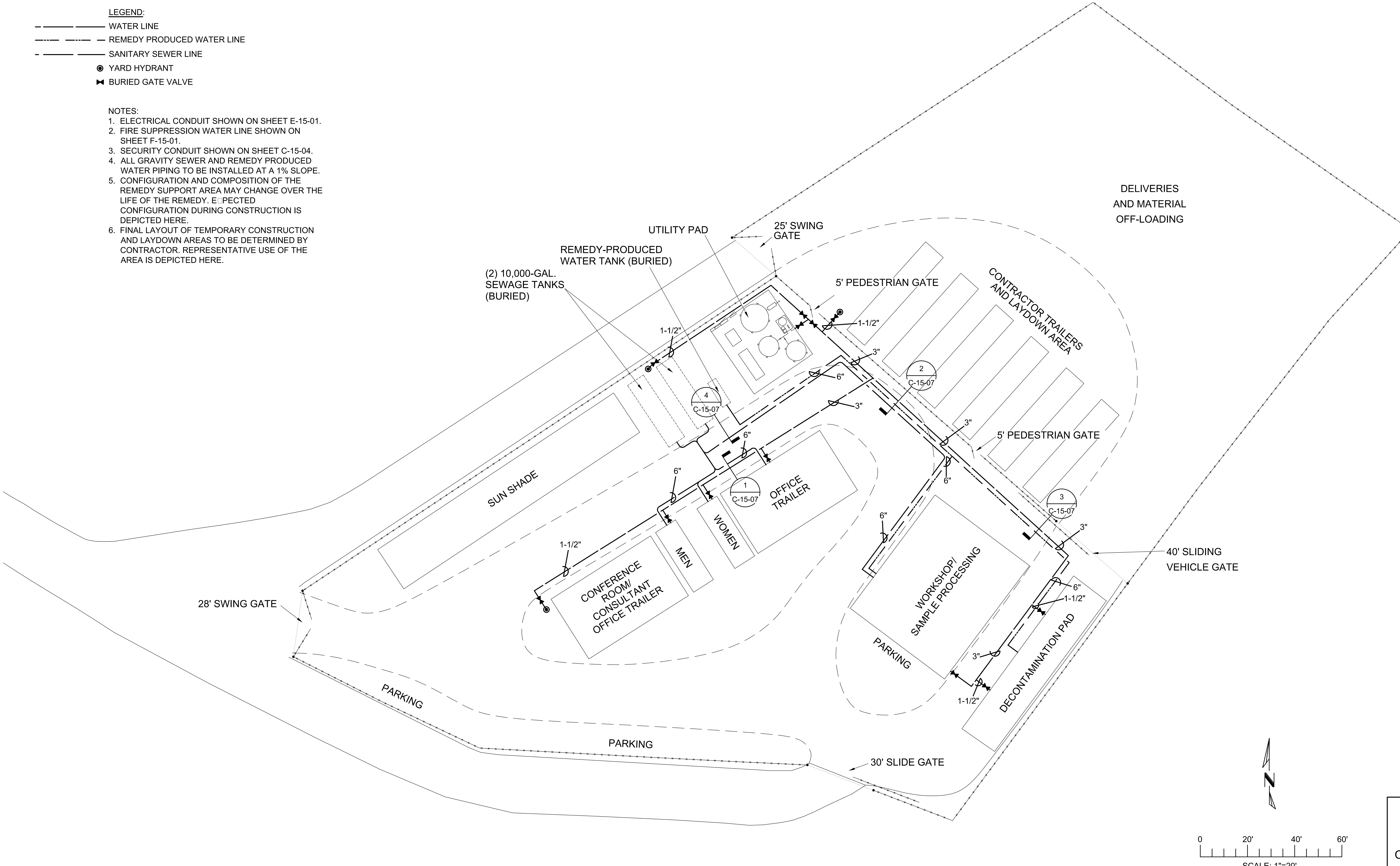
LEGEND:

- WATER LINE
- REMEDY PRODUCED WATER LINE
- SANITARY SEWER LINE
- YARD HYDRANT
- BURIED GATE VALVE

NOTES:

1. ELECTRICAL CONDUIT SHOWN ON SHEET E-15-01.
2. FIRE SUPPRESSION WATER LINE SHOWN ON SHEET F-15-01.
3. SECURITY CONDUIT SHOWN ON SHEET C-15-04.
4. ALL GRAVITY SEWER AND REMEDY PRODUCED WATER PIPING TO BE INSTALLED AT A 1% SLOPE.
5. CONFIGURATION AND COMPOSITION OF THE REMEDY SUPPORT AREA MAY CHANGE OVER THE LIFE OF THE REMEDY. E□PECTED CONFIGURATION DURING CONSTRUCTION IS DEPICTED HERE.
6. FINAL LAYOUT OF TEMPORARY CONSTRUCTION AND LAYDOWN AREAS TO BE DETERMINED BY CONTRACTOR. REPRESENTATIVE USE OF THE AREA IS DEPICTED HERE.



- DRAFT - NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	MSL	JPB	JEF

REVISIONS

APPROVED BY		
JEF	SO	
	SUPV	JPB
	DSGN	MSL
	DWN	AJW
	CHKD	JPB
	OK	JEF
	DATE	7/15/15
	SCALES	1"=20'

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONSTRUCTION HEAD□UARTERS PIPING PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
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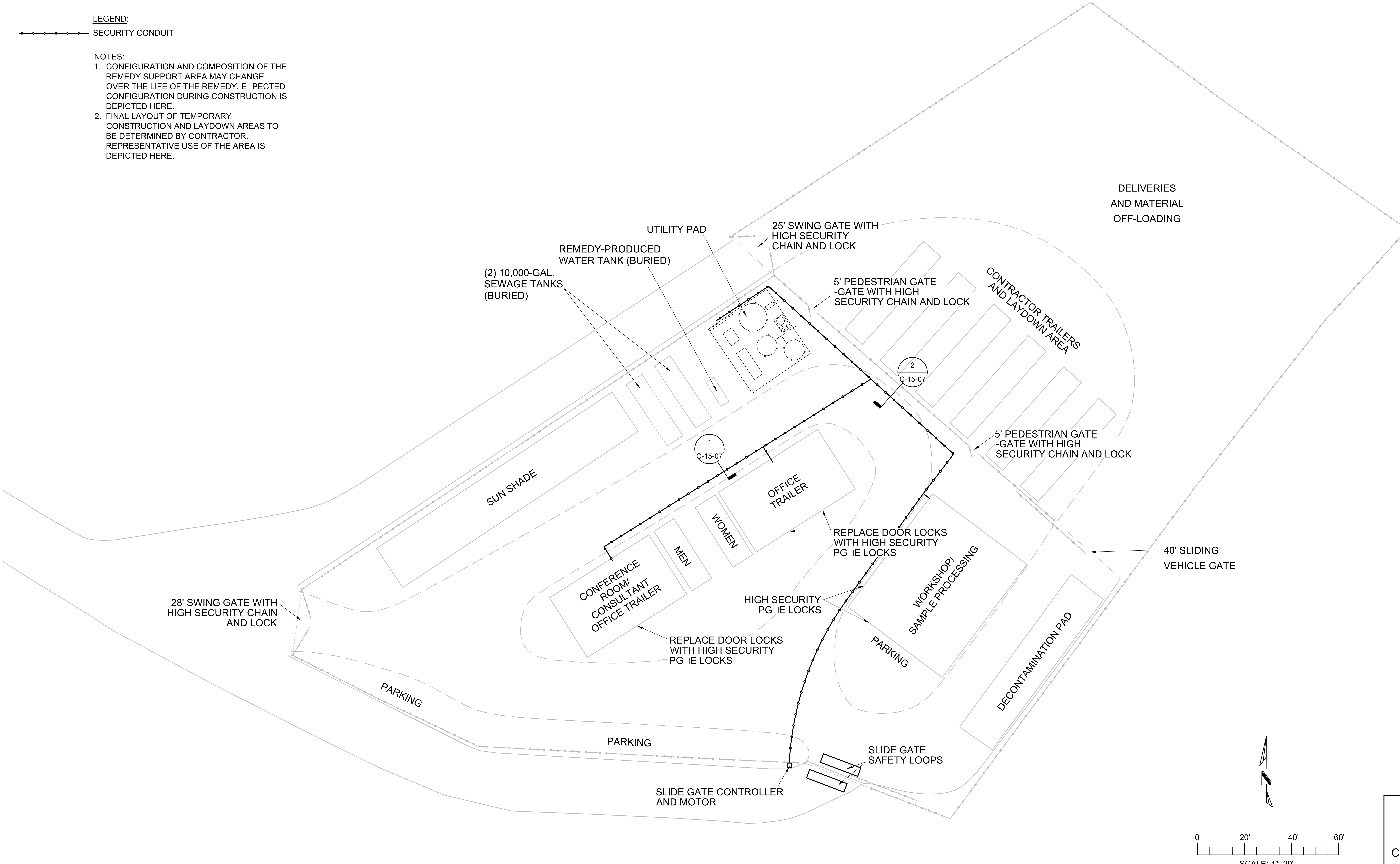
LEGEND:

SECURITY CONDUIT

NOTES:

1. CONFIGURATION AND COMPOSITION OF THE REMEDY SUPPORT AREA MAY CHANGE OVER THE LIFE OF THE REMEDY. E□PECTED CONFIGURATION DURING CONSTRUCTION IS DEPICTED HERE.
2. FINAL LAYOUT OF TEMPORARY CONSTRUCTION AND LAYDOWN AREAS TO BE DETERMINED BY CONTRACTOR. REPRESENTATIVE USE OF THE AREA IS DEPICTED HERE.



- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	JMS	JPB	JEF

REVISIONS

APPROVED BY	JEF
SO	
SUPV	JPB
DSGN	JMS
DWN	AJW
CHKD	JPB
OK	JEF
DATE	7/15/15
SCALES	1"=20'

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONSTRUCTION HEAD□UARTERS
SECURITY PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	REV
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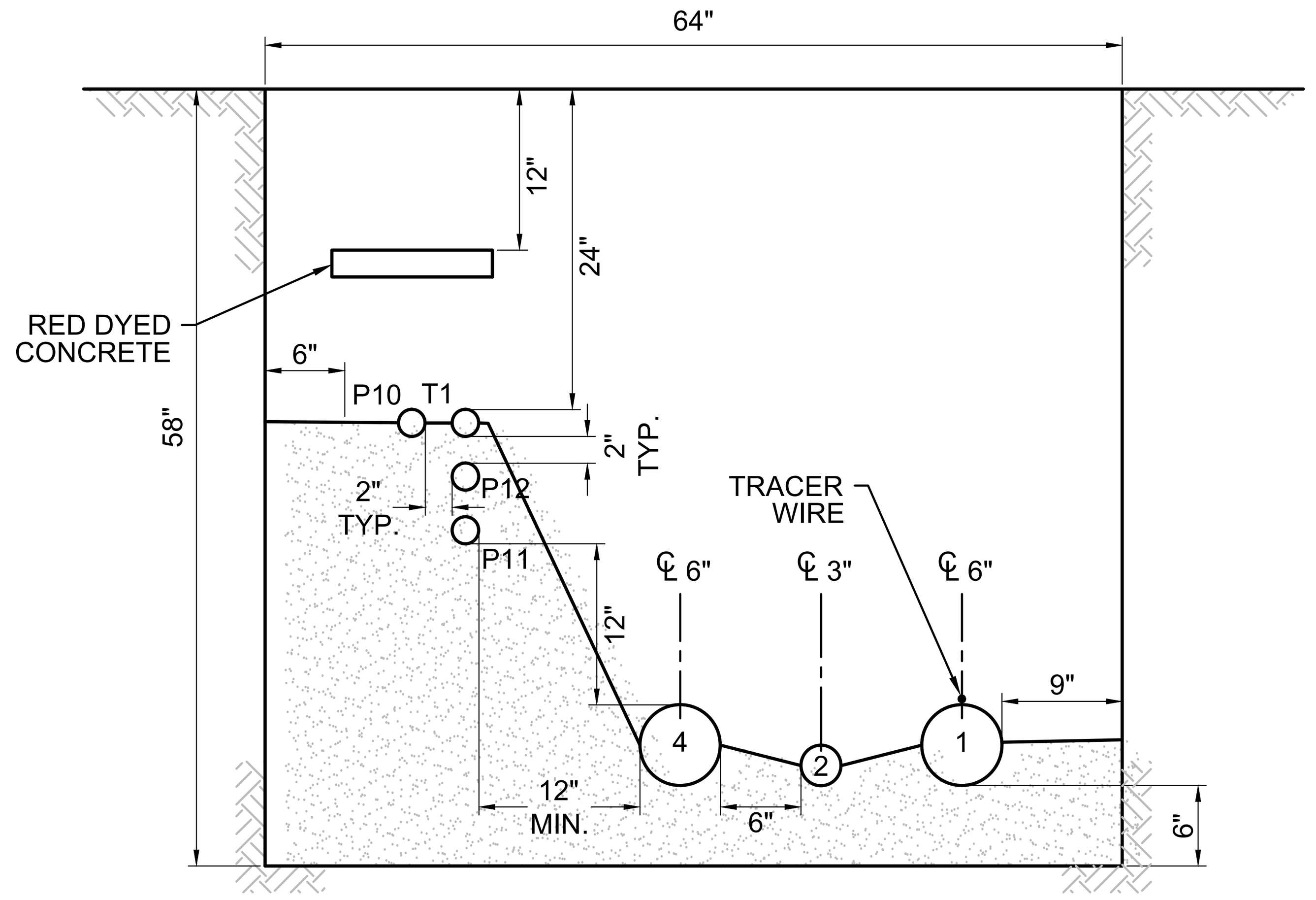
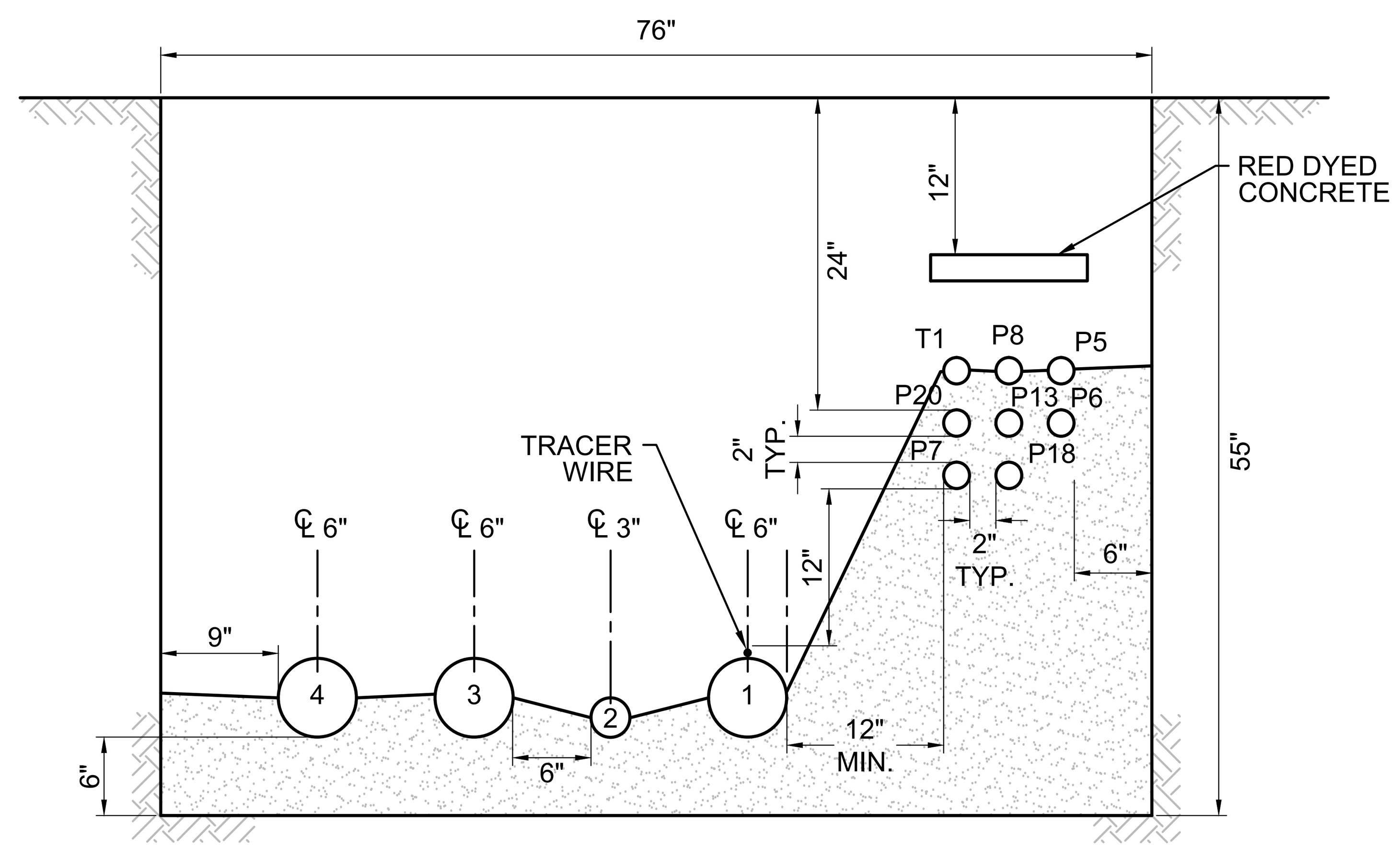
PIPE ID	SERVICE
1	6" FIRE PROTECTION WATER
2	3" WATER LINE
3	6" REMEDY PRODUCED WATER
4	6" SANITARY SEWER
T1	2" TELECOMMUNICATIONS CONDUIT
I1	2" INSTRUMENTATION CONDUIT
S1	2" SECURITY CONDUIT
P□	POWER CONDUIT, SI□E AS SHOWN ON E-15-03

NOTES:
1. SEE SHEET E-15-03 FOR CONSTRUCTION HEAD□UARTERS YARD AND CONDUIT SCHEDULE.



1 SECTION
1"=1'-0"
C-15-03
C-15-04
E-15-01
F-15-01



2 SECTION
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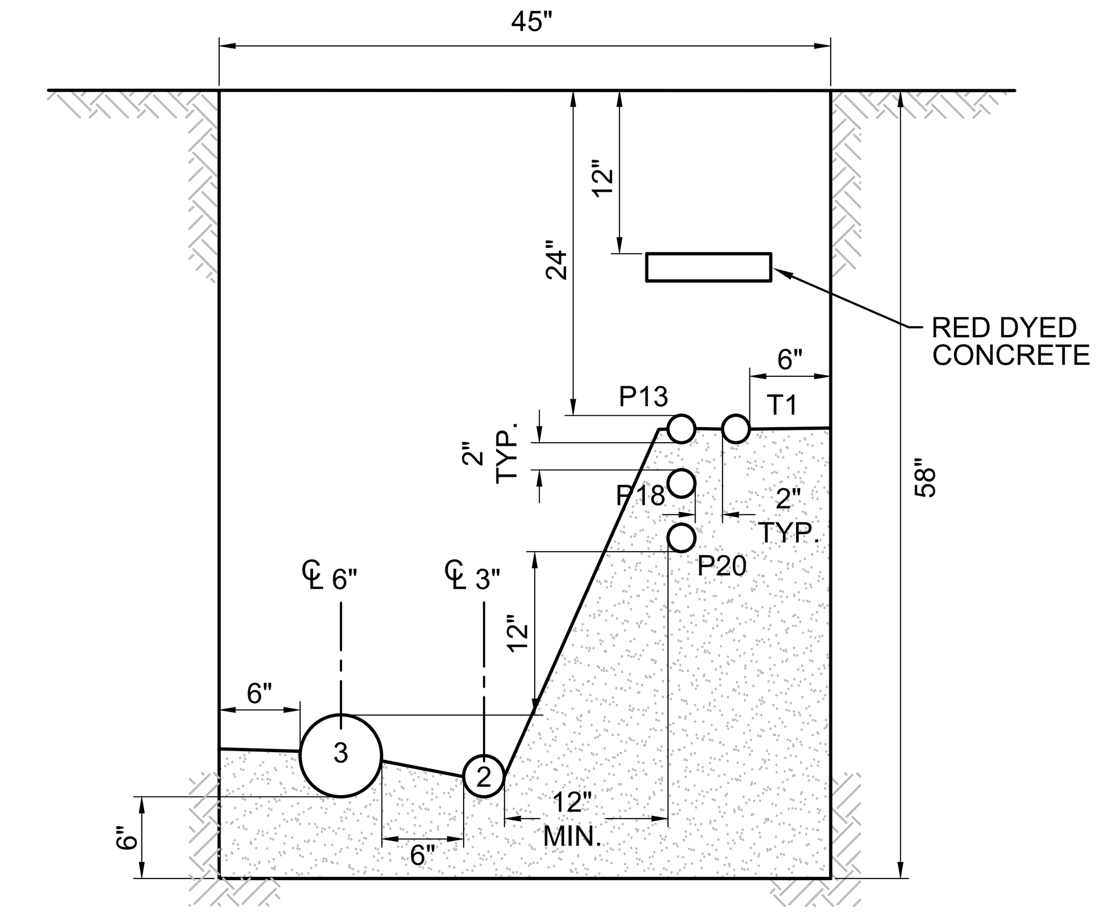
C-15-04
E-15-01
F-15-01



3 SECTION
1"=1'-0"
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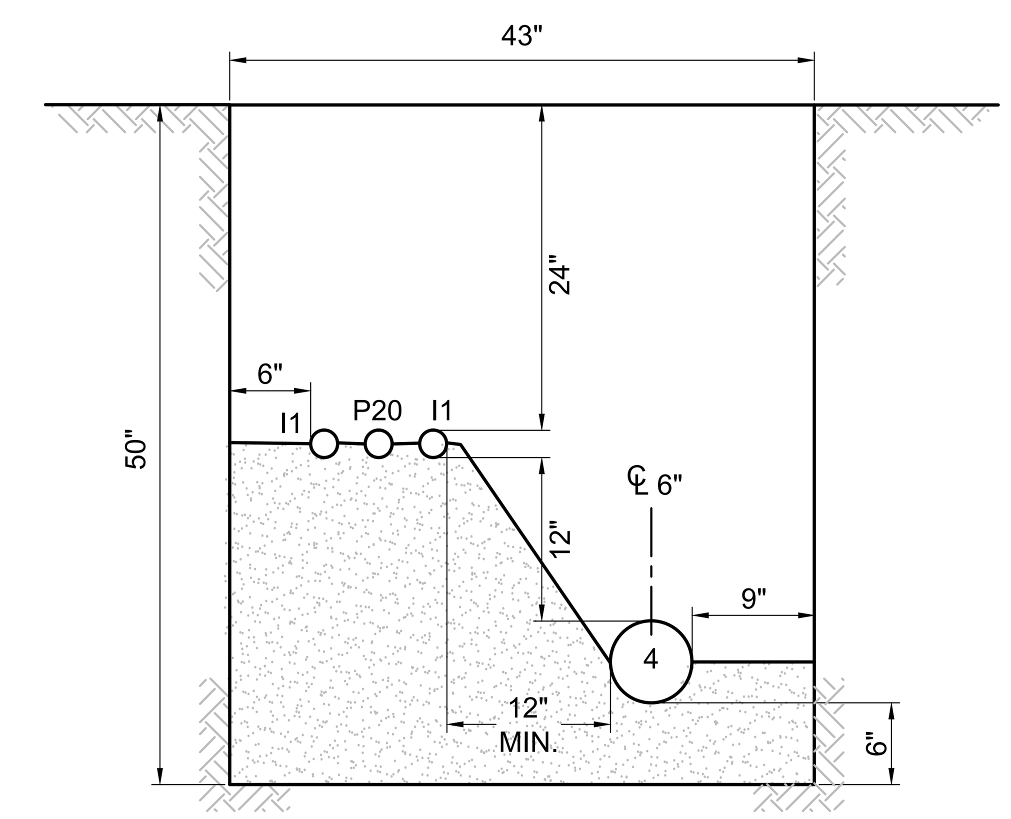
C-15-04
E-15-01
F-15-01



4 SECTION
1"=1'-0"
C-15-03
C-15-04
E-15-01
F-15-01

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	MSL	JPB	JEF

REVISIONS

APPROVED BY	JEF
SO	
SUPV	JPB
DSGN	MSL
DWN	AJW
CHKD	JPB
OK	JEF
DATE	2/2/15
SCALES	NONE

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONSTRUCTION HEAD□UARTERS TRENCH SECTIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY

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ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	MSL	JPB	JEF
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	MSL	JPB	JEF

REVISIONS

APPROVED BY	JEF
SO	
SUPV	JPB
DSGN	MSL
DWN	AJW
CHKD	JPB
OK	JEF
DATE	6/9/15
SCALES	1"=25'

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONSTRUCTION HEADQUARTERS GRADING PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
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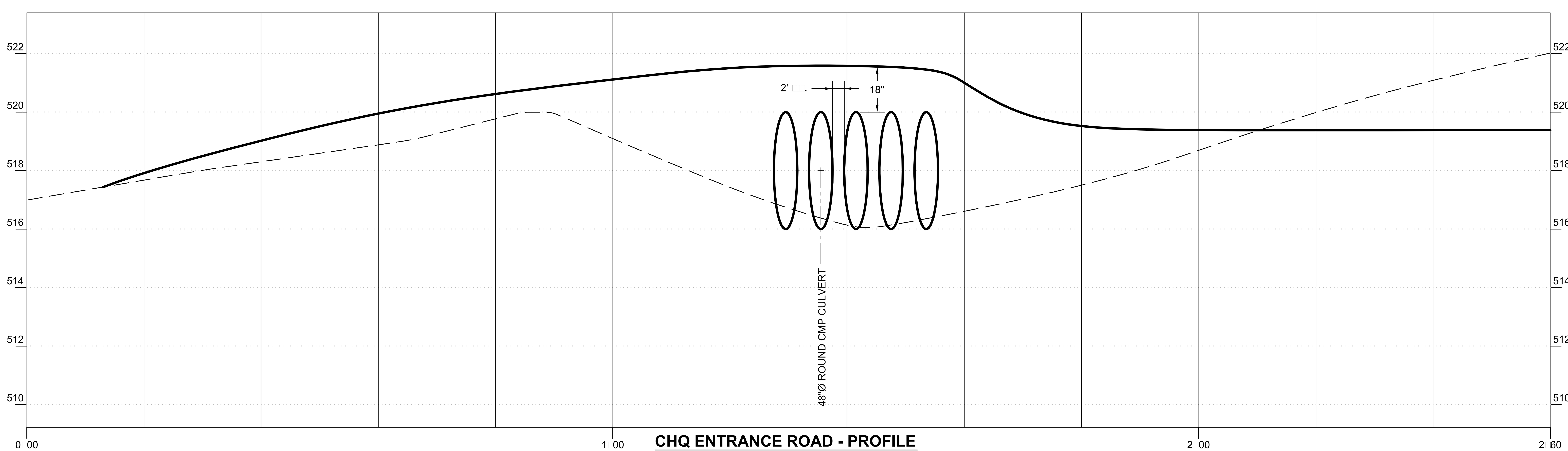
CHQ ENTRANCE ROAD - PLAN

(SCALE: 1" = 10')



CHQ ENTRANCE ROAD - PROFILE

(SCALE: 1" = 10')

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	MSL	JPB	JEF

REVISIONS

APPROVED BY	
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	8/5/15
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

CH□ ENTRANCE ROAD-
PLAN AND PROFILE
STA 0□00 TO STA 2□34

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	REV
C-15-09	0

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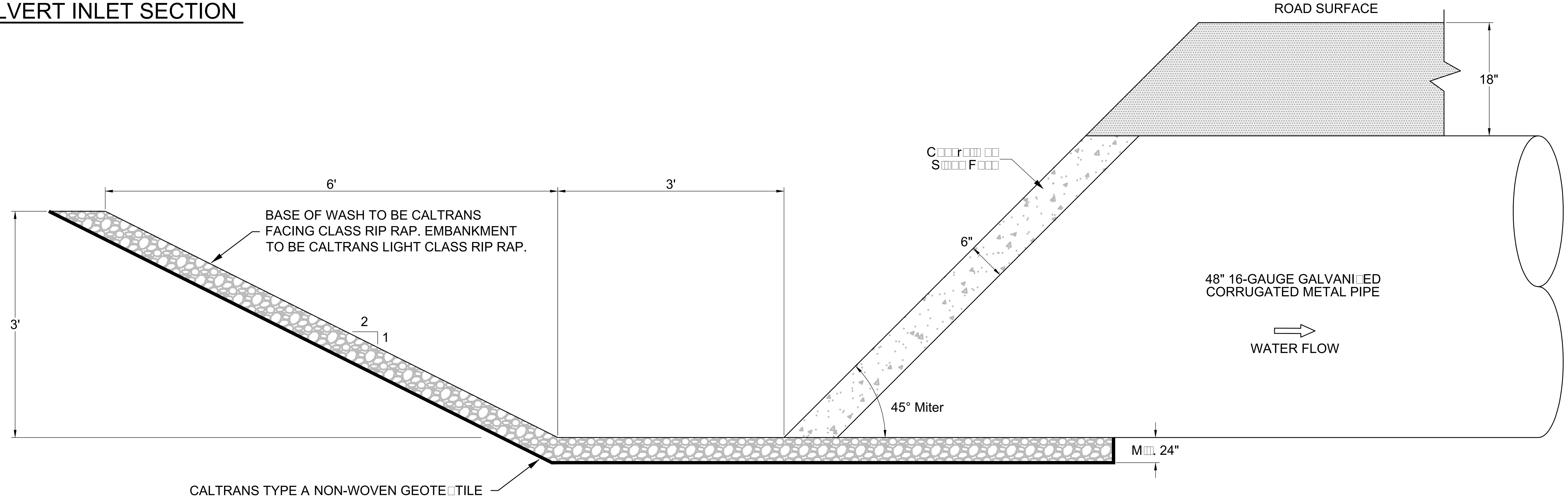
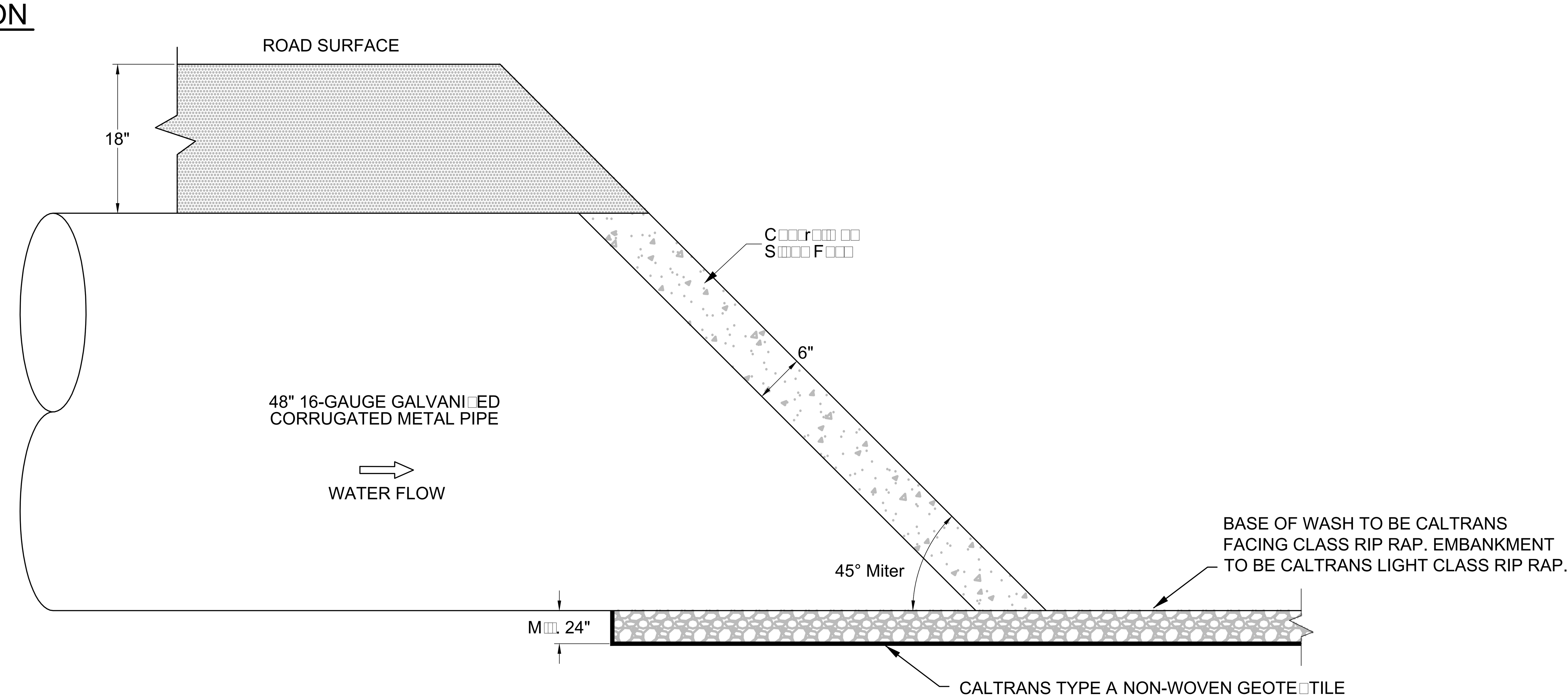
① CULVERT INLET SECTION
1"=1'-0"
C-15-09



② CULVERT OUTLET SECTION
1"=1'-0"
C-15-09



- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING
ARCADIS

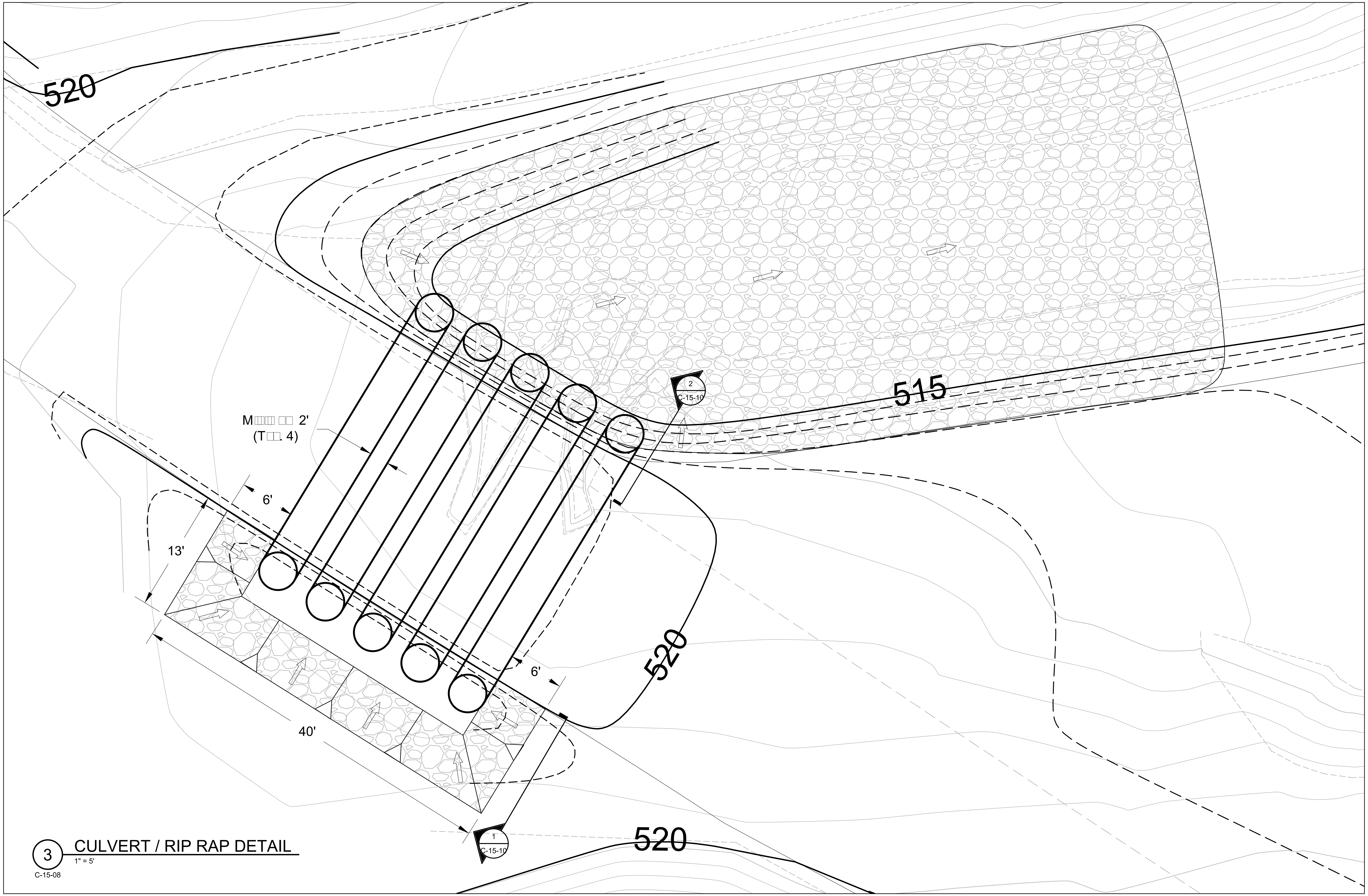
NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	MSL	JPB	JEF

REVISIONS

APPROVED BY	JEF
SO	
SUPV	JPB
DSGN	MSL
DWN	AJW
CHKD	JPB
OK	JEF
DATE	6/9/15
SCALES	1"=1'

TOPOCK GROUNDWATER REMEDIATION PROJECT
CH□ ENTRANCE ROAD-SECTION
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-15-10	REV 0



3 CULVERT / RIP RAP DETAIL
1" = 5'
C-15-08

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	MSL	JPB	JEF

REVISIONS

APPROVED BY	JEF
SO	
SUPV	JPB
DSGN	MSL
DWN	AJW
CHKD	JPB
OK	JEF
DATE	6/9/15
SCALES	1"=5'

TOPOCK GROUNDWATER REMEDIATION PROJECT

CH ENTRANCE ROAD-SECTION

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-15-11	REV 0

08/05/2015, 11:50, G:Gr ... AR TOPOCK-01 ... 100% DWG ... C-15-11

CONSTRUCTION HEADQUARTERS YARD CONDUIT AND CABLE SCHEDULE					
CONDUIT	CONDUIT SIZE	ORIGIN	DESTINATION/ WELL (#)	CONDUCTOR	NOTES
P1	4"	PRIMARY POLE	UTILITY PAD	EMPTY 4" CONDUIT WITH PULL LINE	
P2	4"	UTILITY PAD	ECB-1/MAIN PANEL DP-M	(2) SETS OF (4) 600 KCM	
P3	2"	DP-M	TRAILER #1	(4) #1/0, (1) #6 GND (CONTRACTOR TRAILER #1)	
P4	2"	DP-M	TRAILER #2	(4) #1/0, (1) #6 GND (CONTRACTOR TRAILER #2)	
P5	2"	DP-M	TRAILER #3	(4) #1/0, (1) #6 GND (CONTRACTOR TRAILER #3)	
P6	2"	DP-M	TRAILER #4	(4) #1/0, (1) #6 GND (CONTRACTOR TRAILER #4)	
P7	2"	DP-M	TRAILER #5	(4) #1/0, (1) #6 GND (CONTRACTOR TRAILER #5)	
P8	2"	DP-M	TRAILER #6	(4) #1/0, (1) #6 GND (CONTRACTOR TRAILER #6)	
P9	2"	DP-M	WORKSHOP/LAB	(4) #3/0, (1) #6 GND	
P10	2"	DP-M	CONFERENCE ROOM	(4) #1/0, (1) #6 GND	
P11	1-1/2"	DP-M	WOMEN'S RESTROOM	(4) #1, (1) #8 GND (WOMEN'S RESTROOM)	
P12	1-1/2"	DP-M	MEN'S RESTROOM	(4) #1, (1) #8 GND (MEN'S RESTROOM)	
P13	1"	DP-M	DECONTAMINATION PAD	(2) #8, (1) #8 GND (DECON PAD)	(2) SETS
P14	2"	DP-M	OFFICE TRAILER	(4) #1 / 0, (1) #6 GND	
P15	2"	DP-M	WATER SUPPLY PUMP	(3) #4, (1) #6 GND	
P16	2"	DP-M	FIRE WATER PUMP	(3) #3/0, (1) #6 GND	
P17	4"	ECB-1	ATS/GENERATOR	(2) SETS OF (4) 600 KCM, (1) #1/0 GND	
P18	2"	GRID-TIE INVERTER	TIE JUNCTION BOX	(4) #1/0 USE, (1) #6 GND	
P19	4"	ATS/GENERATOR	DP-M	(2) SETS OF (4) 600 KCM, (1) #1/0 GND	
P20	2"	SUN SHADE	GRID TIE INVERTER	(2) #1 USE, (1) #6 GND	
T1	2"	TELECOMM PANEL	WORKSHOP, OFFICE/CONF.	EMPTY 2" CONDUIT WITH PULL LINE	
S1	2"	WORKSHOP/LAB	GATE OPERATOR	EMPTY 2" CONDUIT WITH PULL LINE	
I1	2"	WATER TANK	SEWAGE TANK	EMPTY 2" CONDUIT WITH PULL LINE	

P=Power, F=Fiber Optic (F.O.), C=Controls, T=Telecomm, S=Security, I=Instrumentation
ALL POWER CONDUCTORS ARE AWG XHHW UNLESS OTHERWISE NOTED

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	BSS	JPB	JMS
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	JMS	JPB	JEF

REVISIONS

APPROVED BY: JEF
SO
SUPV JPB
DSGN JMS
DWN AJW
CHKD JPB
OK JEF
DATE 2/2/15
SCALES 1" = 20'

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONSTRUCTION HEADQUARTERS ELECTRICAL PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
E-15-03
REV 1

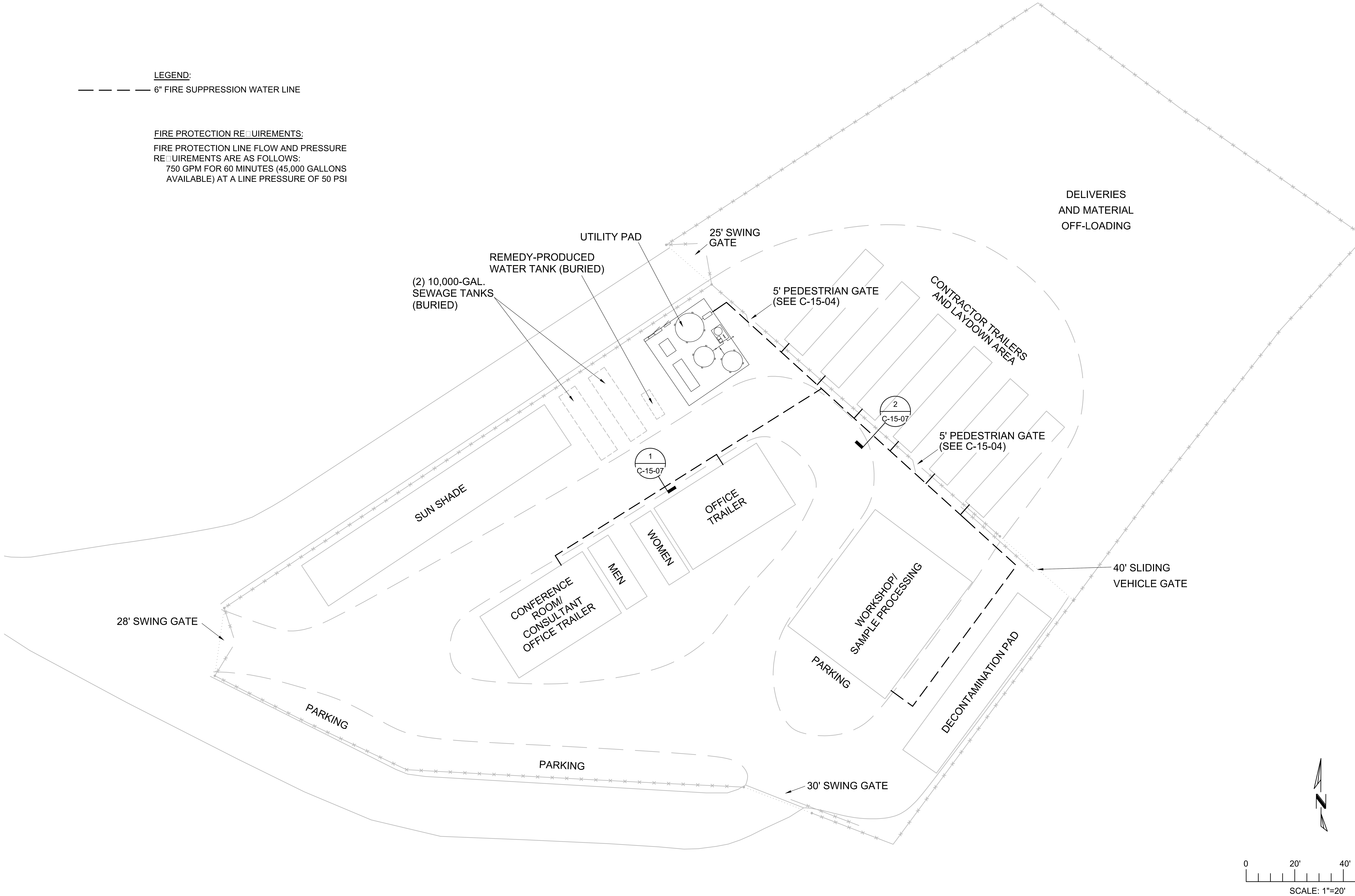
N1808

LEGEND:

— — — — 6" FIRE SUPPRESSION WATER LINE

FIRE PROTECTION RE□UIREMENTS:

FIRE PROTECTION LINE FLOW AND PRESSURE RE□UIREMENTS ARE AS FOLLOWS:
750 GPM FOR 60 MINUTES (45,000 GALLONS AVAILABLE) AT A LINE PRESSURE OF 50 PSI



- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	JMS	JPB	JEF
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	JMS	JPB	JEF

REVISIONS

APPROVED BY		
JEF	SO	
	SUPV	JPB
	DSGN	JMS
	DWN	AJW
	CHKD	JPB
	OK	JEF
	DATE	2/2/15
	SCALES	1" = 20'

TOPOCK GROUNDWATER REMEDIATION PROJECT

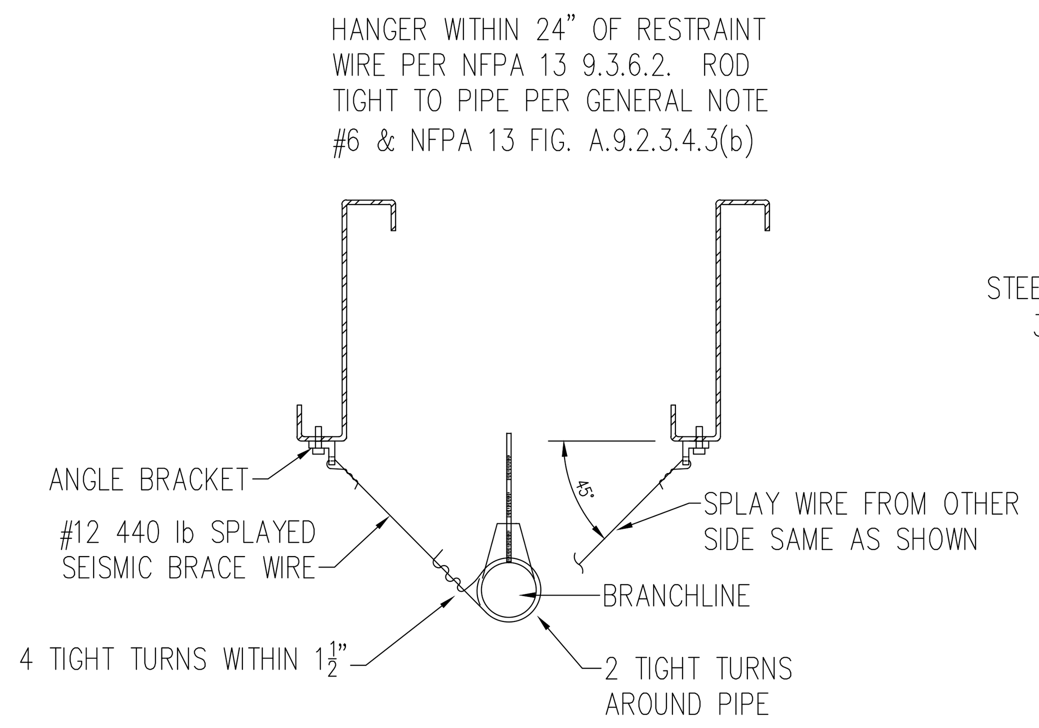
CONSTRUCTION HEAD□UARTERS
FIRE SUPPRESSION YARD PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS

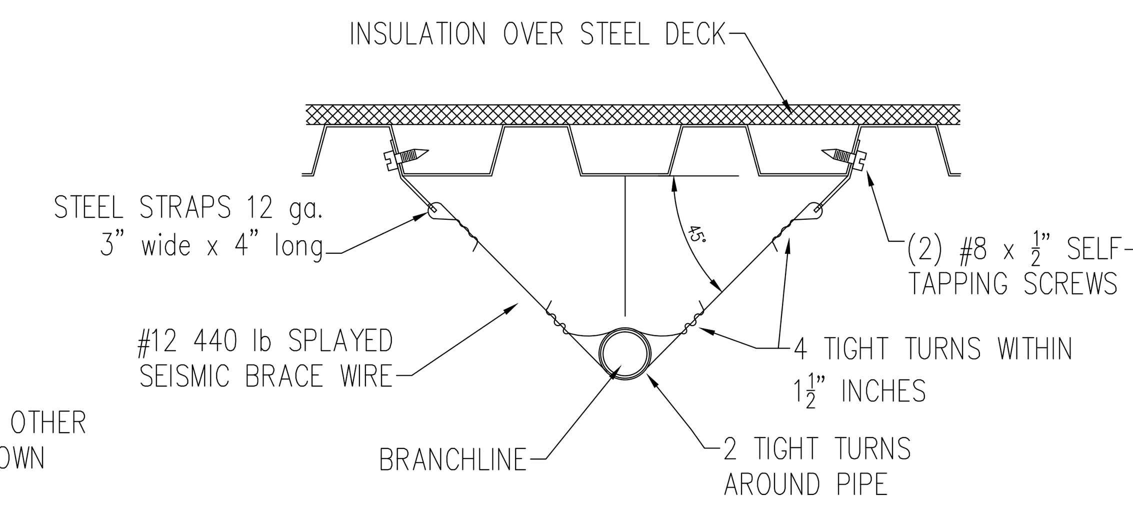
F-15-01 REV 1

N1808



BRANCH LINE RESTRAINT

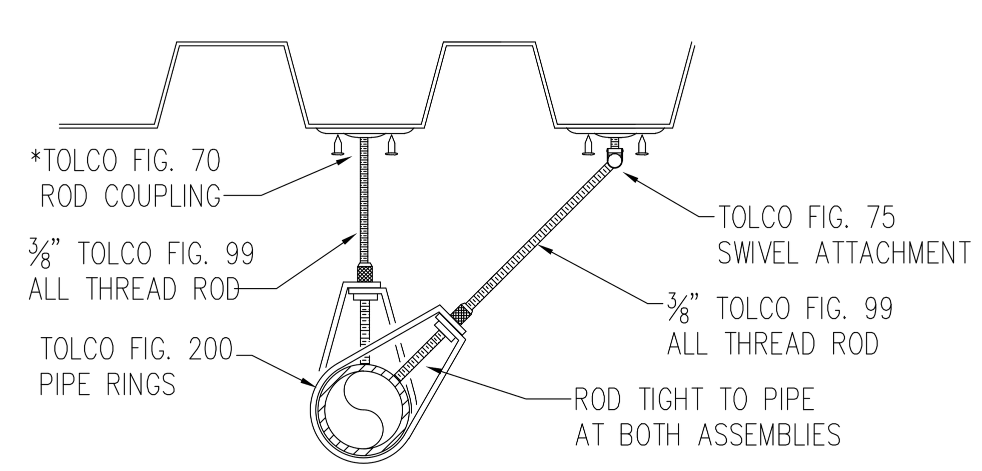
(FOR PIPE HUNG w/ ROD LONGER THAN 6")



BRANCH LINE RESTRAINT

(FOR PIPE HUNG w/ ROD LONGER THAN 6")

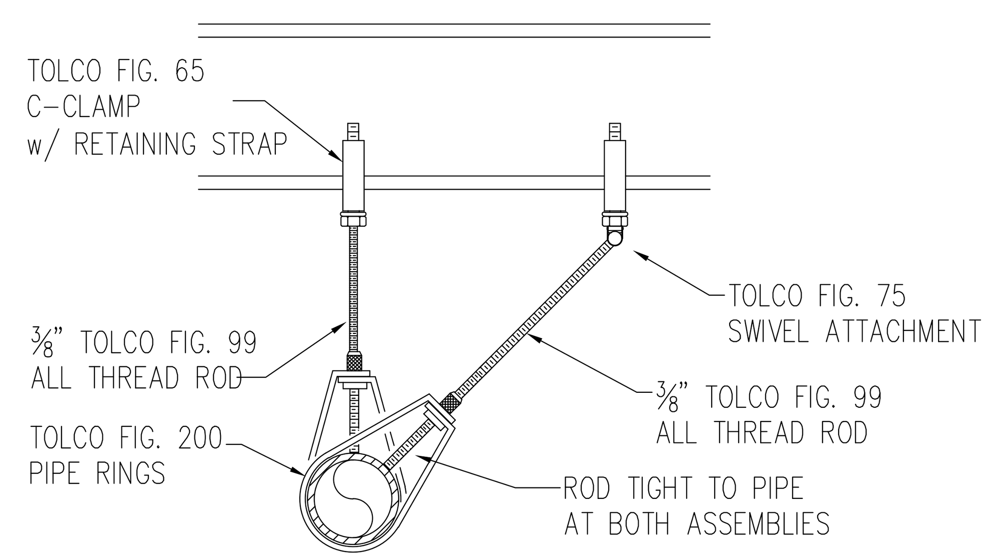
RESTRAINT TO BE INSTALLED WITHIN 24" OF HANGER PER NFPA 13. ROD TO BE RUN DOWN TIGHT TO PIPE PER NFPA 13.



TYPICAL BRANCH LINE RESTRAINT

(FOR PIPE HUNG w/ ROD LONGER THAN 6")

HANGER WITHIN 6" OF RESTRAINT WIRE PER NFPA 13 9.3.6.2. ROD TIGHT TO PIPE PER GENERAL NOTE #6 & NFPA 13 FIG. A.9.2.3.4.3(b)



TYPICAL BRANCH LINE RESTRAINT

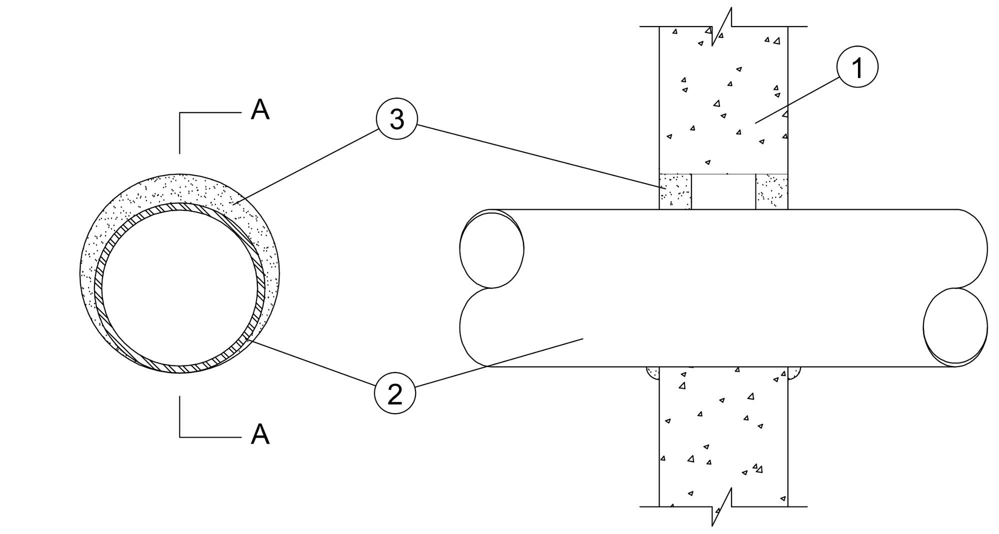
(FOR PIPE HUNG w/ ROD LONGER THAN 6")

HANGER WITHIN 6" OF RESTRAINT WIRE PER NFPA 13 9.3.6.2. ROD TIGHT TO PIPE PER GENERAL NOTE #6 & NFPA 13 FIG. A.9.2.3.4.3(b)

U.L. SYSTEM NO. WJ1067

METAL PIPE THROUGH A SLEEVE IN CONCRETE FLOOR,WALL,OR BLOCK WALL

F RATING = 1 & 2-HR.
T RATING = 0-HR.
L RATING AT AMBIENT = 0 LESS THAN 1 CFM/SQ. FT.
L RATING AT 400° = 4 CFM/SQ. FT.



SECTION A-A

1. WALL ASSEMBLY :
   A. MINIMUM 5" THICK LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL.
   B. U.L. CLASSIFIED CONCRETE BLOCK WALL (MINIMUM 8" BLOCK).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
   A. MAXIMUM 30" DIAMETER SCHEDULE 10 OR HEAVIER STEEL PIPE.
   B. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
   C. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
   D. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. HILTI FS-ONE HIGH PERFORMANCE INTUMESCENT FIRESTOP SEALANT: MIN. 5/8" THICKNESS APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL. AT THE POINT OR CONTINUOUS CONTACT LOCATIONS BETWEEN PIPE AND WALL, A MIN 1/2" DIA BEAD OF FILL MATERIAL SHALL BE APPLIED AT PIPE-WALL INTERFACE ON BOTH SURFACES.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 32-1/4".
2. "ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
3. PIPE TO BE CENTERED WITHIN THE FIRESTOP SYSTEM.

SEE HILTI FIRESTOP INSTALLATION MANUAL FOR ADDITIONAL INSTRUCTIONS
HILTI, INC. TULSA, OK 1-800-879-8000

* PIPES 4" AND LARGER SHALL BE PROVIDED WITH A FLEXIBLE COUPLING WITHIN 12" OF EACH SIDE OF PENETRATION.(NFPA 13)

PENETRATION DETAIL

(NOT TO SCALE)

GENERAL NOTES

1. THE AUTOMATIC SPRINKLER SYSTEM SHALL CONFORM TO THE REQUIREMENTS OF THE 2013 EDITION OF NFPA 13.
2. PENETRATIONS OF RATED ASSEMBLIES SHALL BE FIRE STOPPED. (SEE DETAIL)
3. ALL ELECTRICAL WIRING TO BE PERFORMED BY OTHERS.
4. ARMOVERS LONGER THAN 24" SHALL BE PROVIDED WITH A HANGER.
5. THE NEW SYSTEM IS HYDRAULICALLY CALCULATED. (SEE PIPING PLAN)
6. NEW PIPING SHALL BE SUPPLIED FROM NEW UNDERGROUND.
7. UPON COMPLETION, THE OVERHEAD SYSTEM SHALL BE TESTED AT 200 PSI FOR TWO (2) HOURS. (BEFORE TIE-IN)
8. BUILDING CONSTRUCTION IS OF NON-COMBUSTIBLE CONSTRUCTION.
9. OWNER:
10. FOR INSPECTION CALL:
11. EXCLUSIONS (WORK BY OTHERS):
    1. Installation of Systems.
    2. Wiring of Fire Alarm Systems.
    3. All Underground Fire Line and Hydrant Design (By Civil).
    4. Structural Calculations.
    5. Plan Review, Permit and Water Dept. Flow Fees

LEGEND

- 2-WAY EARTHQUAKE BRACE
- 4-WAY EARTHQUAKE BRACE
- FLEX - FLEXIBLE GROOVED COUPLING
- RIGID "0-FLEX" GRV'D COUPLING
- GROOVED CAP
- #4 - HANGER No.
- APPROX. HANGER LOCATION
- XX - HYDRAULIC REFERENCE NODE
- SYSTEM RISER
- PIPE ELEVATION
- +10'0" - CEILING HEIGHT
- ℄ - CENTER LINE
- AFF - ABOVE FINISH FLOOR
- UNO - UNLESS NOTED OTHERWISE
- BOB - BOTTOM OF BEAM
- BOD - BOTTOM OF DECK
- BOF - BOTTOM OF FRAMING
- COJ - CUT ON JOB
- TOE - THREAD ONE END
- GOE - GROOVE ONE END
- GxG - GROOVE x GROOVE
- TxG - THREAD x GROOVE
- FxG - FLANGE x GROOVE
- TOR - TOP OF RISER
- BOR - BOTTOM OF RISER
- MC - MALLEABLE COUPLING
- UG - UNDERGROUND
- OH - OVERHEAD
- RN - RISER NIPPLE
- SU - SPRIG UP
- DR - DROP TO SPRINKLER
- (E) - EXISTING
- (N) - NEW
- (R) - RELOCATE

BRANCH LINE RESTRAINT NOTES
(FOR PIPE HUNG W/ ROD LONGER THAN 6")

1. BRANCH LINE RESTRAINT SHALL BE PROVIDED BY THE USE OF ONE OF THE FOLLOWING (PER NFPA 13, 2013 ED., SECTION 9.3.6):
   1.1. LISTED SWAY BRACE ASSEMBLY (SEE SEISMIC BRACING DETAILS).
   1.2. WRAPAROUND U-HOOK SATISFYING THE REQUIREMENTS OF 9.3.5.5.11
   1.3. NO. 12, 440 LB WIRE INSTALLED AT LEAST 45° FROM THE VERTICAL PLANE AND ANCHORED ON BOTH SIDES OF THE PIPE. (WIRE RESTRAINT SHALL BE LOCATED WITHIN 24" OF A HANGER WHICH IS OF A TYPE THAT WILL PREVENT UPWARD MOVEMENT PER 9.3.6.2.
   1.4. CPVC HANGERS UTILIZING TWO POINTS OF ATTACHMENT.
   1.5. HANGER NOT LESS THAN 45° FROM VERTICAL INSTALLED WITHIN 6" OF THE VERTICAL HANGER ARRANGED FOR RESTRAINT AGAINST UPWARD MOVEMENT, PROVIDED IT IS UTILIZED SUCH THAT L/R DOES NOT EXCEED 400, WHERE THE ROD SHALL EXTEND TO THE PIPE OR HAVE A SURGE CLIP INSTALLED. MAX LENGTH OF ⅜" ROD @ L/R OF 400 = 30"
2. THE END SPRINKLER ON A LINE SHALL BE RESTRAINED. PER 9.3.6.3.
3. BRANCH LINES SHALL BE LATERALLY RESTRAINED AT INTERVALS NOT EXCEEDING THOSE SPECIFIED IN TABLE 9.3.6.4(A) BASED ON BRANCH LINE DIAMETER AND THE VALUE OF CP. (PER 9.3.5.9.3, CP = .35)
4. WHERE BRANCH LINES ARE SUPPORTED BY RODS LESS THAN 6" LONG MEASURED BETWEEN THE TOP OF THE PIPE AND THE POINT OF ATTACHMENT TO THE BUILDING STRUCTURE, THE REQUIREMENTS OF 9.3.6.1 THROUGH 9.3.6.4 SHALL NOT APPLY AND ADDITIONAL RESTRAINT SHALL NOT BE REQUIRED. (PER 9.3.6.5.)
5. SPRIGS 4 FT OR LONGER SHALL BE RESTRAINED AGAINST LATERAL MOVEMENT. (9.3.6.6)
6. DROPS AND ARMOVERS SHALL NOT REQUIRE RESTRAINT. (9.3.6.7)

Cp value per NFPA 13 – 2013 table 9.3.5.9.3

Ss		Cp
0.23	=	0.35

SEISMIC COEFFICIENT
ASCE 7 Standard

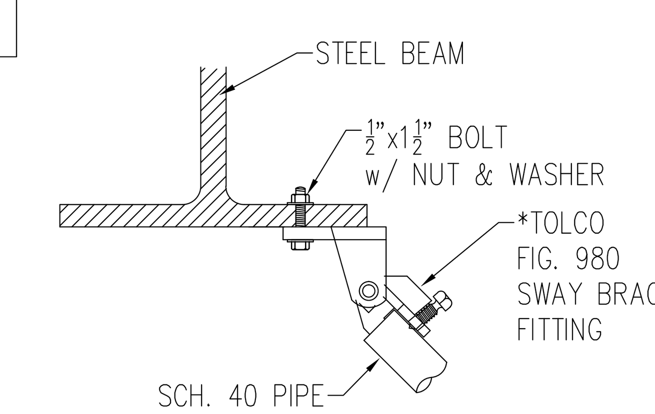
Latitude = 34.84806 Longitude = –114.614131

Spectral Response Accelerations Ss and S1
Ss and S1 = Mapped Spectral Acceleration Values
Site Class B – Fa = 1.0 ,Fv = 1.0
Data are based on a 0.01 deg grid spacing

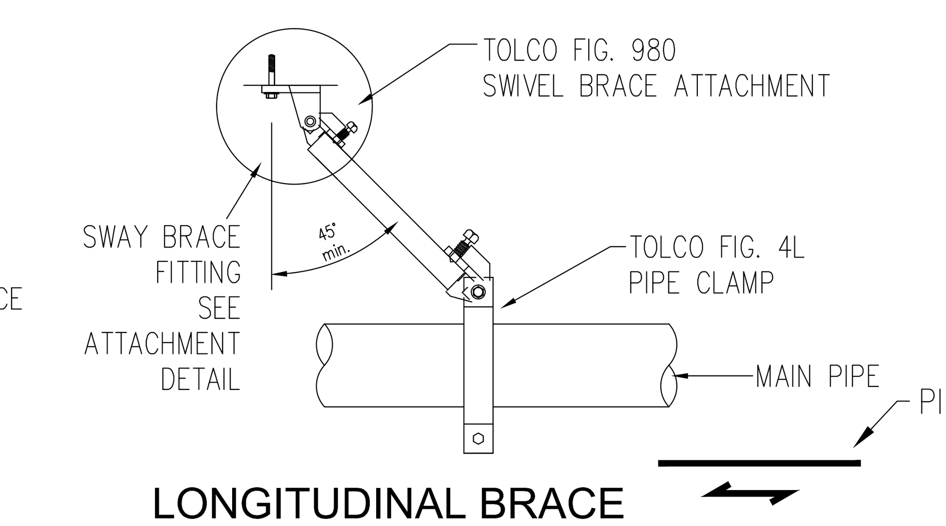
Period (sec)	Sa (g)
0.2	0.226 (Ss, Site Class B)
1.0	0.135 (S1, Site Class B)

MAX SPACING OF STEEL BRANCHLINE RESTRAINTS PER NFPA Table 9.3.6.4(a)

	SEISMIC COEFFICIENT (Cp)		
PIPE (IN.)	Cp≤0.50	0.5<Cp≤0.71	Cp>0.71
1"	43	36	26
1¼"	46	39	27
1½"	49	41	29
2"	53	45	31



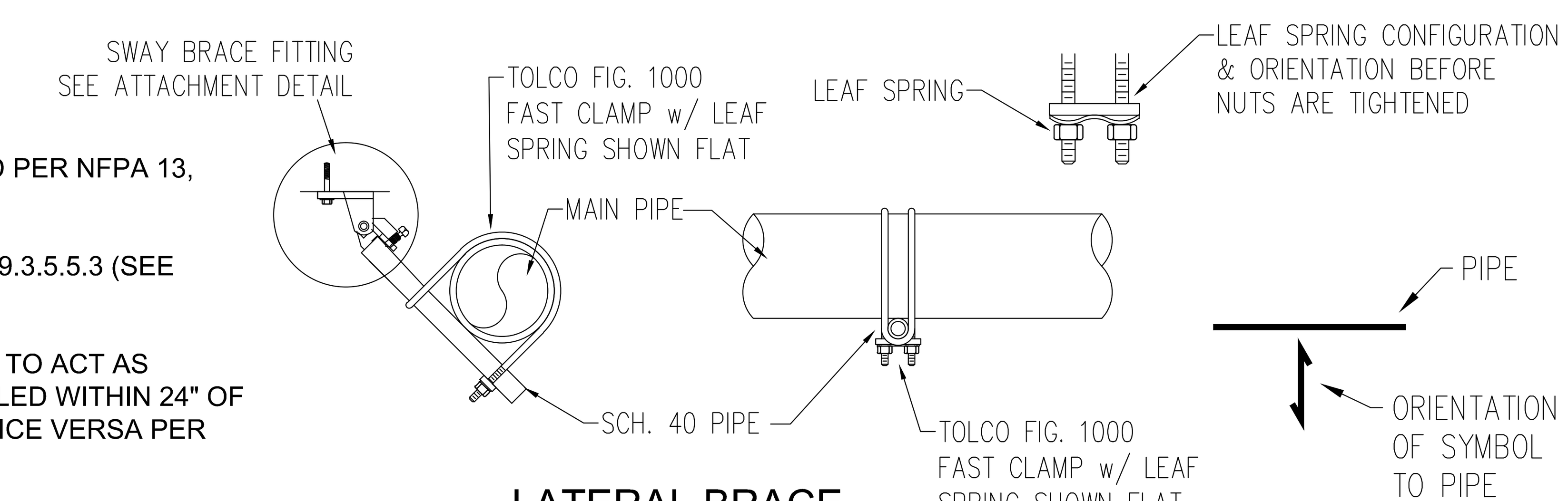
DETAIL S1
*PARALLEL OR PERPENDICULAR TO BEAM



LONGITUDINAL BRACE

EARTHQUAKE BRACING NOTES

1. EARTHQUAKE BRACING SHALL BE PROVIDED PER NFPA 13, 2013 ed., SECTION 9.3.5.
2. LOADS ARE DETERMINED BY ANALYSIS PER 9.3.5.5.3 (SEE ANNEX E & CALCULATIONS).
3. LONGITUDINAL BRACES SHALL BE ALLOWED TO ACT AS LATERAL BRACES WHERE THEY ARE INSTALLED WITHIN 24" OF PIPING WHICH IS BRACED LATERALLY AND VICE VERSA PER 9.3.5.6.27 & 9.3.5.5.8.
4. EACH RUN OF PIPE BETWEEN A CHANGE IN DIRECTION SHALL BE PROVIDED WITH BOTH LATERAL AND LONGITUDINAL BRACING. EXCEPTION: PIPE RUNS LESS THAN 12 ft. PER 9.3.5.7.2.
5. WHERE THERE IS A CHANGE IN DIRECTION, THE CUMULATIVE DISTANCE BETWEEN LATERAL SWAY BRACES SHALL NOT EXCEED THE MAXIMUM PERMITTED DISTANCE IN ACCORDANCE WITH 9.3.5.5.2.2 (40 FT).



LATERAL BRACE

SEISMIC BRACING

NO SCALE

- DRAFT -
NOT FOR CONSTRUCTION

MARQUEE
FIRE PROTECTION
710 W. S[illegible] L[illegible]
S[illegible], CA. 95834-1130
TEL. 916. 641-7997 / 707. 642-7905
FAX. 916. 641-0775
CA. LIC. 570970 C-16

N1808

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	JMS	JPB	JEF
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	JMS	JPB	JEF

REVISIONS

APPROVED BY: JEF

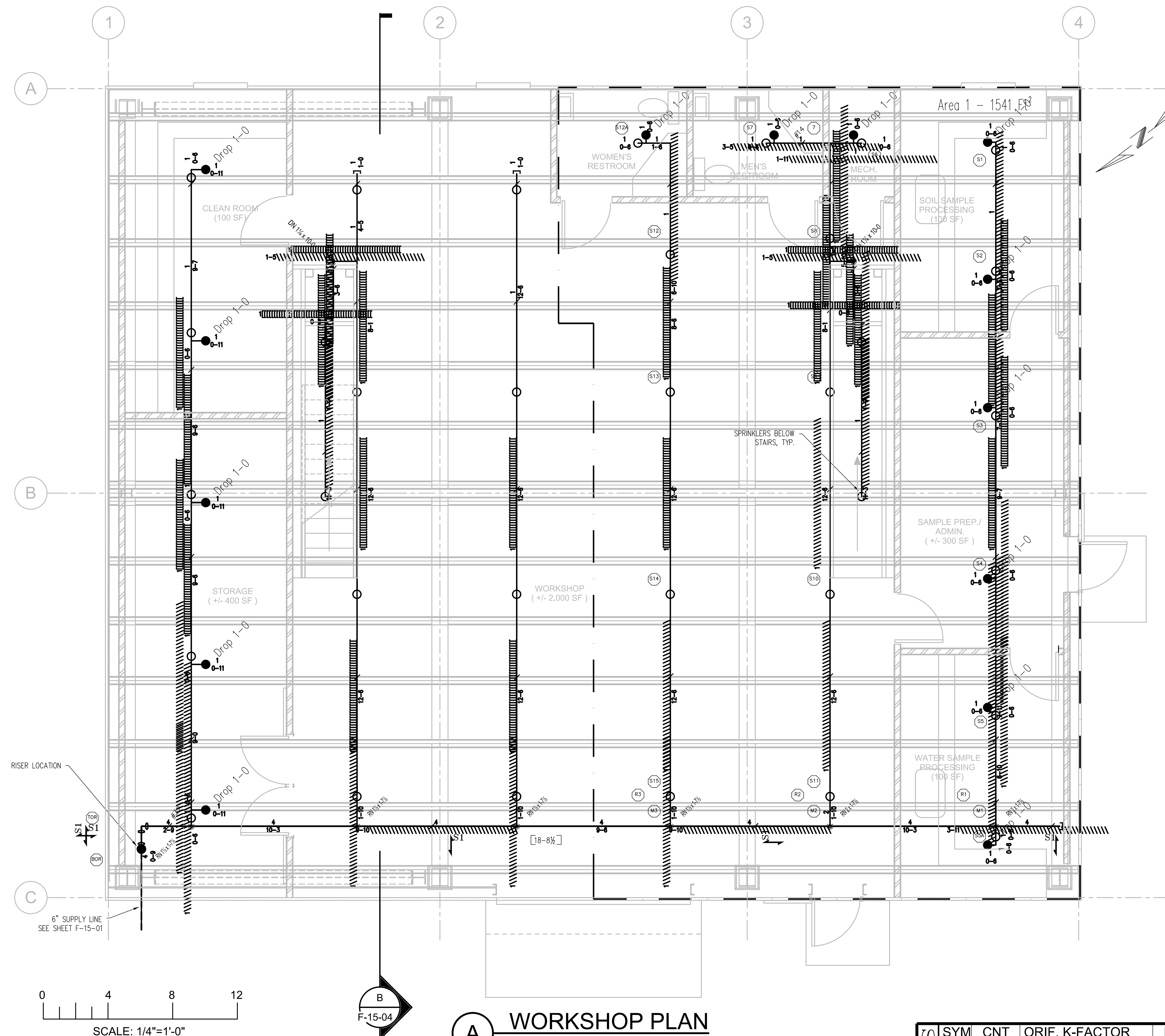
SO	
SUPV	JPB
DSGN	JMS
DWN	AJW
CHKD	JPB
OK	JEF
DATE	2/2/15
SCALES	1" = 20'

TOPOCK GROUNDWATER REMEDIATION PROJECT

WORKSHOP FIRE PROTECTION GENERAL NOTES

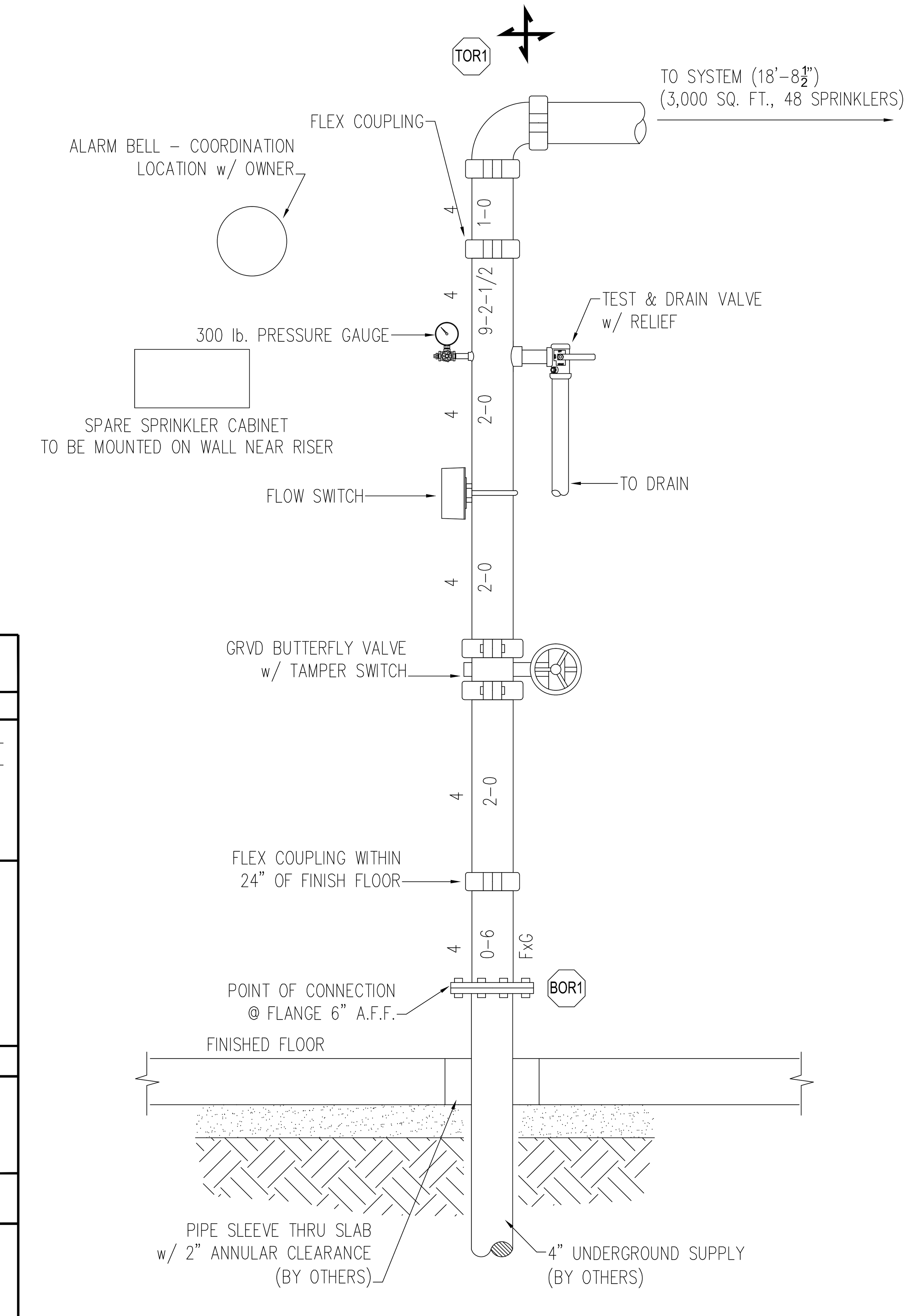
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
F-15-02
REV 1



A WORKSHOP PLAN

1/4" = 1'-0"



FIRE SPRINKLER RISER DETAIL

NO SCALE

CALCULATION DESIGN INFORMATION	
SYSTEM or AREA No.	ONE
QUICK RESPONSE SPRINKLERS?	YES
SYSTEM TYPE	WET
K-FACTOR	8.0
HAZARD	ORD. GP. 2
DENSITY (GPM/FT²)	.20
AREA PER SPRINKLER (FT²)	128
AREA OF OPERATION (FT²)	1500
AREA OF OPERATION ADJUSTED AS FOLLOWS:	
DRY PIPE INCREASE (30%)	N/A
SLOPE >2:12 INCREASE (30%)	N/A
CEILING HEIGHT:	N/A
% REDUCTION:	N/A
CEILING HEIGHT REDUCTION (FT²)	N/A
ADJ. AREA OF OPERATION (FT²)	1500
WATER SUPPLY	
STATIC (PSI)	N/A
RESIDUAL (PSI)	N/A
FLOW (GPM)	N/A
PUMP (GPM @ PSI)	N/A @ N/A
SYSTEM DEMAND REQUIRED AT: BASE OF RISER	
PSI REQUIRED	43.372
GPM REQUIRED	499.353
PSI AVAILABLE	N/A
GPM AVAILABLE	N/A
SAFETY MARGIN	N/A
HOSE STREAM DEMAND (GPM): INSIDE: N/A - OUTSIDE:	250
LOCATION:	WORKSHOP

SPRINKLERS SYM	CNT	ORIF, K-FACTOR	NPT	MFG.	TEMP	FINISH	RESPONSE-STYLE	S.I.N.	MODEL#	ESCUTCHEON
○	34	(17/32",K=8.0)	3/4"	VKG	200	BRASS	SR - SSU	VK200	MMATIC	N/A
◉	14	(17/32",K=8.0)	3/4"	VKG	155	CHRM	SR - SSP	VK202	MMATIC	WHT E-1 RECESSED

48 = TOTAL SPRINKLERS THIS SHEET

PIPING PLAN

1. AT OBSTRUCTED CONSTRUCTION SPRINKLER DEFLECTOR SHALL NOT EXCEED 6" BELOW THE BOTTOM OF THE FRAMING. (DEFLECTOR SHALL NOT EXCEED 22" BELOW THE DECK.)
2. MAIN PIPING SHALL HANG AT 18'-8½" AFF. LINE PIPING SHALL HANG AT 6" BOTTOM OF FRAMING.
3. MAIN HANGERS SHALL BE (#7) C-CLAMP W/ RETAINER STRAP. LINE HANGERS SHALL BE (#4) SIDE BEAM BRACKET. (SEE DETAILS)
4. MAIN PIPING SHALL BE SCHEDULE 10 STEEL (THINWALL) AND SHALL BE ROLL GROOVED PER NFPA 13. LINE PIPING SHALL BE SCHEDULE 40 STEEL (STANDARD) AND SHALL BE GROOVED OR THREADED PER NFPA.

- DRAFT -
NOT FOR CONSTRUCTION

MARQUEE
FIRE PROTECTION
710 W. S[illegible] L[illegible]
S[illegible], CA. 95834-1130
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CA. LIC. 570970 C-16

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	JMS	JPB	JEF

REVISIONS

APPROVED BY	
JEF	
SO	
SUPV	JPB
DSGN	JMS
DWN	AJW
CHKD	JPB
OK	JEF
DATE	2/2/15
SCALES	AS NOTED

TOPOCK GROUNDWATER REMEDIATION PROJECT
WORKSHOP FIRE PROTECTION PIPING PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
F-15-03	REV 1

HANGER NOTES

1. ALL HANGER ASSEMBLIES ARE PER NFPA 13 & MANUFACTURER DETAILS.
2. PER CBC AND NFPA 13 THE BUILDING STRUCTURE MUST BE CAPABLE OF SUPPORTING THE ADD LOAD OF THE WATER FILLED PIPE PLUS A MINIMUM OF 250 LBS.
3. HANGER SPACING SHALL BE PER NFPA 13 TABLE 9.2.2.1(A).

9.2.4 LOCATION OF HANGERS ON MAINS

9.2.4.1 UNLESS THE REQUIREMENTS OF 9.2.4.2, 9.2.4.3, 9.2.4.4, 9.2.4.5 OR 9.2.4.6 ARE MET, HANGERS FOR MAINS SHALL BE IN ACCORDANCE WITH 9.2.2, BETWEEN EACH BRANCH LINE OR ON EACH SECTION OF PIPE, WHICHEVER IS THE LESSER DIMENSION.

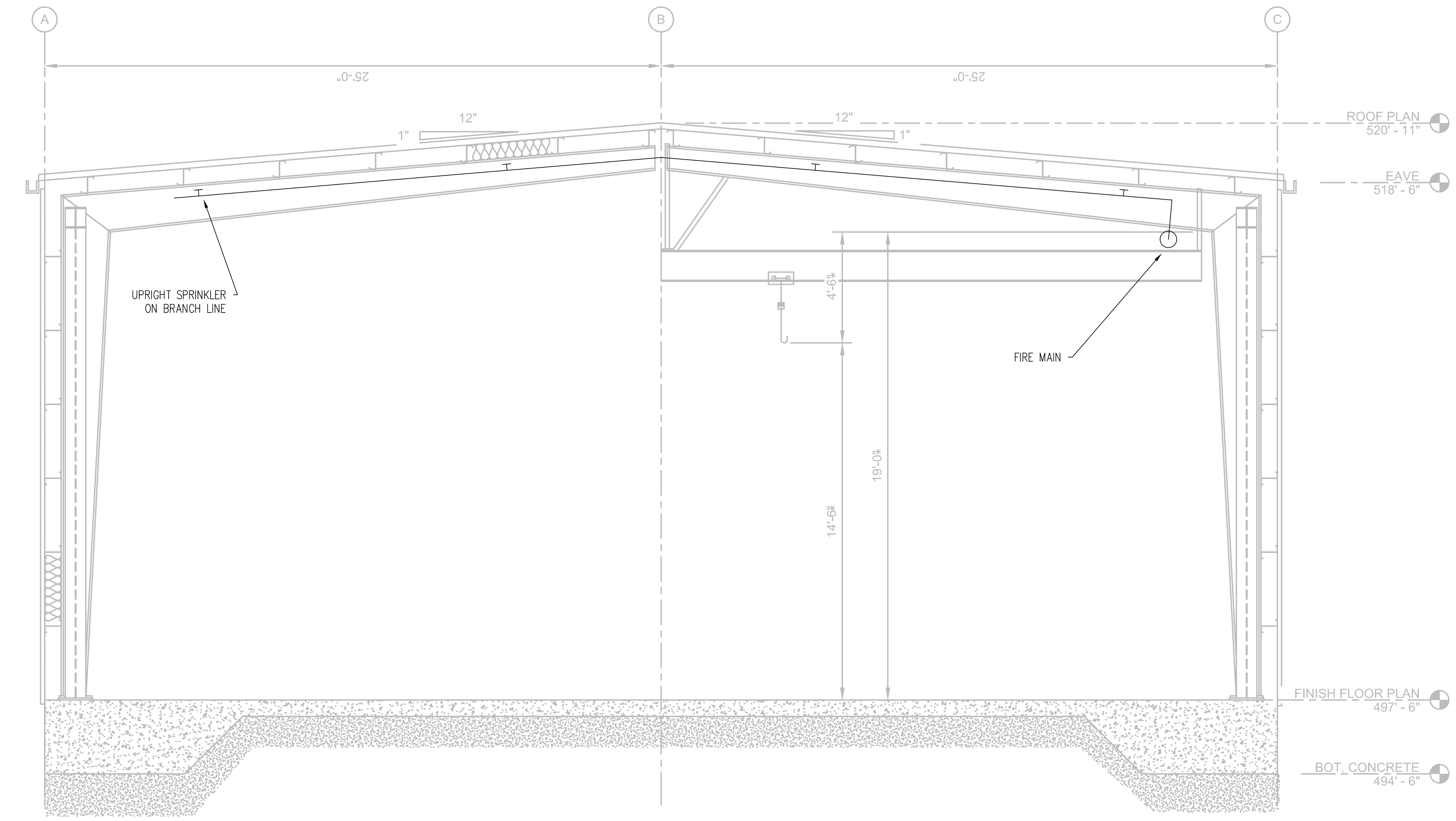
9.2.4.2: FOR WELDED OR MECHANICAL OUTLETS ON A CONTINUOUS SECTION OF PIPE, HANGER SPACING SHALL BE ACCORDING TO TABLE 9.2.2.1(A).

9.2.4.3: FOR CROSS MAINS IN STEEL PIPE SYSTEMS IN BAYS HAVING TWO BRANCH LINES, THE INTERMEDIATE HANGER SHALL BE PERMITTED TO BE OMITTED PROVIDED THAT A HANGER ATTACHED TO A PURLIN IS INSTALLED ON EACH BRANCH LINE LOCATED AS NEAR TO THE CROSS MAIN AS THE LOCATION OF THE PURLIN PERMITS. REMAINING BRANCH LINE HANGERS SHALL BE INSTALLED IN ACCORDANCE WITH 9.2.3.

9.2.4.7: A SINGLE SECTION OF PIPE SHALL NOT REQUIRE A HANGER WHEN THE CUMULATIVE DISTANCE BETWEEN HANGERS ON THE MAIN DOES NOT EXCEED THE SPACING REQUIRED BY TABLE 9.2.2.1(A).

HANGER SPACING TABLE PER NFPA Table 9.2.2.1(a)

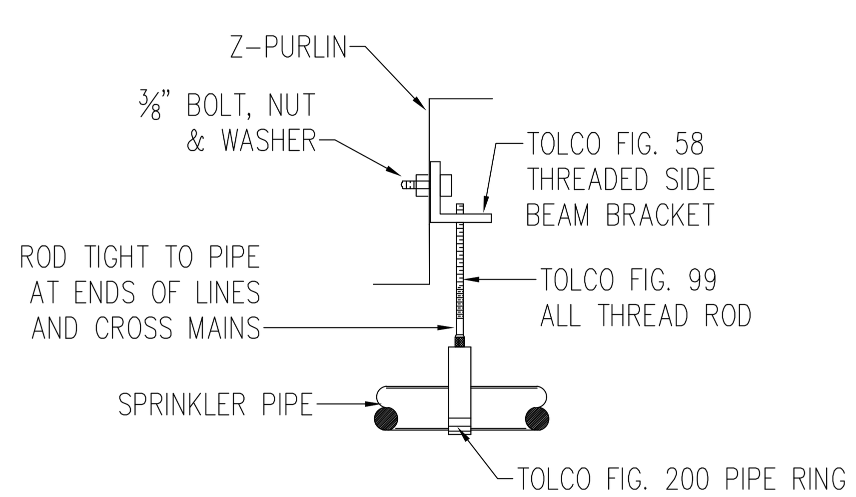
Nominal Pipe Size (in.)	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"
Steel Pipe	12'-0"	12'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"



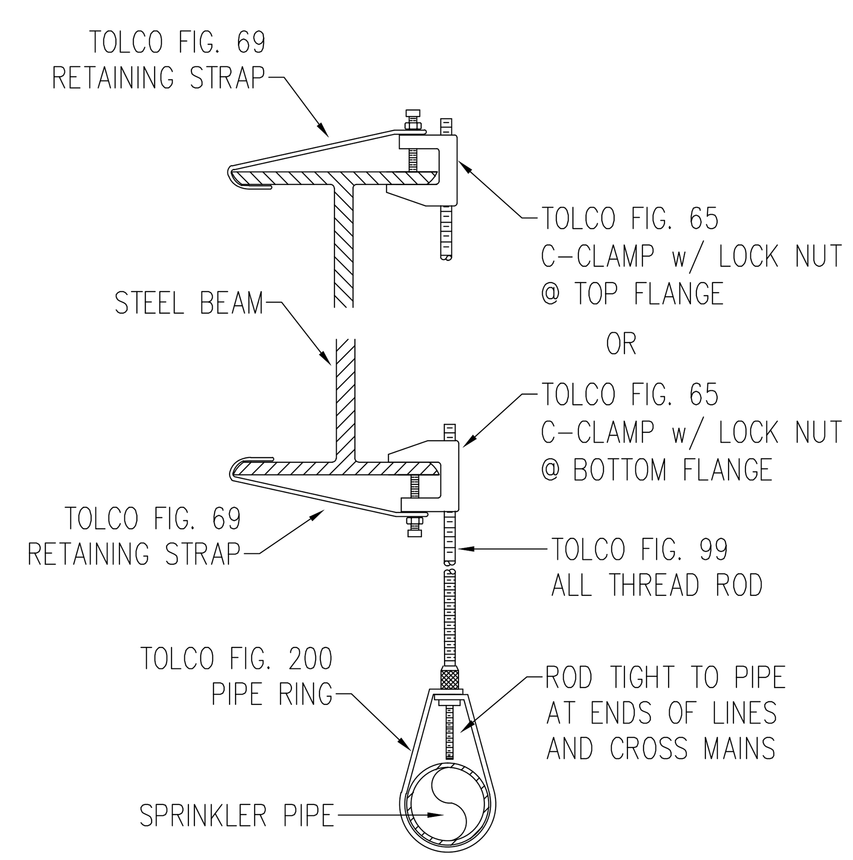
0 4 8 12

SCALE: 1/4"=1'-0"

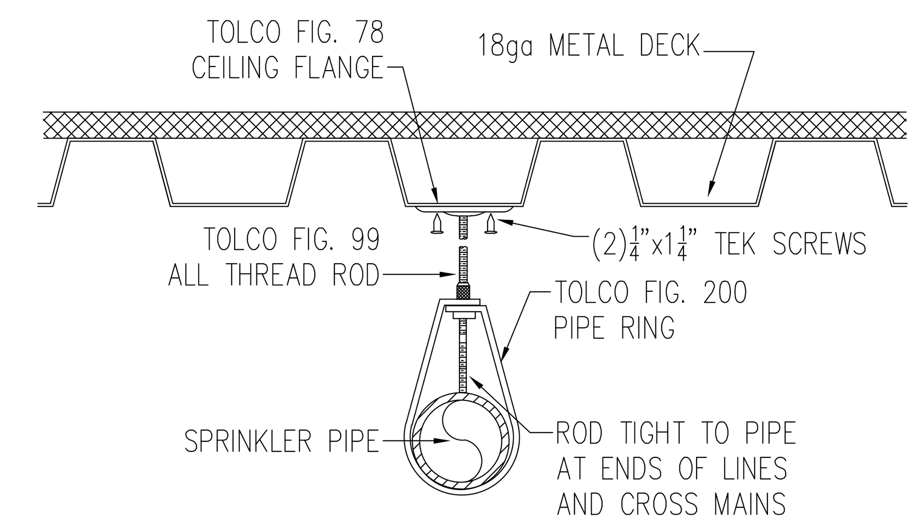
B BUILDING SECTION
1/4" = 1'-0"
F-15-03



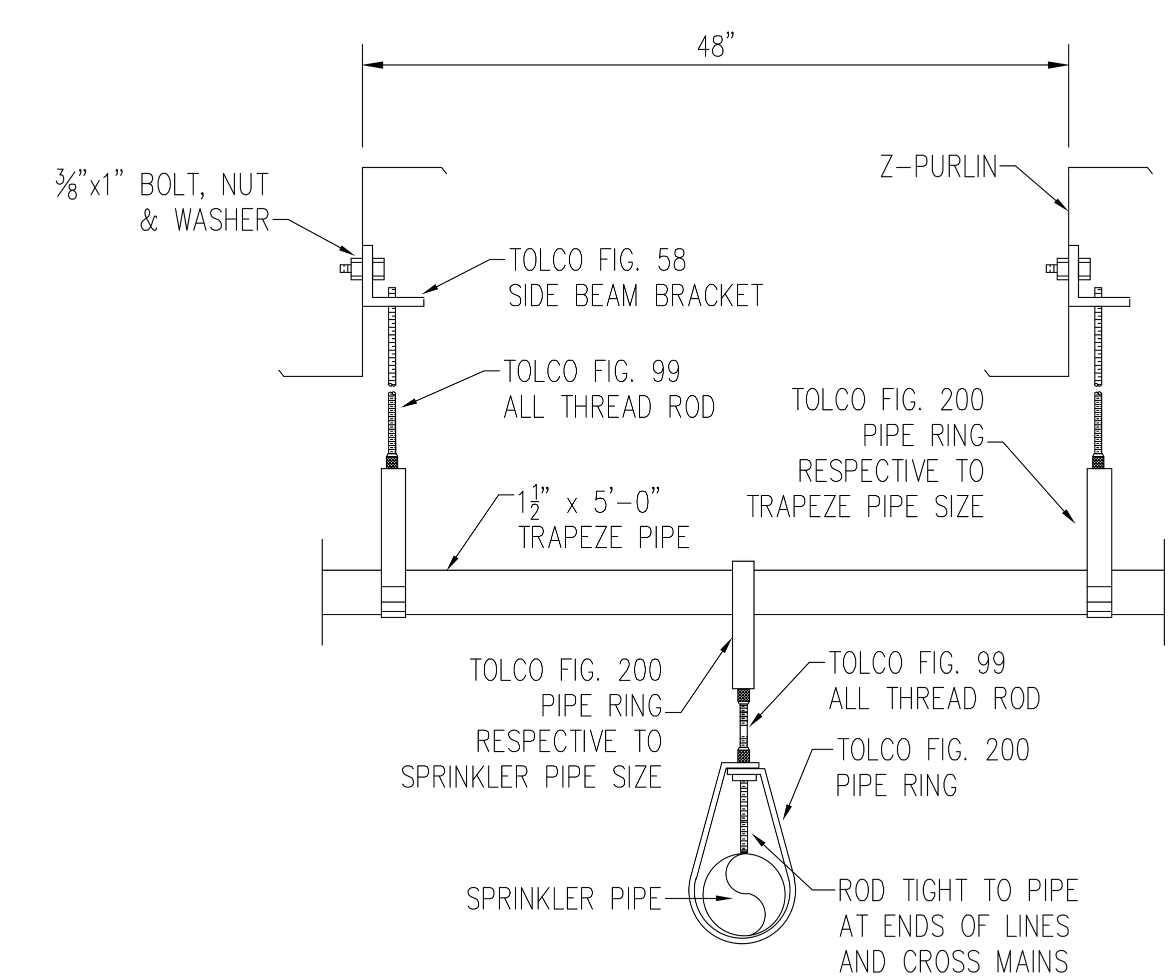
SIDE BEAM BRACKET #4
NO SCALE



C-CLAMP HANGER #7
NO SCALE



CEILING FLANGE HANGER #14
NO SCALE



PIPE TRAPEZE HANGER #32
NO SCALE

- DRAFT -
NOT FOR
CONSTRUCTION

MARQUEE
FIRE PROTECTION
CA. LIC. 570970 C-16

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	JMS	JPB	JEF
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		AJW	JMS	JPB	JEF

REVISIONS

APPROVED BY: JEF
SO
SUPV JPB
DSGN JMS
DWN AJW
CHKD JPB
OK JEF
DATE 2/2/15
SCALES AS NOTED

TOPOCK GROUNDWATER REMEDIATION PROJECT

WORKSHOP FIRE PROTECTION DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
F-15-04
REV 1

Assessment of Biological Resources for the Proposed Sewer and Fire Water Lines for the Construction Headquarters: Final Groundwater Remedy,Topock Compressor Station, California

PREPARED FOR:	Virginia Strohl/PG&E
PREPARED BY:	Russell Huddleston/CH2M HILL
COPIES:	Curt Russell /PG&E Marjorie Eisert/CH2M HILL
DATE:	August 3, 2015

Introduction

This technical memorandum provides a general assessment of biological resources that could be affected by the proposed sewer and fire water lines that may be installed in the future and are associated with the construction headquarters (CHQ) facilities that would be located to the west of Park Moabi, south of the National Trails Highway.

The CHQ and associated infrastructure would be located entirely on federal lands managed by the Bureau of Land Management that are currently leased to San Bernardino County. Therefore, no additional impacts would occur to the Havasu National Wildlife Refuge lands.

Site Description

The CHQ will be located in an area that was recently (early 2013) cleared and graded for a paint ball game sponsored by Park Moabi. Initially, connections from the CHQ to the County sewer line and fire water services will not be constructed. However, sewer and fire water pipelines may be added in the future should connections to the County facilities become available. There are currently two alternatives being considered for the potential sewer and fire water pipeline alignment. For alternative 1, the sewer and fire water pipeline would extend to the west-southwest for approximately 250 feet, in roughly the same alignment as the potable water and power distribution lines. The pipelines would then turn to the northwest and continue approximately 250 feet to the north side of the National Trails Highway. Under this alternative, the alignment would cross a wash within the existing dirt roadway (that would be improved as part of the CHQ). From the north side of the road, the alignment would then continue approximately 1,750 feet along the north shoulder of the National Trails Highway where it would tie into existing pipelines in the developed part of Park Moabi (Figure 1).Under alternative 2, sewer and fire water pipelines would extend approximately 250 feet northwest from the CHQ, crossing a wash feature and continue to the north side of the National Trails Highway. The alignment would then make a 90 degree turn to the northeast and continue approximately 1,400 feet along the north shoulder of the National Trails Highway where it would tie into existing pipelines in the developed part of Park Moabi (Figure 1).

The following sections discuss potential biological issues associated with the proposed potential alignments for the sewer and fire water pipeline alternatives.

Wildlife

Both alternatives are largely located in disturbed areas that provide low quality habitat for wildlife species. No desert tortoise or sign (e.g., burrows, scat, remains) has been found in this area. A number of special-status bird species including bank swallow (*Riparia riparia*), Bell's vireo (*Vireo belli*), southwest willow flycatcher (*Empidonax traillii extimus*), yellow-billed cuckoo (*Coccyzus americanus*), and Yuma clapper rail

(*Rallus longirostris yumanensis*) have been observed in the EIR project area. However, suitable habitat for these species including riparian, emergent wetland, woodlands, and dense shrubby areas are not present along either alternative.

Vegetation

Both alternatives are located in disturbed areas with sparse vegetation. The few large trees and shrubs that are important from both a visual aesthetic viewpoint as well as culturally significant species present in the vicinity of the proposed alignment are spaced widely enough apart that significant impacts to vegetation can be avoided.

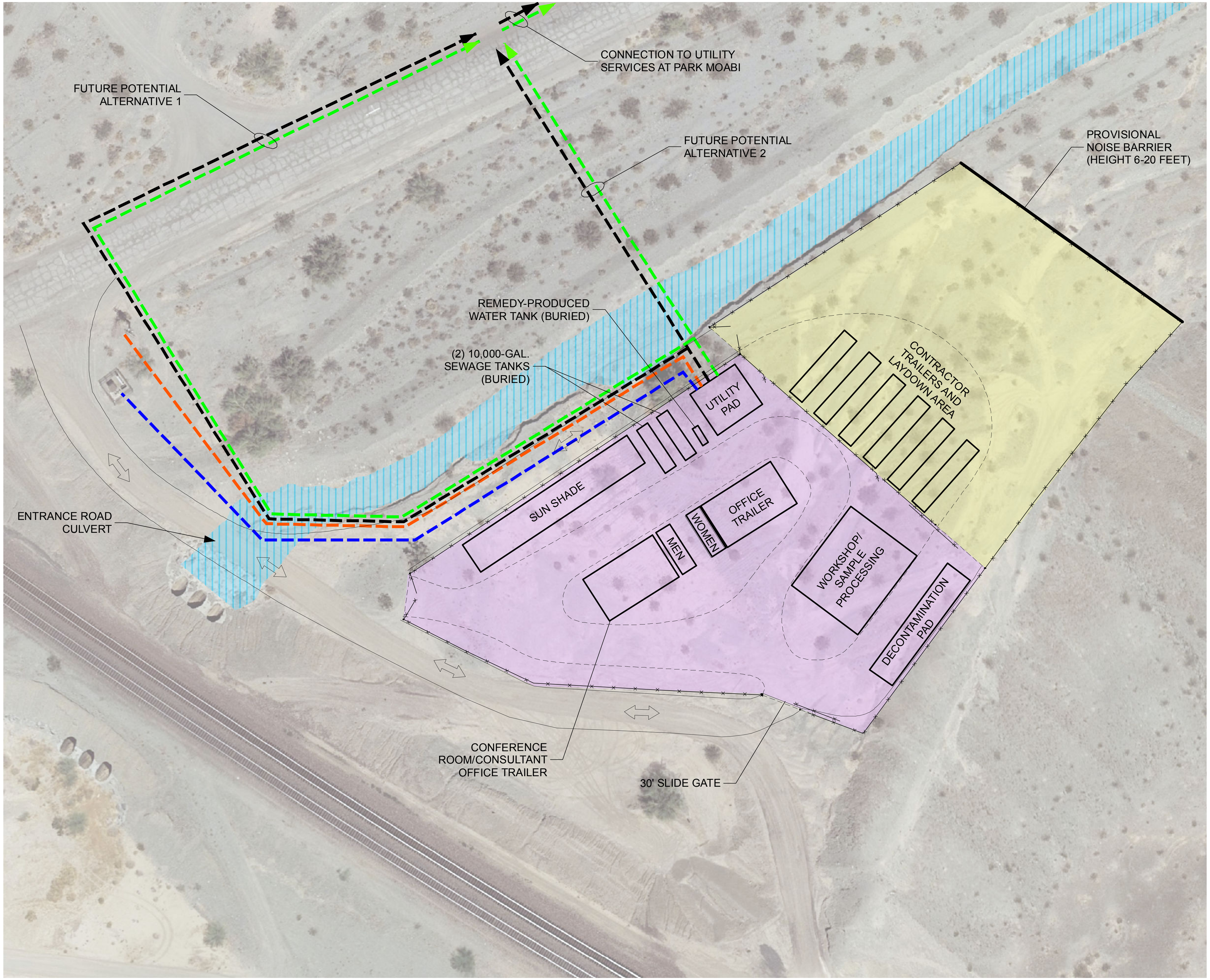
Wetlands and Waters

Both alternatives would cross the wash located on the northern side of the CHQ (Figure 1). The wash has been delineated as a Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded wetland (CH2M HILL 2014). The wash eventually flows into the Park Moabi Slough, and ultimately into the Colorado River. The wash is therefore tributary to a Traditional Navigable Water and is considered to be a jurisdictional Waters of the United States under Section 404 of the Clean Water Act. The wash would also be regulated as a stream under Section 1600 of the California Fish and Game Code. In this area, the wash originates at three 8.5-foot-diameter corrugated metal pipe culverts installed under the Burlington Northern Santa Fe railroad tracks. An existing dirt access road is located just east of the culvert outfall and west of the clearly defined wash channel. The access road is currently in functioning condition, but would be upgraded to maintain flows while allowing access to the CHQ. East of the existing road, the wash is characterized by a relatively uniform bed with steep side slopes. The substrate consists of coarse sand with scattered pebbles and cobbles and boulders. Vegetation within the channel includes several small blue palo verde saplings along the edges with scattered creosote bush, brittlebush (*Encelia farinosa*), honeysweet (*Tidestromia oblongifolia*), small-seeded spurge (*Chamaesyce polycarpa*), and Spanish needle (*Palafoxia arida*) within and along the channel.

Under alternative 1, the excavation for the sewer and fire water pipelines would occur in the area where the existing road and proposed upgrades as well as additional utilities lines would be located (Figure 1). Installation of the pipelines in this location would, therefore, not result in additional temporary impacts to the wash.

Under alternative 2, the proposed alignment for the sewer and fire water pipelines would be buried under the open channel northwest from the proposed CHQ. Impacts associated with this alternative are dependent on construction methods. If the pipe were to be installed in an approximately 5-foot-wide open cut trench across the approximately 40-foot wide channel, approximately 200 square feet of temporary impacts would occur. To the maximum extent possible impacts to perennial vegetation would be avoided and minimized. Following construction, the trench would be backfilled and the channel bed would be restored to the original grade. Alternatively the pipelines could be installed using trenchless methods (e.g. horizontal directional drilling) under the wash, thereby avoiding any temporary impacts to the channel.

All work activities within the wash will be conducted in conformance with the Avoidance and Minimization Measures specified by the California Department of Fish and Wildlife for the project and best management practices for work in jurisdictional wetlands and waters of the U.S. All work also will comply with other applicable federal and state requirements, including applicable measures in the Mitigation Monitoring and Reporting Program (MMRP) for the Topock Compressor Station Groundwater Remediation Project.



Legend

- Fenceline
- Provisional Noise Barrier (height 6-20 feet)
- Future Potential Fire Water Connections
- Future Potential Sanitary Sewer Connections
- Future Potential Water Connection
- Anticipated Electrical and Telecom Connection*
- Temporary Construction Laydown Area (1.05 acres approx.)
- Long Term Remedy Support Area (0.8 acres approx.)
- Jurisdictional Waterway

Notes:

1. All remedy structure locations are approximate.
2. Descriptions of activities/functions anticipated for the construction support areas are included in the Construction/Remedial Action Work Plan.
3. Descriptions of activities/functions anticipated for the long-term remedy support areas are included in Section 3.5 of the BOD and the O&M Manual.
4. Temporary storage/conex boxes (not shown) may be used within the fenced Construction Headquarters.

* Final locations will be determined by Needles

PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA
90% RESPONSE TO COMMENTS

DETAILED LAYOUT OF THE CONSTRUCTION HEADQUARTERS AND LONG-TERM REMEDY SUPPORT AREA – MOABI REGIONAL PARK

ARCADIS

FIGURE
1

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Attachment R: RTC #815

Revised Figures ES-4C (same as Figure 3.4-1 of the 90% BOD, Exhibit 2.7-1 of O&M Manual Volume 1, and Figure 3.1-4 of the C/RAWP)

LEGEND

Underground Gas Supply Pipe

Proposed Remedy Structure

Notes:

1. All remedy structure locations are approximate.

N

0 100 200 400 Feet

FIGURE ES-4C
GENERAL REMEDY SYSTEM LAYOUT - TCS EVAPORATION PONDS
SUPPLEMENTAL PRE-FINAL (90%) DESIGN SUBMITTAL FOR THE FINAL GROUNDWATER REMEDY
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL

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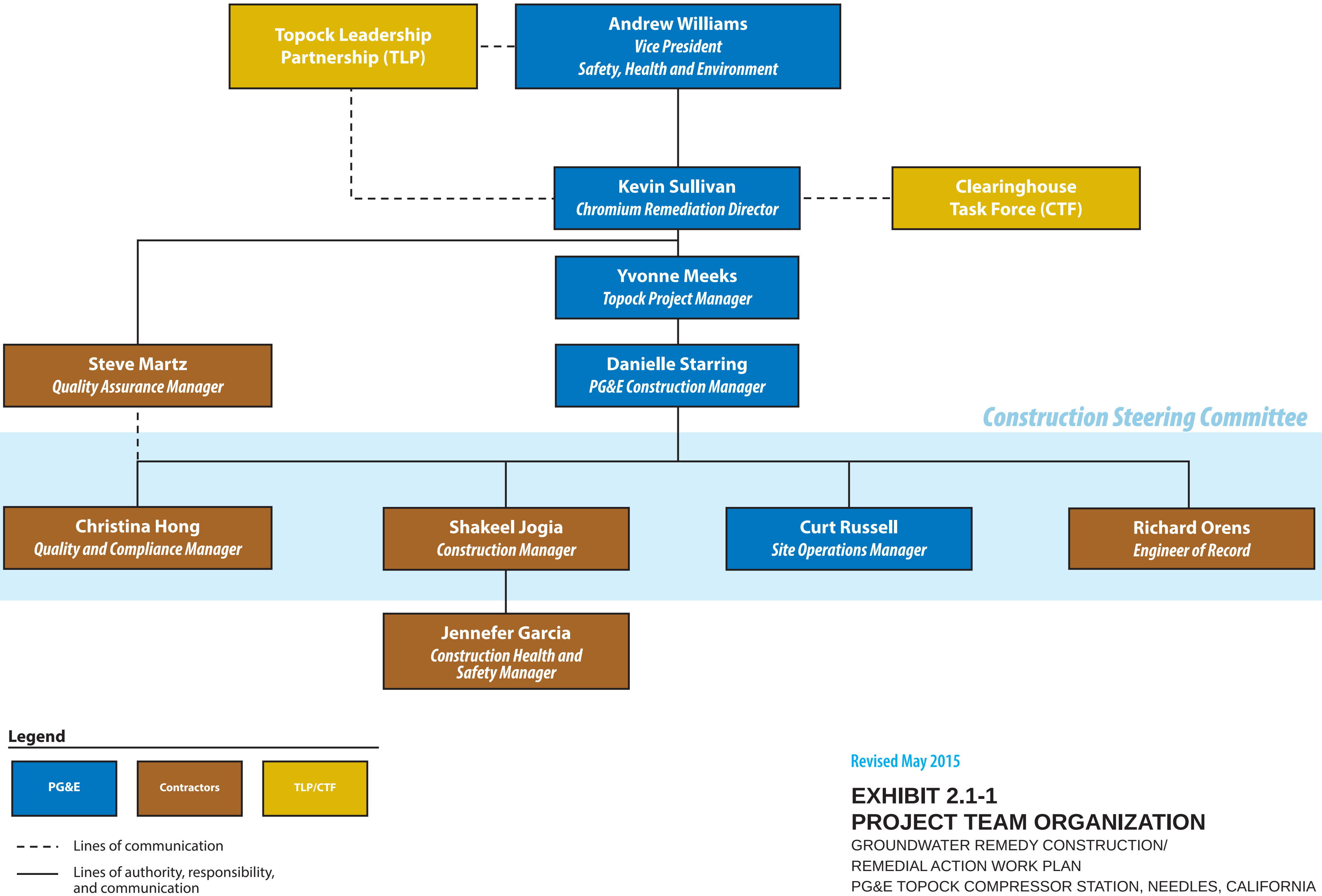
Attachment S: RTC #867

Revised Exhibit 2.1-1 of the C/RAWP



Revised May 2015

EXHIBIT 2.1-1
PROJECT TEAM ORGANIZATION
GROUNDWATER REMEDY CONSTRUCTION/
REMEDIAL ACTION WORK PLAN
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

Attachment T: RTC #932

New Exhibit in C/RAWP Section 3.2.1.2 Defining which Boreholes will be used for Groundwater Sampling during Drilling

Exhibit 3.2-2

Preliminary List of Well Locations for Borehole Groundwater Sample Collection

Groundwater Remedy Construction/Remedial Action Work Plan, PG&E Topock Compressor Station, Needles, California

Category 1 (All Locations)	**Category 2 (All Locations)**	**Category 3 (Key Pilot Boreholes)**
MW-A	MW-I	IRZ-1
MW-P	MW-J	IRZ-5
MW-S	MW-O	IRZ-9
MW-Z	MW-Q	IRZ-13
MW-BB	MW-R	IRZ-15
MW-DD	MW-T	IRZ-20
MW-FF	~~MW-U~~	IRZ-27
MW-10D	MW-V	IRZ-35
MW-11D	MW-W	
MW-70BR-D	MW-X	
MW-U	MW-AA	
	MW-CC	
	MW-GG	
	MW-HH	
	MW-II	
	RB-1	
	RB-2	
	RB-3	
	RB-4	
	RB-5	
	MW-H	
	MW-L	
	MW-M	
	MW-N	
	MW-Y	

Notes:

1 - This preliminary list of well locations for borehole groundwater sample collection is subject to change based on observations in the field, and could result in more or less boreholes being utilized for sample collection.

2 - Typically, only one borehole at a given well location (the deepest) will be utilized for borehole groundwater sample collection.

Attachment U: RTC #938

New C/RAWP Section 3.2.1.6, Baseline Well Sampling

3.2.1.6 Baseline Well Sampling

In response to 90% RTC #938 DTSC-167, this section details the plans and methods to collect initial baseline samples from all new extraction, injection, and monitoring wells[1] constructed as part of the groundwater remedy. As new wells are constructed and developed they will be added to baseline well sampling events that will be conducted on a regular frequency (i.e., initiated every 4-6 weeks) during construction. As many new wells as possible will be grouped in each event for efficiency with sampling and laboratory analysis. Baseline groundwater samples will be collected a minimum of 72 hours after well development is completed, thereby allowing the well to stabilize following the extended purge during development, before sample collection in accordance with the SOPs presented in the subsections below.

Baseline monitoring will include two samples collected to establish the baseline conditions; a third baseline sample will be collected if it is necessary to confirm the baseline condition should data from one of the first two events appear anomalous. The two baseline samples will be collected approximately one month apart; however, the time between samples might be shortened if determined necessary to ensure that the collection of these samples does not delay startup of the system. In addition to baseline sample collection at new wells, existing wells will be added to these events as determined necessary. For example, select Category 1 wells will be included in these events beyond the collection of initial baseline samples as determined necessary to inform the location and design of other remedy wells.

Groundwater Sample Collection Methods and Procedures. Sampling and field measurements will be performed in accordance with the SOPs presented in Appendix B. Required sample containers, preservation requirements, sample storage, and QC methods and requirements are described in further detail in the PG&E Program QAPP and QAPP Addendum (see Appendix C).

In continued efforts to integrate sustainability practices into remedial implementation (see Section 4 of the 90% BOD Report), trials of alternative sampling and data collection methods were conducted at Topock to further reduce the overall sampling and project footprint and minimize potential impacts to sensitive resources (e.g., reduce trips to well sites, reduce purge water generation and management, reduce time spent at well sites, etc.).

The trial began in third quarter 2012 (September) and continued through first quarter 2013; it involved testing of two alternative sampling approaches at 18 site wells: the no-purge HydraSleeveTM sampling system and the minimal drawdown (low flow purging) sampling technique. Additional information about these two approaches can be found in numerous publications and public websites including but not limited to the following:

- HydraSleeveTM sampling system (www.hydrasleeve.com): A joint study completed by the U.S. Army Corps of Engineers, the Air Force Center for Environmental Excellence and the Air Force Real Property Agency in 2005 (Parsons 2005)
- Minimal drawdown (low flow purging or micro-purge) sampling technique: USEPA guidance on sampling procedures including the Groundwater Issue Paper: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures (Puls and Barcelona 1996) and the Groundwater Sampling Guidelines for Superfund and RCRA Project Managers (USEPA 2002)

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[1] Sampling of existing monitoring wells to document baseline site conditions prior to remedy implementation are discussed in the Basis of Design Report, Section 2 (Baseline Site Conditions and Pre-Design Work).

Trial results were compared to the current standard three-volume purge technique, and evaluated for use in monitoring of the final groundwater remedy. The 2013 Annual Groundwater Monitoring Report (CH2M HILL 2014a; available on the project website at http://dtsc-topock.com/) presented the trial results (see Recommendations section and Appendix H) along with detailed correlations between the two alternative sampling methods and the current three-volume purge method.

Based on the trial results, PG&E recommended to DTSC the use of micro-purge as the default sampling method for the existing groundwater monitoring and compliance monitoring programs. While micro-purge was recommended for groundwater/compliance monitoring, HydraSleeve and other grab sampling methods are also seen as useful tools for process monitoring during remedy implementation. DTSC completed review of PG&E's recommendations on June 26, 2014, and approved the use of micro-purge techniques for wells with screen length of up to 20-foot saturated thickness in alluvial and fluvial sediments (upland and floodplain locations) (DTSC 2014). Implementation of the micro-purge technique at approved wells commenced in the third quarter of 2014. SOPs associated with these alternative techniques have been included in Appendix A.

Additional trials using alternative sampling techniques will be conducted at monitoring wells with 30- to 50-foot screen lengths, and at bedrock open borehole wells located in TCS or the East Ravine. Trial results have been and will continue to be evaluated and new information incorporated into the sampling and monitoring for the final remedy, as appropriate. Additional SOPs may be developed and added to the lists below, or existing SOPs may be modified and amended. The latest version of the SOPs will be available to the sampling crews at the in project files onsite during construction.

The method used for the collection of baseline samples from injection and extraction wells constructed for the groundwater remedy will ultimately be determined based on the results of the ongoing alternative sampling technique trials. During operation, these large diameter wells will be equipped with dedicated pumps and will be plumbed into the groundwater remedy; however, the infrastructure may not be installed during remedy construction when the baseline samples are collected. Given the relatively large volumes of groundwater that would have to be purged and managed if sampled using SOP-A1, alternative techniques (SOP-A18 and/or SOP-A19) are preferred.

Groundwater sampling from wells will be performed in accordance with the following SOPs, as appropriate (included in Appendix B). Additional SOPs may be added as appropriate.

- SOP-A1 – Purging and Sampling of Groundwater Monitoring Wells, Well-Volume Method
- SOP-A2 – Purging and Sampling of 1-inch-diameter Groundwater Monitoring Wells, Modified Well-Volume Method
- SOP-A3 – Purging and Sampling of Active and Inactive Water Supply Wells
- SOP-A6 – Sample Field Filtration and Preservation for Metals Analyses
- SOP-A7 – Water Level Measurements
- SOP-A8 – Field Water Quality Measurements Using a Flow-through Cell
- SOP-A9 – Calibration of Field Instruments
- SOP-A10 – Decontamination of Water Sampling Equipment
- SOP-A11 – Total Depth Measurements
- SOP-A13 – Spill Prevention, Containment, and Control Measures for Monitoring Well Sampling

- SOP-A16 – Access Routes
- SOP-A17 – Groundwater and Surface Water Mobile Integrated Sample Tracking
- SOP-A18 – Purging and Sampling of Groundwater Wells Minimal Drawdown Method
- SOP-A19 – Sampling of Groundwater Monitoring Wells Hydrasleeve No Purge Method
- SOP-A23 – Sample Handling and Custody

Groundwater Sample Laboratory Analysis and Management. Baseline groundwater samples will be analyzed at a certified laboratory in accordance with the analytes presented on Exhibit 3.2-4. The laboratory analytical suite for baseline groundwater samples collected from injection and extraction wells is consistent with the analytes listed in Exhibit 4.1-1 (Biological and Geochemical Analytical Monitoring Parameters) of the O&M Manual (Volume 1).

EXHIBIT 3.2-4
Laboratory Analysis of Baseline Groundwater Samples
Groundwater Remedy Construction/Remedial Action Work Plan
PG&E Topock Compressor Station, Needles, California

Constituent	Preferred Method	Units	Monitoring Wells	Extraction Wells	Injection Wells	IRZ Injection Wells
Total Organic Carbon (TOC)	EPA 415.1	mg/L	X	X	X	X
Total Dissolved Solids (TDS)	EPA 160.1	mg/L	X	X	X	X
Title 22 Metals (Total and Dissolved)	EPA 6010B	µg/L	X	X	X	X
Hexavalent Chromium	EPA 218.6 / SM3500-Cr B	µg/L	X			
Iron and Manganese (Total and Dissolved)	EPA 6010B	µg/L	X	X	X	X
Cations: Calcium, Potassium, Magnesium, Sodium (Total)	EPA 6010B	µg/L	X	X	X	X
Anions: Chloride, Fluoride, Bromide, Nitrate, Nitrite, Sulfate	EPA 300.0A	mg/L	X	X	X	X
Sulfide	EPA 9215	mg/L		X	X	
Alkalinity as Total, Carbonate, Bicarbonate	EPA 310.1	mg/L		X	X	X
Phosphate (low detection limits ~0.10 mg/L)	EPA 300.0A	mg/L		X	X	
Total Phosphorus (low detection limits ~0.10 mg/L)	SM 4500-P B	mg/L		X	X	
Silica	SM 4500-Si D	mg/L		X	X	
Hardness as $CaCO_3$	SM 2340 C	mg/L		X	X	
Ammonia-N	SM 4500-NH3 D	mg/L		X	X	
Total Kjeldahl Nitrogen (TKN)	SM 4500-N B	mg/L		X	X	
Biochemical Oxygen Demand (BOD)	EPA 405.1	mg/L		X	X	

Notes:

µg/L = micrograms per liter
EPA = U.S. Environmental Protection Agency
mg/L = milligrams per liter

The contracted analytical laboratory will provide the required sample containers for all samples including QC samples. All containers will have been cleaned and certified free of the analytes of concern for this project. No sample containers will be reused. The contracted laboratory will add preservatives, if required, prior to shipping the sample containers to the field or supply the preservative as appropriate. The laboratory markings will indicate the type of preservative in the container. The date and time of sampling and the initials of the sampler will be recorded on the pre-printed label immediately prior to collection. The waterproof labels will be placed carefully on the proper container, and if waterproof labels are unavailable, they will be secured using clear tape to protect the label. When shipping samples using a freight carrier such as Federal Express, the ice used in shipping containers will be double-bagged and laser printed labels and indelible ink pens will be used to complete sample labels to ensure that the samples arrive at the laboratory dry and appropriately marked. If a laboratory courier is used, no bagging of ice is necessary. Vital information regarding the collection of each sample will be recorded in a field logbook, field sampling form, and/or chain-of-custody (CoC) form, as appropriate. The following information for each sample will be recorded in the field logbook, field sampling form, or CoC form, whichever is appropriate:

- Sampling location and description (sketch and measured distances from reference points will be recorded if there is no established identification for the sample location)
- Sample ID
- Sampler's name
- Date and time of sampling
- Sample designation (e.g., composite, grab, etc.)
- Sample matrix
- Type and ID of sampling equipment
- Field measurement data (e.g., pH, temperature, conductivity)
- Field observations that may be relevant to the analysis or sample integrity (e.g., odor, color, and weather conditions)
- Associated QC blanks
- Shipping details (if the laboratory is providing courier service, the courier must sign and date the CoC forms; copies of the signed CoC forms should be transmitted to the office as soon as practical; if FedEx, UPS, or other courier is used, include shipping information for each shipment)
- Destination laboratory

Sample coolers will be transported to the laboratory immediately after sample collection. An overnight courier may be used to transport the samples. Intermediate stops will be avoided, except for emergencies, in which case the situation will be noted in the field notebooks. The laboratory will be notified that samples are being shipped. The laboratory, upon receipt of the samples, will verify and record the adequacy of preservation and will add additional preservative, if necessary.

Attachment V: RTC #1005

New C/RAWP Figure 3.3-1

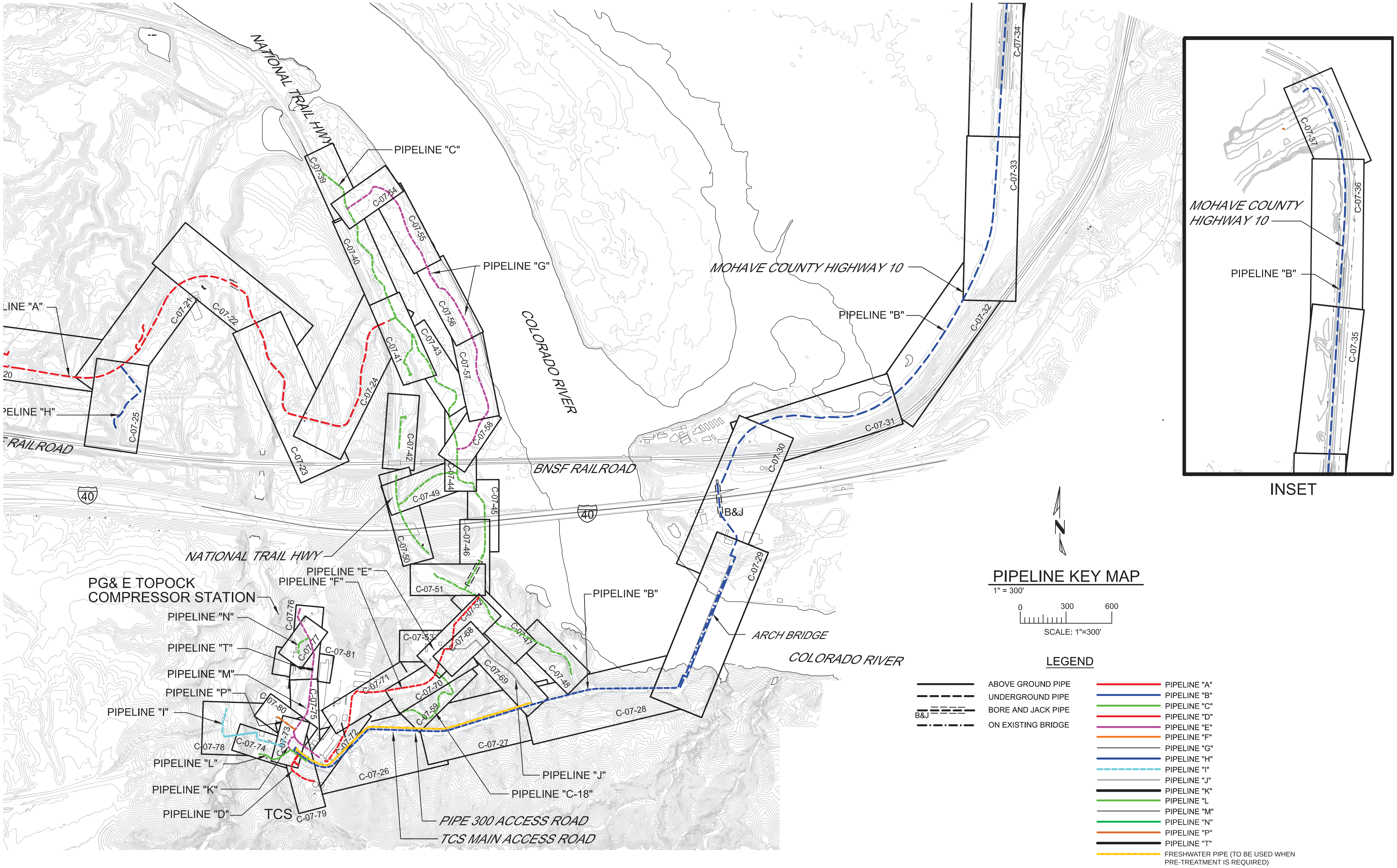
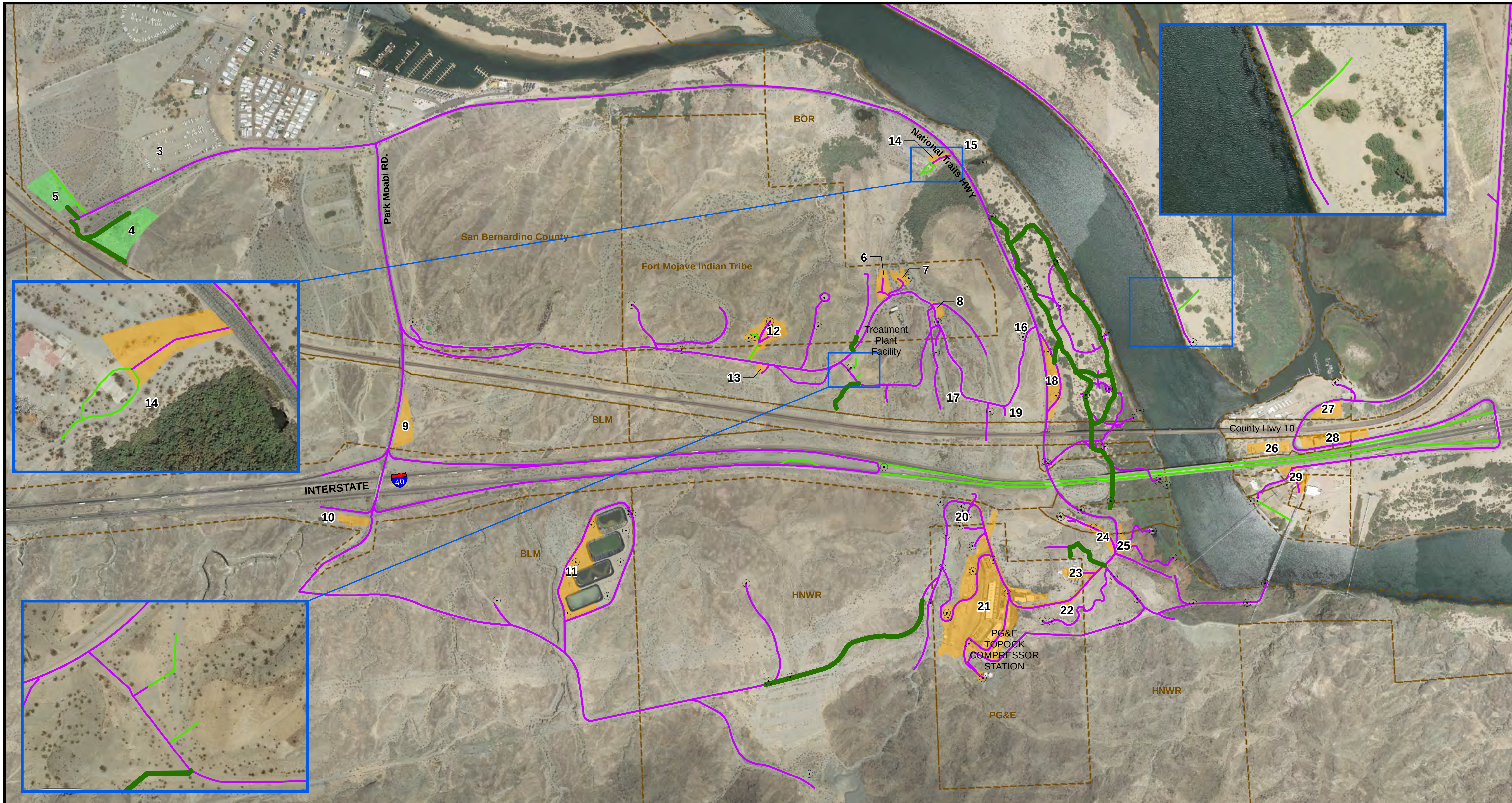


FIGURE 3.3-1
KEY PIPELINE MAP
GROUNDWATER REMEDY CONSTRUCTION/REMEDIAL ACTION WORK PLAN
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

Attachment W: RTC #1012

Revised C/RAWP Figure 4.2-3



LEGEND

- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (proposed to be used as is for access for remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Proposed Soil Processing (Area #5) and Construction Headquarter (Area #4) for Remediation Project
- Proposed Staging Areas for Remediation Project

Notes:

1. Area #3 will not be used as the Construction Headquarter (CHQ). The CHQ will be moved to Area #4.
2. Area #4 will be used as the primary truck inspection area. Areas #9, 18, and 23 or other staging areas might also be used depending on the specific construction activity.
3. Decontamination pads will be located in Area #4 (Construction Headquarters), Area #21 (Topock Compressor Station), and Area #23 (Transwestern Bench).
4. Areas #15, 16, 17, 19, and 20 will not be used as staging areas. Areas #16, 17, and 19 may be part of the primary work zones for remedy infrastructure along the access road.
5. Area #20 may be part of the primary work zone for installation of future provisional well IRL-6 (if determined to be needed in the future) and associated piping/concrete/vault.

FIGURE 4.2-3
CONSTRUCTION SITE PLAN AND ACCESS ROUTES
GROUNDWATER REMEDY CONSTRUCTION/ REMEDIAL ACTION WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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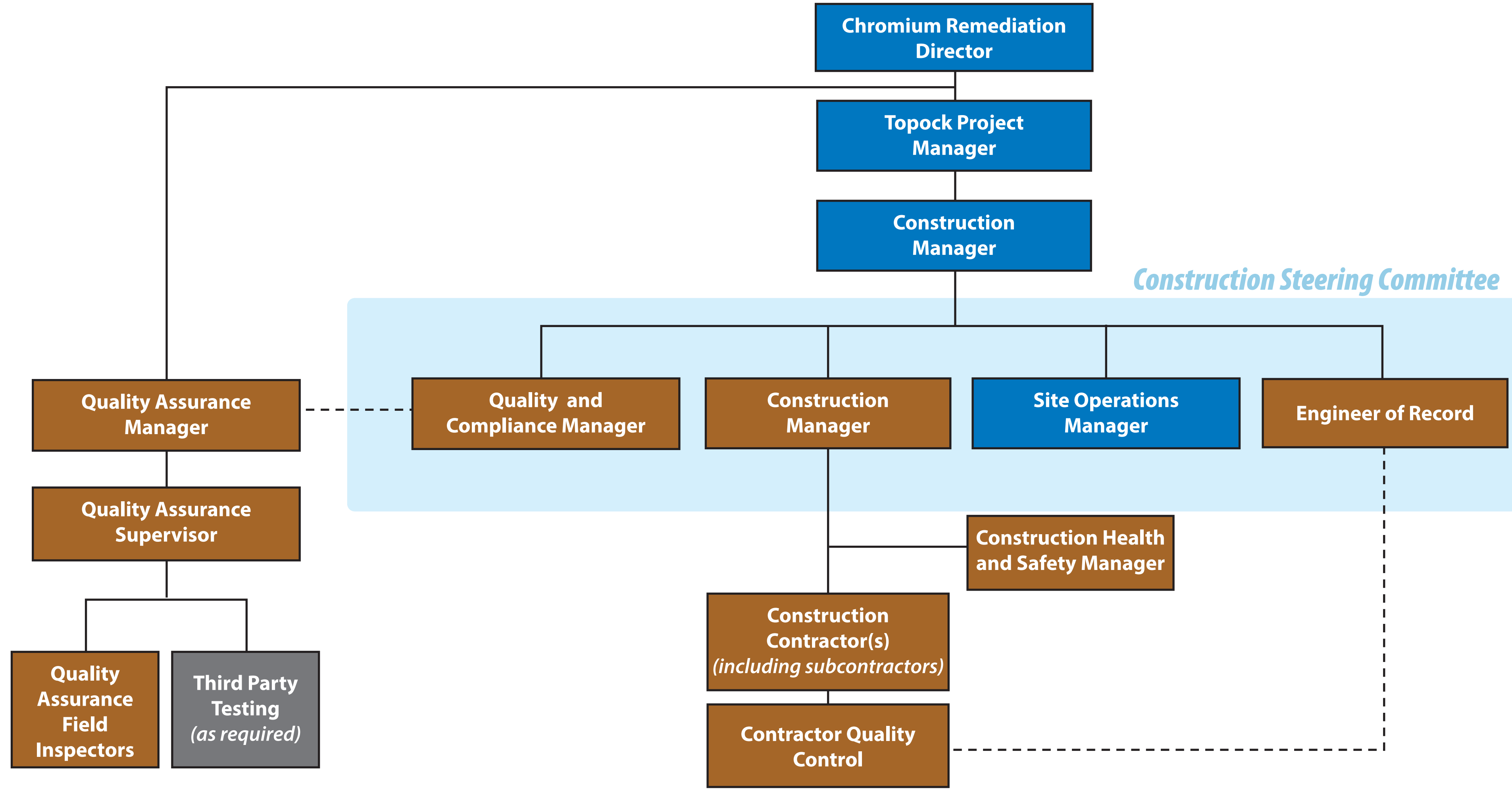
Attachment X: RTC #1055

Revised Figure 2-1 of the CQAPP (Appendix A of the C/RAWP)



Legend

PG&E | Contractors | Specialty Contractors (Testing)

- - - - Lines of communication

—— Lines of authority, responsibility, and communication

Note - for brevity, only the QA and construction QC functions are shown.

Revised May 2015

FIGURE 2-1
TOPOCK REMEDIAL ACTION PROJECT ORGANIZATION
GROUNDWATER REMEDY CONSTRUCTION QUALITY ASSURANCE PROJECT PLAN
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL.

ES031214222824BAO_Fig_2-1_TopockRemedialActionProj_OrgChart.ai_052015_lho

Attachment Y: RTC #1057

Draft Third Party Testing and Inspection by Quality Assurance

DRAFT THIRD PARTY TESTING AND INSPECTION BY QUALITY ASSURANCE (90% RTC #1057 DOI-199)						
90% Spec Ref	**Page No**	**Item of Work**	**Test Required**	**Method**	**Frequency**	**Draft 3rd Party Testing and Inspection by QA**
03 30 00		Cast In Place Concrete				
	24	Source Quality Control	Inspection of batch plants, cement mills and related suppliers by Engineer			QA qualified - source inspection may apply based on local history in the area - submittal dependent from subcontractor.
03 40 00		Precast Concrete				
	7	Source Quality Control	Strength test	ASTM C31	3 cylinders per 50 cy	
03 62 00		Non Shrink Grouting				
	5	Field quality control	Flow cone, strength, segregation, and bleed tests	ASTM C1107/ C1107M	3 cubes per 25 cf of grout	
03 64 23		Crack Repair Epoxy Injection Grouting				QA qualified - 3rd Party Testing only if problems arise through normal use.
	4	Source Quality Control	Pot life test		1 per batch	
	4	Source Quality Control	Bond test	AASHTO T237	1 per batch	
	8	Field quality control	2 component ratio test		Not specified	
	8	Field quality control	Injection pressure test		Not specified	
	8	Field quality control	Crack injection tests	Visual and strength (compression)	3 cores per first 100 lf and 1 per 500 lf after	
05 05 23		Welding				QA 3rd Party Testing Required - see below:
	3	Shop weld inspections	Visual testing		100%	QA 3rd Party visual inspection at 10% rate. Inspection rate could drop or increase based on results of inspections.
			QC of WPS & WPQ			
	5	Field weld inspections (applies to 05 21 19, 05 31 00, 05 41 00)	Visual testing		100%	QA 3rd Party visual inspection at 10% rate. Inspection rate could drop or increase based on results of inspections.
	5		QC of WPS & WPQ			
	5		Radiograph (CJP Groove, Butt Joint Welds)		10% random	QA 3rd Party testing at 1% rate.
	5		Ultrasonic (All other CJP Groove Welds)		10% random	QA 3rd Party testing at 1% rate.
	5		Liquid penetrant or magnetic particle (Fillet Welds and PJP Groove Welds)		50% random	QA 3rd Party visual inspection at 5% rate.
05 12 00		Structural Steel Framing				QA 3rd Party Testing Required - see below:
	8	ASTM A6/A6M Shapes	Charpy V-notch Test	ASTM A6/A6M S30	Not specified	
	9	Fabrication welds	Visual testing		100%	QA 3rd Party visual inspection at 10% rate. Inspection rate could drop or increase based on results of inspections.
	9		Radiograph (Groove welds)		10% random	QA 3rd Party testing at 1% rate.
	9		Liquid penetrant or magnetic particle (Fillet Welds)		10% random	QA 3rd Party testing at 1% rate.
	11	High-strength bolted connections	RCSC Specification for Structural Joins using ASTM A325 or A490 bolts Applies to 05 21 19	Installation and tightening of bolts	Not specified	QA 3rd Party visual inspection at 10% rate. Inspection rate could drop or increase based on results of inspections.
05 50 00		Metal Fabrications				
	22	Fabrication welds	Visual testing	AWS D1.1/D1.1M	1	
	22	Hot-Dip Galvanizing	Inspect and test	ASTM A123/A23M and A153/A153M	Not specified	
	27	Owner furnished QA	Special inspections	Not specified	Not specified	QA source inspection conducted based on risk and complexity - submittal dependent
	27	Stud shear connectors (applies to 05 31 00)	Weld 2 test studs	AWS D1.1/D1.1M	Each production period	QA Inspection at 100% until satisfactory - then reduce over time to 10% inspection
			Torque test threaded anchor studs	AWS D1.1/D1.1M	Each production period	
			Visual testing		Not specified	
05 52 00		Metal Railings				
	3	Railings	Calculations stamped by Registered Civil or Structural Engineer			
08 33 23		Overhead Coiling Doors				
	5	Source Quality Control	UL Certificate of Inspection for oversize fire rated door			
08 80 00		Glazing				
	10	Field quality control	Hose test		Not specified	
08 90 00		Louvers and Vents				
	3	Source Quality Control	Factory performance tests	Airflow versus pressure loss		
	3	Source Quality Control		Rain penetration data		
09 96 35		Chemical-Resitant Coatings				
	5	Field quality control	Electrical spark or other tests		As required (by Engineer)	

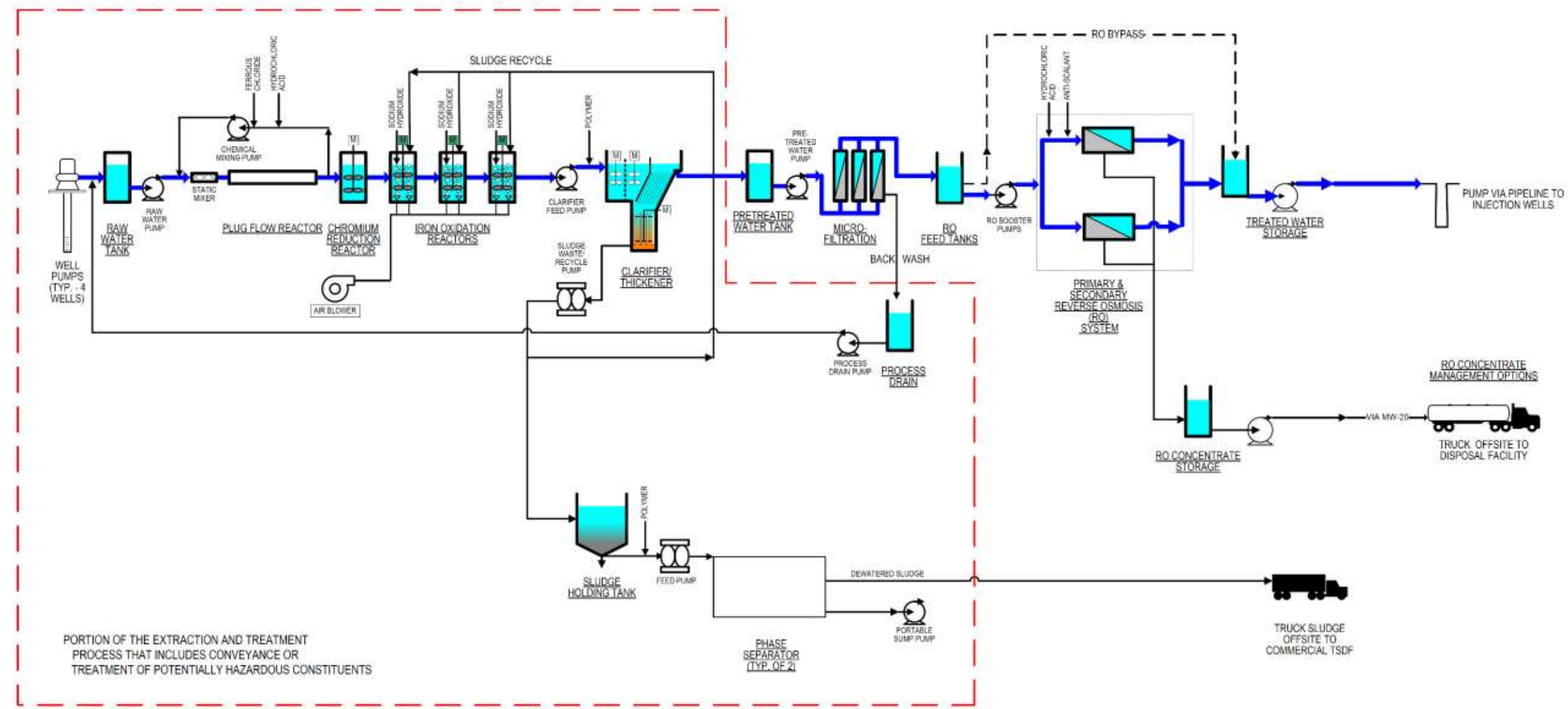
09 97 13		Steel Tank Coatings				
	8	Source Quality Control	Shop inspection of surface preparation and shop application of paints by Engineer	Visual		QA qualified for source inspection - based on submittal at the time.
	17	Coating surfaces	Thickness testing	DFT Gauge SSPC-PA 2	100%	QA Inspection may be required based on submittal from Subcontractor
	17	Submerged coated surfaces	Holiday (pinhole) Testing	NACE RP0188	100%	QA Inspection may be required based on submittal from Subcontractor
22 30 00		Plumbing Equipment				
		Exchangers	Hydrostatic Testing (Factory)	BPVC Section VIII, Div. 1	Not specified	
23 34 00		HVAC Fans				
	12	Source Quality Control	Performance	AMCA 210		
	12	Source Quality Control	Noise	AMCA 300		
	12	Source Quality Control	Fabrication	AMCA 99		
23 81 00		Unitary Air-Conditioning Equipment				
	11	Source Quality Control	Expansion coil leak test	200 psig air underwater. Pressure test to 450 psig.	Not specified	
	11	Source Quality Control	Electrical heating coil test	2000 volt dielectric test	Not specified	
	12	Field quality control	Leak test			
	12	Field quality control	Refrigerant pressure test			
	12	Field quality control	Evaluate (if req'd)			
	12	Field quality control	Dehydrate (if req'd)			
	12	Field quality control	Charge condensing unit			
26 05 05		Conductors				
	17	<=600 V	Conductor test	UL 44 and 854	Not specified	
	17	>600 V	Conductor test	WC 71 and AEIC CS 8 corna level test for TR-XLP insulated cable	Not specified	
26 08 00		Commissioning of Electrical Systems				
	6	Systems	Voltage Field Test			
	7	Systems	Equipment Line Current Tests			
		Switchgear and Switchboard Assemblies	Visual and mechanical inspection			
26 13 16.02		Pad-Mounted Switchgear				
	15	Switchgear	Production test assembly	IEEE C37.20.3	Not specified	
	15	Fuses	Production test	IEEE C37.46	Not specified	
26 22 00		Low-Voltage Transformers				
	4	Transformers	Production test	NEMA ST20	Not specified	
26 24 16		Panelboards				QA Start-up inspection and testing will be required based on O&M Manual.
	5	Internal Surge Suppressors	Production test: Category C3 high exposure waveform (20 kV-1.2/50us, 10kA-8/20 us)	IEEE C62.41	Not specified	Independent QA Source Inspection required.
26 24 19		Motor Control Centers				
	11	Controller	Production test	Manuf. Standard	Not specified	
26 29 23		Low-Voltage Adjustable Frequency Drive System				
	11	Control panels	Factory test		100%	QA Start-up inspection and testing will be required based on O&M Manaul.
	11	Drive components	Functional test of dioides, transistors, and GTOs at 125 C		Not specified	
	12	Drive components	TTL and CMOS chips at 70 C		Not specified	
	12	Drive components	Run power sections at 40C for 12 hours and with motors for 6 hours		Not specified	
	12	Assembled drive	Test at 40C and full load, full speed, for 4 hours		Not specified	
	12	Drive components	Power capacitors and active components		Not specified	
	12	Controller and motor	Operate throug its range and at rated power supply load for 1 hour		Not specified	
	12	Harmonic filters	Performance test that filters do not resonate with rest of system		Not specified	
	12	Motors	Motor test (per mechanical equipment specifications)		Not specified	
31 23 23		Fill and Backfill				QA 3rd Party Testing Required - see below:
	4	Source Quality Control	Import material gradation tests	ASTM C136	1 sample/1,500 cy	QA 3rd Party Testing once per source.

	9	Field quality control	In Place Density and Moisture	ASTM D6938	1 per 12 inch lift / 500 sf or 1 per 25 lf of trench	QA 3rd Party Testing required at 10% specification test frequency. Rate may be reduced over time based on passing results.
	9	Field quality control	Sand cone test	ASTM D1556	1 per fill type	QA visually spot checked in the field
	9	Field quality control	Proof roll fill materials	Loaded water truck, dump truck or similar vehicle	1 per fill type that is too coarse for density gauge	QA visually spot checked in the field
31 23 23.15		Trench Backfill				
	6	Earth backfill	Gradation tests	ASTM C136		QA 3rd Party Testing once per source.
	6	Source Quality Control	Trench stabilization material gradation tests	ASTM C136	Not specified	QA 3rd Party Testing once per source.
	6	Source Quality Control	Bedding and pipe zone material gradation tests	ASTM C136	Not specified	QA 3rd Party Testing once per source.
	6	Source Quality Control	Controlled low strength material - Laboratory performance of mix design		Not specified	
	6	Source Quality Control	Concrete - Laboratory performance of mix design		Not specified	
31 32 00		Soil Stabilization				
	3	Field quality control	Owner acceptance of preparation			QA visually spot checked in the field
	3	Field quality control	Owner acceptance of installation			QA visually spot checked in the field
32 11 23		Aggregate Base Courses				QA 3rd Party Testing once per source.
	4	Source Quality Control	Gradation tests	ASTM C136	Not specified	
	4	Source Quality Control	Plasticity index			
	7	Field quality control	Gradation tests (placed material)	AAHSTO T11 and T27	1 sample/500 tons	QA 3rd Party Testing once per source.
	7	Field quality control	In Place Density and Moisture	ASTM D1557 Method D	One test per gradation produced	QA 3rd Party Testing required at 10% specification test frequency. Rate may be reduced over time based on passing results.
	8	Field quality control	In Place Density and Moisture (in place material)	ASTM D1556 or D9638 (nuclear)	1 for each 200 tons or every 2000 sq ft	
32 12 16		Asphalt Paving				
	9	Field quality control	Field density tests	ASTM D2950	1 per 500 tons or every 4 hours	QA 3rd Party Testing required at 10% specification test frequency. Rate may be reduced over time based on passing results.
	9	Field quality control	Asphalt content, aggregate gradation		1 per 500 tons or every 4 hours	QA 3rd Party Testing required at 10% specification test frequency. Rate may be reduced over time based on passing results.
	9	Field quality control	Mix design (specific gravity)		1 per 1000 tons or every 8 hours	QA 3rd Party Testing required at 10% specification test frequency. Rate may be reduced over time based on passing results.
32 31 13		Chain Link Fences and Gates				
	4	Field quality control	Fabric tension and line post rigidity	ASTM F1816		
33 05 01.02		Ductile Iron Pipe and Fittings				
	6	Source Quality Control	Pressure Testing, flushing and system sterilization (Section 33 12 16)			
33 05 13		Manholes				
	8	Source Quality Control	Manhole section mat & permeability test	ASTM C14	Up to 5%	
	8	Source Quality Control	Manhole concrete compressive Strength	ASTM C31/31M, C39/C39M, C192/C192M	2 cylinders per manhole	
	13	Field quality control	Hydrostatic testing		25 percent (minimum)	
33 16 13.14		Frac Tanks				
	3	Source Quality Control	Factory test and inspections			
33 46 00		Subsurface Drainage				
	9	Field quality control	Drain line grade	Field survey	1 per 250 lf	
	9	Field quality control	Drain line streching			
40 50 10		Underground Piping				HDPE Fusion Welding - QA Inspection required - spot checked in the field. 3rd Party Pressure Testing may be requested of 10% of steel and HDPE pipe sections. QA 3rd Party visual inspection at of bolted flange connections at 10% rate. Inspection rate could drop or increase based on results of inspections.
40 50 20		Aboveground Piping				HDPE Fusion Welding - QA Inspection required - spot checked in the field. 3rd Party Pressure Testing may be requested of 10% of steel and HDPE pipe sections. QA 3rd Party visual inspection at of bolted flange connections at 10% rate. Inspection rate could drop or increase based on results of inspections.
40 90 00		Instrumentation and Control for Process Systems				QA Qualified based on complexity
	36	Source Quality Control	Factory Demonstration Test of Panels			
41 22 13.13		Overhead Cranes				
	10	Source Quality Control	Control panels and equipment inspection			
	10	Source Quality Control	Factory No-load run test			
	10	Field quality control	Alignment test		Each crane	
	10	Field quality control	Performance test (load)	ASME B30.11 and B30.16	Each crane	
43 12 01		Compressed Air Systems				

	6	Source Quality Control	Control panels and equipment inspection			
	6	Source Quality Control	Control panels and equipment test			
43 40 02		High Density Polyethylene Tank				QA Qualified source inspection may apply based on complexity
	4	Source Quality Control	Hydrostatic testing			
43 40 13		Steel Storage Tank				QA Qualified source inspection may apply based on complexity
	4	Source Quality Control	Inspections,			
	4	Source Quality Control	Hydrostatic testing			
	4	Source Quality Control	Laminate test reports			
	4	Field quality control	Hydrostatic testing	24 hour leak test	Each tank	
44 42 56.04		Submersible Pumps				
	2	Source Quality Control	Submersible Motor Function Test	HIS 11.6		
44 42 56.09		Submersible Centrifugal Pumps				
	5	Source Quality Control	Factory test with actual motor and pump	Hydraulic Institute	All pumps	
	6	Field quality control	Alignment test			
	6	Field quality control	Performance test			
44 42 56.10		Horizontal End Suction Centrifugal Pumps				
	2	Source Quality Control	Factory inspection and test		All pumps	
	2	Source Quality Control	Functional test	Manuf. Standard	All pumps	
	2	Source Quality Control	Performance test	Hydraulic Institute	All pumps	
	2	Source Quality Control	Motor test	Manuf. Standard	All pumps	
	2	Source Quality Control	Hydrostatic test	Manuf. Standard	All pumps	
	3	Field quality control	Alignment test		All pumps	
	3	Field quality control	Vibration test		All pumps	
	3	Field quality control	Performance test		All pumps	
44 42 56.10		Horizontal End Suction Centrifugal Pumps				
	2	Source Quality Control	Functional test	Manuf. Standard	All pumps	
	3	Field quality control	Alignment test		All pumps	
44 44 13.01	3	Field quality control	Performance test		All pumps	
		Chemical Metering Pumps				
	4	Source Quality Control	Functional test	Manuf. Standard	All pumps	
	5	Field quality control	Functional test		All pumps	
	5	Field quality control	Performance test		All pumps	
Remediation Wells						QA 3rd Party check on 1) plumbness/alignment and 2) video surveys to ensure proper installation

Attachment Z: RTC #1155

Revised Figure 4-1 of the IM-3 Decommissioning Plan (Appendix F of the C/RAWP)



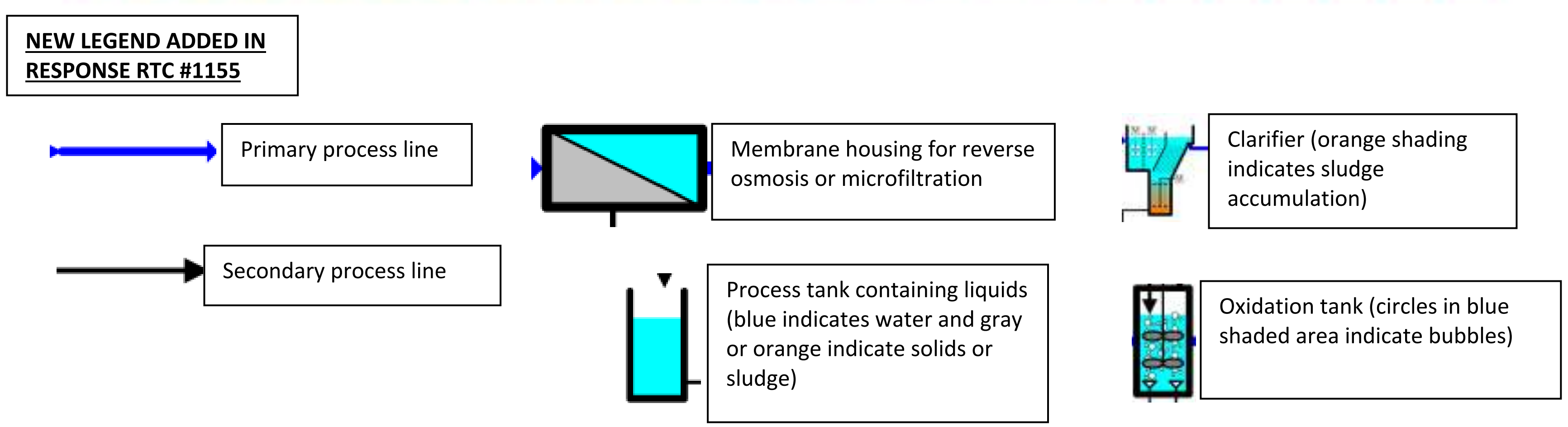


FIGURE 4-1
GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PROCESS FLOW DIAGRAM
IM3 DECOMMISSIONING, REMOVAL, AND RESTORATION WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Attachment AA: RTCs #1157, #1186 and #1188

New REMEDY-SOP-10: Sampling of Concrete/Asphalt Demolition Waste

Standard Operating Procedure
PG&E Topock Groundwater Remedy
Operation and Maintenance Plan

Title: Sampling of Concrete/Asphalt Demolition Waste

Number: Remedy-SOP-10_Rev0

Creation Date: 6/19/2015

1 Background and Scope

Pacific Gas and Electric Company (PG&E) is implementing a groundwater remedy near the intersection of Park Moabi Road and Interstate 40, approximately 12 miles southeast of Needles, California at the PG&E Topock Compressor Station (TCS). Construction and demolition of remedial facilities is expected to generate concrete and asphalt pavement rubble that will be managed for reuse, recycling, or offsite disposal.

Concrete and asphalt rubble will be managed as waste as outlined in Waste Management Plans for the project: see Appendix F of the Construction/Remedial Action Work Plan (Interim Measure No. 3 Decommissioning, Removal and Restoration Work Plan), and Appendix R of the Construction/Remedial Action Work Plan (Waste Management Plan). For concrete and asphalt associated with known hazardous waste or hazardous materials operations (such as the inside of containment structures for process chemicals) or that exhibit visual evidence of contamination, surface samples will be collected prior to demolition to determine if the material is contaminated. If contaminated, the concrete/asphalt demolition waste will be managed by either (1) offsite disposal under the assumption that the surface sample is representative of the entire mass of the slab, or (2) removing the surface contamination by cleaning (e.g., pressure washing with surfactant solution) or scarifying, and managing the cleaning fluids/scarified materials separately from the remaining concrete/asphalt mass as different waste streams. The classification and management requirements for the waste streams are described in the Waste Management Plans and are not repeated herein.

The objective of this Standard Operating Procedure (SOP) is to describe the procedure for sampling of concrete and asphalt surfaces/slabs to be demolished during the remedial action for purposes of determining whether the material is contaminated. Representative samples will be collected from concrete and asphalt surfaces/slabs associated with known hazardous waste or hazardous materials operations as described herein.

Concrete and asphalt slabs that are not associated with known hazardous material operations and that exhibit no visual evidence of contamination (staining, residue, etc.) will not be sampled. Asphalt that exhibits oil stains in areas with no history of polychlorinated biphenyl use will not be sampled.

2 Equipment/Supplies

- Appropriate personal protective equipment (PPE)
- Health and Safety Plan
- Waste Management Plan (see Appendix F or Appendix R of the Construction/Remedial Action Work Plan)
- Map and/or detailed description of concrete and asphalt sampling locations
- Coring drill and coring barrel, rotary impact hammer variable speed drill, or similar

- Hose and water supply for coring drill
- Aluminum foil
- Stainless steel chisel and hammer
- Stainless steel spoon
- Plastic Ziploc bags
- Sample bottles/jars
- Sample labels
- Sample logbook
- Chain-of-custody forms
- Chain-of-custody seals
- Waste container (e.g., 55-gallon drum)

3 Preconditions

- **Sampling and Analysis Plan:** A sampling and analysis plan will be prepared and provided by the Construction Manager or designee.
- **Sampling Approach:** In general, sampling areas shall be determined based on the history of activities performed in the demolished structure or pavement. The approach is based on defining distinct areas of the structure, roadway, or pad or any other feature (e.g., sump), based on historical use. The preferred sampling timing is prior to the demolition of the concrete or asphalt surface.
    - One composite sample will be collected at each distinct area of the structure for demolition (e.g., roadway, concrete pad, process area, tank containment).The composite sample will be collected from locations most likely to have contacted hazardous waste or hazardous materials, such as knowledge of use (inside containment structures for process chemicals), areas of visual staining, or other indication of potential contamination (coloration, or odor) to identify the nature of the contaminants.
    - Prior to sample collection, sample locations will be marked, typically by painting boxes on the designated slab. The samples will be collected within the interior of the painted box but not the painted surface.
    - Samples will be collected by chipping or coring. Typically samples should be no deeper than 1 inch unless staining or discoloration indicates that contamination may extend below that depth. Sampling logs shall record he depth of core samples. Typically, three chips or cores will be collected from each designated area; sufficient sample will be collected for the designated analytical methods.
- **Analytical Parameters:** Analytical parameters shall be selected based on the history of activities performed in the area. The analytical lab shall be consulted to determine sample volumes, preservatives, containers, and any other special requirements.

4 Procedure

1. Take photograph(s) of sample location.
2. Connect power or water supply line to drill, per the drill manufacturer’s instruction manual.
3. Remove debris with a clean brish or cloth prior to drilling. Place the drill over the specified sampling location.
4. For coring:

- Keep a steady downward pressure on the coring barrel.
- Raise the core barrel every few minutes to facilitate the removal of drill cuttings.
- Drill sample so that it extends throughout the entire thickness of the concrete or asphalt.

- Once the cut has been completed, remove the coring barrel from the hole.Typically the concrete/asphalt core will remain in the core barrel. Tap the outside of the core barrel gently with a hammer until the core drops out.

5. For drilling:

- Lock a 0.5"-1" drill bit into the impact hammer drill. and an impact drill.
- Drill vertically to the desired depth, capturing chips or powder with a scoop or spoon. The sampler can also drill multiple holes closely together so that the concrete/asphalt between the drilled holes breaks into chips.

6. Place sample, including powder and smaller chips generated during the drilling, in a stainless steel bowl.
7. To collect a COMPOSITE sample:

NOTE: If analytical laboratory provides alternative composite sample collection procedures, follow the instructions of the laboratory instead of those listed below.

- Repeat steps 1 through 6 for core/chip sample locations that are to be composited.
- After all samples to be composited are in a stainless steel bowl, break samples into smaller pieces (the size of pieces shall be instructed by analytical lab).
- Use a stainless steel spoon to homogenize the sample.
- Transfer the sample into sample container(s).
- Attach sample label, custody seal, and immediately place sample into cooler with ice.

8. Transfer any drill cuttings left over from the sampling into a waste container.

- Ensure waste container is sealed, labeled, and handled appropriately.

5 References

Byrnes, Mark Edward. 2008. *Field Sampling Methods for Remedial Investigations, Second Edition.* CRC Press.

U.S. Environmental Protection Agency (EPA). 2002. *RCRA Waste Sampling Draft Technical Guidance*. http://www.epa.gov/epawaste/hazard/testmethods/sw846/samp_guid.htm. Accessed May 12, 2015.

Attachment BB: RTC #136

Transwestern Bench and MW-20 Bench – Consolidation of Carbon Storage/Dosing Design and Operations

The final design will address DTSC's comments and will replace the leach field at the TW Bench with a septic tank (specifically Drawings C-008-03 and C-008-04.

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY: SO, SUPV, DSGN, DWN, CHKD, OK, DATE 8/5/15, SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH AREA PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
C-06-01 REV 0

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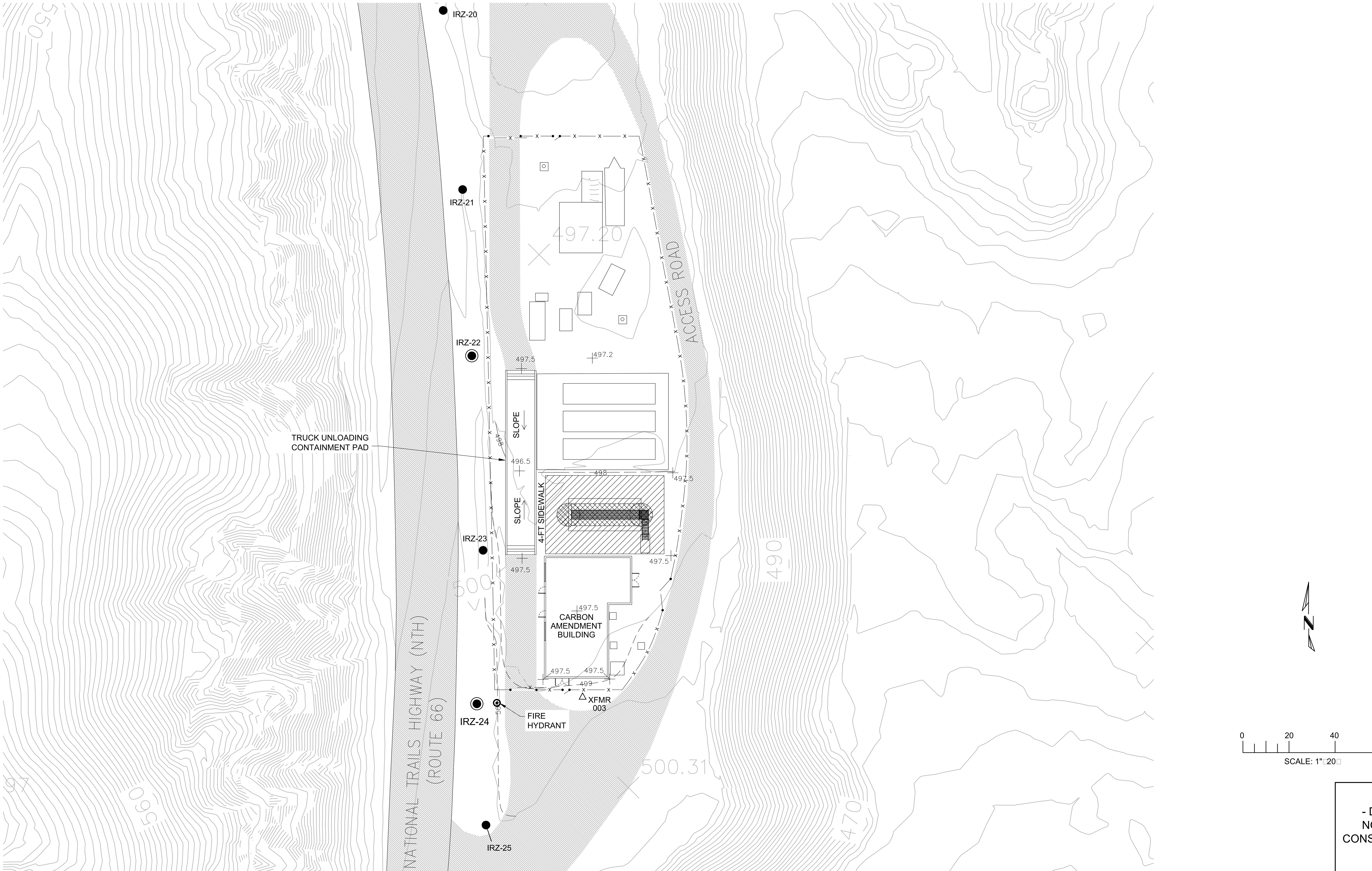

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY	
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	8/5/15
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH GRADING PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-06-02	REV 0

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- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY	
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	8/5/15
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH YARD PIPING PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-06-03	REV 0

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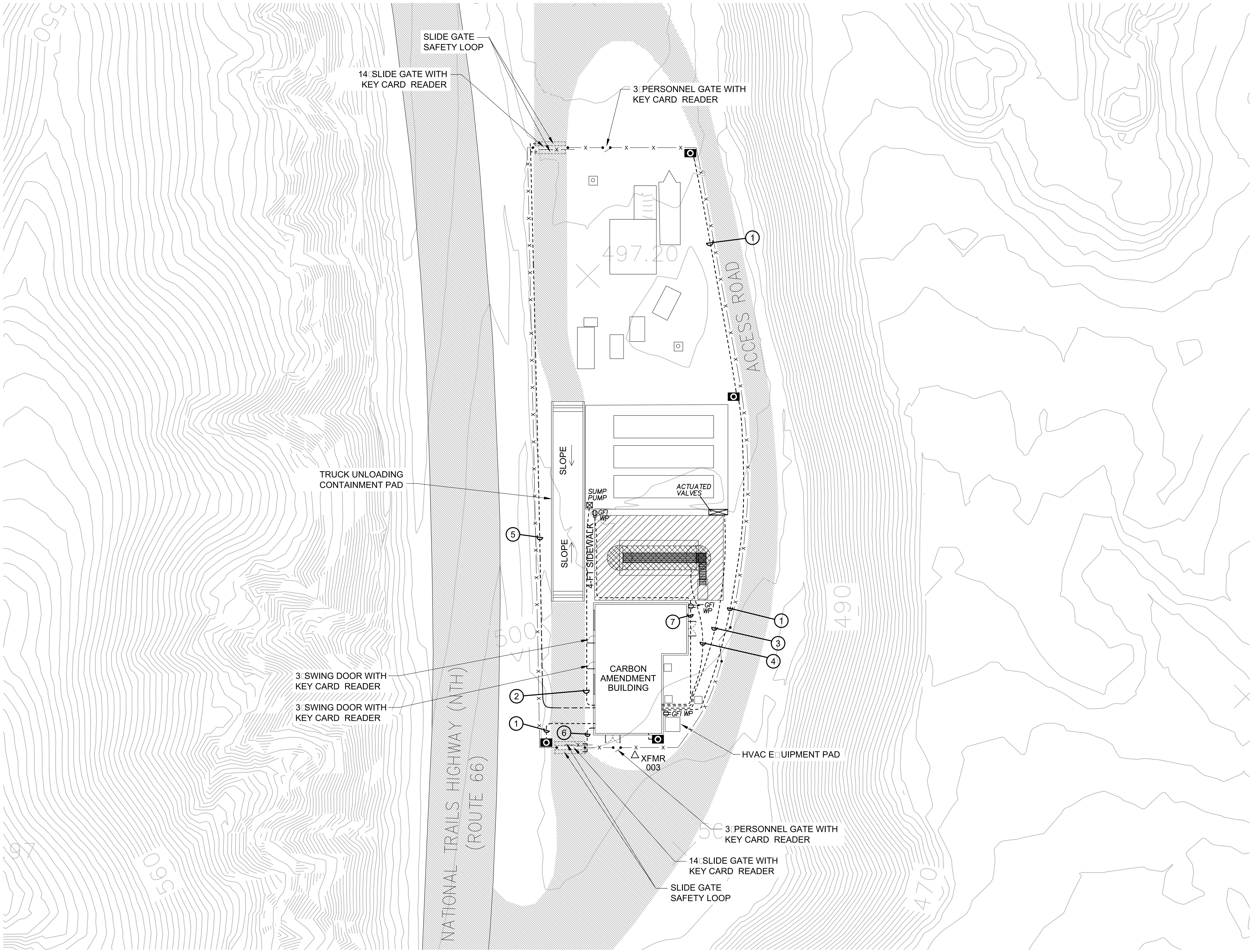


NOTES:

1. ELECTRICAL HAZARD CLASSIFICATIONS:
   A. CLASS I, DIV I WITHIN A 5-FT RADIUS OF THE CARBON STORAGE TANK VENTS.
   B. CLASS I, DIV II WITHIN A 10-FT RADIUS OF THE CARBON STORAGE TANK VENTS (FROM VENT ELEVATION TO GROUND).
   C. CLASS I, DIV II FROM GROUND SURFACE TO 18-INCHES ABOVE GRADE WITHIN A 10-FT RADIUS OF THE TANK FOOTPRINT.
   D. CLASS I, DIV II WITHIN THE CARBON AMENDMENT BUILDING WHERE DOSING LINES CONTAIN >10% ETHANOL. FIRE RATED WALLS MAY BE USED TO MINIMIZE THE FOOTPRINT OF THE CLASSIFIED AREA.
   E. CLASS I, DIV II WITHIN A 10-FT RADIUS OF THE VENTS OF THE EQUIVALENT HAZ CLASS LOCATIONS WITHIN THE BUILDING.
2. SECURITY FEATURES BY OTHERS. CONDUIT INSTALLATION TO FEATURES BY CONTRACTOR.

LEGEND:
- GFI WP OUTDOOR ELECTRICAL RECEPTACLE
- CAMERA

CONDUIT NOTES:

1. 1" EMPTY CONDUIT W/ PULL LINE FOR CAMERAS.
2. (3) #10, (1) #10G, 1" CONDUIT FOR TRUCK UNLOADING CONTAINMENT PAD (LOCAL DISCONNECT).
3. 2" CONDUIT TO CONTAINMENT MANIFOLD ACTUATED VALVES.
4. 2" CONDUIT TO CARBON SUBSTRATE TANK LEVEL TEMPERATURE TRANSMITTERS AND LEVEL SWITCH.
5. 1" EMPTY CONDUIT W/ PULL LINE TO NORTH END SLIDE GATE AND CARD READERS.
6. 1" EMPTY CONDUIT W/ PULL LINE TO SOUTH END SLIDE GATE AND CARD READERS.
7. (2) #10, (1) #10G, 1" CONDUIT FOR OUTDOOR RECEPTACLES, RUN TO LP-3 INSIDE CARBON AMENDMENT BUILDING.

- DRAFT - NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY	
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	8/5/15
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

SECURITY AND ELECTRICAL OUTLET

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

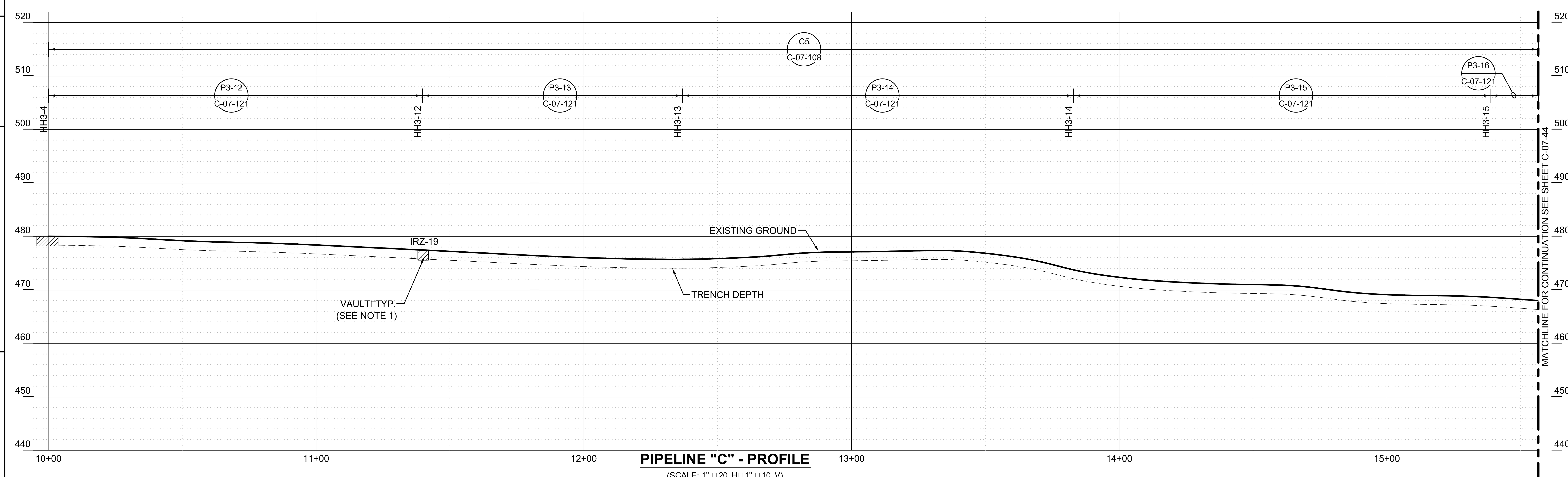
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-06-04	REV 0

H1808

08/04/2015, 19:44, G:\Graphics\AR\TOPOCK-01\Submittal_100%\DWGs\C-Civil\C-06-01-02-03-04_MW20Bench.dwg, Tab: C-06-04

NOTES
1. VAULT DETAILS SHOWN ON SHEETS M-X-X AND S-X-X.
2. SEE CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEETS E-00-12 THRU E-00-20.
3. CLEANOUT LOCATIONS PROVIDE CLEANOUT PIPING FOR ALL INJECTION EXTRACTION BACKWASH AND REMEDY-PRODUCED WATER LINES AT INDICATED LOCATIONS (SEE DETAIL C-07-111).

PIPELINE "C" - PLAN
(SCALE: 1" = 20')



PIPELINE "C" - PROFILE
(SCALE: 1" = 20' H 1" = 10' V)

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY: SO, SUPV, DSGN, DWN, CHKD, OK, DATE 8/5/15, SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT
PIPELINE - PLAN AND PROFILE
PIPELINE "C5"
STA 10+00 TO STA 15+50
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
C-07-43 REV 0

H1808

NOTES

1. VAULT DETAILS SHOWN ON SHEETS M-X-X AND S-X-X.
2. SEE CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEETS E-00-12 THRU E-00-20.
3. CLEANOUT LOCATIONS PROVIDE CLEANOUT PIPING FOR ALL INJECTION EXTRACTION BACKWASH AND REMEDY-PRODUCED WATER LINES AT INDICATED LOCATIONS (SEE DETAIL C-07-111).

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY	JEF
SO	
SUPV	JPB
DSGN	BAS
DWN	AJW
CHKD	JPB
OK	JEF
DATE	09/08/14
SCALES	1" 20

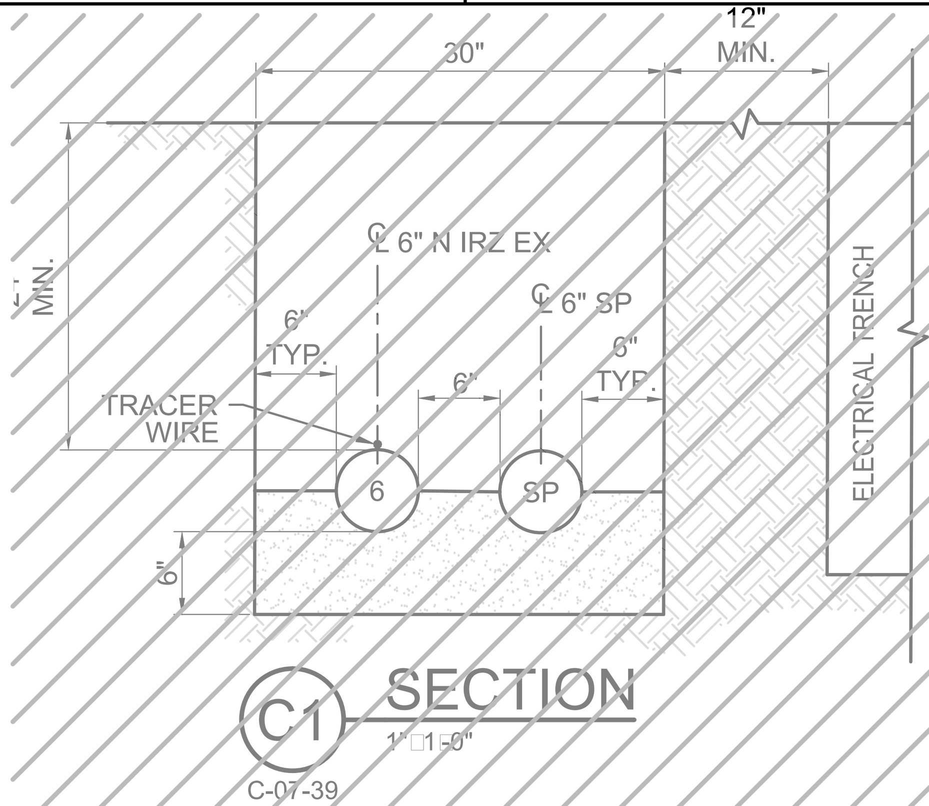
TOPOCK GROUNDWATER REMEDIATION PROJECT

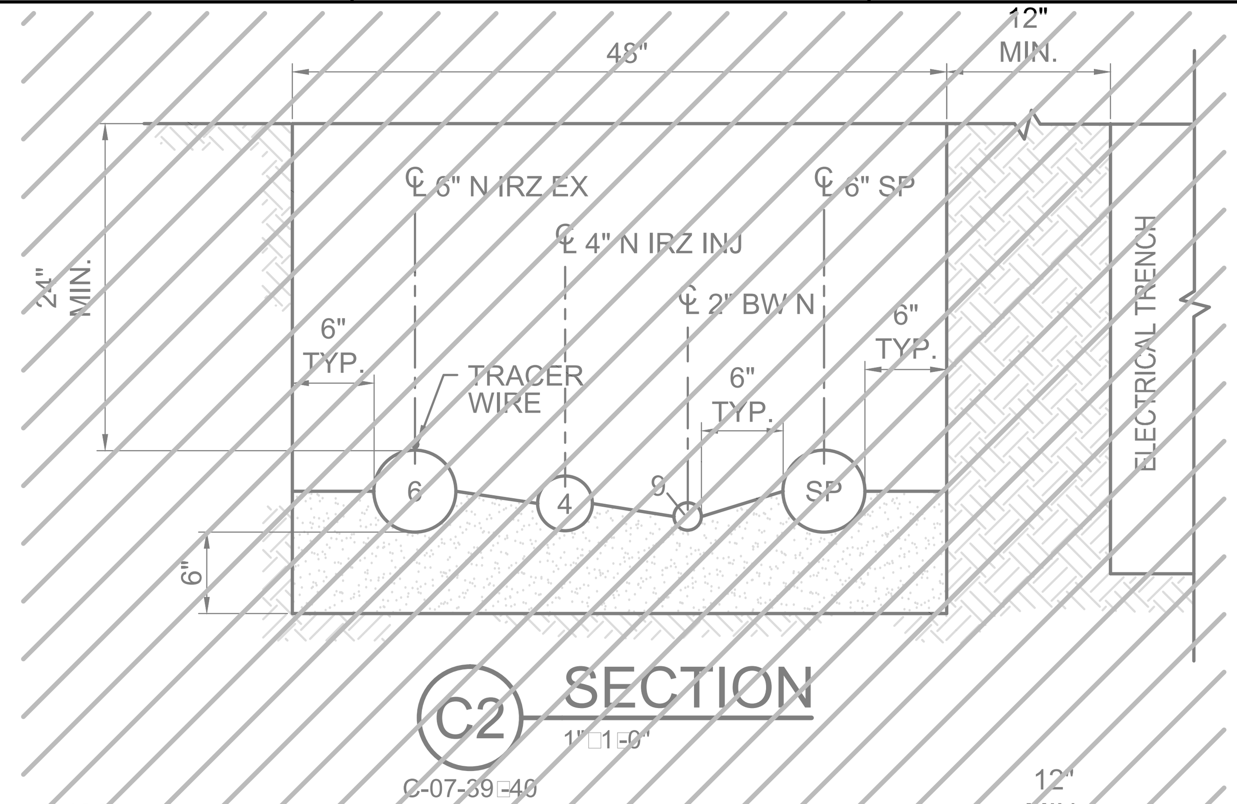
PIPELINE - PLAN AND PROFILE
PIPELINE "F"
STA 10 00 TO STA 16 11

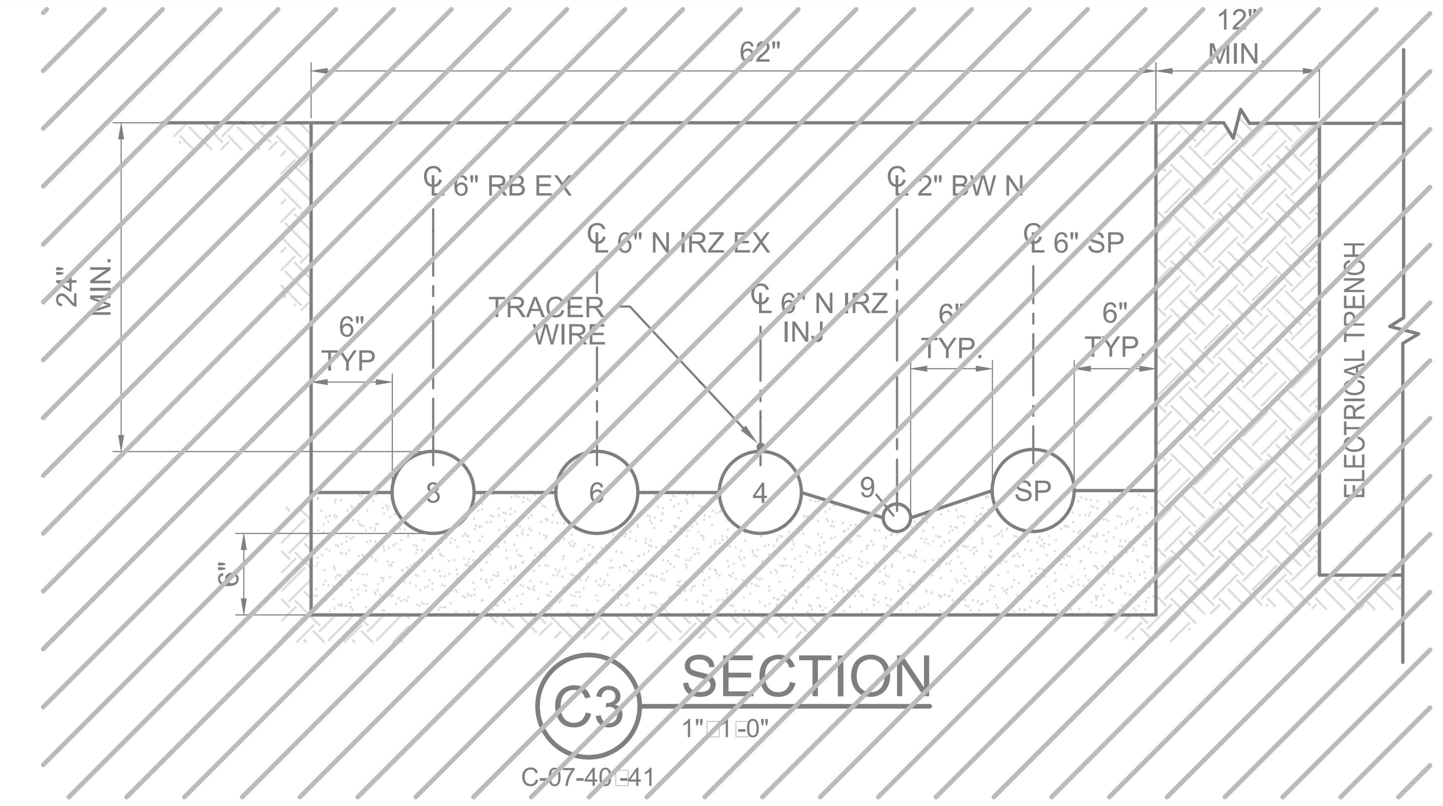
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

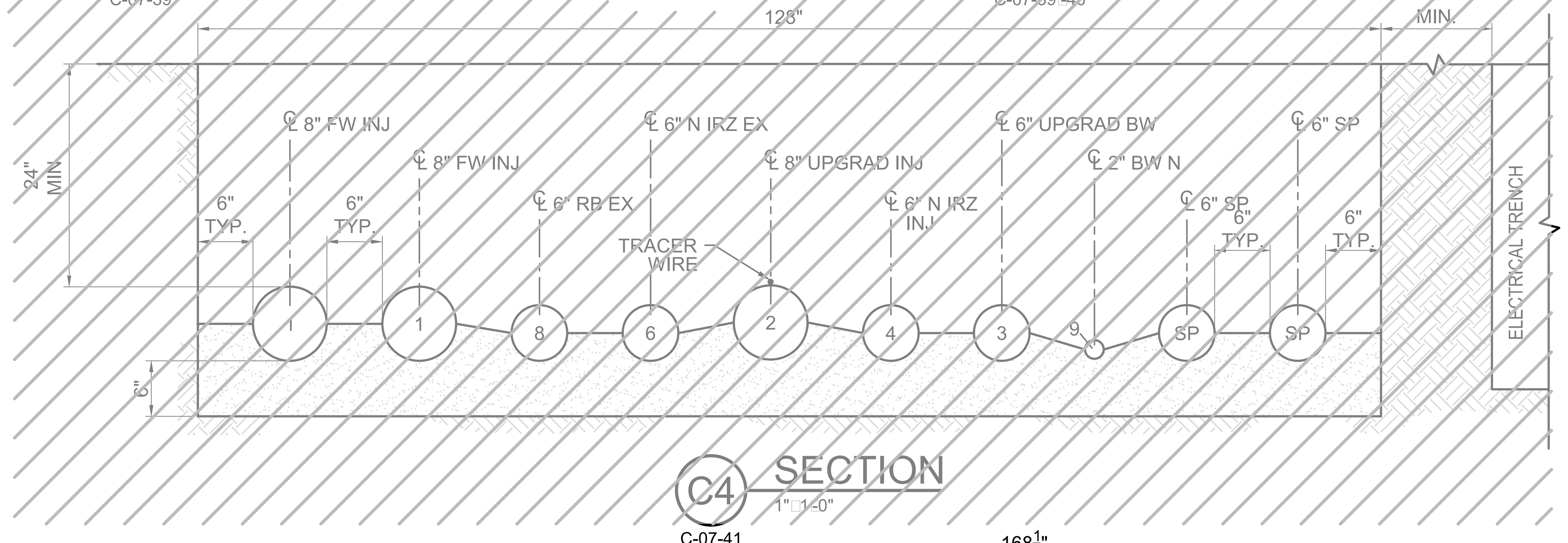
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-07-52	REV 0

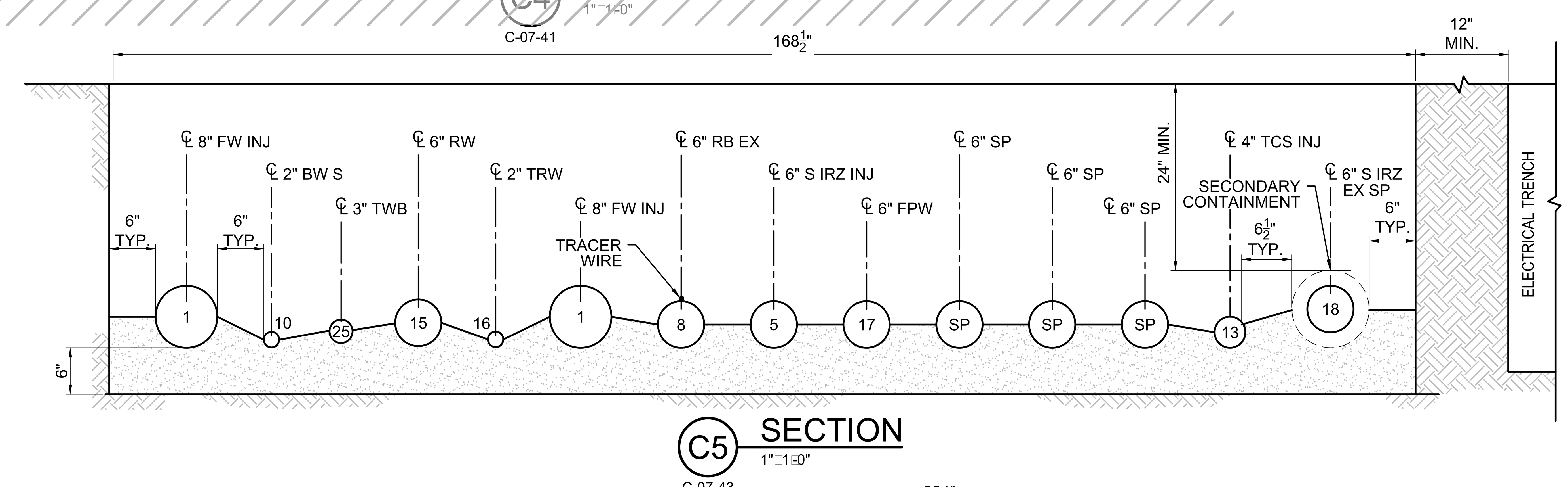
08/04/2015 19:58

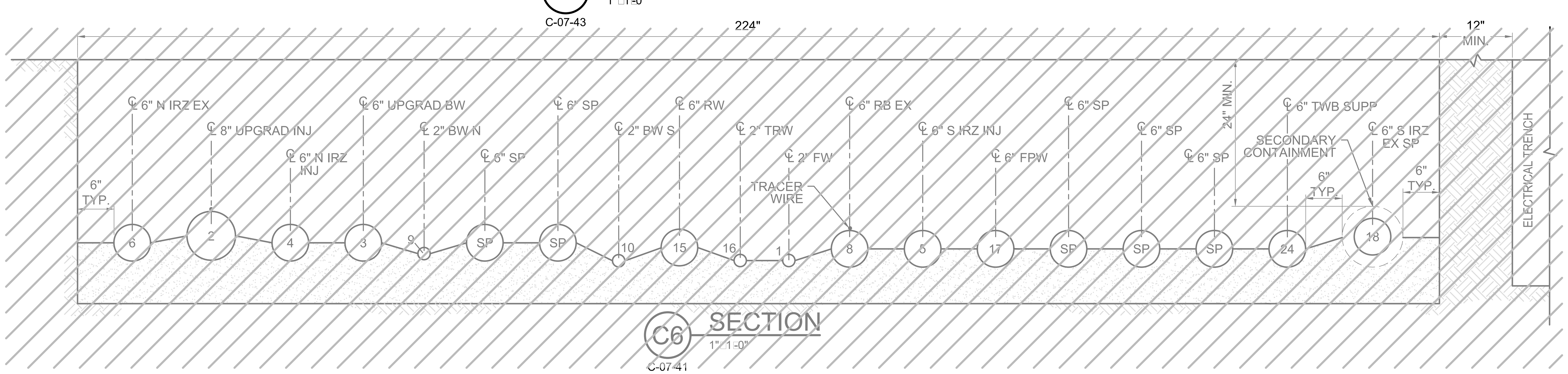












90% RESPONSE TO COMMENTS NOTES:

HATCHED SELECTIONS NOT UPDATED FOR THIS SUBMITTAL. TO BE UPDATED FOR 100% SUBMITTAL.

PIPE ID	SERVICE
1	FRESH WATER INJECTION LOOP
2	UPGRADIENT INJECTION
3	UPGRADIENT BACKWASH
4	NORTH IRZ INJECTION (1-22)
5	SOUTH IRZ INJECTION (24-40)
6	NORTHERN IRZ EXTRACTION
7	IRZ-23 EXTRACTION
8	RIVERBANK EXTRACTION
9	BACKWASH NORTH
10	BACKWASH SOUTH
11	EAST RAVINE EXTRACTION WELL NETWORK HEADER
12	NOT USED
13	TCS INJECTION
14	TCS BACKWASH
15	REMEDY WASTEWATER
16	TREATED WATER
17	FIRE PROTECTION WATER
18	SOUTH IRZ EXTRACTION SPARE
19	EAST RAVINE ER-6 EXTRACTION
20	480V POWER CONDUIT
21	COMMUNICATIONS CONDUIT
22	12 V POWER
23	2/0 BARE COPPER GROUND
24	NOT USED
25	TWB EXTRACTION WELL NETWORK HEADER
CA	CARBON AMENDED WATER
PO	POTABLE WATER
SP	SPARE PIPE
SP( )	SPARE ELECTRICAL CONDUIT

NOTES:

1. SAND SHALL BE USED FROM THE BASE OF THE TRENCH TO 6 INCHES ABOVE THE TOP OF PIPES. SOILS FROM THE TRENCH EXCAVATION SHALL BE MOISTURE CONDITIONED AND USED AS BACKFILL. COMPACT TO 95% RELATIVE COMPACTION TO 12 INCHES BELOW GRADE. FOUR INCHES OF AS-CLASS 2 MATERIAL SHALL BE PLACED ON TOP OF THE COMPACTED SOIL FOLLOWED BY 4 INCHES OF AB-CLASS 2. THE ROADBASE SHALL BE TOPPED WITH A 2-INCH BASE COURSE LAYER AND CAPPED WITH A 2-INCH HMA PG 70-10 SURFACE COURSE.
2. PIPE SUPPORTS AND CLEANOUTS NOT SHOWN FOR CLARITY.
3. ALL COVERS SHALL BE TRAFFIC RATED.
4. CASING SPACERS NOT SHOWN FOR CLARITY.
5. PIPE BEDDING SHALL EXTEND HALF WAY UP THE PIPES PER THE SPECIFICATIONS.

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY: SO; SUPV; DSGN BAS; DWN; CHKD; OK; DATE; SCALES 1" = 1'-0"

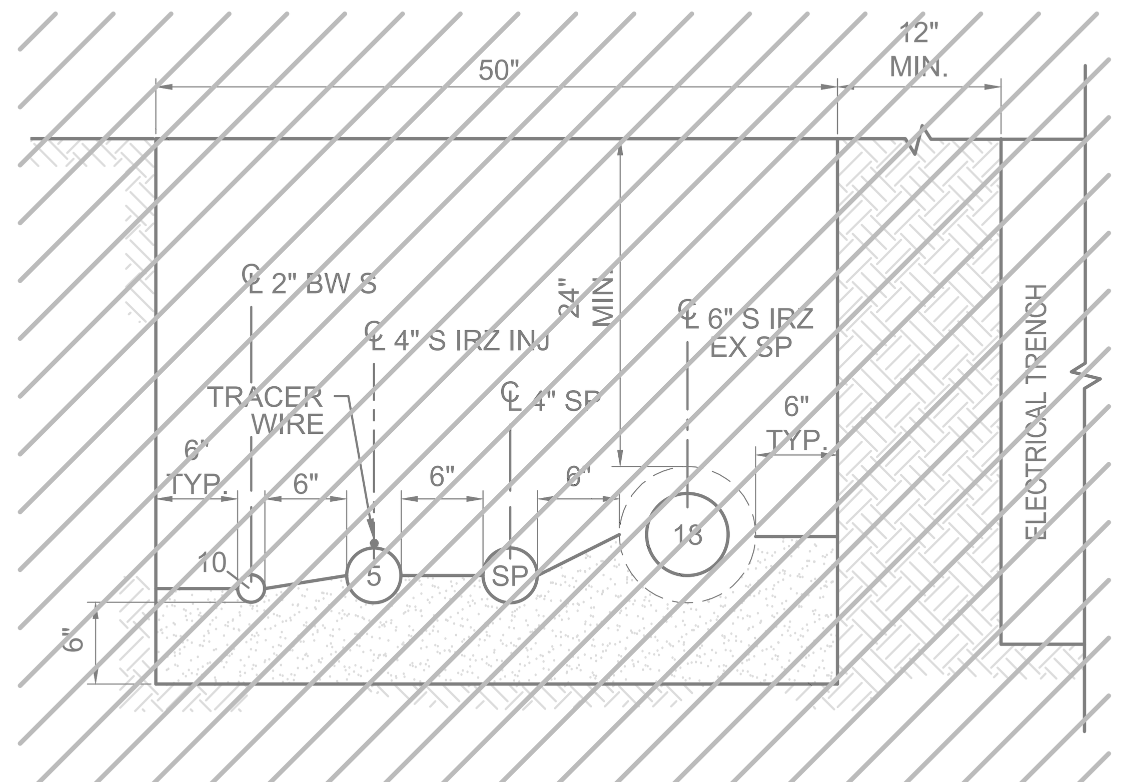
TOPOCK GROUNDWATER REMEDIATION PROJECT

TRENCH SECTIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
C-07-108 REV 2

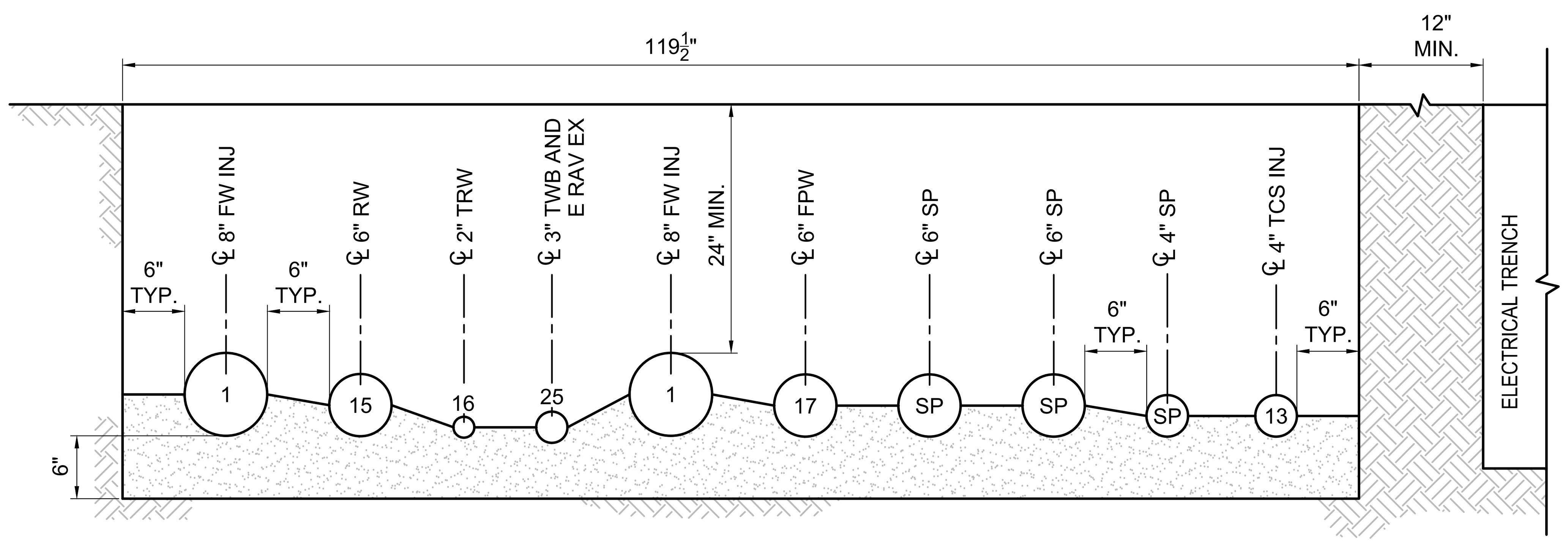
08/05/2015, 11:03, G:\Graphics\AR\TOPOCK-01\Submittal_100%\DWGs\C-Civil\C-07-108 to 122_PipeTrenchDetails.dwg, Tab: C-07-108



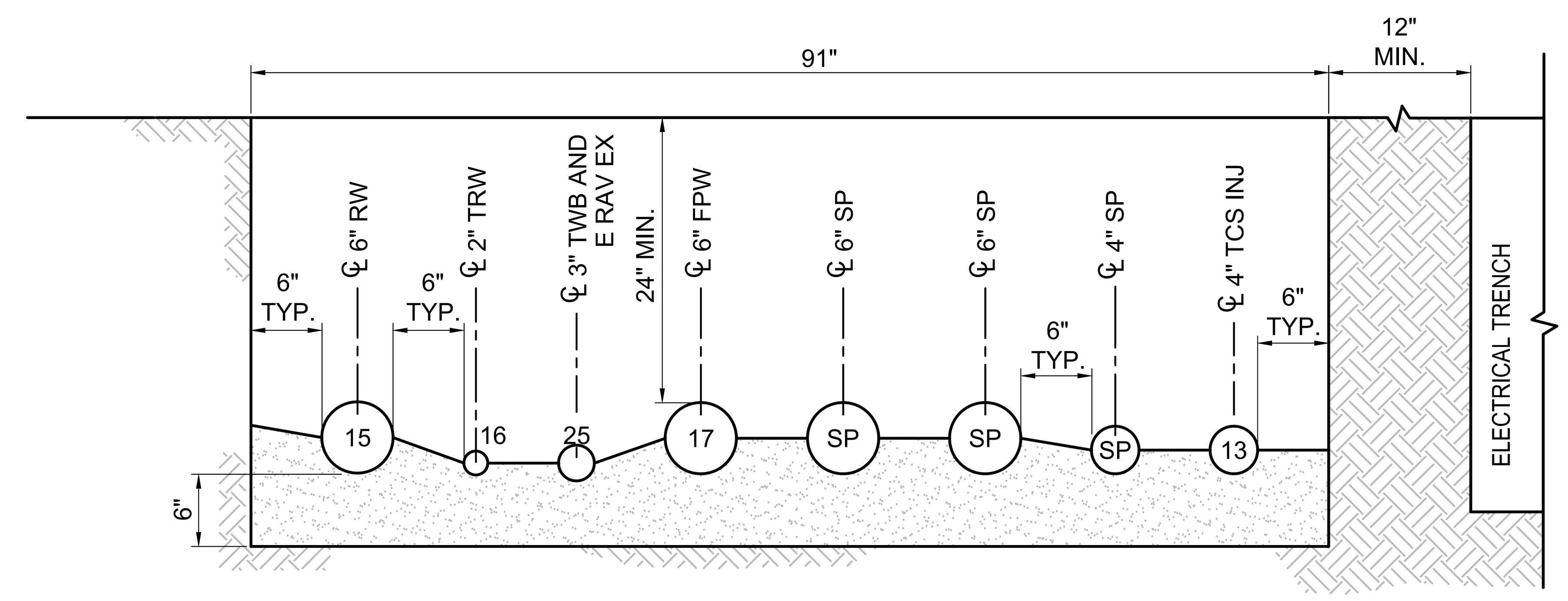
C13 C14 C15 C16 C17 SECTION
1"=1'-0"
C-07-42,49,-50,-51

90% RESPONSE TO COMMENTS NOTES:

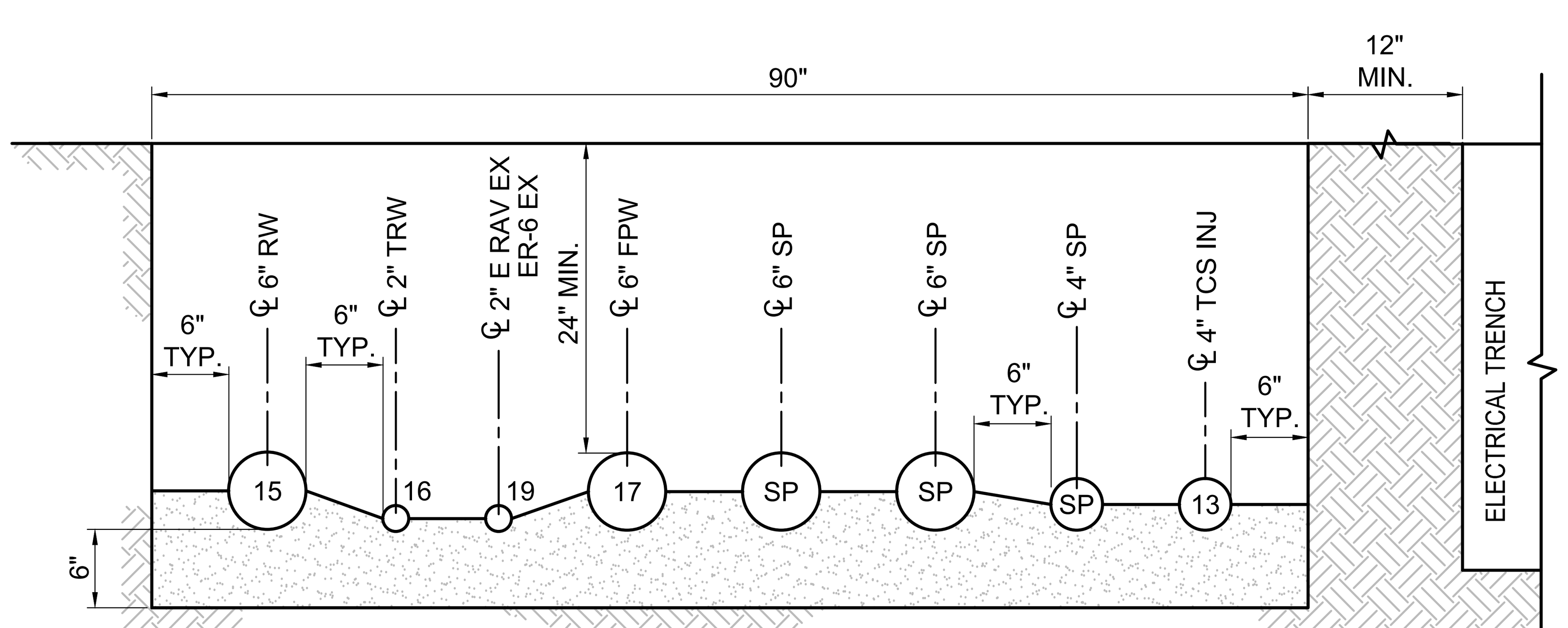
HATCHED SELECTIONS NOT UPDATED FOR THIS SUBMITTAL. TO BE UPDATED FOR 100% SUBMITTAL.



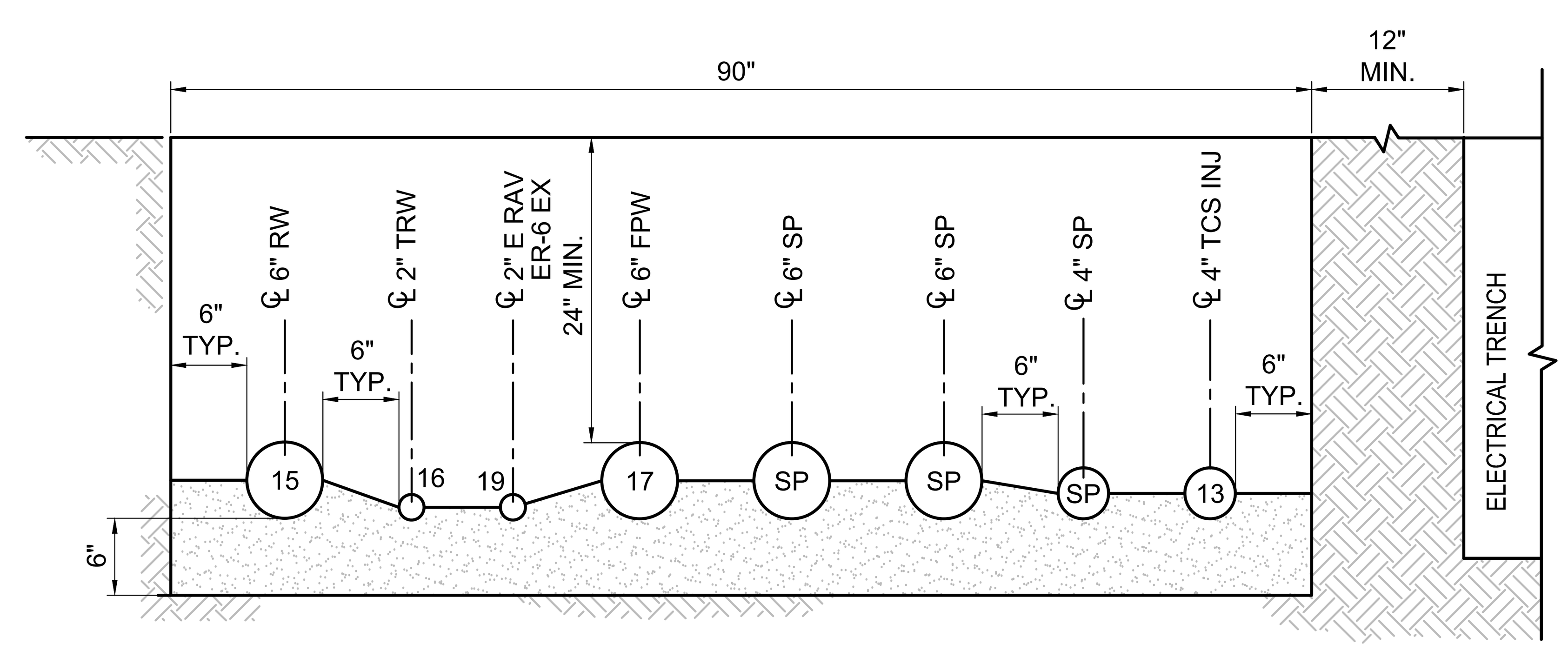
F1 SECTION
1"=1'-0"
C-07-52



F2 SECTION
1"=1'-0"
C-07-52



F3 SECTION
1"=1'-0"
C-07-52,-53



F4 SECTION
1"=1'-0"
C-07-52,-53

PIPE ID	SERVICE
1	FRESH WATER INJECTION LOOP
2	UPGRADIENT INJECTION
3	UPGRADIENT BACKWASH
4	NORTH IRZ INJECTION (1-22)
5	SOUTH IRZ INJECTION (24-40)
6	NORTHERN IRZ EXTRACTION
7	IRZ-23 EXTRACTION
8	RIVERBANK EXTRACTION
9	BACKWASH NORTH
10	BACKWASH SOUTH
11	EAST RAVINE EXTRACTION WELL NETWORK HEADER
12	NOT USED
13	TCS INJECTION
14	TCS BACKWASH
15	REMEDY WASTEWATER
16	TREATED WATER
17	FIRE PROTECTION WATER
18	SOUTH IRZ EXTRACTION SPARE
19	EAST RAVINE ER-6 EXTRACTION
20	480V POWER CONDUIT
21	COMMUNICATIONS CONDUIT
22	12□V POWER
23	□2/0 BARE COPPER GROUND
24	NOT USED
25	TWB EXTRACTION WELL NETWORK HEADER
CA	CARBON AMENDED WATER
PO	POTABLE WATER
SP	SPARE PIPE
SP(□)	SPARE ELECTRICAL CONDUIT

NOTES:

1. SAND SHALL BE USED FROM THE BASE OF THE TRENCH TO 6 INCHES ABOVE THE TOP OF PIPES. SOILS FROM THE TRENCH EXCAVATION SHALL BE MOISTURE CONDITIONED AND USED AS BACKFILL. COMPACT TO 95% RELATIVE COMPACTION TO 12 INCHES BELOW GRADE. FOUR INCHES OF AS-CLASS 2 MATERIAL SHALL BE PLACED ON TOP OF THE COMPACTED SOIL FOLLOWED BY 4 INCHES OF AB-CLASS 2. THE ROADBASE SHALL BE TOPPED WITH A 2-INCH BASE COURSE LAYER AND CAPPED WITH A 2-INCH HMA PG 70-10 SURFACE COURSE.
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3. ALL COVERS SHALL BE TRAFFIC RATED.
4. PIPE BEDDING SHALL EXTEND HALF WAY UP THE PIPES PER THE SPECIFICATIONS.

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING
ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	8/5/15	90% RTC RESOLUTION		AJW	KLD / BAS / KLD	WLM	BJW	

REVISIONS

APPROVED BY
SO
SUPV
DSGN BAS
DWN
CHKD
OK
DATE
SCALES 1"=1'-0"

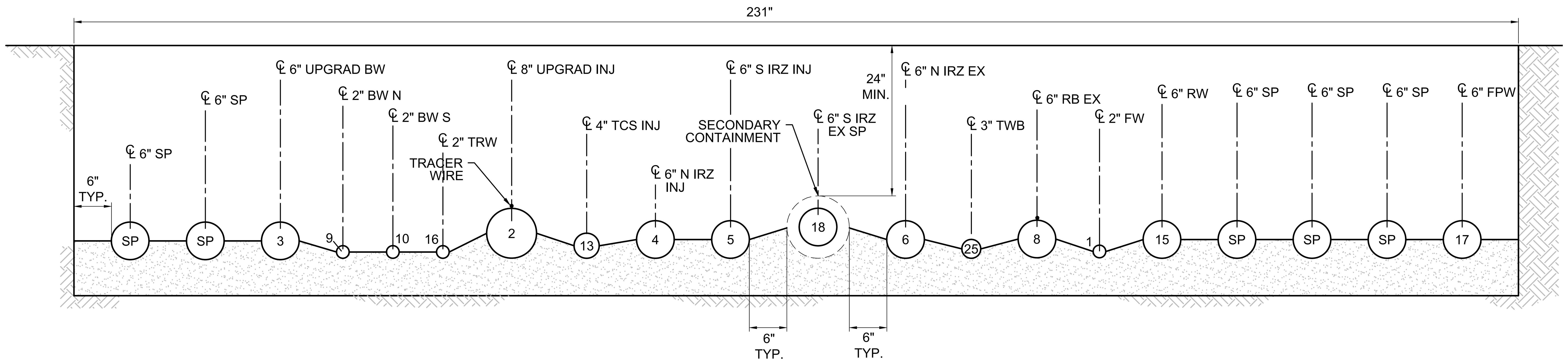
TOPOCK GROUNDWATER REMEDIATION PROJECT

TRENCH SECTIONS

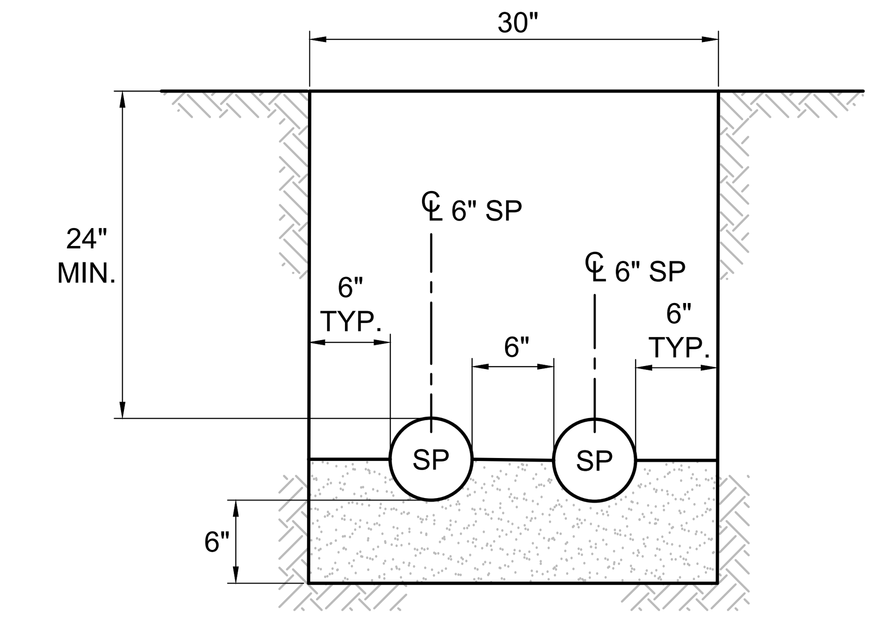
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
C-07-110 REV 2

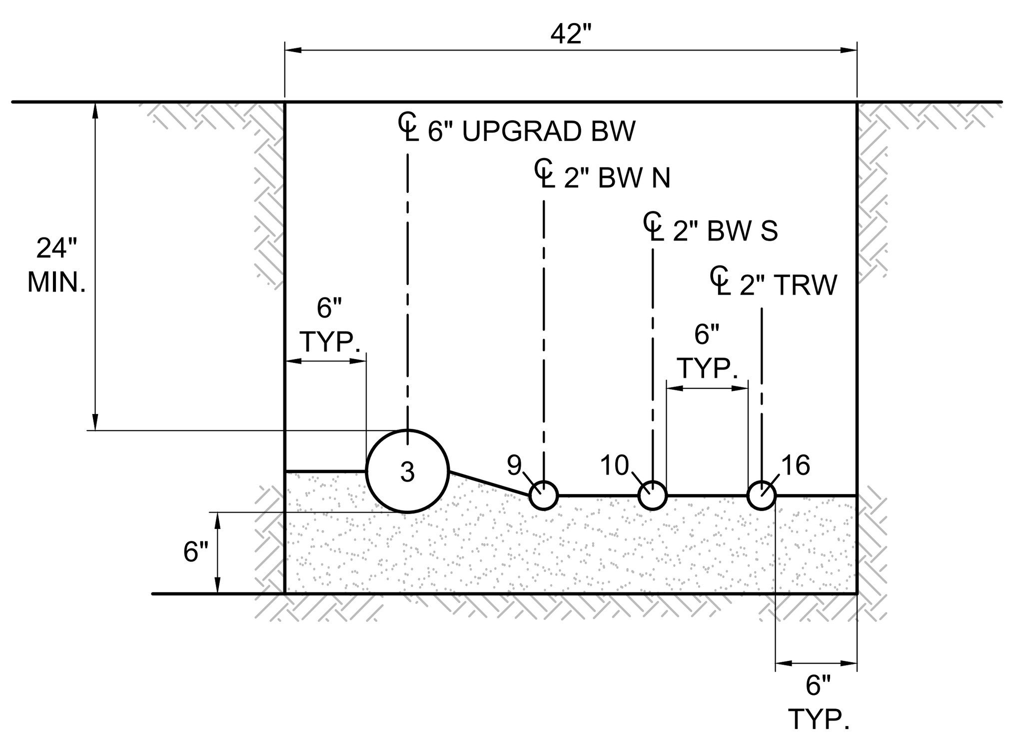
08/05/2015, 11:05, G:\Graphics\AR\TOPOCK-01\Submittal_100%\DWGs\C-Civil\C-07-108 to 122_PipeTrenchDetails.dwg, Tab: C-07-110



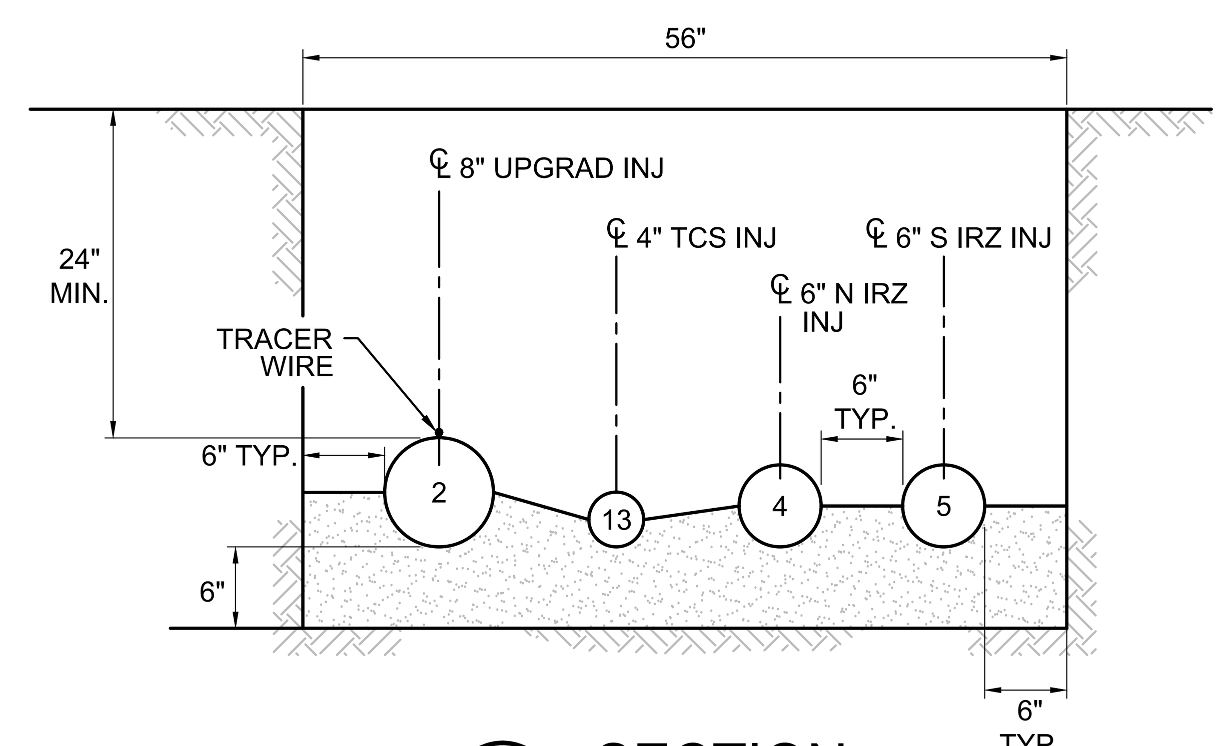
CA SECTION
1" = 1'-0"
C-07-41



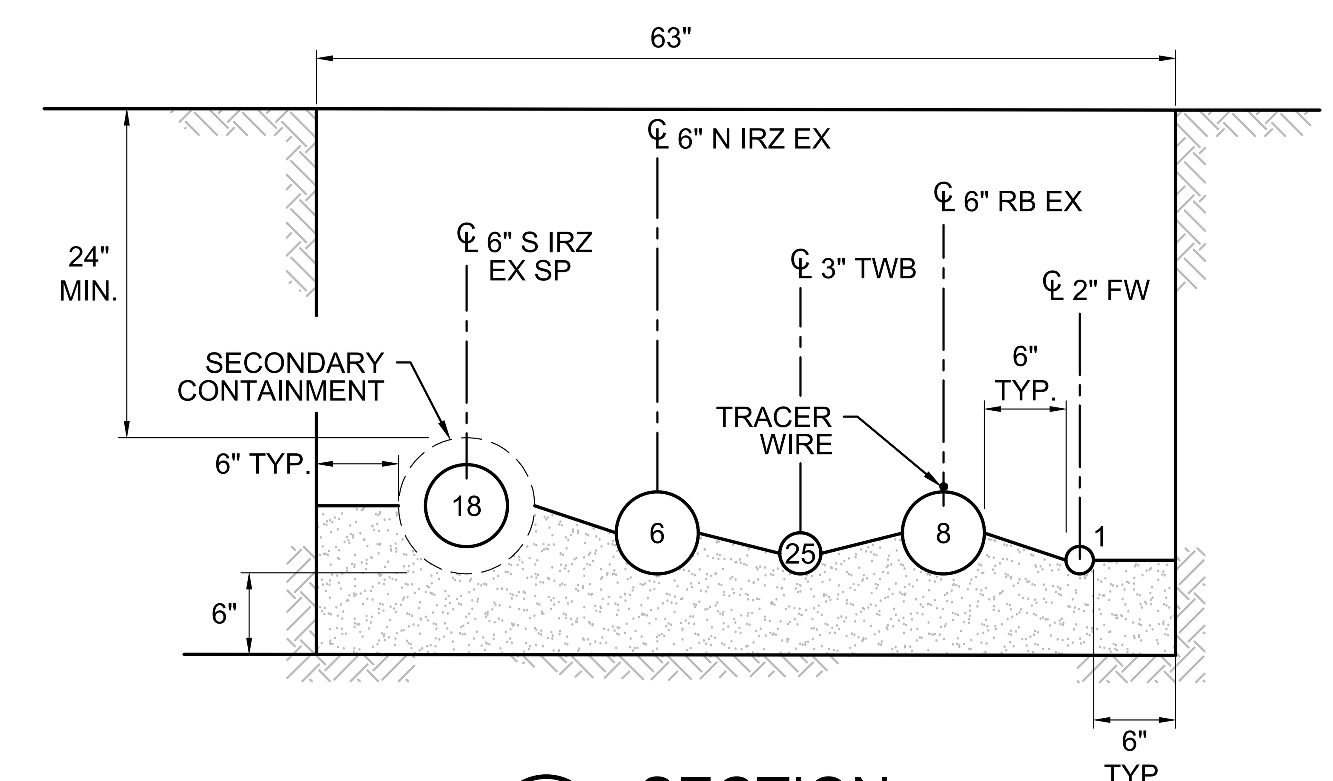
CB SECTION
1" = 1'-0"
C-07-39



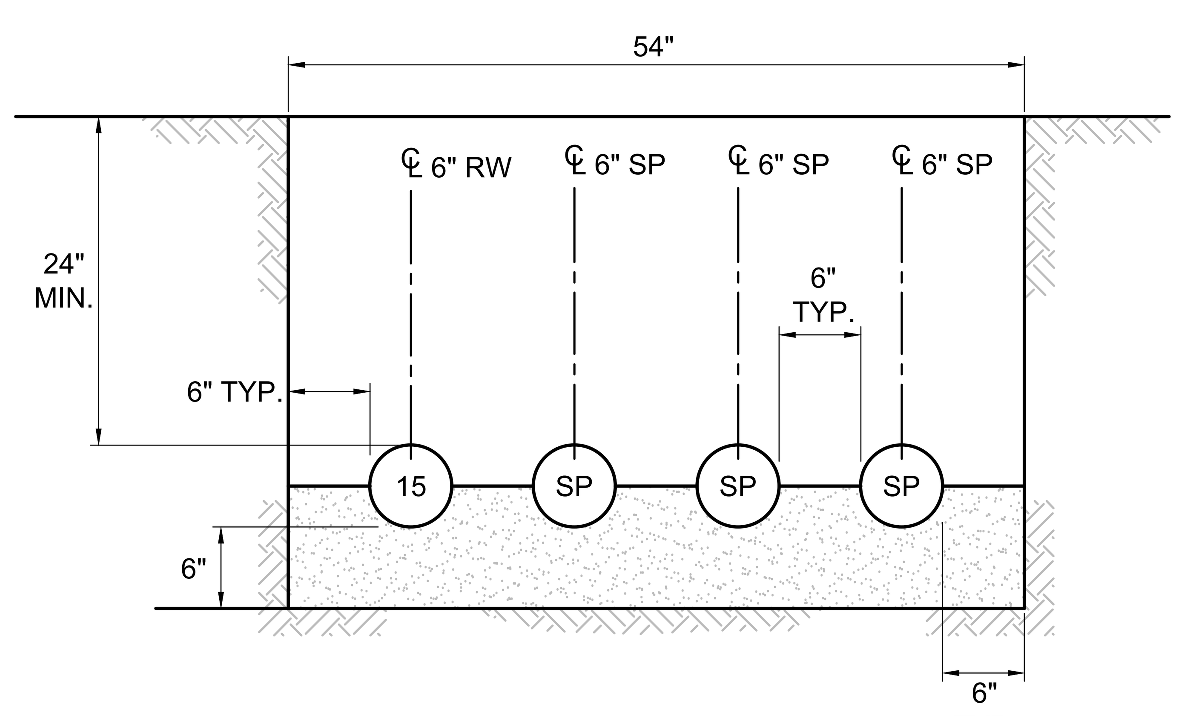
CC SECTION
1" = 1'-0"
C-07-39/40



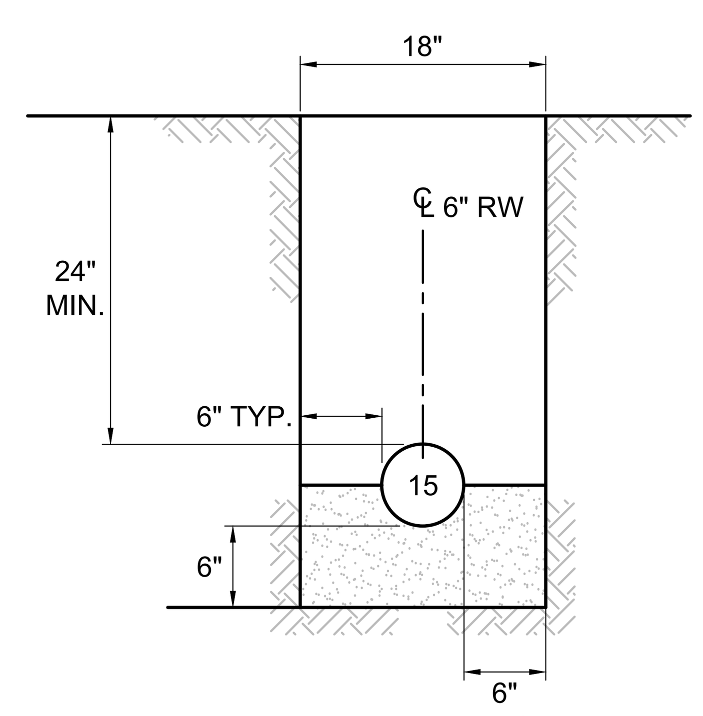
CD SECTION
1" = 1'-0"
C-07-39/40



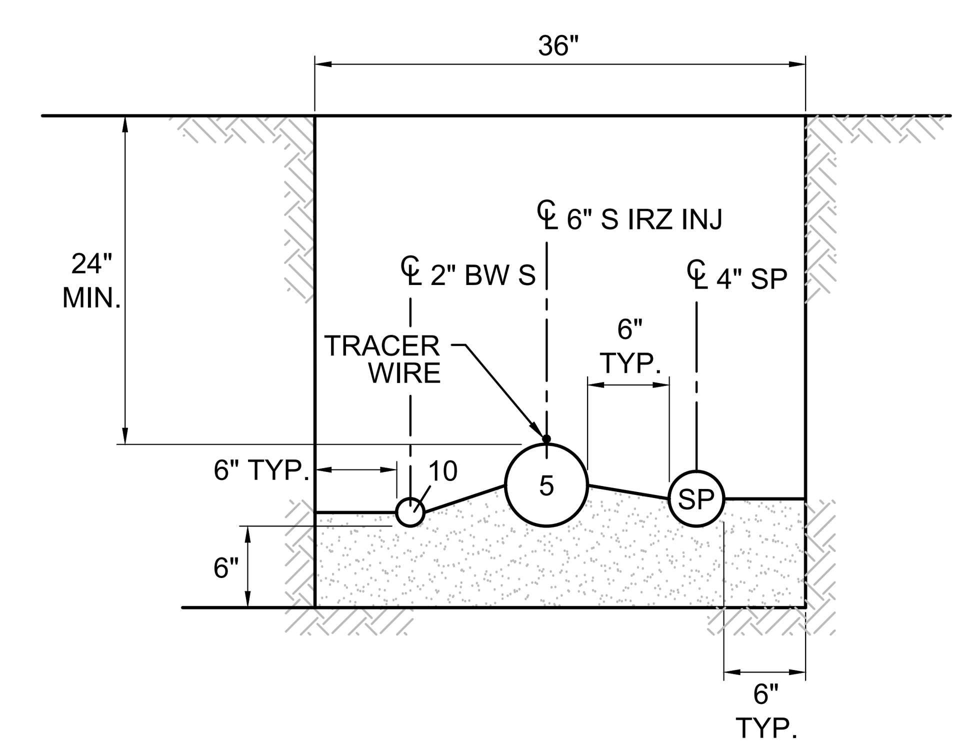
CE SECTION
1" = 1'-0"
C-07-39/40



CF SECTION
1" = 1'-0"
C-07-39/40



CG SECTION
1" = 1'-0"
C-07-39/40



CH SECTION
1" = 1'-0"
C-07-39/40

PIPE ID	SERVICE
1	FRESH WATER INJECTION LOOP
2	UPGRADIENT INJECTION
3	UPGRADIENT BACKWASH
4	NORTH IRZ INJECTION (1-22)
5	SOUTH IRZ INJECTION (24-40)
6	NORTHERN IRZ EXTRACTION
7	IRZ-23 EXTRACTION
8	RIVERBANK EXTRACTION
9	BACKWASH NORTH
10	BACKWASH SOUTH
11	EAST RAVINE EXTRACTION WELL NETWORK HEADER
12	NORTHEAST OF TCS EXTRACTION WELL NETWORK HEADER
13	TCS INJECTION
14	TCS BACKWASH
15	REMEDY WASTEWATER
16	TREATED WATER
17	FIRE PROTECTION WATER
18	SOUTH IRZ EXTRACTION SPARE
19	EAST RAVINE ER-6 EXTRACTION
20	480V POWER CONDUIT
21	COMMUNICATIONS CONDUIT
22	12 V POWER
23	2/0 BARE COPPER GROUND
24	TWB SUPPLEMENTAL FLOW
25	TWB EXTRACTION WELL NETWORK HEADER
CA	CARBON AMENDED WATER
PO	POTABLE WATER
SP	SPARE PIPE
SP( )	SPARE ELECTRICAL CONDUIT

NOTES:

1. SAND SHALL BE USED FROM THE BASE OF THE TRENCH TO 6 INCHES ABOVE THE TOP OF PIPES. SOILS FROM THE TRENCH EXCAVATION SHALL BE MOISTURE CONDITIONED AND USED AS BACKFILL. COMPACT TO 95% RELATIVE COMPACTION TO 12 INCHES BELOW GRADE. FOUR INCHES OF AS-CLASS 2 MATERIAL SHALL BE PLACED ON TOP OF THE COMPACTED SOIL FOLLOWED BY 4 INCHES OF AB-CLASS 2. THE ROADBASE SHALL BE TOPPED WITH A 2-INCH BASE COURSE LAYER AND CAPPED WITH A 2-INCH HMA PG 70-10 SURFACE COURSE.
2. PIPE SUPPORTS AND CLEANOUTS NOT SHOWN FOR CLARITY.
3. ALL COVERS SHALL BE TRAFFIC RATED.
4. CASING SPACERS NOT SHOWN FOR CLARITY.
5. PIPE BEDDING SHALL EXTEND HALF WAY UP THE PIPES PER THE SPECIFICATIONS.

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
0	09/08/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF

REVISIONS

APPROVED BY	JEF
SO	
SUPV	JPB
DSGN	BAS
DWN	AJW
CHKD	JPB
OK	JEF
DATE	09/08/14
SCALES	1" = 1'-0"

TOPOCK GROUNDWATER REMEDIATION PROJECT
MW-20 BENCH AREA
TRENCH SECTIONS
SHEET 1 OF 2
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-07-127	REV 1

N1806

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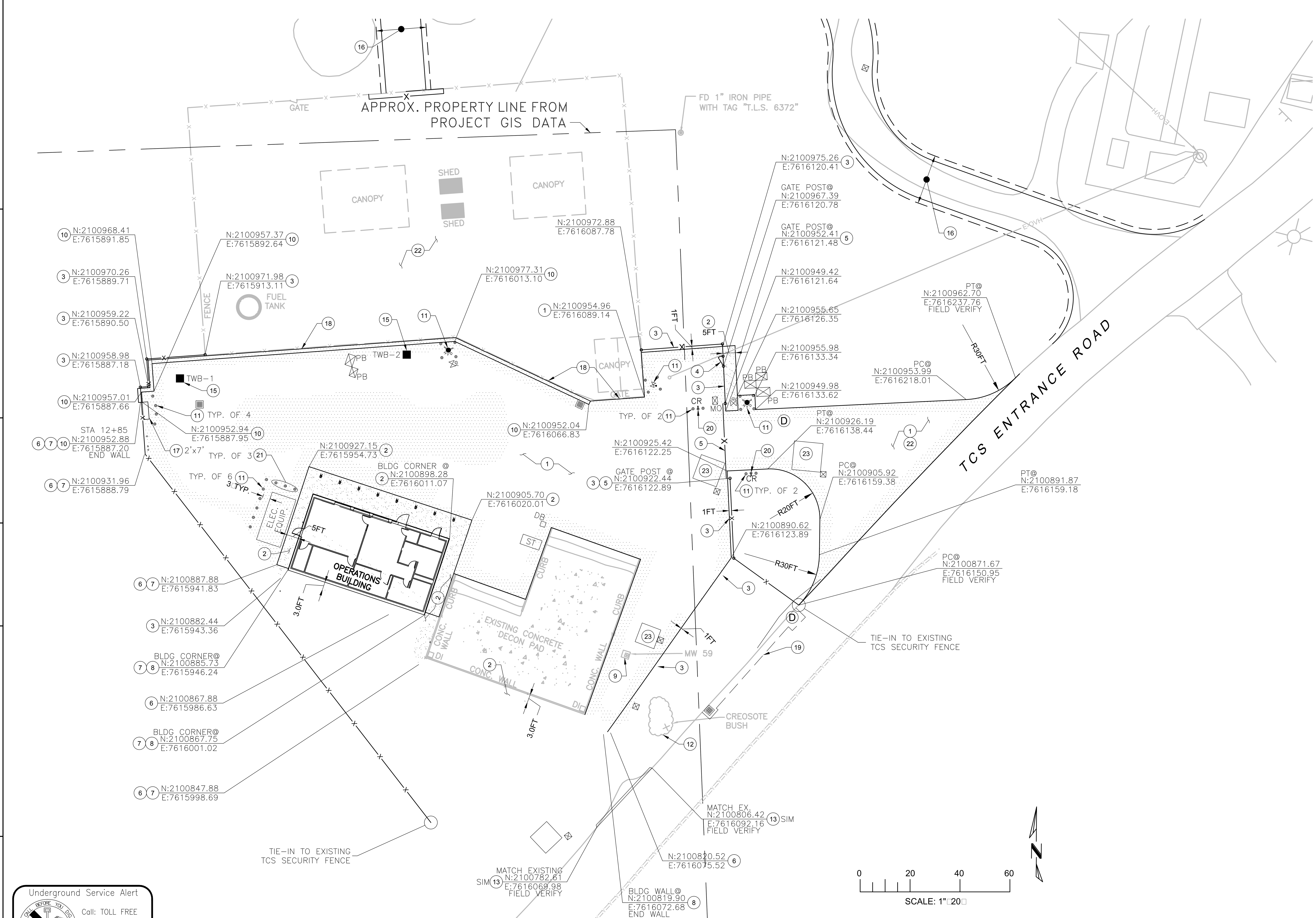


GENERAL NOTES:

A SEE LEGEND, NOTES & ABBREVIATIONS C-08-00 FOR COMPLETE GENERAL NOTES.
B ALL PERIMETER FENCE AND GATE SHALL MEET PG&E PROPERTY FENCE AND GATE STANDARD L-50.

KEYED NOTES:

1 INSTALL ASPHALT PAVEMENT. SEE DETAIL 1/C-08-06.
2 INSTALL CONCRETE SIDEWALK. SEE DETAIL 4/C-08-06.
3 INSTALL 8FT HIGH CHAIN LINK FENCE. SEE DRAWING C-00-06 AND C-00-07.
4 INSTALL PG&E STANDARD PERSONNEL GATE AS MANUFACTURED BY SGS.
5 INSTALL 30FT SLIDE GATE. SEE DRAWING C-00-06 AND C-00-07.
6 INSTALL 8' HIGH CHAIN LINK FENCE ON WALL. SEE DETAIL S-08-09 ON STRUCTURAL PLANS.
7 CONSTRUCT RETAINING WALL. (COORDINATES ARE TO BACK FACE OF WALL). SEE PROFILE C-08-10 AND DETAILS S-08-04 AND S-08-09 ON STRUCTURAL PLANS.
8 SEE STRUCTURAL FOR CONNECTION TO BUILDING WALL.
9 ADJUST EX. WELL TO FINISHED GRADE. COORDINATE FINAL CONDITION WITH PG&E.
10 INSTALL THICKEN EDGE. SEE DETAIL 2/C-08-06.
11 INSTALL BOLLARDS. SEE DETAILS 5/C-08-06.
12 PROTECT EX. CREOSOTE BUSH.
13 INSTALL CURB. SEE DETAIL 3/C-08-06.
14 REFER TO STRUCTURAL DRAWING S-08-09 FOR CONCRETE AND COLUMN INTERFACE.
15 CONFIRM WELL LOCATIONS WITH ARCADIS DRAWING C-07-36.
16 FOR NEW ACCESS ROAD 30% LAYOUT, SEE DRAWING C-08-11.
17 AREA RESERVED FOR ELECTRICAL EQUIPMENT. SEE ELECTRICAL DRAWING E-08-01.
18 PROTECT EXISTING FENCE AND GATES.
19 REINSTATE ASPHALT PAVEMENT AND CURB. MATCH EXISTING CONDITIONS.
20 INSTALL HI-LO CARD READER FOR MAIN GATE AND ASSOCIATED EQUIPMENT. SEE PG&E DRAWINGS S1016, 406169, S1036 THRU 38. COORDINATE ELEC. CONDUITS AND EQUIP. WITH ELEC. DRAWINGS.
21 INSTALL REMOVABLE BOLLARD. SEE DETAIL 8/C-08-06.
22 ACCESS TO TRANSWESTERN GAS METERING STATION YARD MUST BE MAINTAINED AT ALL TIMES.
23 TRENCH F VAULT LOCATION BY ARCADIS SEE DWG C-07-52

Underground Service Alert
Call: TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

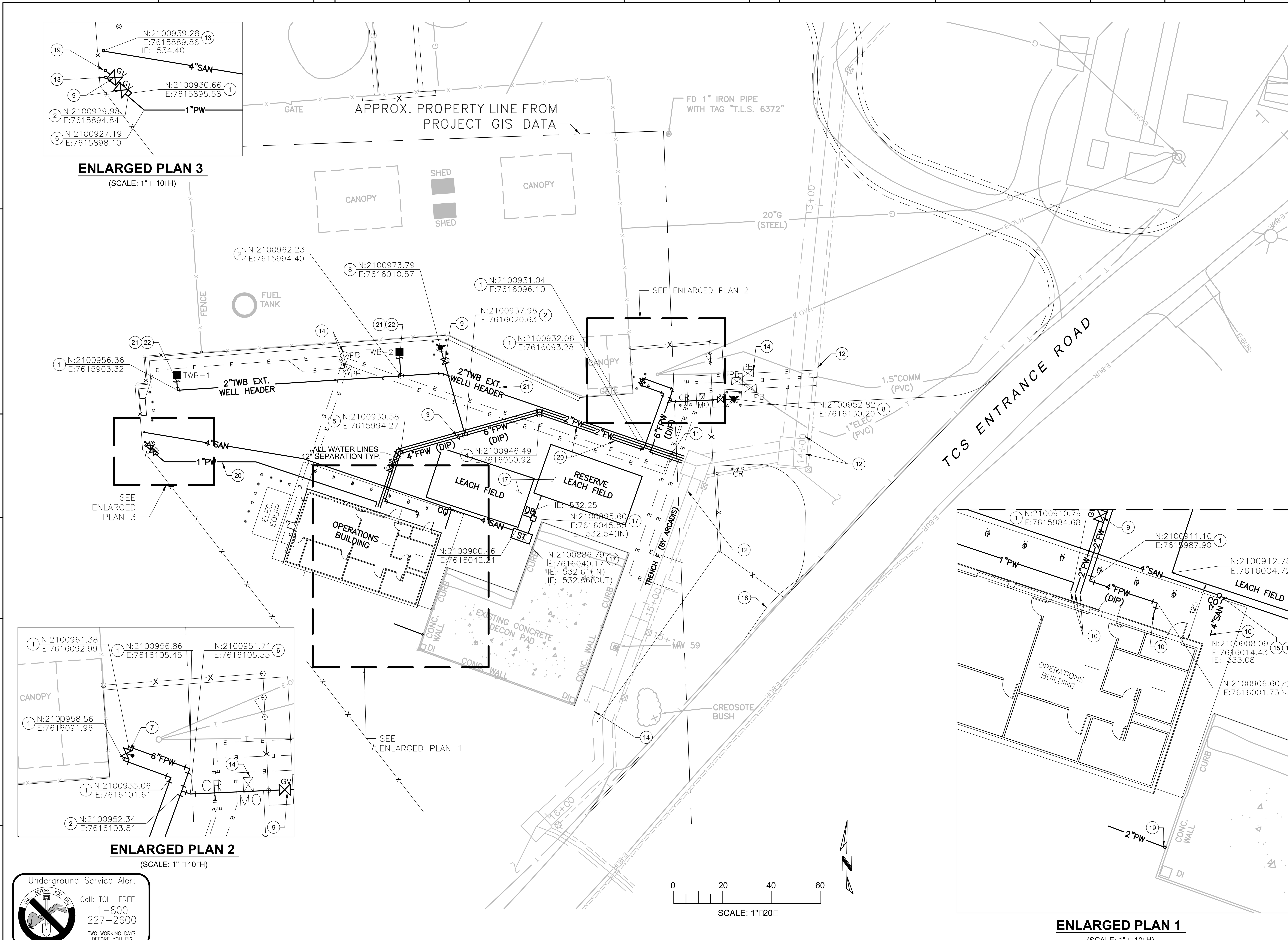
REVISIONS

APPROVED BY	
SO	
SUPV	
DSGN	DA
DWN	DA
CHKD	HO
OK	
DATE	09/08/14
SCALES	1"=20

TOPOCK GROUNDWATER REMEDIATION PROJECT
TRANSWESTERN BENCH SITE IMPROVEMENTS PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-08-02	REV 0

08/05/2015 11:09 G:\Gra...\AR TOPOCK-01\S..bm...\al 100% DWGs C-C...\C-08-02.dwg Tab: C-08-02



GENERAL NOTES:

A SEE LEGEND, NOTES & ABBREVIATIONS C-08-00 FOR COMPLETE GENERAL NOTES.

B THE USE OF MECHANICAL RESTRAINTS IS RECOMMENDED BASED ON UNKNOWN SITE SOIL CHARACTERISTICS. THRUST BLOCK INSTALLATION IS BASED ON INSTALLING THRUST BLOCKS AGAINST UNDISTURBED SITE SOILS. CONTRACTOR IS RESPONSIBLE FOR ADEQUATE THRUST RESTRAINTS ON ALL PRESSURE LINES TO BE INSTALLED. THRUST RESTRAINT SYSTEMS SHALL BE SUBMITTED AND APPROVED BY ENGINEER.

C FOR UTILITY CROSSINGS, SEE DETAILS 4,7/C-08-07.

KEYED NOTES:

1 INSTALL 90° BEND. SEE PLAN FOR ASSOCIATED SIZE.
2 INSTALL TEE. SEE PLAN FOR ASSOCIATED SIZE.
3 INSTALL REDUCER. SEE PLAN FOR ASSOCIATED SIZE.
4 INSTALL 22.5° BEND AND 11.25° FOR TOTAL BEND OF 33.75°. SEE PLAN FOR ASSOCIATED SIZE.
5 INSTALL 45° BEND AND 11.25° FOR TOTAL BEND OF 56.25°. SEE PLAN FOR ASSOCIATED SIZE.
6 INSTALL 22.5° BEND. SEE PLAN FOR ASSOCIATED SIZE.
7 INSTALL POST INDICATOR VALVE. SEE DETAIL 2/C-08-07.
8 INSTALL FIRE HYDRANT. SEE DETAIL 12/C-08-07.
9 INSTALL GATE VALVE AND VALVE BOX. SEE DETAIL 3/C-08-07.
10 INSTALL BUILDING UTILITY PIPE CONNECTION. SEE 6/C-08-07. COORDINATE LOCATION WITH PLUMBING DRAWING P-08-01.
11 APPROXIMATE CONNECTION TO TRENCH F PENDING FINAL DESIGN BY ARCADIS, SEE DWG C-07-52 AND DETAIL 10/C-07-117. COORDINATE FIELD ADJUSTMENT AS NEEDED WITH ARCADIS.
12 VAULTS AND ALIGNMENT OF TRENCH F BY ARCADIS, SEE DWG C-07-52
13 CAP SERVICE AT 6" ABOVE FINISHED GRADE.
14 APPROX. PULL BOX LOCATION. COORDINATE LOCATION PER ELECTRICAL DRAWING E-08-01.
15 INSTALL CLEANOUT. SEE DETAIL 9/C-08-08.
16 INSTALL WYE CONNECTION. SEE PLAN FOR ASSOCIATED SIZE.
17 FOR SEPTIC SYSTEM DESIGN SEE DRAWING C-08-20.
18 REROUTE EX. TELECOM SERVICE. PROVIDE 12" MIN. HORIZONTAL AND VERTICAL CLEARANCE. COORDINATE RELOCATION WITH FRONTIER
19 INSTALL HOSE BIB. SEE DETAIL 1/C-08-08.
20 FOR PIPE MATERIAL OF WATER DISTRIBUTION LINES 2" DIAMETER OR LESS, SEE PLUMBING SPEC. SECTION 22 10 01.
21 EXTEND WATER SERVICE TO WELLS. COORDINATE WELL LOCATION WITH ARCADIS DRAWING C-07-36.
22 FOR ELECTRICAL SERVICE ROUTING TO WELL, SEE ELECTRICAL DRAWING E-08-01.
23 INSTALL 45° BEND. SEE PLAN FOR ASSOCIATED SIZE.

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

SO	
SUPV	
DSGN	DA
DWN	DA
CHKD	HO
OK	
DATE	09/08/14
SCALES	1" = 20'

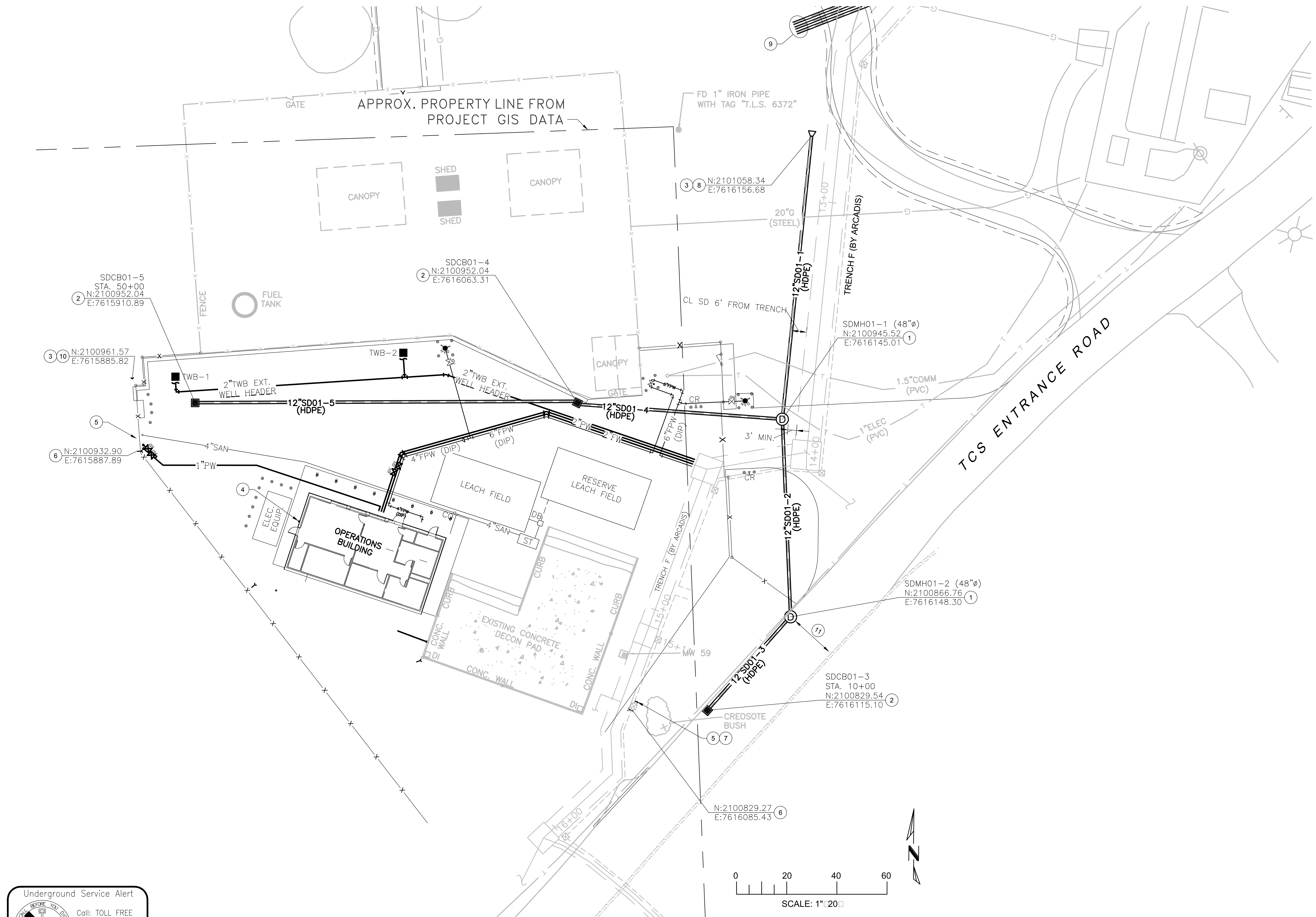
TOPOCK GROUNDWATER REMEDIATION PROJECT

TRANSWESTERN BENCH SITE UTILITIES PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-08-03	REV 0

08/05/2015 11:12 G:\Gra...\TOPOCK-01...\C-08-03.dwg Tab: C-08-03



GENERAL NOTES:

A SEE LEGEND, NOTES & ABBREVIATIONS C–08–00 FOR COMPLETE GENERAL NOTES.

KEYED NOTES:

1. INSTALL MANHOLE. SEE DETAILS 2,3,4/C–08–08.
2. INSTALL 2"X2" CONC. CB AND GRATE SIMILAR TO MODEL CB–2424 AS MANUFACTURED BY OLD CASTLE.
3. INSTALL 18" THICK RIPRAP APRON (D50=12") OVER GEOTEXTILE FABRIC (MODEL 140N BY MIRAFI OR EQUIVALENT). SEE CALTRANS STANDARD DETAIL SS–10 (SIM) EXTEND MIN. 12" VERTICALLY ABOVE CROWN.
4. INSTALL ROOF DRAIN. KEEP ON NORTH FACE OF WALL. (DO NOT CROSS CONNECT WITH WALL DRAIN.)
5. INSTALL WALL DRAIN PER STRUCTURAL DETAIL 5/S–08–09 AND RETAINING WALL PROFILE DRAWING C–08–10. USE 6" ADS RIGID PERFORATED PIPE SURROUNDED WITH 3/4" MINUS DRAIN ROCK AND WRAPPED WITH GEOTEXTILE FABRIC (MODEL 140N BY MIRAFI OR EQUIVALENT) OVERLAPPED 6" MIN.
6. WEEP HOLE THROUGH WALL SEE STRUCTURAL DETAIL S–08–09.
7. INSTALL TERMINAL RISER. SEE CALTRANS STANDARD DETAIL D102 (SIM).
8. INSTALL FLARED END SECTION. SEE CALTRANS STANDARD DETAIL D94A.
9. FOR NEW ACCESS ROAD 30% LAYOUT, SEE DRAWING C–08–11.
10. DAYLIGHT WALL DRAIN ONTO SLOPE AND ENSURE DISCHARGE HAS A FREE DRAINING PATH.
11. AT MINIMUM ONE LANE MUST REMAIN OPEN AT ALL TIMES.

Underground Service Alert
Call: TOLL FREE
1–800
227–2600
TWO WORKING DAYS BEFORE YOU DIG

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

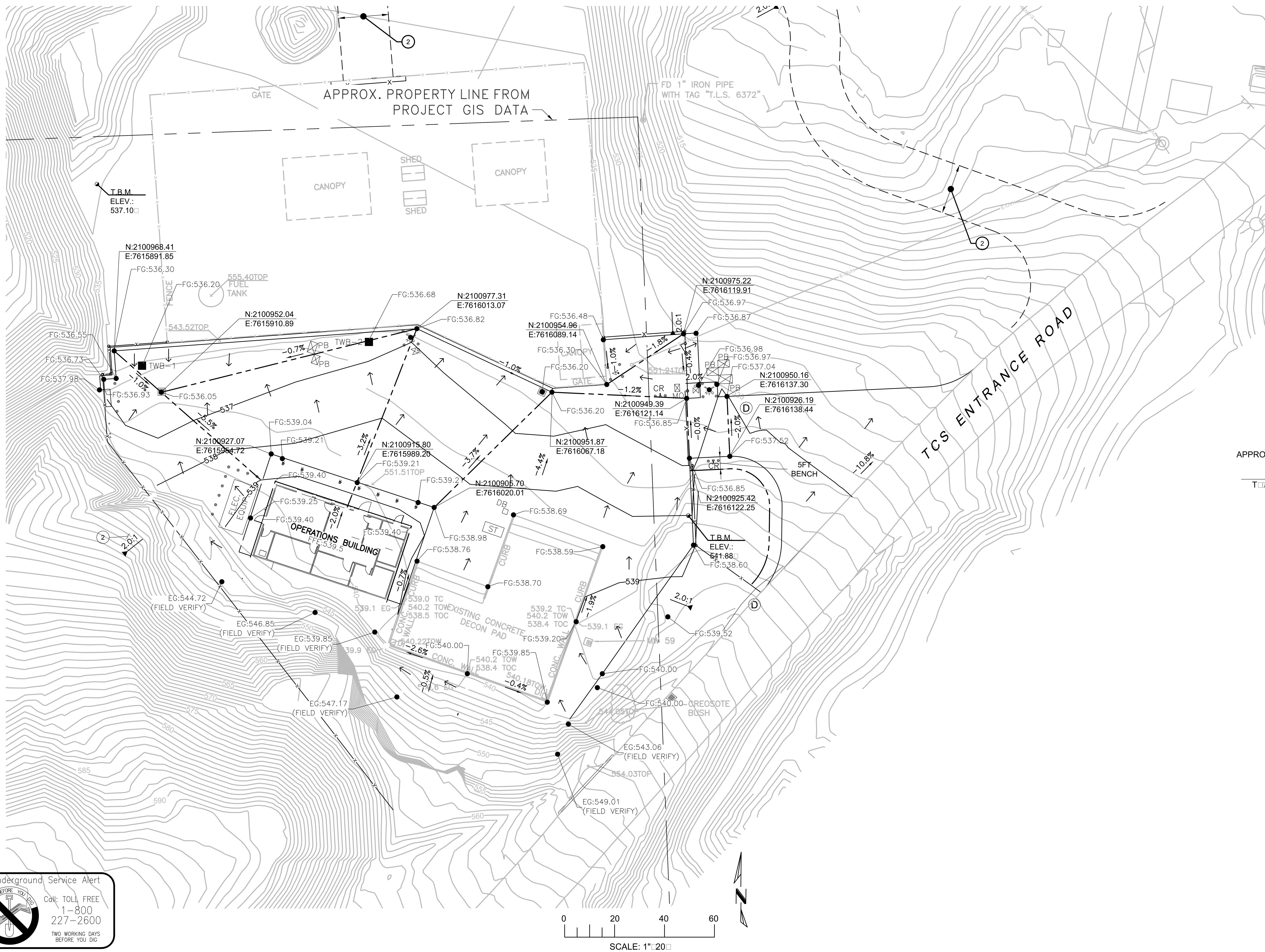
NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

APPROVED BY	SO
	SUPV
	DSGN DA
	DWN DA
	CHKD HO
	OK
	DATE 09/08/14
	SCALES 1"=20'

TOPOCK GROUNDWATER REMEDIATION PROJECT
TRANSWESTERN BENCH STORM DRAINAGE PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-08-04	REV 0



GENERAL NOTES:

A SEE LEGEND□NOTES □ ABBREVIATIONS C-08-00 FOR COMPLETE GENERAL NOTES.

KEYED NOTES:

1 SEE DRAWING C-08-11 FOR NEW ACCESS ROAD 30% LAYOUT.
2 ALL SLOPES SHALL NOT BE ANY STEEPER THAN 2:1 (H:V)

APPROXIMATE EARTHWORK VOLUMES - TRANSWESTERN BENCH AREA
COMPARING FINISHED AND EXISTING SURFACES

	2d Ar□a(S□. F□.)	C□□(C□. Yd.)	F□ll(C□. Yd.)	N□□(C□. Yd.)
T□□al	28□527	839	211	628□C□□□

Underground Service Alert
Call: TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

- DRAFT -
NOT FOR CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW

REVISIONS

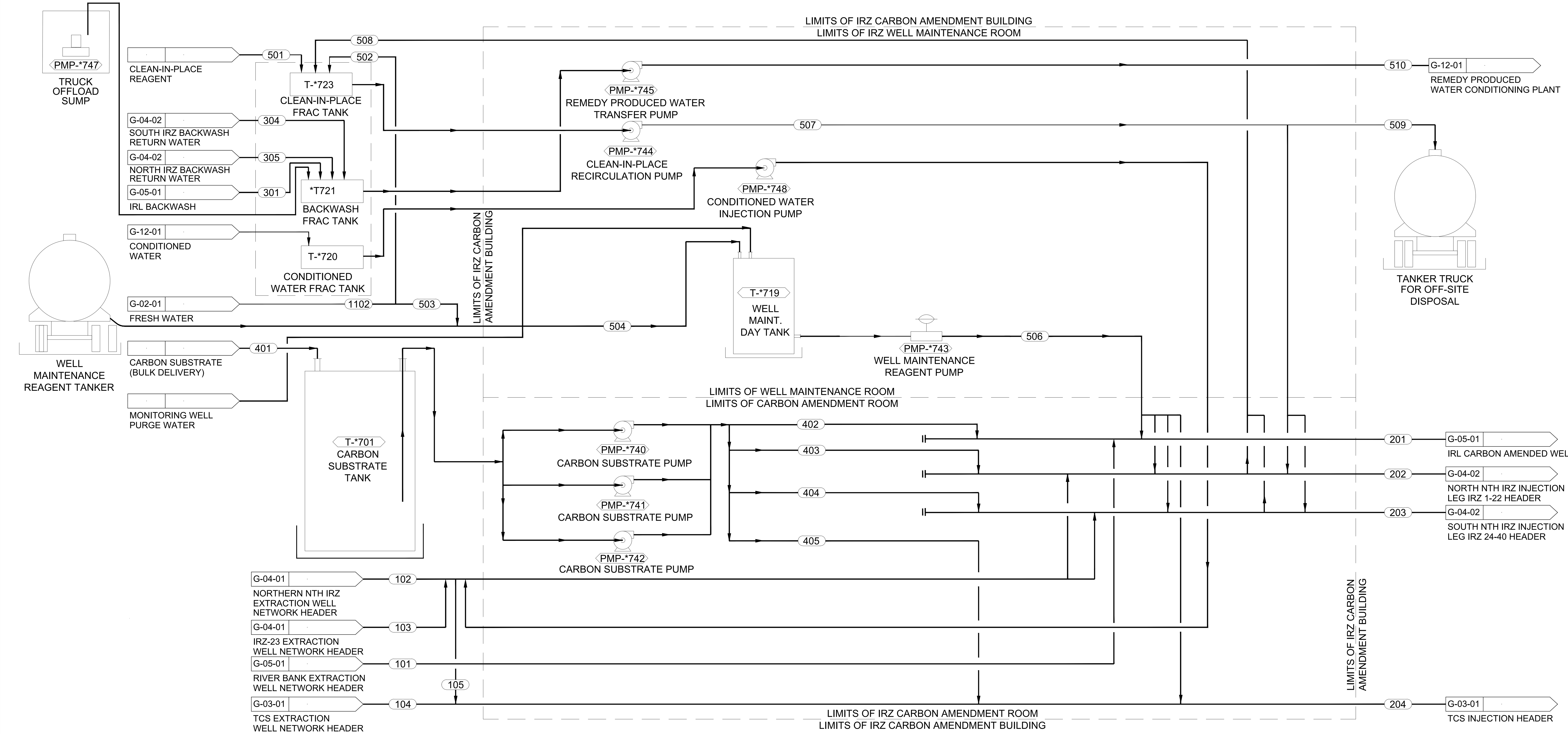
APPROVED BY	
SO	
SUPV	
DSGN	DA
DWN	DA
CHKD	HO
OK	
DATE	09/08/14
SCALES	1" □20□

TOPOCK GROUNDWATER REMEDIATION PROJECT
TRANSWESTERN BENCH SITE GRADING PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
C-08-05 REV 0

N1808

08/05/2015□11:16□G:□Gra□□□s□AR□TOPOCK-01□S.bm□al□100% D□WGs C-C□□□C-08-05.d□g□Tab: C-08-05



NOTES:

1. SPARE HEADERS AND FUTURE PROVISIONAL WELLS ARE NOT SHOWN.

ABBREVIATIONS:

- BWGW: BACKWASH GROUNDWATER
- CAGW: CARBON AMENDED GROUNDWATER
- CIPR: CLEAN IN PLACE REAGENT
- ETOH: ETHANOL
- EXGW: EXTRACTED GROUNDWATER
- FW: FRESH WATER
- GPD: GALLONS PER DAY
- GPM: GALLONS PER MINUTE
- IRL: INNER RECIRCULATION LOOP
- IRZ: IN-SITU REACTIVE ZONE
- lbs/day POUNDS PER DAY
- mg/L: MILLIGRAMS PER LITER
- NTH: NATIONAL TRAIL HIGHWAY
- TOC: TOTAL ORGANIC CARBON
- TW: TREATED WATER
- WMR: WELL MAINTENANCE REAGENT
- µg/L: MICROGRAMS PER LITER

Design Basis and Mass Balance[a,g]

Stream ID:	101	102	103	104	105	201	202	203	204	209	301	304[i]	305[i]	401	402	403	404	405	1102	501	502	503	504	505	506	507	508	509	510	511
Stream Description:	EXGW	EXGW	EXGW	EXGW	EXGW	CAGW/FW	CAGW	CAGW	CAGW	FW	BWGW	BWGW	BWGW	ETOH	ETOH	ETOH	ETOH	ETOH	FW	CIPR	FW	FW	FW	FW	WMR	WMR	WMR	WMR/BWGW	WMR/BWGW	MWPW
Nominal Design Parameters																														
Flow Rate (GPM):	150	200	100	27	TBD	150	300		24	TBD	≤400	17	20	---	---	---	---	---	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Carbon Substrate[b,c] (GPD):	---	---	---	---	---	10	104		8.3	---	---	---	---	---	10	104	TBD	8.3	---	---	---	---	---	---	---	---	---	---	---	---
TOC[b,c] (mg/L):	---	---	---	---	---	20	100		100	---	---	---	---	---	20	100	TBD	100	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (µg/L):	10	26.3	2300	3203	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (lbs/day):	1.8E-02	6.3E-02	2.8E+00	1.00E+00	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum Design Parameters																														
Flow Rate (GPM):	500[e]	400[f]		39	TBD	750[h]	400[f]		75	---	≤400	35	40	---	---	---	---	38	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Carbon Substrate[b,c] (GPD):	---	---	---	---	---	104	694		130	---	---	---	---	j	104	694	TBD	130	---	---	---	---	---	---	---	---	---	---	---	---
TOC[b,c] (mg/L):	---	---	---	---	---	50	500		500	---	---	---	---	---	50	500	TBD	500	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (µg/L):	10	26	2,300	2981	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (lbs/day):	6.0E-02	3.7		1.00E+00	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

a - Values represent target/estimated design parameters for initial operation; system operation may be modified to optimize system performance.
b - Denatured ethanol assumed; instantaneous dosage concentration will not exceed 1-percent by volume.
c - Average flow rate/concentration over time; carbon substrate dosing will be periodic and duration/frequency will vary.
d - Estimated initial concentration.
e - Total maximum River Bank extracted groundwater flow limited to 500 gpm.
f - Total maximum NTH IRZ extracted/injected groundwater flow limited to 400 gpm.
g - Reference: G-03-01, G-04-01, G-04-02.
h - Total maximum carbon-amended injection well flow limited to 750 gpm; may include freshwater (see G-05-01).
i - Total backwash return water volume per week from NTH IRZ injection will network is approximately 18,000 gallons.
j - Maximum delivered volume = 7,000 gallons.

- DRAFT -
NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	8/5/15	90% RTC RESOLUTION		AJW	MSL	JPB	JEF	
				KLD	BJW			
				KLD	BJW			

REVISIONS

APPROVED BY: SO; SUPV; DSGN BJW; DWN KLD; CHKD; OK; DATE; SCALES NONE

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH
PROCESS FLOW DIAGRAM

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
G-06-01 REV 2

N1808

NOTES
1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. FOR THE IRZ CARBON AMENDMENT BUILDING THE LOCATION IS "IRZ00-". EXCHANGE "IRZ00-" FOR "*" TO COMPLETE TAG OR INSTRUMENT REFERENCE. REFER TO SHEET I-00-03 FOR A TABLE OF LOCATION IDS.
2. SEE SHEET I-00-03 FOR INTERLOCK TABLE.
3. CONTRACTOR TO PLACE CLEANOUTS LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- DRAFT -
NOT FOR CONSTRUCTION

ARCADIS

REVISIONS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	8/5/15	90% RTC RESOLUTION	AJW	JPB	BJW	DC	
			MS	MWM			
			MS	MWM			

APPROVED BY
SO
SUPV
DSGN MWM
DWN MS
CHKD
OK
DATE
SCALES NONE

TOPOCK GROUNDWATER REMEDIATION PROJECT
MW-20 BENCH CARBON AMENDMENT BUILDING P&ID SHEET 1 OF 4
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
I-06-01
REV 2

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NOTES

1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. FOR THE IRZ CARBON AMENDMENT BUILDING THE LOCATION IS "IRZ00-". EXCHANGE "IRZ00-" FOR "*" TO COMPLETE TAG OR INSTRUMENT REFERENCE. REFER TO SHEET I-00-03 FOR A TABLE OF LOCATION IDS.
2. SEE SHEET I-00-03 FOR INTERLOCK TABLE.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- DRAFT -
NOT FOR CONSTRUCTION

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	8/5/15	90% RTC RESOLUTION		AJW	JPB	BJW	DC
				MS	MWM		
				MS	MWM		

REVISIONS

APPROVED BY: SO / SUPV / DSGN MWM / DWN MS / CHKD / OK / DATE / SCALES NONE

TOPOCK GROUNDWATER REMEDIATION PROJECT
MW-20 BENCH CARBON AMENDMENT BUILDING P&ID
SHEET 2 OF 4
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
I-06-02 REV 2

N1808

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NOTES
1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. FOR THE IRZ CARBON AMENDMENT BUILDING THE LOCATION IS "IRZ00-". EXCHANGE "IRZ00-" FOR "*" TO COMPLETE TAG OR INSTRUMENT REFERENCE. REFER TO SHEET I-00-03 FOR A TABLE OF LOCATION IDS.
2. SEE SHEET I-00-03 FOR INTERLOCK TABLE.
3. CONTRACTOR TO PLACE CLEANOUTS LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- DRAFT -
NOT FOR CONSTRUCTION

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	8/5/15	90% RTC RESOLUTION		AJW	JPB	BJW	DC
				MS	MWM		
				MS	MWM		

REVISIONS

SO	
SUPV	
DSGN	MWM
DWN	MS
CHKD	
OK	
DATE	
SCALES	NONE

TOPOCK GROUNDWATER REMEDIATION PROJECT
MW-20 BENCH CARBON AMENDMENT BUILDING P ID
SHEET 3 OF 4
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. I-06-03 of SHEETS
REV 2

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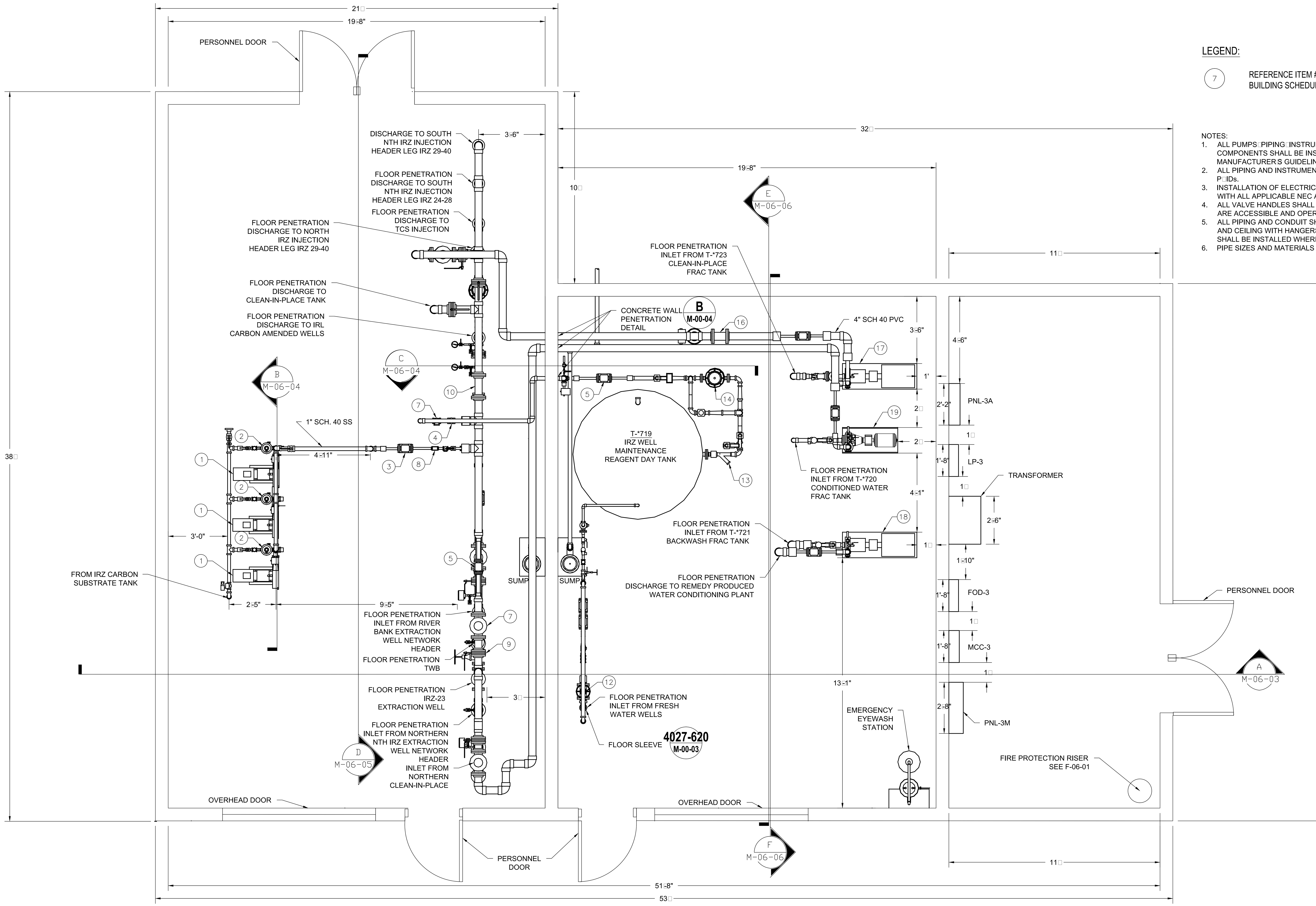

LEGEND:

(7) REFERENCE ITEM # CARBON AM
BUILDING SCHEDULE ON M-06-08

NOTES:
1. ALL PUMPS, PIPING, INSTRUMENTATION
COMPONENTS SHALL BE INSTALLED AS P
MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHAL
P&IDs.
3. INSTALLATION OF ELECTRIC COMPONENT
WITH ALL APPLICABLE NEC AND LOCAL C
4. ALL VALVE HANDLES SHALL BE INSTALLE
ARE ACCESSIBLE AND OPERABLE THROU
5. ALL PIPING AND CONDUIT SHALL BE SECU
AND CEILING WITH HANGERS AND SUPPO
SHALL BE INSTALLED WHERE NECESSARY
6. PIPE SIZES AND MATERIALS ARE SHOWN

MW-20 BENCH CARBON AMENDMENT BUILDING MECHANICAL LAYOUT

3/8" = 1'-0"

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		LUK	JPB	KLD	BJW

REVISIONS

APPROVED BY	
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	8/5/15
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING MECHANICAL LAYOUT

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
M-06-01	REV 0

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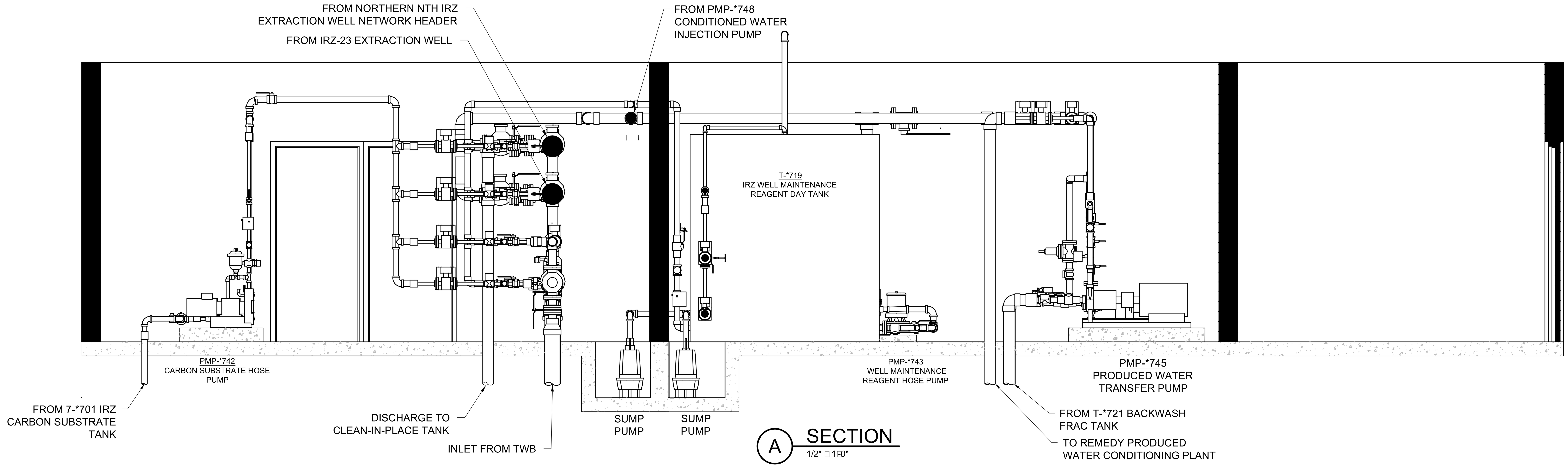
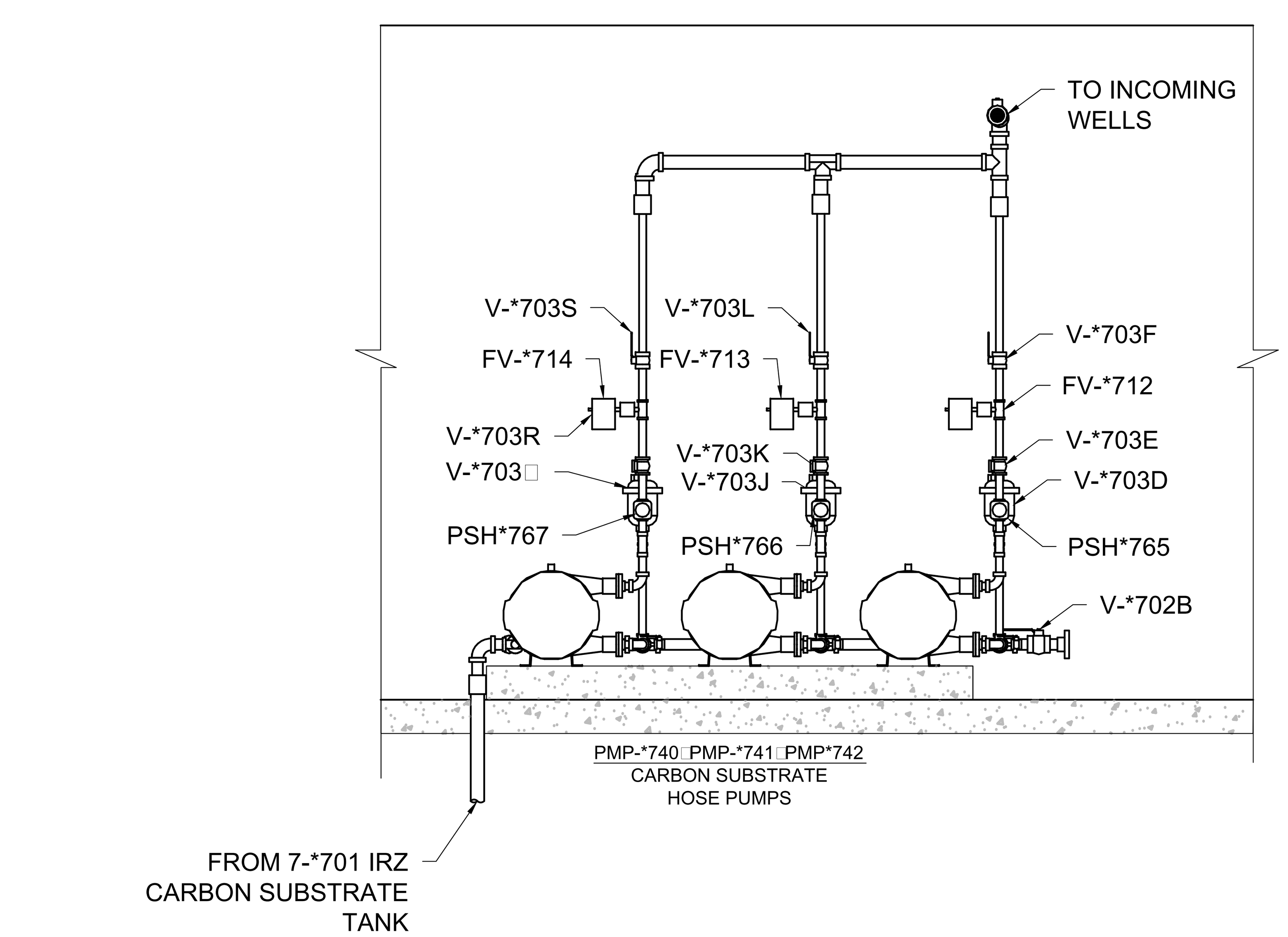
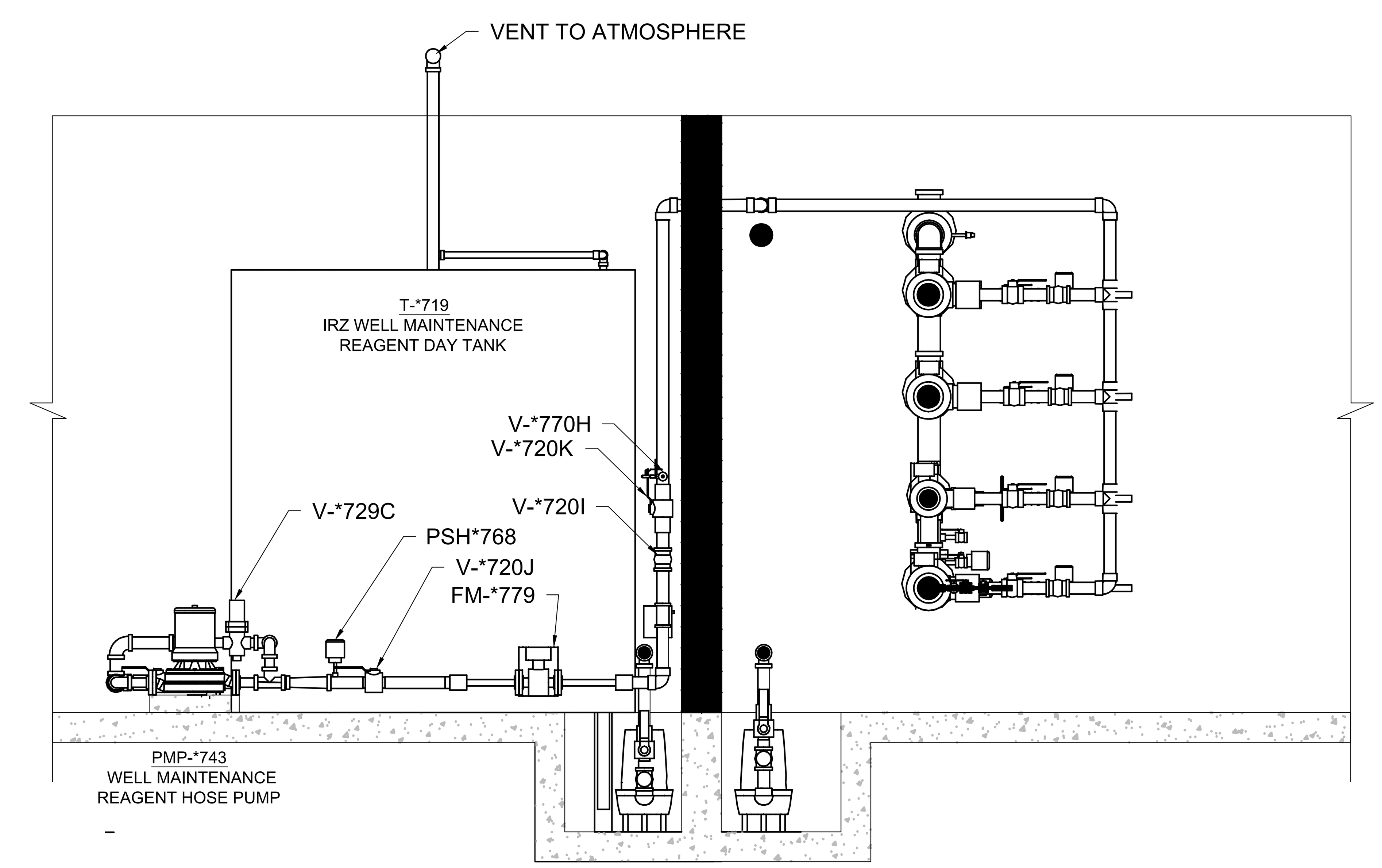
H1808



A SECTION
1/2" = 1'-0"
M-06-01



B SECTION
1/2" = 1'-0"
M-06-01



C SECTION
1/2" = 1'-0"
M-06-01

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		LUK	JPB	KLD	BJW

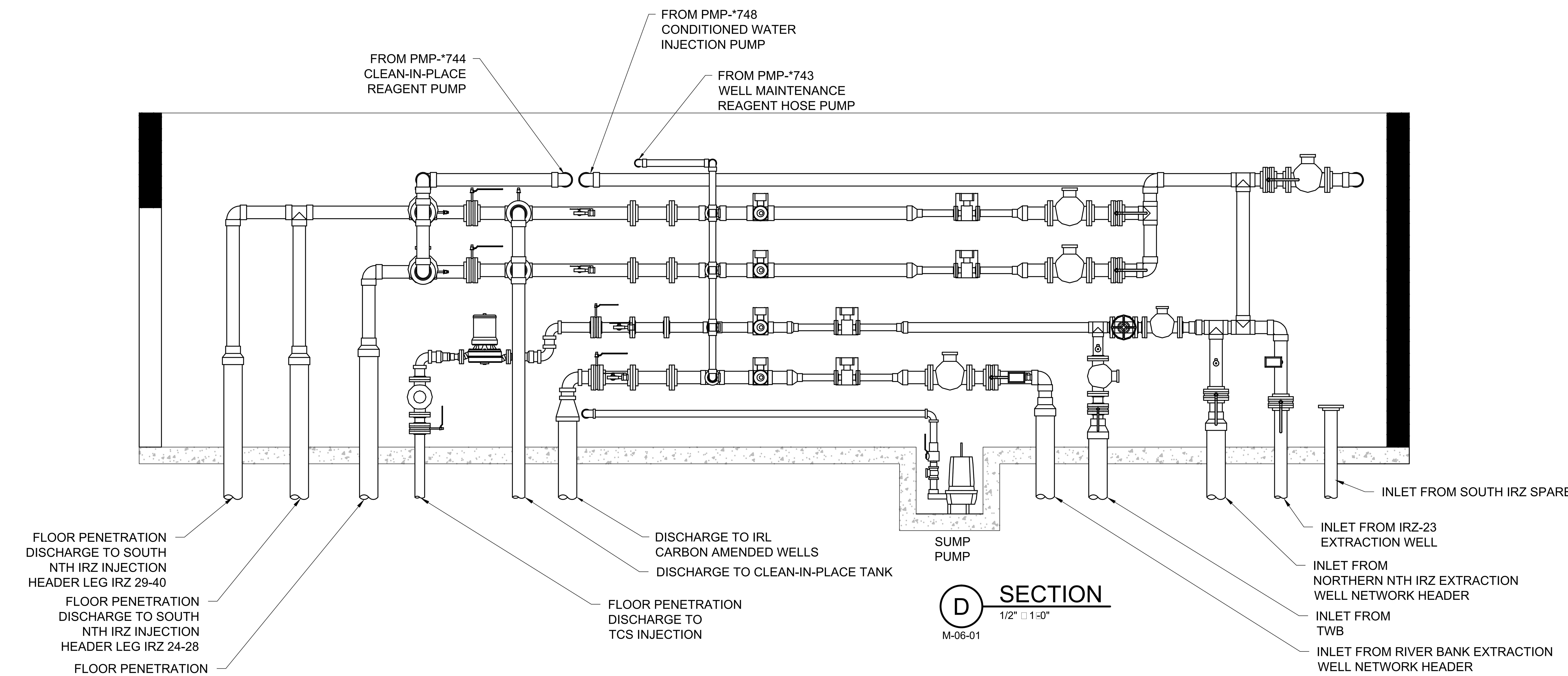
REVISIONS

APPROVED BY	
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	8/5/15
SCALES	

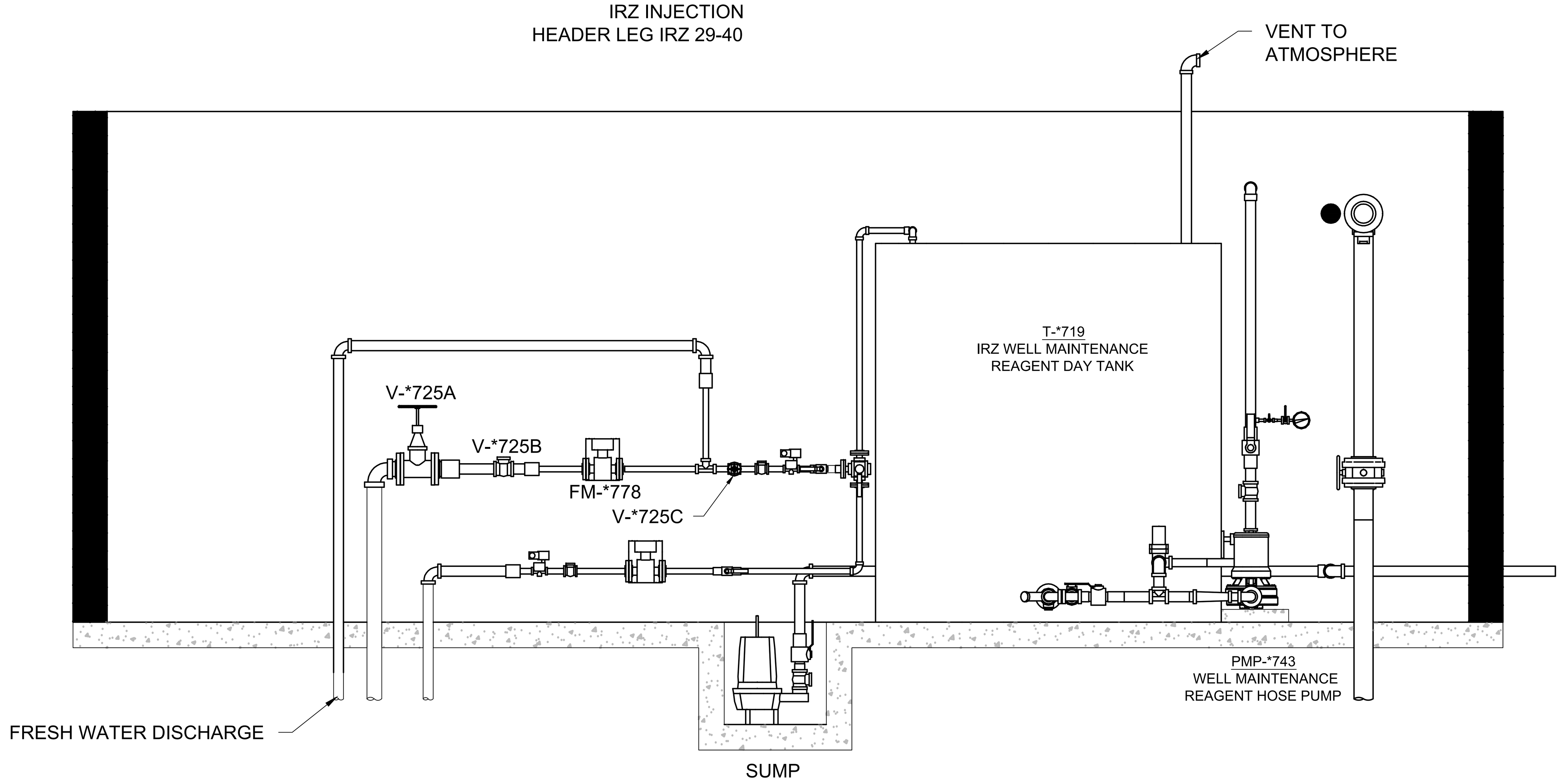
TOPOCK GROUNDWATER REMEDIATION PROJECT
MW-20 BENCH CARBON
AMENDMENT BUILDING
MECHANICAL LAYOUT SECTIONS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
M-06-02	REV 0

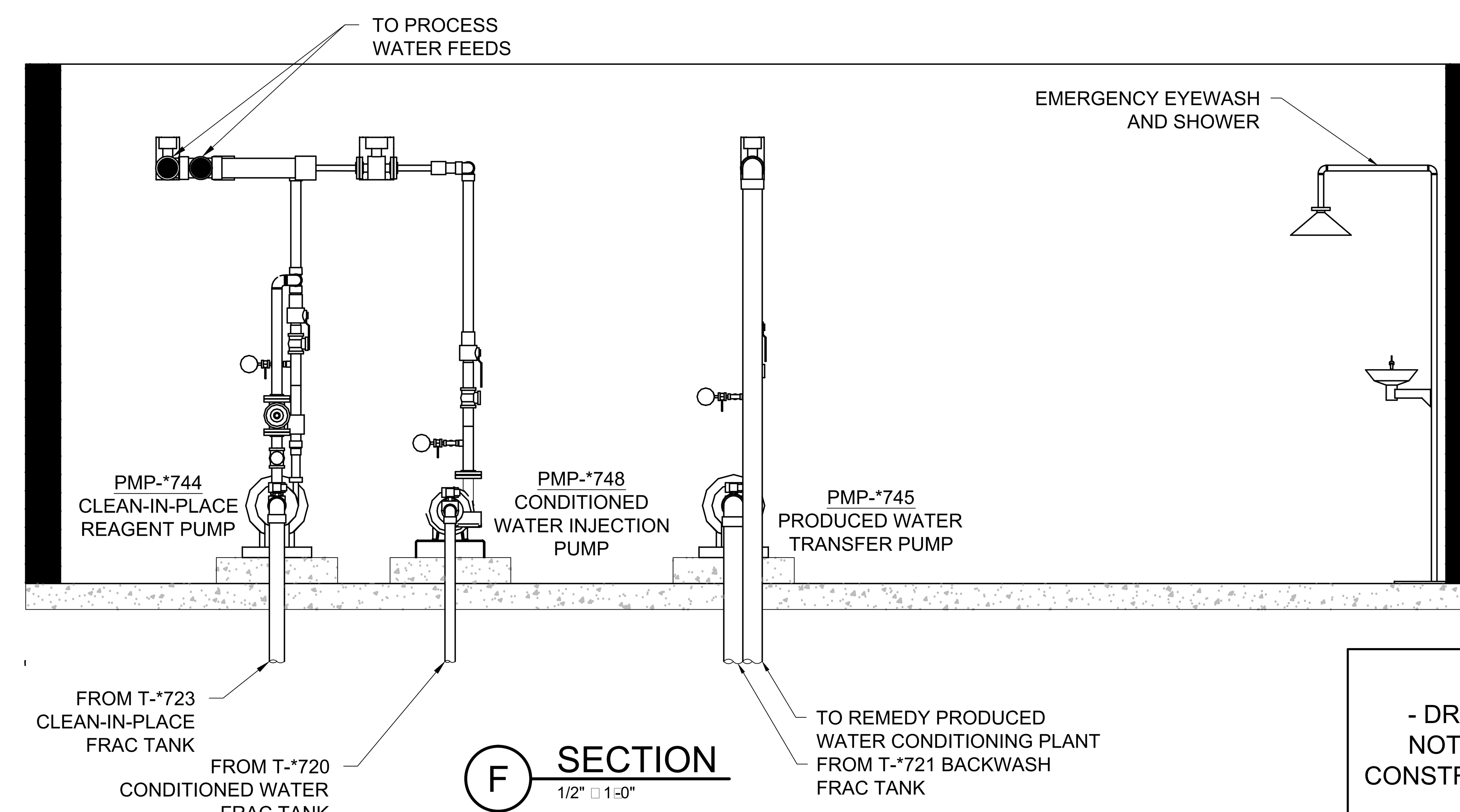
H1808



D SECTION
1/2" = 1'-0"
M-06-01



E SECTION
1/2" = 1'-0"
M-06-01



F SECTION
1/2" = 1'-0"
M-06-01

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		LUK	JPB	KLD	BJW

REVISIONS

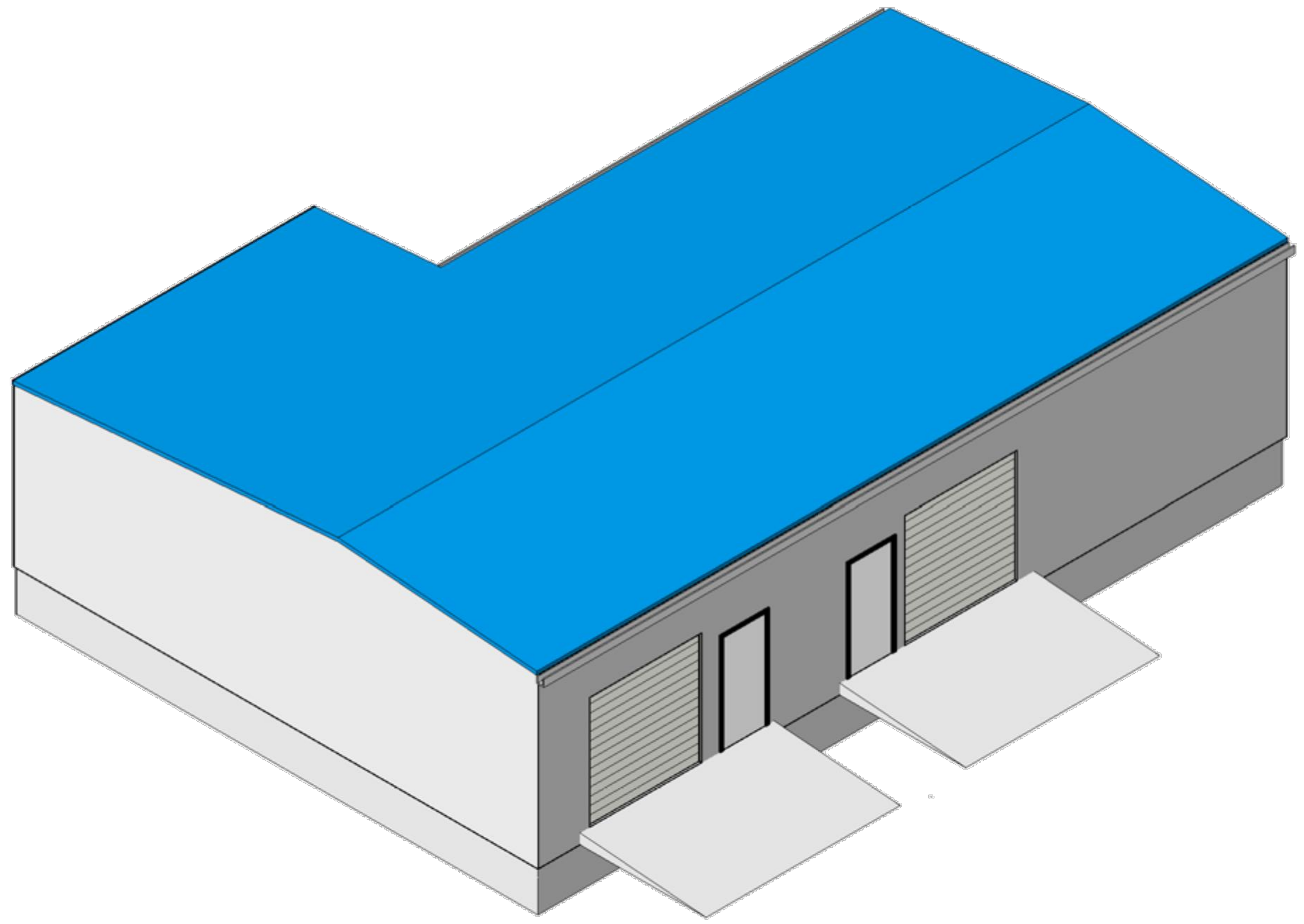
APPROVED BY	
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	8/5/15
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

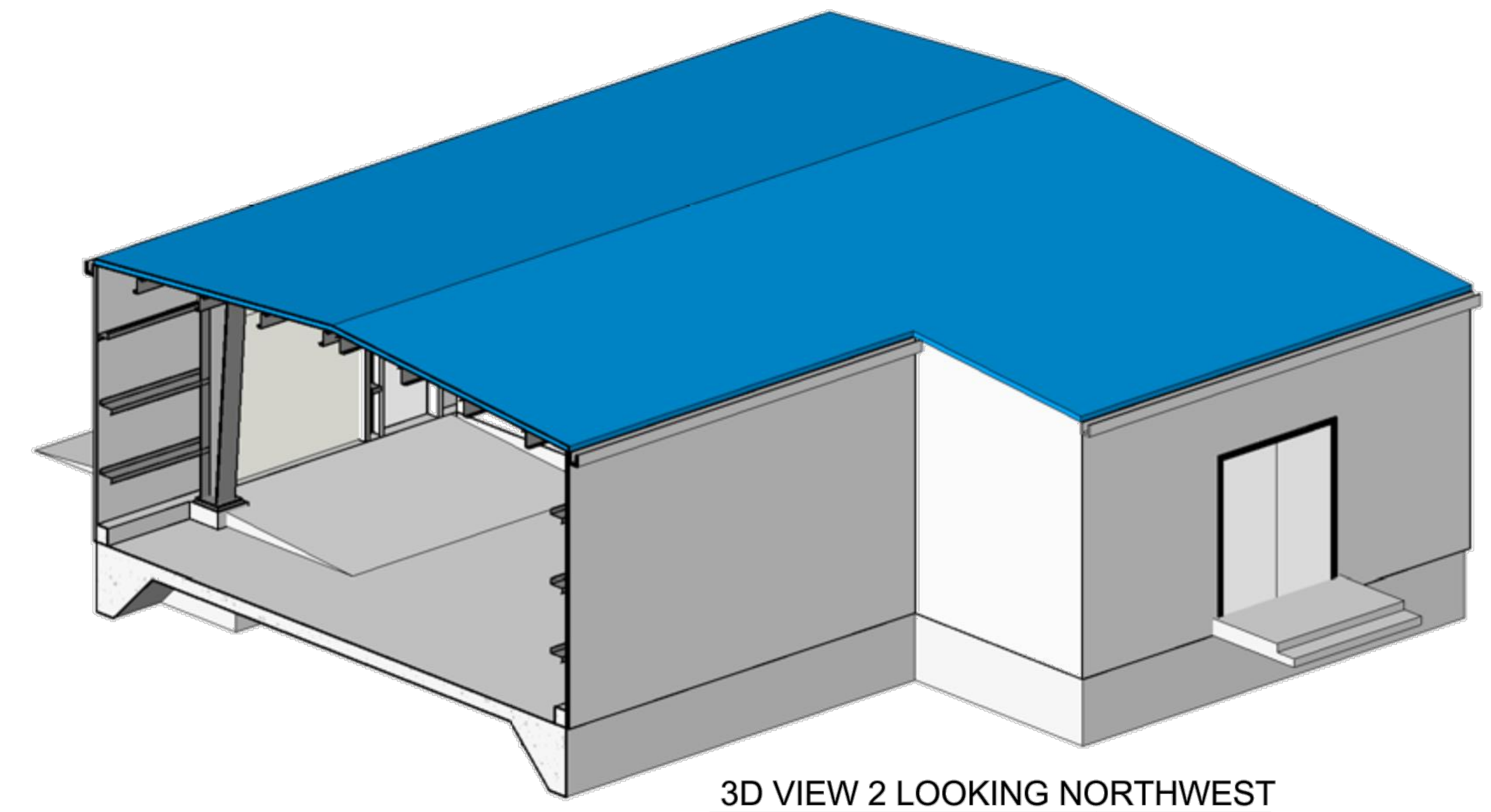
MW-20 BENCH CARBON AMENDMENT BUILDING MECHANICAL LAYOUT SECTIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

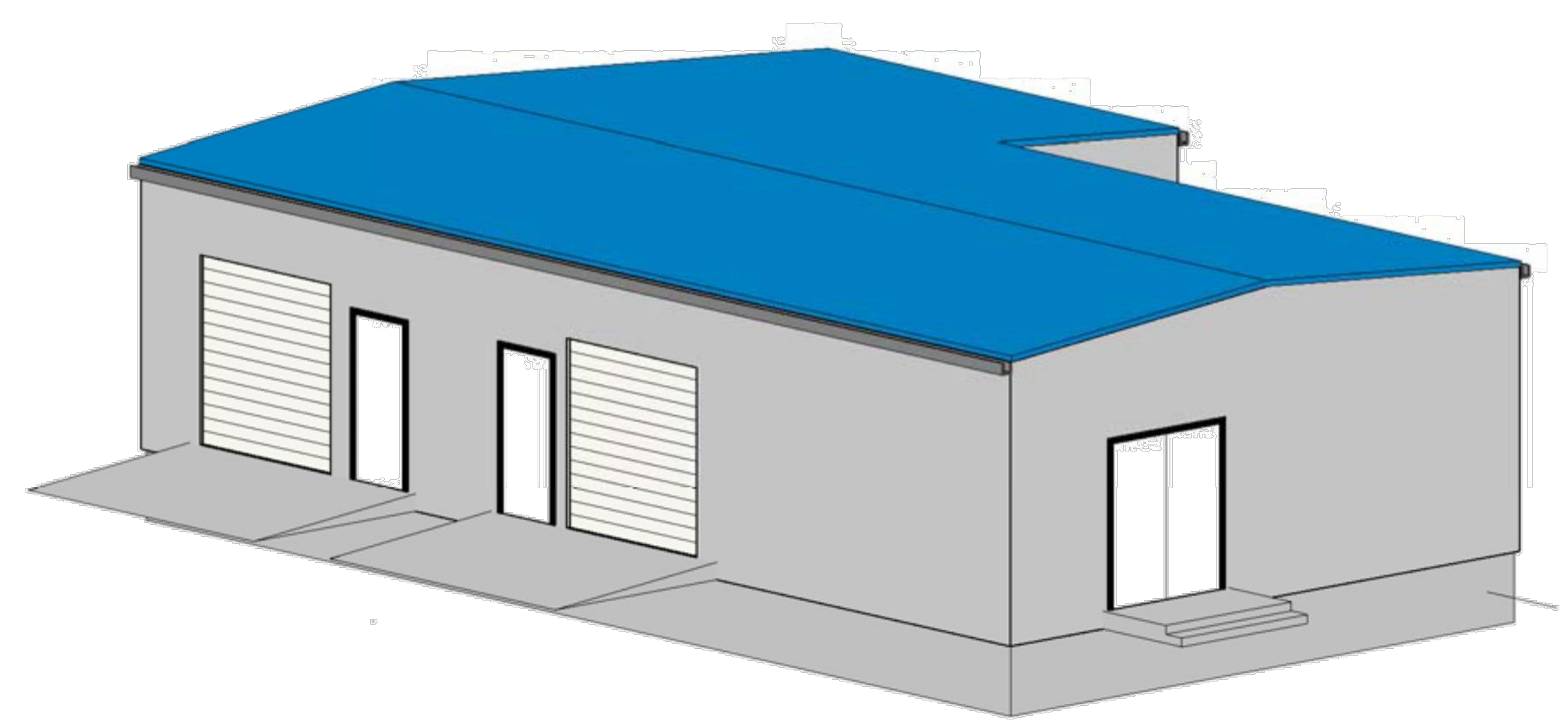
MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
M-06-03
REV 0



3D VIEW LOOKING SOUTHEAST



3D VIEW 2 LOOKING NORTHWEST



3D VIEW LOOKING NORTHEAST

- DRAFT -
NOT FOR
CONSTRUCTION

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		CMW	KLD	MSL	MSL

REVISIONS

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OK	
DATE	8/5/15
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING AXONOMETRIC VIEWS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

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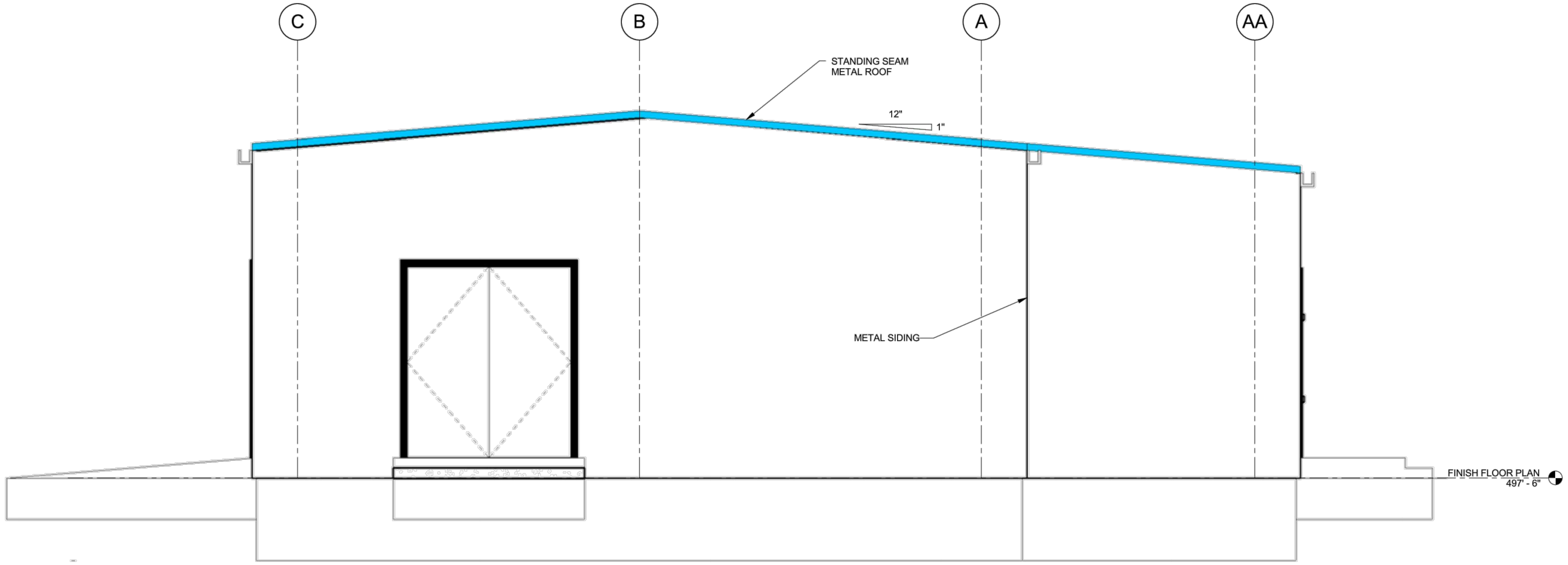

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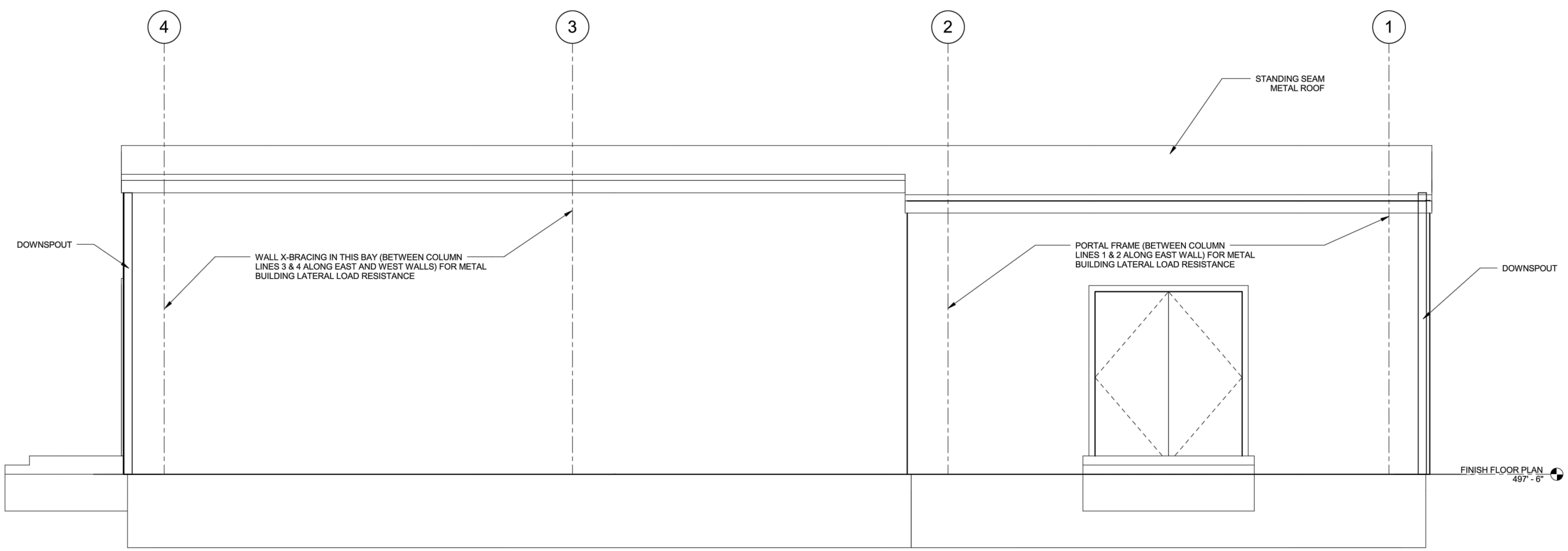

EAST ELEVATION
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ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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REVISIONS

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OK	
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TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING ELEVATIONS (1 OF 2)

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
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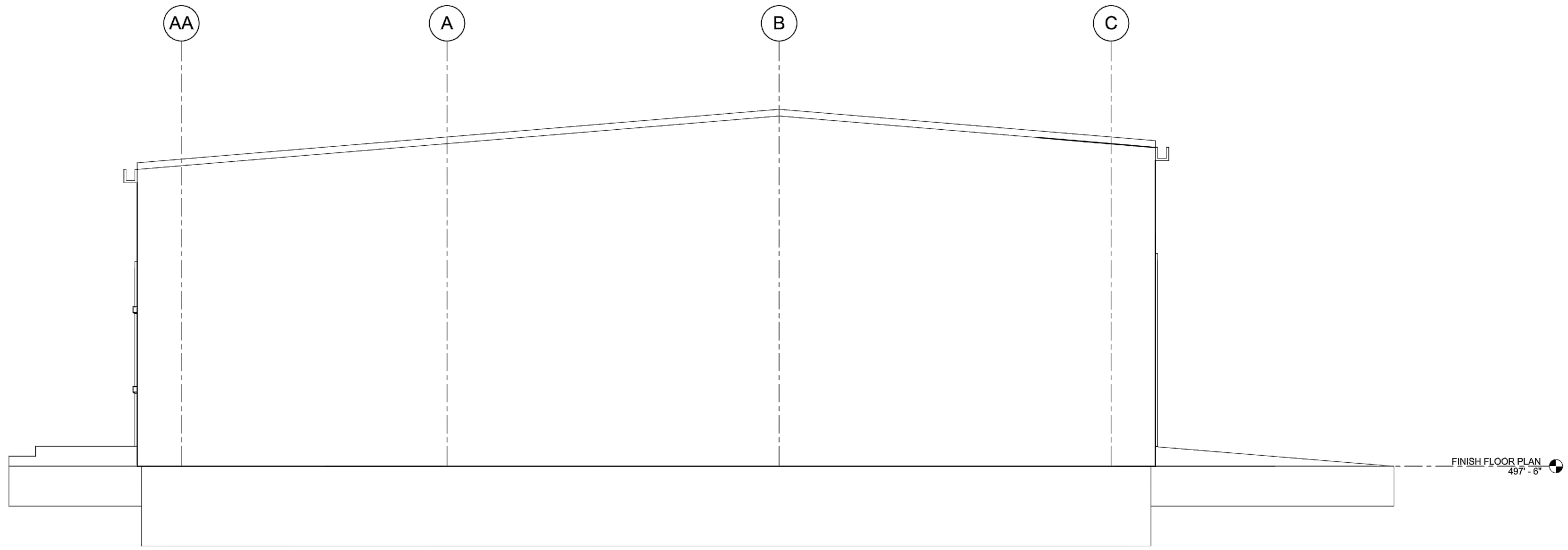

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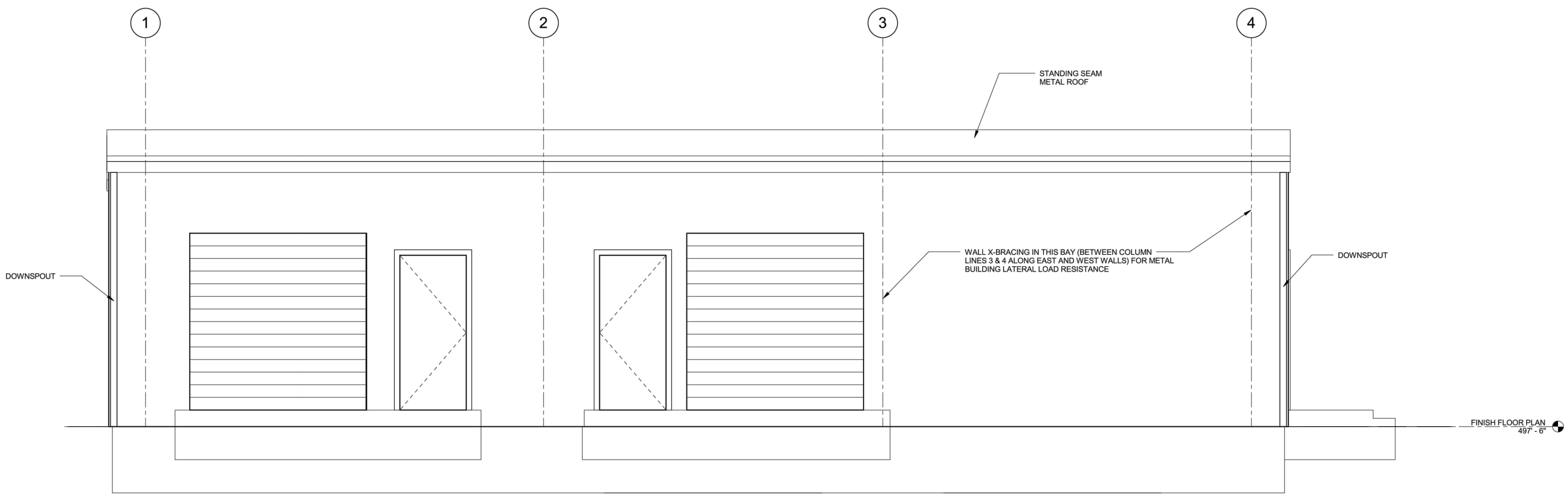

WEST ELEVATION
3/8" = 1'-0"

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ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	8/5/15	90% RTC RESOLUTION		CMW	KLD	MSL	MSL

REVISIONS

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CHKD	
OK	
DATE	8/5/15
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING ELEVATIONS (2 OF 2)

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
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SHEET NO. of SHEETS	REV
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Attachment CC: RTCs #4, #17, #22, #32, #41, #43, and #126

MW-X and MW-Y

Evaluation of Technical Justification

for Proposed Monitoring Wells MW-X and MW-Y

July 15, 2015

by

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Margaret R. Eggers, PhD, RG, CHG (Eggers Environmental, Oceanside, CA)

Introduction

At the request of the Fort Mojave Indian Tribe (FMIT), this paper addresses the following:

1) Evaluation of the technical basis used for locating proposed monitoring wells, MW-X and MW-Y (see **Figure 1a**) along the Arizona shore of the Colorado River, across from the northern part of the proposed PG&E remediation system,
2) Description of further testing and evaluations that could be done to better determine the need and locations of the proposed monitoring wells, and
3) Description of an alternative basis for performance assessment of the proposed remedy near the river.

The FMIT objects to the planned monitor wells MW-X and MW-Y at the proposed locations along the Arizona bank of the Colorado River. The objection stems from the fact that the wells are proposed for siting in a "named place," eligible for nomination to the National Register of Historic Places. Additionally, the area is part of a broader traditional cultural landscape and is therefore culturally sensitive. The Tribe believes that the construction and operation of monitor wells within this area will result in a significant and irreversible adverse impact on the area. Accordingly, it is imperative that a decision, such as one that adversely impacts a culturally-sensitive area, be rigorously justified from a technical vantage. This paper addresses the validity of the technical justification which is being relied upon for placing monitor wells MW-X and MW-Y at the locations proposed by the Pacific Gas and Electric Company's (PG&E) consultants.

The focus of this review was to evaluate the technical rationale applied to the siting of proposed monitor wells MW-X and MW-Y including the use of the existing groundwater model and other data. In particular, **the potential for hydraulic communication beneath the Colorado River between the CA and AZ was evaluated**. This necessitated a thorough examination of the assumptions applied in deciding on the need for these wells within the performance monitoring network. The Department of Toxic Substances Control (DTSC) has relied heavily on the groundwater model as the basis for the design and operation of the proposed remedial system (CH2M Hill, 2014a). As such, DTSC has also relied exclusively on the model in its current state to conclude that monitoring wells are needed across the river, at the proposed MW–X and MW–Y locations in Arizona. This paper presents results and recommendations based on the following key findings related to review of the technical basis for proposed wells MW-X and MW-Y.

Figure 1a. Existing and Future Wells, and Proposed Remedy Monitoring Wells (MW-X and MW-Y) along River Bank in Arizona.

Key Findings

The following headings list the various factors examined as part of this evaluation and list findings related to each. Further details are presented in subsequent discussions.

Purpose: The stated purpose of proposed wells MW-X and MW-Y is unclear and seemingly for cross purposes. Some references suggest that their purpose is to act as "sentinel wells." Elsewhere it is suggested that they would be used in conjunction with existing monitor well MW-54 to solve a three-point solution for determining the direction of hydraulic gradient.

Data Evaluations: Evaluation of relevant data sets presented various project documents was performed. The following observations were made.

- The May 2008 IM-3 extraction well shutdown showed no response in Arizona wells.
- The September 2008 IM-3 extraction well shutdown test failed to demonstrate hydraulic connection in groundwater between California and Arizona.
- Based on available data, future pathways beneath the river and into Arizona groundwater are likely south of the proposed MW-X and MW-Y locations.
- The use and interpretation of Arizona groundwater information is limited.
-

Modeling: Available modeling reports were reviewed and the following observations were made.

- Groundwater flow paths beneath the River and into Arizona inferred from the model appear to be the sole technical basis for establishing need and locations of monitor wells MW-X and MW-Y. However, the model is unrealistic and unreliable for estimating current or future flow conditions in the vicinity of the River, both beneath the River and within Arizona. When originally constructed, model development and calibration focused on the plume area in California, and on remedial design/operation. Through the design phases (i.e., 30%, 60% and 90%), projections have been expanded into Arizona, where model performance has not been validated.
- The current Conceptual Site Model (CSM) does not adequately describe the spatial- or time-varying 3-dimensional flow paths in the vicinity of the river.
- The modeling of flow in the vicinity of the river, beneath it and within Arizona is unrealistic and highly uncertain. This makes any model predictions coming from this model unreliable for evaluating potential flow paths beneath the River under the proposed remedial system operation, in the vicinity of MW-X and MW-Y. Model limitations include:
    - Unrealistic and unfounded hydraulic property distributions within the model.
    - Model boundary conditions are physically unrealistic, or inconsistent with other studies in the area.

- Numerical representation of hydrogeologic contacts is inappropriate, and riverbed bathymetry improperly specified.
- Calibration of the model is poorly presented, missing in Arizona, and questionable.
- The groundwater model code doesn't simulate density-dependent conditions, which would predict different results than assuming a constant groundwater density.
- The MODFLOW code does not simulate density-dependent flow, which likely influences potential groundwater flow between the aquifer and the River and beneath the River into Arizona.
- Results for model updates following the 60% BOD were not reported in the 90% BOD, nor provided to tribes for further review.
- Simulated results of freshwater extraction in Arizona (at either HNWR-1A or Site B) appear unrealistic, overly simplified and do not fully assess impacts on groundwater levels, groundwater hydraulic gradients or the effects of River fluctuations in the vicinity of proposed MW-X and MW-Y.

Recommendations for Further Testing/Evaluations: The following program of testing and evaluation merits consideration for the purpose of resolving the uncertainties associated with the need for monitor wells MW-X and MW-Y, and their siting.

- Field Testing:
  - Conduct tracer testing in existing Arizona monitoring wells.
  - Collect additional continuous monitoring data from existing Arizona wells.
  - Develop more appropriate groundwater contour maps in time, using density-corrected data.
- Model Update:
  - Revise CSM with new data (i.e., tracer testing and continuous monitoring).
  - Correct and re-calibrate the model to IM-3 data.
  - Re-simulate future scenarios, evaluating the need and proposed locations of MW-X and MW-Y.

Alternative Basis for Assessment of Remedy Performance: As a possible alternative for monitoring remedy performance, in lieu of using monitor wells MW-X and MW-Y, define a hydraulic target boundary along eastern plume boundary, and 'down-gradient' sentinel wells between the plume boundary and western river bank.

Purpose of Proposed Monitor Wells MW-X and MW-Y is Unclear

Before any new monitoring wells in Arizona are constructed, a clear and unambiguous purpose must be established. Currently, the purpose for MW-X and MW-Y appears unclear and raises additional questions.

In reference to the need for the proposed wells, DTSC has noted that:

> *"… the importance of these wells as sentry wells for the remedy which will purposely accelerate groundwater flow towards Arizona. Fundamentals on capture zone analysis and associated sentry wells can be found in* *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems* *(USEPA, 2008). DTSC could not approve the remedy without sentry wells. The remedy would have to be drastically modified (groundwater flow in the area would have to move in an opposite direction – towards the west) if sentry wells were to be eliminated."*
>
> *"These wells need to be installed early to establish baseline concentrations for water quality constituents (e.g., baseline chromium concentrations) so any naturally occurring trends can be observed before remedy start up. This will assist in determining if the well has been adversely affected by the remedy. "*[1]

Similarly, the Arizona Department of Environmental Quality (ADEQ) has expressed support for monitor wells at the proposed MW-X and MW-Y locations.[2]

If the proposed wells are to verify hydraulic gradient control of remediation system, this will be challenging for the following reasons:

- As noted in Vol. 2 of the O&M 90% BOD document, it would require 4 different lines of evidence, including use of the groundwater flow model, which is unreliable for this purpose in the vicinity of the river and Arizona where MW-X and MW-Y have been planned. Further adding to the challenge, all time-varying hydraulic stresses (such as other pumping wells and river fluctuations) acting on groundwater in this area need to be considered in the evaluation.

- This could be done more effectively by monitoring groundwater in wells in California, or by simply adopting a more appropriate target capture zone boundary west of the river (as described in the next section).

- Even if hexavalent chromium (Cr(VI)) or byproducts were detected in proposed monitor wells MW-X and MW-Y, or even MW-54, what decisions are then to be made? Would this actually pose any problem that could not be easily remedied by increasing riverbank extraction rates as

[1] See DTSC comment No. 6 on the 90% Design BOD.

[2] Letter from Ms. Taber, ADEQ to Mr. Yue, DTSC, and Ms. Innis, DOI, re "Groundwater Remedy Design Documents – Additional Comments," March 26, 2015.

indicated for Scenario 1 on Figure A1-18 in USEPA 2008? RAO #4 does not prohibit temporary plume expansion, it just cannot be permanent.

On the other hand, if the proposed wells are to also monitor concentration trends:

- It should be noted that multiple sampling events of AZ wells (see Figure 1, page 3 in ADHS, 2005) have already shown broad spatial occurrence of Cr(VI) in AZ wells detected up to ~26 micrograms per liter (µg/l). Therefore, a likely low detection of Cr(VI) in MW-X and MW-Y wells on the AZ side would be at best ambiguous as to its source.

- The USEPA 2008 paper describes details associated with capture zones, but does not consider the added complexity of in situ treatment upgradient of riverbank extraction wells at Topock. As such, the riverbank wells and associated monitoring wells in their vicinity should be considered sentinel wells that monitor both hydraulic capture and concentration trends.

- Arcadis (90% BOD O&M Vol. 2 report, Figure 2.2-1) suggests that these wells are to monitor riverbank extraction (see **Figure 1b**), but it is unclear how this would be done, or how the effects of solely riverbank extraction would be isolated from all other hydraulic stresses that already affect the MW-X and MW-Y area.

- Arcadis (90% BOD O&M Vol. 2 report, page 4-10) states that:

  "*In model layers 3 and 4 (the deep portion of the aquifer where the river bank wells are screened and where the majority of the floodplain Cr(VI) plume exists), 6 well pairs in each model layer were selected to define the expected average hydraulic gradient differences for four scenarios: (1) ambient (non-pumping), (2) nominal river bank extraction (150 gpm), (3) decreased river bank extraction (75 gpm), and (4) increased river bank extraction (300 gpm). In all scenarios, the simulated flow conditions had the NTH IRZ turned off as this is the remedy operating condition for 75% of the time (6 months ON/ 18 months OFF). The 'decreased river bank extraction' scenario (75 gpm) represents an approximation of the threshold where complete hydraulic plume control is achieved above this pumping rate and hydraulic plume control is potentially compromised below this rate. Thus, the well pair average hydraulic gradients simulated for this pumping scenario represent thresholds for hydraulic plume control.*"

  "Neither MW-X nor MW-Y are included in the 6 well pairs in Layers 3 and 4 to demonstrate "complete hydraulic plume control."[3]

Ultimately, if the two Arizona monitoring wells are proposed to confirm that gradients are maintained as predicted by the model, the existing model is deficient in a number of areas. These deficiencies then produce highly uncertain and unreliable results near and beneath the River and in Arizona. Principally, the modeled depiction of the hydraulic conditions beneath the Colorado River was not previously a

[3] Note: gpm = gallons per minute.

focus for this project. Therefore, this area of the model should be carefully reviewed and modified to more closely resemble the anticipated actual River conditions.

Groundwater flow from California toward Arizona beneath the Colorado River is possible due to a) decreased water levels in Arizona side extraction of HNWR-1 and/or Site B wells ranging from 450 to 900 gpm, and b) increased water levels in California due to the net addition of between 450 to 900 GPM in the proposed remediation area (see **Figure 2**). This results in a net increase of flow from California to Arizona of between 900 and 1,800 gpm.

It should be noted that the existing conditions at the site, under the IM-3 pumping influence, have been fundamentally relied upon to develop the groundwater flow and fate/transport models, which are then used to predict future groundwater flow paths, hydraulic gradients and concentration trends. However, an adequate demonstration of model calibration performance against years of carefully monitored groundwater flow and fate/transport data in the principle target remediation area in either California (i.e., IM-3 monitoring data) or Arizona has not been performed. Especially considering that the future pumping conditions will be quite different, the model has many apparent deficiencies which should be addressed prior to attempting to determine whether additional monitoring wells MW-X and MW-Y are needed, and where their locations and construction should be.

Figure 3 shows some simulated groundwater pathlines appear to migrate beneath the Colorado River and into the area of proposed monitor wells MW-X and MW-Y, assuming the National Trails Highway (NTH) In-Situ Reduction Zone (IRZ) system is active. It is our understanding that these model results are the primary technical basis for DTSC's position requiring monitor wells MW-X and MW-Y. However, the model should not be used to make these determinations before addressing the numerous deficiencies in the area beneath the River and along the river banks noted later in this evaluation.

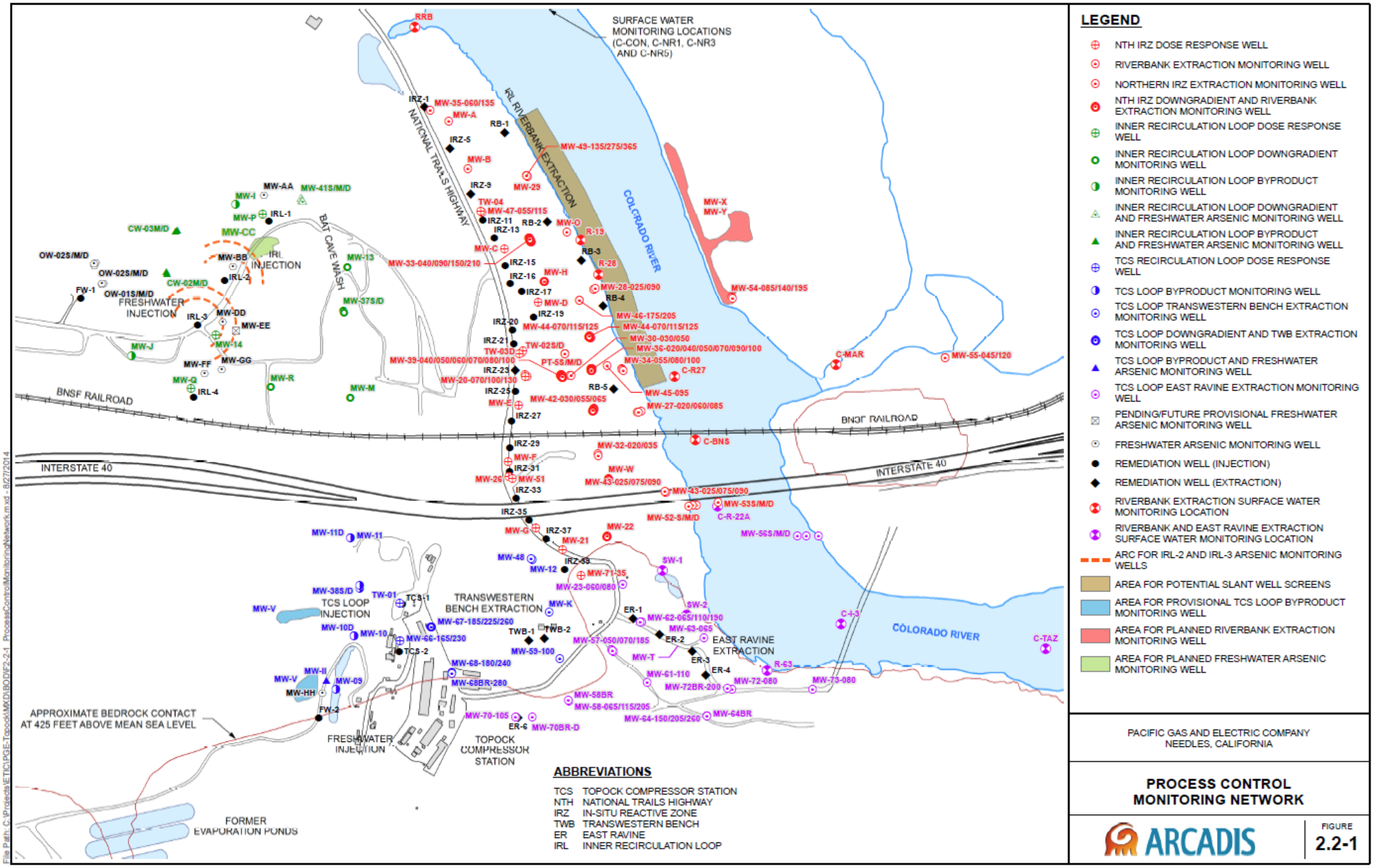

Figure 1b. Monitor wells MW-X and MW-Y are for “Area for Planned Riverbank Extraction Monitoring Well,” but it is unclear whether it is for gradient control, detecting concentrations, or both. From 90%BOD OM Volume 2 Report (CH2M Hill, 2014a).

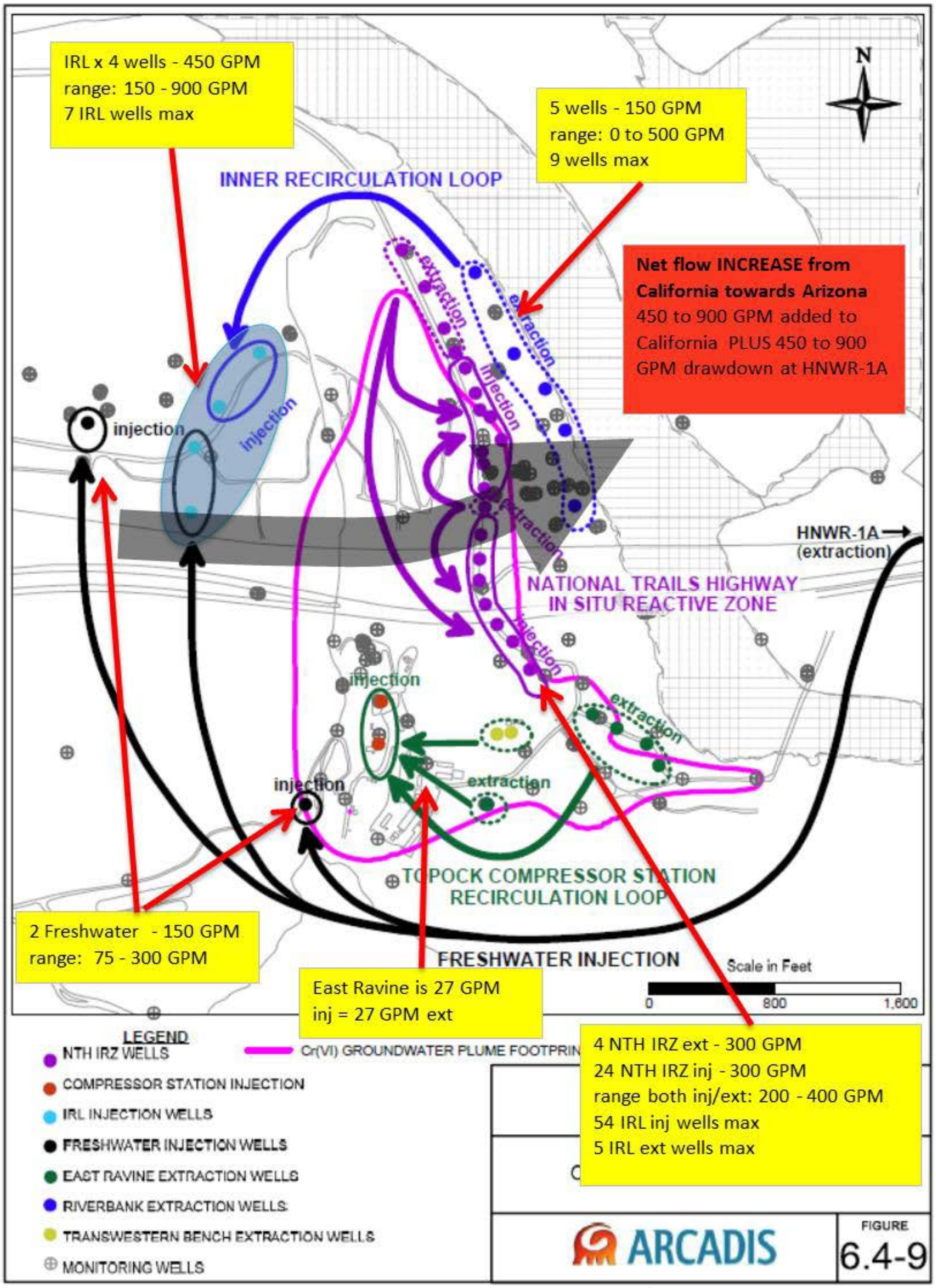

Figure 2. Major proposed remedial components and water routing.[4]

[4] As proposed in the 90% BOD, 450 to 900 gpm will be added in CA concurrent with the extraction of the same amount in AZ, thereby resulting in increased flow from CA towards AZ. By comparison, the current IM-3 extraction of ~130 gpm causes local flow from the direction of the River (possibly from Arizona), but is partially offset by upgradient injection.

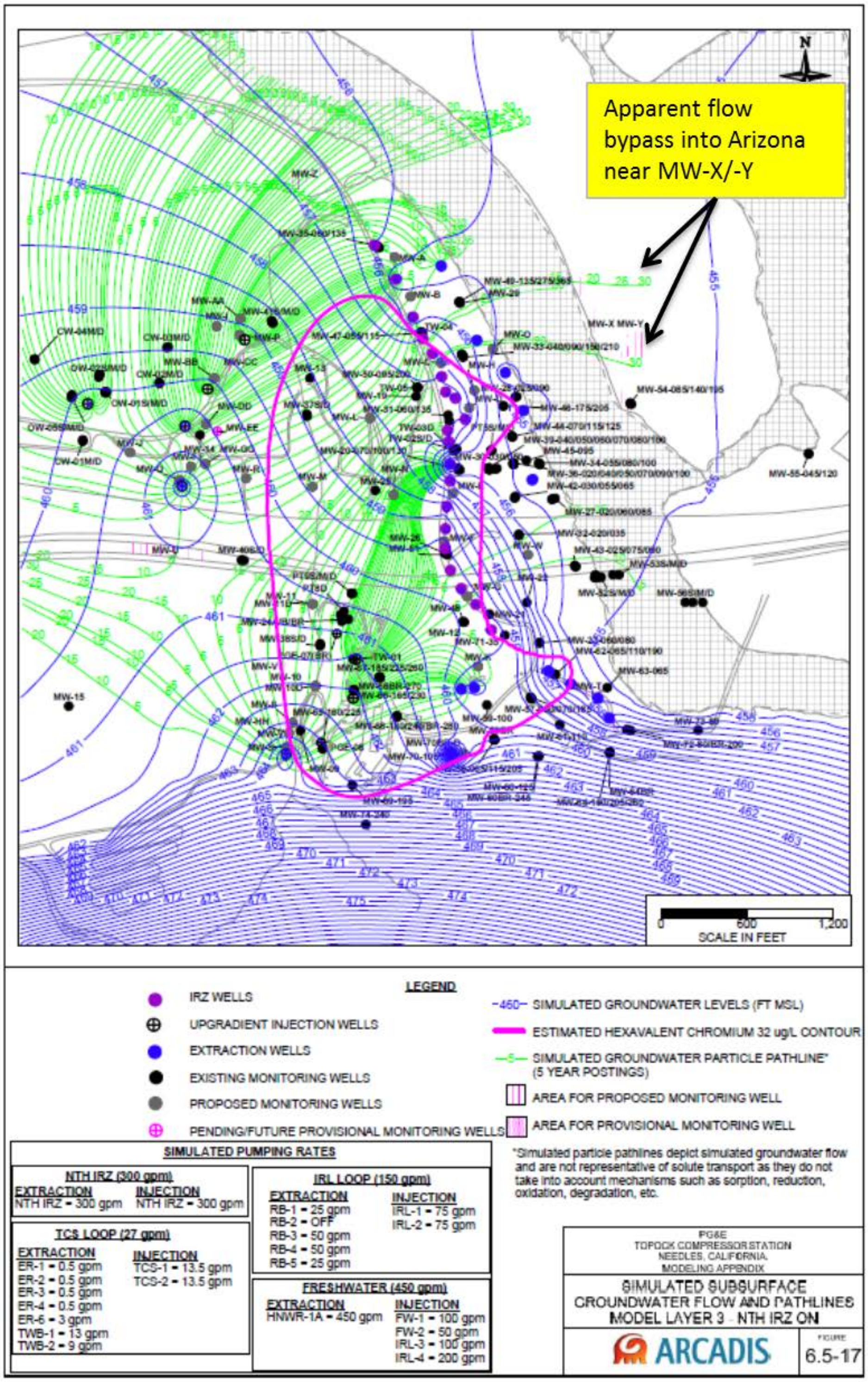

Figure 3. Simulated groundwater particle pathlines for model layer 3 with the NTH IRZ active (CH2M Hill, 2014d).[5]

[5] Some groundwater paths (shown in green) show apparent flow beneath the River and into AZ near proposed monitor wells MW-X and MW-Y. These paths are unreliable, however, due to flaws in the model.

Alternative 'Downgradient' Monitoring Location

A Target Capture Zone (or "Boundary of Hydraulic Containment Area" as shown on **Figure 4** and described at length on pages 6 and 8 of "*A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems*" (USEPA, 2008)), could be defined for the Topock site as the eastern boundary of the current Cr(VI) plume, based on meeting the Remedial Action Objectives (RAOs). The 90% BOD report states the following (CH2M Hill, 2014a, page vi):

> *"The Remedial Action Objectives (RAOs) for the selected groundwater remedy at the Topock site are to:*
>
> 1. *Prevent ingestion of groundwater as a potable water source having Cr(VI) in excess of the regional background concentration of 32 micrograms per liter (µg/L[6]).*
> 2. ***Prevent or minimize migration of total chromium (Cr[T]) and Cr(VI) in groundwater to ensure concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 µg/L Cr[VI]).***
> 3. *Reduce the mass of Cr(T) and Cr(VI) in groundwater at the site to achieve compliance with the applicable or relevant and appropriate requirements (ARARs) in groundwater. This RAO will be achieved through the cleanup goal of the regional background concentration of 32 µg/L of Cr(VI).*
> 4. ***Ensure that the geographic location of the target remediation area does not permanently expand following completion of the remedial action."*** [Emphasis added.]

On page 4-8, Section 4.3.1 in the *Sampling and Monitoring Plan* (CH2M Hill, 2014c), the following is stated:

> "*The objective of RAO 2 is to limit Cr(VI) dissolved in groundwater at the site from migrating into the Colorado River. The remedy addresses this requirement through in-situ and groundwater pumping. The groundwater extraction wells are to be installed as part of the NTH IRZ (River Bank Extraction Wells) and the TCS Loop (East Ravine Extraction Wells). The hydraulic control evaluation is to assess the performance of the groundwater extraction well element of the remedy*."

As written, RAO #2 implies that there would be no violation as long as Cr(VI) and Cr(T)[7] concentrations do not cause Colorado River water concentrations to exceed 11 µg/. It can be shown that this would never happen due to the effects of dilution of normal River flow relative to the very small potential groundwater inflow. But, defining the target hydraulic barrier as the eastern plume boundary would provide greater assurance that RAO #2 would never be impacted. This however, would likely require re-evaluation and adjustment to the currently proposed 90% BOD design and operation of the NTH IRZ and Riverbank Extraction wells, such that existing contaminated groundwater does not move east into clean

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[6] Note: µg/l = micrograms per liter
[7] Note: Cr(T) = total chromium

areas, between the eastern plume boundary and the river bank. At a minimum, RAO #2 supports making the western River shoreline the vertical target hydraulic barrier.

RAO #4 implies that it is acceptable for the plume to temporarily expand into clean areas, but that such expansion cannot extend beyond the projected remedial timeframe. This provision renders any assessment of the RAO compliance virtually impossible until the end of the remediation. Though the "target remediation area" does not necessarily correlate to the actual plume area, this RAO is interpreted to mean that the Cr(VI)-contaminated area should not expand into currently clean areas. This seems consistent with text on pages 2-3 in the 90% BOD Operation and Maintenance Manual Volume 2 (CH2M Hill, 2014c), that states:

> "*The data collected will be analyzed to ensure that the concentrations of Cr(VI) and remedy by-products, specifically manganese and arsenic, do not permanently increase outside of the baseline Cr(VI) plume*".

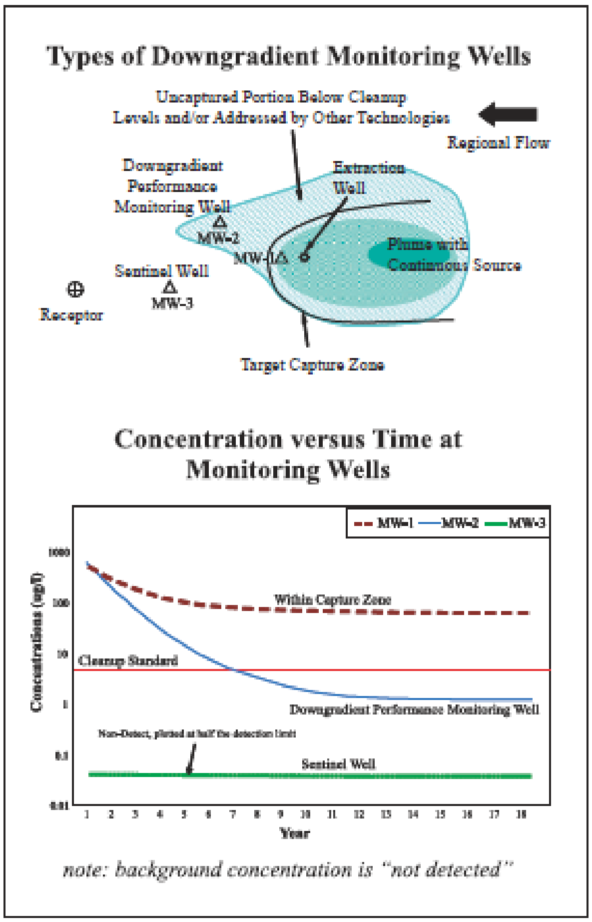


Figure 15. Types of downgradient monitoring wells.

Allowing a system design and operation to cause even the potential movement of the plume into Arizona, with no plan on remediating Arizona groundwater, seems inappropriate.

Because current Cr(VI) contamination is limited to the red outline (**Figure 5**), if a Target Capture Zone boundary is defined along the eastern edge of the plume area, any monitoring wells between the plume edge and the River could then be considered Sentinel Wells (as per Figure 15 in USEPA, 2008, shown to the left), while monitoring wells within the plume area would be considered Performance Monitoring Wells. This would ensure that currently clean areas east of the "baseline" plume extent would not become impacted (RAO #4) and the Receptor (i.e., the River) shown on Figure 15 would not get impacted (i.e., RAO #2), thereby eliminating the need for proposed monitor wells MW-X and MW-Y on the eastern shoreline of the River in Arizona.

Though the USAEPA (2008) Figure 15 (**left**) is a simplified version of the Topock Site, the NTH IRZ extraction wells, represent the 'Extraction Wells' shown, while the Riverbank Extraction wells are a secondary line of extraction intended to intercept treated water and re-inject it back into IRL wells. Extraction wells can be easily added, or rates increased if California monitoring shows expected gradients or concentration thresholds are exceeded.

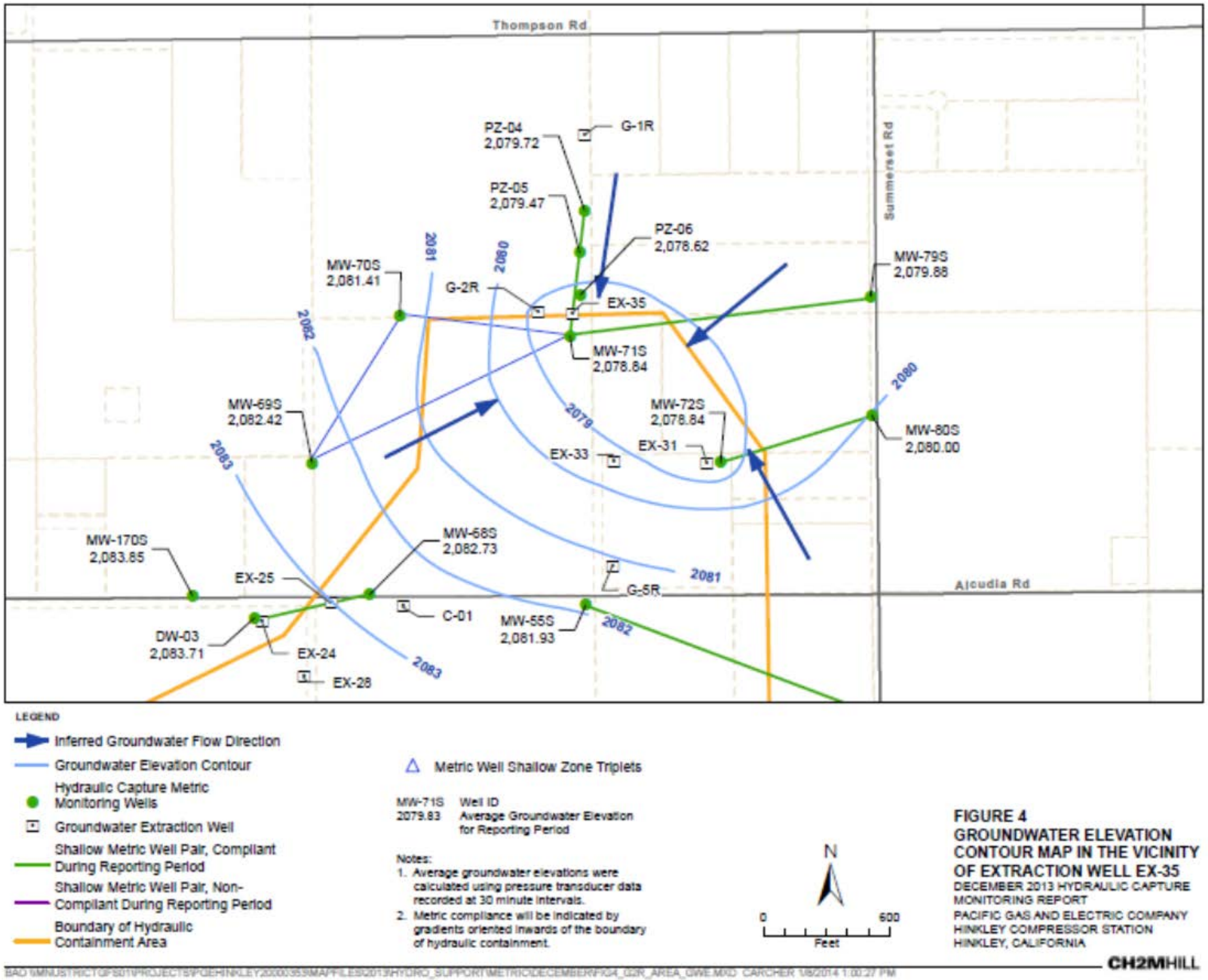


Figure 4. Boundary of Hydraulic Containment Area (orange line) at the Hinkley Site, across which gradients are closely monitored via well pairs/triplets (green lines between wells shown with green dots). (From PG&E, 2014).

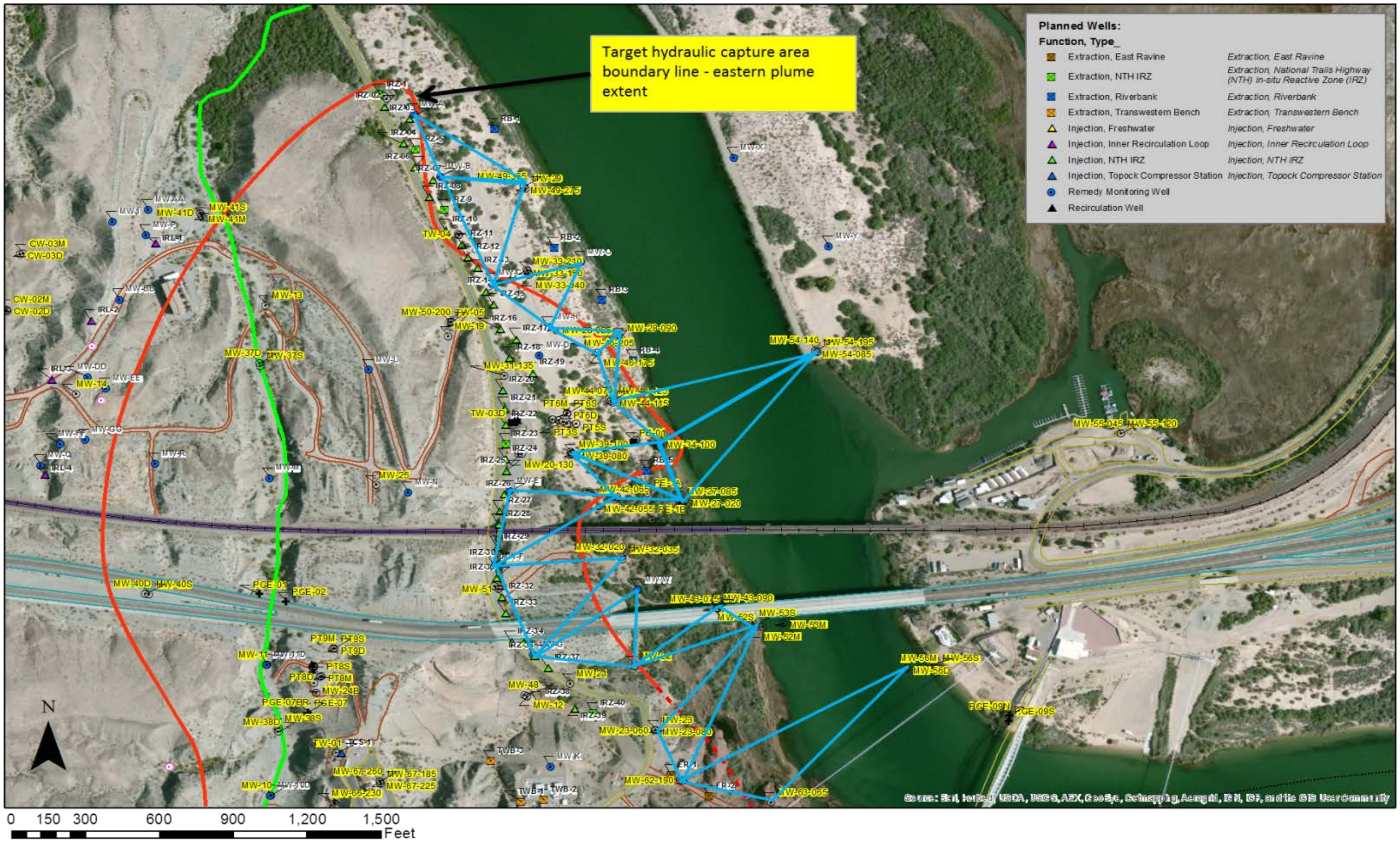


Figure 5. The red line bounds the 32 ug/L Cr(VI) plume (From CH2MHill 2014a).[8]

[8] This should be the "Target Capture Zone Boundary", which prevents contamination to the east. Blue lines represent triangles between monitoring wells (i.e., "triplets") that could be used to confirm hydraulic whether gradients are maintained such that contaminants do not move further east than the red line. Precise topographic and water level elevations would be required. Sentinel wells could be placed between the plume's eastern boundary (red line) and River bank.

Possible Pathway into Arizona Groundwater is Likely South of Proposed MW-X and MW-Y

Detectable Cr(T) and Cr(VI) Concentrations in Arizona

Even if a pathway and hydraulic connection exists beneath the river, detectable concentrations of Cr(T) and Cr(VI) at well MW-55-120 suggest it would be situated considerably (~800 feet) south of the proposed locations of MW-X and MW-Y and ~400 feet south and ~1,200 feet east of MW-54 (and ~2,000 feet east of IM-3 extraction well PE-1). If the concentrations of Cr(VI) and Cr(T), detected only in recent quarterly monitoring rounds at MW-55-120 are from the west side of the river, the entire CSM would need to be revised to account for such a pathway (i.e., are there unknown Arizona production wells drawing groundwater eastward). Alternatively, such detections could be from background concentrations in Arizona, similar to those reported by ADHS (2005). In any case, this information suggests monitor wells MW-X and MW-Y are unnecessary because multi-level monitor well MW-54 to the north has consistently shown non-detects for Cr(VI) and Cr(T) in quarterly monitoring reports. **Table 1** (Table 3-1 in CH2MHill, 2015) summarizes current data and suggests that if any "downgradient" Arizona groundwater should be monitored it would be at a location to the south of MW-54, not north where MW-X and MW-Y are proposed.

TABLE 3-1
Groundwater Sampling Results, February 2014 through March 2015
First Quarter 2015 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Specific Conductance (µS/cm)
MW-52D	DA	17-Dec-14	Slant	ND (1.0)	ND (1.0)	22,000
MW-53M	DA	30-Apr-14	Slant	ND (1.0)	ND (1.0)	—
		17-Dec-14	Slant	ND (1.0)	ND (1.0)	20,000
MW-53D	DA	30-Apr-14	Slant	ND (1.0)	ND (1.0)	—
		17-Dec-14	Slant	ND (1.0)	ND (5.0)	27,000
MW-54-85	DA	09-Apr-14	3V	ND (1.0) J	ND (1.0)	9,230 J
		18-Nov-14	MP	ND (0.20)	ND (1.0)	10,600
		18-Nov-14 FD	MP	ND (0.20)	ND (1.0)	10,500
MW-54-140	DA	09-Apr-14	3V	ND (1.0) J	ND (1.0)	12,300 J
		09-Apr-14 FD	3V	ND (1.0) J	ND (1.0)	12,200 J
		18-Nov-14	MP	ND (0.20)	ND (1.0)	12,900
MW-54-195	DA	09-Apr-14	3V	ND (1.0) J	ND (1.0)	18,300 J
		18-Nov-14	MP	ND (2.0)	ND (1.0)	19,500
MW-55-45	MA	18-Nov-14	MP	ND (1.0)	ND (1.0)	1,470
MW-55-120	DA	18-Nov-14	MP	7.5	7.2	8,930
MW-56S	SA	10-Apr-14	Slant	ND (1.0) J	5.3	6,390 J
		18-Dec-14	Slant	ND (0.20)	ND (1.0)	7,080
MW-56M	DA	10-Apr-14	Slant	ND (1.0) J	1.8	14,400 J
		18-Dec-14	Slant	ND (1.0)	ND (5.0)	14,100
MW-56D	DA	10-Apr-14	Slant	ND (1.0) J	ND (1.0)	19,800 J
		18-Dec-14	Slant	ND (1.0)	ND (5.0)	2,040

Table 1. Cr(VI) and Cr(T) concentrations detected at MW-55-120, MW-56S and MW-56M (from Table 3-1 in CH2M Hill, 2015

Several additional points can be made about the plume migration:

- **Figure 6** suggests the plume migrated towards the east, virtually at (or beneath) the Colorado River, near well monitor well MW-34. This migration from the southernmost plume extent strongly indicates a preferential pathway from the western high concentration area (darker plume color) towards the southeast, or towards the area bounded by MW-54 to the north and MW-56 towards the south, and directly towards MW-55 to the east. This direction appears consistent with increased permeability assigned to model layers 2 and 3 and beneath the river, and former areas within the active Colorado River (see **Figure 7** showing 1942 image and former River bank). **Figure 8** shows the maximum annual head difference calculated from continuous measurements.
- The majority of the existing plume (either by area or by mass) in California (**Figure 6**) lies well south of proposed monitor well MW-X and MW-Y locations. Therefore, Cr(VI) concentrations are much more likely to be detected at proposed wells MW-54, MW-55 or MW-56 than MW-X and MW-Y, well to the north, given the southerly average annual flow of groundwater through Lake Mohave Basin flow, which is discharged to the Colorado River as it funnels through the narrow Topock Gorge.
- The highest concentrations (**Figure 6**) within the current plume also occur well south of the proposed monitor well MW-X and MW-Y locations and would most likely be detected at the MW-54, MW-55 and MW-56 wells. So, these wells appear more than adequate to both detect changes in concentration with time and to monitor hydraulic gradients in the area.
- The Colorado River in this area likely acts as a sink, or net discharge location for groundwater, and because groundwater flow is directed from north to south, any “breakthrough” into Arizona groundwater would likely be south of the proposed locations of monitor wells MW-X and MW-Y. This is consistent with-widely accepted regional groundwater flow concepts (e.g., Tóth, 1963, Freeze, 1967).

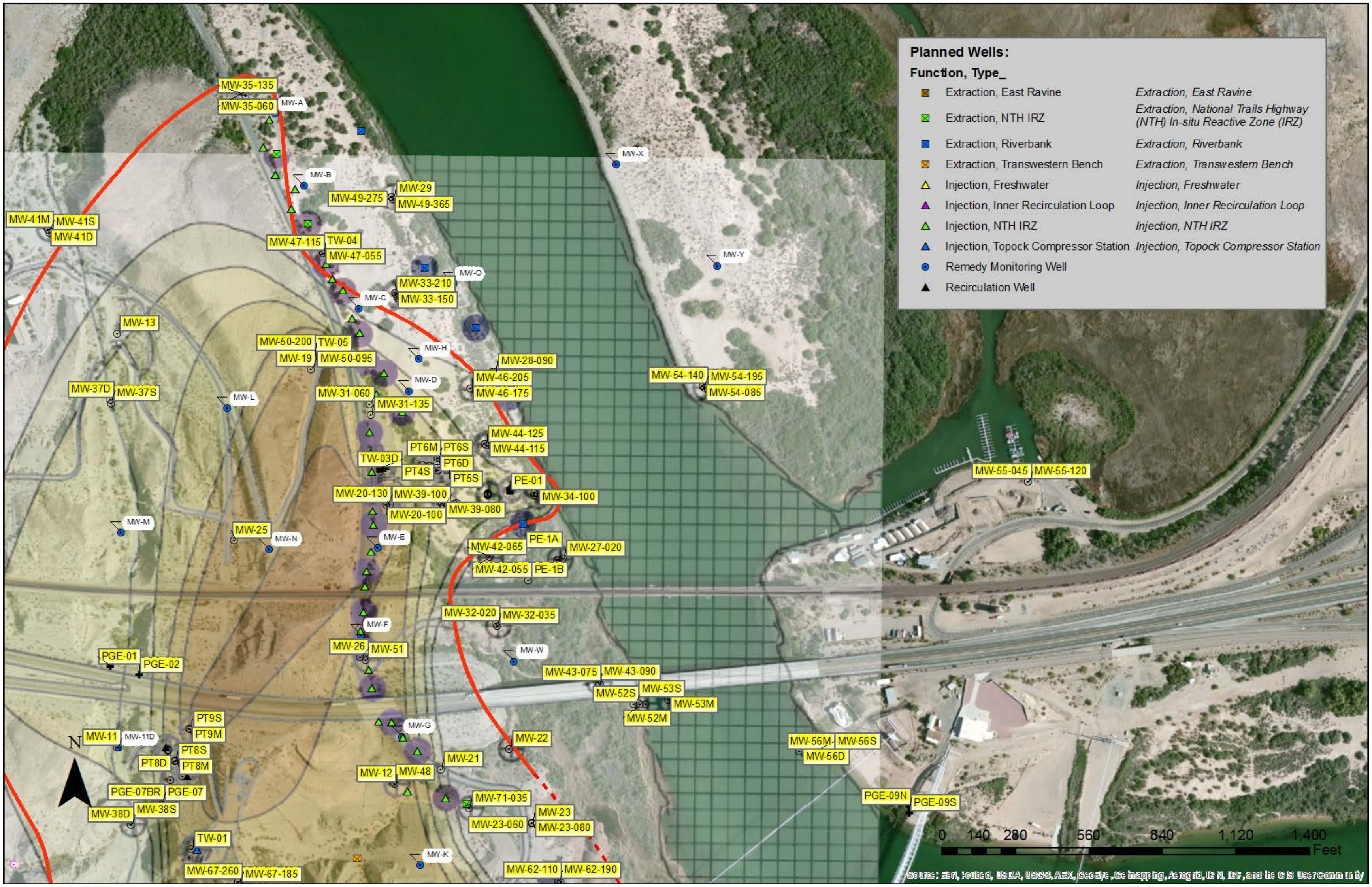


Figure 6. Model Layer 4 concentration contours (from Figure 6.2-4 in CH2M Hill, 2014d). The majority of the plume is well south of proposed MW-X and MW-Y wells.

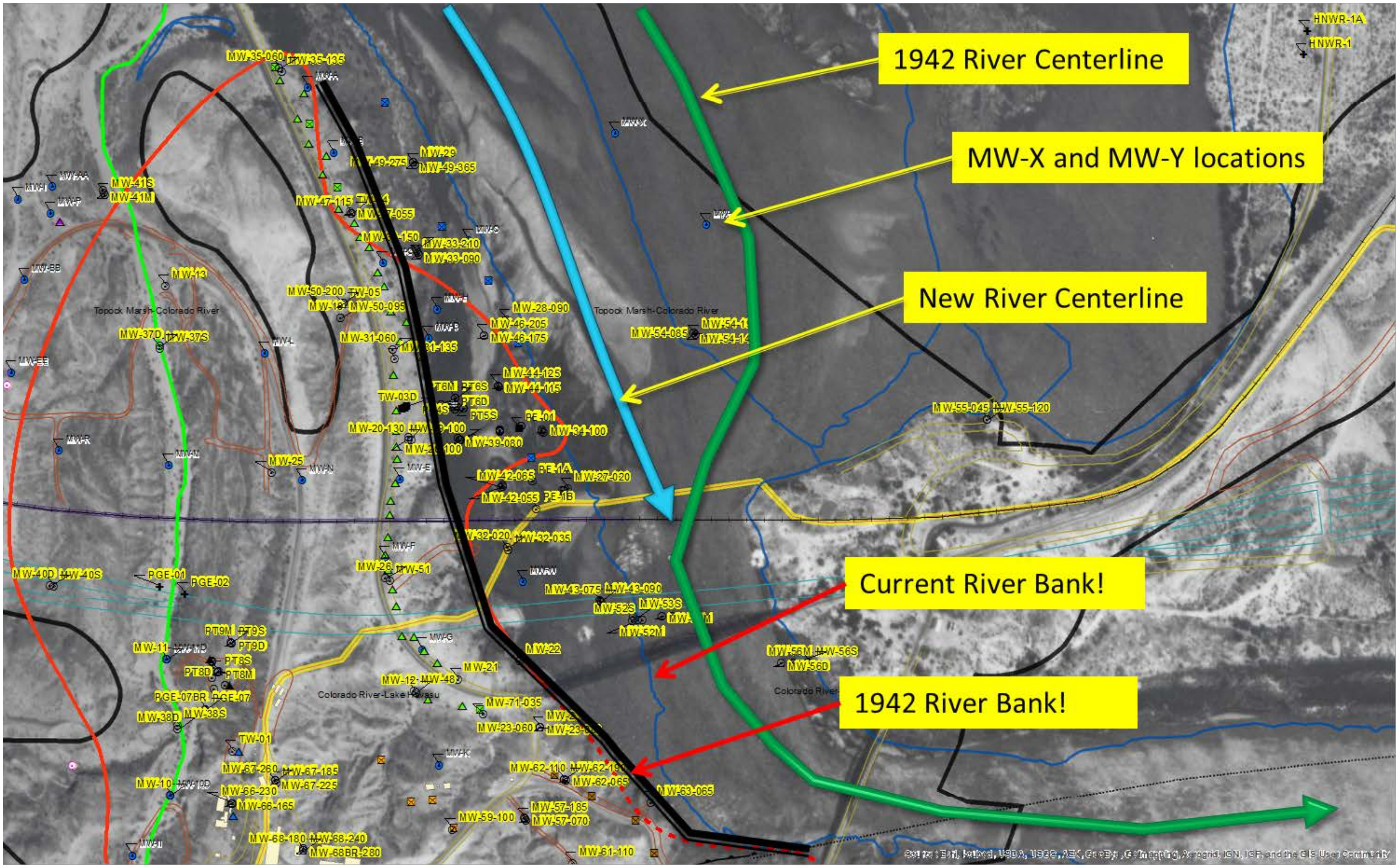


Figure 7. 1942 aerial image with current delineation of monitoring wells and Colorado River/Topock Marsh outline. Note that the River Centerline is actually much further to the east, or right through the proposed locations of monitor wells MW-X and MW-Y.

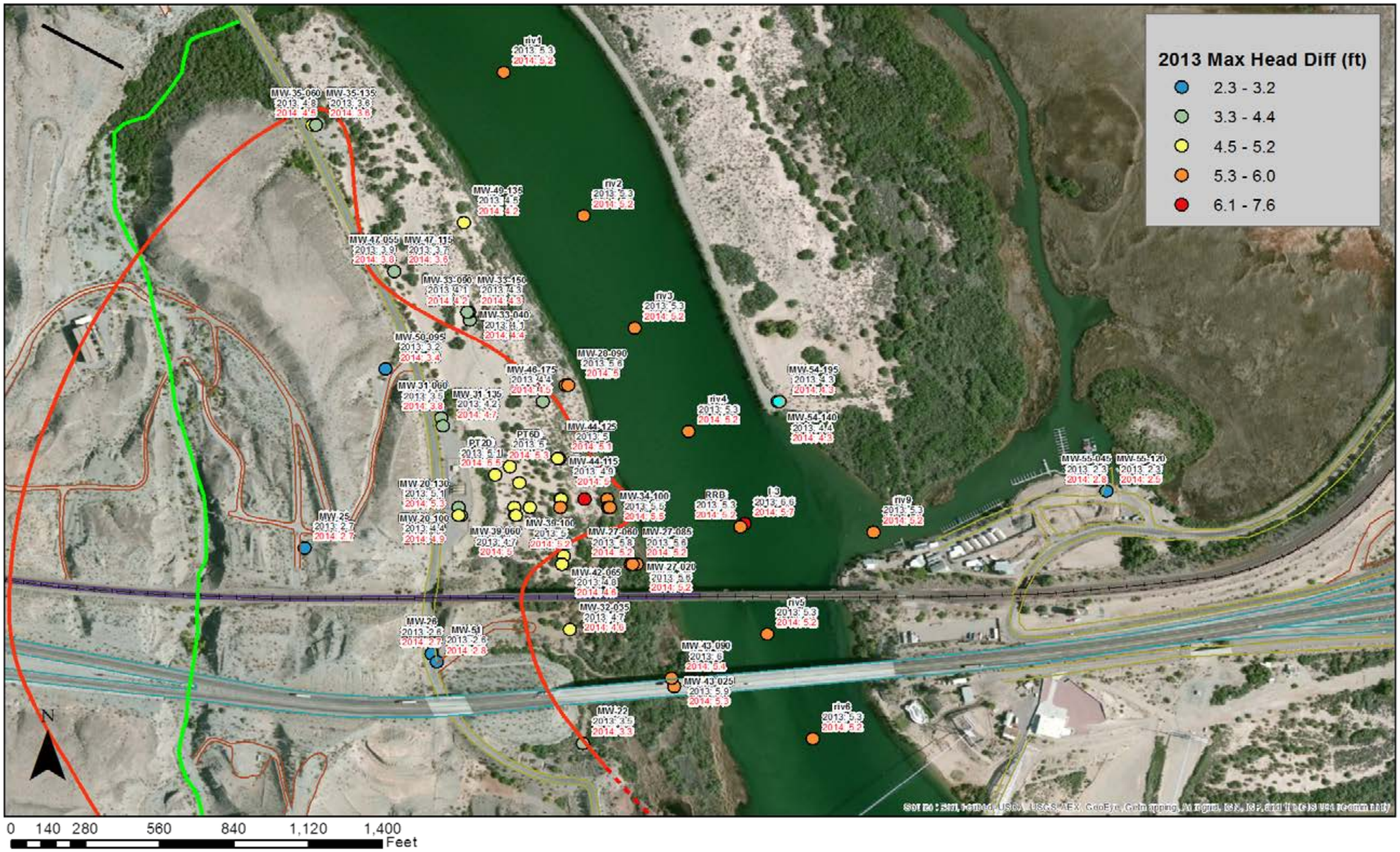


Figure 8. Maximum annual head difference calculated from continuous measurements.[9]

[9] Shows higher fluctuation in IM-3 extraction area better correlated to River stage than other wells with similar distance to riverbank. This implies the River is in greater hydraulic communication with the aquifer in this area, which appears to be an area where the plume has migrated eastward, well south of the proposed locations of monitor wells MW-X and MW-Y and in the pre-dredged area as depicted on Figure 7.

Use and Interpretation of Arizona Groundwater Information Limited

From review of the quarterly IM-3 performance monitoring reports, the following observations have been made:

1) Data from Arizona monitoring wells MW-54, MW-55 and MW-56 are critical to assessing any potential hydraulic connection in groundwater between the two sides of the river.

   i. **Groundwater-Level Data:**

      a. Continuous graphs of hourly corrected heads could not be found for any of these monitoring wells in the IM-3 quarterly monitoring reports, though many others are included relative to river level monitoring well I-3, and annual average values are provided for MW-54 and MW-55. It would be useful to see how their sub-daily groundwater levels respond to Colorado River/Topock Marsh surface water fluctuations.
      b. Though maximum, minimum and average head values are reported for wells MW-54 and MW-55, no values are ever reported for any of the screened intervals in Arizona slant well MW-56, or slant wells in California (i.e., MW-52 and MW-53). These are important locations, especially beneath the river, and should be monitored continuously with transducers, which can be referenced to groundwater elevations by making careful measurements with properly weighted electrical tape measures.
      c. Continuously-recorded water level data could not be found for any other wells in Arizona within the regional model domain, though CH2M Hill (2014c) indicate efforts are being made by PG&E to obtain access to private wells in Arizona. Access to such water level information is important, but would have limited value if only collected once and from pumping wells. Information should also be collected on well pumping details and background Cr(VI) concentrations to support other data in evaluating the hydrogeologic conditions in Arizona and to improve description of the CSM in this area.

   ii. **Aquifer hydraulic properties** – No long term aquifer pumping tests have been conducted at these Arizona wells, probably because extraction could draw Cr(VI) into Arizona. However, conducting a long-term tracer test (see Recommendations section below) could provide valuable information to support parameterization in the model in these areas and to determine the nature of hydraulic connectivity between Arizona and California groundwater.

2) It is unclear what regional wells are currently pumping and potentially influencing groundwater levels near existing monitoring wells MW-54, MW-55 and MW-56. No information was found in any of the 90% BOD documents, or any other reports reviewed. **Figure 20** below shows numerous regional wells obtained from the Arizona Department of Water Resources (ADWR), which

collectively could easily influence groundwater levels at MW-54, MW-55 and MW-56 (and proposed monitor wells MW-X and MW-Y).

Evaluation of Characterizations/Interpretations

To date, characterizations of hydraulic conditions beneath the river and east of it haven't been performed probably due to lack of data, but also because the coupled hydrologic flow system in this area (i.e., 3-dimensional groundwater flow system coupled with the surface water flow system) is complicated. Characterizations (i.e., interpretations of groundwater flow directions) are often aided by iteratively developing and evaluating multiple 3-dimensional CSMs with transient 3-dimensional groundwater modeling, and eliminating alternatives as new data is collected (see Section 5.3 and 5.4 in Neumann and Wierenga, 2003). Such conceptual deficiencies contribute to notable misinterpretations, evident from efforts to contour groundwater levels as discussed below and also typically contribute most to high uncertainty in model prediction (i.e., conceptual uncertainty).

Groundwater Level Contours: A careful review of available reports presenting interpretations of groundwater-level data and contouring resulted in the following observations.

- Meaningful contours cannot be developed from quarterly, averaged heads based on continuously-recorded levels in the presence of such strong river fluctuations. At a minimum, contours calculated over months should not span peaks in river stage, as the actual flow reversals get averaged out. Instead, averages of continuous data should only be done over very short durations (around the peak, or at the low stage) or on just over the rising or falling limbs (longer durations) so that more meaningful flow directions are assessed.

- Some reports include MW-55 and MW-56, but most reports include only MW-54. This results in an incomplete record and requires explanation, which limits development of a more robust CSM in this area of the flow system.

- The configuration of the contours by aquifer layer for different quarterly reports varies significantly. This is most likely due to manual, subjective interpretations by different individuals over time. Why, for example, would not the mid-aquifer depth contours look more like upper layer contours, especially where data are lacking in the middle layer?
- Interpreted 3-dimensional flow paths should be presented to support the CSM. None have been described.

- Though much of the focus has been on horizontal flow gradients, a complete sense of vertical gradients should be assessed during different River stages to get a better sense of how water moves between the different aquifer zones, especially beneath and in the vicinity of the river. This would greatly aid characterization of the groundwater flow directions in 3-dimensions and conceptualization of flow in the vicinity of the River, especially near proposed monitor wells

MW-X and MW-Y. These characterizations are essential to developing a robust numerical flow model whose performance can be verified against this information.

- Simulated contours shown on **Figure 9** appear flawed in Arizona, which we attribute to many factors summarized in a modeling section below. This is compounded by misconceptions with regard to aquifer-River interactions and the overall CSM. Re-contouring as shown using long-term average Arizona values from continuous hourly measurements shows a more realistic conceptualization and better conforms to accepted regional groundwater flow theory.

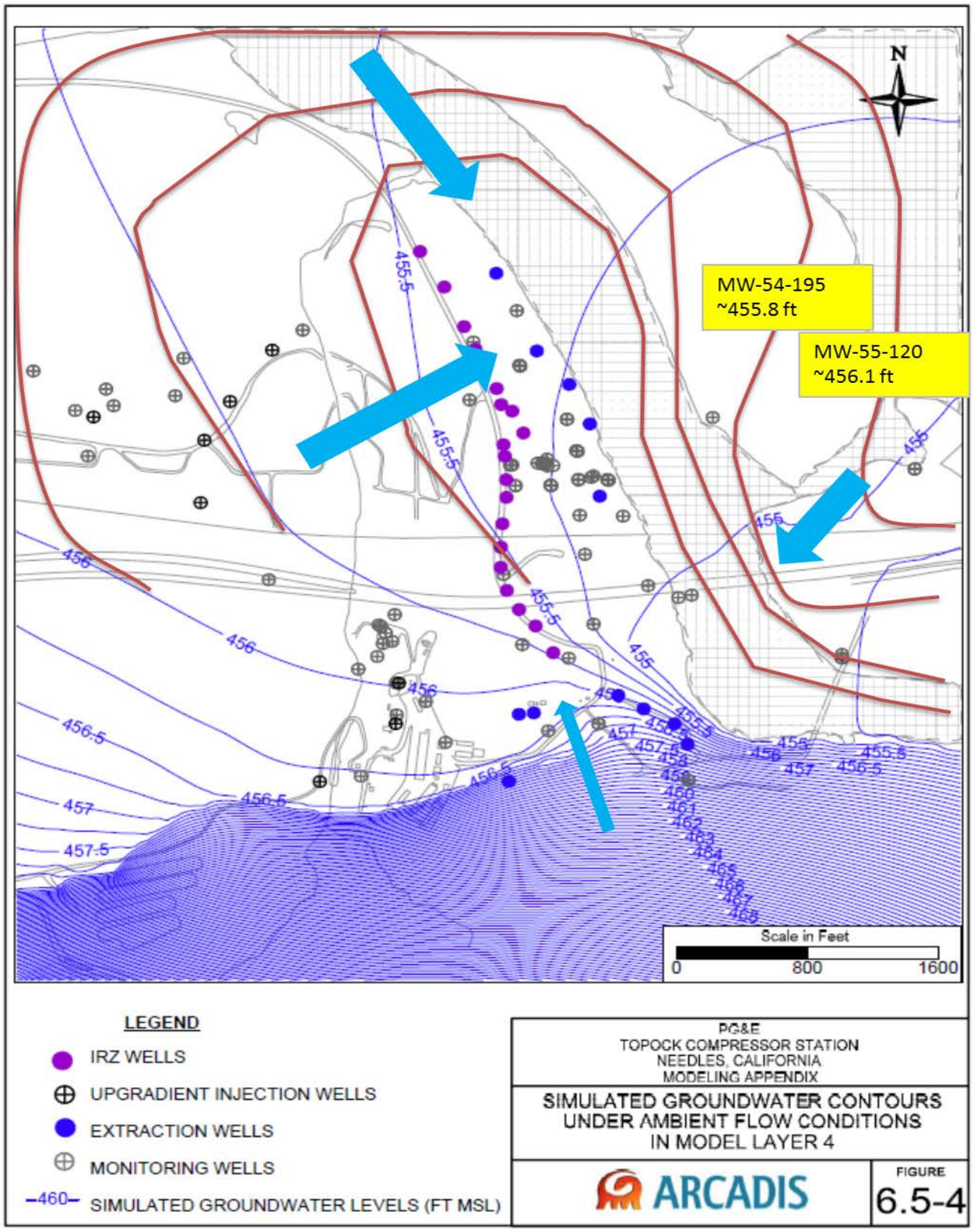


Figure 9. Presumed Average Annual Simulated Head contours for ambient flow conditions (no IM-3 pumping) for the lower aquifer zone.[10]

[10] These contours are lower than average annual heads in lower-screened zones at wells MW-54-195 and MW-55-120, estimated under the potential influence of the IM-3 extraction during 2012 and 2013. Red solid lines denote a reinterpretation of these contours and flow direction (shown as blue arrows) to better incorporate these average annual levels into the simulated groundwater flow. Simulated contours and flow directions do not incorporate the significant model uncertainty. Note that the resulting contour pattern generally reflects a typical conceptualization of regional groundwater flow in a large basin discharging to a river.

The Conceptual Site Model Does Not Adequately Address Areas Beyond West Riverbank

The detailed conceptualization of groundwater flow between the east and west sides of the Colorado River has not previously been a focus of the model. Flows in the vicinity of the River, beneath it and within Arizona are poorly conceptualized. Accordingly, the modeled depiction of the hydraulic conditions beneath the River should be carefully reviewed and modified to more closely resemble actual annual river conditions. In particular, a clear conceptual flow model of the system that fully addresses the dynamic daily and seasonal natural behavior of the aquifer-river flow system should be incorporated into the model as these affect groundwater contouring, which in turn affects conceptualization of flow directions near the River. Developing a 3-dimensional CSM, based on sound characterization of flow and transport, is critical to constructing a reliable and realistic 3-dimensional numerical flow model of the system. Improving this area of the model to produce a more realistic numerical depiction of the area beneath and adjacent to the river is vital for making informed decisions concerning the need for and value of additional monitoring wells, such as MW-X or MW-Y. This is also important because many model results have been presented in the 90% BOD report showing particle paths, concentration distributions, etc. in Arizona, but the associated uncertainties are significant and not explicit in the reporting.

Review of 90% BOD groundwater modeling report (CH2M Hill, 2014d) or related modeling reports revealed no discussion on the characterization or 3-dimensional conceptualization of river-aquifer interaction. These could have encompassed the assumptions and implications to the CSM for parameters like the spatial distribution of hydraulic properties, such as riverbed conductance or horizontal/vertical hydraulic variations beneath the River and their variations in Arizona.

> "*In an area made complex by intersecting alluvial fan and fluvial deposits (both with highly variable hydraulic properties), constantly changing river elevations, and salinity and temperature variability in three dimensions, the model is a simplified version of actual conditions but is considered a valuable tool to apply to evaluation of target pumping rates and remedial alternatives in the immediate site area. Groundwater level changes in response to river fluctuations and to well pumping have been matched to a reasonable degree in areas where data are available.* ***Average groundwater elevations are also reasonably well-matched, given the less reliable data quality****. Simulations of historical Bat Cave Wash discharge have shown general agreement with the current groundwater plume, both in spatial position and in time of travel. As additional information is collected in and around the site, the model will be improved with the new data. Improvements either planned or anticipated for the near future are:* ***(1) calibration to measured heads on the Arizona side of the river;*** *(2) longer-term monitoring of planned injection at IW-2/IW-3; (3) test data from the new PE-1 well near MW-36 in the floodplain; and (4) continuing data collected each month from TW-2D pumping and river fluctuations, including future TW-2D temporary shutdowns.*" [Emphasis added.] [11]

[11] See page 4-1 in CH2MHill, 2005

The reports reviewed also did not discuss subsequent calibration performance and statistics related to Arizona wells. This would be essential information to assess the validity of model predictions such simulated particle tracks for the proposed remediation system design and its operation, contained in the 90% BOD groundwater modeling report (Appendix B). Especially since those predictions are apparently used as the basis for justify the need and locations of planned monitor wells MW-X and MW-Y.

Model Setup is Unrealistic, Uncertain and Unreliable

Only modeling can incorporate all of the complex hydraulic property distributions, combination of complex external stresses (i.e., river fluctuations, pumping, recharge, ET, etc.) and spatial variations in aquifer units (i.e., alluvial/fluvial isopachs and depth to bedrock) in simulating current and future flow conditions that would be influenced by proposed remedial operations. As such, only this tool can provide an adequate basis for determining the need for additional monitoring wells, and if needed, their number(s), locations and screened depth intervals. However a model intended for this purpose would need to be correctly developed and calibrated with estimates of uncertainty to be sufficiently reliable for justifying the need or locations of proposed monitor wells MW-X and MW-Y. This review of the model focused on the MW-X and MW-Y area, and specific model areas which influence current or future simulated flow conditions in this area (i.e., beneath the River and within Arizona).

No single document describes in detail, the development of both the regional microFEM and localized MODFLOW groundwater flow models, all associated setup assumptions, standard calibration details such as Mean Error, Root Mean Square Error, etc.), or even how flow conditions are transferred between these two models (i.e., see 90%BOD DOI comments #429 and #431) . Calibration targets (i.e., average annual heads, monthly heads at selected wells, or localized well shutdown responses) should be provided and shown to be relevant and adequate for the intended uses of the model (i.e., how well does the model reproduce observed remedy performance metrics like hydraulic gradients, flow directions and concentration values or trends as described in the decision/operational framework diagrams shown in Figures 2.2-2 through 2.2-9 in CH2MHill, 2014c). Results of PEST parameter estimation simulations, or specified constraints and their basis could not be found in any available documents, so there is no way to assess parameterization beneath river and east of it, or to assess constraints imposed. Lack of this information makes it difficult to assess overall model performance, for example, the model's ability to reproduce accurate and realistic remedy performance metrics (i.e., observed hydraulic gradients, groundwater flow directions, or concentration trends or values) especially beneath the river and in Arizona proximate to the proposed MW-X and MW-Y locations.

The 90% BOD report (CH2M Hill, 2014a) summarizes modeling Appendix B (CH2M Hill, 2014c), but this mostly discusses the calibrated model, and provides only a brief overview of generalized assumptions on model input. It is neither comprehensive, nor detailed enough to fully assess model calibration performance of either the MODFLOW sub-model, or MicroFEM regional-model. Detailed assumptions, calibration statistics and inputs (i.e., head residuals for all wells, different screened depths, etc.) are not presented. The following is a review of earlier modeling reports issued for the project.

Arcadis (2013) provided 60% BOD modeling file inputs for a specific scenario to Dr. Prucha of the Technical Review Committee (TRC). Dr. Prucha ran this and evaluated both input and output using ESI's Groundwater Vistas program (http://www.groundwatermodels.com/). Some of the input was compared against other spatial data in ArcGIS.

This review indicated a number of reasons, listed below, why the 90% BOD simulated results of future remedial system operation should not be considered reliable enough to justify the need for and locations of proposed Arizona monitoring wells MW-X and MW-Y. The model should be updated and revised using both existing data and new data that could be collected right now (as outlined in the recommendations section below) so that significant conceptual and model input uncertainty can be reduced before attempting to justify two additional monitor wells (MW-X and MW-Y), and before guessing where these should be optimally located and screened for monitoring.

General modeling observations include:

- Two different IM-3 shutdown tests in 2008 failed to demonstrate clear hydraulic response in Arizona monitoring wells MW-54, MW-55 and MW-56. To date, no hydraulic connection, or the nature of such a connection between California and Arizona groundwater has not be clearly demonstrated.
- Water level corrections should incorporate salinity/temperature variations with depth.
- Calibration results are poorly presented. The model inputs should be calibrated against the best available data (IM-3 response to years of extraction and injection).
- Specific input details, assumptions and results of post-60% BOD modeling updates were not provided for tribal review, which limited any evaluation of simulated flows within Arizona, and in proposed monitoring locations MW-X and MW-Y.
- Effects of the extraction of Arizona groundwater (Site B, HNWR-1 or HNWR-1A) e on groundwater conditions at MW-X and MW-Y appears unrealistic and uncertain.
- Various model inputs are unrealistic or unjustified near the river and in Arizona:
    - Model layers do not correlate with hydrostratigraphic unit (HSU) contacts.
    - Evapotranspiration representation should be more realistic.
    - River-aquifer exchange should reflect natural conditions.
    - Recharge input parameters should be more realistic.
    - Distribution and magnitudes of hydraulic conductivity beneath river and in Arizona show considerable variations over many orders of magnitude in areas where no data exists – likely due to poorly constrained automatic parameter estimation.
- Simulated mass balance and head contours appear unrealistic.
- Bedrock depths in the model in Arizona appear inconsistent with other reported depths (Richard et al, 2007).

- Density-dependent flow conditions are not simulated, which affects predicted flow conditions near MW-X and MW-Y.
- Groundwater pumping effects at either the regional model, or sub-model boundaries may not be adequately accounted for in the model, which can affect flow conditions near MW-X and MW-Y.
- Calibration results, especially in Arizona wells, are questionable for intended purposes.

Hydraulic Property Distributions Unrealistic/Poorly Justified

Subsurface hydrogeological model inputs on the Arizona side appear to be based on very limited data for aquifer hydraulic conductivity, storage parameter distributions, and HSU thicknesses. The implications were never assessed on future predicted flows beneath the River, or in Arizona with all of the complicating time-varying stresses such as fluctuations in the River and Topock Marsh area, and existing/future groundwater extraction in Arizona.

Figure 10 below (CH2M Hill, 2014c) shows a very complex distribution of hydraulic conductivity for one model layer (3), which strongly controls lateral groundwater flows beneath the River and vertical flows beneath the River and water exchange between the River and the aquifer. While distributions may actually vary orders of magnitude, the abrupt changes and lack of any data beneath the River indicate that this is unrealistic and non-unique. Though the authors indicate it was derived for each layer through use of a parameter estimation code, unless highly constrained, these tools do nothing more than generate non-unique or “guessed” distributions. Use of the PEST program is not unreasonable, but it is incumbent upon the modeler to clearly convey the implications of the non-uniqueness and implications on the model predictions. The modelers made no attempt to evaluate the validity or range of implications of these assumed significant variations in hydraulic conductivity on model predictions, particularly related to simulated flow paths (particle tracks), which appear to break through the riverbank extraction well network. This is analysis is used as the primary justification for siting of proposed monitor wells MW-X and MW-Y. Any simulations or modeling performed within this area of loosely assumed parameters should be clearly presented with strong qualifiers that these results are at best a gross estimation of how the natural system might actually respond. Accordingly, the current model should **not** be used to determine locations, numbers, or depths of monitoring wells including proposed monitor wells MW-X and MW-Y. The number, locations, screened depths of any monitoring wells in addition to MW-54, MW-55 and MW-56 should not be proposed based on results from this model until it is corrected and better calibrated using all available existing data (IM-3 system), and potentially new data are applied as suggested below.

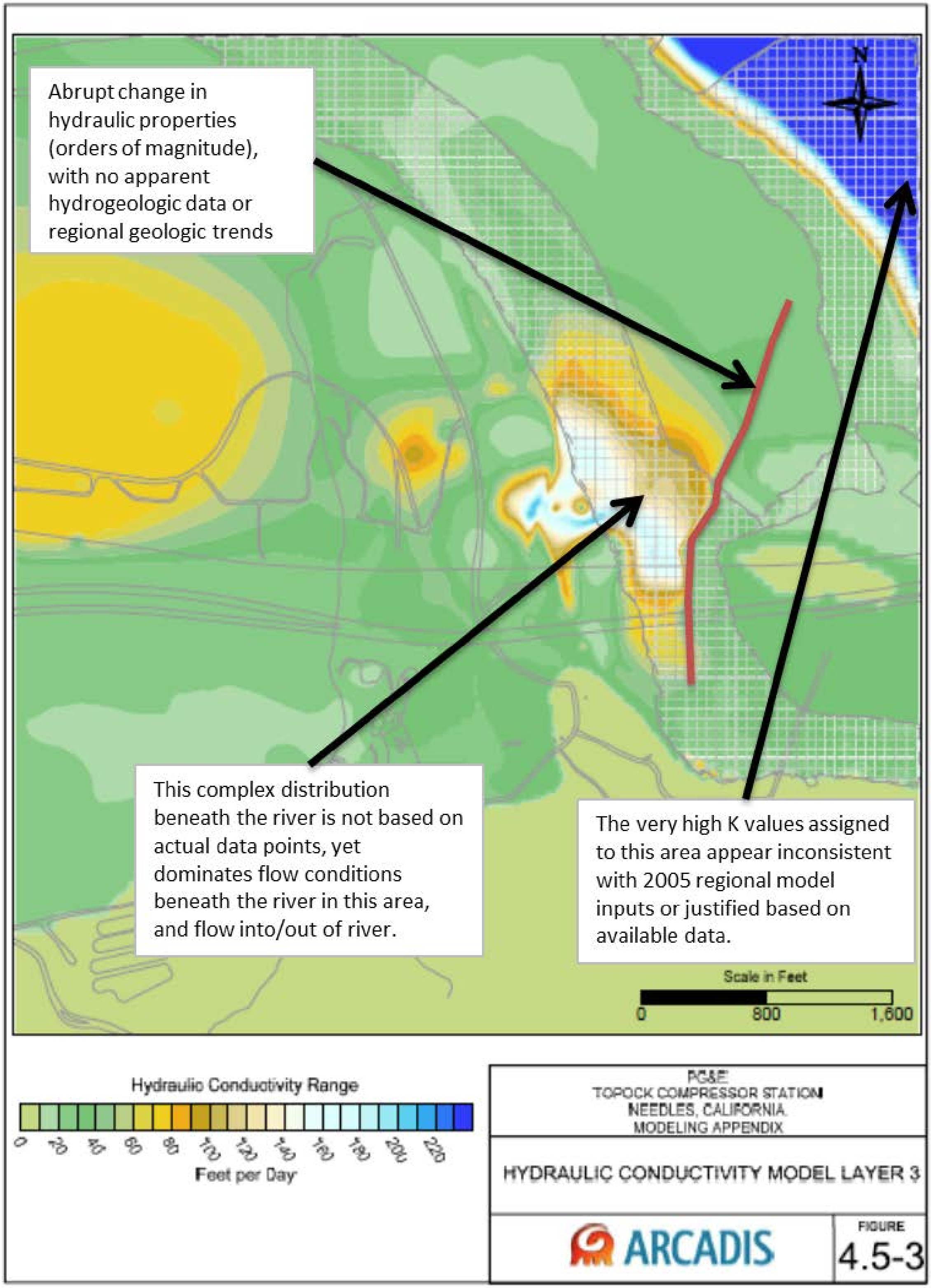
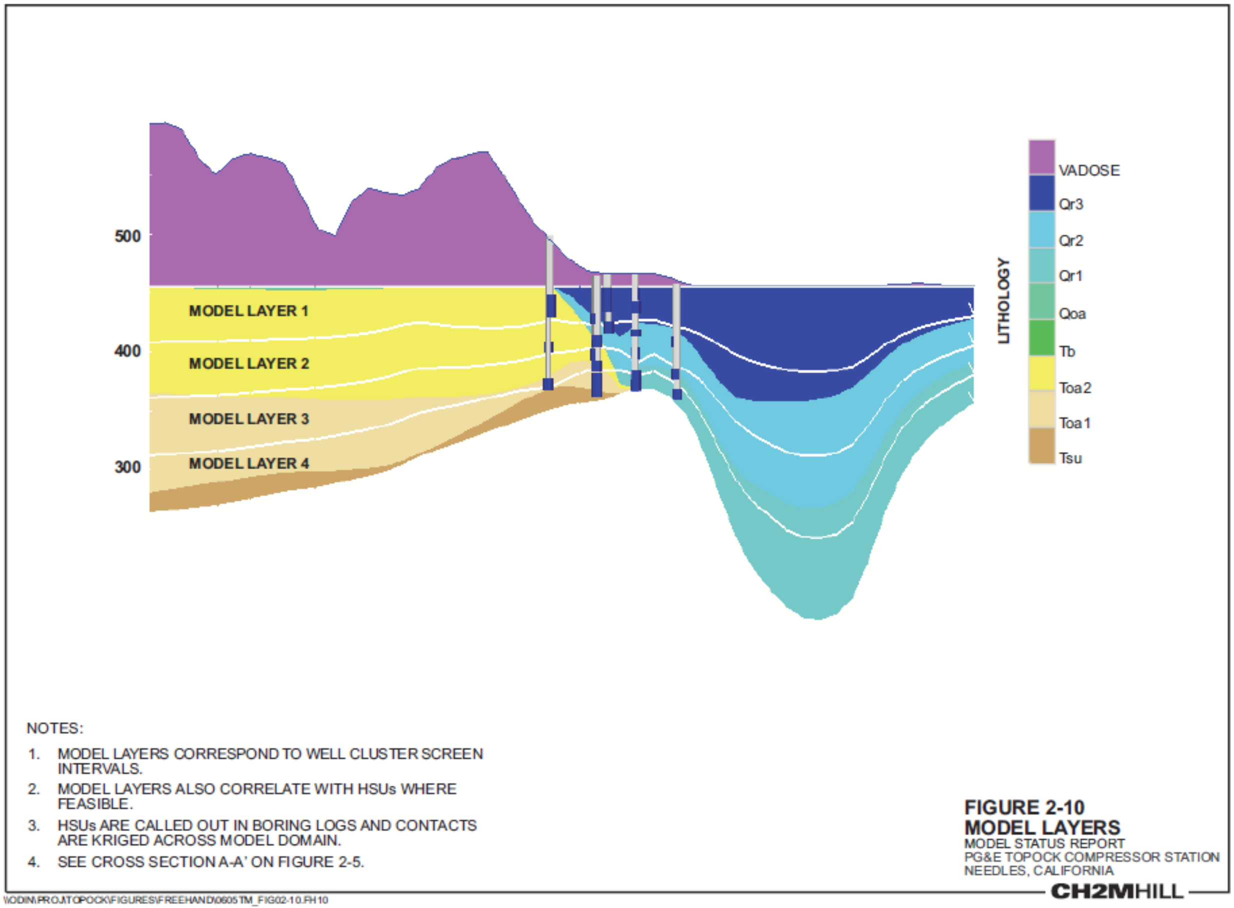


Figure 10. Hydraulic conductivity values used in Model Layer 3, and several unrealistic aspects of the distribution/magnitudes.

Model Layers

Figure 11. Model layers do not follow hydrostratigraphic unit (HSU) contacts (see Figure 2-10 below, CH2MHill, July 2005), especially beneath the river. See 90% BOD TRC comment #60.



The conclusion drawn from this figure is that this model structure reduces the ability of the model to correctly simulate flow beneath the river, or the interactions between groundwater and river water. More importantly, lumping important hydrogeologic properties based on well screen intervals instead of hydraulic properties strongly affects fate/transport simulations. This also renders the results of flow and fate/transport modeling beneath the river and into Arizona unreliable. The analysis should follow HSUs, even adding more layers, especially for fate/transport, to better simulate 3-dimensional flows and contaminant transport.

The top layer is modeled as unconfined, using surface topography everywhere, except over the river, where it uses the average river surface water, including the Topock Marsh. This incorrectly simulates porous media flow in the area between mean surface water and the river bathymetric surface, despite controlling flows in and out of the river with the river package. Actual river bathymetry should be used for the top model layer surface to correctly simulate heads and flow paths within the system in this critical area.

Boundary Conditions Poorly Prescribed

Groundwater Recharge Unrealistic

Groundwater recharge is specified as zero everywhere in the model, except for a few cells along the south in the Chemehuevi Mountains (mountain front recharge). Specification of recharge cells appears inconsistent with literature on where and how focused recharge occurs in mountain front/stream-bed areas in semi-arid/arid environments (see Simmers, 1998). In the Bat Cave Wash drainage, highly focused, efficient recharge in the mouth of the highly permeable (gravelly), widening streambed is very evident, but no recharge is specified here, where it would be most expected. The Bat Cave Wash has a very extensive watershed (more than 5 miles long, and greater than 4 square miles). Instead it was specified in impermeable exposed rock ridge areas, where recharge would likely be near zero. It should be applied in drainages where focused runoff meets permeable alluvium, especially in Bat Cave Wash adjacent to the Compressor Station.

No-Flow Lateral Flux Boundary Conditions Specified from Regional to Sub-Model

Review of 60%BOD Modflow model input, and 90%BOD PG&E response to comments (#429 and #430, or DOI-49 and DOI-50 and #425 – FMIT) suggests the Sub-Model boundaries are specified as No-Flow. This implies that lateral inflows or outflows from the regional model are not transferred from the Regional model to the Sub-Model, which will influence flow conditions in the MW-X and MW-Y area.

Specification of River in Model Unrealistic

The following observations were made with regard to the conceptualization of the River within the model.

- River cells appear missing in critical areas (see **Figure 12**, below). This is an important oversight which will affect simulated groundwater levels, flow paths and magnitudes in the northern portion of the local MODFLOW model. This will directly affect simulated flow paths from freshwater injection, flow beneath the River and simulation results for groundwater in Arizona. Without correctly simulating these boundary conditions, the model will not produce realistic predictions, and should not be used as a basis for justification for the AZ monitor wells MW-X and MW-Y.

- Specification of river cells does not accurately reflect current or future bathymetry or surface water levels in the Topock Marsh. Constant river stage (455.1 ft, msl) and river bottom (452.1 ft, msl) elevations were specified over the entire Topock Marsh (see **Figure 13** below). But aerial images clearly show only a smaller surface flow channel is present in the area, as the U.S. Fish and Wildlife Service (USFW) closely controls discharge via the South Dike control structure

(USFWS, 2006). A sonar-derived bathymetric map was derived for the Topock Marsh, north of the southern outlet control (http://proceedings.esri.com/library/userconf/proc99/proceed/papers/pap396/p396.htm). Based on the constant elevation prescribed in the local MODFLOW model in the Topock Marsh area near the Golden Shores Marina (south of the controlled marsh area), the microFEM regional model likely also prescribes a simplistic, constant bathymetric surface north of the control structure. It is important to specify the correct bathymetry as it controls the spatially variable simulated influx of surface waters in the marsh to underlying groundwater as a function of depth of water in the Marsh. This is not likely critical to simulating flows in the immediate area of the proposed remedy on the California side. However, this will be important in simulating 3-dimensional groundwater flows on the Arizona side, especially considering planned long-term extraction at wells HNWR-1A and/or Site B. These impacts, along with other Arizona extraction could influence water levels and interpretations of flow direction at the proposed locations of monitor wells MW-X and MW-Y.

- The river stage was set to a uniform value for all of Topock Marsh, which is clearly dry much of the year now due to the controlled discharge at the southern end of the South Dike (USFWS, 2006). Recent 2014 aerial images (ArcGIS World Imagery) show the discharge control structure and lack of standing water. This area in the model should be simulated using the MODFLOW ET module so that a constant river stage does not dominate groundwater levels in the area. Realistic stage levels in this area should be specified.

- Steady stages in the river and marsh do not allow adequate calibration of the model parameters and do not correctly simulate the actual water conditions within the system, or potential pathways. Appropriate fluctuating daily and seasonal river levels and Topock Marsh levels should be imposed in the proper areas of the model for transient simulations to correctly simulate groundwater levels and flows (3-D paths and magnitudes). Water levels within the Topock Marsh are controlled by the outlet structure and are fairly-well known based on available graphs (USFWS, 2006).

- Riverbed conductance (vertical hydraulic conductivity divided by assumed streambed thickness and multiplied by flow area) controls the rate of flow between the River and underlying aquifer. Conductance values were obtained from the 60% BOD Report (CH2M Hill, 2014d) MODFLOW input files provided by Arcadis (July 2013, Jonathan Roller at Arcadis). A plot of the riverbed conductance values (**Figure 14**) shows an interesting distribution, which was never reported. The distribution is complex, with the highest values adjacent to the East Ravine discharge area, lower values along the eastern side of the river, and the lowest values in Topock Marsh and just east of the IM-3 extraction wells at PE-1/TW-03D (central river). This may explain how simulated drawdown somehow propagates from these extraction wells toward MW-54-195. The riverbed conductance distributions here are based on estimates derived through PEST simulations rather than using actual measurements. This distribution is critical to controlling what flows between the River and Topock Marsh surface waters and underlying groundwater. It also plays a critical role in determining how influential the river itself is in acting as a hydraulic barrier to flow between Arizona and California.

- A sensitivity evaluation of riverbed conductance does not appear to have been performed. Here, a "sensitivity evaluation" means varying assumed spatially distributed values over a range that is physically-realistic. Without conducting a sensitivity analysis, the modeled conductance distribution is a significant assumption directly influencing important predictions in the model (i.e., RAO #2 flows into the River), which underpin the entire conceptualization of how the river water flows through the aquifer, 3-dimensional flow paths near and beneath the River/Topock Marsh, etc. At a minimum, the basis and conceptual rationale for the conductance distribution should be presented in detail before relying on it to assess hydraulic connection beneath the river (i.e., for IM-3 testing) and for future predictions of performance with the full remedial system in operation. The conductance distribution and the magnitudes have a direct bearing on whether proposed monitor wells MW-X and MW-Y are needed, and, if so, where they should be placed.

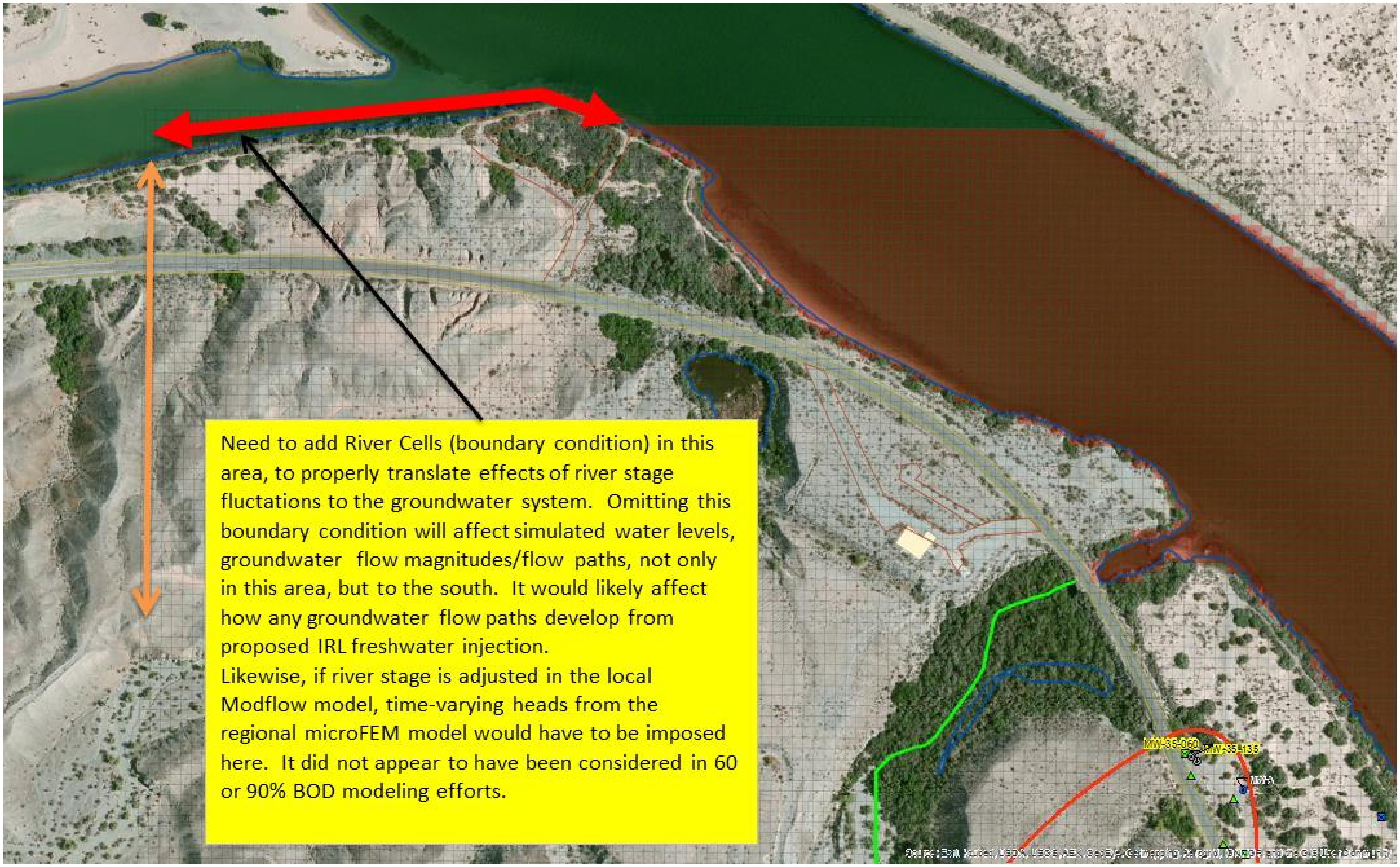


Figure 12. 60% BOD MODFLOW model "River Cells" (in red), which align with the river boundary, except along the northern edge (red arrow) where Beale Slough joins the River at Park Moabi. This slough should have had river cells in order for the model to correctly simulate river-aquifer flows and fluctuations (model cells shown in site ArcGIS document developed for the site).

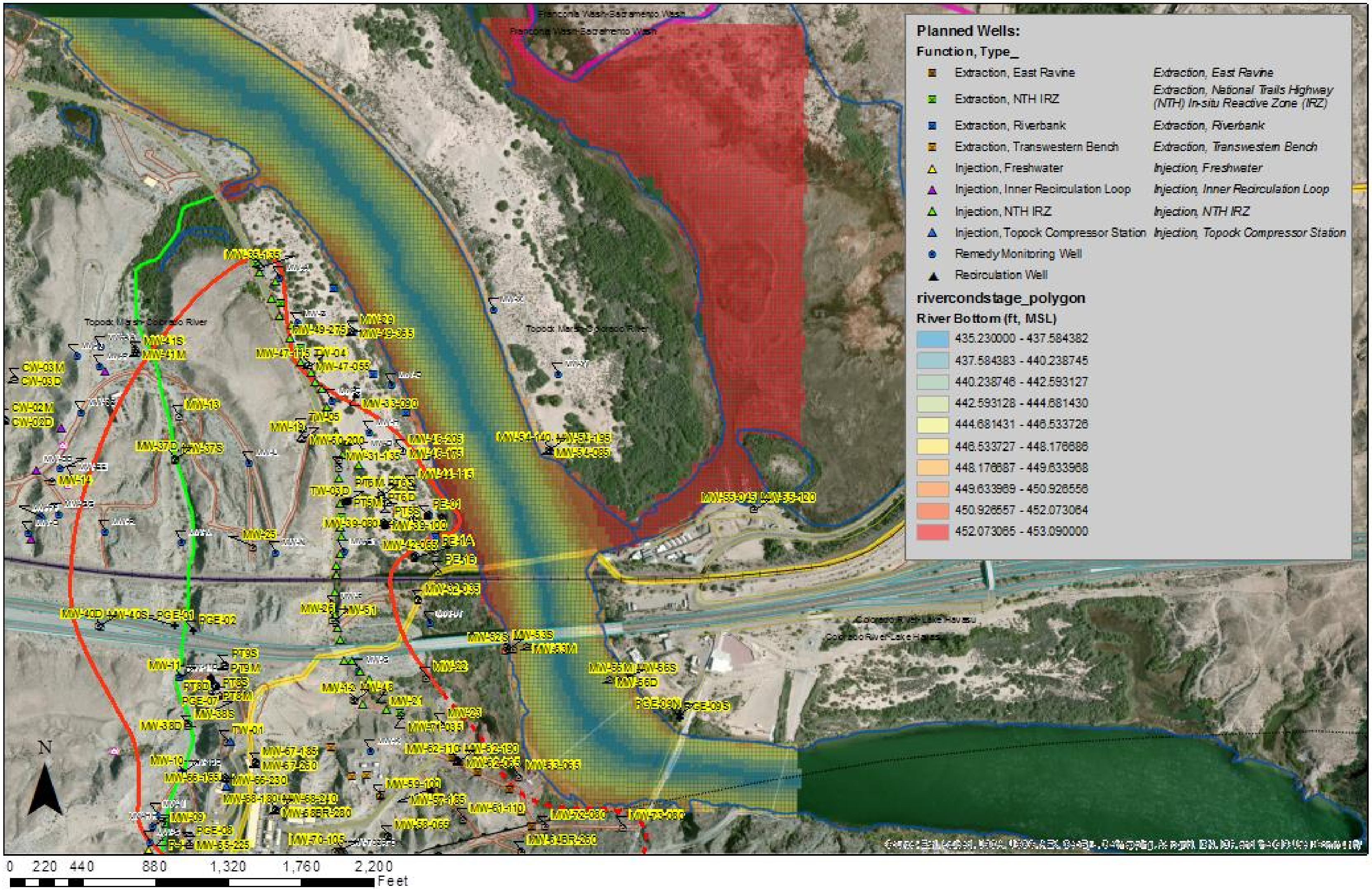


Figure 13. River bathymetry (bottom depth) is deepest in center, but it is unclear if bathymetry used in the model reflects all the actual measurements done in this segment of the river (data from Jonathan Roller, Arcadis July 2013 – 60% BOD MODFLOW Input Files).

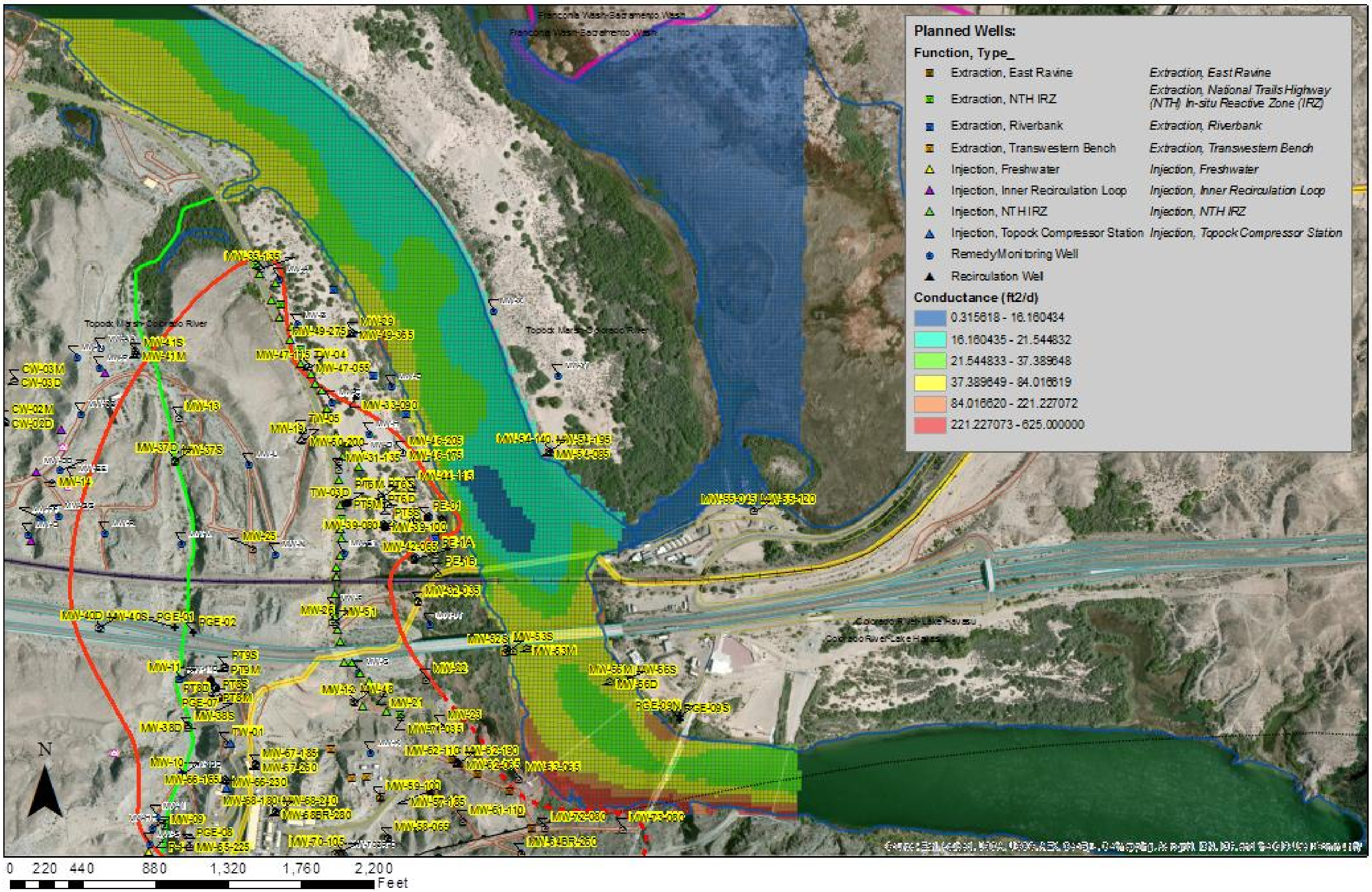


Figure 14. Specified river conductance values (ft^2/d). Note the higher conductance values on western bank, very high values along the western bank of East Ravine, low values just east of IM-3 Extraction wells (PE-1 and TW-03D), and low values in Topock Marsh.

Actual Evapotranspiration (AET) from Groundwater Unrealistic

The MODFLOW model specifies three evapotranspiration (ET) zones – phreatophytes, the River and everything else, though only two are indicated in the 90% BOD report. It is appropriate that ET in the river be zero. But the phreatophyte zone does not capture all variability in phreatophyte vegetation coverage with ET Cells **(Figure 16),** and does not capture differences in arid zone vegetation, which have different rooting and transpiration depths. Most of the lower Topock Marsh (near Golden Shores Marina) is assigned zero ET, because it is simulated as a river. Instead it should be simulated using realistic ET values. This will impact flow conditions along the AZ river bank and has implications for propagating effects from pumping at from HNWR-1 and/or Site B.

The July 2005 update report on modeling (CH2M Hill, 2005) states the following:

> "*Evapotranspiration (ET) losses occur in the floodplain areas and Topock Bay/Topock Marsh. An average maximum ET rate of 0.42 in/yr was assigned to all model nodes except those in the river. This rate was not designed to correspond to published plant ET rates, but as a value averaged over nodal areas which consist of both bare soil along with plant growth*."[12]

However, the 60% BOD report (CH2MHill, 2013) showed two different zones were used to define Actual Evapotranspiration (AET) rates; one for phreatophytes (4.2 in/yr) and the other for non-phreatophytes (0.42 in/yr). The specified AET rate of 4.2 in/yr (0.35 ft/year) for phreatophyte zones seems excessively low as noted in TRC 60% BOD comment (#365). Hill (1993) indicates that AET rates in a comparable region (Yuma) should be more like 3.5 to 7 ft/yr. The phreatophyte zone with a higher specified rate shows dense coverage, but seems to omit important areas of the model which occur in phreatophyte areas within the Topock Marsh. In the graph below (**Figure 15**), AET rates are plotted for different riparian vegetation from Hill's (1993) report, and the graphs clearly show that the AET should be several orders of magnitude higher than what has been used for the Topock MODFLOW model. The model predicted AET loss of 140 ac-ft/year to phreatophytes is likely vastly underestimated, by at least an order of magnitude for this area.

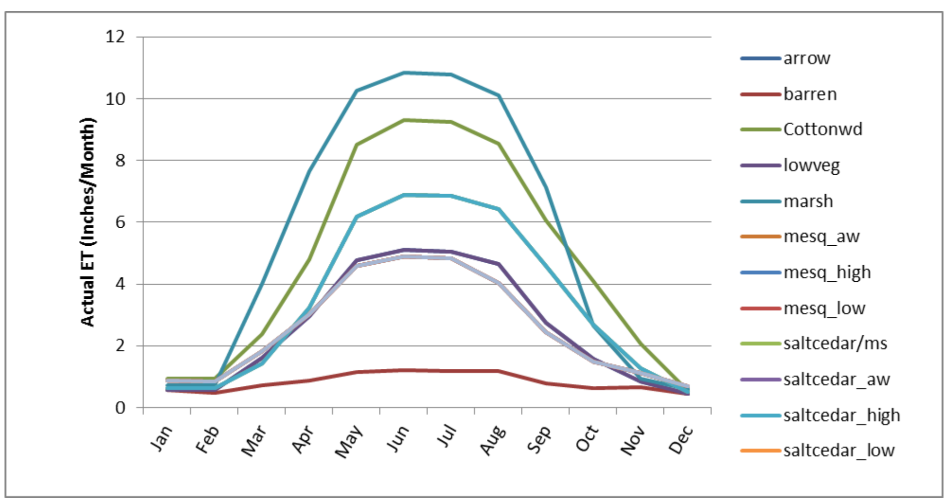


Figure 15. Phreatophyte water use by type.

[12] Note: in/yr = inches per year; ft/yr = feet per year; ac-ft/yr = acre-feet per year (approximately 326,000 gallons)

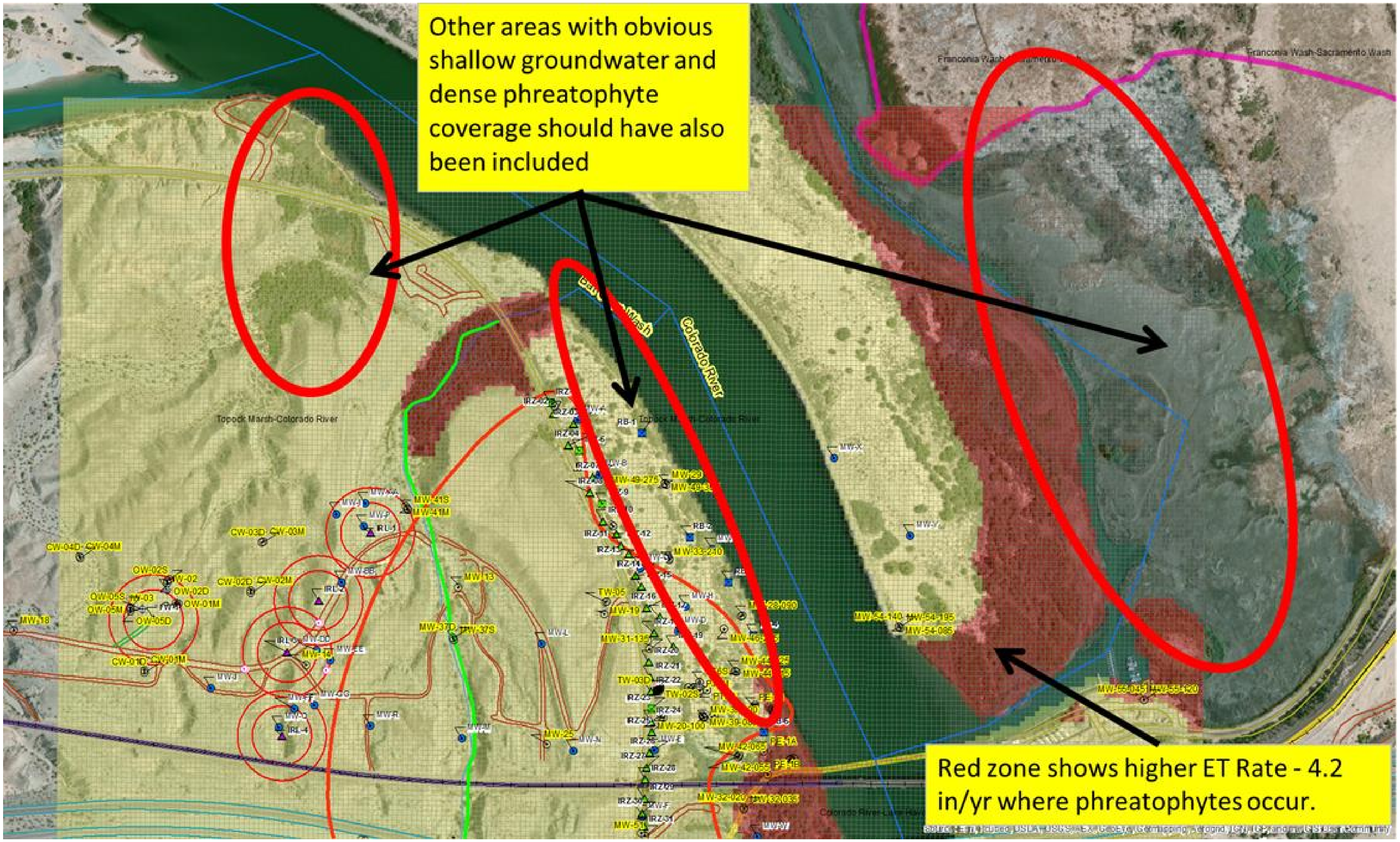


Figure 16. Project MODFLOW model ET zones, where red has a higher rate (4.2 in /yr) for phreatophytes, and 0.42 in /yr everywhere else except rivers. Figure developed in ArcGIS, using data from Jonathan Roller, Arcadis July 2013 – 60% BOD MODFLOW input files.

The Evapotranspiration "Extinction Depth" specified in the model (10 ft), which effectively represents the maximum depth that phreatophyte roots would withdraw water, appears too low and instead should be at least 20 to 30 feet (see Hill, 1993). Other sources suggest this could be as deep as 50 feet (see Table 1 on page D54, Anderson and Freethy (1995), depths from 0 - 50 feet, and ET maximum rates from 3 to 10 ft/yr at 100% density). The density of phreatophytes from aerial imagery appears to be very high. No technical basis for the 10-ft extinction depth is offered. Setting the extinction depth too low reduces the distributed groundwater discharge to phreatophytes, and also affects the 3-dimensional flow paths in the shallow aquifer. Thus, instead of all groundwater moving towards the river, it would be redirected locally towards phreatophyte areas, which were not well-defined to begin with (see discussion above).

Simulated Water Balance Components are Questionable

Other regional studies suggest the water balance results summarized in the 2005 modeling report (Figure 2-14 in the CH2M Hill, 2005) suggest the evapotranspiration from the regional model (**see Figure 17**) is likely much too low (owing to deficiencies noted above). Table 21 (below) in Owens-Joyce and Raymond 1996 (USGS paper) reports AET by phreatophyte density, by month in Mohave Valley.

Table 21. Water-use rates for vegetation types and densities along the lower Colorado River, 1984, calculated by the Lower Colorado River Accounting System

River reach and vegetation type	Monthly water-use rate, in feet												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Hoover Dam to Davis Dam—Willow Beach, Arizona[1]													
Phreatophytes													
Medium	0 00	0 22	0 41	0 48	0 72	0 75	0 81	0 73	0 62	0 33	0 21	0 00	5 28
Sparse	00	18	32	38	57	60	65	58	50	26	17	00	4 21
Mohave Valley—Bullhead City, Arizona[1]													
Alfalfa	00	31	56	66	97	1 00	72	70	82	44	14	00	6 32
Cotton	00	00	00	05	19	44	70	92	68	28	00	00	3 26
Wheat	14	27	75	86	30	00	00	00	00	00	00	00	2 32
Phreatophytes													
Dense	00	28	52	61	90	92	1 01	92	77	41	25	00	6 59
Medium	00	24	43	51	75	77	84	76	63	34	21	00	5 48
Sparse	00	19	34	41	60	62	67	61	51	27	17	00	4 39

In fact, Guay, et al., (2006) state*: "In summary, Mohave Valley is a losing river reach where Colorado River water is later lost to ET and open water evaporation."* This implies that ET is so significant that there is a net recharge from Colorado River leakage into the aquifer, whose levels are being strongly controlled by the phreatophytes and direct evaporation from open waters in the area. This is actually opposite from what is stated in the CSM and simulated in both the regional and local models, where the river is acts a net annual sink or discharge feature in the system.

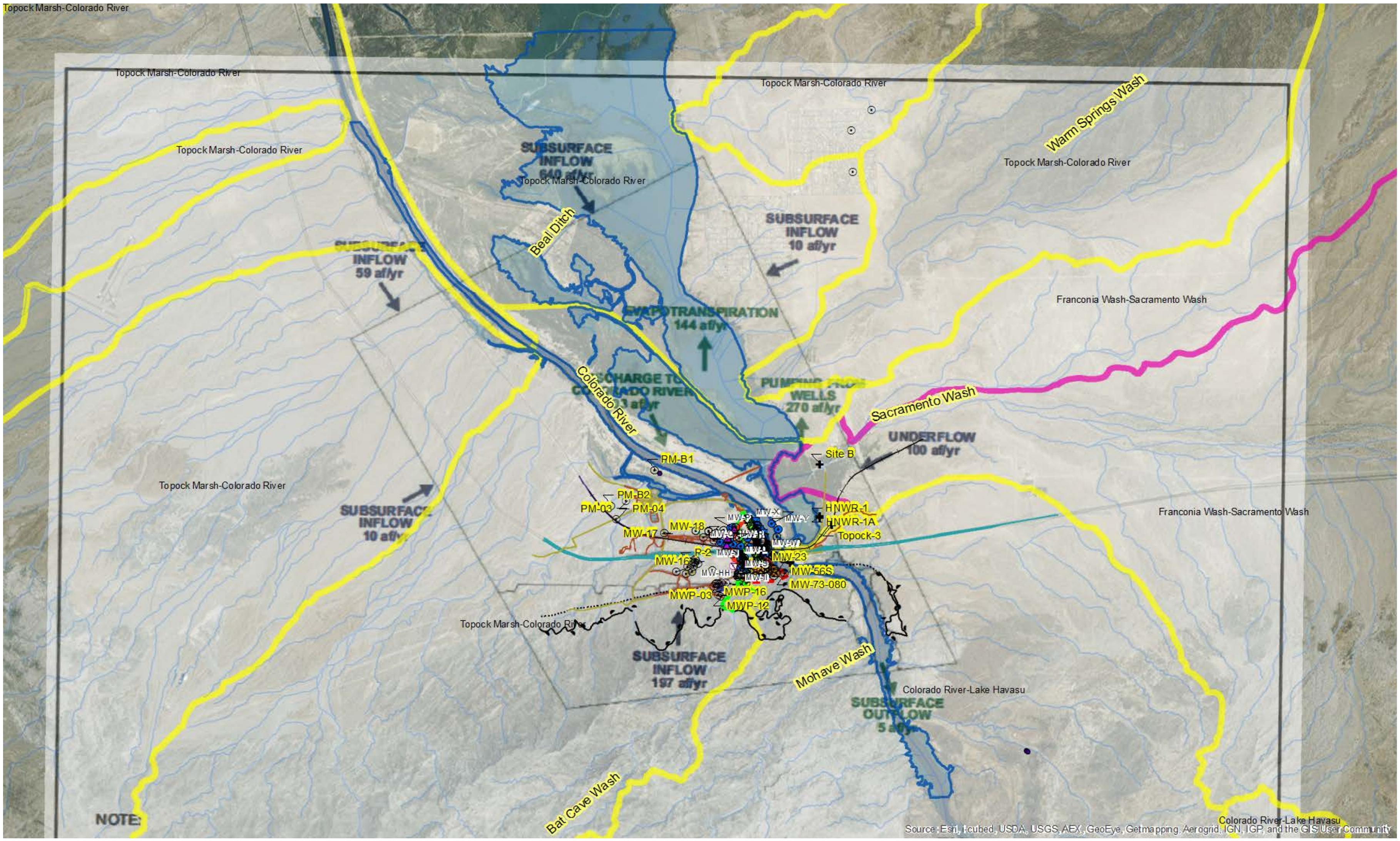


Figure 17. Shows Evapotranspiration of 144 ac-ft/yr from groundwater(Figure 2-14 in the CH2M Hill, 2005). This is likely much too low over this spatial extent. Subsurface “underflow” of 100 af/yr from Sacramento Wash is much less than the 2,400 ac-ft predicted by a recent USGS report (Tillman et al, 2013).

A water budget from a detailed USGS study (Table 10 below from Tillman et al, 2013) of the Sacramento Wash, Hualapai and Arizona Lake Mohave Basin indicates the groundwater discharge through unconsolidated deposits within Sacramento Wash is much higher (at least 1 order of magnitude) than the 100 ac-ft/yr simulated with the regional microFEM model as summarized on Figure 2-14 (i.e., 2,440 ac-ft/yr to 5,600 ac-ft/yr from Sacramento Valley in Table 10). The significantly underestimated maximum ET rate and ET extinction depths noted above likely vastly under predict the actual ET in this area, which would have reduced the 2,440 ac-ft/yr inflows, though recent fires in the lower Sacramento Wash by the USFWS would reduce the AET. In any case, higher subsurface inflows and ET losses should be simulated where they occur as they dictate flow conditions and pathways in the proposed MW-X and MW-Y monitoring locations.

Table 10. Simulated predevelopment groundwater budget for runoff-recharge scenario.

[Values are in acre-feet per year; –, no data]

Water-budget component	Detrital Valley	Hualapai Valley	Sacramento Valley
Inflow from natural recharge	1,870	3,680	6,720
Inflow from adjacent valleys	0	50	1,310
Inflow at Truxton Wash (Hualapai Valley only)	–	800	–
Net outflow to Colorado River	1,780	4,500	2,440
Outflow to adjacent valleys	95	40	[1]5,600

[1]Outflow from Sacramento Valley to Lake Mohave Basin discharges to Topock Marsh and the Colorado River near Topock.

Bedrock Depths Appear Inconsistent

The basis for the modeled bedrock depth in Arizona could not be determined in available reports. The surface appears to be somewhat inconsistent with other reported surfaces (Richard et al, 2007). This would influence simulated groundwater flow gradients/directions in Arizona, especially responding to well production and river fluctuations. The source of information and assumptions used in developing the bedrock surface in the model(s) should be provided to the Tribes for review.

Density-Dependent Flow is Not Simulated with MODFLOW Code

The MODFLOW code does not simulate density-dependent flow, which introduces additional errors in predicting 3-dimensional flows within the model domain, where higher density waters are present. DOI comment #9 on the 90% BOD Appendix B points out that high density dissolved solids concentrations can result in errors predicting flows and can produce uncertainty in capture zone analysis. Simulating the correct flow dynamics of relatively high density variations beneath the river, with strong driving river stage fluctuations, requires a more appropriate modeling tool, especially if the model is going to be used as the primary technical basis for locating and specifying parameters for additional monitor wells such as MW-X and MW-Y. Many codes have the capability of simulating the density-dependent flow conditions (see https://www.twdb.texas.gov/innovativewater/bracs/doc/bracs_gw_model_rpt.pdf for a list of codes).

Groundwater Pumping Effects at Model Boundary

It is unclear whether time-varying effects of all regional groundwater pumping effects both within the regional MicroFEM model and outside are actually incorporated into the model, particularly in the Arizona side. **Figure 18** below shows the local MODFLOW boundary (black box) and the eastern boundary of the MicroFEM regional model with an orange line. Review of earlier modeling reports (CH2M Hill, 2005) indicate that pumping from some of these wells was incorporated into this model (i.e., the Golden Shores community wells to the north) by using a single representative well. Though this appears reasonable, it is unclear whether effects of the groundwater pumping at wells outside of the MicroFEM boundary, but still close enough to affect flow conditions at or within the MicroFEM model boundary were incorporated into the internal modeled flow conditions. In addition, as DOI points out in 90% BOD comments 14, 15, 16 and 41, the proper translation of groundwater pumping effects and other dynamic boundary conditions as a dynamic flux boundary condition from regional MicroFEM model to the local MODFLOW model should be confirmed.

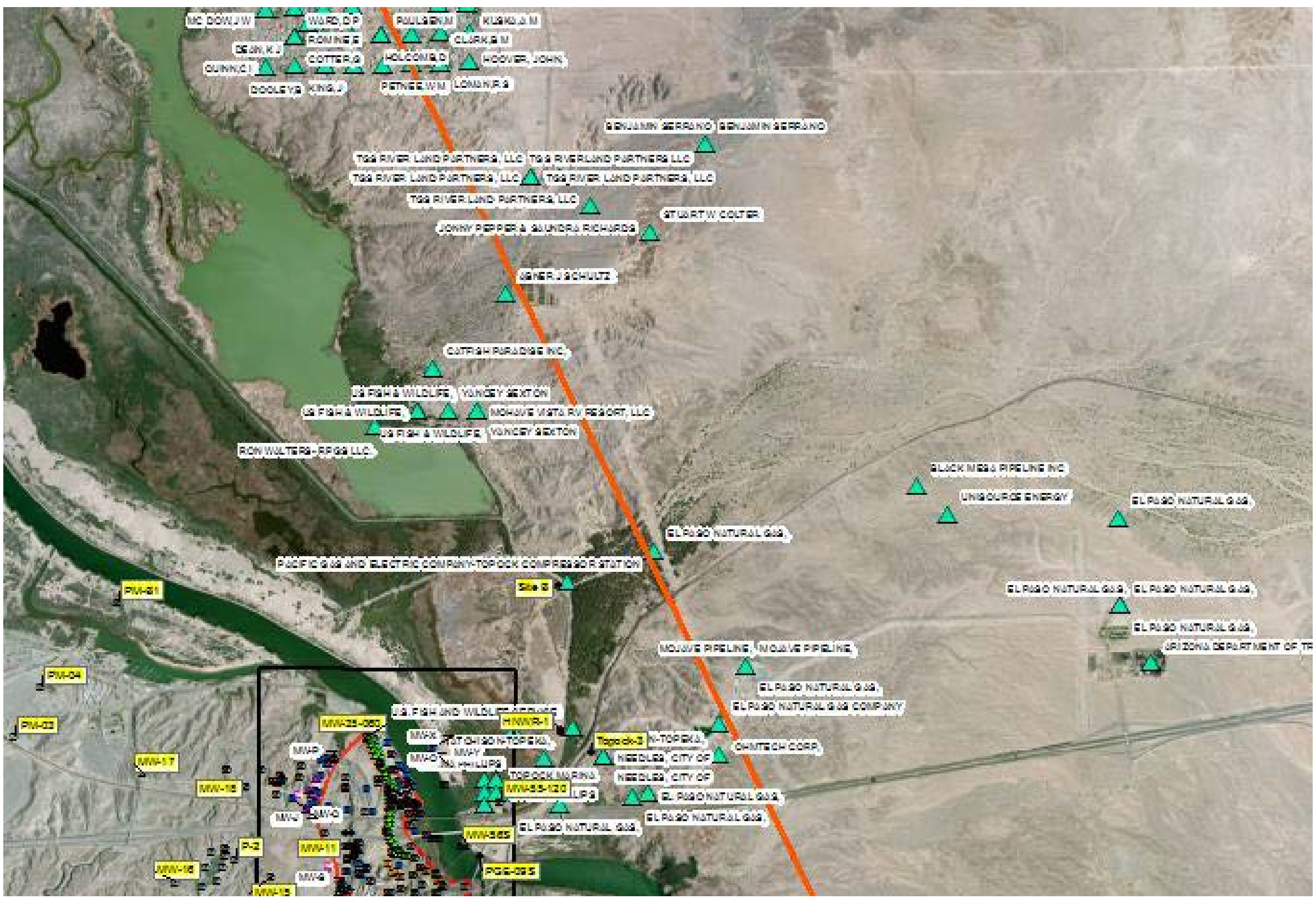


Figure 18. Regional wells from Arizona Department of Water Resources registered well database. Most can be assumed to be pumping, though this information was not reviewed any further than plotting locations here. Figure developed using ArcGIS project file with imported ADWR data.

September 2008 IM-3 Extraction Well Shutdown Test Fails to Demonstrate Hydraulic Connection in Groundwater Between California and Arizona.

CH2M Hill (2009, Appendix E, page E-1) states:

> "*The California Environmental Protection Agency, Department of Toxic Substances Control requested that demonstration of model accuracy be performed by using the model to forecast the hydraulic data collected after the calibration period (between 2005 and 2008). Specifically, the Technical Work Group agreed that the validation should consist of comparing simulated data to: (1) the monthly average groundwater levels in monitoring wells in response to changing monthly average river levels, and (2) the response of Arizona wells in the MW-54 cluster to the May 2008 Interim Measure No. 3 (IM No. 3) pumping shutdown event. However,* ***due to anomalous river*** *levels during the deconvolution fitting period of the May 2008 IM No. 3 shutdown, detection of well response in the MW-54 cluster (located across the river in Arizona) was incomplete. As a result, a second IM No. 3 shutdown event was simulated with the model in September 2008, and improved results were obtained. The September 2008 evaluation was conducted in response to a United States Department of the Interior (DOI) comment on Appendix C of the Draft CMS/FS Report*" [Emphasis added.]

CH2M Hill (2009, Appendix E, page E-3) states:

> "*Figures E-2c through E-2g show the deconvolution analyses for the MW-54 and MW-55 wells in Arizona. In general, the detection limit for observable water-level fluctuation was estimated to be 0.1 foot; however, the detection limit for water level change in the MW-55 well cluster was estimated to be 0.05 foot due to a less noisy baseline in this well. Measurable water-level recovery of 0.1 foot was observed in the deep well at MW-54 (MW-54-195). Water-level recovery in the other Arizona wells was below the estimated detection limits.*"

It seems arbitrary to select 0.1 ft as a detection limit, and then decide that a variation of only 0.05 ft at MW-55 implies a hydraulically connection across the river. The potential error in the adopted deconvolution method could be substantial, especially given the combination of complicating factors which include barometric effects, solid earth tides, river fluctuation, and density/temperature variations. A review of the actual deconvolutions and comparison of simulated vs. observed drawdown for MW-54-195 (see **Figure 19**, below) does not convincingly demonstrate any hydraulic connection (as the May 2008 test showed), or that the model is able to capture the response. It is unclear why the variation in river stage over the test was not included in the modeling as this drives much of the transient fluctuation in all wells evaluated. The river fluctuation could have been left out of the deconvolution analysis to directly compare results. Also, it seems like the relatively high water density variations in formations beneath the River would also need to be considered in the modeling, as drawdown changes would likely dampen out beneath the River due to upconing (buoyancy effects).

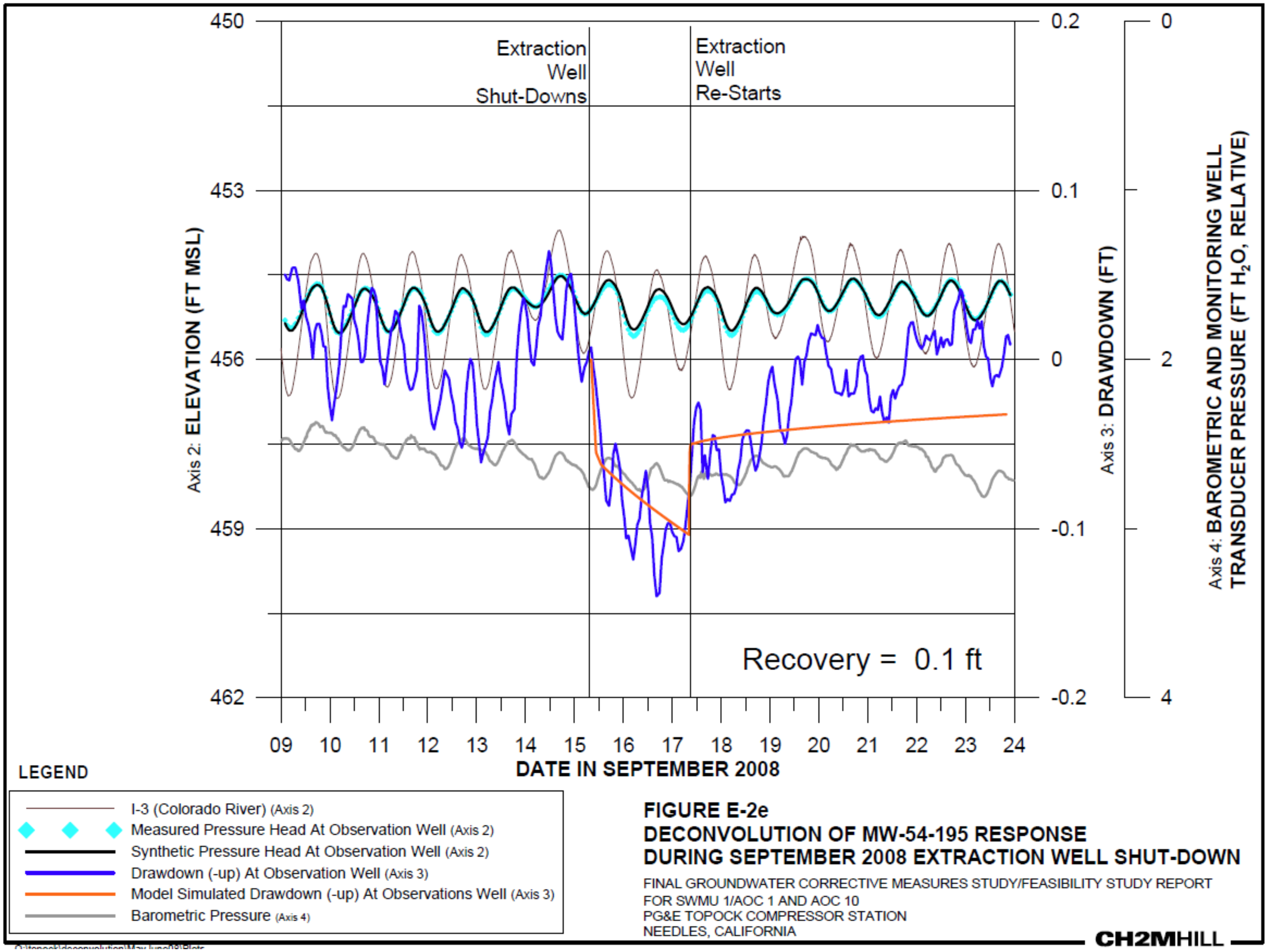


Figure 19. Reproduction of Figure E-2e from CH2M Hill (2009).

The application of the USGS Halford method (Halford, 2006) used here did not indicate that the effects of solid earth tides were incorporated in the plotted data. Earth tides can easily vary up to 0.1 ft, which is similar to the variations recorded at MW-54 and MW-55. In addition, the use of two different plotting axes does not show the errors introduced in matching synthetic and measured well response (before the shutdown), which also appear to be easily within the 0.1 ft perturbation. Figure 21, below, shows that the magnitude of "drawdown" shown by the blue line (calculated by subtracting synthetic pressure from measured pressure) during the pre-shutdown period (i.e., September 9 through 15) is as great (~0.1) as during the shutdown (September 15-17), or even after it, probably because the synthetic pressure did not capture all influences, or incorporate all measurement errors (i.e., like solid earth tides, diffuse areal recharge fluctuations; in addition to barometric and river fluctuations, were not incorporated). In other words, the water level variations in MW-54 and MW-55 recorded during the shutdown period are indistinguishable from the variability observed before and after the shutdown period, which suggests these wells did not respond to the shut-down.

Simulated transient well responses to river fluctuations ((Appendix E in CH2MHill, 2009, see Figures E-1a through E-1p) appear to reproduce observed monthly responses in the selected California wells over a 2 to 3 year period. However, no such comparison was made to Arizona wells MW-54 and MW-55 (or MW-56) at different levels. It is unclear why this is the case, but this fact precludes any evaluation of model performance (i.e., calibrated) in this local area within Arizona. Why install monitoring wells MW-X and MW-Y if the existing monitoring wells MW-54 to MW-56 have not been used to calibrate the model?

More convincing evidence must be presented to all stakeholders before concluding that Arizona groundwater will be affected by California activities. Before concluding a hydraulic connection could exist under the operational conditions of the proposed remediation system operation and requiring additional undesired monitoring wells, a more rigorous testing program is needed. Options include imposing a much greater stress on the system (i.e., an aquifer pumping test) to propagate drawdown from the California side than that induced by the shutdown at PE-1 and TW-03D for just two days. A longer pump test would register a much clearer and unambiguous response in existing Arizona wells MW-54, MW-55 and MW-56. Also, a tracer test could be used to evaluate if an actual connection is present. Ultimately, the model, despite its clear deficiencies, should have been used in conjunction with fully transient river and Topock Marsh fluctuations, to evaluate the potential impacts of the shutdown on Arizona wells rather than attempting a deconvolution. The model has the benefit of including other important factors that influence drawdown propagation (i.e., associated rise due to shutdown of PE-1 and TW-03D) such as the variation in assumed hydraulic conductivity, riverbed conductance and variation in bedrock surface and layer thicknesses.

May 2008 IM-3 Extraction Well Shutdown shows no response in Arizona

From the CH2M Hill (2008; see **Figure 20**) 54-well construction/testing study, it is learned that:

> "*Hydraulic response attributable to the shutdown of groundwater extraction in wells PE-01 and TW-03D was observed in wells up to 1,600 feet away from the nearest extraction well. The*

hydraulic response attributable to the shutdown of injection well IW-3 was observed in wells up to approximately 1,300 feet away. ***Hydraulic response if present, is too low to quantify on the Arizona side of the river. For the MW-54 and MW-55 monitoring well clusters, the lack of quantifiable response is likely due to multiple complex and poorly understood overlapping processes, the largest of which is the Colorado River stage fluctuations. "*** [Emphasis added.]

Calibration Results are Questionable

Four target datasets were used (CH2MHill, 2005) for calibration of the groundwater flow model:

a. Recovery in transducer-equipped monitoring wells following shutdown of TW-2D in November 2004
b. Average monthly groundwater elevations in transducer-equipped monitoring wells (available data between 2003 and March 2005)
c. Recovery in Observation Wells during injection well testing at IW-2 and IW-3 in January 2005
d. Estimated velocity and flow orientation of chromium plume development between initial discharge in 1951 to detection at MW-20 in 1999.

Results of the model calibration in the vicinity of the River and in Arizona are questionable for several reasons:

1. Neither the flow, nor the fate/transport model were calibrated to years of carefully monitored water level and concentration data (i.e., Quarterly IM-3 Monitoring reports) associated with operation of the IM-3, following the 2005 calibration period. The accuracy and reliability of model predictions are critical for demonstrating the model performance not only in the vicinity of IM-3, but also near MW-X and MW-Y.

2. Standard calibration statistics (Anderson and Woessner, 1994) were never presented (i.e., Root-Mean-Square Error, or RMSE, values by layer, or spatial distributions to show bias) for the calibration to average monthly groundwater elevations (b above), or in any of the modeling-related documents reviewed for the Topock groundwater remediation project. Though the model seems to reproduce qualitatively reasonable monthly fluctuations at many wells, some don't compare well and ultimately, there is no way to determine whether calibration is actually adequate for the intended purposes, and how calibration errors may influence key model predictions (i.e., flow rates, well spacings, etc.). Comparison of simulated and observed well water levels reveals that many of the wells show deviations approaching or exceeding 1.0 ft (**Figure 21**). This error greatly exceeds the 0.1 ft simulated difference observed in the September 2008 shut-down test response at MW-54-195. The May 2008 shutdown test response actually showed no response, but was disregarded due to unexplained 'anomalous' river readings (CH2MHill, 2009). Finally, though response is reported for wells in 3 different depth zones, assessment of model performance in terms of vertical gradients,

or even flow directions (i.e., flow up or down) is never presented. It is unclear whether the model predicts the correct vertical flow direction, especially near the river and in Arizona.

3. Neither the groundwater flow model, nor fate/transport model were calibrated against key remedial performance metrics such as hydraulic gradients/flow directions and concentration trends. Yet these model predictions will be used to make critical decisions on whether the system is performing as expected, and if not how to modify design or operations (see Tables 2.1-4, 2.1-5 and Figures 2.2-2 through 2.2-9 in the 90%BOD O&M Volume 2 report – see CH2MHill, 2014c).

4. The model was apparently calibrated to historical plume movement (i.e., target d above), but even a qualitative calibration performance assessment was never presented in the CH2MHill, 2005 report. This should have been provided to gain perspective on the model's performance near the river, and beneath it in Arizona near MW-X and MW-Y.

5. Calibration to response to shutdown of extraction well TW-2D, and injection wells IW-2 and IW-3 only provides a very localized sense of performance assessment near these particular wells. In addition, the implication of the calibration to these events or relevance to eventual remedial system performance metrics is never discussed. This would be especially important when considering the need or locations for proposed monitoring wells MW-X and MW-Y. Results at some wells showed notable deviations from actual observed conditions.

6. Simulated groundwater levels shown on **Figure 21** stop abruptly at the river, and therefore offer no insight into the model performance (or accuracy) in Arizona, especially in at wells MW-54, MW-55 and MW-56 installed in 2008. Though the model was calibrated in 2005, no attempts appear to have been made to update this to well response in these three Arizona monitoring wells. At a minimum, this should be done to improve the reliability of the model before attempting to predict future remedy bypass into Arizona, requiring wells at locations MW-X and MW-Y.

No Results Provided for Model Update after 60% BOD

Page xii of the 90% BOD Report (CH2M Hill, 2014a) states:

> "*Additional modeling efforts completed since the 60% design include an update of the regional groundwater flow model ("the regional flow model") and groundwater flow submodel to reflect hydrogeology encountered at Site B in the vicinity of HNWR-1*".

Details describing all assumptions, calibration, and long-term response with all possible stresses do not appear to have been presented anywhere. So it is impossible to assess the performance of the model in Arizona.

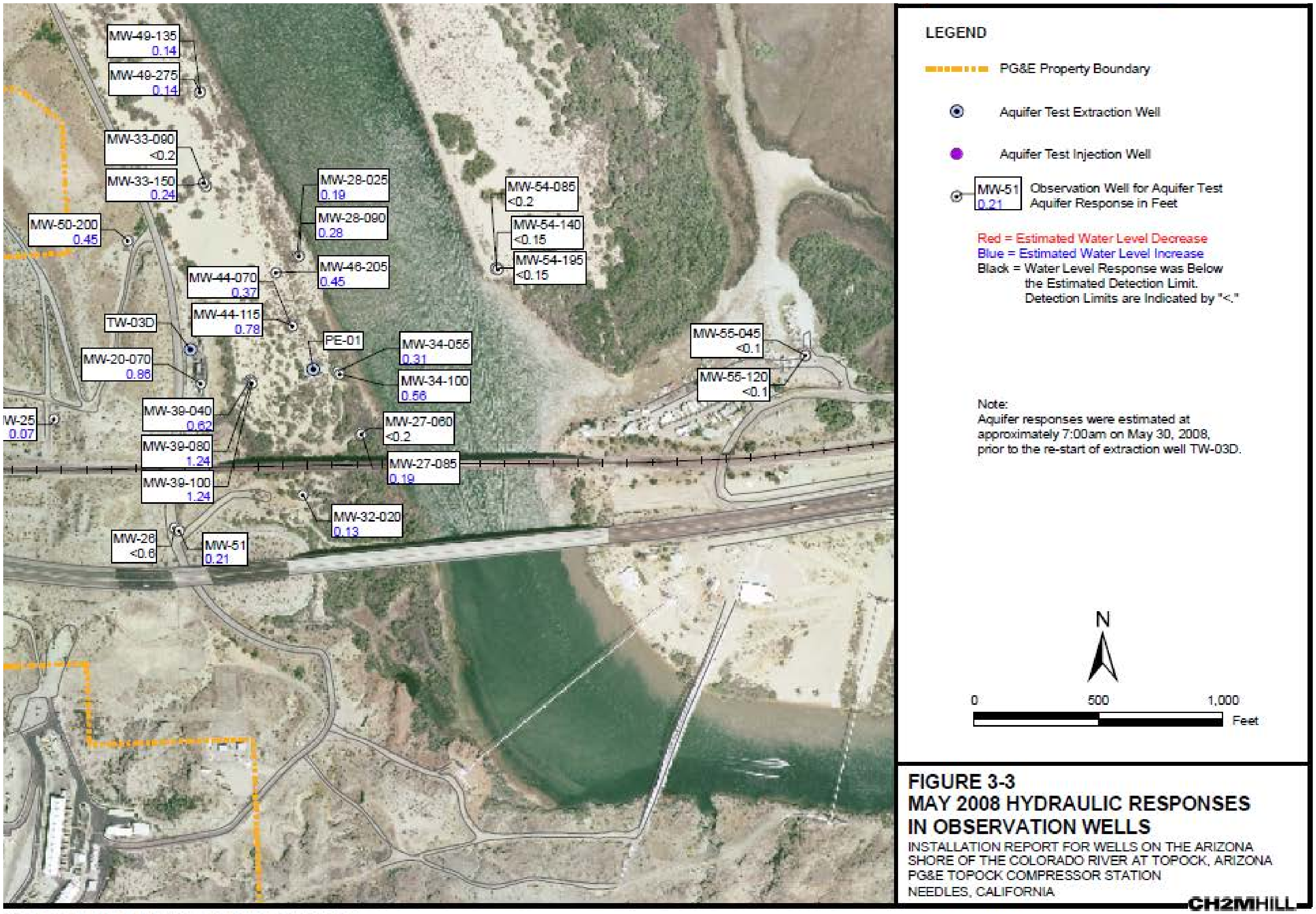


Figure 20. Documentation (CH2MHill, 2008) that MW-54 and MW-55 displayed no hydraulic response to the shutdown of IM-3 extraction wells PE-1 and TW-03D in 2008.

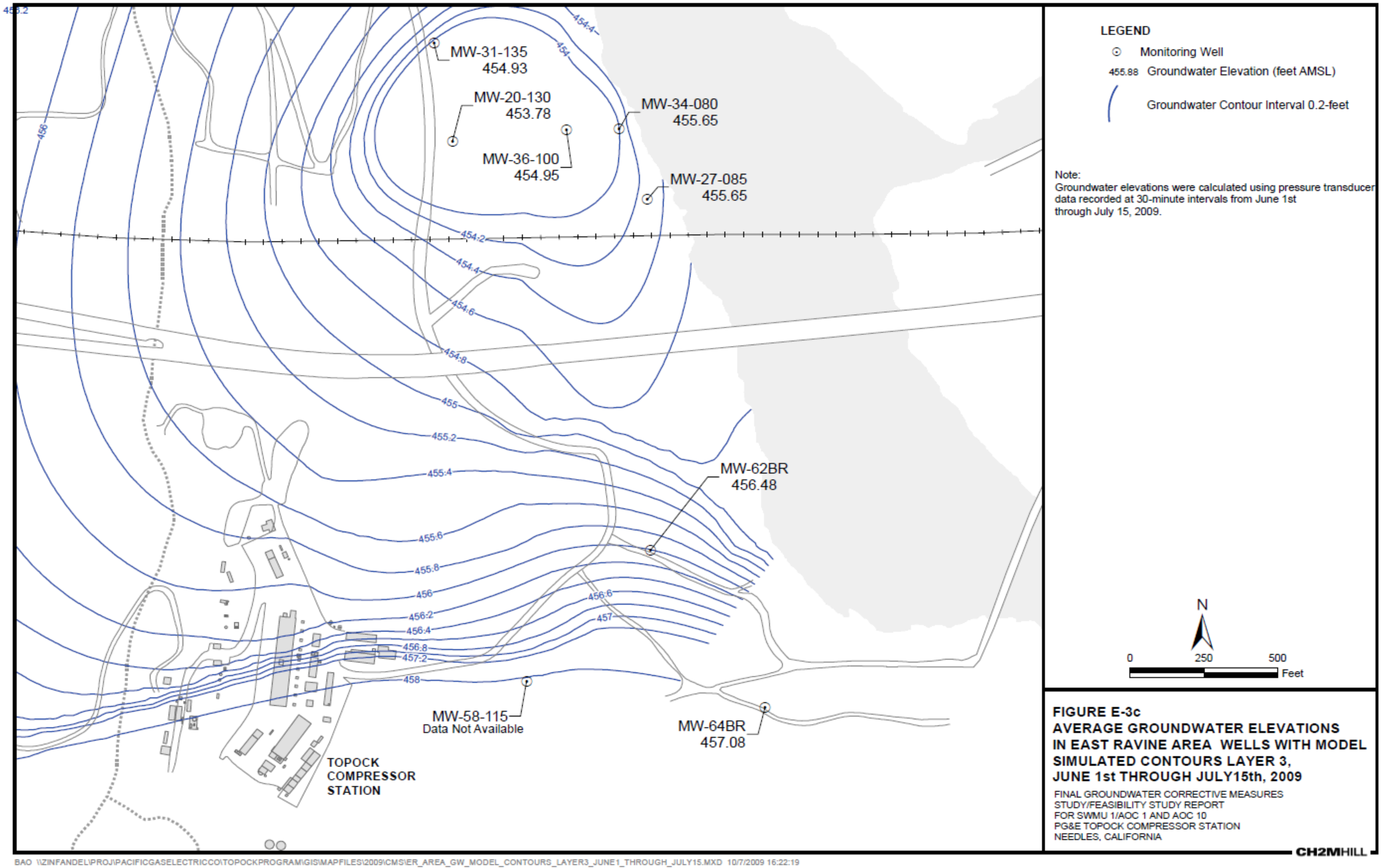


Figure 21. Simulated contours compared to observed, time-averaged (pressure transducer) groundwater levels for model layer 3 (CH2MHill, 2009).

Simulated Results of Site B Extraction Questionable/Uncertain

Exhibit 3.3-3 on page 3-39 (CH2MHill, 2014a), reproduced below as **Figure 22**, shows a concentric ring around HNWR-1/HNWR-1A, representing a simulated 5-year cone of influence (based on AZ guideline fixed-radius equation referenced in CH2MHill, 2014a). If the regional microFEM model was updated with hydrogeologic data from Site B, a perfect concentric cone of influence would not develop like this. Instead, a non-circular drawdown cone would develop as a function of variable aquifer thickness, overlapping drawdowns from other wells in the area, complex, dynamic seasonal interaction with surface waters (Topock Marsh, Colorado River), and complex ET and heterogeneous distribution of hydraulic properties within the aquifer. In any case, details of the subsurface such as the bedrock surface configuration beneath Site B and how it changes up into Sacramento Wash, and changes in hydraulic properties by depth, etc. should be addressed at this point at least on a conceptual level. This would allow a better understanding of how dewatering from Site B and HNWR-1A might influence and complicate flow paths beneath the River during full remedial system operation.

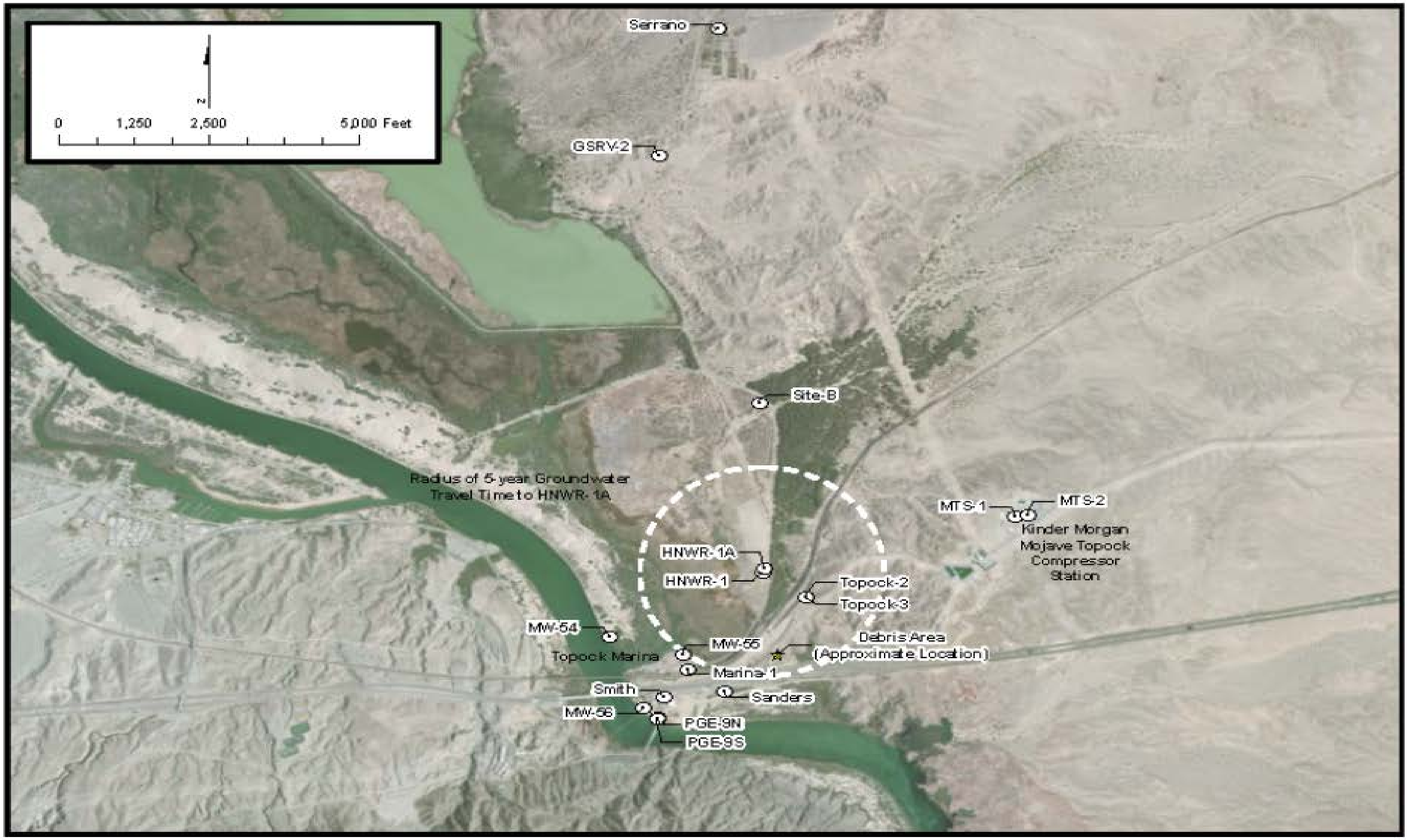


EXHIBIT 3.3-3
RADIUS OF FIVE-YEAR GROUNDWATER TRAVEL TIME TO HNWR-1A WELL
Groundwater Remedy Basis of Design Report/Pre-Final (90%) Design
PG&E Topock Compressor Station, Needles, California

Figure 22. Calculated radius of influence of freshwater supply well HNWR-1A at 5-years based on Arizona fixed-radius equation (page 3-37, CH2M Hill, 2014a). This should be calculated for life of remedial system (i.e., 30 years or more) and using an updated regional MicroFEM model.

Figure 6.5-17 in 90% BOD App B Groundwater Modeling report (CH2MHill, 2014a), reproduced earlier in this paper as **Figure 3** above, indicates some potential for flow breakthrough to the proposed MW-X and MW-Y location(s) during IRZ operation. However, two considerations are worth noting:

a. Monitoring wells between River Bank Extraction Wells (MW-29, MW-49, MW-33, etc.) would show concentration exceedances and violate hydraulic gradients for capture long before any impact would be seen at proposed MW-X or MW-Y. These wells are intended to monitor for bypass of the IRZ treatment area before concentrations were to enter the river or worse, move into Arizona. Monitoring wells located between extraction wells are roughly in the center of each river bank extraction well, where the potential for migration past the capture zone barrier created by the river bank extraction wells would be greatest. So these well locations would be the best locations to monitor for a breakthrough. River bank extraction wells are the least likely breakthrough points as they act as groundwater sinks.

b. In addition, simulated gradients, heads and particle paths are highly uncertain in this area and especially beneath the river. Until the multiyear IM-3 system is simulated and compared against flow and transport response data, model predictions beyond the western river bank should not be relied upon.

From review of the 90% BOD report (CH2M Hill, 2014a) the following were noted:

- For the 90%BOD review, no documentation was provided to the Tribes on the updates to the regional flow model (microFEM presumably performed by CH2M Hill which incorporated additional data from Site B drilling).
- No documentation was provided to the Tribes describing what specific changes were made to the 60% BOD sub-model (MODFLOW and MT3D) in going from 60% to 90%, nor were updated model input files provided for review as was done for the 60% BOD review.
- These updates and all inputs and assumptions are important to Tribes for assessing the performance and reliability of the constructed models and their predictions.
- It does not appear that water extraction from HNWR-1A or the Site B well extraction plus time-varying stage in the Colorado River and Topock Marsh area were ever simulated to better assess probable changes in flow paths.

Recommendations

Several actions could be undertaken immediately to improve understanding of groundwater flow beneath the River and on the Arizona side without incurring considerable cost or schedule delays. The ongoing unrelated project delay due to Subsequent Environmental Impact Report (SEIR) development, combined with the time needed for construction of the system, and system startup/testing should offer sufficient time for PG&E to address some of the limitations noted above. This should provide much needed justification to all parties, especially the Tribes, that any new monitoring wells in addition to MW-54, MW-55 and MW-56 are in fact needed, and that proposed numbers, locations, depths and sampling frequencies have a sound basis.

Field Testing/Monitoring

1. **Tracer Test.** Conduct a tracer test immediately to determine the nature of any hydraulic connection between existing Arizona monitoring wells and California IM-3 extraction and/or monitoring wells:
    a. Introduce different tracers into the deep zones of wells MW-54, MW-55 and MW-56. Based on the current understanding, this is the only likely pathway beneath the Colorado River.
    b. Monitor individual tracer breakthroughs at various depth zones in monitoring wells between PE-1 and TW-3D and Arizona wells (i.e., at MW-34 near PE-1, or at MW-54, if injecting at MW-55).
    c. Utilize the current MODFLOW model with transient river fluctuations, or ideally an updated model, to help predict breakthrough times for each tracer. Even if the time it takes for a tracer to migrate from any of these wells to the west side takes more than a year (i.e., 1 to 2 years based on current gradients and assumption that a flow path exists and does not stop at a potential hydraulic river barrier at depth), even extending into startup of the proposed remedial system (i.e., NTH IRZ injection/extraction wells, Riverbank wells, etc.), the information gained by any tracer test (i.e., just showing hydraulic connection) would be highly valuable in revising the CSM, and model flow and fate/transport parameters. These updated parameters could then be used to assess the number, locations, and depths of any additional monitoring wells beyond MW-54, MW-55 and MW-56.

2. **Monitoring Data.** Monitor head, temperature and conductivity continuously (i.e., hourly) using dataloggers/transducers at all AZ wells (at least MW-54, MW-55, and MW-56).

3. **Revised Contour Maps.** Prepare groundwater contour maps across the entire area bounded by continuous monitoring wells in both Arizona and California for specific times (at a certain hour in a day) using the continuously monitored (hourly) data, incorporating River and Topock Marsh surface water fluctuations in appropriate layers (similar to DOI comments #104 and #105).

Model Revision and Re-Evaluation of Monitoring Need/Locations

1. **Conceptual Model Update.** Develop and clearly describe a conceptual flow/fate/transport model that describes 3-dimensional (horizontal and vertical) flow conditions, based on available data and characterizations, in the vicinity of the River , beneath the River, and into Topock Gorge, and within Arizona to all areas that have stresses (i.e., pumping) that may affect groundwater flows within the eastern banks of the River, or which might be influenced by the remedial system, including the freshwater sources.

2. **Use Current Industry-Standard Modeling Tools.** If PG&E is committed to continuing to using MODFLOW/MT3D, at least consider using more up to date standard MODFLOW packages which would simulate ET, Recharge and River-Aquifer exchange processes more realistically:
   a. ET boundary condition – Instead of using the original MODFLOW EVT package which treats ET loss as a linear function of hydraulic head (not very physically realistic), consider using MODFLOW Riparian ET package (available for MODFLOW-2005) http://pubs.usgs.gov/tm/tm6a39/pdf/tm6a39.pdf, or even the ETS package (http://pubs.er.usgs.gov/publication/ofr00466).
   b. Recharge boundary condition – See the following publication on the Basin Characterization Method (BCM) currently used by the USGS in a number of southwestern basins. (http://pubs.usgs.gov/pp/pp1703/b/pp1703b.pdf) or (http://pubs.usgs.gov/sir/2007/5099/).
   c. River boundary condition – Consider using alternative, newer and more robust stream-aquifer packages to simulate the interaction between the Colorado River and the underlying aquifer(s):
      i. STR package (older than the subsequent two SFR packages, but more robust than RIV package used in the Topock MODFLOW modeling (http://water.usgs.gov/nrp/gwsoftware/modflow2000/MFDOC/index.html?riv.htm)
      ii. SFR1 package - http://pubs.er.usgs.gov/publication/ofr20041042
      iii. SFR2 package - http://pubs.usgs.gov/tm/2006/tm6A13/
   d. Consider simulating flow conditions using a density-dependent flow code (i.e., FEFLOW, SEAWAT (MODFLOW/MT3DMS-based) , SUTRA/Sutrasuite, or even MODFLOW-SURFACT) so that the effects of density and temperature variations could be considered in the modeling as they affect current and future remediation-affected flow paths.

3. **Revise Model Layers.** Revise model layers to coincide with hydrostratigraphic units (and screened zones where possible), and consider adding more layers (i.e., subdividing single units) so that surface water interaction with groundwater, and flows and fate/transport can be simulated more realistically. Not doing so can produce misleading fate/transport estimates (i.e., concentration trends, pathways, etc.).

4. **Recalibrate the Model.** Re-calibrate the existing flow and fate/transport models to the many years of readily available IM-3 quarterly monitoring response data, including fully transient river and Topock Marsh stage fluctuations. Use information from tracer testing in existing Arizona wells (MW-54, MW-55 and MW-56) as described in recommendation #1, continuously monitored and correctly salinity-adjusted Arizona well water levels, and revised conceptualization to assess more realistic/consistent 3-D flow paths beneath the river and into it.

   Reassess and revise all model parameters during calibration, especially parameterization of hydraulic conductivity, storage and riverbed conductance beneath and east of river. These distributions are far too complex due to poorly constrained parameter estimation in this area using PEST. Also reassess and revise ET parameters, recharge and river cells, as detailed above.

    i. Show 3-dimensional particle flow paths, if any are found to exist beneath the river, and in California.
    ii. Utilize PEST where possible, but better constrain the distributions such that critical parameter distributions such as hydraulic conductivity or riverbed conductance don't abruptly change in physically unrealistic/unjustified ways beneath critical parts of the river (i.e., between MW-34 and MW-54 and MW-55.)
    iii. Provide calibration statistics in a more standard and transparent way so all stakeholders can gain confidence in future predictions in key areas of interest, especially in the MW-X and MW-Y proposed area.
5. **Validate the Model**. As an alternative to re-calibrating the model to IM-3 data above, consultants could demonstrate acceptable performance of the model by validating it to IM-3 data as per modeling guidelines outlined on page 12 of this California DTSC document (https://www.dtsc.ca.gov/PublicationsForms/upload/GW_Modeling_for_Hydrogeo_Characterization.pdf).

6. **Conduct Simulations to Predict Future Flow Conditions.** Estimate all future flow paths and fate/transport for the current proposed remedial system with **transient conditions** instead of the steady state approach used in 90% BOD. This should include site conditions such as IRZ on and off, variable stage for the Colorado River and HNWR Topock Marsh, and influence of HNWR-1 (+/- Site B) well extraction, with/without the west side river bank extraction wells operating. Using a transient model that includes the time it takes for the California-side groundwater levels to adjust to IRZ wells being turned off or on with overlapping seasonal and daily fluctuations of the river will greatly aid future tribal (and all stakeholder) visualization and interpretation of the potential for predicted groundwater flow paths in the vicinity of the river, beneath it and into Arizona. This should also greatly aid in evaluating whether monitoring wells MW-X and MW-Y are needed, and whether their locations are appropriate.

7. **Optimize Operations.**
    a. Consider using a standard optimization approach (Optix w/Feflow, or HGL's PBMO software that works with MODFLOW/MT3D (http://www.hgl.com/expertise/modeling-and-

optimization/software-tools/pbmo-toolkit/)) to optimize proposed remedial system decision variables (pumping rates, TOC injections, cycles, pumping depths, injection/extraction well locations, etc.) given various implicit/explicit optimization constraints (i.e., minimizing remedial time, minimizing spatial extent of plume, minimizing by-products) with a new constraint that limits impacts of Arizona water by California remediation operations (i.e., extraction at River Bank wells). Additional constraints could also be considered – going forward w/O&M – which include minimizing pumping rates, TOC injection rates, cycling periods etc.

b. Consider Federal Remediation Technologies Roundtable Remediation Optimization approaches: http://www.frtr.gov/optimization/default.htm or USGS GWM-2000 approaches: http://water.usgs.gov/nrp/gwsoftware/mf2k-gwm/MF2K-GWM.html; see also: http://pubs.usgs.gov/fs/2005/3095/ .

c. Using the revised model, determine whether any additional monitoring wells are actually needed AND if actually needed, then optimize their number/placement – for all proposed remedial system designs/operations and any changes in the proposed system (including HNWR-1A, Site B, River Stage, or any other nearby pumping stresses). The model is the only tool available that can account for all known complexities/conceptual flow conditions, as long as all variables are addressed within the model. Assess 3-D, time-varying (seasonal) pathways between the west and east sides of the Colorado River, if any exist, given annual variations in pumping (west and east sides) AND seasonal variations in river and HNWR Topock Marsh stages.

Define an Alternative Basis for Performance Assessment of the Proposed Remedy

1. **Define a more appropriate target hydraulic containment boundary.** The 90% BOD report (CH2MHill, 2014a) does not mention "hydraulic boundary" or "hydraulic containment" area similar to what is done at the Hinkley Site. To meet RAO objectives (i.e., RAOs #2 and #4 (CH2M Hill, 2014a)), the target hydraulic containment boundary should be either:
   i. The eastern boundary of the Cr(VI) plume, which varies with depth. This boundary is ideal as it prevents migration of the plume into clean areas to the east. This may require additional refinement of the proposed NTH IRZ injection/extraction and Riverbank well extraction strategy, but it can likely be done.
   ii. The western bank of the River, or center line of the river as this technically represents the primary hydraulic boundary between west and east groundwater flows (and it represents the state boundary).

2. Define well pairs/triplets on the western side of the river to monitor gradients and concentration trends such that Cr(VI) does not move east of the current western plume boundary at any depth, or does not move to the edge of the western river bank, except in the vicinity of MW-34, where the plume has migrated furthest to the east at depth. In this area, wells MW-54, MW-55 and MW-56 more than adequately provide eastern monitoring points for assessment of eastward migration.

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TECHNICAL MEMORANDUM

PG&E Response to MW-X and MW-Y Whitepaper

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DATE:	August 14, 2015
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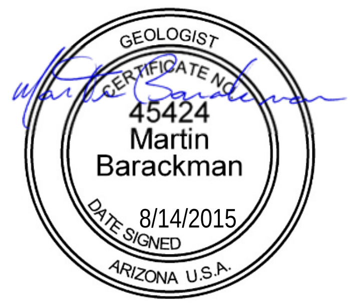

Expires 12/31/2015

As an action item from the July 23, 2015 Technical Work Group Meeting, this memorandum was prepared to present PG&E's review of a whitepaper, titled *Evaluation of Technical Justification for Proposed Monitoring Wells MW-X and MW-Y*, prepared by Robert Prucha and Margaret Eggers, dated July 15, 2015. The whitepaper addresses several technical aspects of the Topock conceptual site model and associated groundwater models as they relate to the location and purpose of the proposed monitoring wells MW-X and MW-Y in Arizona. PG&E's review is organized in the same general order as the whitepaper:

- Principal Premise – Purpose of MW-X and MW-Y
- Alternative Downgradient Monitoring Locations
- Use and Interpretation of Available Groundwater Level Data
- Groundwater Model Setup and Calibration
- Whitepaper Recommendations

Principal Premise -- Purpose of MW-X and MW-Y

The white paper states:

> "*The focus of this review was to evaluate the technical rationale applied to the siting of proposed monitor wells MW-X and MW-Y including the use of the existing groundwater model and other data. In particular, the potential for hydraulic communication beneath the Colorado River between the CA and AZ was evaluated. This necessitated a thorough examination of the assumptions applied in deciding on the need for these wells within the performance monitoring network. The Department of Toxic Substances Control (DTSC) has relied heavily on the groundwater model as the basis for the design and operation of the proposed remedial system (CH2M Hill, 2014a). As such, DTSC has also relied exclusively on the model in its current state to conclude that monitoring wells are needed across the river, at the proposed MW–X and MW–Y locations in Arizona.*"

> "*Currently, the purpose for MW-X and MW-Y appears unclear and raises additional questions.*"

As to the purpose for MW-X and MW-Y, the following is stated in DTSC's July 2014 presentation (titled "Proposed New Monitoring Wells for 90% Design" dated June 18, 2014) to the TWG:

> "*7. Arizona Sentinel Wells: At least two wells to monitor hydraulic capture and confirm that plume does not expand over the life of the remedy.*"

The importance of capture zone monitoring is supported by the agencies' direction letter on the remaining 60% design issues dated April 4, 2014:

> "*It is imperative that appropriate and acceptable plume control for both contaminants and byproducts be evaluated and established for the remedy. Furthermore, capture zone monitoring must provide definitive criteria and sufficient data that would allow DTSC to meet the plume control determination as specified in Exhibit A5a of the DTSC 2012 settlement with FMIT and to enable DTSC to reach findings required under Exhibit A1 and A2 for decommissioning of IM-3.*"

In addition, DTSC noted in its response to 90% comment #17 that these wells (i.e., MW-X and MW-Y) need to be installed early to establish baseline concentrations for water quality constituents (e.g., baseline chromium concentrations) so any naturally occurring trends can be observed before remedy start up. This will assist in determining if the well has been affected by the remedy.

Therefore, PG&E understands the need for MW-X and MW-Y to be as follows:

- Provide monitoring of chromium and byproducts downgradient from the treatment zone (i.e. sentinel wells).
- Provide groundwater levels for evaluating hydraulic influence of river bank wells and better defining capture zone.
- Provide baseline characterization of the aquifer in an area that is currently poorly characterized but important to the remedy and the model.

More importantly, PG&E also understands that the need for downgradient/sentinel wells such as MW-X and MW-Y is not driven by model results, and would not be negated by a model.

The following sections provide PG&E's response to the whitepaper, with the topics in the same general order as they were originally presented.

Alternative Downgradient Monitoring Locations

The whitepaper proposes that the river bank extraction wells could be moved inland so that hydraulic capture could be achieved around the margin of the chromium plume and downgradient monitoring could be implemented on the California floodplain. Moving the pumping wells closer to the IRZ increases the velocity through the sections of the IRZ closest to each river bank extraction well. With uneven flow velocity across the IRZ, there is a risk of chromium breakthrough in the higher velocity sections. To prevent breakthrough more carbon would have to be added, which could result in excess carbon and excess byproduct generation in the lower velocity sections of the IRZ. More organic carbon and in-situ byproducts would reach the extraction wells, leading to increased well maintenance on both extraction and injection wells. The separation between the IRZ and the river bank extraction wells in the current design is the minimum needed to avoid negative impacts of the wells on the IRZ and vice-versa. Moving the extraction wells inland of the plume boundary would require relocating the IRZ a similar distance further inland, into the upland area. A significant portion of the plume containing relatively high concentrations of chromium would then be located downgradient from the IRZ, presumably to be captured by the relocated river bank extraction wells. A treatment plant could be needed to remove chromium from the water pumped by the extraction wells prior to its re-injection in the IRL wells. Thus, establishing hydraulic capture in the floodplain with the river bank extraction wells relocated inland would result in a major re-design of the remedy, additional impacts in the uplands, and potentially expanded treatment system infrastructure and footprint. This could be considered a different remedial approach than approved by the DOI (Groundwater ROD, Dec. 2010) and DTSC (Resolution Approving the Final Remedy Project, Jan. 2011), could potentially take the project back to the CMS/FS stage.

Use and Interpretation of Available Groundwater Level Data

General Groundwater Flow Patterns near Topock

Based on the discussion and figures provided, it appears there may be a misconception in the whitepaper about groundwater flow patterns near the site. In order to be sure that there is common understanding, PG&E would like to provide some clarification of the conceptual model of groundwater flow at the southern end of the Mohave Valley. Figure 9 in the whitepaper is a groundwater contour plot showing groundwater flow from Arizona converging at the river channel and exiting southward through the narrow "notch" where the river flows between two bedrock outcrops. Only a small fraction (<10%) of the groundwater leaving the Mohave Valley flows through the notch where the river exits the valley. The majority (>90%) flows through a much deeper and wider paleo-channel beneath the Topock Marina. The existence of this paleo-channel and its inclusion in the model was directed by the USGS (Peter Martin, Program Chief of the Desert and Eastern Sierra Nevada of the California District) and is supported by geomorphology work done by Dr. Keith Howard of the USGS, which included carbon dating of sediments from boreholes on the Topock floodplain that showed the age of the fluvial material beneath the current river channel to be less than 12,000 years.

Although there are currently local gradients defined by MW-54 and MW-55 that show westerly flow, these westerly gradients are likely in large part a response to IM-3 pumping. The overall groundwater flow pattern under non-pumping conditions likely has an easterly component, from the Topock floodplain toward Arizona where most of the groundwater flows out of the valley. During the final remedy, the pumping of freshwater from Arizona will strengthen the natural easterly component of the gradient, resulting in increased potential for easterly migration of groundwater from California if the capture zone of the river bank extraction wells is incomplete. This easterly component would be most prevalent in the northern portion of the floodplain, where MW X and Y are proposed.

The groundwater contours in Figure 9 of the whitepaper are not consistent with the overall conceptual model of the site and are not representative of what would be expected during the operation of the final remedy. PG&E is concerned that much of the discussion about location of MW's X/Y and the hydraulic connection between Arizona and California in the whitepaper may be affected by what appears to be a basic misunderstanding of the groundwater flow patterns in the southern portion of the Mohave Valley.

Use of Water Level Data from Arizona Wells in Model

In response to questions raised in the whitepaper, PG&E can confirm that continuous water level data has been collected from the vertical well clusters in Arizona, MW-54 and MW-55 since 2008. These wells were not installed until late 2007, so the data from them were not available in during original calibration of the groundwater flow model in 2005. Although they were not incorporated in the original model calibration, the depth to bedrock in the model was subsequently revised to account for the observed bedrock contacts in the MW-54 and MW-55 boreholes and the depth to bedrock estimations from the USGS seismic survey conducted in the river channel at about the same time. The revised model projections were compared with measured water levels in the MW-54 and MW-55 wells and the match was determined to be reasonable. Therefore, no model recalibration was considered necessary based on data from these wells. As noted in the whitepaper, no long-term pumping tests have been conducted in the vicinity of MW-54 and MW-55 and the influence from IM-3 pumping at these locations is too slight to provide reliable measurements above the river fluctuations. Continuous water level data are available from these wells starting in 2008 and the average water levels from them are presented in the PMP reports.

As noted in the whitepaper, continuous water level data are not collected from the slant wells, MW-55 and MW-56. Slant wells were originally proposed as individual wells, each in a separate borehole. This would have required 6 boreholes at each slant well location. In order to minimize the number of boreholes, PG&E developed a design that allowed three monitoring intervals in each slant well borehole. Conventional well construction techniques could not be used due to the instability of the boreholes and the extreme angle at which they drilled. Consequently, the screened intervals in these wells consist of small diameter porous tubes (similar to Barcad® samplers) connected to small diameter (3/8”) flexible tubing. The upper portion of the wells is 1” PVC pipe, which can accommodate a small transducer but is too narrow allow insertion of a sounder in the well while the transducer is installed. Manual water level readings using a sounder are needed to calibrate a transducer in order to obtain a precise water level elevation. Even if sounders could be inserted, precise measurements of the angle of the pipes would be needed to establish the vertical depth to water. In addition, precise knowledge of the vertical depth of the monitoring interval would be needed to calculate a salinity correction and allow the water level to be referenced to mean sea level datum. The angle of the boreholes and depth of the monitoring intervals is not known with sufficient precision to allow these wells to be usable as water level monitoring points. The inability to get accurate water level data from these wells was anticipated and discussed at the time they were installed. It was understood that this was a trade-off the project stakeholders were willing to make in exchange for obtaining sufficient water quality data while minimizing the number of boreholes.

Water Level Averaging to Evaluate Gradients

The whitepaper contends that averaging of water levels from the transducers is not an appropriate way to measure average gradients. We believe this is incorrect. This issue was debated at length among all the stakeholders in late 2004 and early 2005 when the gradient metrics for IM-3 were being established. Particle tracking was conducted to show that groundwater movement in the floodplain could be predicted equally well with monthly average gradients or daily or hourly gradients. This method of monthly averaging of water levels has proven to be reliable over a decade of monitoring at this site. Water levels all across the site fluctuate in response to changes in river elevation, so a snapshot of water levels at one time of day may show flow toward the river while at a different time of day it would be away from the river. A groundwater divide is seen in snapshot water level plots that moves back and forth through the day. Without averaging, there is no way to make meaningful conclusions about overall groundwater flow patterns at a site where water levels are fluctuating several feet per day.

Model Setup and Calibration

The whitepaper raises numerous issues about the setup and calibration of the models. The information in this section is intended to provide clarification and address some of these issues. The groundwater flow model was developed over more than a decade, with ongoing improvement at each stage. Many of the ideas raised in the whitepaper have been discussed before and some may be implemented in future updates of the model. Other issues are based on misconceptions that we will attempt to clear up.

Model Boundary Conditions

There appears to be a misunderstanding in the whitepaper about the linkage between the flow and transport models. The whitepaper seems to indicate that the edges of the transport model are no-flow boundaries. As described in Appendix B of all the basis of design reports (30%, 60% and 90%), all the boundaries around the edge of the transport model are prescribed flux boundaries. The boundary fluxes are exported from the flow model. The transfer of boundary flux from a larger model to smaller, more detailed model provides a linkage between the models so that the water balance from the larger regional model is preserved in the smaller transport model. The whitepaper suggests the transport model is deficient because the river cells are not specified along the section of the northern boundary coincident with the river. The river flux in and out of the cells along the northern boundary is incorporated in the boundary fluxes imported from the larger flow model. Specifying river cells at the boundary in addition to the specified flux already assigned there would introduce errors in the model. The river cells are assigned in the interior of the transport model, but not at the boundaries.

The stage in the river and marsh are set to annual average conditions and the flow model is run in steady state. This is considered appropriate for the purposes of evaluating a remedy that is designed to perform for decades. The short term daily and monthly river level fluctuations are not critical to understanding overall remedy performance.

Bathymetry in the river was established based on the USGS seismic survey data in the vicinity of the site and estimated elsewhere. Considering that the model is run in steady state and the water table is generally coupled to the river and the marsh, it is unlikely to be sensitive to the bathymetry. If the model was run in transient mode to simulate a low river level where a portion of the marsh were dry, then more accurate bathymetry would be needed.

Riverbed conductance has not been measured and could not be directly measured without wells installed into the river bottom. Conductance would have a much larger influence on the steady state model results than bathymetry. The conductance in the marsh was set to a lower value than the river in recognition of the muddy bottom typical in marsh environments compared to the sand bottom in the river channel.

Evapotranspiration (ET) is another parameter that is difficult to measure and therefore typically assigned based on literature values. The ET rate in the model is based on the fact that the vegetation is sparse, so that in any one model cell there are areas of bare ground and areas covered by plants. The ET rate in the model was developed through calibration to the areas of the site were groundwater level data were available, primarily in the California floodplain. As suggested in the whitepaper, literature suggests a higher ET rate could be appropriate, but when a higher rate was applied, the simulated water levels in the southern floodplain, where vegetation is most prevalent, were excessively low. Because neither river conductance nor ET are tightly constrained, it’s likely that a calibration could be achieved with a higher river conductance (to provide more water) and a higher ET rate (to extract more water). Because most of the phreatophytes are near the river, the net result of an increased ET rate on the groundwater flow across the site would likely be small. Because the river represents an essentially unlimited source of water to the model, the water removed by a higher ET rate would be provide by the river cells nearby. There would more water exchanged between the river and the vegetation but the effects of additional ET in areas away from the river would be muted.

Water Balance

The whitepaper questions the discrepancy in the water balance between a regional USGS model and the local scale Topock model. This discrepancy was noted at the time the Topock model was being calibrated. At that time the USGS model was unpublished, but the USGS was heavily involved in the

Topock project and provided a "preview" of the USGS model. PG&E attempted to apply the large volume of Sacramento Wash underflow that is suggested by the USGS model to the Topock model, but it resulted in water levels far above land surface all throughout the eastern side of the model. The inconsistency between the two models was noted but the reason for it was never resolved. At the time, USGS scientist Peter Martin agreed that the Sacramento Wash underflow in the Topock model was more reasonable than the value in the USGS model. He believed it was possible that there was another outlet from the Sacramento valley where groundwater could move south without flowing down the Sacramento Wash valley.

Model Layering and Depth to Bedrock

The model layers do not correspond to hyrostratigraphic units everywhere in the model. Shortly before the CMS was prepared, there was a considerable discussion about revising the layering in the model to make it more consistent with the geology and initial efforts were undertaken to accomplish this. It was recognized at the time that this change was largely cosmetic and would likely not make a meaningful difference in the model projections. Because it would have added significant time to the schedule, it was not completed and the layering in the model remains as it was in 2005.

The whitepaper questions the assignment of depth to bedrock in Arizona. Further information about the depth to bedrock in the Arizona portion of the model is provided in a tech memo titled "Additional Details on Aquifer Test Interpretation and Groundwater Flow Model Updates for the Arizona Portion of the Topock Remediation Project Area, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California", distributed by e-mail from Christina Hong to the CWG members on August 12, 2015.

Density Dependent Flow

The issue of density dependent flow has been previously discussed in the Appendix B of the 90% BOD report, which states:

> *"With respect to TDS and density variations, while it is acknowledged that effects of density-driven flow may be possible, they are not expected to be significant. Given the aquifer heterogeneity and vertical anisotropy, and the relatively high expected flow velocities within the system in the vicinity to the freshwater injection wells, advection-driven flows are expected to allow adequate horizontal flows to develop and be maintained at all depths between freshwater injection wells and River Bank extraction wells. If however, effects of density are observed during remedy implementation (i.e. slower, or 'short-circuiting' of flushing within the deeper, more saline portions of the aquifer in areas some distance away from the injection wells with respect to monitored average hydraulic gradients), steps can be taken to mitigate these impacts."*

Incorporating density dependent flow into the model would make it a very cumbersome tool for use in remedial design.

Aquifer Response to IM-3 Shut Down

The whitepaper seems to suggest that because the effects of shutting off the IM-3 were not clearly observed in wells in Arizona, there may be some kind of hydraulic barrier or at least poor hydraulic communication between California and Arizona. PG&E sees no geologic basis for this interpretation. A much more likely explanation is that the signal generated by the modest amount of IM-3 pumping is simply not strong enough to propagate to the wells in Arizona and be seen above the noise of the river fluctuations. It should be noted that even in the floodplain near the pumping wells, the amount of water level change observed from the IM-3 shutdown test was generally less than 6 inches. PG&E believes that there was a likely a small response observed in the Arizona wells, but it was just too small to be quantified against the noise of the daily river fluctuations. The lack of response from the IM-3 shutdown test does not suggest the lack of hydraulic communication.

Whitepaper Recommendations

PG&E responses to the recommendations in the whitepaper are presented in this section.

Tracer Test

The whitepaper recommends a tracer test to evaluate groundwater flow between existing Arizona monitoring wells at the MW-54 location and IM-3 extraction wells in California under the Colorado River. PG&E conducted a modeling analysis to gauge the duration and the scale of such a tracer test under current pumping conditions. Current pumping of IM-3 consists of PE-1 at 30 gpm and TW-3D at 100 gpm, and was simulated to continue for 5 years into the future. First, the groundwater flow model was utilized to conduct a pathline analysis where particles were initialized around the existing MW-54 monitoring wells to represent tracer injected into the middle and deep screened intervals of the well (Model Layers 3 and 4, respectively). The particles were then tracked for a 5 year period which represent the average groundwater flow movement, and while particles traveled farther in Model Layer 3 than Model Layer 4, after 5 years particles still did not reach extraction well PE-1 in California. After 5 years, the full remedial design, including groundwater extraction along the river bank, was simulated and the particles shifted their migration path towards RB-4.

The potential impact of pumping from a future Topock Marina groundwater supply well (not associated with the Topock Remediation Project) was also evaluated with the pathline analysis. The pumping rate at this hypothetical well was assigned as 16 gpm, based on the anticipated future water demand reported by the Topock 66 Resort. The hypothetical well was located at the same location as the current Topock Marina well (which pumps brackish water) and screened in model layers 3 and 4. It's meant to simulate a potential future well that could be drilled somewhere on the marina property and produce water of sufficient quality for use at the marina. The pathline analysis indicates that tracer particles also have the potential to eventually arrive at such a hypothetical future Topock Marina supply well.

To further evaluate the tracer test, a solute transport model simulation was conducted to account for mechanisms such as dispersion and advection. The solute transport model was run using the same IM-3 hydraulic stresses as the groundwater flow model for a 5 year period. A theoretical conservative tracer was simulated without sorption or degradation originating at the MW-54 location in model layers 3 and 4. This transport analysis indicates that in order for an average concentration of 10 ppb (typical detection limit for bromide) tracer to arrive at PE-1 after 5 years, approximately 58,000 gallons of 2,000 ppm tracer would need to be introduced at MW-54. This would only be indicative of the arrival of the leading edge of the tracer mass. Significantly more than 5 years would be needed to observe the arrival of the center of the tracer mass and observe the tailing off of the concentrations, which is necessary in order do any quantitative analysis of a tracer test.

Based on the model simulations, it is apparent that a relatively significant volume of tracer and a long period of time would be needed to conduct a tracer test beneath the river. While a tracer test conducted under IM-3 gradients may show hydraulic connection, it is not representative of final remedy pumping conditions and will neither confirm nor refute the basis for the need for monitoring wells MW-

X and Y. Injecting a large volume of tracer that could linger in the aquifer for decades also increases the risk of tracer emerging in the river or arriving at future pumping wells.

Water Level Monitoring and "Snapshot" Contour Maps

As discussed earlier in this technical memorandum, continuous water level data are available from MW-54 and MW-55 wells, however it is not possible to get water levels from the slant wells with sufficient accuracy to support contouring with other wells at the site. The whitepaper recommends "snapshot" water level contour plots using water levels from a specific hour of the day. It is not clear what insight could be gained from this. Each hour of the day would show a different set of water level contours as the river signal propagated through the aquifer. While it is possible to gain insights and even develop estimates of hydraulic parameters by observation of aquifer response to changing river levels, these insights cannot be gained through snapshot contour plots, but rather by comparison of water level hydrographs to the river hydrograph. This hydrograph approach was used during model calibration to estimate hydraulic properties in the floodplain. Without a better understanding of how the interpretations would be used, PG&E does not see value in producing hourly water level contour plots.

Model Revisions

The whitepaper has many recommendations for revisions to the model, including use of different model packages and codes, revisions to the model structure, recalibration, validation, and optimization of the model. As noted above, the model has developed over a decade and will continue to be updated throughout the implementation and operation of the final remedy. The current model was initially built (as a flow model) to support comparison of remedial alternatives in the FS, then later augmented to provide solute transport capability in support of the design of the final remedy. It is anticipated that as new data become available and the project objectives change, the model will continue be improved and the recommendations in the whitepaper, along with others, will be considered at each step. Some of the recommendations, such as incorporating density dependent flow, could render the model unwieldy and therefore less useful as a tool for remedy design and operation. Others could add value and therefore be warranted. Each revision will be evaluated according to the model objectives at that particular time. Based on that evaluation, changes that could make the model less usable for its intended purpose and provide no greater accuracy should not be implemented.

Summary

The whitepaper appears to reflect some misunderstanding of groundwater flow patterns, model boundary conditions, and constraints on operation of the IRZ near pumping wells. It is hoped that this memo has provided some clarification of these issues. The whitepaper offers a number of recommendations for improvements to the Topock groundwater models which should be evaluated during future model revisions and updates. However, the need for and location of MW-X and MW-Y were not based exclusively on the model. Until the final remedy is installed and operating, it won't be possible to validate the model projections of capture zone extent and flow patterns associated with the river bank wells or the pumping in Arizona. Therefore, the need for MW-X and MW-Y cannot be negated by any improvements that could be done to the model at the present time. Analysis shows that the proposed tracer test could likely not be completed before IM-3 is scheduled to be shut down, might result in tracer eventually emerging in the river or in future supply wells, and would likely not yield data pertinent to the operation of the final remedy.

Response to PG&E August 14, 2015 Response to July 15, 2015 MW-X and MW-Y Whitepaper

Friday, August 21, 2015

Robert H. Prucha, PhD, PE (TRC)

Margaret R. Eggers, PhD, PG, CHG (TRC)

1) Evaluating tracer movement, timing and breakthrough with the current model is flawed, due to incorrect setup of several model inputs, highly uncertain parameterization and lack of any sensitivity/uncertainty analysis beneath river and in Arizona to qualify results.
    a. Flow and fate/transport model parameters have still not been calibrated to the available well data in Arizona or the near decade of IM-3 data in California. The latest PGE documents confirm this. Standard calibration statistics have still not been provided to stakeholders in any available online reports. Based on limited plots showing observed and simulated groundwater levels, model errors exceed 1 foot in key areas, like MW-34-80 (see page 50 of MW-X/MW-Y white paper). As a result, the model or the tracer test results cannot be relied upon. This is magnified by the strong sensitivity of tracer flow paths and times to gradient.
    b. The whole point to the proposed tracer test was evaluate model performance in a critical area of the model. It was not to use the current flawed model to demonstrate that a tracer test is not feasible. The tracer test was proposed in an effort to fill a glaring data gap, including:
        i. evaluate the potential for and nature of any hydraulic connection, particularly given the complex and poorly known hydraulic conductivity and riverbed conductance beneath river and in Arizona.
        ii. utilize the tracer results to revise the existing model. Using the existing model (un-calibrated in Arizona, and in need of several corrections) to calculate breakthrough times and flow paths under existing IM-3 extraction or proposed remediation, with average riverbank extraction rates (knowing these could be increased to reduce bypass) is flawed.
        iii. use the updated, improved model to re-evaluate the need for and valid locations for MW-X/MW-Y.
    c. Based on available data, reasonable estimated of hydraulic conductivity, and a simple Darcy velocity calculation, tracer breakthrough times were estimated at between 41 and 471 days, (See Table 1).
    d. There is no guarantee that:
        i. tracer movement could be greatly enhanced by continuously injecting water and increasing the gradient from MW-54 to MW-34. The challenge would be finding a source of water to inject into the well (river?). We originally assumed gradients resulting only from the existing IM-3 continuous extraction.
        ii. These high values seem very possible given the conceptual basis suggested in the August 11, 2015 CH2MHill Technical Memo clarifying details on aquifer test interpretations in Arizona. The memo suggests highly conductive gravels from Sacramento Wash moved into the Colorado floodplain and were deposited as shown on Figure 3. The problem is that the actual area of the high conductivity zone is arbitrarily assumed, as the model is not calibrated in Arizona. More likely the area of high conductivity extends into the actual Colorado River, coincidently, right across from where the Topock Marsh drains into the Colorado River. This is also roughly where the CrVI plume from California

appears to have migrated furthest to the east at the edge of the river AND where the high permeability zone in Layer 3 extends beneath the river, but then abruptly transitions into lower permeability material with no justification (Figure 2).

2) It is strange that the conclusion is now that IM-3 shutdown test resulted in no clear response in Arizona. It appears that the lack of connection is now used to justify not conducting a tracer test.
3) The conceptual model of 90% of Mohave Lake Basin flow through a hypothesized paleochannel (see Figure 4), based on unpublished discussions with USGS and no data, is surprising. No previous mention of this feature and it's important implications seems contradictory to previous conclusions in available documents. Figure 5 shows inferred bedrock surface elevation contours which suggest groundwater flows would still be directed beneath the Topock Gorge, as it is more deeply incised in this area. It is unclear why important details, for example, groundwater contours, mass balance, and calibration have still never been provided for the AZ side of the river provided earlier. As Prucha and Eggers (July 15, 2015) point out in their whitepaper, key specified or calculated water flows into/out of the model seem much too low, such as the estimated 3 gpm beneath the entire Colorado River at the southern end of the regional model (see Figure 6).

   It is equally unclear why an evaluation of the effects of alternative conceptual models in AZ (i.e., different paleochannel configurations) on proposed remedial design and system operation have not been conducted. Such predictions increase the level of transparency to all stakeholders on critical issues, such as the likelihood, extent and nature of any CrVI or byproducts that may be pushed into Arizona waters. Results of this analysis would be very relevant to all stakeholders now rather than after the system has been built. During the TWG meeting on August 19, 2015, PGE Consultant Martin Barackman indicated that calibration in the California proposed remediation area showed no difference when the hypothesized paleochannel was either included or left out. We strongly recommend that PGE Consultants review ASTM Standard D-5611 94 (Standard Guide for Conducting a Sensitivity Analysis for a Ground-Water Flow Model Application) on how to conduct such a predictive sensitivity analysis and to assess implications of having similar calibration results for different model setups, but differing predictions (i.e., a paleochannel vs. no paleochannel).
4) Only a select number of model deficiencies were discussed. The key deficiencies weren't addressed, and obvious corrections should be made to the model before utilizing it to assess any flow and/or fate/transport conditions beneath or across the river. At a minimum, if any results are shown, the model should be calibrated in this area and an uncertainty analysis performed on all predictions.
5) What are the realistic ramifications of tracer detections in the Marina well? The Marina well is only hypothetical – but would this really be something that would occur, given the increasing CrVI levels at MW-55 and MW-56 and the possibility and significant uncertainty for breakthrough from California to Arizona?
6) The point to MW-X/MW-Y is still unclear. For example:

a. What does the existing model predict for the range of CrVI concentrations in that area? We expect any by-pass concentrations would be low and likely well within observed range of background CrVI. Therefore, how could these wells actually be considered "sentinel' wells?
b. Data from wells MW-54, MW-55 and MW-56 were never used to calibrate the model, even after 10 years of data collection. In addition, the recent August 14, 2015 Technical Memorandum from Martin Barackman and Mike Cavaliere entitled "PG&E Response to MW-X and MW-Y Whitepaper" concludes that no discernible drawdown is observed in wells MW-54, MW-55 or MW-56 despite continuous 130 gpm extraction at IM-3 pumping wells. The total proposed Riverbank well extraction is only 150 gpm, but distributed over 5 wells. Any impact on drawdown at proposed monitoring wells MW-X and MW-Y will likely be even less than the negligible, if any, response at MW-54. The MW-54 data were initially thought to indicate some affect from IM-3 pumping, but later any impact was deemed to be so negligible as to be indistinguishable from variations in the fluctuating river level. In fact, it is likely that any affect from the IRL injection wells would be difficult to discern given the overlapping effects of river stage fluctuations, ET, well extraction at Riverbank wells, HNWR-1A, Site B and other production wells. So again, we strongly believe any water level data at MW-X or MW-Y would provide little value as either a sentinel monitoring well to monitor riverbank extraction performance, or to improve the conceptual site model or the numerical model.

7) What are details of the plan if CrVI is detected in AZ and attributed to California source?
   a. Once detected at MW-X and MW-Y, additional wells would be needed to characterize the extent of any new plume propagation and configuration within Arizona. The number and location(s) of additional wells is unknown.
   b. What would be the remediation plan in Arizona? The current proposed California remediation River-Bank extraction system would likely be unable to capture the Arizona contamination without compromising the performance objectives within California. If River-bank extraction rates are increased in an attempt to capture Arizona by-pass contaminants, this would increase the potential negative effects in the remediation system, such as striping, or increased by-pass.
   c. Not remediating all Arizona contamination (CrVI, Mn, As, etc.) violates RAOs. Would this additional remediation involve pump and treat in Arizona? Certainly some amount of additional infrastructure, roads, buildings, contractor activities etc., would be needed in Arizona.
   d. Worst case scenarios should be considered in any decision to install new monitoring wells in Arizona. At a minimum, the current entire proposed remediation design really needs to be re-thought here. Certainly, the possibility of expansion of the plume into Arizona was not considered during the early process of remedy selection.

8) A key recommendation at this point, which is echoed in comments by DOI consultant David Back, is to simply wait to determine the need, number and locations of any additional Arizona groundwater monitoring wells (i.e., MW-X and MW-Y), until new data is collected during system construction and startup testing. After the model is updated and re-calibrated, various

scenarios can be run and explored to evaluate possible locations in Arizona. We fundamentally believe that fixing all of the model issues now, and re-calibrating to available Arizona groundwater and the nearly 10-years of IM-3 data, is crucial to maintaining the model as a predictive tool. Proposed remediation design and operating scenarios can then be simulated which incorporate a fluctuating river and different conceptual models of the poorly characterized subsurface system in Arizona. Scenarios might be run with or without a permeable paleochannel, or extending the high permeability (500-900 ft/d) material from Sacramento Wash into the Colorado River and connecting it with the MW-34 well area material. Such applications of an improved model would provide the necessary confidence to all parties that the model predictions, as well as the remedy as designed, will function as planned. Once the remedy is installed, it will be too late to avoid unnecessary components, and additional wells and infrastructure may be needed to address unforeseen shortcomings in the system.

9) How much tracer volume is really required to see tracer compound detections at CA wells? The >50,000 gallons estimated by PG&E consultants seems highly excessive.

The high volume estimate included an assumption of 35% porosity – initialized both mobile and immobile. Initializing this with a more realistic effective porosity of 12% would greatly reduce tracer volume required. The estimate was made by modeling one addition of tracer into a single 25' x 25' model cell instead of using an actual well borehole volume. This seems to have only been done for the purpose of doing the estimation within the model itself. Evaluating this same situation but using the well borehole volume for a 4-inch to 12-inch well seems more appropriate, and more realistically, and greatly reduces, the estimated tracer volume required. We believe much lower injected volumes would be needed to produce detectable concentrations at wells near MW-34 in California (IM-3 Area).

Table 1. Estimated Tracer Breakthrough Times

Approximate Distance from MW-34 to MW-54 (ft)[1]	770
Effective (mobile) Porosity	0.12

	Kh		Avg. Annual Head, ft		Gradient	Velocity	Breakthrough
	(ft/d)	Year	(mw-34-100)	(mw-54-195)	ft/ft	ft/d	days
High K value between mw-34 and mw-54, Layer 3[2]	175	2014	452.16	453.78	0.0021	3.07	250.96
High K value between mw-34 and mw-54, Layer 3[2]	175	2013	451.71	453.62	0.0025	3.62	212.86
High K value between mw-34 and mw-54, Layer 3[2]	175	2012	451.97	453.48	0.0020	2.86	269.25
Minimum K between mw-34 and mw-54, Layer 3[2]	100	2014	452.16	453.78	0.0021	1.75	439.19
Minimum K between mw-34 and mw-54, Layer 3[2]	100	2013	451.71	453.62	0.0025	2.07	372.50
Minimum K between mw-34 and mw-54, Layer 3[2]	100	2012	451.97	453.48	0.0020	1.63	471.18
Site B, Table 2, Layer 4[3]	900	2014	452.16	453.78	0.0021	15.78	48.80
Site B, Table 2, Layer 4[3]	900	2013	451.71	453.62	0.0025	18.60	41.39
Site B, Table 2, Layer 4[3]	900	2012	451.97	453.48	0.0020	14.71	52.35
Topock-2/-3, Table 2, Layer 1[3]	160	2014	452.16	453.78	0.0021	2.81	274.49
Topock-2/-3, Table 2, Layer 1[3]	160	2013	451.71	453.62	0.0025	3.31	232.81
Topock-2/-3, Table 2, Layer 1[3]	160	2012	451.97	453.48	0.0020	2.61	294.49
Site B, Table 2, Layer 3[3]	500	2014	452.16	453.78	0.0021	8.77	87.84
Site B, Table 2, Layer 3[3]	500	2013	451.71	453.62	0.0025	10.34	74.50
Site B, Table 2, Layer 3[3]	500	2012	451.97	453.48	0.0020	8.17	94.24

Note 1. See Figure 1 for distance between MW-34 and MW-54.
Note 2. See Figure 2 for the values and distribution of conductivities in model layer 3 between MW-34 and MW-54.
Note 3. See CH2MHill, August 11, 2015. Technical Memorandum from Martin Barackman to PG&E. "Additional Details on Aquifer Test Interpretation and Groundwater Flow Model Updates for the Arizona Portion of the Topock Remediation Project Area, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California"

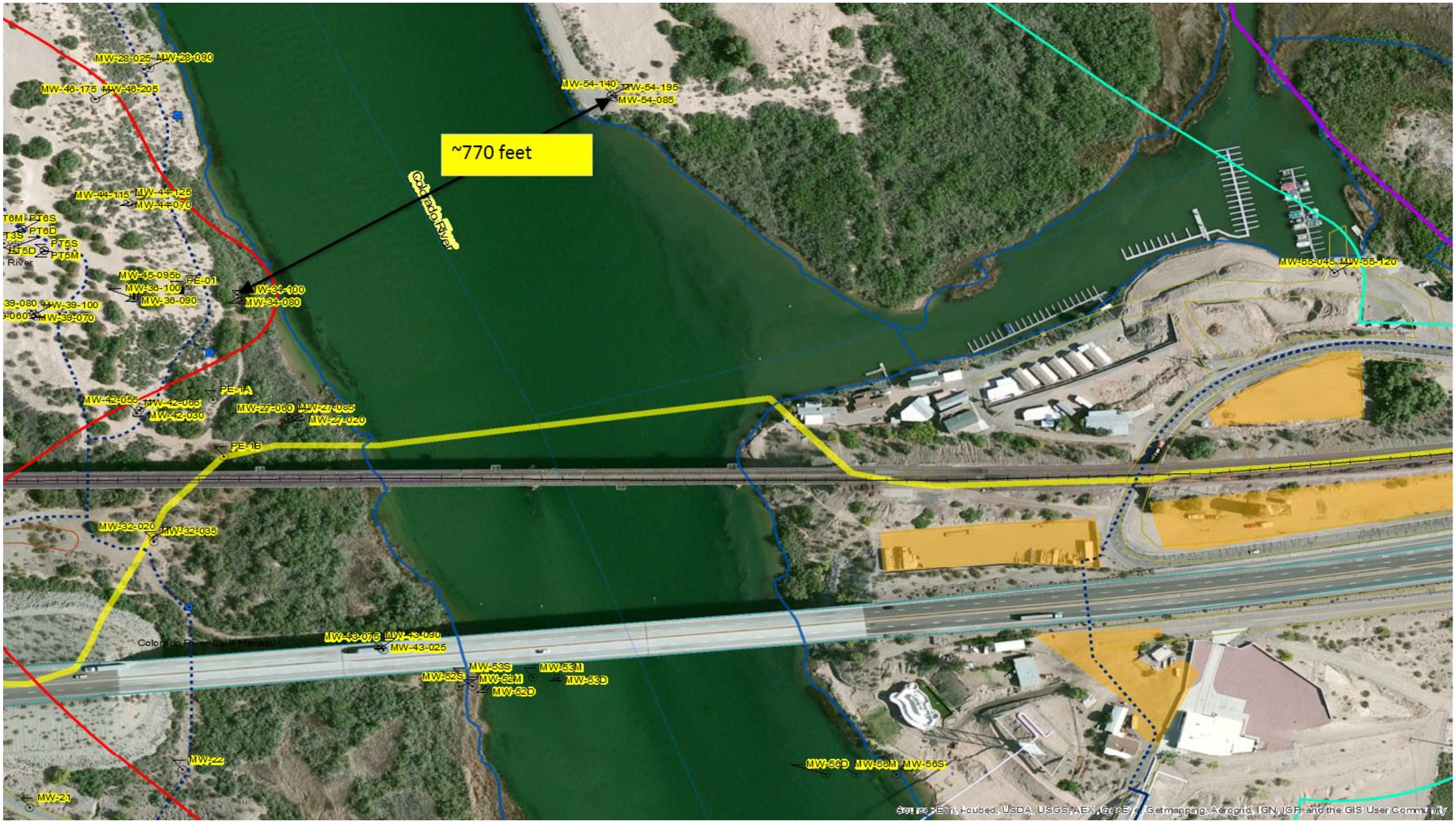

Figure 1. Shows distance between wells MW-34 (California) and MW-54 (Arizona).

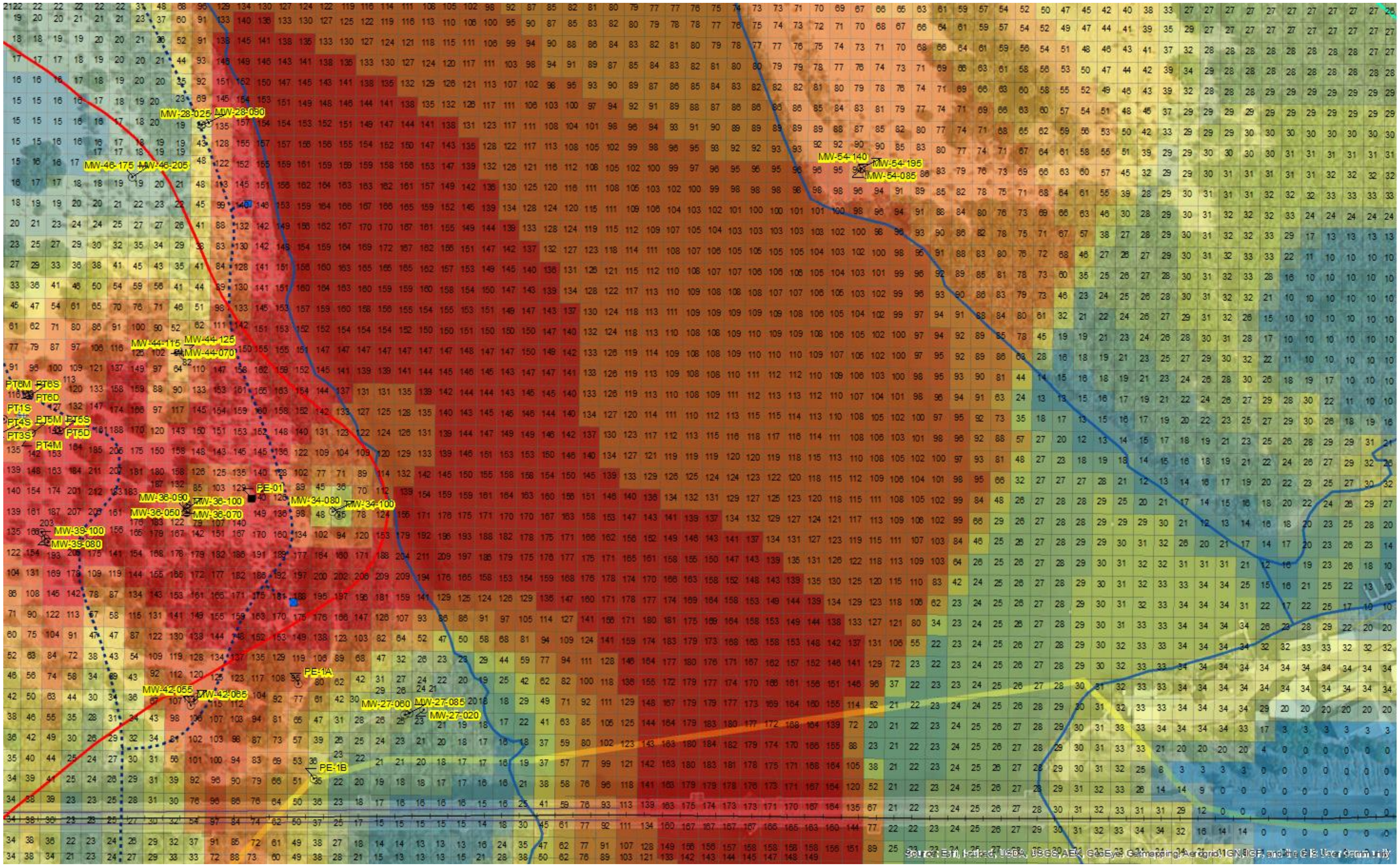

Figure 2. Shows 60%BOD Modflow Model Layer 3 Hydraulic Conductivity Values Between MW-34 and MW-54 (ft/d).

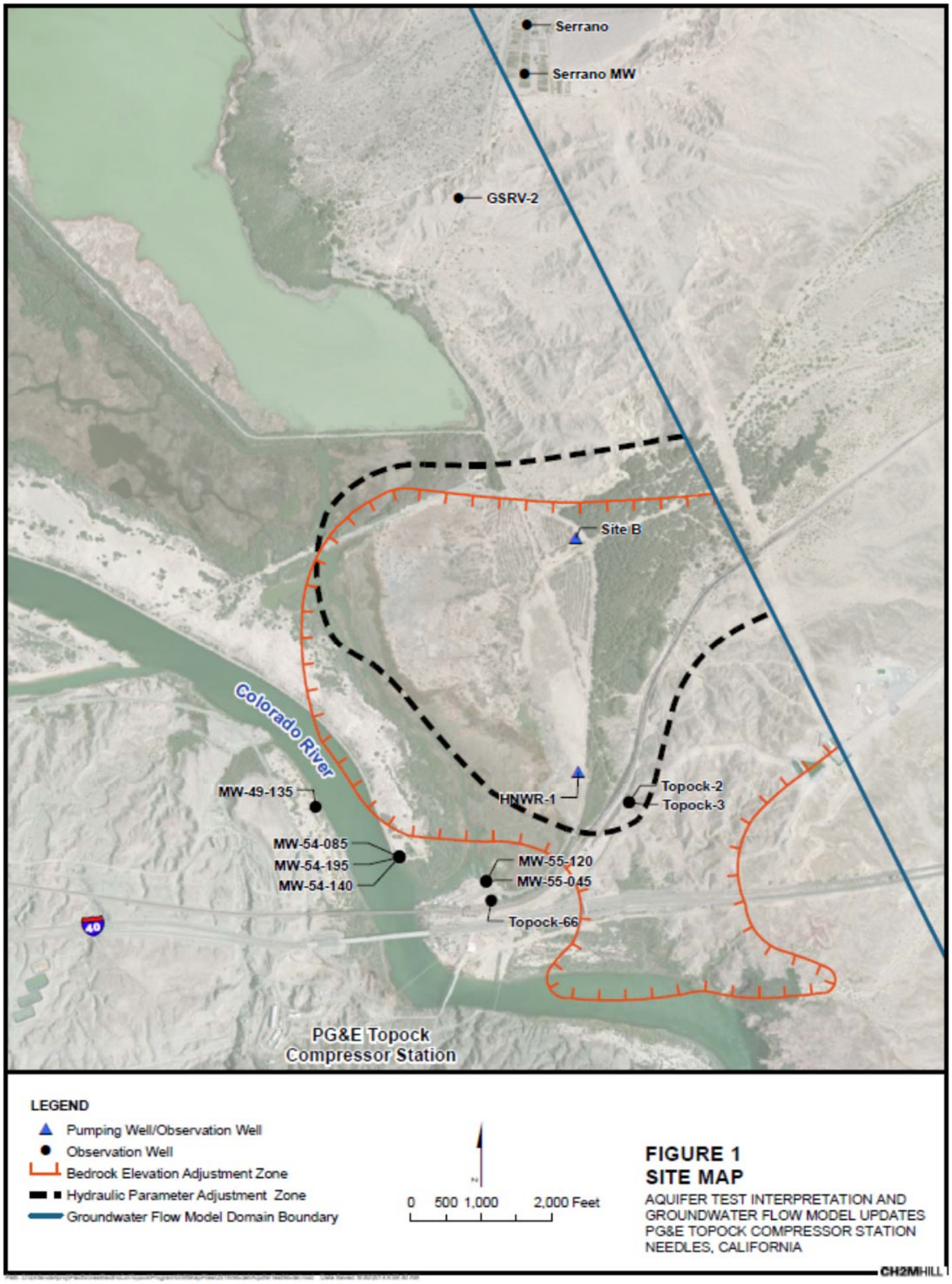

Figure 3. Hydraulic Parameter Adjustment Zone – where high hydraulic conductivity assigned, but arbitrary given no calibration east of River.

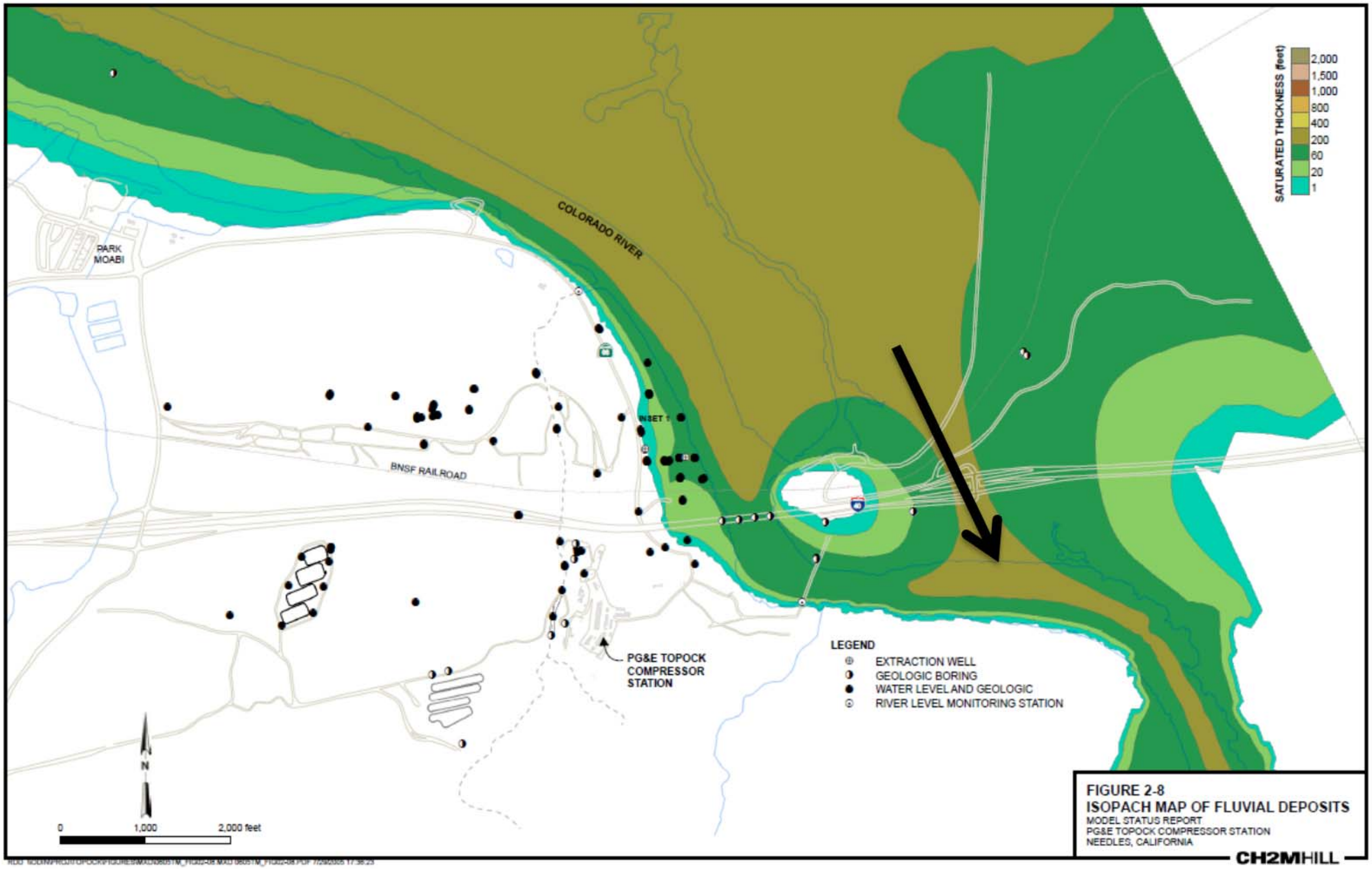

Figure 4. Shows assumed Fluvial Deposit (black arrow), through which CH2MHill argues 90% of groundwater from entire Mohave GW system discharges to the south and into material beneath Colorado River. However – there are no data to support this, no CrVI has been detected in AZ from California which seem more likely given increased potential flow from PGE site to this fluvial outlet. GW contours don't seem to support this concept (i.e., MW-54, -55 and -56 are oriented towards Colorado River (natural gradient if discharge is via Colorado River in lower aquifer)).

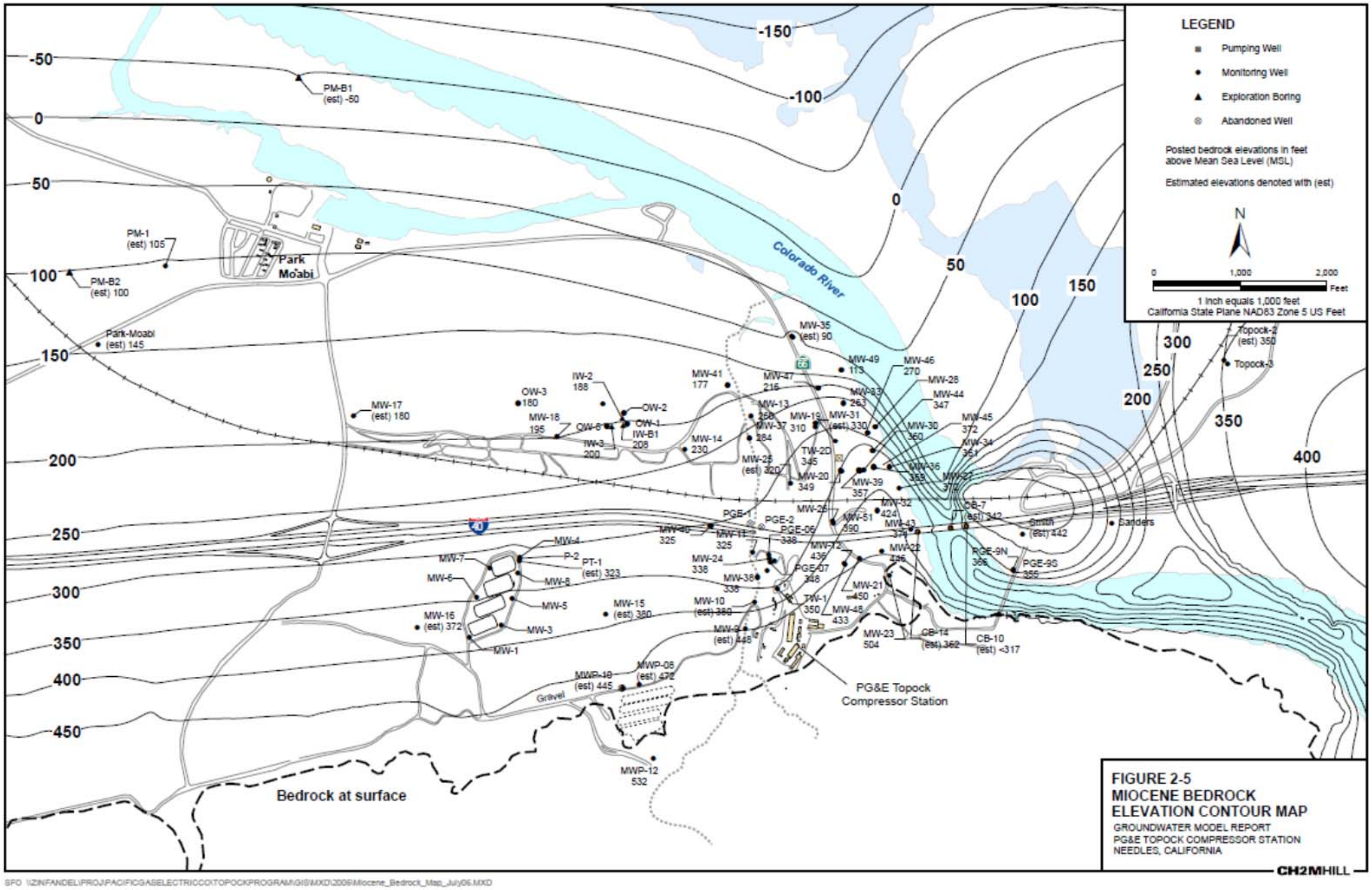

Figure 5. The estimated bedrock surface, revised with USGS seismic data suggests the primary discharge area is through the Topock Gorge, versus through the paleochannel, hypothesized immediately south of the Topock Marsh, east of Topock Marina, which connects up with the Colorado River to the south.

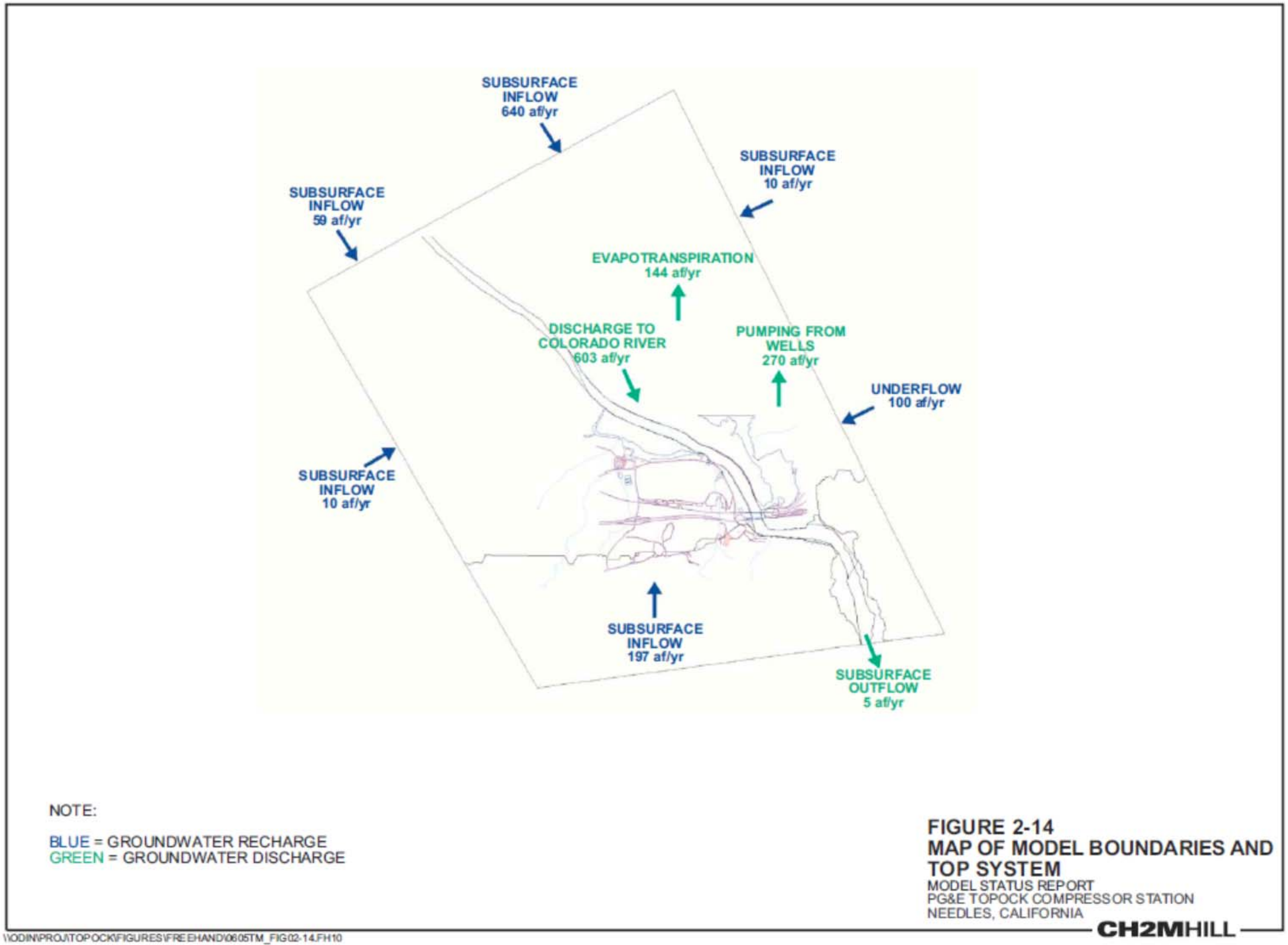

Figure 6. Shows Calibrated model external water balance specifications. Subsurface outflow is only 5 ac-ft/yr beneath Colorado River. This equates to only 3 GPM, or a low flow garden shower. Conceptually this appears unrealistically lower than might be expected below the mighty Colorado River, nearly 3 football fields wide.

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Office of the General Manager

September 10, 2015

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Dear Mr. Yue and Ms. Innis:

Topock Groundwater Remediation Project
Response to Comments on the 90 Percent Design Documents

The Metropolitan Water District of Southern California (Metropolitan) appreciates the opportunity to submit comments for your agencies' consideration in providing direction to Pacific Gas and Electric (PG&E) on the final design for the groundwater remediation project at the PG&E Topock Gas Compressor Station site. On June 26, 2015, we received the Response to Comments (RTC) on the 90 Percent Design Documents and have participated in subsequent Technical Work Group (TWG) meetings, held in July and August 2015, focused on resolving outstanding project concerns. Metropolitan's 90 percent design comments have been adequately addressed in the RTC. We are providing additional comments below, based on recent TWG discussions regarding the proposed MW-X and MW-Y monitoring wells and construction sequencing.

Comment 1
Metropolitan affirms the critical need for monitoring wells, MW-X and MW-Y. The groundwater remedy involves accelerating groundwater flow eastward, towards an In-situ Reactive Zone (IRZ) located west of the Colorado River in California. Monitoring wells, MW-X and MW-Y, are proposed to be located downgradient from the remediation zone

and east of the Colorado River in Arizona. We agree with the Department of Toxic Substances Control's (DTSC's) determination (per RTC table comments #10 and #17) that the wells are needed to establish baseline concentrations for water quality and to monitor for chromium-6 and byproducts generated from treatment downgradient of the remediation zone. Overall, the MW-X and MW-Y wells would serve as sentinel wells to confirm hydraulic gradient and capture in the remediation zone and to ensure protection of the Colorado River.

Comment 2
At the August 27, 2015 TWG meeting, PG&E presented a proposed construction sequence schedule that would involve shut-down of the Interim Measure 3 (IM-3) treatment and start-up of the IRZ operations, almost two years prior to completion of the groundwater remediation system and the start-up of the riverbank extraction wells. Metropolitan understands the importance of shutting down IM-3 sooner to be able to evaluate the IRZ start-up without influence from IM-3 extraction and to collect additional information needed to refine the groundwater remedy construction. However, we are concerned with the potential for IRZ to not perform as modeled. If groundwater movement and transport of chromium-6 and remedy byproducts are not as predicted and instead they move significantly towards the Colorado River prior to PG&E completing construction of all groundwater remedy components, the riverbank wells will be needed as a contingency to protect the Colorado River. Metropolitan requests that PG&E consider the installation of the riverbank wells a priority in the construction sequence and that these wells be available for pumping when IM-3 is shut-down and IRZ begins operation.

We thank DTSC and the U.S. Department of the Interior (DOI) for considering our comments in providing direction to PG&E on the final design. Also, we value DTSC and DOI's extensive collaboration with stakeholders to adequately address outstanding project concerns, while ensuring that the final remedy moves forward in a timely manner. If you have any questions, please contact me at (213) 217-5646 or bkoch@mwdh2o.com.

Very truly yours,

Bart Koch

Bart Koch
Section Manager, Operational Safety & Environmental Services

BK:dp
W:Koch/BK_Topock comment letter 2015.docx

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