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September 23, 2005

Mr. Norman Shopay
California Department of Toxic Substances Control
Permitting and Corrective Action Branch
700 Heinz Avenue, Suite 200
Berkeley, California 94710-2721

Subject: Groundwater Background Study Step 1 Results
PG&E Topock Compressor Station, Needles, California

Dear Mr. Shopay:

This letter transmits the results of Step 2 of the Topock groundwater background study, selection of final background wells. This report uses data collected during the first two rounds of background sampling to select the set of wells to remain in the background study. Step 2 of the Topock background study was performed as described in the *Draft Work Plan for Assessing Background Metals Concentrations in Groundwater, PG&E Topock Compressor Station and Vicinity, Needles, California*, dated June 30, 2004, and approved by DTSC on October 29, 2004.

If you have any questions, please do not hesitate to call me.

Sincerely,

Julie Eakins for Yvonne Meeks

Enclosure

cc: Kate Burger/DTSC

PG&E Topock Background Study, Step 2 Results

DATE: September 23, 2005

1.0 Introduction

This technical memorandum (TM) provides the results of Step 2 of the groundwater background study at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station site (Topock site), near Needles California. Step 2 of the background study is the selection of the final set of background wells, as described in the *Draft Work Plan for Assessing Background Metals Concentrations in Groundwater, PG&E Topock Compressor Station and Vicinity, Needles, California* (Background Study Work Plan), dated June 30, 2004 (CH2M HILL, 2004a), and approved by the California Department of Toxic Substances Control (DTSC) on October 29, 2004.

An outline of the background study process for identifying and selecting wells for sampling and determining background concentrations is provided in Section 2.0 of this TM. Section 3.0 provides a description of the criteria used to select the final set of background wells. Section 4.0 provides a summary of the analytical results for the first two background study sampling events. An evaluation of the first two rounds of data and reasons for selection or elimination of wells in the final set of background wells is provided in Section 5.0. Finally, Section 6.0 provides the conclusions and recommendations for Step 2 of the background study.

2.0 Background Study Process

The purpose of the background study is to assess the range of naturally-occurring background concentrations of hexavalent chromium [Cr (VI)], total chromium [Cr (T)], and other metals in groundwater near the Topock site and surrounding region. The Background Study Work Plan identifies a process for identifying and evaluating potential background wells for sample collection and determining background metals concentrations in groundwater. The process includes four steps:

1. Selecting potential background wells.
2. Selecting final background wells.
3. Calculating background concentrations.
4. Reviewing background concentrations.

Step 1 has been completed and involved the selection of potential background wells for inclusion in the first two rounds of sampling. Step 1 did not involve sample collection, but involved the collection and evaluation of location and accessibility information, and geologic and well construction logs for each well to determine the suitability for inclusion in the background study. Results of Step 1 were reported in the *PG&E Topock Background Study, Step 1 Results* TM, dated March 10, 2005 (CH2M HILL, 2005a).

Wells that were selected through the implementation of Step 1 were then sampled in May and July 2005 as part of the first two sampling events for the background study. This TM

uses the analytical results of these first two sampling events to recommend the final set of background study wells and the final set of analytes to be sampled during the final four rounds of sampling. This is referred to as Step 2.

Step 3 of the background study will involve the collection of four more rounds of samples (sampling events 3, 4, 5 and 6) from the final set of background wells on a bi-monthly frequency. After completion of the sixth sampling event, data from all six sampling events (for the final set of background wells only) will be used to calculate background concentrations of Cr(VI), Cr(T) and other metals. Analytical data from those wells sampled during the first two sampling events which are not recommended for inclusion in the final set of background wells will not be used for calculation of background concentrations.

Step 4 will involve the review of the calculated background concentrations to check for sample independence and comparison against other background studies carried out in the region.

3.0 Criteria for Selection of Final Background Wells and Final List of Analytes

This section outlines the criteria used during the data evaluation (Section 5.0) to assess which wells should be selected in the set of final background wells and which analytes should be included in the list of analytes for the final four rounds of sampling.

The criteria used to select the final set of background wells are:

- **Is the groundwater general chemistry consistent with the Topock site groundwater general chemistry?**

  The groundwater chemistry of the first two rounds of sampling will be compared to the Topock site groundwater chemistry by evaluating the general chemistry (as represented by cation, anion and total dissolved solid [TDS] concentrations) and stable isotopes of oxygen and hydrogen. The general chemistry of natural groundwater is determined by the mineral assemblages in the geologic environment along the waters flowpath. Comparing the general chemistry of groundwater from different wells is a common method of determining whether the water is from the same or different sources. The background study is intended to provide an estimate of the natural background concentrations of contaminants of concern (COCs) in the vicinity of the Topock site. It is therefore important that the background wells have general chemistry similar to that found in wells at the Topock site.

  The geologic units that contain elevated concentrations of COCs at the Topock site are unconsolidated alluvium and fluvial deposits. Therefore it was desireable to select background wells screened in similar geologic units. Wells screened in deep bedrock were not considered as desirable candidates for background wells. During Step 1 of the background study, available logs for candidate background wells were reviewed to assess what geologic units the wells were screened within. Geologic logs were not available for all wells (see Table 1). Some wells for which logs were not available remained in the study if well depths indicated that the wells were likely screened in unconsolidated alluvium or fluvial deposits. The first two rounds of data will also provide an indication of geology, based on the groundwater chemistry. Therefore, although a confirmation of the geology monitored by all background wells may not be

possible because of a lack of geologic well logs, the geology monitored by the wells will be assumed to be unconsolidated alluvium or fluvial deposits if the groundwater general chemistry is consistent with other wells known to monitor these geologic units.

Several wells in Table 1 are deeper than Topock site wells (e.g. ADOT New Well, EPNG-2, TMLP-2, GSWC wells). Although logs are not available for some of these wells, published gravity survey data indicate that unconsolidated alluvial materials extend to much greater depths to the east and northeast of the site. There are no known aquitards that stratify the alluvial aquifer, so wells screened at greater depths will not be removed from the background study unless their chemical signatures are significantly different from the range found near the site.

- **Is there a potential anthropogenic source impacting the concentration of metals in groundwater?** During Step 1 of the background study, an assessment of potential anthropogenic impacts on groundwater for each of the candidate background wells was made based on information obtained from record searches and through site reconnaissance activities. In this Step 2 evaluation, this selection criterion is refined using analytical data for each of the wells to see if there is indication of potential anthropogenic impacts on the concentrations of metals in groundwater.

- **Is the well located within a cluster of other background wells which could cause a geographic bias in the background concentration?** Background concentrations will be calculated using conventional statistics that do not differentiate between wells based on their location. Therefore, if wells that are located very close to one another are screened over the same general depth interval and exhibit very similar chemistry are included in the data set, a bias in the background concentrations could occur. Clusters of similarly constructed wells would provide redundant data points, all representing the groundwater in a small portion of the study area. If the groundwater in the vicinity of the cluster of wells were not representative of the study area as a whole, the inclusion of this redundant data in the data set would bias the statistics. The spacing, screened depth and chemistry of wells located in clusters will therefore be evaluated to assess whether a bias may occur if all wells in the cluster are included in the data set.

The criteria used to select the suite of constituents to be analyzed during the final four rounds of sampling are:

- **Will a background concentration be calculated for the analyte?** If a background concentration is to be calculated for the analyte, then it must be analyzed in all groundwater samples.

- **Is the analyte necessary for confirming that the groundwater chemistry remains consistent with the Topock site groundwater chemistry?** It will be necessary when calculating the background concentration to confirm that the general chemistry of the groundwater does not significantly change throughout the study or become inconsistent with the groundwater chemistry of the Topock site.

- **Is the analyte frequently not detected in the groundwater samples?** If the analyte is not required to remain in the analytical suite based on the first two criteria, and is frequently non-detect during the first two rounds of sampling, it is not likely to prove

useful for the remainder of the study, and can be eliminated from the list of analytes for the final four rounds of sampling.

4.0 Sampling Events 1 and 2

The first two sampling events for the background study took place between May 9 and May 20, and July 18 and July 26, 2005[1]. A total of 36 wells (18 from California and 18 from Arizona) were sampled during each of the first two sampling events. This is a reduction in the number of wells that were selected as potential background wells during Step 1 of the background study. The *PG&E Topock Background Study, Step 1 Results* TM, dated March 10, 2005 (CH2M HILL, 2005a) recommended a total of 43 wells for sampling during the first two sampling events. DTSC's conditional approval of the Step 1 results, dated April 6, 2005 eliminated 2 wells from the initial set of wells for sampling. During the first sampling event it was discovered that five of the wells (PT-01, PMM-RO, BOR South Levee Rd, BOR Levee Rd, MWP-12) could not be sampled. The reasons for not sampling these wells are as follows:

- PT-01 is located near the PG&E New Evaporation Pond site and was sealed shut at the top with only a ¾ inch access point. This access point was not large enough to allow a pump to be used to sample the well. Two other selected potential background wells, MW-04 and P-2, are within approximately 100 feet of this well.
- PMM-RO System is a well that was drilled to provide drinking water for the Park Moabi campsites along the peninsula. During the initial well reconnaissance (prior to Step 1 Results TM), this well was unavailable for close inspection and therefore, the majority of information collected concerning this well came from the local Park Ranger at Park Moabi. During the Round 1 sampling event, it was discovered that this well is actually a cistern, approximately 10 feet in diameter, which is not appropriate for sampling.
- BOR South Levee Rd was initially installed in the Topock marsh as part of an isotope study (according to the USFW Refuge shop caretaker). The top of casing (TOC) for the well was slightly below ground surface and there was no surface completion or cap for the well. Upon close inspection, runoff had been entering the well for some time which included debris from the local surface soil. The total depth of the well according to state well records was 18 feet, but the total measured depth was 12.5 feet. At that time, a decision was made that this well likely did not represent background conditions and therefore was not sampled.
- BOR Levee Rd well was located in an area that was severely burned during a wildfire in approximately 1997. The USFW Refuge shop caretaker did not have a key so he cut the lock off to open the well cover. When we opened the well cover, the PVC casing of the well had melted due to the intense heat, and the well was inaccessible.
- MWP-12 was a monitoring well located slightly upgradient of the Old Evaporation Pond site. The well went completely dry during purging and did not recover within 24 hours so it could not be sampled.

[1] Note that two wells (Topock-2 and Needles MW-12) were sampled on June 22nd for sampling event one and one well (Topock-3) was sampled on August 11th for sampling event two because these wells were not available for sampling during the initial sampling events due to inoperable dedicated pumps.

Table 1 summarizes the known well construction and geologic information for the wells sampled. As indicated in Table 1, the geologic unit monitored by the well is not known for all wells, usually because a geologic log is not available. However, as discussed in Section 3.0, the geology monitored by the wells is assumed to be unconsolidated alluvium or fluvial deposits if the groundwater chemistry is consistent with other wells known to monitor these geologic units.

Figure 1 shows the location of the wells sampled during sampling events 1 and 2. Appendices A and B contain the sampling forms and chain of custodies for the first and second sampling events, respectively.

Samples were analyzed for the parameters outlined in the Background Study Work Plan, including dissolved metals (filtered samples), general chemistry parameters, stable isotopes of oxygen and hydrogen, and various field parameters. In addition, all samples were analyzed for total metals (unfiltered samples) during the first sampling event, and three samples were analyzed for total lead (unfiltered samples) during the second sampling event. On one occasion, samples were analyzed for total metals (unfiltered samples) to allow for comparison with other sampling results (past and future), and to allow an evaluation of the impact of suspended material on metals concentrations. Samples for total lead analysis were collected during the second sampling event from three wells (Sanders, EPNG-2, USFW-5), as requested by DTSC and ADEQ, to confirm preliminary results from the first sampling event.

The analytical results for the first two rounds of samples are presented in Tables 2 to 5. Table 6 summarizes the number of detects, range of concentrations and average concentrations of dissolved and total metals, and general chemistry parameters.

4.1 Analytical Data Quality Review

The laboratory analytical data generated from the first and second sampling events were independently reviewed by project chemists to assess data quality and identify deviations from analytical requirements. A detailed discussion of data quality for the background study sampling data is presented in the data validation reports, which are kept in the project file and are available upon request.

Matrix Interference: Matrix interference was encountered in groundwater samples from two of the wells (PGE-09N and PGE-09S), which affected the sensitivity for Cr (VI) when using Method SW 7199. These two samples required dilution and were reported as ND. Results from a total of eight wells reflect adjusted reporting limits as a result of serial dilutions that were required to overcome the matrix interference and provide acceptable matrix spike recoveries.

Matrix Spike Samples: Matrix spike (MS) acceptance criteria were met, with the following exceptions:

1. Two samples had MS's that were recovered at levels below the lower control limit: the Sanders Well during sampling event 1 for calcium, boron and sodium - flagged 'J', and the MW-08 well during sampling event 2 for mercury - flagged 'UJ'.

Quantitation and Sensitivity: All method and analyte combinations met the project reporting limit objectives.

Holding Time Data Qualification: All method holding time (HT) requirements were met, with the following exceptions:

1. Iodide was analyzed outside of the Laboratories established HT. The method is a modification from the E300.0 method, and does not have an official HT. These were all flagged 'UJ'.
2. Nitrate from twenty two wells, from the second event, were analyzed outside HT because of an oversight by the laboratory, in which the samples were originally analyzed within the HT but at too large of a dilution to report. Two results were flagged 'R', and the rest were flagged 'J'.
3. One pH and two TDS analyses were performed outside HT, because of CH2M HILL requested re-analysis. These were flagged 'J'.

Field Duplicates: All field duplicate acceptance criteria were met, with the following exceptions:

1. Twenty six metal pairs, four TSS pairs, four turbidity pairs, and two silica pairs had (relative percent differences) RPDs above the upper control limit. These were flagged 'J' and 'UJ'.

Equipment Blanks: Equipment blank (EB) acceptance criteria for all methods were met, with the following exceptions:

1. Nickel and zinc were detected above the reporting limit (RL) in the EB associated with SDG 05E116. Six sample results that are less than 5 times the EB value were 'U' flagged (non-detect).

Laboratory Duplicates: Laboratory duplicate acceptance criteria for all methods were met.

Additional Data Quality: The samples collected during the two sampling events also had additional minor QA/QC deviations. These include iodide samples that exceeded the protocol temperature range, and perchlorate, copper, fluoride, and nitrate samples associated with lab QC that exceeded control limits. None of these minor QC deviations result in rejected data.

Conclusion: As discussed above, the completeness objectives were met for all method and analyte combinations. No significant analytical deficiencies were identified in the first and second sampling event data. With minor exceptions, the analyses and data quality meet the laboratory method quality control acceptance criteria. Overall, the analytical data for the first and second sampling events are considered acceptable for the purpose of the background study.

5.0 Data Evaluation

This section summarizes the data evaluation activities undertaken to allow the final set of background wells and final suite of analytes to be selected based on the criteria outlined in Section 3.0.

An important selection criterion for the wells is whether the groundwater general chemistry of the background well data set is consistent with the Topock site groundwater general

chemistry. Therefore, the analytical data evaluation in Section 5.1 focuses on identifying if any outlier wells exist where the groundwater chemistry is not consistent with the range of natural groundwater chemistry found around the Topock site. In the discussions below, wells defining general chemistry in and around the Topock Site (called "site background wells") include: MW-1, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-16, MW-17, MW-18, PMM-Supply, PGE-09N, PGE-09S, Sanders, Topock-2, and Topock-3. The remainder of the background wells listed in the tables are referred to as "regional background wells." Topock site wells that were not included in the background study (but were installed for other Topock site studies, e.g. GMP, RFI) are referred to in the following discussion as "site wells". The general chemistry of the site wells is outlined in *RCRA Facility Investigation/Remedial Investigation Report, PG&E Topock Compressor Station, Needles, California*, dated February 2005 (CH2M HILL, 2005b) and the *Groundwater and Surface Water Monitoring Report, Second Quarter 2004, PG&E Topock Compressor Station, Needles, California* dated August 17, 2004 (CH2M HILL, 2004b).

The data evaluation used to evaluate wells for potential anthropogenic impacts are discussed in Section 5.2. In Section 5.3, an evaluation of potential redundant wells is described. In Section 5.4, analytes that were frequently non-detect or otherwise do not meet the analyte selection criteria for determining background concentrations are identified and discussed.

A summary of the well selection process is provided in Table 7, along with the recommended final set of background wells.

5.1 General Chemistry and Stable Isotopes

Chemical data used for this analysis include major ion data consisting of the cations (positively charge species) sodium, calcium, and magnesium, and the anions (negatively charged species) chloride, bicarbonate, and sulfate. Collectively, the relative concentrations of the major ions provide a unique fingerprint of water chemistry that may be compared to other samples. In addition, stable isotopes of oxygen (^{18}O) and hydrogen (^{2}H or deuterium) are used for the same purpose, as waters originating in similar geologic environments will have similar ranges of stable isotope concentrations.

5.1.1 Stiff and Piper Diagrams

Stiff and Piper diagrams are commonly used graphical methods for plotting general water chemistry. Stiff diagrams, along with total dissolved solids (TDS), are posted on regional and local scale maps of the Topock Site on Figures 2 and 3, respectively. Only the second sampling event data is posted on these maps, because there was very little variation observed between sampling events one and two results (see Table 3). In these diagrams, concentrations of the major ions are plotted with cations on the left and anions on the right, with the largest "bulges" in the plot representing the dominant ions. The plots create unique geometric shapes or "fingerprints" for the water chemistries, and the size of each Stiff diagram is proportional to TDS concentrations.

Groundwater at the Topock Site is typically a sodium-chloride type (i.e. the dominant cation and anion, respectively) with a large range in TDS concentrations (CH2M HILL, 2005b). Site background wells screened in the alluvial material range in TDS from 500-1,000 mg/L in shallow wells (MW-1, MW-3 to MW-8, MW-16, MW-17, MW-18) to several thousand mg/L

in some deep wells (P-2, PGE-9N, PGE-9S), as shown in Figure 2. Though sodium-chloride is the most common chemistry in these wells, the dominant anion may be sulfate (MW-17) or bicarbonate (MW-6). Fluvial wells at the site were not included in the background study, due to their close proximity to (or inclusion in) the chromium plume, but general chemistry of non-plume wells may be discussed for the purposes of classification. Shallow fluvial wells close to the Colorado River (MW-27-20, MW-28-25) show very similar chemistry to river water, which is a calcium/sodium-sulfate type with TDS in the 500-700 mg/L range. Deeper fluvial wells tend to show sodium-chloride chemistry similar to that of alluvial wells.

The majority of regional background samples show a cation dominance of sodium or calcium, similar to wells at the Topock site. Calcium was generally greater in wells in closer proximity to the Colorado River. TDS ranged from 260 mg/L (TMLP-2) to 1600 mg/L (Needles MW-11) (Figure 3 and Table 3). Consistent with wells around the Topock Site, anion dominance was split between chloride (e.g. EPNG-2, CA Agricultural Station), bicarbonate (e.g. Lily Hill, BOR-3), and sulfate (e.g. Needles MW-10, New Farm Well).

A piper plot (Figure 4) posting results from Topock site area background wells, regional background wells, and site non-background wells shows that chemistry ranges of regional background wells are consistent with those at the Topock Site. Wells with sulfate dominance tend to be near the Colorado River, screened in recent fluvial material. This is consistent with Topock site conditions, discussed above.

Concentrations of other general chemistry parameters (e.g. silica, alkalinity) and field parameters (e.g. pH, temperature) are consistent with site wells, and do not indicate any outlier wells. The analytical results for general chemistry suggest that all background wells are screened in either the unconsolidated alluvium or fluvial deposits.

5.1.2 Redox Conditions

The Topock site wells display more reducing conditions (absence of nitrate, presence of manganese, highly negative oxidation-reduction potential [ORP] readings) in the shallow and medium depth floodplain wells. In alluvial wells and deep fluvial wells, conditions are more oxidizing (presence of nitrate, absence of manganese and iron, positive ORP readings).

Redox indicator parameter (ORP, nitrate, iron, manganese, and sulfide) values for background wells are provided in Tables 3 and 4. Seven regional background locations are anaerobic. All are adjacent to the Colorado River (Needles MW-12, New Farm Well, USFW-5, BOR-2, BOR-3, PGE-9N, and PGE-9S) and are consistent with site wells screened in fluvial materials. The majority of these wells are shallow (total depth 118 ft bgs or less). All of these anaerobic locations exhibit elevated dissolved organic carbon concentrations relative to the rest of the non-fluvial locations. Elevated manganese is prevalent in most anaerobic samples, with no nitrate present. Little to no total iron was detected in anaerobic samples, suggesting redox conditions between manganese-reducing and iron-reducing. Sulfide was not detected in any sample.

Redox parameters in background wells indicating aerobic conditions are consistent with site wells completed in unconsolidated alluvium. Aerobic conditions are likely stable in wells completed in alluvium, due to the low organic carbon content. Nitrate is present in nearly all of these samples, and manganese is either low or absent.

Redox indicator parameters indicate that aerobic background wells are completed in unconsolidated alluvium and anaerobic background wells are completed in fluvial deposits.

5.1.3 Stable Isotopes

Background stable oxygen and deuterium isotope ratios were generally within the same range as isotope ratios measured at the Topock site in May-June 2004 (CH2M HILL, 2005b)(see Figure 5). Several samples collected from regional background wells exhibited similar isotopic signatures to both I-3 (Colorado River) and Topock Site shallow floodplain wells. These wells are presumably completed in fluvial deposits similar to shallow wells adjacent to the river at the Topock site. The overlap of isotope data between regional and Topock site wells further demonstrates the consistency of the two data populations. No outliers are apparent among the regional samples on Figure 5.

In summary, general chemistry and stable isotope data indicate that the range of regional background data is consistent with the groundwater chemistry observed in and around the Topock site. Though distinctions may be made between fluvial and alluvial samples, and between aerobic and anaerobic samples, there are no regional background samples that appear to belong to a separate geochemical group from those found at the site.

5.2 Anthropogenic Sources

The chemical data from the first two sampling events were evaluated for evidence of anthropogenic sources of metals.

Samples were analyzed for total metals (non-filtered samples) and dissolved metals (field-filtered samples) during sampling event 1. The non-filtered samples were collected to allow comparison to samples collected by other groups who may not have used field filtration, and also to allow an assessment of whether suspended materials could be influencing metal concentrations. The results are provided in Table 5 and, as expected, total metal concentrations in non-filtered samples tended to be higher than those in field-filtered samples, with a few exceptions.

An unexpected finding that came from the non-filtered sample results was the highly elevated metals concentrations in some of the samples collected from the New Ponds Wells (MW-1, MW-3 to MW-8). Total chromium concentrations of filtered and unfiltered samples along with total suspended solids were compared, and the suspended solids were found to contribute about 15% more chromium by mass. This corresponds to typical chromium concentrations in stainless steel, which also contains significant amounts of iron, nickel, and molybdenum. All of these metals were elevated in unfiltered samples collected from these wells. Further investigation revealed that the dedicated sample pumps in these wells are an older pneumatic style in which a large stainless steel spring wears against the stainless steel pump chamber and releases fine particles of stainless steel into the sample. Though this doesn't affect the major ion or isotope chemistry, it does affect the unfiltered metal concentrations and may have some effect on dissolved metal concentrations. For this reason, data from these wells are not considered usable for the calculation of background concentrations of metals.

Based on analysis of chemical data from background sampling events 1 and 2, there are no other wells (except for the wells MW-1, MW-3 to MW-8) that exhibit outlier concentrations of metals which would suggest anthropogenic impacts on groundwater.

5.3 Redundant Wells

Well locations and depths and groundwater chemistry were evaluated to determine whether clusters of wells would provide redundant data, and therefore skew the background calculation statistics.

Four sets of background wells are located close to one another and have similar well depths: BOR-2/BOR-3, Topock-2/Topock-3, PGE-09S/PGE-09N, and Needles MW-11/Needles MW-12. Chemical data from these well pairs were compared to determine whether any of the pairs represented redundant information that would tend to skew later statistical analysis of background concentrations.

Of the four pairs, BOR-2/BOR-3 and PGE-09S/PGE-09N did have nearly identical major ion chemistry, stable isotope signatures, and trace element concentrations. Therefore, it is recommended that one well from each of these clusters be removed from inclusion in the Background Study, on the basis of data redundancy.

The Topock-2/Topock-3 pair wells are completed at significantly different depths (Topock-2 is 150 feet deep and Topock-3 is 250 feet deep) and are screened over slightly different intervals (100-140 feet and 85 to 150 feet below ground surface, respectively). Although the stable isotope signatures are similar, there are some differences in general chemistry and trace element concentrations. Therefore, it is recommended that both of these wells be included in the background study.

The Needles pair showed significant differences in chemistry, which may reflect a difference in screened intervals (the screen intervals are unknown, but Needles MW-11 is 60 feet deeper than Needles MW-12, as displayed in Table 1). Therefore, it is recommended that both of these wells remain in the background study.

Another pair of wells that are geographically close together is GSWC-3/GSWC-4, in the Golden Shores area. Though their chemistries are similar, the well depths vary by more than 100 feet, and the screened intervals are unknown. The wells could represent different vertical horizons within the alluvial/fluvial background system, and are therefore recommended to be included in the study.

5.4 Selection of Analytes

The analytes for which samples were tested during the first two sampling events were those outlined in the Background Study Work Plan. However, it is evident after the first two rounds of sampling that it is not necessary to analyze for all of these analytes during sampling events 3, 4, 5 and 6. In order to assess which analytes could be eliminated, an evaluation was performed using the selection criteria outlined in Section 3.0. A summary of the results of this selection process is provided in Table 8, along with the parameters recommended to be sampled for the remaining four sampling events. The results of this evaluation are also discussed below.

Background concentrations will be calculated for Cr(VI), Cr(T) and other metals, so these analytes must be sampled during each event. Background concentrations will be calculated using dissolved metal results (filtered samples). Total metal results (unfiltered samples) will not be used to calculate the background concentrations, so they can be eliminated from further analysis.

Some analytes are necessary to assess whether the general chemistry of the groundwater monitored by the background wells does not change significantly or become significantly different from the Topock site groundwater chemistry. These analytes include field parameters, cations, anions, stable oxygen and hydrogen isotopes, redox indicator parameters and other general chemistry parameters.

As shown in Table 6, several analytes were undetected in many or all samples collected during both events. Many of these are trace metals that will require background concentration estimation, and therefore must remain in the Background Study to obtain enough data for statistical significance. Other undetected analytes that were sampled to classify general water chemistry need not be analyzed further, including bromide, iodide, sulfide, perchlorate and tritium.

Bromide and iodide were originally sampled because they may be useful as conservative constituents that, like stable isotope signatures, may be used to group waters of different origin or geochemical regimes. However, both of these parameters were consistently non-detect, and therefore are not useful in this regard.

Sulfide, one of several redox indicator parameters, was consistently undetected. Sulfide is not considered useful in this study, as redox conditions can be characterized with other parameters (e.g. ORP, manganese, nitrate, iron).

The absence of detectable tritium (radioactive hydrogen or ^{3}H) in all samples indicates that groundwater is consistently older than about 50 years. Therefore, tritium cannot be used to differentiate younger groundwater.

In summary, it is recommended that bromide, iodide, sulfide, perchlorate, tritium, and unfiltered metals no longer be included in the list of analytes. Table 8 summarizes the proposed list of analytes to be included in future sampling events.

6.0 Conclusions and Recommendations

A total of 27 wells are recommended to be included in the final set of background wells, 16 from Arizona and 11 from California. Table 7 presents the 27 wells recommended as the final set of background wells. It is recommended that these 27 wells be sampled for the remaining four sampling events and be used for the calculation of the background concentrations. This recommendation is based on the following conclusions:

- Groundwater chemistry of these 27 wells is consistent with the groundwater chemistry of the Topock site, as indicated by the TDS concentrations, cation/anion "fingerprint" and stable isotope signatures.
- No anthropogenic impact on the concentrations of metals in the groundwater is indicated by the analytical data for the 27 wells. The seven wells located around the Topock Site New Evaporation Ponds (MW-1, MW-3, MW-4, MW-5, MW-6, MW-7, and

MW-8) indicate a possible anthropogenic impact from the use of dedicated stainless steel pneumatic pumps in the wells. Therefore these wells are recommended to be excluded from the final background well set.

- The analytical results for these 27 wells are not considered to introduce a statistical bias to the background concentration calculations, based on their location, depth and groundwater chemistry. Wells BOR-3 and PGE-9N are recommended for exclusion from the final background well set due to the nearly identical location, screened interval, and groundwater chemistry to wells BOR-2 and PGE-9S, respectively.

The analytes that are recommended for exclusion from the next four background study sampling events include total (unfiltered) metals, sulfide, iodide, bromide, tritium and perchlorate. Table 8 outlines the list of analytes proposed for the final four sampling events, and which metals a background concentration will be calculated for during Step 3 of the background study.

7.0 References

CH2M HILL, 2004a. "*PG&E Topock Background Study, Step 1 Results Technical Memorandum*", dated March 10, 2005.

CH2M HILL, 2004b. "*Groundwater and Surface Water Monitoring Report, Second Quarter 2004, PG&E Topock Compressor Station, Needles, California*", dated August 17, 2004.

CH2M HILL, 2005a. "*Draft Work Plan for Assessing Background Metals Concentrations in Groundwater, PG&E Topock Compressor Station and Vicinity, Needles, California*", dated June 30, 2004.

CH2M HILL, 2005b. "*RCRA Facility Investigation/Remedial Investigation Report, PG&E Topock Compressor Station, Needles, California*", dated February 2005.

Tables

TABLE 1 Well and Geology Information

Wells Sampled During Sampling Events 1 and 2
PG&E Topock Background Study
PG&E Compressor Station and Vicinity, Needles, California

Well ID	Common Well ID or Mapped ID	Location Description	State	Current Well Owner	Well Use / Remarks	Date Installed	Boring Depth (ft)	Well Depth (ft)	Well Screen Length (ft)	Well Screen Interval (ft)	Depth to Water (ft)[1]	Well Diameter (in)	Depth to Bedrock	Driller's Log or Geologic Log Available	Well Construction Log Available	Hydrogeologic Unit Monitored
577479	ADOT New Well	Needle Mountain, AZ	AZ	Arizona Department of Transportation	Industrial/ Municipal Supply	11/18/1999	530	530	200	330-530	220	8	NE	Driller's Log	Yes	Unconsolidated Alluvium
509569	Sanders	I-40 at the CA/AZ border	AZ	Brown Investments	Domestic	1/1/1984		230	Unk.	Unk.	12	3	NE	No	No	Unknown
600189	Topock-2	East of Golden Shores Marina	AZ	City of Needles	Industrial/ Municipal Supply	9/1/1980	150	150	40	100-140	53	12	Unk.	No	No	Unknown
600187	Topock-3	East of Golden Shores Marina	AZ	City of Needles	Industrial/ Municipal Supply	5/17/1974	250	250	65	85-150	50	12	Unk.	No	No	Unknown
611578/ 529685 Replaced	EPNG-2	EPNG	AZ	El Paso Natural Gas	Industrial/ Municipal Supply	10/7/1990	500	500	160	322-482	240	10.75/ 8	Unk.	Driller's Log	Yes	Unconsolidated Alluvium
629199-L	GSWC-1	Golden Shores	AZ	Golden Shores Water Company	Industrial/ Municipal Supply	1/16/1962	250	250	Unk.	Unk.	140	8	Unk.	No	No	Unknown
629198-L	GSWC-2	Golden Shores	AZ	Golden Shores Water Company	Industrial/ Municipal Supply	2/26/1965	500	500	unk.	unk.	270	12	Unk.	No	No	Unknown
629200-L	GSWC-3	Golden Shores	AZ	Golden Shores Water Company	Industrial/ Municipal Supply	2/13/1965	500	500	Unk.	Unk.	280	8	Unk.	No	No	Unknown
576721	GSWC-4	Golden Shores	AZ	Golden Shores Water Company	Industrial/ Municipal Supply	10/26/1999	610	610	170	352-522	258	12	NE	Driller's Log	Yes	Unknown
561779	PGE-9N	I-40 at the CA/AZ border	AZ	Pacific Gas and Electric	Industrial/ Municipal Supply	4/4/1997	95	95	69	26-95	5.83	12	94	Both Logs	Yes	Fluvial AA (Qr1, Qr2)
561780	PGE-9S	I-40 at the CA/AZ border	AZ	Pacific Gas and Electric	Industrial/ Municipal Supply	4/22/1997	100	100	70	30-100	5.72	12	104	Both Logs	Yes	Fluvial AA (Qr1, Qr2)
627665	Langmaack	Golden Shores	AZ	Richard and Maria Langmaack	Domestic	1/1/1979	240	240	Unk.	Unk.	190	6	Unk.	No	No	Unknown
571831	GSRV-2	Catfish Paradise	AZ	RPGS LLC	Domestic	2/9/2000	245	245	40	205-245	60	8	NE	Driller's Log	Yes	Unknown
553713	TMLP-2	East of EPNG	AZ	Topock Mesa Limited Partnership	Monitoring/ Piezometer	3/4/1996	880	880	80	750-880	Artesian	2	159	Driller's Log	No	Unconsolidated Alluvium
526376	BOR-2	Havasu Nat Wild Ref	AZ	U.S. Bureau of Reclamation	Monitoring/ Piezometer	12/6/1989	35	30.48	5	30-35	16.18	2	NE	Driller's Log	Yes	Fluvial Younger Qr
526375	BOR-3	Havasu Nat Wild Ref	AZ	U.S. Bureau of Reclamation	Monitoring/ Piezometer	12/7/1989	35	24.6	5	30-35	11.94	2	NE	Driller's Log	Yes	Fluvial Younger Qr
547600	New Farm Well	Havasu Nat Wild Ref	AZ	Havasu Nat Wild Ref	Irrigation	4/3/1995	116	116	60	56-116	9	16	NE	Driller's Log	Yes	Unknown
594835	USFW-5	Havasu Nat Wild Ref	AZ	U.S. Fish and Wildlife	Domestic	11/15/2002	75	75	5	70-75	21	5	NE	Driller's Log	Yes	Fluvial Younger Qr
008N023E27Q 001S	CA Agriculture Station	Agriculture Check Station	CA	California Department of Food and Agriculture Plant Inspection Post	Domestic	7/1/1965	Unk.	202	Unk.	Unk.	150	6	Unk.	No	No	Unknown
MW-10	Needles MW-10	Bush and "K" St. Needles	CA	City of Needles	Industrial/ Municipal Supply	Unk.	Unk.	180	100	80-180	14	10	Unk.	No	No	Unconsolidated Alluvium
MW-11	Needles MW-11	Needles Golf Course	CA	City of Needles	Industrial/ Municipal Supply	Unk.	Unk.	280	Unk.	Unk.	Unk.	18	Unk.	No	No	Unconsolidated Alluvium
MW-12	Needles MW-12	Needles Golf Course	CA	City of Needles	Industrial/ Municipal Supply	Unk.	Unk.	220	Unk.	Unk.	Unk.	Unk.	Unk.	No	No	Unconsolidated Alluvium
11059752V	Lily Hill	1501 Lily Hill Dr. #36 Needles	CA	Mountain View Rentals (aka Terrace View), LLC	Irrigation	11/28/1997	225	225	5	220-225	175	5	NE	Driller's Log	Yes	Unconsolidated Alluvium
008N023E20K 001S	Tayloe	National Old Trails Rd and Hwy 95, South of Needles	CA	John Tayloe	Domestic	4/1/1969	Unk.	394	40	360-400	280	6	Unk.	No	No	Unconsolidated Alluvium
07N24E07H04	MW-01 (Formerly P-1)	New Ponds site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	8/26/1986	212	210.5	10	200.5-210.5	207	4	NE	Geologic Log	Yes	Unconsolidated Alluvium

TABLE 1 Well and Geology Information

Wells Sampled During Sampling Events 1 and 2
PG&E Topock Background Study
PG&E Compressor Station and Vicinity, Needles, California

Well ID	Common Well ID or Mapped ID	Location Description	State	Current Well Owner	Well Use / Remarks	Date Installed	Boring Depth (ft)	Well Depth (ft)	Well Screen Length (ft)	Well Screen Interval (ft)	Depth to Water (ft)[1]	Well Diameter (in)	Depth to Bedrock	Driller's Log or Geologic Log Available	Well Construction Log Available	Hydrogeologic Unit Monitored
07N24E07H01	MW-03 (Formerly P-3)	New Ponds site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	8/20/1986	207	203	10	193-203	189	4	NE	Geologic Log	Yes	Unconsolidated Alluvium
07N24E07H03	MW-04 (Formerly P-4)	New Ponds site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	8/21/1986	180	174.5	10	164.5-174.5	170.32	4	NE	Geologic Log	Yes	Unconsolidated Alluvium
MW-05	MW-05	New Ponds site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	6/1/1989	188	185.4	9	175.9-185.4	180	4	NE	Both Logs	Yes	Unconsolidated Alluvium
MW-06	MW-06	New Ponds site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	6/1/1989	194.1	194	9	184.5-193.5	185.5	4	NE	Both Logs	Yes	Unconsolidated Alluvium
MW-07	MW-07	New Ponds site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	6/1/1989	188	182.7	10	172.7-182.7	177	4	NE	Both Logs	Yes	Unconsolidated Alluvium
MW-08	MW-08	New Ponds site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	6/1/1989	179.4	180.3	9	169-178	171	4	NE	Both Logs	Yes	Unconsolidated Alluvium
MW-16	MW-16	On-site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	4/10/1998	218	218.1	20	198-218	201.57	4	NE	Both Logs	Yes	Unconsolidated Alluvium
MW-17	MW-17	On-site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	5/18/1998	151	150.5	20.5	130-150.5	133.8	4	NE	Both Logs	Yes	Unconsolidated Alluvium
MW-18	MW-18	On-site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	4/8/1998	110	110	20	85-105	88.9	4	NE	Both Logs	Yes	Unconsolidated Alluvium
07N24E07H02	P-2	New Ponds site	CA	Pacific Gas and Electric	Monitoring/ Piezometer	8/28/1986	249	258	10	238.5-248.5	170.98	4	NE	Geologic Log	Yes	Unconsolidated Alluvium
7N/24E8B	PMM-Supply	Park Moabi	CA	Park Moabi Marina	Industrial/ Municipal Supply	3/1/1961	190	180	129	28-42/65-180	22.5	10	Unk.	Driller's Log	No	Unconsolidated Alluvium

Notes:

1. Depth to water based on field measurements or water depths noted on logs.

Unk. = Unknown

NE = not encountered

Table 2: Groundwater Analytical Results - Dissolved (Filtered) Metals
Sampling Events 1 and 2
PG&E Topock Background Study

Well ID	Sample	Dissolved (Filtered) Metals in µg/L																				Dissolved (Filtered) General Minerals in mg/L					
		Aluminium	Antimony	Arsenic	Barium	Beryllium	Cadmium	Hexavalent Chromium [1]	Total Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Boron	Calcium	Iron	Magnesium	Potassium	Sodium
ARIZONA																											
ADOT New Well	5/18/2005	64.5	ND (2.0)	6.12	81.9	ND (1.0)	ND (1.0)	8.20	9.32	ND (1.0)	4.47	ND (1.0)	2.45	ND (0.2)	9.54	ND (1.0)	1.07	ND (1.0)	ND (1.0)	12.1	64.4	0.578	39.2	ND (0.1)	5.90	5.58	177
	7/25/2005	61.2	ND (2.0)	5.64	82.0	ND (1.0)	ND (1.0)	8.10	5.25	ND (1.0)	4.47	ND (1.0)	4.12	ND (0.2)	10.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	12.8	60.1	0.545	39.4	ND (0.1)	5.89	5.81	185
Sanders	5/18/2005	73.8	ND (2.0)	24.4	63.8	ND (1.0)	ND (1.0)	0.24	1.04	ND (1.0)	5.96	ND (1.0)	171	ND (0.2)	31.1	1.37	3.87	ND (1.0)	1.14	42.8	112	1.10	82.1	ND (0.1)	10.4	3.76	374
	7/25/2005	ND (50)	ND (2.0)	27.7	53.7	ND (1.0)	ND (1.0)	0.57	1.13	ND (1.0)	3.94	ND (1.0)	172	ND (0.2)	37.3	1.00	3.92	ND (1.0)	ND (1.0)	47.6	60.5	1.05	67.7	ND (0.1)	8.49	3.81	370
Topock-2	6/22/2005	ND (50)	ND (2.0)	10.6	80.0	ND (1.0)	ND (1.0)	6.30	10.8	ND (1.0)	3.60	ND (1.0)	2.51	ND (0.2)	23.9	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	19.1	19.1	0.735	48.5	0.146	5.78	7.86	331
	7/21/2005	ND (50)	ND (2.0)	12.7	69.0	ND (1.0)	ND (1.0)	7.40	11.0	ND (1.0)	4.90	ND (1.0)	1.54	ND (0.2)	25.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	17.9	ND (10)	0.685	41.5	ND (0.1)	4.77	7.58	315
Topock-3	5/17/2005	ND (50)	ND (2.0)	13.6	82.4	ND (1.0)	ND (1.0)	13.8	12.5	ND (1.0)	2.91	ND (1.0)	ND (1.0)	ND (0.2)	20.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	17.8	ND (10)	0.503	34.4	ND (0.1)	5.37	5.89	227
	5/17/2005 (FD)	ND (50)	ND (2.0)	13.1	80.8	ND (1.0)	ND (1.0)	13.9	12.6	ND (1.0)	1.25	ND (1.0)	ND (1.0)	ND (0.2)	19.8	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	16.9	ND (10)	0.502	33.9	ND (0.1)	5.34	5.85	225
	8/11/2005	ND (50)	ND (2.0)	13.8	71.8	ND (1.0)	ND (1.0)	8.60	12.5	ND (1.0)	3.67	2.51 J	1.78	ND (0.2)	19.2	1.26	ND (1.0)	ND (1.0)	ND (1.0)	18.9	ND (10)	0.545	30.1	ND (0.1)	3.93	5.95	229
	8/11/2005 (FD)	ND (50)	ND (2.0)	14.3	76.7	ND (1.0)	ND (1.0)	8.90	14.1	ND (1.0)	2.07	ND (1.0)J	1.50	ND (0.2)	20.6	1.83	ND (1.0)	ND (1.0)	ND (1.0)	19.8	ND (10)	0.577	32.4	ND (0.1)	4.15	6.36	243
EPNG-2	5/18/2005	53.5	ND (2.0)	5.28	83.6	ND (1.0)	ND (1.0)	7.40	9.69	ND (1.0)	5.80	ND (1.0)	1.49	ND (0.2)	8.36	ND (1.0)	1.27	ND (1.0)	ND (1.0)	13.8	22.7	0.507	35.9	ND (0.1)	7.10	5.36	162
	7/25/2005	53.9	ND (2.0)	5.35	85.0	ND (1.0)	ND (1.0)	9.70	10.7	ND (1.0)	1.77	ND (1.0)	ND (1.0)	ND (0.2)	8.74	ND (1.0)	1.13	ND (1.0)	ND (1.0)	15.3	51.3	0.49	37.3	ND (0.1)	7.33	5.66	174
GSWC-1	5/17/2005	ND (50)	ND (2.0)	6.04	36.6	ND (1.0)	ND (1.0)	13.0	12.0	ND (1.0)	2.63	ND (1.0)	ND (1.0)	ND (0.2)	7.03	ND (1.0)	4.34	ND (1.0)	ND (1.0)	16.4	ND (10)	0.244	37.7	ND (0.1)	15.9	5.97	82.7
	7/22/2005	ND (50)	ND (2.0)	7.34	40.1	ND (1.0)	ND (1.0)	12.8	12.7	ND (1.0)	5.02	1.29	ND (1.0)	ND (0.2)	7.15	1.22	3.96	ND (1.0)	ND (1.0)	18.4	15.3	0.263	39.9	ND (0.1)	16.4	6.68	88.2
GSWC-2	5/17/2005	ND (50)	ND (2.0)	7.21	46.4	ND (1.0)	ND (1.0)	5.40	5.64	ND (1.0)	ND (1.0)	ND (1.0)	1.38	ND (0.2)	7.29	ND (1.0)	1.61	ND (1.0)	ND (1.0)	17.3	ND (10)	0.236	29.1	ND (0.1)	11.7	5.17	95.9
	7/22/2005	ND (50)	ND (2.0)	8.52	50.6	ND (1.0)	ND (1.0)	5.30	5.82	ND (1.0)	20.2	1.91	ND (1.0)	ND (0.2)	7.17	1.72	1.48	ND (1.0)	ND (1.0)	18.4	27.6	0.25	30.3	ND (0.1)	11.5	5.64	100
GSWC-3	5/18/2005	ND (50)	ND (2.0)	8.87	28.0	ND (1.0)	ND (1.0)	12.7	13.8	ND (1.0)	6.64	1.36	3.22	ND (0.2)	6.28	ND (1.0)	1.20	ND (1.0)	ND (1.0)	23.0	22.6	0.228	25.3	ND (0.1)	8.96	4.66	76.7
	7/22/2005	ND (50)	ND (2.0)	10.1	22.6	ND (1.0)	ND (1.0)	7.10	11.4	ND (1.0)	2.71	ND (1.0)	3.35	ND (0.2)	5.83	1.13	1.67	ND (1.0)	ND (1.0)	22.6	33.8	0.222	25.2	ND (0.1)	8.90	5.09	72.0
GSWC-4	5/18/2005	ND (50)	ND (2.0)	7.42	60.1	ND (1.0)	ND (1.0)	9.50	7.84	ND (1.0)	4.85	ND (1.0)	1.84	ND (0.2)	6.93	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	20.0	23.5	0.245	25.3	0.203	8.91	4.71	84.0
	7/22/2005	ND (50)	ND (2.0)	8.62	42.3	ND (1.0)	ND (1.0)	10.7	11.2	ND (1.0)	4.91	ND (1.0)	ND (1.0)	ND (0.2)	6.97	1.04	1.06	ND (1.0)	ND (1.0)	21.4	27.2	0.244	25.9	ND (0.1)	8.61	5.06	80.7
PGE-09N	5/11/2005	ND (50)	ND (2.0)	ND (1.0)	17.6	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	562	ND (0.2)	ND (2.0)	2.43	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	125	0.637	34.5	1.43	92.9	14.7	1920
	7/20/2005	ND (50)	ND (2.0)	32.1	108	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.00	29.0	ND (1.0)	723	ND (0.2)	19.1	2.17	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	896	1.55	383	ND (0.1)	151	21.3	2640
PGE-09S	5/11/2005	ND (50)	ND (2.0)	23.4	94.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.20	ND (1.0)	1080	ND (0.2)	15.3	1.79	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1870	1.43	345	3.41	152	20.9	2710
	7/20/2005	ND (50)	ND (2.0)	35.6	180	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	2.49	ND (1.0)	1950	ND (0.2)	19.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	655	1.64	383	14.0	154	17.2	2330
Langmaack	5/17/2005	ND (50)	ND (2.0)	5.26	21.8	ND (1.0)	ND (1.0)	22.4	19.5	ND (1.0)	2.25	ND (1.0)	1.10	ND (0.2)	3.56	ND (1.0)	1.84	ND (1.0)	ND (1.0)	15.3	ND (10)	0.18	26.3	ND (0.1)	11.3	4.71	58.4
	7/25/2005	61.6	ND (2.0)	6.37	22.7	ND (1.0)	ND (1.0)	20.9	20.4	ND (1.0)	2.99	ND (1.0)	4.05	ND (0.2)	3.50	ND (1.0)	1.65	ND (1.0)	ND (1.0)	19.2	16.2	0.197	29.7	ND (0.1)	12.5	5.48	67.6
GSRV-2	5/19/2005	ND (50)	ND (2.0)	5.31	53.4	ND (1.0)	ND (1.0)	37.3	35.3	ND (1.0)	4.74	ND (1.0)	ND (1.0)	ND (0.2)	5.91	ND (1.0)	1.31	ND (1.0)	ND (1.0)	17.2	14.3	0.153	42.9	ND (0.1)	14.9	5.13	61.4
	5/19/2005 (FD)	ND (50)	ND (2.0)	4.88	52.8	ND (1.0)	ND (1.0)	38.6	34.2	ND (1.0)	3.69	ND (1.0)	ND (1.0)	ND (0.2)	5.84	ND (1.0)	1.60	ND (1.0)	ND (1.0)	16.3	11.9	0.14	41.7	ND (0.1)	14.7	5.03	59.5
	7/22/2005	ND (50)	ND (2.0)	6.61	60.1	ND (1.0)	ND (1.0)	25.4	27.9	ND (1.0)	1.71 J	ND (1.0)	ND (1.0)	ND (0.2)	6.74	ND (1.0)	1.30	ND (1.0)	ND (1.0)	18.2	11.8	0.173	45.4	ND (0.1)	14.8	5.72	63.6
	7/22/2005 (FD)	ND (50)	ND (2.0)	6.20	62.7	ND (1.0)	ND (1.0)	25.7	29.7	ND (1.0)	4.49 J	ND (1.0)	ND (1.0)	ND (0.2)	6.91	1.10	1.87	ND (1.0)	ND (1.0)	19.6	19.3	0.185	48.1	ND (0.1)	15.7	6.05	66.8
TMLP-2	5/12/2005	ND (50)	ND (2.0)	5.34	22.3	ND (1.0)	ND (1.0)	10.9	19.3	ND (1.0)	ND (1.0)	ND (1.0)	2.38	ND (0.2)	5.16	ND (1.0)	1.00	ND (1.0)	ND (1.0)	17.0	ND (10)	0.126	21.5	0.106	8.81	5.68	52.6

Table 2: Groundwater Analytical Results - Dissolved (Filtered) Metals
Sampling Events 1 and 2
PG&E Topock Background Study

Well ID	Sample	Dissolved (Filtered) Metals in µg/L																			Dissolved (Filtered) General Minerals in mg/L					
		Aluminium	Antimony	Arsenic	Barium	Beryllium	Cadmium	Hexavalent Chromium [1]	Total Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Boron	Calcium	Iron	Magnesium	Potassium	Sodium
ARIZONA																											
TMLP-2	7/20/2005	ND (50)	ND (2.0)	6.64	20.2	ND (1.0)	ND (1.0)	18.1	22.5	ND (1.0)	3.05	ND (1.0)	4.29	ND (0.2)	6.11	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	21.4	18.0	0.15	25.6	ND (0.1)	10.7	7.00	62.6
BOR-2	5/11/2005	ND (50)	ND (2.0)	16.4	57.8	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	259	ND (0.2)	6.30	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	12.3	0.147	78.1	1.07	34.4	5.18	109
	7/20/2005	56.1	ND (2.0)	17.8	103	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	294	ND (0.2)	5.77	1.16	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	0.148	76.7	1.36	30.7	5.22	99.3
BOR-3	5/11/2005	ND (50)	ND (2.0)	3.77	299	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	166	ND (0.2)	4.94	3.41	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	26.1	0.176	74.1	1.49	31.1	4.67	109
	7/21/2005	ND (50)	ND (2.0)	4.94	359	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	2.25	ND (1.0)	202	ND (0.2)	5.40	1.58	ND (1.0)	ND (1.0)	ND (1.0)	1.05	28.0	0.199	83.1	2.23	33.9	4.85	116
New Farm Well	5/12/2005	ND (50)	ND (2.0)	5.02	60.1	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	1.50	ND (1.0)	456	ND (0.2)	5.71	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	0.154	104	0.46	32.9	5.18	128
	7/20/2005	53.7	ND (2.0)	6.41	66.4	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	1.24	ND (1.0)	505	ND (0.2)	6.59	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	34.4	0.171	114	0.468	36.6	5.99	145
USFW-5	5/12/2005	ND (50)	ND (2.0)	3.42	37.0	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	1.96	ND (1.0)	266	ND (0.2)	4.38	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	0.116	77.2	0.473	26.6	4.31	83.9
	7/20/2005	53.8	ND (2.0)	3.83	43.8	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	3.30	ND (1.0)	302	ND (0.2)	5.28	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	12.2	0.14	88.2	0.431	31.6	5.17	99.2
CALIFORNIA																											
CA Agriculture Station	5/16/2005	ND (50)	ND (2.0)	3.37	27.8	ND (1.0)	ND (1.0)	2.80	2.76	ND (1.0)	2.06	ND (1.0)	1.63	ND (0.2)	20.2	ND (1.0)	2.72	ND (1.0)	ND (1.0)	13.1	ND (10)	0.564	56.4	ND (0.1)	15.4	5.15	216
	7/25/2005	56.2	ND (2.0)	3.41	28.4	ND (1.0)	ND (1.0)	2.20	2.81	ND (1.0)	2.65	ND (1.0)	2.46	ND (0.2)	20.7	ND (1.0)	2.52	ND (1.0)	ND (1.0)	14.8	35.7	0.591	59.3	ND (0.1)	15.9	5.39	235
Needles MW-10	5/16/2005	ND (50)	ND (2.0)	2.99	16.8	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	1.55	ND (1.0)	28.8	ND (0.2)	9.81	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	4.73	ND (10)	0.161	67.2	ND (0.1)	23.7	4.01	134
	7/21/2005	50.9	ND (2.0)	3.84	20.7	ND (1.0)	ND (1.0)	ND (0.2)	1.09	ND (1.0)	3.22	ND (1.0)	30.8	ND (0.2)	10.7	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	5.83	24.8	0.202	78.3	ND (0.1)	27.7	5.00	153
Needles MW-11	5/16/2005	ND (50)	ND (2.0)	5.64	23.2	ND (1.0)	ND (1.0)	2.30	2.26	ND (1.0)	4.31	ND (1.0)	20.4	ND (0.2)	15.7	ND (1.0)	3.08	ND (1.0)	ND (1.0)	9.18	ND (10)	0.487	94.7	ND (0.1)	41.2	11.8	290
	7/21/2005	ND (50)	ND (2.0)	6.56	28.6	ND (1.0)	ND (1.0)	2.30	2.89	ND (1.0)	4.19	1.43	21.1	ND (0.2)	17.7	1.02	3.84	ND (1.0)	ND (1.0)	10.8	46.5	0.559	111	ND (0.1)	48.2	14.1	338
Needles MW-12	6/22/2005	ND (50)	ND (2.0)	3.53	28.8	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	3.66	ND (1.0)	602	ND (0.2)	10.5	3.31	ND (1.0)	ND (1.0)	1.22	6.95	26.4	0.34	132	ND (0.1)	51.8	8.21	242
	7/21/2005	ND (50)	ND (2.0)	3.49	30.8	ND (1.0)	ND (1.0)	ND (0.2)	ND (1.0)	ND (1.0)	3.50	ND (1.0)	567	ND (0.2)	10.4	2.77	ND (1.0)	ND (1.0)	ND (1.0)	5.31	ND (10)	0.38	144	ND (0.1)	55.7	9.57	273
Lily Hill	5/16/2005	ND (50)	ND (2.0)	14.6	52.6	ND (1.0)	ND (1.0)	10.9	9.52	ND (1.0)	3.56	ND (1.0)	ND (1.0)	ND (0.2)	12.6	ND (1.0)	2.07	ND (1.0)	ND (1.0)	21.6	ND (10)	0.291	20.6	ND (0.1)	7.22	4.21	89.1
	7/25/2005	63.1	ND (2.0)	15.9	59.6	ND (1.0)	ND (1.0)	10.3	10.6	ND (1.0)	1.80	ND (1.0)	ND (1.0)	ND (0.2)	13.2	ND (1.0)	2.61	ND (1.0)	1.16	24.2	24.2	0.311	23.5	ND (0.1)	7.93	4.62	101
Tayloe	5/16/2005	ND (50)	ND (2.0)	4.38	49.9	ND (1.0)	ND (1.0)	1.00	1.13	ND (1.0)	ND (1.0)	2.52	ND (1.0)	ND (0.2)	10.1	ND (1.0)	1.88	ND (1.0)	ND (1.0)	7.62	35.3	0.324	32.1	ND (0.1)	5.07	3.66	132
	7/25/2005	ND (50)	ND (2.0)	6.18	44.9	ND (1.0)	ND (1.0)	0.49	ND (1.0)	ND (1.0)	2.89	1.14	ND (1.0)	ND (0.2)	10.9	ND (1.0)	2.36	ND (1.0)	ND (1.0)	9.61	66.3	0.348	34.6	ND (0.1)	5.40	4.13	145
MW-01	5/9/2005	ND (50)	ND (2.0)	13.2	20.8	ND (1.0)	ND (1.0)	4.80	5.70	ND (1.0)	2.72	ND (1.0)	3.21	ND (0.2)	ND (2.0)	7.79	3.48	ND (1.0)	ND (1.0)	36.9	ND (10)	0.126	26.0	ND (0.1)	5.13	3.96	119
	7/18/2005	68.6	ND (2.0)	13.3	26.3	ND (1.0)	ND (1.0)	4.70	6.98	ND (1.0)	1.55	ND (1.0)	4.34	ND (0.2)	ND (2.0)	6.71	3.34	ND (1.0)	ND (1.0)	40.6	72.8	0.137	30.2	ND (0.1)	6.09	4.47	135
MW-03	5/9/2005	ND (50)	ND (2.0)	10.3	14.1	ND (1.0)	ND (1.0)	9.90	12.4	ND (1.0)	4.07	ND (1.0)	19.3	ND (0.2)	29.3	41.5	8.84	ND (1.0)	ND (1.0)	30.8	27.6	0.386	35.5	ND (0.1)	6.59	4.75	225
	7/18/2005	63.6	ND (2.0)	11.9	15.9	ND (1.0)	ND (1.0)	10.2	12.5	ND (1.0)	4.85	ND (1.0)	3.24	ND (0.2)	26.6	12.5	8.09	ND (1.0)	ND (1.0)	37.4	ND (10)	0.391	35.8	ND (0.1)	6.76	4.93	234
MW-04	5/9/2005	ND (50)	ND (2.0)	5.44	16.1	ND (1.0)	ND (1.0)	19.1	22.9	ND (1.0)	2.75	ND (1.0)	3.19	ND (0.2)	15.8	7.74	3.42	ND (1.0)	ND (1.0)	21.1	18.0	0.364	27.3	ND (0.1)	4.92	4.87	178
	7/18/2005	61.8	ND (2.0)	6.07	17.6	ND (1.0)	ND (1.0)	19.2	24.0	ND (1.0)	2.27	ND (1.0)	1.76	ND (0.2)	18.2	13.2	3.91	ND (1.0)	ND (1.0)	23.6	12.8	0.422	30.1	ND (0.1)	5.59	5.75	202
MW-05	5/13/2005	ND (50)	ND (2.0)	5.73	27.8	ND (1.0)	ND (1.0)	12.3	12.9	ND (1.0)	2.83	ND (1.0)	3.51	ND (0.2)	45.2	ND (6.5)	17.3	ND (1.0)	ND (1.0)	20.1	ND (32)	0.427	46.9	ND (0.1)	9.13	5.77	262
	7/18/2005	58.5	ND (2.0)	7.34	29.7	ND (1.0)	ND (1.0)	12.6	15.0	ND (1.0)	2.04	ND (1.0)	1.34	ND (0.2)	50.4	4.97	20.3	ND (1.0)	ND (1.0)	23.5	36.7	0.496	52.0	ND (0.1)	10.2	6.60	291
MW-06	5/13/2005	ND (50)	ND (2.0)	14.2	10.2	ND (1.0)	ND (1.0)	7.00	7.98	ND (1.0)	1.89	ND (1.0)	2.21	ND (0.2)	5.61	ND (2.9)	1.44	ND (1.0)	ND (1.0)	44.1	ND (27)	0.296	9.74	ND (0.1)	1.97	3.08	148

Table 2: Groundwater Analytical Results - Dissolved (Filtered) Metals
Sampling Events 1 and 2
PG&E Topock Background Study

Well ID	Sample	Dissolved (Filtered) Metals in µg/L																			Dissolved (Filtered) General Minerals in mg/L					
		Aluminium	Antimony	Arsenic	Barium	Beryllium	Cadmium	Hexavalent Chromium [1]	Total Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Boron	Calcium	Iron	Magnesium	Potassium	Sodium
CALIFORNIA																											
MW-06	7/18/2005	61.8	ND (2.0)	15.7	9.17	ND (1.0)	ND (1.0)	7.20	9.03	ND (1.0)	1.48	ND (1.0)	ND (1.0)	ND (0.2)	5.68	1.44	1.31	ND (1.0)	ND (1.0)	47.2	37.8	0.303	9.60	ND (0.1)	2.03	3.61	150
MW-07	5/13/2005	ND (50)	ND (2.0)	11.1	15.2	ND (1.0)	ND (1.0)	14.6	14.9	ND (1.0)	1.19	ND (1.0)	17.3	ND (0.2)	17.1	8.03	6.95	ND (1.0)	ND (1.0)	33.0	ND (16)	0.296	14.7	ND (0.1)	2.72	3.51	207
	7/18/2005	53.5	ND (2.0)	13.8	17.8	ND (1.0)	ND (1.0)	14.7	18.2	ND (1.0)	1.30	ND (1.0)	1.85	ND (0.2)	20.4	5.29	7.47	ND (1.0)	ND (1.0)	38.7	12.4	0.35	16.0	ND (0.1)	3.11	4.06	233
MW-08	5/13/2005	ND (50)	ND (2.0)	4.64	29.1	ND (1.0)	ND (1.0)	47.0	48.7	ND (1.0)	2.11	ND (1.0)	2.98	ND (0.2)	18.5	ND (5.5)	6.07	ND (1.0)	ND (1.0)	18.3	ND (14)	0.322	52.1	ND (0.1)	9.92	6.60	201
	7/18/2005	ND (50)	ND (2.0)	6.21	32.1	ND (1.0)	ND (1.0)	49.0	56.3	ND (1.0)	11.4	ND (1.0)	1.32	ND (0.2)J	19.5	2.46	6.67	ND (1.0)	ND (1.0)	22.6	72.7	0.353	55.8	ND (0.1)	11.0	7.44	224
MW-16	5/13/2005	ND (50)	ND (2.0)	8.71	26.1	ND (1.0)	ND (1.0)	10.7	10.8	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (0.2)	13.7	7.09	1.81	ND (1.0)	ND (1.0)	28.4	ND (10)	0.306	30.6	ND (0.1)	5.84	4.11	212
	5/13/2005 (FD)	ND (50)	ND (2.0)	9.76	29.1	ND (1.0)	ND (1.0)	10.5	11.6	ND (1.0)	1.83	ND (1.0)	ND (1.0)	ND (0.2)	14.1	ND (6.5)	1.92	ND (1.0)	ND (1.0)	31.6	ND (41)	0.32	32.8	ND (0.1)	6.27	4.40	224
	7/26/2005	58.1	ND (2.0)	9.74	29.4	ND (1.0)	ND (1.0)	8.80	10.2	ND (1.0)	4.13	ND (1.0)	2.91	ND (0.2)	12.6	8.84	1.61	ND (1.0)	ND (1.0)	32.0	14.0	0.303	29.9	ND (0.1)	5.59	4.25	209
	7/26/2005 (FD)	ND (50)	ND (2.0)	9.91	29.1	ND (1.0)	ND (1.0)	9.20	10.3	ND (1.0)	2.75	ND (1.0)	1.84	ND (0.2)	13.1	8.12	1.38	ND (1.0)	ND (1.0)	33.3	ND (10)	0.315	31.1	ND (0.1)	5.85	4.52	219
MW-17	5/19/2005	ND (50)	ND (2.0)	1.73	34.2	ND (1.0)	ND (1.0)	14.1	13.2	ND (1.0)	19.8 J	ND (1.0)	5.20	ND (0.2)	17.4	ND (1.0)	12.2	ND (1.0)	ND (1.0)	4.48	63.4	0.239	119	ND (0.1)	17.9	10.2	272
	5/19/2005 (FD)	ND (50)	ND (2.0)	1.41	35.2	ND (1.0)	ND (1.0)	13.5	13.8	ND (1.0)	7.20 J	1.08	5.94	ND (0.2)	17.6	ND (1.0)	12.6	ND (1.0)	ND (1.0)	4.65	65.4	0.245	122	ND (0.1)	18.3	10.3	277
	7/26/2005	ND (50)	ND (2.0)	1.53	35.2	ND (1.0)	ND (1.0)	12.5	12.0	ND (1.0)	3.15	ND (1.0)	4.50	ND (0.2)	18.7	1.50	13.1	ND (1.0)	ND (1.0)	3.93	88.8	0.249	126	ND (0.1)	18.5	11.0	274
	7/26/2005 (FD)	51.2	ND (2.0)	1.50	38.5	ND (1.0)	ND (1.0)	13.0	12.3	ND (1.0)	3.08	ND (1.0)	4.74	ND (0.2)	20.6	ND (1.0)	14.7	ND (1.0)	ND (1.0)	4.05	85.3	0.275	138	ND (0.1)	19.8	12.2	303
MW-18 [2]	5/12/2005	84.8	ND (2.0)	ND (1.0)	83.1	ND (1.0)	ND (1.0)	26.5	27.8	ND (1.0)	ND (1.0)	ND (1.0)	6.72	√D (0.0005	3.60	ND (1.0)	2.58	ND (1.0)	ND (1.0)	3.37	40.4 J	0.176	105	0.298	16.0	8.70	178
	7/26/2005	ND (50)	ND (2.0)	1.07	82.8	ND (1.0)	ND (1.0)	23.6	26.3	ND (1.0)	3.27	ND (1.0)	ND (1.0)	ND (0.2)	4.42	ND (1.0)	2.67	ND (1.0)	ND (1.0)	3.87	22.2	0.202	102	ND (0.1)	15.5	9.16	178
P-2	5/13/2005	ND (50)	ND (2.0)	2.26	147	ND (1.0)	ND (1.0)	2.70	2.91	ND (1.0)	ND (1.0)	ND (1.0)	1.44	ND (0.2)	5.78	ND (1.4)	1.63	ND (1.0)	ND (1.0)	11.4	ND (16)	0.545	269	ND (0.1)	53.1	10.9	694
	7/26/2005	ND (50)	ND (2.0)	2.09	141	ND (1.0)	ND (1.0)	3.20	3.80	ND (1.0)	3.36	ND (1.0)	ND (1.0)	ND (0.2)	5.78	ND (1.0)	1.98	ND (1.0)	ND (1.0)	12.7	ND (10)	0.541	263	ND (0.1)	50.6	10.6	670
PMM-Supply	5/18/2005	ND (50)	ND (2.0)	1.58	143	ND (1.0)	ND (1.0)	10.2	11.5	ND (1.0)	4.64	ND (1.0)	1.14	ND (0.2)	5.31	2.71 J	1.36	ND (1.0)	ND (1.0)	9.65	37.5	0.201	82.0	ND (0.1)	16.3	6.52	149
	5/18/2005 (FD)	57.8	ND (2.0)	1.64	141	ND (1.0)	ND (1.0)	10.0	10.9	ND (1.0)	4.75	ND (1.0)	ND (1.0)	ND (0.2)	5.44	ND (1.0)J	1.84	ND (1.0)	ND (1.0)	9.96	25.6	0.20	80.4	ND (0.1)	15.9	6.36	148
	7/21/2005	60.0	ND (2.0)	2.06	155	ND (1.0)	ND (1.0)	9.70	10.2	ND (1.0)	2.41	ND (1.0)	ND (1.0)	ND (0.2)	5.41	ND (1.0)	1.51	ND (1.0)	ND (1.0)	9.31	14.5	0.205	86.1	ND (0.1)	16.9	6.81	155
	7/21/2005 (FD)	ND (50)	ND (2.0)	1.89	158	ND (1.0)	ND (1.0)	9.60	10.8	ND (1.0)	1.52	ND (1.0)	ND (1.0)	ND (0.2)	5.35	ND (1.0)	1.41	ND (1.0)	ND (1.0)	9.16	24.7	0.206	89.3	ND (0.1)	18.0	6.90	163

Table 2: Groundwater Analytical Results - Dissolved (Filtered) Metals
Sampling Events 1 and 2
PG&E Topock Background Study

Notes:

[1] Hexavalent Chromium is lab filtered. All other metals are field filtered
[2] MW-18 was purged and sampled on 05/11/05 for lab filtered metals under the IM3 Compliance sampling

FD	field duplicate
µg/L	micrograms per liter
mg/L	milligrams per liter
ND	parameter not detected at the listed reporting limit (listed in the adjacent parenthesis)
J	concentration or reporting limits estimated by laboratory or validation

Table 3: Groundwater Analytical Results - General Chemistry Parameters
Sampling Events 1 and 2
PG&E Topock Background Study

		Reported in mg/L											0/00		mg/L	pci/L	mg/L		pH units	µS/cm	mg/L				NTU
Well ID	Sample Date	Bromide	Chloride	Fluoride	Nitrate as Nitrogen	Sulfate	Total Kjeldahl Nitrogen	Ammonia as nitrogen	Alkalinity, bicarb. as caco3	Alkalinity, as carbonate	Alkalinity, total as caco3	Perchlorate	Oxygen 18	Deuterium	Iodide	Tritium	Sulfide	Dissolved organic carbon	pH	Specific conductance	Silica	Total suspended solids	Total dissolved solids	Total organic carbon	Turbidity
ARIZONA																									
ADOT New Well	5/18/2005	ND (0.5)	208	4.20	1.81	70.6	ND (0.5)	ND (0.5)	92.7	ND (5.0)	92.7	ND (0.002)	-10.5	-77	ND (0.5)J	ND (350)	ND (2.0)	1.09	7.88	1030	24.2	ND (10)	695	1.10	1.29
	7/25/2005	ND (0.5)	209	3.79	1.99 J	67.4	ND (0.5)	ND (0.5)	87.6	ND (5.0)	87.6	ND (0.002)	-9.8	-73	ND (0.5)	ND (-240)	ND (2.0)	1.52	---	---	24.1	ND (10)	600	ND (1.0)	ND (1.0)
Sanders	5/18/2005	ND (0.5)	357	6.17	2.40	229	ND (0.5)	ND (0.5)	258	ND (5.0)	258	ND (0.002)	-10.3	-78	ND (0.5)J	ND (350)	ND (2.0)	1.66	7.58	2040	45.9	ND (10)	1370	1.45	1.11
	7/25/2005	ND (0.5)	306	5.69	2.75 J	192	ND (0.5)	ND (0.5)	255	ND (5.0)	255	ND (0.002)	-9.9	-72	0.82	ND (-110)	ND (2.0)	1.69	---	---	46.4	ND (10)	1150	ND (1.0)	ND (1.0)
Topock-2	6/22/2005	ND (0.5)	437	3.90	1.80	118	ND (0.5)	ND (0.5)	75.8	ND (5.0)	75.8	ND (0.002)	-9.9	-72	ND (0.5)J	ND (19)	ND (2.0)	1.17	7.84	1930	24.8	ND (10)	1050	ND (1.0)	ND (1.0)
	7/21/2005	ND (0.5)	389	3.65	1.93 J	102	ND (0.5)	ND (0.5)	81.1	ND (5.0)	81.1	ND (0.002)	-9.9	-73	ND (0.5)J	ND (60)	ND (2.0)	1.36	---	---	22.6	ND (10)	975	1.38	ND (1.0)
Topock-3	5/17/2005	ND (0.5)	304	4.03	1.95	96.8	ND (0.5)	ND (0.5)	103	ND (5.0)	103	ND (0.002)	-10	-76	ND (0.5)J	ND (350)	ND (2.0)	1.03	7.97	1430	25.4 J	ND (10)	930	ND (1.0)	ND (1.0)
	5/17/2005 (FD)	ND (0.5)	304	4.00	1.95	97.3	ND (0.5)	ND (0.5)	87.2	ND (5.0)	87.2	ND (0.002)	-10.1	-76	ND (0.5)J	ND (350)	ND (2.0)	1.21	8.00	1420	31.9 J	ND (10)	834	1.11	ND (1.0)
	8/11/2005	ND (0.5)	275	3.84	2.06	73.8	ND (0.5)	ND (0.5)	94.2	ND (5.0)	94.2	ND (0.002)	NA	NA	ND (0.5)	ND (230)	ND (2.0)	3.05	---	---	NA	ND (10)	735	ND (1.0)	4.21 J
	8/11/2005 (FD)	ND (0.5)	266	3.89	2.12	75.8	ND (0.5)	ND (0.5)	94.2	ND (5.0)	94.2	ND (0.002)	NA	NA	ND (0.5)J	ND (72)	ND (2.0)	1.98	---	---	NA	ND (10)	745	ND (1.0)	ND (1.0)J
EPNG-2	5/18/2005	ND (0.5)	195	3.68	1.84	69.7	ND (0.5)	ND (0.5)	92.7	ND (5.0)	92.7	ND (0.002)	-10.4	-77	ND (0.5)J	ND (350)	ND (2.0)	1.00	7.83	984	24.1	ND (10)	665	ND (1.0)	1.31
	7/25/2005	ND (0.5)	195	3.30	2.01 J	61.9	ND (0.5)	ND (0.5)	95.1	ND (5.0)	95.1	ND (0.002)	-10.1	-74	ND (0.5)	ND (6.2)	ND (2.0)	ND (1.0)	---	---	24.5	ND (10)	560	ND (1.0)	ND (1.0)
GSWC-1	5/17/2005	ND (0.5)	79.0	ND (0.5)	3.90	80.3	ND (0.5)	ND (0.5)	123	ND (5.0)	123	ND (0.002)	-10	-73	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	7.92	759	30.4	ND (10)	520	ND (1.0)	ND (1.0)
	7/22/2005	ND (0.5)	77.8	0.845	4.32	89.0	ND (0.5)	ND (0.5)	132	ND (5.0)	132	ND (0.002)	-8.8	-67	ND (0.5)	ND (-50)	ND (2.0)	1.17	---	---	32.3	ND (10)	600	ND (1.0)	ND (1.0)
GSWC-2	5/17/2005	ND (0.5)	99.1	ND (0.5)	1.31	56.4	ND (0.5)	ND (0.5)	128	ND (5.0)	128	ND (0.002)	-9.7	-72	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	8.01	722	31.4	ND (10)	466	ND (1.0)	ND (1.0)
	7/22/2005	ND (0.5)	98.4	0.855	1.49 J	59.4	ND (0.5)	ND (0.5)	134	ND (5.0)	134	ND (0.002)	-9.1	-67	ND (0.5)	ND (-180)	ND (2.0)	1.28	---	---	33.3	ND (10)	575	ND (1.0)	ND (1.0)
GSWC-3	5/18/2005	ND (0.5)	35.0	0.718	2.23	33.3	ND (0.5)	ND (0.5)	157	ND (5.0)	157	ND (0.002)	-9.4	-74	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	7.79	472	35.3	ND (10)	395	ND (1.0)	ND (1.0)
	7/22/2005	ND (0.5)	32.7	0.838	2.73	34.8	ND (0.5)	ND (0.5)	144	ND (5.0)	144	ND (0.002)	-9.3	-66	ND (0.5)	ND (31)	ND (2.0)	1.04	---	---	32.6	15.0	400	ND (1.0)	1.20
GSWC-4	5/18/2005	ND (0.5)	54.4	0.754	1.44	36.3	ND (0.5)	ND (0.5)	160	ND (5.0)	160	ND (0.002)	-9.3	-75	ND (0.5)J	ND (350)	ND (2.0)	1.69	7.82	547	35.1	ND (10)	380	ND (1.0)	ND (1.0)
	7/22/2005	ND (0.5)	46.7	0.855	1.90 J	33.9	ND (0.5)	ND (0.5)	152	ND (5.0)	152	ND (0.002)	-9.4	-69	ND (0.5)	ND (-19)	ND (2.0)	1.31	---	---	35.3	ND (10)	460	ND (1.0)	ND (1.0)
PGE-09N	5/11/2005	ND (0.5)	2680	ND (0.5)	ND (0.1)	96.5	1.64	ND (0.5)	121	ND (5.0)	121	ND (0.002)J	-11.3	-91	ND (0.5)J	ND (350)	ND (2.0)	2.70	7.87	8680	ND (2.0)	35.0	4890	2.38	64.6
	7/20/2005	ND (0.5)	4050	ND (0.5)J	ND (0.5)	843	2.29	0.517	519	ND (5.0)	519	ND (0.01)	-11.2	-87	ND (0.5)J	ND (250)	ND (2.0)	7.73	---	---	27.3	26.0	8740	7.65	60.2
PGE-09S	5/11/2005	ND (0.5)	4070	ND (0.5)	ND (0.1)	801	1.70	0.733	436	ND (5.0)	436	ND (0.002)J	-11.5	-93	ND (0.5)J	ND (350)	ND (2.0)	6.23	7.73	13500	28.0	22.0	8410	6.55	70.2
	7/20/2005	ND (0.5)	3420	ND (0.5)J	ND (0.5)	778	1.72	1.06	583	ND (5.0)	583	ND (0.01)	-11.1	-85	ND (0.5)J	ND (200)	ND (2.0)	9.53	---	---	24.3	46.0	7550	8.73	27.9
Langmaack	5/17/2005	ND (0.5)	47.3	ND (0.5)	3.04	36.1	ND (0.5)	ND (0.5)	138	ND (5.0)	138	ND (0.002)	-9.9	-72	ND (0.5)J	ND (350)	ND (2.0)	1.06	7.88	527	30.2	ND (10)	406	1.16	ND (1.0)
	7/25/2005	ND (0.5)	45.8	0.785	3.24 J	36.2	ND (0.5)	ND (0.5)	138	ND (5.0)	138	ND (0.002)	-9.4	-69	ND (0.5)	ND (19)	ND (2.0)	1.31	---	---	31.5	ND (10)	375	ND (1.0)	ND (1.0)
GSRV-2	5/19/2005	ND (0.5)	51.7	2.22	3.10	40.6	ND (0.5)	ND (0.5)	156	ND (5.0)	156	ND (0.002)J	-10.3	-75	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	7.68	581	38.4	ND (10)	390	ND (1.0)	ND (1.0)
	5/19/2005 (FD)	ND (0.5)	51.6	2.03	3.08	40.6	ND (0.5)	ND (0.5)	156	ND (5.0)	156	ND (0.002)J	-10	-74	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	7.71	578	43.1	ND (10)	356	ND (1.0)	ND (1.0)
	7/22/2005	ND (0.5)	49.0	1.90	3.18	37.5	ND (0.5)	ND (0.5)	157	ND (5.0)	157	ND (0.002)	-9.9	-72	ND (0.5)	ND (-39)	ND (2.0)	1.44	---	---	39.4	ND (10)	505	1.48	ND (1.0)
	7/22/2005 (FD)	ND (0.5)	48.4	1.92	3.20	37.7	ND (0.5)	ND (0.5)	160	ND (5.0)	160	ND (0.002)	-9.9	-71	ND (0.5)	ND (21)	ND (2.0)	1.51	---	---	38.3	ND (10)	485	ND (1.0)	ND (1.0)
TMLP-2	5/12/2005	ND (0.5)	25.6	1.20	3.63	17.4	ND (0.5)	ND (0.5)	151	ND (5.0)	151	ND (0.002)	-10.7	-78	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	7.87	420	35.7	ND (10)	328	ND (1.0)	2.41
	7/20/2005	ND (0.5)	24.4	1.22 J	3.61	14.7	ND (0.5)	ND (0.5)	147	ND (5.0)	147	ND (0.002)	-9.8	-69	ND (0.5)J	ND (160)	ND (2.0)	1.52	---	---	28.3	ND (10)	260	ND (1.0)	ND (1.0)

Table 3: Groundwater Analytical Results - General Chemistry Parameters
Sampling Events 1 and 2
PG&E Topock Background Study

		Reported in mg/L											0/00		mg/L	pci/L	mg/L		pH units	µS/cm	mg/L				NTU
Well ID	Sample Date	Bromide	Chloride	Fluoride	Nitrate as Nitrogen	Sulfate	Total Kjeldahl Nitrogen	Ammonia as nitrogen	Alkalinity, bicarb. as caco3	Alkalinity, as carbonate	Alkalinity, total as caco3	Perchlorate	Oxygen 18	Deuterium	Iodide	Tritium	Sulfide	Dissolved organic carbon	pH	Specific conductance	Silica	Total suspended solids	Total dissolved solids	Total organic carbon	Turbidity
ARIZONA																									
BOR-2	5/11/2005	ND (0.5)	79.1	ND (0.5)	ND (0.1)	208	0.997	ND (0.5)	173	ND (5.0)	173	ND (0.002)	-12.4	-104	ND (0.5)J	ND (350)	ND (2.0)	2.84	7.94	1070	25.5	89.5	714	3.04	13.0
	7/20/2005	ND (0.5)	70.7	ND (0.5)J	ND (0.5)	189	1.27	ND (0.5)	200	ND (5.0)	200	ND (0.002)	-12.6	-101	ND (0.5)J	ND (10)	ND (2.0)	3.21	---	---	20.9	15.0	645	2.91	9.39
BOR-3	5/11/2005	ND (0.5)	74.2	ND (0.5)	ND (0.1)	130	1.95	1.14	299	ND (5.0)	299	ND (0.002)	-12.4	-105	ND (0.5)J	ND (350)	ND (2.0)	4.15	7.92	1060	26.2	23.0	700	4.12	7.51
	7/21/2005	ND (0.5)	73.2	0.526	0.50 R	148	1.77	1.16	276	ND (5.0)	276	ND (0.002)	-12.3	-100	ND (0.5)J	ND (140)	ND (2.0)	3.88	---	---	20.6	ND (10)	640	3.76	5.19
New Farm Well	5/12/2005	ND (0.5)	108	ND (0.5)	ND (0.5)	305	ND (0.5)	ND (0.5)	190	ND (5.0)	190	ND (0.002)	-12.3	-102	ND (0.5)J	ND (350)	ND (2.0)	2.80	7.77	1280	22.3	ND (10)	1030	2.79	7.65
	7/20/2005	ND (0.5)	99.6	ND (0.5)J	ND (0.5)	304	0.764	ND (0.5)	205	ND (5.0)	205	ND (0.002)	-12.4	-100	ND (0.5)J	ND (-52)	ND (2.0)	3.61	---	---	20.3	ND (10)	860	2.77	1.76
USFW-5	5/12/2005	ND (0.5)	79.3	ND (0.5)	ND (0.5)	220	ND (0.5)	ND (0.5)	145	ND (5.0)	145	ND (0.002)	-12.3	-105	ND (0.5)J	ND (350)	ND (2.0)	1.74	7.83	962	16.2	ND (10)	716	1.87	4.35
	7/20/2005	ND (0.5)	76.2	ND (0.5)J	ND (0.5)	223	ND (0.5)	ND (0.5)	152	ND (5.0)	152	ND (0.002)	-12.1	-97	ND (0.5)J	ND (12)	ND (2.0)	2.17	---	---	13.8	ND (10)	665	1.84	2.10
CALIFORNIA																									
CA Agriculture Station	5/16/2005	ND (0.5)	259	1.30	1.76	220	ND (0.5)	ND (0.5)	92.3	ND (5.0)	92.3	ND (0.002)	-9.0	-69	ND (0.5)J	ND (350)	ND (2.0)	1.05	7.89	1460	28.1	ND (10)	960	ND (1.0)	ND (1.0)
	7/25/2005	ND (0.5)	261	1.26	1.86 J	215	ND (4.8)	ND (0.5)	87.6	ND (5.0)	87.6	ND (0.002)	-8.6	-64	ND (0.5)	ND (-160)	ND (2.0)	1.58	---	---	28.6	ND (10)	920	ND (1.0)	ND (1.0)
Needles MW-10	5/16/2005	ND (0.5)	98.6	0.627	ND (0.5)	261	ND (0.5)	ND (0.5)	151	ND (5.0)	151	ND (0.002)J	-13.5	-101	ND (0.5)J	ND (350)	ND (2.0)	1.77	7.74	1120	25.4	ND (10)	840	1.54	ND (1.0)
	7/21/2005	ND (0.5)	95.6	0.705	0.50 R	262	ND (0.5)	ND (0.5)	155	ND (5.0)	155	ND (0.002)	-12.5	-101	ND (0.5)J	ND (170)	ND (2.0)	2.37	---	---	20.1	ND (10)	765	1.56	1.80
Needles MW-11	5/16/2005	ND (0.5)	291	1.53	1.57	428	ND (0.5)	ND (0.5)	205	ND (5.0)	205	ND (0.002)	-13.6	-104	ND (0.5)J	ND (350)	ND (2.0)	1.67	7.52	2120	37.2	ND (10)	1470	1.82	ND (1.0)
	7/21/2005	ND (0.5)	281	1.36	1.72 J	435	ND (0.5)	ND (0.5)	208	ND (5.0)	208	ND (0.002)	-13.3	-103	ND (0.5)J	ND (47)	ND (2.0)	3.68	---	---	29.8	ND (10)	1530	1.27	ND (1.0)
Needles MW-12	6/22/2005	ND (0.5)	204	0.704	ND (0.5)	488	ND (0.5)	ND (0.5)	205	ND (5.0)	205	ND (0.002)	-11.3	-96	ND (0.5)J	ND (4.1)	ND (2.0)	2.46	7.66	1980	26.4	ND (10)	1350	2.36	ND (1.0)
	7/21/2005	ND (0.5)	230	0.716	0.687 J	524	ND (0.5)	ND (0.5)	236	ND (5.0)	236	ND (0.002)	-12.4	-101	ND (0.5)J	ND (120)	ND (2.0)	4.04	---	---	23.8	ND (10)	1600	3.01	ND (1.0)
Lily Hill	5/16/2005	ND (0.5)	50.7	1.71	4.22	54.5	ND (0.5)	ND (0.5)	144	ND (5.0)	144	ND (0.002)	-10	-77	ND (0.5)J	ND (350)	ND (2.0)	1.09	8.01	578	30.2	ND (10)	430	1.07	ND (1.0)
	7/25/2005	ND (0.5)	50.4	1.63	4.70 J	61.5	ND (0.5)	ND (0.5)	138	ND (5.0)	138	ND (0.002)	-9.5	-71	ND (0.5)	ND (-97)	ND (2.0)	1.15	---	---	31.5	ND (10)	405	ND (1.0)	ND (1.0)
Tayloe	5/16/2005	ND (0.5)	135	0.677	1.89	91.7	ND (0.5)	ND (0.5)	108	ND (5.0)	108	ND (0.002)	-8.5	-69	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	7.91	856	21.6	ND (10)	574	1.14	ND (1.0)
	7/25/2005	ND (0.5)	137	0.726	1.79 J	85.4	ND (0.5)	ND (0.5)	108	ND (5.0)	108	ND (0.002)	-7.9	-61	ND (0.5)	ND (6.2)	ND (2.0)	1.46	---	---	21.9	ND (10)	2050	ND (1.0)	ND (1.0)
MW-01	5/9/2005	ND (0.5)	111	0.735	6.28	77.3	ND (0.5)	ND (0.5)	70.4	ND (5.0)	70.4	ND (0.002)	-9.6	-74	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	8.16	738	22.9	ND (10)	406	ND (1.0)	1.14
	7/18/2005	ND (0.5)	118	0.891	6.16 J	66.6	0.517	ND (0.5)	66.1	ND (5.0)	66.1	ND (0.002)	-9.1	-64	ND (0.5)J	ND (17)	ND (2.0)	2.97	---	---	22.1	ND (10)	490	ND (1.0)	2.49
MW-03	5/9/2005	ND (0.5)	159	2.98	11.0	182	0.656	ND (0.5)	89.8	ND (5.0)	89.8	0.00243	-9.3	-70	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	7.99	1260	24.8	11.0	780	ND (1.0)	3.12
	7/18/2005	ND (0.5)	164	3.05	9.00 J	172	ND (0.5)	ND (0.5)	81.3	ND (5.0)	81.3	ND (0.002)	-8.8	-64	ND (0.5)J	ND (54)	ND (2.0)	ND (1.0)	---	---	24.4	ND (10)	780	ND (1.0)	2.37
MW-04	5/9/2005	ND (0.5)	111	1.93	6.28	151	ND (0.5)	ND (0.5)	104	ND (5.0)	104	ND (0.002)	-8.9	-68	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	8.02	1010	22.7	ND (10)	566	ND (1.0)	1.41
	7/18/2005	ND (0.5)	115	1.73	5.49 J	152	ND (0.5)	ND (0.5)	107	ND (5.0)	107	ND (0.002)	-8.6	-63	ND (0.5)J	ND (120)	ND (2.0)	1.05	---	---	22.5	ND (10)	615	ND (1.0)	1.79
MW-05	5/13/2005	ND (0.5)	232	4.73	18.9 J	227	ND (0.5)	ND (0.5)	62.6	ND (5.0)	62.6	0.003	-8.9	-88	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	8.16	1600	22.8	ND (10)	980 J	ND (1.0)	1.93
	7/18/2005	0.676	230	4.97	14.8 J	214	ND (0.5)	ND (0.5)	68.6	ND (5.0)	68.6	0.00377	-8.8	-63	ND (0.5)J	ND (58)	ND (2.0)	1.67	---	---	21.6	ND (10)	960	ND (1.0)	1.23
MW-06	5/13/2005	ND (0.5)	18.9	6.87	2.77	57.4	ND (0.5)	ND (0.5)	180	ND (5.0)	180	ND (0.002)	-9.1	-67	ND (0.5)J	ND (350)	ND (2.0)	1.12	8.41	656	22.6	ND (10)	574	ND (1.0)	1.18
	7/18/2005	ND (0.5)	21.5	7.24	2.69	69.0	ND (0.5)	ND (0.5)	183	ND (5.0)	183	ND (0.002)	-9.1	-63	ND (0.5)J	ND (97)	ND (2.0)	2.87	---	---	22.7	ND (10)	410	ND (1.0)	1.85
MW-07	5/13/2005	ND (0.5)	117	4.68	7.83	151	ND (0.5)	ND (0.5)	107	ND (5.0)	107	ND (0.002)	-9.3	-66	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	8.37	1070	20.8	ND (10)	656	ND (1.0)	7.17

Table 3: Groundwater Analytical Results - General Chemistry Parameters
Sampling Events 1 and 2
PG&E Topock Background Study

		Reported in mg/L											0/00		mg/L	pci/L	mg/L		pH units	µS/cm	mg/L				NTU
Well ID	Sample Date	Bromide	Chloride	Fluoride	Nitrate as Nitrogen	Sulfate	Total Kjeldahl Nitrogen	Ammonia as nitrogen	Alkalinity, bicarb. as caco3	Alkalinity, as carbonate	Alkalinity, total as caco3	Perchlorate	Oxygen 18	Deuterium	Iodide	Tritium	Sulfide	Dissolved organic carbon	pH	Specific conductance	Silica	Total suspended solids	Total dissolved solids	Total organic carbon	Turbidity
CALIFORNIA																									
MW-07	7/18/2005	ND (0.5)	119	5.07	7.06 J	153	ND (0.5)	ND (0.5)	112	ND (5.0)	112	ND (0.002)	-8.7	-62	ND (0.5)J	ND (200)	ND (2.0)	1.14	---	---	20.9	ND (10)	665	ND (1.0)	1.48
MW-08	5/13/2005	ND (0.5)	91.6	0.868	20.5 J	273	ND (0.5)	ND (0.5)	73.0	ND (5.0)	73.0	ND (0.002)	-8.8	-65	ND (0.5)J	ND (350)	ND (2.0)	1.14	8.06	1250	21.4	ND (10)	886	1.07	1.48
	7/18/2005	ND (0.5)	94.7	1.00	15.0 J	284	0.506	ND (0.5)	76.2	ND (5.0)	76.2	ND (0.002)	-8.1	-60	ND (0.5)J	ND (140)	ND (2.0)	3.35	---	---	21.3	ND (10)	825	ND (1.0)	1.25
MW-16	5/13/2005	ND (0.5)	169	2.80	3.27	159	ND (0.5)	ND (0.5)	99.1	ND (5.0)	99.1	ND (0.002)	-9.0	-68	ND (0.5)J	ND (350)	ND (2.0)	1.43	8.08	1200	24.0	467 J	720	1.26	88.2 J
	5/13/2005 (FD)	ND (0.5)	170	2.75	3.24	158	ND (0.5)	ND (0.5)	102	ND (5.0)	102	ND (0.002)	-9.2	-68	ND (0.5)J	ND (350)	ND (2.0)	1.05	8.07	1200	23.0	93.0 J	696	ND (1.0)	68.2 J
	7/26/2005	ND (0.5)	202	2.35	3.07	136	ND (0.5)	ND (0.5)	98.0	ND (5.0)	98.0	ND (0.002)	-9.0	-66	ND (0.5)	ND (-17)	ND (2.0)	1.76	---	---	21.5	55.5 J	665	ND (1.0)	24.5
	7/26/2005 (FD)	ND (0.5)	192	2.33	3.06	129	ND (0.5)	ND (0.5)	98.0	ND (5.0)	98.0	ND (0.002)	-9.0	-64	ND (0.5)	ND (41)	ND (2.0)	1.84	---	---	22.0	ND (10)J	660	ND (1.0)	18.3
MW-17	5/19/2005	ND (0.5)	104	1.84	3.76	702	ND (0.5)	ND (0.5)	51.3	ND (5.0)	51.3	ND (0.002)J	-8.4	-65	ND (0.5)J	ND (350)	ND (2.0)	1.18	7.58	1780	19.1	ND (10)	1400	1.11	ND (1.0)
	5/19/2005 (FD)	ND (0.5)	101	1.84	3.74	688	ND (0.5)	ND (0.5)	53.8	ND (5.0)	53.8	ND (0.002)J	-8.5	-66	ND (0.5)J	ND (350)	ND (2.0)	1.71	7.63	1810	18.8	ND (10)	1320	1.84	ND (1.0)
	7/26/2005	ND (0.5)	106	1.70	3.51	699	0.584	ND (0.5)	53.9	ND (5.0)	53.9	ND (0.002)	-7.9	-59	ND (0.5)	ND (230)	ND (2.0)	2.12	---	---	17.8	ND (10)	1370	1.16	ND (1.0)
	7/26/2005 (FD)	ND (0.5)	108	1.70	3.71	715	ND (0.5)	ND (0.5)	53.9	ND (5.0)	53.9	ND (0.002)	-7.9	-60	ND (0.5)	ND (290)	ND (2.0)	1.90	---	---	18.1	ND (10)	1320	1.16	ND (1.0)
MW-18	[1] 5/12/2005	ND (0.5)	339	ND (0.5)	4.19	108	ND (0.5)	ND (0.5)	85.7	ND (5.0)	85.7	ND (0.002)	-9.5	-72	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	7.38 J	1480	23.8	ND (10)	1010 J	ND (1.0)	3.98
	7/26/2005	ND (0.5)	337	0.633	3.87	82.6	ND (0.5)	ND (0.5)	76.0	ND (5.0)	76.0	ND (0.002)	-9.1	-65	ND (0.5)	ND (340)	ND (2.0)	1.68	---	---	22.0	ND (10)	980	ND (1.0)	ND (1.0)
P-2	5/13/2005	ND (0.5)	1590	1.96	2.52	176	ND (0.5)	ND (0.5)	49.6	ND (5.0)	49.6	ND (0.002)	-9.6	-73	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	7.53	5180	23.0	ND (10)	3360	ND (1.0)	ND (1.0)
	7/26/2005	3.00	1490	1.91	2.60	209	ND (0.5)	ND (0.5)	51.5	ND (5.0)	51.5	ND (0.004)	-9.6	-73	ND (0.5)	ND (33)	ND (2.0)	1.97	---	---	22.1	35.5	3120	ND (1.0)	ND (1.0)
PMM-Supply	5/18/2005	ND (0.5)	297	2.32	3.03	62.4	ND (0.5)	ND (0.5)	90.1	ND (5.0)	90.1	ND (0.002)	-8.9	-88	ND (0.5)J	ND (350)	ND (2.0)	1.30	7.74	1220	22.0	ND (10)	905	1.01	ND (1.0)
	5/18/2005 (FD)	ND (0.5)	290	2.27	3.04	61.0	ND (0.5)	ND (0.5)	85.0	ND (5.0)	85.0	ND (0.002)	-8.9	-70	ND (0.5)J	ND (350)	ND (2.0)	ND (1.0)	7.77	1260	22.4	ND (10)	875	ND (1.0)	ND (1.0)
	7/21/2005	ND (0.5)	314	2.18	3.14 J	58.3	ND (0.5)	ND (0.5)	81.1	ND (5.0)	81.1	ND (0.002)	-9.0	-66	ND (0.5)J	ND (14)	ND (2.0)	1.08	---	---	18.0	ND (10)	870	ND (1.0)	ND (1.0)
	7/21/2005 (FD)	ND (0.5)	310	2.16	3.15 J	58.2	ND (0.5)	ND (0.5)	83.6	ND (5.0)	83.6	ND (0.002)	-8.8	-65	ND (0.5)J	ND (-8.2)	ND (2.0)	ND (1.0)	---	---	18.7	ND (10)	850	ND (1.0)	ND (1.0)

Notes:

[1] MW-18 was purged and sampled on 05/11/05 for lab filtered metals under the IM3 Compliance sampling

NA	not available, Isotope and Silica results will be reported in next submittal.
FD	field duplicate
mg/L	milligrams per liter
0/00	differences from global standards in parts per thousand
pci/L	pico curies per liter
µS/cm	micro Siemens per centimeter
NTU	nephelometric turbidity units
ND	parameter not detected at the listed reporting limit (listed in the adjacent parenthesis)
J	concentration or reporting limits estimated by laboratory or validation
---	not sampled during sampling event 2. pH and specific conductance were measured in the field and are presented in Table 4

Table 4: Groundwater Field Parameter Measurement
Sampling Events 1 and 2
PG&E Topock Background Study

Well ID	Sampling Date	Electrical Conductivity (µS/cm)	Temperature (°C)	pH (pH units)	ORP (mV)	Dissolved Oxygen (mg/L)
ARIZONA						
ADOT New Well	5/18/2005	2440	31.3	7.96	83.0	4.56
	7/25/2005	1000	31.6	7.72	127	3.95
Sanders	5/18/2005	3780	25.4	6.84	166	4.07
	7/25/2005	1780	28.5	7.44	144	2.79
Topock-2	6/22/2005	2470	38.3	7.89	-120	3.60
	7/21/2005	2020	38.5	7.91	-82	4.56
Topock-3	5/17/2005	1550	37.8	7.77	-8.0	3.40
	8/11/2005	1640	37.1	7.28	145	3.72
EPNG-2	5/18/2005	5890	33.3	7.83	111	3.81
	7/25/2005	980	33.8	7.69	150	6.88
GSWC-1	5/17/2005	726	30.7	7.75	-9.0	4.60
	7/22/2005	718	30.5	7.80	50.0	7.50
GSWC-2	5/17/2005	682	32.9	7.85	-112	2.80
	7/22/2005	694	33.4	7.72	152	7.30
GSWC-3	5/18/2005	38700 [1]	32.7	7.74	128	2.99
	7/22/2005	376	32.2	7.99	85.0	8.40
GSWC-4	5/18/2005	3550	32.8	7.80	132	1.15
	7/22/2005	509	32.7	7.85	44.0	6.80
PGE-09N	5/11/2005	14900	24.2	7.18	-136	0.47
	7/20/2005	13800	25.4	7.24	-155	3.84
PGE-09S	5/11/2005	15600	23.0	7.27	-137	1.00
	7/20/2005	11700	24.5	7.20	-151	4.23
Langmaack	5/17/2005	510	29.7	7.85	-53	6.60
	7/25/2005	720	30.0	7.63	180	5.99
GSRV-2	5/19/2005	553	30.9	8.24	604	8.90
	7/22/2005	1170	31.3	7.58	48.0	6.52
TMLP-2	5/12/2005	402	33.6	7.79	1.00	4.20
	7/20/2005	999	33.8	7.98	-1.0	4.43
BOR-2	5/11/2005	1200	23.2	7.70	-193	0.60
	7/20/2005	1060	23.4	7.78	-168	5.04
BOR-3	5/11/2005	1170	22.4	7.23	-172	0.50
	7/21/2005	1190	26.0	7.58	-162	5.66
New Farm Well	5/12/2005	1390	20.7	7.54	-163	0.90
	7/20/2005	1380	20.7	7.73	-129	6.01
USFW-5	5/12/2005	1040	20.7	7.96	-210	1.60
	7/20/2005	1060	19.8	7.93	-151	6.23
CALIFORNIA						
CA Agriculture Station	5/16/2005	1440	31.0	7.87	-49	7.00
	7/25/2005	1480	33.2	7.38	188	6.91
Needles MW-10	5/16/2005	1110	20.6	7.75	-93	1.40
	7/21/2005	1330	20.1	7.75	35.0	9.30
Needles MW-11	5/16/2005	2060	25.6	7.53	23.0	2.30
	7/21/2005	2480	25.6	7.55	72.0	7.46

Table 4: Groundwater Field Parameter Measurement
Sampling Events 1 and 2
PG&E Topock Background Study

Well ID	Sampling Date	Electrical Conductivity (µS/cm)	Temperature (°C)	pH (pH units)	ORP (mV)	Dissolved Oxygen (mg/L)
Needles MW-12	6/22/2005	2300	20.4	7.34	118	3.01
	7/21/2005	2470	20.3	7.37	71.0	7.90
Lily Hill	5/16/2005	514	30.8	8.05	71.0	7.60
	7/25/2005	955	31.3	6.34	244	6.52
Tayloe	5/16/2005	773	34.6	8.06	41.0	3.50
	7/25/2005	900	31.6	7.14	192	2.52
MW-01	5/9/2005	668	29.1	7.91	98.0	7.50
	7/18/2005	990	29.2	8.27	105	8.05
MW-03	5/9/2005	1310	30.0	7.91	-13	8.70
	7/18/2005	1440	30.1	8.18	115	8.64
MW-04	5/9/2005	900	28.9	7.81	37.0	7.90
	7/18/2005	1160	29.3	8.18	117	7.85
MW-05	5/13/2005	1590	29.2	8.11	149	10.4
	7/18/2005	1750	29.7	8.16	116	8.04
MW-06	5/13/2005	582	29.1	8.23	112	9.80
	7/18/2005	634	29.8	7.56	150	9.20
MW-07	5/13/2005	958	29.1	8.35	91.0	9.60
	7/18/2005	970	29.6	8.13	40.0	9.10
MW-08	5/13/2005	1260	29.7	8.05	79.0	9.40
	7/18/2005	1200	29.8	7.92	91.0	8.60
MW-16	5/13/2005	1250	30.1	7.87	-44	7.20
	7/26/2005	1240	29.6	7.22	54.0	6.37
MW-17	5/19/2005	1910	30.8	8.17	23.0	6.30
	7/26/2005	2500	30.4	7.51	75.0	4.99
MW-18	5/11/2005	1600	28.4	7.51	159	6.97
	7/26/2005	2310	28.9	7.68	99.0	7.38
P-2	5/13/2005	5120	31.2	7.58	-9.0	4.50
	7/26/2005	6270	31.2	7.54	142	4.95
PMM-Supply	5/18/2005	3610	30.0	7.67	93.0	3.02
	7/21/2005	1550	30.0	7.82	37.0	6.02

NOTES:

[1] Potential units error with the Horiba U-22

All field measurements were collected during groundwater sampling using a Horiba U-22 water quality meter

µS/cm	microSiemens per centimeter
ORP	oxidation reduction potential
°C	degree centigrade
mV	millivolts
mg/L	milligrams per liter

Table 5: Groundwater Analytical Results - Total (Unfiltered) Metals
Sampling Events 1 and 2
PG&E Topock Background Study

Well ID	Sample Date		Total (Unfiltered) Metals in µg/L																			Total (Unfiltered) General Minerals in mg/L				
			Aluminium	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead [1]	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Boron	Calcium	Iron	Magnesium	Potassium	Sodium
ARIZONA																										
ADOT New Well	5/18/2005		68.2	ND (2.0)	6.07	84.1	ND (1.0)	ND (1.0)	11.9	ND (1.0)	5.22 J	ND (1.0)	6.41	ND (0.2)	9.42	1.88	ND (1.0)	ND (1.0)	ND (1.0)	11.7	50.5	0.559	39.0	0.393	5.81	5.54	177
Sanders	5/18/2005		64.2	ND (2.0)	27.2	78.3	ND (1.0)	ND (1.0)	1.13	1.77	9.61 J	15.4	502	ND (0.2)	32.5	1.16	4.22	ND (1.0)	ND (1.0)	46.8	283	1.16 J	87.2 J	0.109	11.2	3.93	398 J
	7/25/2005		---	---	---	---	---	---	---	---	---	ND (5.0)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Topock-2	6/22/2005		ND (50)	ND (2.0)	9.95	81.0	ND (1.0)	ND (1.0)	10.4	ND (1.0)	3.69	ND (1.0)	1.65	ND (0.2)	24.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	19.1	18.1	0.769	49.3	ND (0.1)	5.95	8.09	337
Topock-3	5/17/2005		ND (50)	ND (2.0)	12.7	81.7	ND (1.0)	ND (1.0)	12.7	ND (1.0)	2.05	ND (1.0)	ND (1.0)	ND (0.2)	19.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	17.4	ND (10)	0.496	33.7	ND (0.1)	5.30	5.88	223
	5/17/2005	(FD)	ND (50)	ND (2.0)	13.1	80.6	ND (1.0)	ND (1.0)	12.6	ND (1.0)	1.89	ND (1.0)	ND (1.0)	ND (0.2)	19.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	17.1	ND (10)	0.493	32.9	ND (0.1)	5.20	5.79	219
EPNG-2	5/18/2005		ND (50)	ND (2.0)	5.35	87.8	ND (1.0)	ND (1.0)	13.7	ND (1.0)	4.73 J	ND (1.0)	2.26	ND (0.2)	8.48	ND (1.0)	1.12	ND (1.0)	ND (1.0)	14.2	17.7	0.508	37.0	0.217	7.41	5.49	167
	7/25/2005		---	---	---	---	---	---	---	---	---	ND (5.0)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
GSWC-1	5/17/2005		ND (50)	ND (2.0)	5.95	35.3	ND (1.0)	ND (1.0)	11.6	ND (1.0)	1.80	ND (1.0)	ND (1.0)	ND (0.2)	6.60	ND (1.0)	3.82	ND (1.0)	ND (1.0)	16.2	ND (10)	0.24	36.5	ND (0.1)	15.5	5.81	80.6
GSWC-2	5/17/2005		ND (50)	ND (2.0)	7.25	44.8	ND (1.0)	ND (1.0)	5.57	ND (1.0)	2.68	ND (1.0)	1.62	ND (0.2)	7.06	ND (1.0)	1.70	ND (1.0)	ND (1.0)	16.6	ND (10)	0.232	27.9	ND (0.1)	11.2	4.96	91.8
GSWC-3	5/18/2005		ND (50)	ND (2.0)	8.88	28.5	ND (1.0)	ND (1.0)	14.1	ND (1.0)	5.58 J	1.61	3.24	ND (0.2)	6.40	ND (1.0)	1.12	ND (1.0)	ND (1.0)	23.3	22.5	0.235	25.5	ND (0.1)	9.13	4.74	78.1
GSWC-4	5/18/2005		74.4	ND (2.0)	8.86	45.8	ND (1.0)	ND (1.0)	9.29	ND (1.0)	5.49 J	ND (1.0)	1.66	ND (0.2)	7.99	ND (1.0)	1.30	ND (1.0)	1.55	22.3	26.7	0.27	27.6	ND (0.1)	9.87	5.17	92.6
PGE-09N	5/11/2005		ND (50)	ND (2.0)	ND (1.0)	21.7	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	751	ND (0.2)	ND (2.0)	1.19	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	613	0.572	38.7	11.4	88.0	13.7	1780
PGE-09S	5/11/2005		ND (50)	ND (2.0)	34.7	107	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.45	1.18	1140	ND (0.2)	17.6	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1890	1.47	400	5.76	156	21.5	2770
Langmaack	5/17/2005		ND (50)	ND (2.0)	5.01	21.5	ND (1.0)	ND (1.0)	20.8	ND (1.0)	3.39	ND (1.0)	1.17	ND (0.2)	3.25	ND (1.0)	1.61	ND (1.0)	ND (1.0)	15.1	ND (10)	0.186	26.3	ND (0.1)	11.3	4.83	58.0
GSRV-2	5/19/2005		ND (50)	ND (2.0)	5.79	53.6	ND (1.0)	ND (1.0)	35.6	ND (1.0)	10.8	ND (1.0)	ND (1.0)	ND (0.2)	6.09	ND (1.0)	1.65	ND (1.0)	ND (1.0)	17.1	20.0	0.161	43.9	ND (0.1)	15.1	5.19	62.6
	5/19/2005	(FD)	ND (50)	ND (2.0)	6.00	60.5	ND (1.0)	ND (1.0)	39.8	ND (1.0)	4.25	ND (1.0)	ND (1.0)	ND (0.2)	6.71	ND (1.0)	1.53	ND (1.0)	ND (1.0)	18.5	16.5	0.164	48.6	ND (0.1)	17.0	5.81	70.3
TMLP-2	5/12/2005		ND (50)	ND (2.0)	5.25	21.9	ND (1.0)	ND (1.0)	20.4	ND (1.0)	ND (1.0)	ND (1.0)	2.97	ND (0.2)	4.97	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	16.8	ND (10)	0.122	21.0	0.279	8.61	5.55	51.4
BOR-2	5/11/2005		3350	ND (2.0)	21.4	148	ND (1.0)	ND (1.0)	5.84	4.14	17.8	13.7	857	ND (0.2)	6.47	11.3	ND (1.0)	ND (1.0)	ND (1.0)	9.07	67.0	0.153	167	8.63	50.5	6.29	113
BOR-3	5/11/2005		95.5	ND (2.0)	3.65	325	ND (1.0)	ND (1.0)	1.62	ND (1.0)	12.9	2.10	181	ND (0.2)	5.32	3.58	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	38.8	0.178	80.3	1.35	32.6	4.84	113
New Farm Well	5/12/2005		ND (50)	ND (2.0)	4.87	59.7	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	3.68	ND (1.0)	461	ND (0.2)	5.62	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	0.151	104	0.466	33.0	5.24	127
USFW-5	5/12/2005		ND (50)	ND (2.0)	3.23	36.5	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	10.3	ND (1.0)	260	ND (0.2)	4.42	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	0.115	76.0	0.481	25.9	4.27	83.1
	7/20/2005		---	---	---	---	---	---	---	---	---	ND (5.0)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CALIFORNIA																										
CA Agriculture Station	5/16/2005		ND (50)	ND (2.0)	3.06	26.9	ND (1.0)	ND (1.0)	3.08	ND (1.0)	1.59	ND (1.0)	1.34	ND (0.2)	19.2	ND (1.0)	2.47	ND (1.0)	ND (1.0)	12.4	ND (10)	0.539	54.8	ND (0.1)	14.7	4.94	209
Needles MW-10	5/16/2005		ND (50)	ND (2.0)	3.50	16.8	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	2.04	ND (1.0)	28.7	ND (0.2)	9.95	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	4.57	ND (10)	0.16	66.0	ND (0.1)	23.5	3.96	130
Needles MW-11	5/16/2005		ND (50)	ND (2.0)	6.03	23.3	ND (1.0)	ND (1.0)	16.5	ND (1.0)	3.62	ND (1.0)	19.7	ND (0.2)	15.5	1.19	3.44	ND (1.0)	ND (1.0)	9.27	ND (10)	0.466	94.3	ND (0.1)	41.8	11.6	287
Needles MW-12	6/22/2005		ND (50)	ND (2.0)	3.61	27.3	ND (1.0)	ND (1.0)	1.01	ND (1.0)	7.35	ND (1.0)	590	ND (0.2)	10.3	3.21	ND (1.0)	ND (1.0)	ND (1.0)	6.54	18.1	0.329	130	ND (0.1)	51.1	8.06	240
Lily Hill	5/16/2005		ND (50)	ND (2.0)	15.6	52.2	ND (1.0)	ND (1.0)	9.77	ND (1.0)	2.26	ND (1.0)	ND (1.0)	ND (0.2)	12.3	ND (1.0)	2.59	ND (1.0)	ND (1.0)	21.9	ND (10)	0.295	20.7	ND (0.1)	7.25	4.24	89.2
Tayloe	5/16/2005		ND (50)	ND (2.0)	4.35	49.6	ND (1.0)	ND (1.0)	1.86	ND (1.0)	ND (1.0)	2.17	ND (1.0)	ND (0.2)	9.66	ND (1.0)	2.32	ND (1.0)	ND (1.0)	7.78	34.5	0.32	32.2	ND (0.1)	5.07	3.60	131
MW-01	5/9/2005		82.8	ND (2.0)	11.5	20.9	ND (1.0)	ND (1.0)	139	1.14	14.2	ND (1.0)	18.6	ND (0.2)	ND (2.0)	76.2	2.76	ND (1.0)	ND (1.0)	35.5	ND (10)	0.114	24.8	0.668	4.88	3.63	108
MW-03	5/9/2005		ND (50)	ND (2.0)	10.4	14.2	ND (1.0)	ND (1.0)	1500	7.32	51.8	ND (1.0)	165	ND (0.2)	45.8	911	8.08	ND (1.0)	ND (1.0)	40.8	11.7	0.39	34.9	6.71	6.50	4.59	221

Table 5: Groundwater Analytical Results - Total (Unfiltered) Metals
Sampling Events 1 and 2
PG&E Topock Background Study

Well ID	Sample Date		Total (Unfiltered) Metals in µg/L																			Total (Unfiltered) General Minerals in mg/L				
			Aluminium	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead [1]	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Boron	Calcium	Iron	Magnesium	Potassium	Sodium
CALIFORNIA																										
MW-04	5/9/2005		ND (50)	ND (2.0)	5.36	15.7	ND (1.0)	ND (1.0)	356	2.58	25.9	ND (1.0)	35.9	ND (0.2)	18.7	177	2.81	ND (1.0)	ND (1.0)	23.4	23.0	0.36	26.4	1.48	4.75	4.71	172
MW-05	5/13/2005		ND (50)	ND (2.0)	7.04	28.0	ND (1.0)	ND (1.0)	603	4.70	46.6	ND (1.0)	60.3	ND (0.2)	51.7	297	18.5	ND (1.0)	ND (1.0)	22.7	43.3	0.443	47.4	2.60	9.16	5.97	263
MW-06	5/13/2005		ND (50)	ND (2.0)	14.7	10.3	ND (1.0)	ND (1.0)	198	1.47	17.3	ND (1.0)	21.3	ND (0.2)	7.39	98.2	1.01	ND (1.0)	ND (1.0)	44.2	13.2	0.296	9.72	0.901	1.97	3.14	146
MW-07	5/13/2005		78.4	ND (2.0)	12.1	17.3	ND (1.0)	ND (1.0)	276	1.02	5.57	ND (1.0)	34.8	ND (0.2)	22.3	162	7.70	ND (1.0)	ND (1.0)	36.9	16.1	0.323	15.9	1.41	2.96	3.88	224
MW-08	5/13/2005		ND (50)	ND (2.0)	5.26	29.1	ND (1.0)	ND (1.0)	302	2.24	28.8	ND (1.0)	29.8	ND (0.2)	20.8	126	6.15	ND (1.0)	ND (1.0)	19.5	16.5	0.307	50.3	1.17	9.82	6.54	197
MW-16	5/13/2005		4310 J	ND (2.0)	13.2 J	58.7	ND (1.0)	ND (1.0)	55.0 J	4.40	24.6 J	4.79	137 J	ND (0.2)	14.8	53.3 J	1.98	ND (1.0)	ND (1.0)	56.7 J	97.5 J	0.327	38.8	6.96	8.44	5.67	229
	5/13/2005	(FD)	2610 J	ND (2.0)	10.2 J	49.1	ND (1.0)	ND (1.0)	38.7 J	3.00	14.3 J	3.01	85.3 J	ND (0.2)	13.0	31.6 J	2.12	ND (1.0)	ND (1.0)	44.4 J	79.1 J	0.299	34.7	4.65	7.15	4.81	208
MW-17	5/19/2005		ND (50)	ND (2.0)	1.44	36.7	ND (1.0)	ND (1.0)	15.8	ND (1.0)	12.7	1.30	5.31	ND (0.2)	18.3	9.47	12.6	ND (1.0)	ND (1.0)	5.06	124 J	0.26	128	ND (0.1)	19.0	10.9	288
	5/19/2005	(FD)	ND (50)	ND (2.0)	1.39	37.3	ND (1.0)	ND (1.0)	15.4	ND (1.0)	11.9	1.59	5.43	ND (0.2)	18.6	ND (1.0)	13.5	ND (1.0)	ND (1.0)	4.59	78.4 J	0.257	131	ND (0.1)	19.4	11.1	295
MW-18	[2] 5/12/2005		ND (50)	ND (2.0)	ND (1.0)	75.0	ND (1.0)	ND (1.0)	22.7	ND (1.0)	1.04	ND (1.0)	2.42	ND (0.2)	3.20	ND (1.0)	2.30	ND (1.0)	ND (1.0)	2.80	ND (10)	0.169	95.1	ND (0.1)	15.0	7.67	155
P-2	5/13/2005		ND (50)	ND (2.0)	2.16	146	ND (1.0)	ND (1.0)	3.43	ND (1.0)	1.00	ND (1.0)	2.61	ND (0.2)	5.57	4.16	1.68	ND (1.0)	ND (1.0)	11.3	27.0	0.541	272	0.207	53.1	11.0	704
PMM-Supply	5/18/2005		ND (50)	ND (2.0)	1.62	145	ND (1.0)	ND (1.0)	10.9	ND (1.0)	4.92 J	ND (1.0)	ND (1.0)	ND (0.2)	5.39	ND (1.0)	1.45	ND (1.0)	ND (1.0)	9.72	17.9	0.205	82.4	ND (0.1)	16.5	6.49	151
	5/18/2005	(FD)	74.0	ND (2.0)	1.71	144	ND (1.0)	ND (1.0)	11.0	ND (1.0)	5.00 J	ND (1.0)	1.20	ND (0.2)	5.61	ND (1.0)	2.09	ND (1.0)	ND (1.0)	9.47	28.5	0.198	81.1	ND (0.1)	16.2	6.46	149

Notes:

[1] Select wells were sampled for Total Lead in Round 2. To check preliminary results from Round 1
[2] MW-18 was purged and sampled on 05/11/05 for lab filtered metals under the IM3 Compliance sampling

FD field duplicate
µg/L micrograms per liter
mg/L milligrams per liter
--- not sampled
ND parameter not detected at the listed reporting limit (listed in the adjacent parenthesis)
J concentration or reporting limits estimated by laboratory or validation

Table 6
Summary Statistics for Background Study Round 1 and Round 2
PG&E Topock Background Study

Analyte	Units	Number of Detections	Total Samples	Minimum Detected Value	Maximum Detected Value	Average [1]
General Chemistry						
Bromide	mg/L	2	72	0.7	3.00	0.29
Chloride	mg/L	72	72	18.9	4070	378.70
Fluoride	mg/L	57	72	0.5	7.24	1.89
Nitrate as Nitrogen	mg/L	59	72	0.5	20.5 J	3.47
Sulfate	mg/L	72	72	14.7	843	190.00
Total Kjeldahl Nitrogen	mg/L	13	72	0.5	ND (4.8)	ND (4.8)
Ammonia as nitrogen	mg/L	5	72	0.5	1.16	0.30
Alkalinity, bicarb. as caco3	mg/L	72	72	49.6	583	145.92
Alkalinity, as carbonate	mg/L	0	72	---	ND (5.0)	ND (5.0)
Alkalinity, total as caco3	mg/L	72	72	49.6	583	145.92
Perchlorate	mg/L	3	72	0.0	ND (0.01)	ND (0.01)
Oxygen 18	0/00	71	71	-13.6	-7.9	-10.07
Deuterium	0/00	71	71	-105.0	-59	-77.31
Iodide	mg/L	1	72	0.8	0.82	0.26
Tritium	pCi/L	0	72	---	ND (350)	ND (350)
Sulfide	mg/L	0	72	---	ND (2.0)	ND (2.0)
Dissolved organic carbon	mg/L	57	72	1.0	9.53	1.86
pH	pH Units	72	72	6.3	8.41	7.77
Specific conductance	µS/cm	72	72	376.0	13800	1930.24
Soluble silica	mg/L	70	71	13.8	46.4	25.76
Total suspended solids	mg/L	12	72	11.0	467 J	15.84
Total dissolved solids	mg/L	72	72	260.0	8740	1211.63
Total organic carbon	mg/L	30	72	1.0	8.73	1.32
Turbidity	NTU	36	72	1.1	88.2 J	6.27
Metals - Dissolved						
Aluminum	µg/L	21	72	50.9	84.8	35.39
Antimony	µg/L	0	72	---	ND (2.0)	ND (2.0)
Arsenic	µg/L	70	72	1.1	35.6	8.64
Barium	µg/L	72	72	9.2	359	59.40
Beryllium	µg/L	0	72	---	ND (1.0)	ND (1.0)
Cadmium	µg/L	0	72	---	ND (1.0)	ND (1.0)
Hexavalent chromium	µg/L	56	72	0.2	49.0	9.33
Chromium	µg/L	56	72	1.0	56.3	10.37
Cobalt	µg/L	1	72	1.0	1.00	0.51
Copper	µg/L	62	72	1.2	29.0	3.72
Lead	µg/L	7	72	1.1	2.52	0.62
Manganese	µg/L	55	72	1.1	1950	118.25
Mercury	µg/L	0	72	---	ND (0.2)	ND (0.2)
Molybdenum	µg/L	69	72	3.5	50.4	12.60
Nickel	µg/L	31	72	1.0	41.5	2.59
Selenium	µg/L	49	72	1.0	20.3	2.85
Silver	µg/L	0	72	---	ND (1.0)	ND (1.0)
Thallium	µg/L	3	72	1.1	1.22	0.53
Vanadium	µg/L	61	72	1.0	47.6	16.41
Zinc	µg/L	48	72	11.8	1870	72.75
Boron	mg/L	72	72	0.1	1.64	0.39
Calcium	mg/L	72	72	9.6	383	72.71

Table 6
Summary Statistics for Background Study Round 1 and Round 2
PG&E Topock Background Study

Analyte	Units	Number of Detections	Total Samples	Minimum Detected Value	Maximum Detected Value	Average [1]
Metals - Dissolved						
Iron	mg/L	15	72	0.1	14.0	0.42
Magnesium	mg/L	72	72	2.0	154	22.82
Potassium	mg/L	72	72	3.1	21.3	6.67
Sodium	mg/L	72	72	52.6	2710	308.72
Metals - Total						
Aluminum	µg/L	8	36	64.2	4310 J	245.10
Antimony	µg/L	0	36	---	ND (2.0)	ND (2.0)
Arsenic	µg/L	34	36	1.4	34.7	8.28
Barium	µg/L	36	36	10.3	325	59.87
Beryllium	µg/L	0	36	---	ND (1.0)	ND (1.0)
Cadmium	µg/L	0	36	---	ND (1.0)	ND (1.0)
Chromium	µg/L	31	36	1.0	1500	102.53
Cobalt	µg/L	10	36	1.0	7.32	1.22
Copper	µg/L	33	36	1.0	51.8	9.83
Lead	µg/L	8	39	1.2	15.4	1.63
Manganese	µg/L	30	36	1.2	1140	148.02
Mercury	µg/L	0	36	---	ND (0.2)	ND (0.2)
Molybdenum	µg/L	34	36	3.2	51.7	13.01
Nickel	µg/L	17	36	1.2	911	54.09
Selenium	µg/L	24	36	1.0	18.5	2.79
Silver	µg/L	0	36	---	ND (1.0)	ND (1.0)
Thallium	µg/L	1	36	1.6	1.55	0.53
Vanadium	µg/L	31	36	2.8	56.7 J	17.20
Zinc	µg/L	23	36	11.7	1890	98.75
Boron	mg/L	36	36	0.1	1.47	0.37
Calcium	mg/L	36	36	9.7	400	70.68
Iron	mg/L	19	36	0.1	11.4	1.45
Magnesium	mg/L	36	36	2.0	156	22.16
Potassium	mg/L	36	36	3.1	21.5	6.43
Sodium	mg/L	36	36	51.4	2770	298.54

NOTES:

[1] One half the reporting limit is used to calculate average for non detect samples

pH and SC values for Round 2 sampling event were taken from field instruments, all other values are laboratory results

µg/L	micrograms per liter
mg/L	milligrams per liter
0/00	differences from global standards in parts per thousand
µS/cm	microSiemens per centimeter
pci/l	picocuries per liter
NTU	nephelometric turbidity units
ND	parameter not detected at the listed reporting limit (listed in the adjacent parenthesis)
J	concentration or reporting limits estimated by laboratory or validation

TABLE 7 Background Well Selection Matrix
PG&E Topock Background Study
PG&E Compressor Station and Vicinity, Needles, California

Well Order	Common Well ID	State	Is there a potential anthropogenic source impacting the concentration of metals in groundwater?	Is the groundwater general chemistry, as indicated by the cation/anion concentrations, consistent with the Topock site groundwater general chemistry?	Is the groundwater general chemistry, as indicated by the stable isotope signature, consistent with the Topock site groundwater general chemistry?	Is the well located within a cluster of other background wells which could cause a geographic bias in the background concentration?	Selected as final background well?	Comments/Reason for exclusion
1	ADOT New Well	AZ	No	Yes	Yes	No	Yes	
2	Sanders	AZ	No	Yes	Yes	No	Yes	
3	Topock-2	AZ	No	Yes	Yes	No	Yes	
4	Topock-3	AZ	No	Yes	Yes	No	Yes	
5	EPNG-2	AZ	No	Yes	Yes	No	Yes	
6	GSWC-1	AZ	No	Yes	Yes	No	Yes	
7	GSWC-2	AZ	No	Yes	Yes	No	Yes	
8	GSWC-3	AZ	No	Yes	Yes	No	Yes	
9	GSWC-4	AZ	No	Yes	Yes	No	Yes	
10	PGE-09N	AZ	No	Yes	Yes	Yes	No	Located adjacent to PGE-9S, well is the same depth and has the same groundwater chemistry so eliminated to prevent a statistical bias
11	PGE-09S	AZ	No	Yes	Yes	Yes	Yes	
12	Langmaack	AZ	No	Yes	Yes	No	Yes	
13	GSRV-2	AZ	No	Yes	Yes	No	Yes	
14	TMLP-2	AZ	No	Yes	Yes	No	Yes	
15	BOR-2	AZ	No	Yes	Yes	Yes	Yes	
16	BOR-3	AZ	No	Yes	Yes	Yes	No	Located adjacent to BOR-2, well is the same depth and has the same groundwater chemistry so eliminated to prevent a statistical bias
17	New Farm Well	AZ	No	Yes	Yes	No	Yes	
18	USFW-5	AZ	No	Yes	Yes	No	Yes	
19	CA Agriculture Station	CA	No	Yes	Yes	No	Yes	
20	Needles MW-10	CA	No	Yes	Yes	No	Yes	
21	Needles MW-11	CA	No	Yes	Yes	No	Yes	
22	Needles MW-12	CA	No	Yes	Yes	No	Yes	
23	Lily Hill	CA	No	Yes	Yes	No	Yes	
24	Taylee	CA	No	Yes	Yes	No	Yes	
25	MW-01	CA	Yes	Yes	Yes	No	No	The dedicated pneumatic pumps in these wells may be affecting the dissolved chromium concentrations, so the wells were eliminated.
26	MW-03	CA	Yes	Yes	Yes	No	No	
27	MW-04	CA	Yes	Yes	Yes	No	No	
28	MW-05	CA	Yes	Yes	Yes	No	No	
29	MW-06	CA	Yes	Yes	Yes	No	No	
30	MW-07	CA	Yes	Yes	Yes	No	No	
31	MW-08	CA	Yes	Yes	Yes	No	No	
32	MW-16	CA	No	Yes	Yes	No	Yes	
33	MW-17	CA	No	Yes	Yes	No	Yes	
34	MW-18	CA	No	Yes	Yes	No	Yes	
35	P-2	CA	No	Yes	Yes	No	Yes	
36	PMM-Supply	CA	No	Yes	Yes	No	Yes	

TABLE 8 Background Study Analyte Selection Matrix
PG&E Topock Background Study
PG&E Compressor Station and Vicinity, Needles, California

Order	Analyte	Will a background concentration be calculated for the analyte?	Is the analyte necessary for confirming that the groundwater chemistry remains consistent with the Topock site groundwater chemistry?	Is the analyte frequently not detected in the groundwater samples?	Selected as final background study analyte?	Comments/Reason for exclusion
1	Dissolved Aluminum	Yes	Yes	No	Yes	
2	Dissolved Antimony	Yes	Yes	Yes	Yes	
3	Dissolved Arsenic	Yes	Yes	No	Yes	
4	Dissolved Barium	Yes	Yes	No	Yes	
5	Dissolved Beryllium	Yes	Yes	Yes	Yes	
6	Dissolved Cadmium	Yes	Yes	Yes	Yes	
7	Hexavalent Chromium	Yes	Yes	No	Yes	
8	Dissolved Chromium	Yes	Yes	No	Yes	
9	Dissolved Cobalt	Yes	Yes	Yes	Yes	
10	Dissolved Copper	Yes	Yes	No	Yes	
11	Dissolved Lead	Yes	Yes	Yes	Yes	
12	Dissolved Manganese	Yes	Yes	No	Yes	
13	Dissolved Mercury	Yes	Yes	Yes	Yes	
14	Dissolved Molybdenum	Yes	Yes	No	Yes	
15	Dissolved Nickel	Yes	Yes	No	Yes	
16	Dissolved Selenium	Yes	Yes	No	Yes	
17	Dissolved Silver	Yes	Yes	Yes	Yes	
18	Dissolved Thallium	Yes	Yes	Yes	Yes	
19	Dissolved Vanadium	Yes	Yes	No	Yes	
20	Dissolved Zinc	Yes	Yes	No	Yes	
21	Dissolved Boron	Yes	Yes	No	Yes	
22	Dissolved Calcium	Yes	Yes	No	Yes	
23	Dissolved Iron	Yes	Yes	No	Yes	
24	Dissolved Magnesium	Yes	Yes	No	Yes	
25	Dissolved Potassium	Yes	Yes	No	Yes	
26	Dissolved Sodium	Yes	Yes	No	Yes	

TABLE 8 Background Study Analyte Selection Matrix
PG&E Topock Background Study
PG&E Compressor Station and Vicinity, Needles, California

Order	Analyte	Will a background concentration be calculated for the analyte?	Is the analyte necessary for confirming that the groundwater chemistry remains consistent with the Topock site groundwater chemistry?	Is the analyte frequently not detected in the groundwater samples?	Selected as final background study analyte?	Comments/Reason for exclusion
27	Bromide	No	No	Yes	No	Not necessary for calculating background concentrations or checking groundwater chemistry and was mostly non-detect.
28	Chloride	No	Yes	No	Yes	
29	Fluoride	No	Yes	No	Yes	
30	Nitrate as Nitrogen	No	Yes	No	Yes	
31	Sulfate	No	Yes	No	Yes	
32	Total Kjeldahl Nitrogen	No	Yes	No	Yes	
33	Ammonia as Nitrogen	No	Yes	Yes	Yes	
34	Alkalinity, as biocarbonate	No	Yes	No	Yes	
35	Alkalinity, as carbonate	No	Yes	Yes	Yes	
36	Alkalinity, total	No	Yes	No	Yes	
37	Perchlorate	No	No	Yes	No	Not necessary for calculating background concentrations or checking groundwater chemistry and was mostly non-detect.
38	Oxygen 18	No	Yes	No	Yes	
39	Deuterium	No	Yes	No	Yes	
40	Iodide	No	No	Yes	No	Not necessary for calculating background concentrations or checking groundwater chemistry and was mostly non-detect.
41	Tritium	No	No	Yes	No	Not necessary for calculating background concentrations or checking groundwater chemistry and was mostly non-detect.

TABLE 8 Background Study Analyte Selection Matrix
PG&E Topock Background Study
PG&E Compressor Station and Vicinity, Needles, California

Order	Analyte	Will a background concentration be calculated for the analyte?	Is the analyte necessary for confirming that the groundwater chemistry remains consistent with the Topock site groundwater chemistry?	Is the analyte frequently not detected in the groundwater samples?	Selected as final background study analyte?	Comments/Reason for exclusion
42	Sulfide	No	No	Yes	No	Not necessary for calculating background concentrations or checking groundwater chemistry and was mostly non-detect.
43	Dissolved Organic Carbon	No	Yes	No	Yes	
44	Silica	No	Yes	No	Yes	
45	TDS	No	Yes	No	Yes	
46	TSS	No	Yes	No	Yes	
47	Total Organic Carbon	No	Yes	No	Yes	
48	pH	No	Yes	No	Yes	
49	Specific Conductance	No	Yes	No	Yes	
50	Turbidity	No	Yes	No	Yes	
51	Temperature	No	Yes	No	Yes	
52	Dissolved Oxygen	No	Yes	No	Yes	
53	Oxidation-Reduction Potential	No	Yes	No	Yes	
54	Total Metals	No	No	No	No	Not necessary for calculating background concentrations or checking groundwater chemistry during future sampling events.

Figures

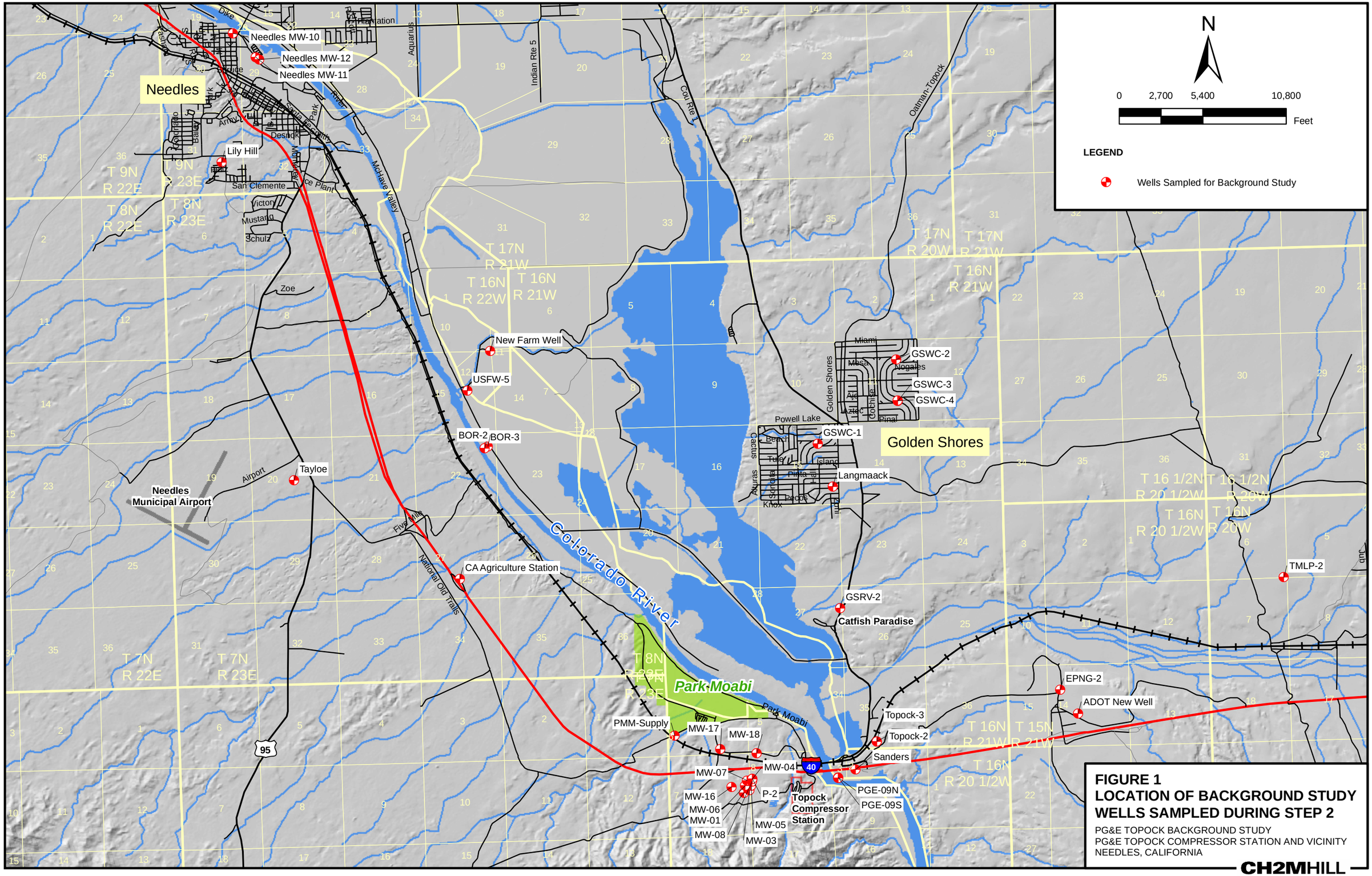

FIGURE 1
LOCATION OF BACKGROUND STUDY WELLS SAMPLED DURING STEP 2

PG&E TOPOCK BACKGROUND STUDY
PG&E TOPOCK COMPRESSOR STATION AND VICINITY
NEEDLES, CALIFORNIA

CH2MHILL

N

LEGEND

0 2,700 5,400 Feet

Wells Sampled for Background Study

T 8N R 23E

T 7N R 23E

Park Moabi

Park Moabi

Catfish Paradise

T 16N R 21W

T 15N R 21W

T 16N R 20 1/2

GSRV-2
TDS 505

PGE-09S
Na Cl Ca HCO3 Mg SO4
TDS 7550
20016012080 40 40 80 120160200 (meq/l)

PGE-09N
Na Cl Ca HCO3 Mg SO4
TDS 8740
20016012080 40 40 80 120160200 (meq/l)

Topock-2
TDS 975

Topock-3
TDS 735

Sanders
TDS 1150

P-2
Na Cl Ca HCO3 Mg SO4
TDS 3120
50 40 30 20 10 10 20 30 40

PMM-Supply
TDS 865

MW-17
TDS 1370

MW-07
TDS 665

MW-18
TDS 980

MW-16
TDS 665

MW-06
TDS 410

MW-01
TDS 490

MW-03
TDS 780

MW-04
TDS 615

MW-05
TDS 960

MW-08
TDS 825

Top Con Stat

LEGEND

MW-01
Na Cl Ca HCO3 Mg SO4
TDS 865 mg/L
15 10 5 5 10 15 (meq/l)

Scale used for all plots unless shaded blue.

Note:
Results from wells sampled during step two of background study from 7/18/2005 through 8/11/2005.

FIGURE 2
TOPOCK AREA STIFF DIAGRAMS

PG&E TOPOCK BACKGROUND STUDY
PG&E TOPOCK COMPRESSOR STATION AND VICINITY
NEEDLES, CALIFORNIA

CH2MHILL

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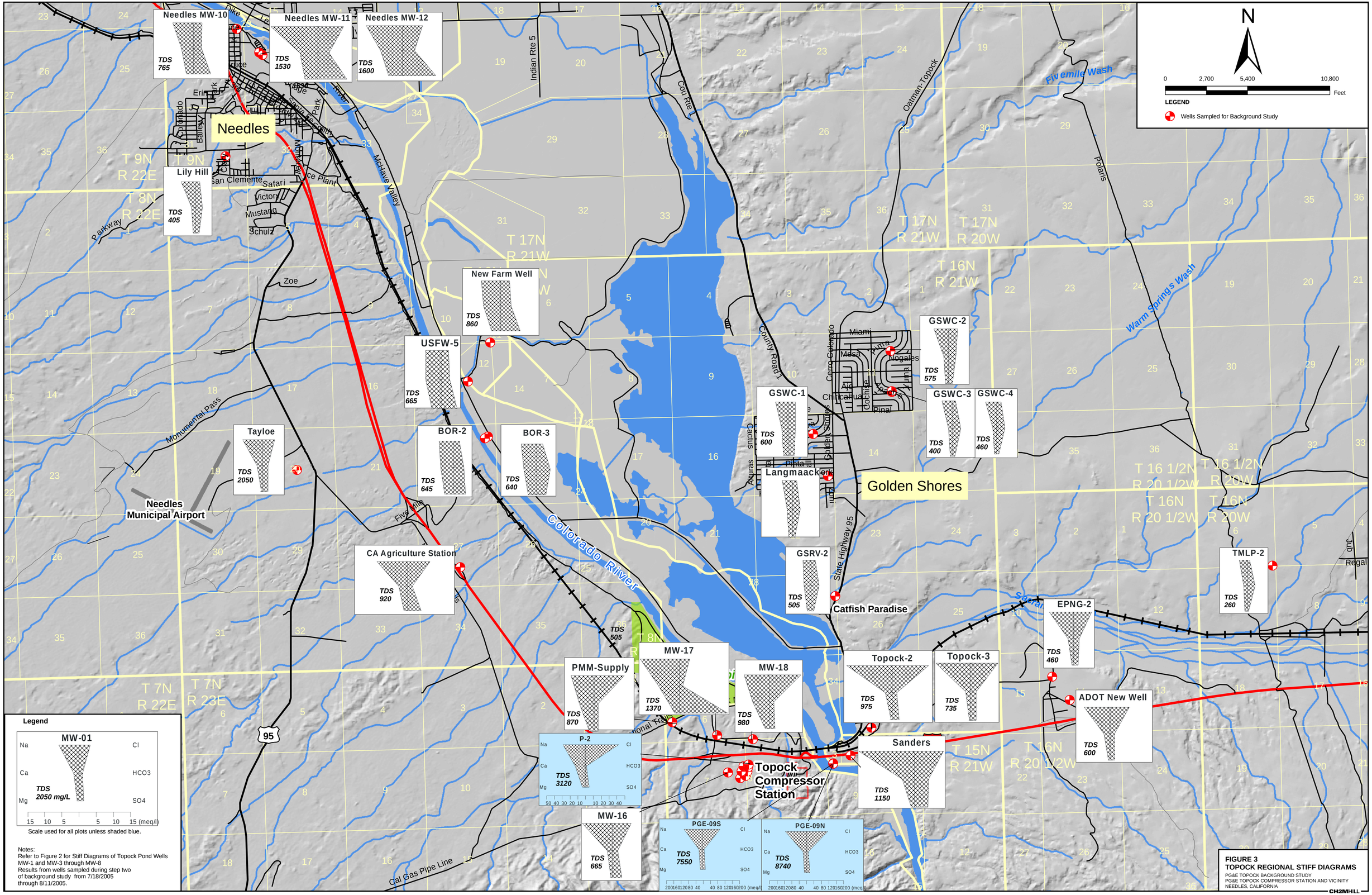

Scale used for all plots unless shaded blue.

Notes:
Refer to Figure 2 for Stiff Diagrams of Topock Pond Wells MW-1 and MW-3 through MW-8
Results from wells sampled during step two of background study from 7/18/2005 through 8/11/2005.

FIGURE 3
TOPOCK REGIONAL STIFF DIAGRAMS
PG&E TOPOCK BACKGROUND STUDY
PG&E TOPOCK COMPRESSOR STATION AND VICINITY
NEEDLES, CALIFORNIA

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MXD\2005\BKG_STUDY_CR_Regional_11x17.MXD

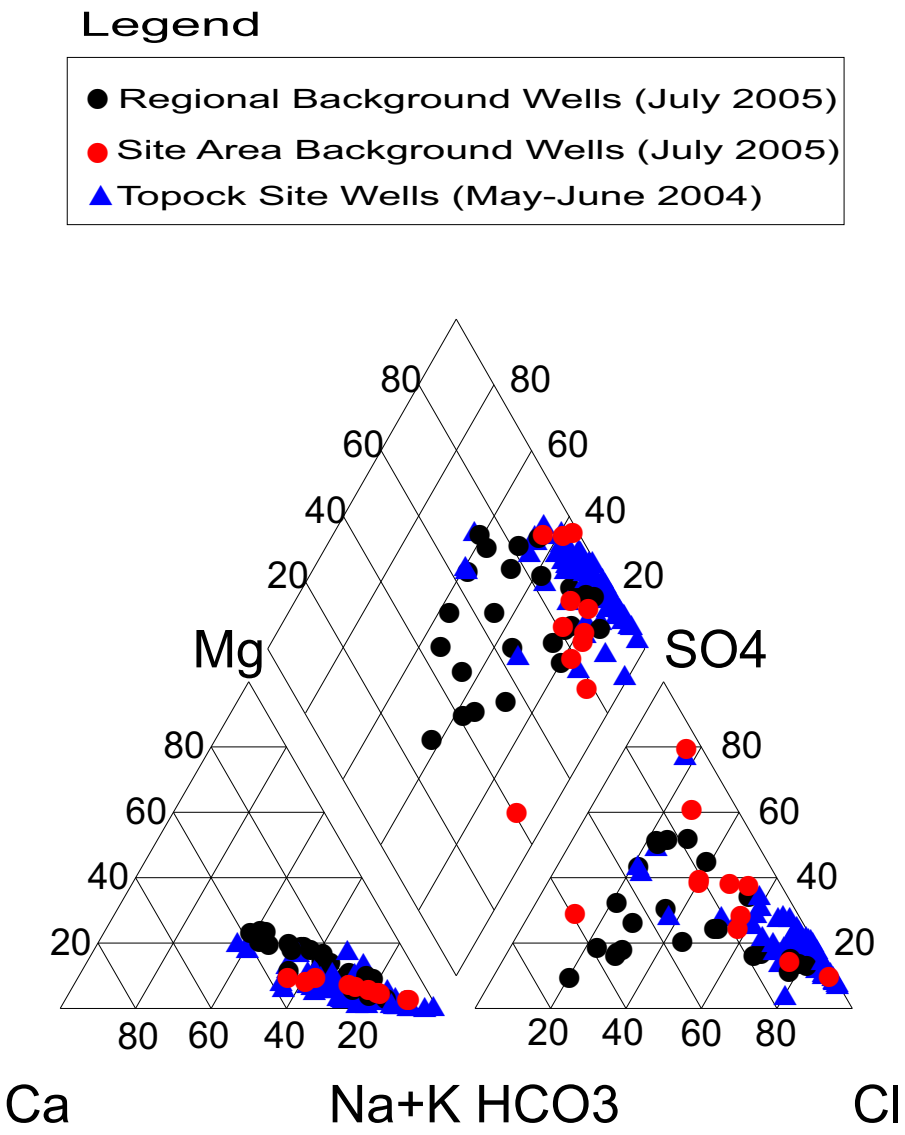

Figure 4
Background Study Piper Plot

PG&E TOPOCK BACKGROUND STUDY
PG&E TOPOCK COMPRESSOR STATION AND VICINITY
NEEDLES, CALIFORNIA

CH2MHILL

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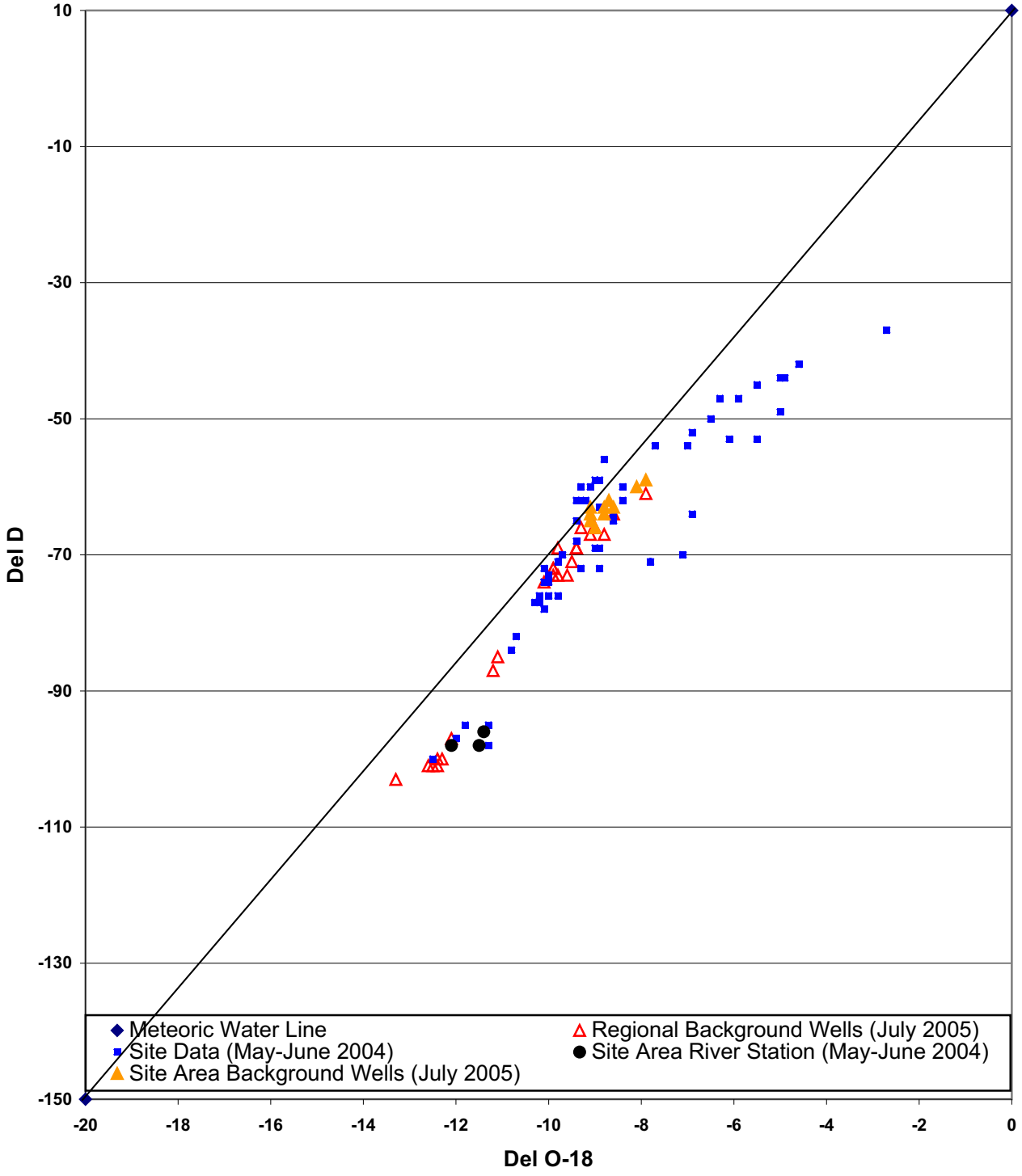

Figure 5
Background Study Stable Isotopes
PG&E TOPOCK BACKGROUND STUDY
PG&E TOPOCK COMPRESSOR STATION AND VICINITY
NEEDLES, CALIFORNIA

CH2MHILL

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Appendices