



Linda S. Adams
Secretary for
Environmental Protection



Department of Toxic Substances Control

Maureen F. Gorsen, Director
5796 Corporate Avenue
Cypress, California 90630



Arnold Schwarzenegger
Governor

Sent Via Email

September 3, 2007

Ms. Yvonne Meeks
Portfolio Manager – Site Remediation
Pacific Gas and Electric Company
4325 South Higuera Street
San Luis Obispo, CA 93401

COMMENTS ON CORRECTIVE MEASURES/ FEASIBILITY STUDY WORK PLAN,
PACIFIC GAS AND ELECTRIC COMPANY (PG&E), TOPOCK COMPRESSOR
STATION, NEEDLES, CALIFORNIA (EPA ID NO. CAT080011729)

Dear Ms. Meeks,

The Department of Toxic Substances Control (DTSC) has completed our review of the June 29, 2007 revision of the Corrective Measures/ Feasibility Study Work Plan and offers the following comments.

1. Page 1-2, Section 1.2, Site History and RFI/RI Status: The CMS Work Plan suggests six phases of investigation at the Topock Site, but did not specifically identify these phases. For clarity, please identify the six phases as stated.
2. Page 1-2, Section 1.2: The third bullet in paragraph 2 should include a reference to the fact that interstitial water and historic wastes were also sampled and analyzed as part of the site investigation conducted at the Topock site.
3. Page 2-1, Exhibit 2-1: The exhibit suggests that the site investigation and the risk assessment provide the initial steps to the Site Conceptual Model. The reality is probably more of an iterative process to refine the Site Conceptual Model leading to a good predicative risk assessment to derive at the Remedial Action Objectives.
4. Page 2-2, Contaminant Distribution in Groundwater: Section 2.1.1 identifies the following COPCs for groundwater: total chromium (Cr(T)), hexavalent chromium (Cr(VI)), copper, nickel, lead, zinc, pH, electrical conductivity and

total petroleum hydrocarbons (TPH) as well as other COPCs as ongoing investigation are completed. Section 2.1.2 states that, in August 2004, DTSC approved the deletion of copper, nickel and zinc from the routine groundwater monitoring suite. However, the Work Plan does not seem to emphasize and carry forward other COPCs except chromium in groundwater. DTSC notes that arsenic and molybdenum were also identified as potentially elevated in recent groundwater investigations for some wells.

5. Page 2-2, Section 2.1.2: The first paragraph identifies the California MCL for Cr(T) in units of milligrams per liter (mg/L). Since the figures in the CMS/FS Work Plan present concentrations of COPCs, including Cr(T), in units of micrograms per liter ($\mu\text{g/L}$), this paragraph also should provide the MCL for Cr(T) in units of $\mu\text{g/L}$. The text and figures should be consistent in the units of measure utilized.
6. Page 2-3, Section 2.1.3: No quantification is provided with regard to reducing conditions observed in groundwater in the fluvial deposits and sediments beneath the Colorado River. The last sentence in this section misleads the effectiveness of the natural reducing conditions to limit or prevent Cr(VI) impacted groundwater through the sediments. Please notes that the deepest well screen interval for MW-34 has Cr(VI) concentrations above 50 $\mu\text{g/L}$.
7. Page 2-3, Section 2.1.4, Potential Groundwater Receptors: The conclusion or suggestion that there is currently no evidence of a complete pathway for Cr(VI) in groundwater to reach a receptor is premature and unsubstantiated. Unless PG&E provides full justification and discussion of potential pathways with the site conceptual model in this work plan, DTSC can not concur with this statement and suggests its removal.
8. Page 2-3, Section 2.2, Conceptual Model for Soil: DTSC notes that PG&E cited one SWMU, 17 AOCs and one undesignated area for the soil investigation, but listed SWMU 2 in Figure 1-2 to be inclusive. DTSC recommends inclusion of a table of all SWMUs, AOCs, and other undesignated areas as an additional exhibit for clarity. This table can also differentiate which units are studied within the soil or groundwater RFI.
9. Page 2-4, Section 2.2.1: PG&E only noted the origin of contaminants to be released through spills and leaks. PG&E should also recognize that some release of contaminants could have been associated with past management practices associated with hazardous material handling.

10. Page 2-4, Section 2.2.2: This section suggests that copper and zinc are found above background concentrations. However, background concentrations for COPCs have yet to be determined.
11. Page 2-4, Section 2.2.3: This section discusses two primary routes of soil contaminant migration that will be considered in the CMS/FS. Additional route; however, consisting of transport of contaminants through soil via infiltration (but not to groundwater), and possible air dispersion due to blowing wind should also be included in this section.
12. Page 2-5, Section 2.3: PG&E used the term “points of compliance” in a couple of sections in this work plan, but failed to properly define its meaning or its use. DTSC notes that this is a similar comment in our May 15, 2007 letter.
13. Page 3-2, Section 3.1.1, Groundwater site objectives: Remedial action objectives for the groundwater should also include consideration for elimination or control of contaminated groundwater migration in the region, not just to river.
14. Page 3-3, Section 3.2.2: The write up should also consider “action specific” ARARs which are completely absent from this section.
15. Page 3-3, Section 3.2.3: Please clarify that the groundwater background study report is still under evaluation despite the completion of the field study. This section misleads readers to think that there is a conclusion on the background study results.
16. Page 4-2, Section 4.0: *In-situ* remediation is not used consistently in Table 4-1. For example, with TPH, no specific *in-situ* remediation technologies are listed for soil or groundwater. For volatile organic compounds (VOCs), along with *in-situ* remediation, soil vapor extraction, which is a specific *in-situ* remediation technology, is also listed. The same holds true for Cr(VI) where specific *in-situ* remediation technologies are listed. Instead of just stating *in-situ* remediation as a technology, the specific potential *in-situ* remediation technologies applicable to the site should be mentioned. This table also has MNA (monitored natural attenuation) which should be defined when initially introduced in the table, and this abbreviation also is not included in the Acronyms and Glossary. Similarly, Table 4.1 should include technologies for *ex-situ* treatment of excavated soil. DTSC also notes that additional potential remedial technologies for groundwater should also be listed including phytoremediation for VOC, Cr(VI) and other metals. Extraction and trucking should also be considered and evaluated for groundwater and soil. Also,

potential of using soil washing for TPH and PAH in soil should also be considered.

17. Page 4-6, Section 4.1.4: PG&E states that “heavy equipment is needed for construction” of a permeable reactive barrier. Please define “heavy.” DTSC notes that in some cases, such as for some zero-valent iron filing walls, installation can be completed with equipment similar to a drill rig. Since the intention of the CMS/FS is to present an unbiased evaluation of the available technologies based on specific alternative evaluation criteria, PG&E should be cautious of any discussion which may bias the technology in this work plan.
18. Page 4-7, Section 4.2: This section states that the soil COPCs to be addressed in the CMS/FS have not been determined yet; therefore, the CMS/FS Work Plan focuses on technologies to address Cr(VI), which is the primary COPC in groundwater and likely in soil. However, the 2005 Draft RFI/RI indicated that the COPCs Cr(T), polynuclear aromatic hydrocarbons (PAHs), and lead have been found at concentrations above the residential and, in some cases, industrial PRGs during investigations conducted at the site to date. Based on this information, it would be pertinent to include a discussion of soil remediation technologies for those additional COPCs in the Draft CMS/FS Work Plan.
19. Page 4-10, Section 4.2.2.2: The soil screening box in Exhibit 4-7 should have the arrow directed to the oversized material box. The arrow from the dewatering step should be directed to the sludge box.
20. Page 4-11, Section 4.2.3: Two primary requirements for soil flushing should be listed: (1) the flushing solution must be effectively transported so as to contact the impacted soil and remove the contaminant; this is not identified as a key requirement for this technology’s success, and (2) groundwater can be captured, extracted, and treated (this is stated in the Work Plan).
21. Page 4-13, Section 4.2.6: Change wording that “capping in place is a common form of soil remediation,” rather than “the most common form.”
22. Page 5-1, Section 5.0, 1st paragraph: CERCLA and RCRA does not “require” that technologies be combined... instead, it allows it to be combined. Please change the wording.
23. Figure 7-1: Since the submission of the CMS/FS Work Plan, a revised base line for the project schedule has been proposed. DTSC requests PG&E to revise the included schedule to follow the new base line schedule. Also, some of the key activities are unclear in the CMS Work Plan schedule. For

Ms. Yvonne Meeks
September 3, 2007
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example, what is meant by "Additional Soil Investigation?" Why did it start before Q1 2007?

In addition to DTSC comments above, comments were also received from stakeholders (including the San Diego County Water Authority, Hargis and Associates, Inc. on behalf of the Fort Mojave Indian Tribe, the Metropolitan Water District of Southern California, and the Department of Interior) during the CMS/FS Work Plan review and comment period ending August 1, 2007. These comments are also enclosed. DTSC requests PG&E to provide responses to comments by September 24, 2007.

If you have any questions regarding this letter or the comments above, please feel free to contact me at (714) 484-5439.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Aaron Yue', with a stylized flourish at the end.

Aaron Yue
Project Manager
Geology, Permitting and Corrective Action Branch

Enclosures

aky:090701A

cc: PG&E Topock Consultative Workgroup Members – Via e-mail

PG&E Topock Technical Workgroup Members – Via e-mail

Native American Tribal Contacts for PG&E Topock project – Via e-mail

TOPOCK COMPRESSOR STATION CMS/FS DRAFT WORK PLAN PROJECT DOCUMENT REVIEW SHEET

1. Document Title/Number: <u>Draft Corrective Measures/Feasibility Study Work Plan, Topock Compressor Station Needles, California.</u>					2. Document Date: <u>June 2007</u>				
3. Revision Number <u>Draft</u>					4. Originator/Organization: <u>PG&E/CH2MHill</u>				
5. Date Comments Due: _____					6. Review Criteria: <u>Technical</u>				
7. Reviewer/Organization/Phone No.: <u>DOI/(303)236-3350</u>					8. Reviewer's Signature _____				

9. Comment Number/ Location	10. Type ^a	11. Comment	12. Comment Response	13. Accept
1. Cover page and interior cover	M	Following "Prepared for Department of Toxic Substances Control", please add "...and United States Department of the Interior"		
2. Sec 1.0	M	<p>Sentence should read "<i>This work plan conceptually (insert) describes the planned activities and the schedule to complete the corrective measures study/feasibility study (CMS/FS) at the Pacific Gas and Electric Company.....</i></p> <p>Rational: The level of detail (i.e. area of disturbance; machinery to be used; amount of vegetation removed; dates when activities will occur; mitigation etc.) within this Draft Report is not adequate to assess the level of impacts that may occur to the biological environment or to species listed under the Endangered Species Act.</p> <p>Please note that all activities performed must comply with conservation measures established by the <i>Programmatic Biological Assessment for Pacific Gas and Electric, Topock Compressor Station Remedial and Investigative Actions (2007)</i>.</p>		

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3. Sec 1.0	S	In the last sentence of the third paragraph, please replace "to implement response actions" with "under which PG&E agreed to perform a remedial investigation and feasibility study (RI/FS)"		
4. Sec 1.1	S	Please revise the first sentence of the first paragraph to read as follows: "Both the RCRA CMS and the CERCLA FS identify and evaluate remedial alternatives to address the release of hazardous wastes/hazardous substances into the environment."		
5. Sec. 1.2, Page 1-2	M	It should be clarified and stated in this section which sites will be handled under this work plan...all sites whether or not they are on the compressor station property? Or only sites outside the compressor station fence?		

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6. Sec 1.2, Page 1-2	M	Please revise the second, third, and fourth sentences of the fourth paragraph to read as follows: "Volume 2 of the RFI/RI will address the "Groundwater Operable Unit" (OU) comprising groundwater, surface water, pore water, and river sediment and will contain data from those media. Volume 3 will address the "Soils Operable Unit" and will contain soil data. The separation of the Final RFI/RI into three volumes (and two OUs) is intended to manage efficiently ...(continue with the remainder of the sentence)."		
7. Sec. 1.2, Page 1-3, Last Para.	S	Has this the final number of sites to be investigated been agreed to?		
8. Sec. 1.3, Exhibit 1-2, Page 1-4	M	The Conceptual Site Model (CSM) is generally initiated during the DQO process and refined during the risk assessment. The intent of the RFI/RI is to fully characterize the site which includes the finalization of the conceptual site model. The first block of the diagram doesn't present this approach.		

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9. Sec. 1.3, Exhibit 1-2, Page 1-4	M	Where do ARARs fit into this process? This section should be revised to incorporate the regulatory requirement for ARARs within the CERCLA process. (ref. CERCLA Section 121(d) and		
10. Sec. 2.0, Exhibit 2-1, Page 2-1	M	The initiation of the CSM should be during the planning stages and refined as additional information is collected. This iterative approach will serve to direct the investigation to meet the requirement of an adequate and detailed site characterization. Please provide additional clarification on the development of the CSM.		
11. Figure 2-1 and Secs. 2.1.1 and 2.1.2, Page 2-2	M	The CSM presented in the figure does not illustrate the other potential sources of contamination. It focuses on the percolation beds in Bat Cave Wash without considering other potential and uncharacterized sources. Please revise the CSM to illustrate other potential sources and make it consistent with other CSMs developed during the DQO process.		

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12. Sec. 2.1.1 Page 2-2		Source of Groundwater Contaminants, Second Paragraph, Second Sentence – Electrical conductivity is listed as a COPC (Chemical of Potential Concern). Electrical conductivity is a measurement of a material's (in this case ground water) ability to conduct an electric current. The COPC to be listed here is probably instead total dissolved solids.		
13. Sec. 2.1.3, Page 2- 3	M	<p>This section focuses on groundwater as the primary route of contaminant migration, however, overland flow by surface runoff should also be considered. There has been documented erosion within Bat Cave Wash at the location of the former percolation beds. The white material identified as potentially containing Cr has been eroded down stream.</p> <p>There is also the potential for vertical migration from potential sources in the AOCs and SWMUs that will be investigated under the soils work plan. The CMS/FS work plan should be able to deal with all the sources once they are identified. The CSM should also reflect all potential migration pathways.</p> <p>Please revise this section to include a discussion of other potential migration pathways.</p>		

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14. Sec. 2.2, Page 2-3	M	The CSM should be finalized before the completion of the CMS/FS. As discussed in the DQOs the CSM is the foundation of the investigation and is revised as needed until the characterization is complete. Waiting until the CMS/FS is complete to evaluate the CSM is not acceptable.		
15. Sec. 2.2.1, Page 2-4	S	Define the term elevated.		
16. Sec. 2.2.3, Page 2-4		Routes of Contaminant Migration in Soils – An additional route of soil contamination migration is wind transport of contaminated soil particles.		
17. Sec. 2.2.4, Page 2-4	M	What are the exposure routes for the receptors? Dermal contact, ingestion, uptakes, inhalation, etc? Please add the exposure routes for the receptors.		

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18. Page 2-5		The risk assessment should also determine protective levels of the chemicals of concern (COCs).		
19. Sec. 2.3, Page 2-5, 1 st Para.	M	In general the COPCs are identified during the site characterization phase of the effort. The risk assessment is used to evaluate the potential risk to human health and the environment, and the result is the identification of the COCs. The COCs are evaluated in the selection of the remedial alternative. We suggest changing the term COPC to COC throughout the document.		
20. General comment		The term COPCs is used throughout this document to refer to the chemicals that will be evaluated during the CMS/FS. However, following convention, the COPCs are defined in the RFI/RI and the COCs are identified during the risk assessment. Once the COCs have been identified, the CMS/FS evaluates technologies to deal with the COCs not the COPCs.		
21. Sec 3.0	M	Please revise the fourth sentence of the first paragraph by deleting "including existing restrictions on land uses and/or agreements made by authorities regarding limitations on land use."		

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22. Sec 3.1, Page 3-2	M	Typically the RAOs are derived during the risk assessment and are the levels or concentration of specific chemical or compounds that will not present an unacceptable risk to human health or the environment. Please make this section more specific in regards to the RAOs by specifying, in particular, that remediation of groundwater will be to eliminate unacceptable risks to humans and ecological receptors and attain ARARs..		
23. Sec.3.1.2, Page 3-2	M	There is no discussion of the RAOs for the biota. Please discuss the RAOs for biota.		
24. Page 3-3, Table 3-1		Anticipated Chemical-specific ARARs for Cr (VI), CR (III), and Cr (T) in Groundwater and Surface Water Corrective Measures Study Work Plan, Topock Compressor Station, footnote a – Metal toxicity to aquatic life is influenced by water hardness. The footnote should say “assuming water hardness = 142 parts per million [CaCO ₃ equivalents]”.		

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25. Sec 4.0, Page 4-1	M	<p>There is no mention of effectiveness or compliance monitoring as being part of the remedial technologies.</p> <p>Please add effectiveness or compliance monitoring to the remedial technologies, or explain the rationale used to not include them.</p>		

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26. Sec. 4.0		<p>This section presents a list of alternative technologies that are being considered for this project. These technologies are discussed very conceptually and do not provide adequate information to assess the impacts they may impose on the environment or to listed species. Further detail is required if that is the intent of the Report.</p> <p>This section also states that "If appropriate, bench- or pilot-scale treatability tests may be performed to better evaluate specific technologies (page 4-2)." Many of the technologies presented are not discussed within the current <i>Programmatic Biological Assessment (2007)</i> and may require individual biological assessments for each project. Please insert language requiring that DOI wildlife biologists be contacted early in the project, so as to determine and coordinate the development of any biological assessments that may be needed.</p>		
27. Sec. 4.0	S	<p>Are the technologies presented the preferred ones or just examples of potential alternatives that are available? Please clarify.</p>		

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28. Sec. 4.2.1		<p><i>"According to CERCLA's statutory preference for treatment of contaminants, excavation, and offsite disposal is now less acceptable than in the past."</i></p> <p>This is a conclusive statement and tends to bias the alternatives prior to any selection. If the statement is accurate, it should be referenced appropriately. In addition, the statement should be revised to acknowledge that offsite disposal and treatment are not mutually exclusive. Or. In the alternative, the statement should be deleted.</p>		

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29. Sec. 5.1.1		<p>Suggested Language</p> <p><u>Sensitive Habitats</u>: The study area encompasses a portion of the Havasu National Wildlife Refuge, the Beale Slough Area of Critical Concern, and the Colorado Floodplain. These lands are administered by the U.S. Fish and Wildlife Service, the U.S. Bureau of Land Management and the U.S. Bureau of Reclamation. Any actions taken will be in accordance with applicable laws, regulations and agency policies and procedures for managing public lands.</p> <p><u>Threatened and Endangered Species</u>: Federally listed threatened and endangered species that may be found in or near the study area include the Southwest Willow Flycatcher, the Yuma Clapper Rail, the Mohave Desert Tortoise, the Razorback Sucker and the Bonytail Chub. The States of California and Arizona also maintain lists of additional threatened and endangered species that can be found in or near the study site. All actions will be required to be in compliance with the Federal Endangered Species Act of 1973, as well as those requirements set by the States, and must avoid and/or mitigate any adverse impacts to any listed species and their critical habitat. Please also add the overall application of the original document <i>Mitigation Measures, Lake Havasu Field Office</i> are to be adhered to so as to generally minimize and/or avoid impacts to the natural environment.</p>		

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30. Sec. 5.1, Page 5-3		For clarification, please add "tribal" to sovereign nations to read "sovereign tribal nations".		
31. Sec. 5.2		All of the alternatives will affect the biological resources in or near the project area in some form or another, but it appears that the constraints will be evaluated with the use of a matrix to compare/contrast alternatives. While a sample matrix may be appropriate for providing an example of some of the criteria that may used to weight the alternatives, please also reference the <i>Programmatic Biological Assessment (2007)</i> .		
32. Sec. 5.2, Page 5-4	M	Please explain whether, and how, the proposal discussed in the second and third paragraphs to use "a number of approaches" to develop cost/benefit comparisons of remedial alternatives will be consistent with the application of the CERCLA remedy selection criteria. CERCLA and the NCP do not use a cost/benefit analysis in selecting a remedy. Does the proposal in this section contradict that? There is a typo in last sentence – remedial alterative should be remedial "alternative".		

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33. Sec. 6.0	M	There is no mention here of the ARARs. This should be added to the outline.		

^aComment Types: M = Mandatory, S = Suggested.



MWD

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Executive Office

August 1, 2007

Mr. Aaron Yue, Project Manager
Geology Permitting and Corrective Action Branch
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Reply to: 700 Moreno Avenue
La Verne, CA 91750

Dear Mr. Yue:

Topock Remediation Project Corrective Measures Study/Feasibility Study Work Plan

Metropolitan Water District of Southern California (Metropolitan), a member of the Topock Consultative Workgroup (CWG), has several comments on the Topock Remediation Project Corrective Measure Study (CMS)/Feasibility Study (FS) Work Plan. The CMS/FS work plan provides a broad overview of the approach that will be applied to identify, screen, and determine the final remedy. However, it does not provide a detailed description of the means that will be used to identify feasible corrective measures or how selection criteria will be applied to select the preferred treatment alternative. A detailed description of the process that will be used to identify and evaluate alternative corrective measures should be included. It should describe how each alternative will be studied with respect to site conditions and constraints. The evaluation process could include: paper study of existing data and reference material, pilot and bench studies, or other information. Additional specific comments are further described in this letter.

Section 1.2 discusses the site history and Remedial Facility Investigation (RFI)/Remedial Investigation (RI). Six phases of investigation are mentioned. What were those six phases? What was conducted under each phase? What are the existing data gaps? Volume 1 of the RFI/RI is cited but has yet to be released to the CWG. When will Volume 1 be released to the CWG? It also states that determination of the areas for remediation will be decided prior to the start of the CMS/FS. The PG&E compressor station fenceline is referred to several times. What is the significance of the fenceline compared to areas that have been impacted by past PG&E operations? What will the start date be for the CMS/FS?

In the flow chart shown in section 2.0, the risk assessment feeds into the site conceptual model, which is incorrect. The site conceptual model provides input to the risk assessment, which is used to estimate the risk to human health and the environment. These results are used in turn to identify impacted media that require treatment for the CMS.

Section 2.1.1 describes the source of contamination and lists the chemicals of potential concern (COPCs) as chromium VI, chromium (T), copper, nickel, lead, zinc, pH, electrical conductivity,

Mr. Aaron Yue, Project Manager

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and total petroleum hydrocarbons. Although other COPCs may be identified later in the project, these represent the main COPCs for groundwater and should be the basis for the CMS. Some of the metals have been deleted from the routine groundwater monitoring because they have been infrequently detected or detected at low levels. Releases of COPCs from the old evaporation ponds and the disposal well should also be identified in addition to the releases to Bat Cave Wash. In section 2.1.2 it states that COPCs that will be addressed in the CMS/FS will be restricted to those that are found to be elevated. The plan should stipulate the identity of these COPCs and what is meant by elevated (i.e., compared to a regulatory standard or background level).

In section 2.1.3 the description of groundwater movement as "relatively slow" is misleading. While compared to other sites, movement of the PG&E chromium plume may be slow, it should be pointed out that the plume has moved approximately 2,800 feet in less than 50 years equating to a rate of movement greater than 50 feet per year. Section 2.1.3 also discusses the reducing conditions that exist in the floodplain. The pore water study did find reducing conditions, but the depth of testing was limited to only 6 feet. Groundwater in the floodplain and below the river exists at much deeper depths. Initial sampling from the slant wells has also indicated reducing conditions, but these wells have not yet equilibrated. Metropolitan believes that the equilibration process for these wells will take some time (6 months or more) because of the low flow conditions of the wells. Proper evaluation of the chromium VI levels and reducing conditions cannot be accurately determined until the wells have equilibrated. In addition, the anaerobic core testing will be conducted on core samples taken from the slant wells. The anaerobic core testing will determine the reducing capacity of the fluvial sediments below the river and in the floodplain. Until these studies are complete the reducing capacity of the sediments in the floodplain cannot be definitely stated.

Section 2.1.4 states that there is currently no evidence of a complete pathway for chromium VI in groundwater to reach a receptor. Although this statement may be true, it is premature to state this definitively at this time. It has been stated that the plume has traveled under the river. It is likely that a pathway could exist for chromium VI to enter the Colorado River. Interim Measures 3 (IM3) has been put in place to reverse the hydraulic gradient to protect the river. In addition, the reducing conditions below the river may present a natural barrier of protection for the river. Additional studies are being conducted to determine if the objectives of IM3 and the reducing capacity of the sediments actually protect the river.

In Section 2.2.3 possible migration of soil contaminants should also consider transport in air as dust and vapors.

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Section 3.1.1 states an objective for groundwater to be “Preventing elevated concentration of Cr(VI) in groundwater ...from discharging to the Colorado River”. The term “elevated” is not defined. The objective should be to prevent the contaminated groundwater from discharging to the river. The objective should be similar to that of IM3—to maintain a hydraulic gradient away from the river and prevent the groundwater chromium VI plume from entering the river. The second objective states “Remediating groundwater to reduce Cr(VI) concentrations”. This objective should be to reduce concentrations to a background level. Studies are being conducted to determine the background levels and these studies should be utilized to establish the cleanup objective.

Section 3.1.2 states an objective for soil as “Preventing unacceptable risks resulting from chemicals of concern in soils migrating to groundwater or surface water”. The term unacceptable risk is not defined. The objective should be defined by studies that determine the migration potential of the COPCs from the soil remediation to the groundwater or surface water.

Section 3.2.1 mentions that the human health risk assessment and screening ecological risk assessment have not been completed. The risk assessments are cited throughout the CMS/FS work plan. How will the risk assessments be conducted? What criteria will be used for the risk assessments? When will the risk assessments be completed? How will the results of the risk assessment be incorporated into the CMS/FS?

Section 3.2.2 discusses the solicitation and evaluation of Applicable or Relevant and Appropriate Requirements (ARARs) for the Topock site. There appears to be a typo in section 3.2.2 line 4. The word “medial” should be either “media” or “remedial”. Also, Table 3-1 lists several chemical specific ARARs. There should be consideration of background levels in relation to any other criteria. Table 3-1 shows Cr (III) criteria for surface water, which is higher than background. Any cleanup criteria chosen cannot be appreciably higher than background.

Section 3.2.3 cites a study conducted between 2005 and 2006 in which calculated background concentrations for chromium (T), chromium VI, and other metals were determined. The background concentrations should be listed in this work plan. These levels should be tied into the objectives for the final remedy.

Section 4.0 discusses the screening of technologies for developing the remedial alternatives. It states that the screening will be based on expected effectiveness in meeting objectives, ability to be implemented, and cost-effectiveness. How will each of these evaluations be conducted? Will it be a paper study, bench/pilot study, or other? What are the criteria for selection? A description on the methodologies used to determine effectiveness, ability to implement and cost-effectiveness should be included.

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Section 4.1 states that the groundwater COPCs have not yet been determined. The groundwater monitoring over the past 10-years has been extensive. The COPCs and the zones where they occur should already be known. The CMS/FS work plan should be based on those COPCs known to date. Any additional COPCs discovered from more recent monitoring can be added later. Also, the bulleted paragraph on reactive treatment zones states that chromium VI will be removed. Chromium VI will be reduced to chromium III, which will then precipitate as a solid. This sentence should be changed to better reflect the result of the in-situ process.

Section 4.1.2 lists discharge to the Colorado River as a potential disposal option for the pump-and-treat remediation. This would require an evaluation to determine whether discharge would cause any degradation in water quality of the river. The discharge to the river would also have to be approved by the Regional Water Quality Control Board.

Section 4.1.3 discusses the impermeable barrier wall. This section should include the statement from section 4.1.4: "As heavy equipment is needed for construction, vehicle access is a requirement". It also states that impermeable barriers are typically placed at depths of up to 100 feet. Barrier walls are typically 2 to 3 feet wide and have been constructed to depths over 400 feet.

Section 4.1.4 discusses the permeable reactive barrier. This section should include a more complete statement on the composition of the barrier material (both reactive and inert materials). Does this barrier need to be keyed into the bedrock? What is the lifetime capacity estimate for the reactive barrier? It should be noted in this section that construction requirements are similar to those for impermeable barrier walls.

Section 4.2 discusses the technologies for soil remediation. The work plan should describe how each of these technologies will be evaluated. Paper studies may be utilized to evaluate and screen out some of the technologies. Pilot or bench studies may be necessary for some of the other technologies. In particular, migration of COPCs [e.g., chromium (T) and chromium VI] should be evaluated to determine the effect on the groundwater aquifer and the Colorado River. A description of the evaluation process should be included in the work plan. The soil flushing technology described in Section 4.2 may affect the groundwater. It is important to evaluate this effect because it can create a greater burden on the groundwater remediation.

Section 4.3 lists treatability studies and other relevant studies. It would be helpful to define how these studies will be used to evaluate the treatment alternatives. In addition, there appears to be a typo on the second to the last bullet on page 4-15. The term "pump/inject" should be "pump/treat".

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Section 5.0 describes that the potential effective remedial alternatives will be screened to identify those that cannot be technically implemented at the site. How will the screening process be conducted? What are the criteria for this screening? This section is vague as to the process for developing and applying screening criteria.

Section 5.1.1 describes key site characteristics. The bulleted paragraph on geochemical conditions in the floodplain states "...reducing conditions naturally convert Cr(VI) into the relatively innocuous Cr(III)...". Chromium III, although less toxic and less soluble, is still of concern. The maximum contaminant level is based on total chromium. This statement should be rephrased to read "These reducing conditions naturally convert Cr(VI) into Cr(III), which is removed from groundwater by chemical precipitation".

Several wells have been proposed for installation on the Arizona side of the Colorado River. These wells will provide new information on the extent of the plume. The CMS/FS work plan should include a discussion on evaluation of results from the Arizona wells.

Metropolitan appreciates the opportunity to comment on the CMS/FS work plan. This document will serve as guidance for development of the CMS/FS report and the ultimate selection of the final remedy.

Sincerely,



Bart Koch
Unit Manager

BK:smh

H://letters/bk Topock remediation corrective measures study.docx

cc: Eric Fordham
Geopentech
525 North Cabrillo Park Drive
Suite 280
Santa Ana, CA 92701

Mr. Aaron Yue, Project Manager

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David Pettijohn, Manager
Water Resources Development
Los Angeles Department of Water and Power
111 North Hope Street, Room 1460
Los Angeles, CA 90012

David Gilbert
Pacific Gas & Electric
Mail Code B24A
P.O. Box 770000
San Francisco, CA 94177

Yvonne Meeks
Pacific Gas & Electric
Chromium Remediation Project Office
4325 South Higuera Street
San Luis Obispo, CA 93401

Denise M. Landstedt
Senior Water Resources Specialist
San Diego County Water Authority
4677 Overland Avenue
San Diego, CA 92123-1233

Steve Bigley
Water Quality Manager
Coachella Valley Water District
Post Office Box 1058
Coachella, CA 92236

Abbas Amirteymoori
Environmental Program Manager I
Colorado River Board of California
770 Fairmont Avenue, Suite 100
Glendale, CA 91203-1035



San Diego County Water Authority

4677 Overland Avenue • San Diego, California 92123-1233
(858) 522-6600 FAX (858) 522-6568 www.sdcwa.org

July 16, 2007

MEMBER AGENCIES

Carlsbad
Municipal Water District

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City of San Diego

Fallbrook
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Helix Water District

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Rincon del Diablo
Municipal Water District

San Dieguito Water District

Santa Fe Irrigation District

South Bay Irrigation District

Vallecitos Water District

Valley Center
Municipal Water District

Vista Irrigation District

Yuima
Municipal Water District

OTHER REPRESENTATIVE

County of San Diego

Mr. Aaron Yue

Project Manager

California Department of Toxic Substances Control

5796 Corporate Avenue

Cypress, CA 90630

Subject: Comments on the Draft Corrective Measures/Feasibility Study Work Plan
PG&E Topock Compressor Station, Needles, California

Dear Mr. Yue:

As a member of the PG&E Topock Consultative Workgroup (CWG), I took the opportunity to review the Draft Corrective Measures/Feasibility Study Work Plan for the PG&E Topock Compressor Station. I have a few simple comments for consideration as follows:

1. Page 1-2, Section 1.2, second paragraph: This paragraph states that there “have been six phases of investigation at the Topock site.” It would be beneficial to reference a document or other source where the reader could locate what the six phases included and when they occurred.
2. Page 2-2, Section 2.1.1, second paragraph: The information presents a 13-year period for release of the Cr(VI), which represents the time period before 1951 to 1964. However, depending on the time in 1951 it started and the time in 1964 it ceased, it may be more appropriately represented as a 14-year period.
3. Page 2-4, Section 2.2.4: The paragraph indicates “different cleanup standards may be evaluated...depending on location and intended future use.” Future use is likely only as far as related land use documents have planned, which could change. The cleanup standard should be a consistent level so that no further remediation would be necessary in the future at an additional cost and planning effort.
4. Page 3-3, Section 3.2.2, Notes to Table 3-1: CaCO₃ should be included in the Acronyms on page vii or noted in this section. It is not apparent that this was introduced in any prior section.
5. Page 4-5, Section 4.1.3, second paragraph: This section and paragraph include a listing of several vertical barriers typically used to control groundwater flow. Page 5-3, Section 5.1.2, states that the “intent is to define a wide range of alternatives.” Therefore, is there a reason that deep soil mixing has not been included?

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Mr. Aaron Yue
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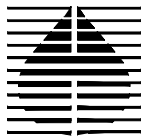
Thank you for the opportunity for review and comment. If you have any questions regarding my comments I can be reached at (858) 522-6786.

Sincerely,

A handwritten signature in blue ink that reads "Denise M. Landstedt". The signature is fluid and cursive, with the last name being more prominent.

Denise M. Landstedt
Senior Water Resources Specialist

Cc: Bart Koch, Metropolitan Water District of Southern California



HARGIS + ASSOCIATES, INC.

HYDROGEOLOGY • ENGINEERING

1820 East River Road, Suite 220

Tucson, AZ 85718

Phone: 520.881.7300

Fax: 520.529.2141

July 23, 2007

VIA ELECTRONIC MAIL

Mr. Aaron Yue
Project Manager
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL
5796 Corporate Avenue
Cypress, CA 90630

Ms. Michele Easley
Acting Field Office Manager
BUREAU OF LAND MANAGEMENT
Lake Havasu City, Arizona 86406

Re: Fort Mojave Indian Tribe Preliminary Comments on PG&E June 2007 draft report titled, Corrective Measures/Feasibility Study Work Plan, Topock Compressor Station, Needles, California.

Dear Mr. Yue and Ms. Easley:

On behalf of our client, the Fort Mojave Indian Tribe (the Tribe), Hargis + Associates, Inc. is hereby transmitting comments on the above-referenced draft work plan (the Plan), prepared on behalf of the Pacific Gas & Electric Co. (PG&E) by CH2M Hill. This is in response to your July 2, 2007, electronic solicitation for comments.

General Comments

In general, the Tribe agrees that the document provides a reasonable outline of the necessary elements of both a Corrective Measures Study (CMS) and Feasibility Study (FS) report as required under the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), respectively. As far as the Tribe is concerned, the CMS/FS represents a key document for the process that will reveal strategies that are of primary concerns. Accordingly, we are very interested in the progress toward its completion.

Section 1.2 mentions that "... there have been six phases of investigation at the Topock Site." Please identify the six phases of investigation that are being referred to.

The flowcharts depicting the process to be followed within each chapter is both useful and effective. However, it seems that the step involving identification of applicable or relevant and

Other Offices:
Mesa, AZ
San Diego, CA

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appropriate requirements (ARARs) should appear somewhere in the diagrams as well as the stage at which screening out of alternatives will occur.

Site Conceptual Model

Proper development and understanding of the site conceptual model (SCM) is arguably the most important step in the process as erroneous concepts can lead to serious problems in the final decision. This section defines the SCM as "... a graphical and narrative summary of site conditions based on currently available data that describes the probable sources of contamination and the potential pathways by which human or environmental exposures could occur." This definition is incomplete because the importance of data interpretation is not acknowledged. Indeed, the data assemblage is important and the basis for site assessment, but it is more than a mapping of data points. As data are generated, it must continually be examined and re-examined within the context of accepted scientific concepts. Each new set of data has the potential for consistency or conflict with elements of the currently-accepted SCM and should be viewed as such. As this process evolves, the uncertainty associated with the SCM should decrease. Likewise, with confidence in the SCM, the need for collection of new data is reduced.

The reason for emphasizing the interrelationship between data acquisition and the SCM relates to a theme that the Tribe has previously emphasized ... specifically a minimalist approach that involves only the most necessary disturbances to the earth and its resources. A recent example is the proposed drilling on the Arizona shore at the Site 1 location. Among other reasons, it was argued data at this location would be needed to define the lateral extent of the hexavalent chromium plume in groundwater. At the same time, it was asserted that monitoring data from a well at this location was fully expected to produce negative results. This is a clear indication that the application of conceptual reasoning is a useful tool in developing the SCM. The likely reason for expecting negative results at that location was based on generally accepted concepts of regional groundwater flow, which would be inconsistent with groundwater underflow beneath a major river system such as the Colorado River, without some anthropogenic stress factor overriding natural gradients. Another useful exercise with regard to development of the SCM is to consider alternative interpretations of the data set with the intent of determining whether further data acquisition would be useful in discriminating between the alternatives, and moreover, whether such discrimination would actually be important to a pending remedial decision.

It is quite an important observation that "Nearly all of the Cr(VI) present in groundwater at the site is believed to have been released during the 13-year period [1951-1964] when untreated wastewater was discharged into Bat Cave Wash." Likewise it is worth noting that there have not been detections of Cr(VI) in the Colorado River along the Topock reach to date. Together, these observations seem to support (1) limited plume "strength;" (2) slow groundwater velocities; and/or (3) the effect of the geochemical barrier associated with the Colorado River fluvium.

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The Tribe is also concerned with the apparently open-ended statement in Section 2.1.2 that indicates "As ... new wells are installed, the plume will be more precisely defined." As you are aware, in commenting on past work plans involving proposed drilling of new wells, the Tribe has emphasized the need for minimization of the number of intrusions (such as the drilling of new wells) into sacred areas.

Section 2.1.4 refers to the protection of "... potential receptors in the future." It is unclear as to which future receptors this might refer to as well as why, if it is unlikely there are any complete exposure pathways in the present, there would be any in the future.

Remedial Action Objectives

With regard to the groundwater remedial action objectives (RAOs), the goal of "Preventing elevated concentrations of Cr(VI) in groundwater at the Topock Site from discharging to the Colorado River" is vague, potentially unquantifiable, and potentially unachievable to some degree. The RAO of implementing remedial actions "... in a manner that is respectful of and causes minimal disturbance to cultural resources ..." overlooks the possibility of avoiding such disturbances altogether. The RAO should be to avoid such impacts. This comment also applies to the soil RAOs.

Table 3-1 identifies only chemical-specific applicable or relevant and appropriate requirements (ARARs). As discussed in the June 20, 2007, Consultative Work Group (CWG) meeting, it is likely that there are also action- and location-specific ARARs that need to be addressed.

Appropriate ARARs for Cr(t) and Cr(VI) in groundwater are the MCLs and the California Public Health Goals (PHGs). It should be noted in the text that these values are in the process of being re-evaluated for Cr(VI), due to the availability of newly published long-term animal studies. For example, focusing the groundwater cleanup on the California Cr(VI) MCL of 50 micrograms per liter may not be appropriate if the MCL is significantly lowered. Accordingly, the flexibility of the remedial alternatives in achieving even lower cleanup goals should be assessed in the CMS/FS.

Corrective Measure/Remedial Action

In selecting, developing, and evaluating the corrective measure/remedial action (CM/RA) alternatives for this site, it will be necessary to examine the alternatives in a perhaps atypical manner due to the potential for impacts on unique cultural resources. Preference needs to be given in developing alternatives in such a way as to minimize, if not eliminate, land disturbances and avoid disturbances to cultural resources.

With regard to waste disposal options available for groundwater pump-and-treat alternatives (p. 4-4), offsite transportation to a treatment and disposal facility should be listed. This technology

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was implemented successfully at the site in the past and should be at least listed and considered in the CMS/FS.

The Tribe also reiterates its opposition to all types of barrier technologies emplace within biologically or culturally sensitive areas as the Tribe believes that such systems would interfere with spiritual and biological pathways (p. 4-5).

Under soil remediation technologies, the Tribe has expressed serious concerns with actions that would necessitate soil disruption, particularly with excavation and offsite disposal (p. 4-7). Accordingly, Page 4-8 should list impacts to cultural resources under "Other Considerations." Also, because some tribes believe that capping in place may lead to the "suffocation" of tangible and intangible cultural resources, this should be listed under the other considerations for this technology (p. 4-14).

Section 5.1.1. (Page 5-2), while the Tribe appreciates the listing of Cultural Resources as a "Key Site Characteristic," the Tribe's strong view that this area is a cultural landscape should be noted here. Also, it should be listed that the Bureau of Land Management (BLM), through its recently adopted Resource Management Plan, has designated this area as the "Topock-Needles Special Cultural Resource Management Area." Finally, under Sensitive Habitats, the word "proposed" should be struck because the Resource Management Plan (RMP) that designated the Beale Slough Area of Critical Environmental Concern (ACEC) has been adopted by BLM. It should further be noted that a Management Plan for the ACEC will be adopted.

Project Schedule

Based on the June 20, 2007, meeting of the project's CWG, the Tribe understands that separate CMS/FS documents are being prepared for the soils and the groundwater operating units (OUs). This is also reflected on Figure 7-1. According to this schedule, this work plan will be completed during the third quarter (Q3) of this year (2007). Work on the soils CMS/FS will be performed beginning in Q4 2009 and ending during Q1 2011, whereas the groundwater CMS/FS work will begin during Q1 2009 and end during Q4 2009.

The Tribe understands that at this time, this division appears to be an appropriate strategy in the interest of schedule efficiency. At the same time, there needs to be some level of awareness with regard to potential relationships between the two OUs. For example, in the soils workplan the issue of continuing sources of groundwater contamination was raised. If indeed this condition were present, would it be dealt with in the context of the groundwater remedy or the soil remedy or both? The screening of various remedial technologies would then need to account for such potential media interactions. Perhaps another example would be that various groundwater remedies may have surface facilities (e.g., wells, pipelines, etc.). The siting of such facilities might need to account for the location soil contamination areas.



HARGIS + ASSOCIATES, INC.

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Basically, the Tribe would generally support the decoupling of the CMS/FS documents for the two OUs, but cautions that PG&E should remain aware of the potential need to address interactions between the two media.

Thank you for the opportunity to review this document. We look forward to your response. Please contact me if you have any questions concerning these comments or wish to discuss this further.

Sincerely,
HARGIS + ASSOCIATES, INC.

A handwritten signature in black ink, appearing to read "Leo S. Leonhart".

For

Leo S. Leonhart, PhD, PG, RG
Principal Hydrogeologist

cc: C. Coyle
K. Doebbler, DOI
S. McDonald
Y. Meeks, PG&E
L. Otero
J. Smit
M. Sullivan
T. Williams

CMS-FS WP draft