QUARTERLY GROUNDWATER MONITORING RESULTS, JUNE-JULY, 1997

at the:

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EXECUTIVE SUMMARY

Presented in this report are the results of the fourth long-term groundwater monitoring event (June-July, 1997) of the Comprehensive Environmental Response, Compensation and Liability Act Remedial Investigation/Feasibility Study at the NASA-Jet Propulsion Laboratory (JPL). This event is part of the long-term quarterly groundwater monitoring program which was initiated in response to requests from the United States Environmental Protection Agency.

Between June 16 and July 15, 1997, groundwater samples were collected from fifteen JPL on-site monitoring wells and from five JPL off-site monitoring wells and analyzed for volatile organic compounds (VOCs), metals (arsenic, lead, total chromium, and hexavalent chromium), perchlorate, and major anions/cations. Additional analyses for tributyltin were performed on samples from well MW-13 and from the upper two screens of deep multi-port wells MW-12 and MW-4.

Results indicate that only three VOCs (carbon tetrachloride, trichloroethene, and 1,2-dichloroethane) were detected in concentrations above state or federal Maximum Contaminant Levels (MCLs) for drinking water. Perchlorate was detected in 6 wells above its interim action level of 18 µg/l. Tributyltin was detected in two wells at its detection limit of 0.002 µg/l, and hexavalent chromium was found in one well. To date, an MCL has not been established for hexavalent chromium. Arsenic, lead, and total chromium were not detected at concentrations above their MCLs. A summary of the sampling procedure is included in Section 2.0 and a summary of the analytical results is included in Section 3.0.

Results from major anion/cation analyses (water chemistry) were used to identify the general water types beneath JPL during this sampling event. These results are presented in Section 4.0. Water-level measurements, recorded before and after sampling activities, are presented in Section 5.0.

1.0 INTRODUCTION

Presented in this report are the results from the fourth sampling event of the long-term quarterly groundwater monitoring program currently being conducted at the NASA-Jet Propulsion Laboratory (JPL). The purpose of the program is to monitor the elevation, flow direction, and quality of the groundwater beneath and adjacent to the JPL site and generate data for the JPL Comprehensive Environmental Response, Compensation and Liability Act Remedial Investigation/Feasibility Study. From June 16 to July 15, 1997, the JPL groundwater monitoring wells (both on and off-site) were sampled by Foster Wheeler Environmental Corporation (Foster Wheeler) personnel. In addition, water level measurements at each well were taken prior to (June 11 and 12, 1997), and after sampling (July 16, 1997).

The locations of the JPL groundwater monitoring wells are shown in Figure 1-1. Monitoring wells MW-3, MW-4, MW-11, MW-12, MW-14, MW-17, MW-18, MW-19, MW-20, and MW-21 are deep, multi-port (MP) wells, each containing five screened intervals within a Westbay Instruments, Inc. (Westbay) multi-port casing system. Monitoring wells MW-1, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-13, MW-15, and MW-16 are relatively shallow standpipe wells, each containing a single screened interval located at the water table. Monitoring well MW-2 has been replaced with well MW-14 (Figure 1-1) as a JPL sampling point. A summary of the well construction details for the JPL groundwater monitoring wells is included in Table 1-1.

All of the groundwater samples collected at JPL were taken to Montgomery Watson Laboratories in Pasadena, California, for chemical analysis. Montgomery Watson Laboratories is certified by the California Department of Health Services. The following analyses were performed.

Analysis	EPA Method
Volatile Organic Compounds (all wells)	524.2
Total Chromium (all wells)	200.8
Hexavalent Chromium (all wells)	7196
Total Lead (all wells)	200.8
Total Arsenic (all wells)	200.9
Major Cations and Major Anions (all wells)	Various
Perchlorate (all wells)	300.0, modified
Tributyltin (MW-13, and upper two screens in MW-4 and MW-12)	GC/FPD

In addition to groundwater samples, field quality assurance/quality control (QA/QC) samples were collected for laboratory analysis. Sampling records for each shallow well are included in Appendix A and sampling records and piezometric pressure profiling records from the deep multi-port wells are included in Appendix B. Field instrument calibration forms are included in Appendix C and laboratory analytical reports and associated chain-of-custody forms are included in Appendix D.

2.0 SAMPLING AND FIELD QUALITY ASSURANCE/ QUALITY CONTROL PROCEDURES

Two different procedures were used in collection and handling of groundwater samples at JPL: one designed for the shallow wells, and the other for the deep multi-port wells. These procedures are outlined below.

2.1 SHALLOW MONITORING WELLS

The sampling procedure described below was applied to all the JPL shallow monitoring wells, which includes wells MW-1, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-13, MW-15, and MW-16.

The primary equipment used to sample the shallow wells included a dedicated 2-inch Grundfos Redi-Flo2® pump, a pump controller, and a 220-volt generator. All of the dedicated 2-inch Grundfos Redi-Flo2® pump systems were decontaminated prior to their installation before the beginning of the long-term quarterly monitoring program. Details of decontamination procedures for the Grundfos Redi-Flo2® pump systems are outlined in a previous document (Ebasco, 1993a).

Prior to sample collection, the water in each well casing was purged (by pumping) to remove groundwater that may have been exposed to the atmosphere and thus is not representative of undisturbed aquifer conditions. This purged groundwater was discharged into 500- or 1,000-gallon polyethylene storage tanks for disposal by JPL personnel pursuant to Environmental Protection Agency (EPA) guidance on the management of investigation-derived wastes (EPA, 1991 and 1992).

Temperature, pH, electrical conductivity and turbidity of the water removed from each well were monitored during purging. After these parameters had stabilized (when two successive measurements made approximately 3 minutes apart were within approximately 10 percent of each other) and the turbidity was less than 5 Nephelometric Turbidity Units, the groundwater samples were collected with the dedicated pump. During sampling for volatile organic compounds (VOCs), the pump rate was reduced to approximately 0.02 gallons per minute to minimize sample agitation. All information concerning sampling was noted on the Well Development/Well Sampling Log Forms included in Appendix A.

All sample bottles were filled completely (not allowed to overflow), capped, labeled, and placed in a cooler with ice immediately after sample collection. Samples collected for VOCs had zero headspace.

Calibration, or standardization, of the field instruments used to measure temperature, pH, conductivity, and turbidity, was performed to the manufacturer's specifications at the beginning and end of each sampling day. Field instrument calibration forms are included in Appendix C.

2.2 DEEP MULTI-PORT MONITORING WELLS

Sampling of the deep JPL multi-port (MP) monitoring wells required specialized sampling equipment manufactured by Westbay. This equipment included a pressure profiling/sampling probe with a surface control unit. Field personnel using this equipment were trained by Westbay personnel to ensure proper use. Copies of the detailed operations manuals for the Westbay pressure profiling/ sampling probe are included in the OU-1 and OU-3 Field Sampling and Analysis Plans (Ebasco, 1993a; 1994).

The Westbay sampling probe and sample bottles were decontaminated prior to sampling each screened interval in the deep MP wells according to the following procedures:

- Wash each 250-ml stainless steel sample bottle in a solution of non-phosphate detergent (Liquinox®) and deionized water followed by washing each bottle in a solution of an acidic detergent (Citranox®) and deionized water.
- Rinse each bottle twice with deionized water.
- The interior surfaces of the Westbay sampling probe, and the hoses and valves associated with the Westbay sample bottles, were decontaminated by forcing several volumes of a solution of Liquinox® and deionized water through the sampling equipment. This was followed by forcing several volumes of a Citranox® and deionized water solution through the sampling equipment. A final rinse with deionized water was then carried out. Each of these decontamination procedures was carried out using a clean plastic squeeze bottle used only for this purpose.

Purging before sampling is not required in the deep MP monitoring wells because the groundwater sample is collected directly from the aquifer, and is not exposed to the atmosphere. However, at each screened interval an initial sample was collected in order to check pH, conductivity, temperature, and turbidity in the field, and to rinse the sampling container with formation water. Samples for laboratory analysis were then collected and transferred to bottles as described above (final paragraph in Section 2.1). A final sample was collected and analyzed for pH, conductivity, temperature, and turbidity to ensure continuity of aquifer conditions during sampling. Results of the field analyses were recorded on well development logs, which are included in Appendix B. Calibration and maintenance of field instruments were carried out according to procedures described previously (Ebasco, 1993a; 1994).

2.3 FIELD QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

To verify the quality of the groundwater samples collected from the JPL monitoring wells, field QA/QC samples were collected. The field QA/QC program included the collection of duplicate samples, equipment blanks, trip blanks and a field blank. In addition, laboratory QA/QC samples were used by the laboratory according to analytical method requirements.

In accordance with established protocol, a minimum of one duplicate groundwater sample was collected for approximately every 20 groundwater samples (Ebasco, 1993b). Duplicate samples for VOCs and metals analyses were collected from shallow groundwater monitoring wells MW-10 and MW-13, and deep MP wells MW-4 (screen 2), and MW-12 (screen 1). Duplicate samples from MW-10, MW-12 (screen 1) and MW-13 were analyzed for perchlorate (ClO_4), and the duplicate sample from MW-12 (screen 1) was also analyzed for tributyltin (TBT). In addition, one matrix spike (MS) sample and one matrix spike duplicate (MSD) sample were collected and analyzed for VOCs for every 20 samples submitted to the laboratory. The MS/MSD samples were used to verify the accuracy of the analytical method.

One equipment blank sample was collected from the Westbay sample bottles during each day of sampling the deep MP wells. Equipment blanks were collected by passing American Society of Testing Materials (ASTM) Type II organic free water (provided by the analytical laboratory) through the sampling equipment as a final rinse after the equipment had been decontaminated. This equipment blank was analyzed for the same constituents as the groundwater samples to identify potential cross contamination due to inadequate decontamination procedures. Equipment blanks were not collected during sampling of the shallow wells as dedicated sampling equipment was used.

A trip blank, consisting of ASTM Type II water placed in two 40-ml glass vials by the laboratory, was transported with the empty sample bottles to the field and back to the laboratory with the groundwater samples. One trip blank was submitted for VOC analysis with each shipment of groundwater samples. Trip blanks were used to identify potential cross contamination of groundwater samples during transport.

During this sampling event, one field blank was collected at well MW-7. The field blank is used to determine whether ambient conditions or sample containers may effect analytical results. The field blank consisted of sample bottles, filled with ASTM Type II organic free water supplied by the laboratory, left open at the well head during the sampling of the well. After sampling, the field-blank bottles were capped and analyzed for the same constituents as the groundwater samples.

3.0 ANALYTICAL RESULTS

JPL groundwater monitoring wells MW-1 and MW-3 through MW-21 were sampled between June 16 and July 15, 1997. MW-2 was not sampled as it was replaced as a JPL monitoring point by deep multi-port well MW-14.

The groundwater samples were analyzed for VOCs, total chromium (Cr), hexavalent chromium (Cr^{6+}), total lead (Pb), total arsenic (As), ClO_4 and TBT (MW-13, and MW-12 and MW-4, screens 1 and 2 only). All samples were also analyzed for general water chemistry parameters that included major cations and anions [sodium (Na), potassium (K), calcium (Ca), magnesium (Mg), iron (Fe), alkalinity (CO_3 + HCO_3), chloride (Cl), sulfate (SO_4), nitrate (NO_3)], total dissolved solids (TDS), specific conductivity and pH. A summary of the samples collected, sample numbers used, and the analyses performed on each sample is presented in Table 3-1. Analytical laboratory reports and associated chain-of-custody forms are included in Appendix D.

3.1 VOLATILE ORGANIC COMPOUNDS RESULTS

Groundwater samples collected during the June-July 1997 sampling event were analyzed for over 60 different VOCs in accordance with EPA Method 524.2. For data presentation purposes, the aquifer has been divided into 4 aquifer layers based on correlations as interpreted on lithologic cross sections. Listed in Table 3-2 are the JPL monitoring well screens and their corresponding aquifer layers. Results of the analyses for VOCs in the June-July 1997 samples are summarized in Table 3-3 along with the Maximum Contaminant Levels (MCLs) for drinking water as listed in Title 22 of the California Code of Regulations and in the EPA Health Advisory Guidelines. A small number of compounds were detected in these samples, and only three VOCs [carbon tetrachloride (CCl_4), trichloroethene (TCE), and 1,2-dichloroethane (1,2-DCA)] were found in concentrations exceeding the state and/or federal MCLs (Table 3-3). The concentrations of CCl_4, TCE, and 1,2-DCA in each aquifer layer where they were detected above their MCLs are contoured on maps to provide an estimate of the spatial distribution of each constituent. In addition, contour maps of tetrachloroethene (PCE) are also included. Where state and federal MCLs differed, the more stringent MCL was used. Carbon tetrachloride levels in aquifer layers 1, 2 and 3 are contoured in Figures 3-1, 3-2 and 3-3, respectively. Figures 3-4, 3-5 and 3-6 include contours of TCE concentrations detected in layers 1, 2 and 3, respectively, and Figure 3-7 contains contours of 1,2-DCA concentrations detected in aquifer layer 1. Figures 3-8, 3-9 and 3-10 include contours of PCE detected in aquifer layers 1, 2 and 3. A summary of VOC results collected during all four of the long-term quarterly sampling events completed to date is provided in Table 3-4.

CCl_4 in excess of the state MCL (0.5 µg/l) was found in seven of the on-site wells, and two of the off-site wells (Table 3-3, Figures 3-1, 3-2 and 3-3). The federal MCL (5.0 µg/l) was exceeded in 5 on-site wells. The highest concentrations of CCl_4 were found in shallow on-site wells MW-7 and MW-16.

TCE in excess of state and federal MCLs (5.0 µg/l) was detected in four on-site wells, and two off-site wells (Table 3-3, Figures 3-4, 3-5, and 3-6). The highest levels of TCE were found in shallow on-site wells MW-7, MW-13, MW-16, and deep off-site well MW-21.

1,2-DCA concentrations above the state MCL (0.5 µg/l) were found in three on-site wells (Table 3-3 and Figure 3-7). 1,2-DCA was not detected above the state MCL in any of the off-site wells, and the federal MCL (5.0 µg/l) was not exceeded in any of the wells.

PCE was detected in four on-site wells and four off-site wells, although not at concentrations exceeding state or federal MCLs (5.0 µg/l) (Figures 3-8, 3-9 and 3-10).

3.2 PERCHLORATE RESULTS

Perchlorate analyses were conducted on groundwater samples from the June-July 1997 event by ion chromatography (EPA 300.0, modified). Results are included in Table 3-3, along with the Department of Health Services interim action level (18 µg/l). No MCLs for Perchlorate have been established to date. Perchlorate was detected in a total of 15 wells, of which 6 exceeded the interim action level (Table 3-3). Perchlorate concentrations exceeding the interim action level are contoured in Figures 3-11 and 3-12 for aquifer layers 1 and 2, respectively. Perchlorate was not detected above the interim action level in aquifer layer 3 or 4. The highest ClO_4 levels were observed in shallow, on-site wells MW-7, MW-13 and MW-16.

3.3 TRIBUTYLTIN RESULTS

Analyses for TBT were performed on groundwater samples collected from screens 1 and 2 of deep MP wells MW-4 and MW-12, and from shallow well MW-13. A duplicate sample from MW-12 (screen 1) was also analyzed for TBT. This analysis was conducted because TBT has been used as an anti-foulant in cooling towers such as those in use at JPL. Well MW-13 is the closest well to JPL's central cooling tower system (Building 296) and well MW-12 was chosen by Department of Toxic Substances Control as being downgradient of potential TBT releases.

TBT was detected in MW-4 (screen 2) and MW-12 (screen 1), at the analytical detection limit of 0.002 µg/l. The EPA Preliminary Remediation Goal for tributyltin oxide in drinking water is 1.1 µg/l.

3.4 METALS RESULTS

Groundwater samples from the June-July 1997 sampling event were analyzed for the following suite of metals: total As, total Pb, total Cr, and Cr^{6+}. The results of these analyses are summarized in Table 3-5.

Total As was detected at concentrations below the state and federal MCL (0.05 mg/l) in three wells (MW-3 screen 5, MW-18 screen 4, and MW-20 screen 5). Total Pb was detected in one well (MW-8) also at a concentration below its MCL (0.05 mg/l). Total Cr was detected in four wells (MW-4 screen 2, MW-6, MW-10, and MW-13) at concentrations below the MCL (0.05 mg/l). Hexavalent chromium was detected in on-site shallow well MW-13. At this time, an MCL for Cr^{6+} has not been established by state or federal agencies.

Table 3-6 contains a summary of metals data from all four long-term quarterly sampling events completed to date.

3.5 QUALITY ASSURANCE/QUALITY CONTROL RESULTS

Review of the QA/QC data provided with the laboratory analytical results (Appendix D) indicates that results obtained from June-July 1997 samples are acceptable for their intended use of characterizing aquifer quality. Surrogate compound, matrix and blank spike, and method blank results were used by the laboratory to determine the accuracy and precision of the analytical techniques and to identify anomalous results due to laboratory contamination or instrument malfunction.

In addition to laboratory QA/QC samples, QA/QC samples were collected in the field by Foster Wheeler personnel. These samples included duplicate samples, equipment blanks, trip blanks, and a field blank.

Duplicate samples were used as an independent means of evaluating the precision of the laboratory analyses. Duplicate groundwater samples for VOC and metals analyses were collected from MW-4 (screen 2), MW-10, MW-12 (screen 1), and MW-13. Perchlorate analyses were conducted on duplicate samples from MW-10, MW-12 (screen 1), and MW-13. A duplicate sample from MW-12 (screen 1) was analyzed for TBT. All of the analytical results for the duplicate samples were similar to the results of the original groundwater samples (Table 3-3).

Nineteen equipment blanks were submitted for analysis during the June-July 1997 sampling event. Toluene was found in three of the equipment blanks, and Pb was found in one. Neither toluene nor Pb were detected in the associated groundwater samples, and therefore do not reflect cross-contamination of samples through the sampling equipment. Five of the equipment blanks also contained minor amounts of unidentifiable organic compounds. None of the compounds (identified

only by retention time) were found in any groundwater samples. One of the unidentified compounds was also found in an associated laboratory method blank.

A total of nineteen trip blanks were also submitted along with the June-July 1997 groundwater samples. Carbon disulfide was detected in one trip blank, and Freon 11 in another. Neither of these compounds were detected in associated groundwater samples. Eight trip blanks also contained small quantities of unidentifiable organic compounds, none of which were detected in groundwater samples. Three of these compounds were also present in laboratory method blanks.

No constituents were detected in the field blank collected during the June-July 1997 event.

4.0 GENERAL WATER CHEMISTRY

As part of this groundwater monitoring event, groundwater samples were submitted for analysis of major cations and anions in an effort to further understand the natural water chemistry of the groundwater beneath JPL. Samples from each of the JPL shallow monitoring wells, and each of the deep MP wells, were analyzed for major cations (Ca, Fe, Mg, Na, and K), major anions (Cl, SO_4, NO_3, CO_3 + HCO_3), and TDS. The water chemistry results for this quarterly sampling event are summarized in Table 4-1.

4.1 ANALYTICAL RESULTS

To illustrate the relative proportions of the major cations and anions in each groundwater sample, the water chemistry results from the June-July 1997 event have been compiled as Stiff diagrams (Figures 4-1 and 4-2). Review of the water chemistry data from this investigation indicates that the majority of groundwater sampled at JPL can be classified as one of three general types, based on the predominant cation and anion, and the occurrence of other anions. These general water types include:

Type 1. Calcium-bicarbonate groundwater. Groundwater with Ca as the dominant cation and HCO_3 as the dominant anion.

Type 2. Sodium-bicarbonate groundwater. Groundwater with Na as the dominant cation and HCO_3 as the dominant anion.

Type 3. Calcium-bicarbonate/chloride/sulfate groundwater. Groundwater with Ca as the dominant cation and HCO_3 the dominant anion, but with relatively elevated Cl and SO_4 concentrations.

Based on this scheme, waters classified as Type 1 and Type 3 are very similar in that both types contain calcium as the predominant cation and bicarbonate as the predominant anion. Type 3 groundwater, however, contains higher concentrations of chloride and sulfate anions relative to those of Type 1.

All of the shallow wells contained calcium-bicarbonate or calcium-bicarbonate/chloride sulfate waters during the June-July 1997 sampling event (Figure 4-1). Calcium-bicarbonate and calcium-bicarbonate/chloride/sulfate waters were also the predominant compositional types found in the uppermost screened intervals of all the deep multi-port wells (Figures 4-1 and 4-2). Calcium-bicarbonate waters were also seen in MW-14 screen 4. Intervals containing elevated concentrations of chloride and sulfate (Type 3 waters) include MW-4 (screen 2), MW-14 (screens 1-3), MW-19 (screens 2-5), and MW-21 (all screens).

Sodium-bicarbonate waters (Type 2) were found in the lower intervals of deep multi-port wells MW-3 (screens 3-5), MW-4 (screen 4), MW-11 (screen 5), MW-14 (screen 5), MW-18 (screen 5), and MW-20 (screens 2-5). Apparent blending of Type 2 water with Type 1 was noted in MW-4 (screens 3 and 5), MW-12 (screen 5), MW-17 (screens 4 and 5), and MW-18 (screen 4).

4.2 QUALITY ASSURANCE/QUALITY CONTROL RESULTS

To evaluate the general quality of the water chemistry data, two independent geochemical quality control checks of the analytical results from the June-July 1997 samples were performed. These checks included calculation of total ion-charge balances, and comparison of measured TDS to calculated TDS. The results of these checks for the June-July 1997 water-chemistry results are presented in Table 4-2. Charge balances are expressed as the percent difference between the sum of the equivalent weights of all of the anions and all of the cations analyzed (Freeze and Cherry, 1979). The ideal range for charge balances is ± 5 percent, although charge balance errors up to ± 10 percent are acceptable.

The charge balances for samples analyzed for major anions and cations during the June-July 1997 sampling event are within the ideal range (± 5 percent) for 58 of the 60 sets of water chemistry results. The charge balance for the remaining sets of water chemistry analyses were slightly above 5 percent (Table 4-2). This indicates that the results are acceptable for their intended use.

TDS results can be used to verify that all of the important water-chemistry constituents have been analyzed. This is done by comparing the measured laboratory TDS value to a calculated TDS value (calculated as the sum of the concentrations of all the major anions and cations) for each sample. Under ideal conditions, the ratio should range from 1.0 to 1.2 (Oppenheimer and Eaton, 1986).

The ratio of measured to calculated TDS values for the June-July 1997 water-chemistry results fell within the ideal range (1.0 to 1.2) for 56 of the 60 sets of water chemistry analyses performed (Table 4-2). The ratio for the remaining four sets of water chemistry data fell outside this ideal range suggesting sample inhomogeneity errors in the measured TDS values. However, these data are suitable for identifying differences in water chemistry across the site.

5.0 WATER-LEVEL MEASUREMENTS

Water-level measurements were taken before sampling, on June 11 and 12, 1997, and after sampling on July 16, 1997. Water-level data in the shallow wells were collected using a Solinst® water-level indicator that utilized a water-sensor probe attached to a measuring tape. As the probe was lowered into a well, contact with the groundwater completed a circuit between two electrodes in the probe, thus activating a sounding device attached to a reel at the surface. Depth to groundwater was then read directly from the measuring tape at the top of the well casing.

In the deep MP wells, the potentiometric head at each sampling port in each screened interval was measured with a pressure-transducer probe manufactured by Westbay specifically for the unique casing used in these wells.

Water table elevation measurements taken before sampling are provided in Table 5-1 and have been contoured in Figure 5-1. Water table elevation measurements taken after sampling are given in Table 5-2 and are contoured in Figure 5-2.

As indicated by Figures 5-1 and 5-2, groundwater flow was primarily to the south and east both before and after sampling. The "trough" of depression observed in Figures 5-1 and 5-2 suggests active or recent pumping by the city of Pasadena municipal production wells both immediately before and at the end of this sampling event.

The potentiometric heads measured at each deep MP well screen before and after sampling are presented graphically in Figures 5-3 and 5-4, respectively. The potentiometric pressure profile records for the deep MP wells are included in Appendix B.

The effects of pumping by the city of Pasadena production wells is represented in Figure 5-3 and 5-4 and is shown by the difference in potentiometric head between the upper- and lower-most screened intervals.

6.0 REFERENCES

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TABLES

TABLE 1-1
SUMMARY OF WELL CONSTRUCTION DETAILS FOR JPL GROUNDWATER MONITORING WELLS

Well Number	Well Type	Year Installed	Drilling Method	Depth to Bottom of Casing (feet)	Depth of Screened Interval (feet)	Elevation Top 4 inch Casing (feet above mean sea level)	Elevation of Screened Interval (feet above mean sea level)	Multi-Port Well Screen Number	Sand Pack (feet)	Screen Slot Size (inch)	Casing Material
MW-1	Shallow Standpipe	1989	Mud Rotary	120	70-110	1116.7	1006.70-1046.70	-	99		4" PVC
MW-2	Shallow Standpipe	1989	Mud Rotary	177	127-167	1168.85	1001.85-1041.85	-			
MW-3	Deep Multi-Port	1990	Mud Rotary	700	170-180	1099.82	919.82-929.82	1	37	0.010	4" low-carbon steel
					250-260		839.82-849.82	2	47	0.010	4" low-carbon steel
					344-354		745.82-755.82	3	45	0.010	4" low-carbon steel
					555-565		534.82-544.82	4	39	0.010	4" low-carbon steel
					650-660		433.82-443.82	5	64	0.010	4" low-carbon steel
MW-4	Deep Multi-Port	1990	Mud Rotary	559	147-157	1082.72	925.72-935.72	1	48	0.010	4" low-carbon steel
					237-247		835.72-845.72	2	34	0.010	4" low-carbon steel
					318-328		754.72-764.72	3	42	0.010	4" low-carbon steel
					389-399		683.72-693.72	4	54	0.010	4" low-carbon steel
					509-519		563.72-573.72	5	52	0.010	4" low-carbon steel
MW-5	Shallow Standpipe	1990	Air Percussion	140	85-135	1071.6	936.60-986.60	-	71	0.010	4" low-carbon steel
MW-6	Shallow Standpipe	1990	Air Percussion	245	195-245	1188.52	943.52-993.52	-	62	0.010	4" low-carbon steel
MW-7	Shallow Standpipe	1990	Air Percussion	275	225-275	1212.88	937.88-987.88	-	63	0.010	4" low-carbon steel
MW-8	Shallow Standpipe	1992	Air Percussion	205	155-205	1139.53	934.53-984.53	-	75	0.010	4" low-carbon steel
MW-9	Shallow Standpipe	1992	Air Percussion	68	18-68	1106.02	1038.02-1088.02	-	56	0.010	4" PVC
MW-10	Shallow Standpipe	1992	Air Percussion	155	105-155	1087.71	932.71-982.71	-	67.5	0.010	4" PVC (0-85') 4" stainless steel (85'-105')
MW-11	Deep Multi-Port	1992	Mud Rotary	680	140-150	1139.35	989.35-999.35	1	24	0.010	4" low-carbon steel
					250-260		879.35-889.35	2	22	0.010	4" low-carbon steel
					420-430		709.35-719.35	3	26	0.010	4" low-carbon steel
					515-525		614.35-624.35	4	26	0.010	4" low-carbon steel
					630-640		499.35-509.35	5	28	0.010	4" low-carbon steel

TABLE 1-1
SUMMARY OF WELL CONSTRUCTION DETAILS FOR JPL GROUNDWATER MONITORING WELLS

Well Number	Well Type	Year Installed	Drilling Method	Depth to Bottom of Casing (feet)	Depth of Screened Interval (feet)	Elevation Top 4 inch Casing (feet above mean sea level)	Elevation of Screened Interval (feet above mean sea level)	Multi-Port Well Screen Number	Sand Pack (feet)	Screen Slot Size (inch)	Casing Material
MW-12	Deep Multi-Port	1994	Mud Rotary	596	135-145	1102.14	957.14-967.14	1	22	0.010	4" low-carbon steel
					240-250		852.14-862.14	2	19	0.010	4" low-carbon steel
					315-325		777.14-787.14	3	21	0.010	4" low-carbon steel
					430-440		662.14-672.14	4	22	0.010	4" low-carbon steel
					546-556		546.14-556.14	5	21	0.010	4" low-carbon steel
MW-13	Shallow Standpipe	1994	Air Rotary	235	180-230	1183.47	953.47-1003.47	-	65	0.010	4" PVC
MW-14	Deep Multi-Port	1994	Mud Rotary	588	205-215	1173.42	958.42-968.42	1	22	0.010	4" low-carbon steel
					275-285		888.42-898.42	2	26	0.010	4" low-carbon steel
					380-390		783.42-793.42	3	22	0.010	4" low-carbon steel
					453-463		710.42-720.42	4	27	0.010	4" low-carbon steel
					538-548		625.42-635.42	5	21	0.010	4" low-carbon steel
MW-15	Shallow Standpipe	1994	Air Percussion	74	19-69	1120.66	1051.66-1101.66	-	60	0.010	4" stainless steel
MW-16	Shallow Standpipe	1994	Air Percussion	285	230-280	1236.27	956.27-1006.27	-	62	0.010	4.5" PVC
MW-17	Deep Multi-Port	1995	Mud Rotary	774	246-256	1190.99	934.99-944.99	1	24	0.010	4" low-carbon steel
					366-376		814.99-824.99	2	24	0.010	4" low-carbon steel
					466-476		714.99-724.99	3	27	0.010	4" low-carbon steel
					578-588		602.99-612.99	4	25	0.010	4" low-carbon steel
					723-733		457.99-467.99	5	22	0.010	4" low-carbon steel
MW-18	Deep Multi-Port	1995	Mud Rotary	732	266-276	1225.34	949.34-959.34	1	22	0.010	4" low-carbon steel
					326-336		889.34-899.34	2	24	0.010	4" low-carbon steel
					421-431		794.34-804.34	3	20	0.010	4" low-carbon steel
					561-571		654.34-664.34	4	22	0.010	4" low-carbon steel
					681-691		534.34-544.34	5	23	0.010	4" low-carbon steel
MW-19	Deep Multi-Port	1995	Mud Rotary	543	240-250	1143.2	893.20-903.20	1	20	0.010	4" low-carbon steel
					310-320		823.20-833.20	2	20	0.010	4" low-carbon steel
					390-400		743.20-753.20	3	17	0.010	4" low-carbon steel
					442-452		691.20-701.20	4	20	0.010	4" low-carbon steel
					492-502		641.20-651.20	5	22	0.010	4" low-carbon steel

TABLE 1-1
SUMMARY OF WELL CONSTRUCTION DETAILS FOR JPL GROUNDWATER MONITORING WELLS

Well Number	Well Type	Year Installed	Drilling Method	Depth to Bottom of Casing (feet)	Depth of Screened Interval (feet)	Elevation Top 4 inch Casing (feet above mean sea level)	Elevation of Screened Interval (feet above mean sea level)	Multi-Port Well Screen Number	Sand Pack (feet)	Screen Slot Size (inch)	Casing Material
MW-20	Deep Multi-Port	1995	Mud Rotary	948	228-238	1164.89	926.89-936.89	1	24	0.010	4" low-carbon steel
					388-398		766.89-776.89	2	23	0.010	4" low-carbon steel
					558-568		596.89-606.89	3	19	0.010	4" low-carbon steel
					698-708		456.89-466.89	4	23	0.010	4" low-carbon steel
					898-908		256.89-266.89	5	27	0.010	4" low-carbon steel
MW-21	Deep Multi-Port	1995	Mud Rotary	416	86-96	1058.99	962.99-972.99	1	26	0.010	4" low-carbon steel
					156-166		892.99-902.99	2	25	0.010	4" low-carbon steel
					236-246		812.99-822.99	3	21	0.010	4" low-carbon steel
					306-316		742.99-752.99	4	22	0.010	4" low-carbon steel
					366-376		682.99-692.99	5	22	0.010	4" low-carbon steel

TABLE 3-1

SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS JUNE-JULY 1997

Sample Location	Sample Number	Sampling Date	Sample Type	VOCs EPA 524.2	Total Cr, As, Pb, Major Cations (various)	Hexavalent Cr EPA 7196	Major Anions and TDS EPA 300.0/310.1	Perchlorate EPA 300.0 Modified	Tributyltin GC/FPD
MW-1	MW-972-64	6/18/97	GW	X	X	X	X	X	
MW-3									
Screen 1	MW-972-63	7/15/97	GW	X	X	X	X	X	
Screen 2	MW-972-62	7/15/97	GW	X	X	X	X	X	
Screen 3	MW-972-61	7/15/97	GW	X	X	X	X	X	
Screen 4	MW-972-60	7/14/97	GW	X	X	X	X	X	
Screen 5	MW-972-59	7/14/97	GW	X	X	X	X	X	
MW-4									
Screen 1	MW-972-58	7/10/97	GW	X	X	X	X	X	X
Screen 2	MW-972-56	7/10/97	GW	X	X	X	X	X	X
Screen 2	MW-972-57	7/10/97	DUP	X	X (no cations)	X			
Screen 3	MW-972-55	7/10/97	GW	X	X	X	X	X	
Screen 4	MW-972-54	7/10/97	GW	X	X	X	X	X	
Screen 5	MW-972-53	7/10/97	GW	X	X	X	X	X	
MW-5	MW-972-52	6/16/97	GW	X	X	X	X	X	
MW-6	MW-972-51	6/16/97	GW	X	X	X	X	X	
MW-7	MW-972-50	6/18/97	GW	X	X	X	X	X	
MW-8	MW-972-49	6/17/97	GW	X	X	X	X	X	
MW-9	MW-972-48	6/18/97	GW	X	X	X	X	X	
MW-10	MW-972-46	6/17/97	GW	X	X	X	X	X	
MW-10	MW-972-47	6/17/97	DUP	X	X (no cations)	X		X	
MW-11									
Screen 1	MW-972-45	7/11/97	GW	X	X	X	X	X	
Screen 2	MW-972-44	7/11/97	GW	X	X	X	X	X	
Screen 3	MW-972-43	7/11/97	GW	X	X	X	X	X	
Screen 4	MW-972-42	7/11/97	GW	X	X	X	X	X	
Screen 5	MW-972-41	7/11/97	GW	X	X	X	X	X	

GW: Groundwater Sample
DUP: Duplicate Sample

TABLE 3-1

SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS JUNE-JULY 1997

Sample Location	Sample Number	Sampling Date	Sample Type	VOCs EPA 524.2	Total Cr, As, Pb, Major Cations (various)	Hexavalent Cr EPA 7196	Major Anions and TDS EPA 300.0/310.1	Perchlorate EPA 300.0 Modified	Tributyltin GC/FPD
MW-12									
Screen 1	MW-972-39	7/9/97	GW	X	X	X	X	X	X
Screen 1	MW-972-40	7/9/97	DUP	X	X (no cations)	X		X	X
Screen 2	MW-972-38	7/8/97	GW	X	X	X	X	X	X
Screen 3	MW-972-37	7/8/97	GW	X	X	X	X	X	
Screen 4	MW-972-36	7/8/97	GW	X	X	X	X	X	
Screen 5	MW-972-35	7/8/97	GW	X	X	X	X	X	
MW-13	MW-972-33	6/17/97	GW	X	X	X	X	X	X
MW-13	MW-972-34	6/17/97	DUP	X	X (no cations)	X		X	
MW-14									
Screen 1	MW-972-32	7/2/97	GW	X	X	X	X	X	
Screen 2	MW-972-31	7/3/97	GW	X	X	X	X	X	
Screen 3	MW-972-30	7/7/97	GW	X	X	X	X	X	
Screen 4	MW-972-29	7/7/97	GW	X	X	X	X	X	
Screen 5	MW-972-28	7/7/97	GW	X	X	X	X	X	
MW-15	MW-972-27	6/18/97	GW	X	X	X	X	X	
MW-16	MW-972-26	6/17/97	GW	X	X	X	X	X	
MW-17									
Screen 1	MW-972-25	6/17/97	GW	X	X	X	X	X	
Screen 2	MW-972-24	6/18/97	GW	X	X	X	X	X	
Screen 3	MW-972-23	6/20/97	GW	X	X	X	X	X	
Screen 4	MW-972-22	6/17/97	GW	X	X	X	X	X	
Screen 5	MW-972-21	6/19/97	GW	X	X	X	X	X	

GW: Groundwater Sample
DUP: Duplicate Sample

TABLE 3-1

SUMMARY OF ANALYSES PERFORMED ON GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS JUNE-JULY 1997

Sample Location	Sample Number	Sampling Date	Sample Type	VOCs EPA 524.2	Total Cr, As, Pb, Major Cations (various)	Hexavalent Cr EPA 7196	Major Anions and TDS EPA 300.0/310.1	Perchlorate EPA 300.0 Modified	Tributyltin GC/FPD
MW-18									
Screen 1	MW-972-20	6/17/97	GW	X	X	X	X	X	
Screen 2	MW-972-19	6/16/97	GW	X	X	X	X	X	
Screen 3	MW-972-18	6/16/97	GW	X	X	X	X	X	
Screen 4	MW-972-17	6/16/97	GW	X	X	X	X	X	
Screen 5	MW-972-16	6/16/97	GW	X	X	X	X	X	
MW-19									
Screen 1	MW-972-15	6/26/97	GW	X	X	X	X	X	
Screen 2	MW-972-14	6/26/97	GW	X	X	X	X	X	
Screen 3	MW-972-13	6/26/97	GW	X	X	X	X	X	
Screen 4	MW-972-12	6/27/97	GW	X	X	X	X	X	
Screen 5	MW-972-11	7/7/97	GW	X	X	X	X	X	
MW-20									
Screen 1	MW-972-10	6/23/97	GW	X	X	X	X	X	
Screen 2	MW-972-09	6/23/97	GW	X	X	X	X	X	
Screen 3	MW-972-08	6/23/97	GW	X	X	X	X	X	
Screen 4	MW-972-07	6/23/97	GW	X	X	X	X	X	
Screen 5	MW-972-06	6/20/97	GW	X	X	X	X	X	
MW-21									
Screen 1	MW-972-05	6/24/97	GW	X	X	X	X	X	
Screen 2	MW-972-04	6/24/97	GW	X	X	X	X	X	
Screen 3	MW-972-03	6/24/97	GW	X	X	X	X	X	
Screen 4	MW-972-02	6/24/97	GW	X	X	X	X	X	
Screen 5	MW-972-01	6/25/97	GW	X	X	X	X	X	

GW: Groundwater Sample
DUP: Duplicate Sample

TABLE 3-2

LOCATION OF WELL SCREENS IN AQUIFER LAYERS

Well Number	AQUIFER LAYERS			
	Layer 1	Layer 2	Layer 3	Layer 4
MW-1	X			
MW-3				
Screen 1	X			
Screen 2		X		
Screen 3		X		
Screen 4			X	
Screen 5			X	
MW-4				
Screen 1	X			
Screen 2		X		
Screen 3		X		
Screen 4			X	
Screen 5			X	
MW-5	X			
MW-6	X			
MW-7	X			
MW-8	X			
MW-9	X			
MW-10	X			
MW-11				
Screen 1	X			
Screen 2	X			
Screen 3		X		
Screen 4			X	
Screen 5			X	
MW-12				
Screen 1	X			
Screen 2	X			
Screen 3		X		
Screen 4			X	
Screen 5			X	
MW-13	X			
MW-14				
Screen 1	X			
Screen 2		X		
Screen 3		X		
Screen 4			X	
Screen 5			X	

TABLE 3-2

LOCATION OF WELL SCREENS IN AQUIFER LAYERS

Well Number	AQUIFER LAYERS			
	Layer 1	Layer 2	Layer 3	Layer 4
MW-15	X			
MW-16	X			
MW-17				
Screen 1	X			
Screen 2		X		
Screen 3		X		
Screen 4			X	
Screen 5			X	
MW-18				
Screen 1	X			
Screen 2	X			
Screen 3		X		
Screen 4			X	
Screen 5			X	
MW-19				
Screen 1	X			
Screen 2		X		
Screen 3		X		
Screen 4			X	
Screen 5			X	
MW-20				
Screen 1	X			
Screen 2		X		
Screen 3			X	
Screen 4			X	
Screen 5				X
MW-21				
Screen 1	X			
Screen 2		X		
Screen 3		X		
Screen 4			X	
Screen 5			X	

TABLE 3-3

SUMMARY OF VOLATILE ORGANIC COMPOUNDS AND PERCHLORATE DETECTED IN GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS, JUNE-JULY 1997

(concentrations in µg/l)
Values above state or federal MCLs or action levels are in bold and shaded

Sampling Location	Sample Number	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
MW-1	MW-972-64	--	--	--	--	--	--	--	--	--	--
MW-3											
Screen 1	MW-972-63	--	--	--	--	--	--	--	--	--	--
Screen 2	MW-972-62	--	--	--	--	--	--	1.0	1.2	--	--
Screen 3	MW-972-61	1.2	0.8	0.6	--	--	--	2.8	1.8	--	**21**
Screen 4	MW-972-60	--	--	--	--	--	--	--	--	--	--
Screen 5	MW-972-59	--	--	--	--	--	--	--	--	4.5 Carbon disulfide	--
MW-4											
Screen 1	MW-972-58	--	--	--	--	--	--	--	--	--	--
Screen 2	MW-972-56	**4.0**	**5.7**	--	--	--	0.5	--	3.4	--	**51**
Screen 2 (DUP)	MW-972-57	**6.2**	**8.6**	--	--	--	0.8	--	4.6	--	NA
Screen 3	MW-972-55	--	--	--	--	--	--	--	--	--	--
Screen 4	MW-972-54	--	--	--	--	--	--	--	--	--	--
Screen 5	MW-972-53	--	--	--	--	--	--	--	--	--	--
MW-5	MW-972-52	--	--	--	--	--	--	--	--	--	--
MW-6	MW-972-51	--	--	--	--	--	--	--	--	--	5.5
MW-7	MW-972-50	**39**	**23**	0.7	--	**0.8**	1.0	4.1	11	10 Unknown	**285**
MW-8	MW-972-49	--	--	--	--	--	--	--	--	--	6.4
MW-9	MW-972-48	--	--	--	--	--	--	--	--	--	--
MW-10	MW-972-46	--	2.2	--	--	--	--	--	--	--	11
MW-10 (DUP)	MW-972-47	--	2.3	--	--	--	--	--	--	--	13

E: Estimated concentration; result exceeded calibration range
--: Not detected
DUP: Duplicate
NA: Not analyzed
1: California Department of Health Services Interim Action Level
NE: Not established
a: Only VOCs for which MCLs have been established are listed

TABLE 3-3

SUMMARY OF VOLATILE ORGANIC COMPOUNDS AND PERCHLORATE DETECTED IN GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS, JUNE-JULY 1997

(concentrations in µg/l)
Values above state or federal MCLs or action levels are in bold and shaded

Sampling Location	Sample Number	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
MW-11											
Screen 1	MW-972-45	**1.4**	--	--	--	--	--	--	--	--	--
Screen 2	MW-972-44	**1.2**	--	--	--	--	--	--	1.0	--	--
Screen 3	MW-972-43	**0.7**	--	--	--	--	--	--	1.4	--	--
Screen 4	MW-972-42	--	--	--	--	--	--	--	--	--	--
Screen 5	MW-972-41	--	--	--	--	--	--	--	--	--	--
MW-12											
Screen 1	MW-972-39	--	--	--	--	--	--	--	0.5	--	--
Screen 1 (DUP)	MW-972-40	--	--	--	--	--	--	--	0.5	--	--
Screen 2	MW-972-38	**1.0**	--	--	--	--	--	--	0.8	--	6.9
Screen 3	MW-972-37	**20**	--	--	--	--	--	--	1.6	--	5.7
Screen 4	MW-972-36	**4.9**	--	--	--	--	--	--	1.3	--	7.3
Screen 5	MW-972-35	**1.9**	--	--	--	--	--	--	0.5	--	4.1
MW-13	MW-972-33	**6.4**	**24(E)**	--	--	**0.9**	0.5	--	11	--	**130**
MW-13 (DUP)	MW-972-34	**6.6**	**21**	--	--	**0.9**	--	--	11	--	**130**
MW-14											
Screen 1	MW-972-32	--	--	--	2.0	--	--	--	--	--	--
Screen 2	MW-972-31	--	1.1	1.7	1.5	--	--	--	0.9	0.5 1,2,3-Trichlorobenzene	--
Screen 3	MW-972-30	--	--	--	--	--	--	--	--	--	4.3
Screen 4	MW-972-29	--	--	--	--	--	--	--	--	--	--
Screen 5	MW-972-28	--	--	--	--	--	--	--	--	--	--

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TABLE 3-3

SUMMARY OF VOLATILE ORGANIC COMPOUNDS AND PERCHLORATE DETECTED IN GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS, JUNE-JULY 1997

(concentrations in µg/l)
Values above state or federal MCLs or action levels are in bold and shaded

Sampling Location	Sample Number	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
MW-15	MW-972-27	--	--	--	--	--	--	--	--	--	--
MW-16	M2-972-26	**68**	**25**	1.1	--	**2.1**	1.7	0.6	43	--	**615**
MW-17											
Screen 1	MW-972-25	--	--	--	--	--	--	--	--	--	--
Screen 2	MW-972-24	--	--	--	--	--	--	--	4.1	--	--
Screen 3	MW-972-23	**1.3**	**5.9**	--	--	--	--	--	7.3	0.9 Bromodichloromethane	12
Screen 4	MW-972-22	--	4.5	--	--	--	--	--	0.6	--	13
Screen 5	MW-972-21	--	**11**	0.7	--	--	--	--	1.3	--	12
MW-18											
Screen 1	MW-972-20	--	--	--	--	--	--	--	0.8	--	--
Screen 2	MW-972-19	--	--	--	--	--	--	--	4.5	--	--
Screen 3	MW-972-18	**0.6**	2.4	1.8	--	--	--	--	4.4	--	--
Screen 4	MW-972-17	**1.9**	--	0.7	--	--	--	--	--	--	11
Screen 5	MW-972-16	--	--	--	--	--	--	--	--	1.1 Carbon disulfide	--
MW-19											
Screen 1	MW-972-15	--	--	--	--	--	--	--	2.5	--	--
Screen 2	MW-972-14	--	--	0.6	--	--	--	--	--	--	--
Screen 3	MW-972-13	--	--	2.0	--	--	--	--	--	--	4.1
Screen 4	MW-972-12	--	0.7	--	--	--	--	--	1.3	--	--
Screen 5	MW-972-11	--	--	1.5	--	--	--	--	--	--	--

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--: Not detected
DUP: Duplicate
NA: Not analyzed
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NE: Not established
a: Only VOCs for which MCLs have been established are listed

TABLE 3-3

SUMMARY OF VOLATILE ORGANIC COMPOUNDS AND PERCHLORATE DETECTED IN GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS, JUNE-JULY 1997

(concentrations in µg/l)
Values above state or federal MCLs or action levels are in bold and shaded

Sampling Location	Sample Number	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
MW-20											
Screen 1	MW-972-10	--	--	--	--	--	--	--	0.8	--	5.7
Screen 2	MW-972-09	--	--	--	--	--	--	--	3.3	--	--
Screen 3	MW-972-08	--	--	--	--	--	--	--	--	--	--
Screen 4	MW-972-07	--	--	--	--	--	--	--	--	--	--
Screen 5	MW-972-06	--	--	--	--	--	--	--	--	--	--
MW-21											
Screen 1	MW-972-05	--	**20**	--	--	--	--	--	1.6	--	**19**
Screen 2	MW-972-04	--	--	0.7	--	--	--	--	--	--	--
Screen 3	MW-972-03	--	--	1.2	--	--	--	--	--	--	--
Screen 4	MW-972-02	--	--	2.8	--	--	--	--	--	--	4.6
Screen 5	MW-972-01	--	--	3.0	--	--	--	--	--	--	--
Practical Quantitation Limit		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4.0
California Maximum Contaminated level		0.5	5.0	5.0	5.0	0.5	6.0	1,200	100	(a)	18[1]
EPA Region IX Maximum Contaminant level		5.0	5.0	5.0	NE	5.0	7.0	NE	100	100 Bromodichloromethane[a]	NE

E: Estimated concentration; result exceeded calibration range
--: Not detected
DUP: Duplicate
NA: Not analyzed

1: California Department of Health Services Interim Action Level
NE: Not established
a: Only VOCs for which MCLs have been established are listed

TABLE 3-4

SUMMARY OF VOLATILE ORGANIC COMPOUNDS AND PERCHLORATE DETECTED DURING THE LONG-TERM QUARTERLY GROUNDWATER SAMPLING PROGRAM JET PROPULSION LABORATORY

(concentrations in µg/l)

Values above state and federal MCLs or action levels are in bold and shaded

Sampling Location	Sampling Event	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
MW-1	Aug/Sep 1996	--	--	--	--	--	--	--	--	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	1.9 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	1.9 Acetone	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
MW-3											
Screen 1	Aug/Sep 1996	--	--	--	--	--	--	--	1.2	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	8.3	0.7(B) Naphthalene	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	2.6 Carbon disulfide	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
Screen 2	Aug/Sep 1996	--	--	--	--	--	--	--	5.5	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	4.8	1.9(B) Naphthalene	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	4.4	8.0 Carbon disulfide	NA
	Jun/Jul 1997	--	--	--	--	--	--	1.0	1.2	--	--
Screen 3	Aug/Sep 1996	0.6	0.8	--	--	--	--	--	1.6	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	0.7	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	0.8	--	NA
	Jun/Jul 1997	1.2	0.8	0.6	--	--	--	2.8	1.8	--	21
Screen 4	Aug/Sep 1996	--	--	--	--	--	--	--	--	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	1.2 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	1.0 Hexane	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
Screen 5	Aug/Sep 1996	--	--	--	--	--	--	--	--	2.1 Methylene chloride	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	2.1 Acetone 1.2 Carbon disulfide	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	1.5 Carbon disulfide 2.7 Sulfur dioxide 1.3 Unknown (RT=2.51)	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	4.5 Carbon disulfide	--

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(concentrations in µg/l)

Values above state and federal MCLs or action levels are in bold and shaded

Sampling Location	Sampling Event	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
MW-4											
Screen 1	Aug/Sep 1996	--	--	--	--	--	--	--	--	2.9(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
Screen 2	Aug/Sep 1996	**5.5**	**19**	--	--	**0.9**	0.7	--	6.7	3.2(B) Acetone	NA
	Oct/Nov 1996	**5.3**	**15**	--	--	**0.6**	0.8	--	5.4	1.8 Acetone	NA
	Feb/Mar 1997	**7.9**	**19**	--	--	**0.8**	0.8	--	7.8	--	NA
	Jun/Jul 1997	**4.0**	**5.7**	--	--	--	0.5	--	3.4	--	**51**
Screen 3	Aug/Sep 1996	--	--	--	--	--	--	--	--	3.0(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	1.5 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
Screen 4	Aug/Sep 1996	--	--	--	--	--	--	--	--	3.9(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	1.6 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
Screen 5	Oct/Nov 1996	--	--	--	--	--	--	--	--	1.9 Acetone	NA
	Aug/Sep 1996	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
MW-5	Aug/Sep 1996	--	--	--	--	--	--	--	--	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
MW-6	Aug/Sep 1996	--	--	--	--	--	--	--	1.3(TB)	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	0.8	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	5.5

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(concentrations in µg/l)

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Sampling Location	Sampling Event	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
MW-7	Aug/Sep 1996	**90**	**39**	0.8	--	**1.2**	1.1	7.2	13(TB)	--	NA
	Oct/Nov 1996	**170**	**27**	1.3	--	**0.8**	2.3	7.7	14	4.3(B) 1,1-Difluoroethane 2.8(B) Acetone	NA
	Feb/Mar 1997	**45**	**27**	0.6	--	**0.8**	0.9	5.1	9.9	--	NA
	Jun/Jul 1997	**39**	**23**	0.7	--	**0.8**	1.0	4.1	11	10 Unknown	**285**
MW-8	Aug/Sep 1996	**4.0**	4.6	--	--	--	--	--	1.3	--	NA
	Oct/Nov 1996	**2.8**	2.2	--	--	--	--	0.6	0.6	1.7 Acetone	NA
	Feb/Mar 1997	**1.5**	4.5	--	--	--	--	--	1.3	1.1 Freon 11 1.9 Carbon disulfide	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	6.4
MW-9	Aug/Sep 1996	--	--	--	--	--	--	--	--	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
MW-10	Aug/Sep 1996	**0.7**	**18**	0.5	--	--	--	1.2	1.4(TB)	--	NA
	Oct/Nov 1996	**0.6**	**6.6**	1.0	1.9	--	--	0.8	1.1	3.0(B) Acetone 1.1 Unknown scan #350	NA
	Feb/Mar 1997	--	**5.2**	--	--	--	--	--	0.6	--	NA
	Jun/Jul 1997	--	2.2	--	--	--	--	--	--	--	11
MW-11											
Screen 1	Aug/Sep 1996	--	--	--	--	--	--	--	--	2.6(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	7.1 MTBE 1.8 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	**1.4**	--	--	--	--	--	--	--	--	--
Screen 2	Aug/Sep 1996	**2.4**	--	--	--	--	--	--	1.0	--	NA
	Oct/Nov 1996	**1.1**	--	--	--	--	--	--	1.2	--	NA
	Feb/Mar 1997	**1.7**	--	--	--	--	--	--	1.0	--	NA
	Jun/Jul 1997	**1.2**	--	--	--	--	--	--	1.0	--	--

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(concentrations in µg/l)
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Sampling Location	Sampling Event	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
Screen 3	Aug/Sep 1996	**0.9**	--	--	--	--	--	--	1.3	2.9(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	1.4	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	1.1	--	NA
	Jun/Jul 1997	**0.7**	--	--	--	--	--	--	1.4	--	--
Screen 4	Aug/Sep 1996	--	--	--	--	--	--	--	0.5	2.4(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	1.5 2-Methyl-1-Propene	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
Screen 5	Aug/Sep 1996	--	--	--	--	--	--	--	--	2.4(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	1.1 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
MW-12											
Screen 1	Aug/Sep 1996	--	--	--	--	--	--	--	4.1	--	NA
	Not Sampled*	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	5.8	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	0.5	--	--
Screen 2	Aug/Sep 1996	**0.9**	--	--	--	--	--	--	--	--	NA
	Oct/Nov 1996	**1.5**	0.6	--	--	--	--	0.5	--	--	NA
	Feb/Mar 1997	**1.1**	0.5	--	--	--	--	--	--	1.1(B) Acetone	NA
	Jun/Jul 1997	**1.0**	--	--	--	--	--	--	0.8	--	6.9
Screen 3	Aug/Sep 1996	**4.5**	--	--	--	--	--	--	1.3	--	NA
	Oct/Nov 1996	**3.8**	--	--	--	--	--	--	1.3	1.6 Acetone	NA
	Feb/Mar 1997	**6.4**	--	--	--	--	--	--	1.4	1.3(B) Acetone	NA
	Jun/Jul 1997	**20**	--	--	--	--	--	--	1.6	--	5.7
Screen 4	Aug/Sep 1996	**6.3**	--	--	--	--	--	--	1.4	--	NA
	Oct/Nov 1996	**5.1**	--	--	--	--	--	--	1.4	2.5 Acetone	NA
	Feb/Mar 1997	**4.9**	--	--	--	--	--	--	1.3	--	NA
	Jun/Jul 1997	**4.9**	--	--	--	--	--	--	1.3	--	7.3

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(concentrations in µg/l)

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Sampling Location	Sampling Event	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
Screen 5	Aug/Sep 1996	**3.4**	--	--	--	--	--	--	0.7	--	NA
	Oct/Nov 1996	**1.3**	--	--	--	--	--	--	--	1.5 Acetone	NA
	Feb/Mar 1997	**1.7**	--	--	--	--	--	--	0.5	--	NA
	Jun/Jul 1997	**1.9**	--	--	--	--	--	--	0.5	--	4.1
MW-13	Aug/Sep 1996	**21**	**47**	0.6	--	**2.5**	1.5	0.7	21(TB)	--	NA
	Oct/Nov 1996	**27**	**27**	--	--	**1.9**	1.5	0.6	14	--	NA
	Feb/Mar 1997	**18**	**28**	--	--	**0.9**	1.1	0.6	9.2	--	NA
	Jun/Jul 1997	**6.4**	**24 E**	--	--	**0.9**	0.5	--	11	--	**130**
MW-14											
Screen 1	Aug/Sep 1996	--	--	--	2.4	--	--	--	0.6	--	NA
	Oct/Nov 1996	--	--	--	2.9	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	0.7	1.5	--	--	--	0.7	--	NA
	Jun/Jul 1997	--	--	--	2.0	--	--	--	--	--	--
Screen 2	Aug/Sep 1996	--	2.8	1.6	1.4	--	--	--	1.5	--	NA
	Oct/Nov 1996	--	1.5	1.6	1.0	--	--	--	0.9	0.6 1,2,3-Trichlorobenzene 1.1 Acetone	NA
	Feb/Mar 1997	--	0.9	1.9	1.3	--	--	--	0.8	0.8 1,2,3-Trichlorobenzene 1.1 Acetone	NA
	Jun/Jul 1997	--	1.1	1.7	1.5	--	--	--	0.9	0.5 1,2,3-Trichlorobenzene	--
Screen 3	Aug/Sep 1996	--	--	--	--	--	--	--	--	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	4.3
Screen 4	Aug/Sep 1996	--	--	--	--	--	--	--	--	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--

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(concentrations in µg/l)
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Sampling Location	Sampling Event	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
Screen 5	Aug/Sep 1996	--	--	--	--	--	--	--	--	2.1(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	1.6(TB) Acetone	NA
										1.3 Carbon disulfide	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
MW-15	Aug/Sep 1996	--	--	--	--	--	--	--	--	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	2.6 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
MW-16	Aug/Sep 1996	**125**	**33**	1.3	--	**2.4**	2.2	2.0	40(TB)	--	NA
	Not Sampled*	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	**91**	**23**	1.3	--	**1.7**	2.6	1.6	29	--	NA
	Jun/Jul 1997	**68**	**25**	1.1	--	**2.1**	1.7	0.6	43	--	**615**
MW-17											
Screen 1	Aug/Sep 1996	--	--	--	--	--	--	--	--	4.3(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	1.4 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
Screen 2	Aug/Sep 1996	--	--	--	--	--	--	--	3.8	4.5(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	6.0	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	5.2	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	4.1	--	--
Screen 3	Aug/Sep 1996	**2.0**	**7.9**	--	--	--	--	--	7.5	--	NA
	Oct/Nov 1996	**3.3**	**18**	0.8	--	--	--	--	8.7	--	NA
	Feb/Mar 1997	**5.1**	**23**	1.1	--	--	--	--	6.2	--	NA
	Jun/Jul 1997	**1.3**	**5.9**	--	--	--	--	--	7.3	0.9 Bromodichloromethane	12
Screen 4	Aug/Sep 1996	--	**9.5**	0.5	--	--	--	--	1.1	--	NA
	Oct/Nov 1996	--	**8.9**	--	--	--	--	--	1.5	--	NA
	Feb/Mar 1997	--	**5.8**	--	--	--	--	--	0.7	--	NA
	Jun/Jul 1997	--	4.5	--	--	--	--	--	0.6	--	13

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Sampling Location	Sampling Event	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
Screen 5	Aug/Sep 1996	--	**13**	0.6	--	--	--	--	1.7	3.4(B) Acetone	NA
	Oct/Nov 1996	--	**16**	0.7	--	--	--	--	1.7	--	NA
	Feb/Mar 1997	--	**14**	0.7	--	--	--	--	1.3	--	NA
	Jun/Jul 1997	--	**11**	0.7	--	--	--	--	1.3	--	12
MW-18											
Screen 1	Aug/Sep 1996	--	--	--	--	--	--	--	1.6	--	NA
	Not Sampled*	--	--	--	--	--	--	--	--		NA
	Feb/Mar 1997	--	--	--	--	--	--	--	3.0	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	0.8	--	--
Screen 2	Aug/Sep 1996	--	--	--	--	--	--	--	7.3	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	8.2		NA
	Feb/Mar 1997	--	--	--	--	--	--	--	1.9	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	4.5	--	--
Screen 3	Aug/Sep 1996	**0.7**	4.7	2.8	--	--	--	--	5.1	--	NA
	Oct/Nov 1996	**0.7**	**6.4**	3.2	--	--	--	--	5.6	--	NA
	Feb/Mar 1997	**0.8**	**6.6**	2.9	--	--	--	--	5.1	--	NA
	Jun/Jul 1997	**0.6**	2.4	1.8	--	--	--	--	4.4	--	--
Screen 4	Aug/Sep 1996	**2.2**	--	0.7	--	--	--	--	0.5	--	NA
	Oct/Nov 1996	**2.2**	--	0.7	--	--	--	--	0.5	1.4(TB) Acetone	NA
	Feb/Mar 1997	**2.2**	--	1.5	--	--	--	--	0.6	--	NA
	Jun/Jul 1997	**1.9**	--	0.7	--	--	--	--	--	--	11
Screen 5	Aug/Sep 1996	--	--	--	--	--	--	--	--	--	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	1.6 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	1.1 Carbon disulfide	--

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MW-19											
Screen 1	Aug/Sep 1996	--	--	--	--	--	--	--	0.9	3.7(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	0.6	2.9 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	0.8	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	2.5	--	--
Screen 2	Aug/Sep 1996	--	--	0.8	--	--	--	--	--	3.0(B) Acetone	NA
	Oct/Nov 1996	--	--	1.1	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	0.6	--	--	--	--	--	--	--
Screen 3	Aug/Sep 1996	--	--	3.1	--	--	--	--	--	2.6(B) Acetone	NA
	Oct/Nov 1996	--	--	2.5	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	2.1	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	2.0	--	--	--	--	--	--	4.1
Screen 4	Aug/Sep 1996	0.5	1.5	--	--	--	--	--	2.1	--	NA
	Oct/Nov 1996	--	1.5	--	--	--	--	--	1.9	--	NA
	Feb/Mar 1997	--	1.1	0.6	--	--	--	--	1.5	--	NA
	Jun/Jul 1997	--	0.7	--	--	--	--	--	1.3	--	--
Screen 5	Aug/Sep 1996	--	--	3.0	--	--	--	--	0.6	1.6(B) Unknown scan #940	NA
	Oct/Nov 1996	--	--	2.4	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	1.7	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	1.5	--	--	--	--	--	--	--

B: Compound detected in the laboratory method blank
--: Not detected
TB: Compound detected in associated trip blank
NA: Not analyzed
E: Estimated concentration; result exceeded calibration range
*: Not sampled, no water over screen
1: California Department of Health Services Interim Action Level
a: Only VOCs for which MCLs have been established are listed
NE: Not established

TABLE 3-4

SUMMARY OF VOLATILE ORGANIC COMPOUNDS AND PERCHLORATE DETECTED DURING THE LONG-TERM QUARTERLY GROUNDWATER SAMPLING PROGRAM JET PROPULSION LABORATORY

(concentrations in µg/l)
Values above state and federal MCLs or action levels are in bold and shaded

Sampling Location	Sampling Event	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
MW-20											
Screen 1	Aug/Sep 1996	--	--	--	--	--	--	--	0.7	3.4(B) Acetone	NA
	Not Sampled*	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	1.4	2.4(EB) Acetone	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	0.8	--	5.7
Screen 2	Aug/Sep 1996	--	--	--	--	--	--	--	7.7	4.0(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	4.4	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	3.2	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	3.3	--	--
Screen 3	Aug/Sep 1996	--	--	--	--	--	--	--	--	2.7(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	0.6	2.3 Acetone	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
Screen 4	Aug/Sep 1996	--	--	--	--	--	--	--	--	3.8(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--
Screen 5	Aug/Sep 1996	--	--	--	--	--	--	--	--	4.8(B) Acetone	NA
	Oct/Nov 1996	--	--	--	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	--	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	--	--	--	--	--	--	--	--

B: Compound detected in the laboratory method blank
--: Not detected
TB: Compound detected in associated trip blank
NA: Not analyzed
E: Estimated concentration; result exceeded calibration range
*: Not sampled, no water over screen
1: California Department of Health Services Interim Action Level
a: Only VOCs for which MCLs have been established are listed
NE: Not established

TABLE 3-4

SUMMARY OF VOLATILE ORGANIC COMPOUNDS AND PERCHLORATE DETECTED DURING THE LONG-TERM QUARTERLY GROUNDWATER SAMPLING PROGRAM JET PROPULSION LABORATORY

(concentrations in µg/l)
Values above state and federal MCLs or action levels are in bold and shaded

Sampling Location	Sampling Event	Carbon Tetrachloride	TCE	PCE	1,1-DCA	1,2-DCA	1,1-DCE	Freon 113	Total Trihalomethanes (Primarily Chloroform)	Other Volatile Organic Compounds	Perchlorate
MW-21											
Screen 1	Aug/Sep 1996	--	**33**	0.7	--	--	--	--	1.8	2.3(B) Acetone	NA
	Not Sampled*										
	Feb/Mar 1997	--	**29**	--	--	--	--	--	2.2	--	NA
	Jun/Jul 1997	--	**20**	--	--	--	--	--	1.6	--	**19**
Screen 2	Aug/Sep 1996	--	--	0.9	--	--	--	--	0.5	--	NA
	Oct/Nov 1996	--	0.6	2.3	--	--	--	--	0.6	1.4(TB) Acetone	NA
	Feb/Mar 1997	--	--	1.1	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	0.7	--	--	--	--	--	--	--
Screen 3	Aug/Sep 1996	--	0.7	1.5	--	--	--	--	0.5	--	NA
	Oct/Nov 1996	--	0.9	1.6	--	--	--	--	--	1.2 Acetone	NA
	Feb/Mar 1997	--	0.8	1.6	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	1.2	--	--	--	--	--	--	--
Screen 4	Aug/Sep 1996	--	0.8	4.2	--	--	--	--	--	--	NA
	Oct/Nov 1996	--	--	2.5	--	--	--	--	--	1.6 Acetone	NA
	Feb/Mar 1997	--	--	1.8	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	2.8	--	--	--	--	--	--	4.6
Screen 5	Aug/Sep 1996	--	--	4.5	--	--	--	--	0.6	--	NA
	Oct/Nov 1996	--	--	3.1	--	--	--	--	--	--	NA
	Feb/Mar 1997	--	--	3.0	--	--	--	--	--	--	NA
	Jun/Jul 1997	--	--	3.0	--	--	--	--	--	--	--
Practical Quantitation Limit		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4.0
California Maximum Contaminant Level		0.5	5.0	5.0	5.0	0.5	6.0	1,200	100	150 Freon 11[a]	18[1]
EPA Region IX Maximum Contaminant Level		5.0	5.0	5.0	NE	5.0	7.0	NE	100	5.0 Methylene chloride[a] 100 Bromodichloromethane	NE

B: Compound detected in the laboratory method blank
--: Not detected
TB: Compound detected in associated trip blank
NA: Not analyzed
E: Estimated concentration; result exceeded calibration range

*: Not sampled, no water over screen
1: California Department of Health Services Interim Action Level
a: Only VOCs for which MCLs have been established are listed
NE: Not established

TABLE 3-5

SUMMARY OF METALS DETECTED IN GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS JUNE-JULY 1997

(concentrations in mg/l)

Sample Location	Sample Number	Arsenic	Lead	Total Chromium	Hexavalent Chromium	Field Turbidity (NTUs)
MW-1	MW-972-64	--	--	--	--	1.92
MW-3						
Screen 1	MW-972-63	--	--	--	--	2.61
Screen 2	MW-972-62	--	--	--	--	1.13
Screen 3	MW-972-61	--	--	--	--	3.41
Screen 4	MW-972-60	--	--	--	--	2.71
Screen 5	MW-972-59	0.007	--	--	--	0.83
MW-4						
Screen 1	MW-972-58	--	--	--	--	2.79
Screen 2	MW-972-56	--	--	0.013	--	2.69
Screen 2 (DUP)	MW-972-57	--	--	0.011	--	2.69
Screen 3	MW-972-55	--	--	--	--	1.98
Screen 4	MW-972-54	--	--	--	--	4.62
Screen 5	MW-972-53	--	--	--	--	3.98
MW-5	MW-972-52	--	--	--	--	4.50
MW-6	MW-972-51	--	--	0.019	--	2.50
MW-7	MW-972-50	--	--	--	--	0.98
MW-8	MW-972-49	--	0.002	--	--	4.61
MW-9	MW-972-48	--	--	--	--	3.22
MW-10	MW-972-46	--	--	0.014	--	2.92
MW-10 DUP	MW-972-47	--	--	0.013	--	2.92
MW-11						
Screen 1	MW-972-45	--	--	--	--	1.53
Screen 2	MW-972-44	--	--	--	--	4.67
Screen 3	MW-972-43	--	--	--	--	1.85
Screen 4	MW-972-42	--	--	--	--	4.80
Screen 5	MW-972-41	--	--	--	--	0.69
MW-12						
Screen 1	MW-972-39	--	--	--	--	4.80
Screen 1 (DUP)	MW-972-40	--	--	--	--	4.80
Screen 2	MW-972-38	--	--	--	--	3.16
Screen 3	MW-972-37	--	--	--	--	4.79
Screen 4	MW-972-36	--	--	--	--	2.49
Screen 5	MW-972-35	--	--	--	--	4.97

(DUP): Duplicate
--: Not detected
a: Treatment technique and public notification triggered at 0.015 mg/l
NE: Not established

TABLE 3-5

SUMMARY OF METALS DETECTED IN GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS JUNE-JULY 1997

(concentrations in mg/l)

Sample Location	Sample Number	Arsenic	Lead	Total Chromium	Hexavalent Chromium	Field Turbidity (NTUs)
MW-13	MW-972-33	--	--	0.038	0.037	1.21
MW-13 DUP	MW-972-34	--	--	0.036	0.037	1.21
MW-14						
Screen 1	MW-972-32	--	--	--	--	2.21
Screen 2	MW-972-31	--	--	--	--	4.97
Screen 3	MW-972-30	--	--	--	--	0.70
Screen 4	MW-972-29	--	--	--	--	2.31
Screen 5	MW-972-28	--	--	--	--	1.90
MW-15	MW-972-27	--	--	--	--	0.21
MW-16	MW-972-26	--	--	--	--	0.12
MW-17						
Screen 1	MW-972-25	--	--	--	--	2.23
Screen 2	MW-972-24	--	--	--	--	4.49
Screen 3	MW-972-23	--	--	--	--	4.83
Screen 4	MW-972-22	--	--	--	--	4.09
Screen 5	MW-972-21	--	--	--	--	34.0
MW-18						
Screen 1	MW-972-20	--	--	--	--	0.42
Screen 2	MW-972-19	--	--	--	--	1.53
Screen 3	MW-972-18	--	--	--	--	3.88
Screen 4	MW-972-17	0.005	--	--	--	3.58
Screen 5	MW-972-16	--	--	--	--	3.97
MW-19						
Screen 1	MW-972-15	--	--	--	--	0.78
Screen 2	MW-972-14	--	--	--	--	2.80
Screen 3	MW-972-13	--	--	--	--	4.88
Screen 4	MW-972-12	--	--	--	--	4.88
Screen 5	MW-972-11	--	--	--	--	2.15
MW-20						
Screen 1	MW-972-10	--	--	--	--	0.16
Screen 2	MW-972-09	--	--	--	--	2.54
Screen 3	MW-972-08	--	--	--	--	2.14
Screen 4	MW-972-07	--	--	--	--	1.29
Screen 5	MW-972-06	0.006	--	--	--	1.94

(DUP): Duplicate
--: Not detected
a: Treatment technique and public notification triggered at 0.015 mg/l
NE: Not established

TABLE 3-5

SUMMARY OF METALS DETECTED IN GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS JUNE-JULY 1997

(concentrations in mg/l)

Sample Location	Sample Number	Arsenic	Lead	Total Chromium	Hexavalent Chromium	Field Turbidity (NTUs)
MW-21						
Screen 1	MW-972-05	--	--	--	--	2.76
Screen 2	MW-972-04	--	--	--	--	1.68
Screen 3	MW-972-03	--	--	--	--	1.40
Screen 4	MW-972-02	--	--	--	--	2.46
Screen 5	MW-972-01	--	--	--	--	26.4
Practical Quantitation Limit		0.005	0.002	0.01	0.005	
California Maximum Contaminant Level		0.05	0.05	0.05	NE	
EPA Maximum Contaminant Level		0.05	(a)	0.1	NE	

(DUP): Duplicate
--: Not detected
a: Treatment technique and public notification triggered at 0.015 mg/l
NE: Not established

TABLE 3-6

SUMMARY OF METALS DETECTED DURING LONG-TERM QUARTERLY SAMPLING PROGRAM JET PROPULSION LABORATORY

(concentrations in mg/l)

Sample Location	Sampling Date	Arsenic	Lead	Total Chromium	Hexavalent Chromium	Field Turbidity (NTUs)
MW-1	Aug/Sep 1996	--	--	--	--	0.8
	Oct/Nov 1996	--	--	--	--	0.5
	Feb/Mar 1997	--	--	--	--	2.5
	Jun/Jul 1997	--	--	--	--	1.92
MW-3						
Screen 1	Aug/Sep 1996	--	--	--	--	7.2
	Oct/Nov 1996	--	--	--	--	3.1
	Feb/Mar 1997	--	--	--	--	6.1
	Jun/Jul 1997	--	--	--	--	2.61
Screen 2	Aug/Sep 1996	--	--	--	--	1.7
	Oct/Nov 1996	--	--	--	--	2.7
	Feb/Mar 1997	--	--	--	--	3.8
	Jun/Jul 1997	--	--	--	--	1.13
Screen 3	Aug/Sep 1996	--	--	--	--	5.2
	Oct/Nov 1996	--	--	--	--	2.7
	Feb/Mar 1997	--	--	--	--	1.7
	Jun/Jul 1997	--	--	--	--	3.41
Screen 4	Aug/Sep 1996	--	--	--	--	4.3
	Oct/Nov 1996	--	--	--	--	2.6
	Feb/Mar 1997	--	--	--	--	4.5
	Jun/Jul 1997	--	--	--	--	2.71
Screen 5	Aug/Sep 1996	0.011	--	--	--	1.5
	Oct/Nov 1996	0.007	--	--	--	1.9
	Feb/Mar 1997	--	--	--	--	2.5
	Jun/Jul 1997	0.007	--	--	--	0.83
MW-4						
Screen 1	Aug/Sep 1996	--	--	--	--	2.6
	Oct/Nov 1996	--	--	--	--	1.7
	Feb/Mar 1997	--	--	--	--	4.6
	Jun/Jul 1997	--	--	--	--	2.79
Screen 2	Aug/Sep 1996	--	--	0.023	--	3.8
	Oct/Nov 1996	--	--	0.014	--	4.2
	Feb/Mar 1997	--	--	0.011	--	4.5
	Jun/Jul 1997	--	--	0.013	--	2.69
Screen 3	Aug/Sep 1996	--	--	--	--	0.6
	Oct/Nov 1996	--	--	--	--	1.5
	Feb/Mar 1997	--	--	--	--	2.8
	Jun/Jul 1997	--	--	--	--	1.98

NA: Not analyzed
--: Not detected
a: Treatment technique and public notification triggered at 0.015 mg/l
NE: Not established

TABLE 3-6

SUMMARY OF METALS DETECTED DURING LONG-TERM QUARTERLY SAMPLING PROGRAM JET PROPULSION LABORATORY

(concentrations in mg/l)

Sample Location	Sampling Date	Arsenic	Lead	Total Chromium	Hexavalent Chromium	Field Turbidity (NTUs)
Screen 4	Aug/Sep 1996	--	--	--	--	3.0
	Oct/Nov 1996	--	--	--	--	1.4
	Feb/Mar 1997	--	--	--	--	2.5
	Jun/Jul 1997	--	--	--	--	4.62
Screen 5	Aug/Sep 1996	--	--	--	--	4.5
	Oct/Nov 1996	--	--	--	--	4.1
	Feb/Mar 1997	--	--	--	--	4.4
	Jun/Jul 1997	--	--	--	--	3.98
MW-5	Aug/Sep 1996	--	--	--	--	2.7
	Oct/Nov 1996	--	0.003	--	--	2.7
	Feb/Mar 1997	--	--	--	--	1.5
	Jun/Jul 1997	--	--	--	--	4.50
MW-6	Aug/Sep 1996	--	--	0.050	--	4.5
	Oct/Nov 1996	--	--	0.011	--	1.1
	Feb/Mar 1997	--	--	0.014	--	4.3
	Jun/Jul 1997	--	--	0.019	--	2.50
MW-7	Aug/Sep 1996	--	--	0.013	0.007	4.8
	Oct/Nov 1996	--	--	0.019	0.019	3.5
	Feb/Mar 1997	--	--	--	0.010	2.2
	Jun/Jul 1997	--	--	--	--	0.98
MW-8	Aug/Sep 1996	--	--	--	--	4.0
	Oct/Nov 1996	--	0.003	--	--	4.7
	Feb/Mar 1997	--	--	--	--	3.1
	Jun/Jul 1997	--	0.002	--	--	4.61
MW-9	Aug/Sep 1996	--	--	--	--	2.1
	Oct/Nov 1996	--	--	--	--	2.5
	Feb/Mar 1997	--	--	--	--	4.2
	Jun/Jul 1997	--	--	--	--	3.22
MW-10	Aug/Sep 1996	--	--	0.011	0.010	4.5
	Oct/Nov 1996	--	0.003	0.011	--	4.9
	Feb/Mar 1997	--	--	--	--	2.2
	Jun/Jul 1997	--	--	0.014	--	2.92
MW-11						
Screen 1	Aug/Sep 1996	--	--	--	--	4.0
	Oct/Nov 1996	--	--	--	--	2.5
	Feb/Mar 1997	--	--	--	--	2.5
	Jun/Jul 1997	--	--	--	--	1.53

NA: Not analyzed
--: Not detected
a: Treatment technique and public notification triggered at 0.015 mg/l
NE: Not established

TABLE 3-6

SUMMARY OF METALS DETECTED DURING LONG-TERM QUARTERLY SAMPLING PROGRAM JET PROPULSION LABORATORY

(concentrations in mg/l)

Sample Location	Sampling Date	Arsenic	Lead	Total Chromium	Hexavalent Chromium	Field Turbidity (NTUs)
Screen 2	Aug/Sep 1996	--	--	--	--	4.5
	Oct/Nov 1996	--	--	--	--	4.7
	Feb/Mar 1997	--	--	--	--	3.1
	Jun/Jul 1997	--	--	--	--	4.67
Screen 3	Aug/Sep 1996	--	--	--	--	0.5
	Oct/Nov 1996	--	--	--	--	2.3
	Feb/Mar 1997	--	--	--	--	1.7
	Jun/Jul 1997	--	--	--	--	1.88
Screen 4	Aug/Sep 1996	--	--	--	--	3.9
	Oct/Nov 1996	--	--	--	--	3.3
	Feb/Mar 1997	--	0.009	--	--	5.2
	Jun/Jul 1997	--	--	--	--	4.80
Screen 5	Aug/Sep 1996	0.007	--	--	--	0.6
	Oct/Nov 1996	0.005	--	--	--	1.9
	Feb/Mar 1997	--	0.002	--	--	1.6
	Jun/Jul 1997	--	--	--	--	0.69
MW-12						
Screen 1	Aug/Sep 1996	--	0.004	--	--	50.4
	Not Sampled	NA	NA	NA	NA	NA
	Feb/Mar 1997	--	0.003	--	--	3.8
	Jun/Jul 1997	--	--	--	--	4.80
Screen 2	Aug/Sep 1996	--	0.024	--	--	4.0
	Oct/Nov 1996	--	--	--	--	4.0
	Feb/Mar 1997	--	--	--	--	2.5
	Jun/Jul 1997	--	--	--	--	3.16
Screen 3	Aug/Sep 1996	--	--	--	--	2.5
	Oct/Nov 1996	--	--	--	--	3.1
	Feb/Mar 1997	--	--	--	--	5.0
	Jun/Jul 1997	--	--	--	--	4.79
Screen 4	Aug/Sep 1996	--	0.005	--	--	1.8
	Oct/Nov 1996	--	--	--	--	0.7
	Feb/Mar 1997	--	--	--	--	2.4
	Jun/Jul 1997	--	--	--	--	2.49
Screen 5	Aug/Sep 1996	--	--	--	--	2.0
	Oct/Nov 1996	--	--	--	--	2.0
	Feb/Mar 1997	--	--	--	--	1.5
	Jun/Jul 1997	--	--	--	--	4.97

NA: Not analyzed
--: Not detected
a: Treatment technique and public notification triggered at 0.015 mg/l
NE: Not established

TABLE 3-6

SUMMARY OF METALS DETECTED DURING LONG-TERM QUARTERLY SAMPLING PROGRAM JET PROPULSION LABORATORY

(concentrations in mg/l)

Sample Location	Sampling Date	Arsenic	Lead	Total Chromium	Hexavalent Chromium	Field Turbidity (NTUs)
MW-13	Aug/Sep 1996	--	--	0.046	0.047	4.1
	Oct/Nov 1996	--	0.005	0.031	0.028	3.0
	Feb/Mar 1997	--	--	0.032	0.035	0.5
	Jun/Jul 1997	--	--	0.038	0.037	1.21
MW-14						
Screen 1	Aug/Sep 1996	--	--	--	--	3.3
	Oct/Nov 1996	--	--	--	--	4.5
	Feb/Mar 1997	--	--	--	--	4.3
	Jun/Jul 1997	--	--	--	--	2.21
Screen 2	Aug/Sep 1996	--	--	--	--	4.4
	Oct/Nov 1996	--	--	--	--	3.8
	Feb/Mar 1997	--	--	--	--	4.8
	Jun/Jul 1997	--	--	--	--	4.97
Screen 3	Aug/Sep 1996	--	--	--	--	1.7
	Oct/Nov 1996	--	--	--	--	2.0
	Feb/Mar 1997	--	--	--	--	2.5
	Jun/Jul 1997	--	--	--	--	0.70
Screen 4	Aug/Sep 1996	--	--	--	--	3.1
	Oct/Nov 1996	--	--	--	--	2.5
	Feb/Mar 1997	--	--	--	--	4.1
	Jun/Jul 1997	--	--	--	--	2.31
Screen 5	Aug/Sep 1996	--	--	--	--	1.5
	Oct/Nov 1996	--	--	--	--	4.1
	Feb/Mar 1997	--	0.028	--	--	2.3
	Jun/Jul 1997	--	--	--	--	1.90
MW-15	Aug/Sep 1996	--	--	--	--	1.3
	Oct/Nov 1996	--	--	NA	--	0.5
	Feb/Mar 1997	--	--	--	--	2.6
	Jun/Jul 1997	--	--	--	--	0.21
MW-16	Aug/Sep 1996	--	--	0.018	--	3.4
	Not Sampled	NA	NA	NA	NA	NA
	Feb/Mar 1997	--	--	--	0.007	0.2
	Jun/Jul 1997	--	--	--	--	0.12
MW-17						
Screen 1	Aug/Sep 1996	--	--	NA	NA	1.0
	Oct/Nov 1996	--	--	--	--	2.9
	Feb/Mar 1997	--	--	--	--	2.0
	Jun/Jul 1997	--	--	--	--	2.23

NA: Not analyzed
--: Not detected
a: Treatment technique and public notification triggered at 0.015 mg/l
NE: Not established

TABLE 3-6

SUMMARY OF METALS DETECTED DURING LONG-TERM QUARTERLY SAMPLING PROGRAM JET PROPULSION LABORATORY

(concentrations in mg/l)

Sample Location	Sampling Date	Arsenic	Lead	Total Chromium	Hexavalent Chromium	Field Turbidity (NTUs)
Screen 2	Aug/Sep 1996	--	--	NA	NA	4.5
	Oct/Nov 1996	--	--	--	--	2.5
	Feb/Mar 1997	--	--	--	--	2.7
	Jun/Jul 1997	--	--	--	--	4.49
Screen 3	Aug/Sep 1996	--	0.002	NA	NA	4.9
	Oct/Nov 1996	--	--	--	--	4.8
	Feb/Mar 1997	--	--	--	--	6.0
	Jun/Jul 1997	--	--	--	--	4.83
Screen 4	Aug/Sep 1996	--	--	NA	NA	2.8
	Oct/Nov 1996	--	--	--	--	2.6
	Feb/Mar 1997	--	--	--	--	5.6
	Jun/Jul 1997	--	--	--	--	4.09
Screen 5	Aug/Sep 1996	--	--	NA	NA	5.0
	Oct/Nov 1996	--	0.005	--	--	5.2
	Feb/Mar 1997	--	0.003	--	--	24.5
	Jun/Jul 1997	--	--	--	--	34.0
MW-18						
Screen 1	Aug/Sep 1996	--	--	NA	NA	0.9
	Not Sampled	NA	NA	NA	NA	NA
	Feb/Mar 1997	--	--	--	--	1.9
	Jun/Jul 1997	--	--	--	--	0.42
Screen 2	Aug/Sep 1996	--	--	NA	NA	3.5
	Oct/Nov 1996	--	0.003	--	--	3.4
	Feb/Mar 1997	--	--	--	--	2.8
	Jun/Jul 1997	--	--	--	--	1.53
Screen 3	Aug/Sep 1996	--	--	NA	NA	4.2
	Oct/Nov 1996	--	0.002	NA	--	4.0
	Feb/Mar 1997	--	--	0.015	0.007	3.3
	Jun/Jul 1997	--	--	--	--	3.88
Screen 4	Aug/Sep 1996	--	--	NA	NA	2.0
	Oct/Nov 1996	--	0.003	--	--	1.9
	Feb/Mar 1997	--	--	--	--	2.8
	Jun/Jul 1997	0.005	--	--	--	3.58
Screen 5	Aug/Sep 1996	--	--	NA	NA	2.8
	Oct/Nov 1996	--	0.002	--	--	3.6
	Feb/Mar 1997	--	--	--	--	2.9
	Jun/Jul 1997	--	--	--	--	3.97

NA: Not analyzed
--: Not detected
a: Treatment technique and public notification triggered at 0.015 mg/l
NE: Not established

TABLE 3-6

SUMMARY OF METALS DETECTED DURING LONG-TERM QUARTERLY SAMPLING PROGRAM JET PROPULSION LABORATORY

(concentrations in mg/l)

Sample Location	Sampling Date	Arsenic	Lead	Total Chromium	Hexavalent Chromium	Field Turbidity (NTUs)
MW-19						
Screen 1	Aug/Sep 1996	--	--	NA	NA	5.0
	Oct/Nov 1996	--	--	--	--	3.4
	Feb/Mar 1997	--	--	--	--	6.6
	Jun/Jul 1997	--	--	--	--	0.78
Screen 2	Aug/Sep 1996	--	--	NA	NA	4.5
	Oct/Nov 1996	--	--	--	--	3.6
	Feb/Mar 1997	--	--	--	--	21.9
	Jun/Jul 1997	--	--	--	--	2.80
Screen 3	Aug/Sep 1996	--	--	NA	NA	3.0
	Oct/Nov 1996	--	--	--	--	5.0
	Feb/Mar 1997	--	--	--	--	4.9
	Jun/Jul 1997	--	--	--	--	4.88
Screen 4	Aug/Sep 1996	--	--	NA	NA	4.2
	Oct/Nov 1996	--	--	--	--	8.0
	Feb/Mar 1997	--	0.003	--	--	15.8
	Jun/Jul 1997	--	--	--	--	4.88
Screen 5	Aug/Sep 1996	--	--	NA	NA	4.9
	Oct/Nov 1996	--	--	NA	--	4.6
	Feb/Mar 1997	--	--	--	--	3.8
	Jun/Jul 1997	--	--	--	--	2.15
MW-20						
Screen 1	Aug/Sep 1996	--	--	--	NA	3.5
	Not Sampled	NA	NA	NA	NA	NA
	Feb/Mar 1997	--	--	--	--	2.3
	Jun/Jul 1997	--	--	--	--	0.16
Screen 2	Aug/Sep 1996	--	--	NA	NA	3.9
	Oct/Nov 1996	--	--	--	--	1.1
	Feb/Mar 1997	--	--	--	--	2.1
	Jun/Jul 1997	--	--	--	--	2.54
Screen 3	Aug/Sep 1996	--	--	NA	NA	1.7
	Oct/Nov 1996	--	--	--	--	1.6
	Feb/Mar 1997	--	--	--	--	1.9
	Jun/Jul 1997	--	--	--	--	2.14
Screen 4	Aug/Sep 1996	--	--	NA	NA	1.0
	Oct/Nov 1996	--	--	--	--	1.3
	Feb/Mar 1997	--	--	--	--	3.3
	Jun/Jul 1997	--	--	--	--	1.29

NA: Not analyzed
--: Not detected
a: Treatment technique and public notification triggered at 0.015 mg/l
NE: Not established

TABLE 3-6

SUMMARY OF METALS DETECTED DURING LONG-TERM QUARTERLY SAMPLING PROGRAM JET PROPULSION LABORATORY

(concentrations in mg/l)

Sample Location	Sampling Date	Arsenic	Lead	Total Chromium	Hexavalent Chromium	Field Turbidity (NTUs)
Screen 5	Aug/Sep 1996	--	--	NA	NA	1.8
	Oct/Nov 1996	--	--	NA	--	1.3
	Feb/Mar 1997	--	0.004	--	--	1.6
	Jun/Jul 1997	0.006	--	--	--	1.94
MW-21						
Screen 1	Aug/Sep 1996	--	--	NA	NA	0.9
	Not Sampled	NA	NA	NA	NA	NA
	Feb/Mar 1997	--	--	--	--	1.1
	Jun/Jul 1997	--	--	--	--	2.76
Screen 2	Aug/Sep 1996	--	--	NA	NA	2.1
	Oct/Nov 1996	--	--	--	--	1.2
	Feb/Mar 1997	--	--	--	--	3.9
	Jun/Jul 1997	--	--	--	--	1.68
Screen 3	Aug/Sep 1996	--	--	NA	NA	4.6
	Oct/Nov 1996	--	--	--	--	4.9
	Feb/Mar 1997	--	0.003	--	--	4.6
	Jun/Jul 1997	--	--	--	--	1.40
Screen 4	Aug/Sep 1996	--	--	NA	NA	2.5
	Oct/Nov 1996	--	--	--	--	3.3
	Feb/Mar 1997	--	0.004	--	--	4.4
	Jun/Jul 1997	--	--	--	--	2.46
Screen 5	Aug/Sep 1996	--	--	NA	NA	4.9
	Oct/Nov 1996	--	--	--	--	5.0
	Feb/Mar 1997	--	--	--	--	28.0
	Jun/Jul 1997	--	--	--	--	26.4
Practical Quantitation Limit		0.005	0.002	0.01	0.005	
Calif. Maximum Contaminant Level		0.05	0.05	0.05	NE	
EPA Maximum Contaminant Level		0.05	(a)	0.10	NE	

NA: Not analyzed
--: Not detected
a: Treatment technique and public notification triggered at 0.015 mg/l
NE: Not established

TABLE 4-1

SUMMARY OF WATER-CHEMISTRY RESULTS FOR GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS JUNE-JULY 1997

(concentrations in mg/L)

Well Number	ANIONS					CATIONS					Measured Alkalinity	Measured pH
	Cl	CO_3	HCO_3	NO_3-N	SO_4	Na	Mg	K	Ca	Fe		
MW-1	17	1.14	220	1.5	41	25	16	3.5	52	0.10	180	7.9
MW-3												
Screen 1	6.0	0.36	177	0.5	23	16	13	3.0	34	0.45	145	7.5
Screen 2	14	0.48	232	1.0	37	19	19	3.3	49	0.22	190	7.5
Screen 3	24	6.89	168	0.2	18	38	11	3.6	22	0.66	140	8.8
Screen 4	9.9	5.90	181	0.4	18	47	9.4	2.7	16	0.47	150	8.7
Screen 5	9.5	13.5	165	--	11	67	1.0	1.6	5.6	0.17	140	9.1
MW-4												
Screen 1	10	0.21	165	0.9	26	17	12	3.3	35	1.50	135	7.3
Screen 2	55	0.25	189	7.8	64	25	25	2.9	67	0.67	155	7.3
Screen 3	22	1.31	201	7.6	11	30	14	2.3	42	0.18	165	8.0
Screen 4	14	2.06	200	3.9	7.4	39	11	2.4	28	0.66	165	8.2
Screen 5	8.8	1.79	219	1.0	17	35	10	2.5	35	0.87	180	8.1
MW-5	7.5	0.07	165	1.6	30	14	12	2.7	39	0.28	135	6.8
MW-6	92	0.09	175	11	93	26	28	2.1	80	0.19	145	6.9
MW-7	24	0.57	175	6.5	48	17	17	2.8	54	0.16	145	7.7
MW-8	12	0.50	195	1.7	42	15	15	2.7	49	--	160	7.6
MW-9	16	1.34	260	--	23	20	17	3.3	57	0.27	215	7.9
MW-10	36	0.20	195	5.6	70	16	21	2.7	66	0.14	160	7.2
MW-11												
Screen 1	14	1.70	262	0.70	38	24	21	4.0	53	0.25	215	8.0
Screen 2	14	1.42	219	0.40	35	21	18	3.7	43	0.70	180	8.0
Screen 3	12	2.92	225	0.20	25	25	15	2.8	42	0.31	185	8.3
Screen 4	11	2.67	206	--	22	24	14	2.9	37	0.98	170	8.3
Screen 5	11	2.20	170	--	17	45	2.4	1.6	24	0.21	140	8.3
MW-12												
Screen 1	8.3	0.52	201	0.6	36	21	16	3.8	40	1.40	165	7.6
Screen 2	14	0.63	244	1.7	37	24	19	3.8	56	0.35	200	7.6
Screen 3	16	1.58	243	1.2	33	24	17	3.5	56	0.50	200	8.0
Screen 4	14	1.58	243	1.2	29	23	15	2.9	56	0.37	200	8.0
Screen 5	12	1.84	225	1.0	18	35	12	2.6	40	0.32	185	8.1
MW-13	22	0.39	190	9.3	60	21	19	2.8	60	0.13	155	7.5
MW-14												
Screen 1	135	0.13	250	19	225	42	49	3.3	135	2.30	205	6.9
Screen 2	125	0.29	354	15	190	35	56	3.3	145	2.30	290	7.1
Screen 3	84	1.22	237	13	100	37	42	4.0	87	--	195	7.9
Screen 4	29	1.31	201	10	19	27	19	2.6	54	0.10	165	8.0
Screen 5	8.5	7.38	180	0.2	15	35	13	2.9	17	0.20	150	8.8

--: Not detected

TABLE 4-1

SUMMARY OF WATER-CHEMISTRY RESULTS FOR GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS JUNE-JULY 1997

(concentrations in mg/L)

Well Number	ANIONS					CATIONS					Measured Alkalinity	Measured pH
	Cl	CO_3	HCO_3	NO_3-N	SO_4	Na	Mg	K	Ca	Fe		
MW-15	14	0.42	255	0.4	26	21	17	3.3	54	0.15	210	7.4
MW-16	23	0.45	175	12	42	21	19	2.5	56	0.13	145	7.6
MW-17												
Screen 1	5.8	0.43	165	1.0	29	13	12	2.2	39	0.14	135	7.6
Screen 2	8.4	0.66	160	0.2	26	16	16	2.7	25	0.32	130	7.8
Screen 3	12	0.78	190	1.4	32	19	15	2.0	43	0.58	155	7.8
Screen 4	12	1.59	245	2.2	27	31	13	1.8	51	--	200	8.0
Screen 5	12	1.53	235	2.0	27	34	13	1.8	49	0.72	195	8.0
MW-18												
Screen 1	60	0.30	185	6.0	67	17	19	2.9	61	--	150	7.4
Screen 2	13	0.27	205	1.3	38	17	15	2.7	50	0.18	170	7.3
Screen 3	13	1.00	245	1.0	32	20	17	3.0	52	0.23	200	7.8
Screen 4	9.3	1.40	215	0.7	25	30	9.9	1.5	41	0.38	175	8.0
Screen 5	11	14.0	170	0.1	6.3	49	5.2	1.7	11	0.14	145	9.1
MW-19												
Screen 1	6.9	0.41	158	0.8	24	12	13	2.8	39	0.17	130	7.6
Screen 2	34	0.20	195	4.2	59	14	24	2.3	51	0.12	160	7.2
Screen 3	73	0.66	256	9.9	66	30	32	3.1	86	0.45	210	7.6
Screen 4	39	0.83	256	5.0	49	26	26	2.7	72	2.20	210	7.7
Screen 5	64	0.56	274	8.4	60	31	32	2.9	91	0.52	225	7.5
MW-20												
Screen 1	56	0.65	200	15	140	22	32	3.8	105	0.44	165	7.7
Screen 2	13	14.9	145	0.2	29	41	11	2.2	13	0.32	125	9.2
Screen 3	30	2.37	230	3.1	21	51	13	2.3	37	0.80	190	8.2
Screen 4	11	2.20	170	--	22	56	3.0	1.0	12	0.22	140	8.3
Screen 5	9.1	19.1	185	--	23	71	1.9	1.6	8.8	--	160	9.2
MW-21												
Screen 1	78	0.09	210	17	110	27	31	2.2	87	--	170	6.8
Screen 2	120	0.84	325	7.0	155	50	44	3.4	140	--	265	7.6
Screen 3	93	0.45	305	9.8	90	35	34	3.2	98	0.87	250	7.4
Screen 4	67	0.44	270	10	71	27	27	2.6	84	--	220	7.4
Screen 5	64	0.52	255	11	76	29	28	2.9	81	1.50	210	7.5
Detection Limit	1.0	0.001	0.001	0.10	2.0	1.0	1.0	1.0	1.0	0.10	2.0	

--: Not detected

TABLE 4-2

SUMMARY OF QUALITY CONTROL ANALYSES OF WATER-CHEMISTRY DATA FROM GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS JUNE-JULY 1997

Well Number	Total Anions	Total Cations	Total Ions	Charge Balance	Measured TDS	Calculated TDS	Measured TDS/ Calculated TDS
MW-1	5.04	5.09	10.1	0.49	300	270.5	1.1
MW-3							
Screen 1	3.58	3.54	7.12	0.56	220	185.1	1.2
Screen 2	5.04	4.92	9.96	1.20	290	260.5	1.1
Screen 3	3.87	3.75	7.62	1.57	220	207.6	1.1
Screen 4	3.68	3.69	7.37	0.14	210	200.1	1.0
Screen 5	3.30	3.32	6.62	0.30	210	190.5	1.1
MW-4							
Screen 1	3.59	3.56	7.15	0.42	210	190.1	1.1
Screen 2	6.54	6.57	13.1	0.23	390	367.2	1.1
Screen 3	4.69	4.62	9.31	0.75	270	255.2	1.1
Screen 4	4.13	4.06	8.19	0.85	220	220.1	1.0
Screen 5	4.27	4.16	8.43	1.30	230	223.1	1.0
MW-5	3.65	3.62	7.27	0.41	200	193.8	1.0
MW-6	8.22	7.49	15.7	4.65	470	456.0	1.0
MW-7	5.04	4.91	9.95	1.31	300	278.3	1.1
MW-8	4.53	4.41	8.94	1.34	260	239.6	1.1
MW-9	5.23	5.20	10.4	0.29	290	265.8	1.1
MW-10	6.07	5.79	11.9	2.36	360	332.7	1.1
MW-11							
Screen 1	5.54	5.52	11.1	0.18	320	287.9	1.1
Screen 2	4.75	4.64	9.39	1.17	270	246.3	1.1
Screen 3	4.57	4.49	9.06	0.88	260	236.5	1.1
Screen 4	4.17	4.12	8.29	0.60	240	215.8	1.1
Screen 5	3.46	3.39	6.85	1.02	210	187.0	1.1
MW-12							
Screen 1	4.33	4.33	8.66	0.00	240	228.5	1.1
Screen 2	5.29	5.50	10.8	1.95	310	282.3	1.1
Screen 3	5.22	5.33	10.6	1.04	280	276.4	1.0
Screen 4	5.08	5.11	10.2	0.29	290	266.6	1.1
Screen 5	4.48	4.58	9.06	1.10	260	236.8	1.1
MW-13	5.63	5.27	10.9	3.30	340	319.8	1.1
MW-14							
Screen 1	14.0	12.7	26.7	4.87	820	798.6	1.0
Screen 2	14.4	13.5	27.9	3.23	810	797.3	1.0
Screen 3	9.28	9.52	18.8	1.28	580	529.2	1.1
Screen 4	5.23	5.50	10.7	2.52	320	295.1	1.1
Screen 5	3.57	3.52	7.09	0.71	200	188.4	1.1

Note: Shaded areas represent values that fall outside the ideal range for each particular QA/QC test.

TABLE 4-2

SUMMARY OF QUALITY CONTROL ANALYSES OF WATER-CHEMISTRY DATA FROM GROUNDWATER SAMPLES COLLECTED FROM JPL MONITORING WELLS JUNE-JULY 1997

Well Number	Total Anions	Total Cations	Total Ions	Charge Balance	Measured TDS	Calculated TDS	Measured TDS/ Calculated TDS
MW-15	5.17	5.10	10.3	0.68	280	263.0	1.1
MW-16	5.28	5.34	10.6	0.56	320	303.2	1.1
MW-17							
Screen 1	3.54	3.56	7.10	0.28	200	187.1	1.1
Screen 2	3.39	3.33	6.72	0.89	200	174.6	1.1
Screen 3	4.21	4.26	8.47	0.59	260	224.0	1.2
Screen 4	5.06	5.01	10.1	0.50	280	267.6	1.0
Screen 5	4.94	5.04	9.98	1.00	280	263.4	1.1
MW-18							
Screen 1	5.67	5.43	11.1	2.16	340	314.7	1.1
Screen 2	4.65	4.54	9.19	1.20	240	242.7	1.0
Screen 3	5.10	4.95	10.1	1.49	270	263.1	1.0
Screen 4	4.33	4.21	8.54	1.41	200	227.3	0.9
Screen 5	3.35	3.15	6.50	3.08	170	182.4	0.9
MW-19							
Screen 1	3.35	3.61	6.94	3.74	320	179.5	1.8
Screen 2	5.69	5.19	10.9	4.60	480	299.1	1.6
Screen 3	8.34	8.32	16.7	0.12	510	460.8	1.1
Screen 4	6.68	6.94	13.6	1.91	390	365.7	1.1
Screen 5	8.16	8.61	16.8	2.68	480	453.8	1.1
MW-20							
Screen 1	8.87	8.94	17.8	0.39	520	524.5	1.0
Screen 2	3.49	3.39	6.88	1.45	210	196.6	1.1
Screen 3	5.31	5.20	10.5	1.05	280	284.3	1.0
Screen 4	3.57	3.31	6.88	3.78	210	191.0	1.1
Screen 5	3.91	3.72	7.66	2.87	240	225.5	1.1
MW-21							
Screen 1	9.11	8.13	17.2	5.68	520	513.7	1.0
Screen 2	12.4	12.9	25.3	1.98	740	704.0	1.1
Screen 3	10.2	9.3	19.5	4.62	580	547.9	1.1
Screen 4	8.48	7.66	16.1	5.08	460	456.0	1.0
Screen 5	8.37	7.69	16.1	4.23	510	457.0	1.1

Note: Shaded areas represent values that fall outside the ideal range for each particular QA/QC test.

TABLE 5-1

GROUNDWATER MONITORING WELL WATER LEVEL MEASUREMENTS JUNE 11 AND 12, 1997

Well Number	Date Measured	Depth to Water (ft)	Reference Elevation (ft msl)	Water Level Elevation (ft msl)
MW-1	6/11/97	22.75	1116.70	1093.95
MW-3				
Screen 1 (top)	6/11/97	134.58	1100.34	965.76
Screen 2	6/11/97	149.61	1100.34	950.73
Screen 3	6/11/97	154.27	1100.34	946.07
Screen 4	6/11/97	236.24	1100.34	864.10
Screen 5	6/11/97	263.24	1100.34	837.10
MW-4				
Screen 1 (top)	6/11/97	108.20	1082.84	974.64
Screen 2	6/11/97	125.84	1082.84	957.00
Screen 3	6/11/97	128.54	1082.84	954.30
Screen 4	6/11/97	137.53	1082.84	945.31
Screen 5	6/11/97	219.29	1082.84	863.55
MW-5	6/11/97	98.17	1071.60	973.43
MW-6	6/11/97	204.35	1188.52	984.17
MW-7	6/11/97	237.35	1212.88	975.53
MW-8	6/11/97	162.69	1139.53	976.84
MW-9	6/11/97	17.95	1106.02	1088.07
MW-10	6/11/97	113.59	1087.71	974.12
MW-11				
Screen 1 (top)	6/11/97	117.59	1139.30	1021.71
Screen 2	6/11/97	167.04	1139.30	972.26
Screen 3	6/11/97	184.35	1139.30	954.95
Screen 4	6/11/97	191.54	1139.30	947.76
Screen 5	6/11/97	259.63	1139.30	879.67
MW-12				
Screen 1 (top)	6/11/97	120.78	1102.14	981.36
Screen 2	6/11/97	142.18	1102.14	959.96
Screen 3	6/11/97	146.70	1102.14	955.44
Screen 4	6/11/97	162.68	1102.14	939.46
Screen 5	6/11/97	229.02	1102.14	873.12
MW-13	6/11/97	207.12	1183.47	976.35
MW-14				
Screen 1 (top)	6/11/97	187.37	1173.47	986.10
Screen 2	6/11/97	189.06	1173.47	984.41
Screen 3	6/11/97	189.40	1173.47	984.07
Screen 4	6/11/97	189.68	1173.47	983.79
Screen 5	6/11/97	190.68	1173.47	982.79

TABLE 5-1

GROUNDWATER MONITORING WELL WATER LEVEL MEASUREMENTS JUNE 11 AND 12, 1997

Well Number	Date Measured	Depth to Water (ft)	Reference Elevation (ft msl)	Water Level Elevation (ft msl)
MW-15	6/11/97	28.09	1120.66	1092.57
MW-16	6/11/97	260.19	1236.27	976.08
MW-17				
Screen 1 (top)	6/12/97	222.81	1191.21	968.40
Screen 2	6/12/97	246.29	1191.21	944.92
Screen 3	6/12/97	259.18	1191.21	932.03
Screen 4	6/12/97	322.82	1191.21	868.39
Screen 5	6/12/97	333.22	1191.21	857.99
MW-18				
Screen 1 (top)	6/12/97	262.77	1225.41	962.64
Screen 2	6/12/97	266.54	1225.41	958.87
Screen 3	6/12/97	278.81	1225.41	946.60
Screen 4	6/12/97	311.87	1225.41	913.54
Screen 5	6/12/97	326.25	1225.41	899.16
MW-19				
Screen 1 (top)	6/12/97	183.89	1142.94	959.05
Screen 2	6/12/97	198.30	1142.94	944.64
Screen 3	6/12/97	203.45	1142.94	939.49
Screen 4	6/12/97	302.46	1142.94	840.48
Screen 5	6/12/97	305.60	1142.94	837.34
MW-20				
Screen 1 (top)	6/12/97	217.03	1165.05	948.02
Screen 2	6/12/97	218.19	1165.05	946.86
Screen 3	6/12/97	242.93	1165.05	922.12
Screen 4	6/12/97	256.31	1165.05	908.74
Screen 5	6/12/97	215.57	1165.05	949.48
MW-21				
Screen 1 (top)	6/11/97	78.66	1059.10	980.44
Screen 2	6/11/97	80.60	1059.10	978.50
Screen 3	6/11/97	81.26	1059.10	977.84
Screen 4	6/11/97	81.51	1059.10	977.59
Screen 5	6/11/97	81.55	1059.10	977.55

TABLE 5-2

GROUNDWATER MONITORING WELL WATER LEVEL MEASUREMENTS
JULY 16, 1997

Well Number	Date Measured	Depth to Water (ft)	Reference Elevation (ft msl)	Water Level Elevation (ft msl)
MW-1	7/16/97	27.12	1116.70	1089.58
MW-3				
Screen 1 (top)	7/16/97	139.00	1100.34	961.34
Screen 2	7/16/97	149.22	1100.34	951.12
Screen 3	7/16/97	153.18	1100.34	947.16
Screen 4	7/16/97	225.45	1100.34	874.89
Screen 5	7/16/97	250.58	1100.34	849.76
MW-4				
Screen 1 (top)	7/16/97	116.27	1082.84	967.35
Screen 2	7/16/97	128.44	1082.84	954.40
Screen 3	7/16/97	130.45	1082.84	952.39
Screen 4	7/16/97	139.12	1082.84	943.72
Screen 5	7/16/97	213.83	1082.84	869.01
MW-5	7/16/97	105.49	1071.60	966.11
MW-6	7/16/97	211.14	1188.52	977.38
MW-7	7/16/97	244.98	1212.88	967.90
MW-8	7/16/97	170.24	1139.53	969.29
MW-9	7/16/97	22.28	1106.02	1083.74
MW-10	7/16/97	120.56	1087.71	967.15
MW-11				
Screen 1 (top)	7/16/97	120.35	1139.30	1018.95
Screen 2	7/16/97	170.19	1139.30	969.11
Screen 3	7/16/97	185.52	1139.30	953.78
Screen 4	7/16/97	190.68	1139.30	948.62
Screen 5	7/16/97	249.89	1139.30	889.41
MW-12				
Screen 1 (top)	7/16/97	129.14	1102.14	973.00
Screen 2	7/16/97	144.39	1102.14	957.75
Screen 3	7/16/97	148.25	1102.14	953.89
Screen 4	7/16/97	161.78	1102.14	940.36
Screen 5	7/16/97	219.92	1102.14	882.22
MW-13	7/16/97	214.21	1183.47	969.26
MW-14				
Screen 1 (top)	7/16/97	194.06	1173.47	979.41
Screen 2	7/16/97	195.09	1173.47	978.38
Screen 3	7/16/97	195.45	1173.47	978.02
Screen 4	7/16/97	195.45	1173.47	978.02
Screen 5	7/16/97	196.53	1173.47	976.94

TABLE 5-2

GROUNDWATER MONITORING WELL WATER LEVEL MEASUREMENTS JULY 16, 1997

Well Number	Date Measured	Depth to Water (ft)	Reference Elevation (ft msl)	Water Level Elevation (ft msl)
MW-15	7/16/97	32.64	1120.66	1088.02
MW-16	7/16/97	267.42	1236.27	968.85
MW-17				
Screen 1 (top)	7/16/97	230.93	1191.21	960.28
Screen 2	7/16/97	247.04	1191.21	944.17
Screen 3	7/16/97	260.42	1191.21	930.79
Screen 4	7/16/97	308.05	1191.21	883.16
Screen 5	7/16/97	317.99	1191.21	873.22
MW-18				
Screen 1 (top)	7/16/97	268.70	1225.41	956.71
Screen 2	7/16/97	271.07	1225.41	954.34
Screen 3	7/16/97	278.43	1225.41	946.98
Screen 4	7/16/97	304.93	1225.41	920.48
Screen 5	7/16/97	319.52	1225.41	905.89
MW-19				
Screen 1 (top)	7/16/97	189.77	1142.94	953.17
Screen 2	7/16/97	202.14	1142.94	940.80
Screen 3	7/16/97	207.11	1142.94	935.83
Screen 4	7/16/97	308.38	1142.94	834.56
Screen 5	7/16/97	311.89	1142.94	831.05
MW-20				
Screen 1 (top)	7/16/97	222.34	1165.05	942.71
Screen 2	7/16/97	222.99	1165.05	942.06
Screen 3	7/16/97	245.64	1165.05	919.41
Screen 4	7/16/97	256.45	1165.05	908.60
Screen 5	7/16/97	219.28	1165.05	945.77
MW-21				
Screen 1 (top)	7/16/97	85.97	1059.10	973.13
Screen 2	7/16/97	87.15	1059.10	971.95
Screen 3	7/16/97	87.57	1059.10	971.53
Screen 4	7/16/97	87.85	1059.10	971.25
Screen 5	7/16/97	87.82	1059.10	971.28

FIGURES

Jet Propulsion Laboratory

MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-16
MW-17
MW-18
MW-19
MW-20
MW-21
MH-01

La Canada Irrigation District
#6
#1
#3
#2
#4
#1
Valley Water Company

City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5

Rubio Canyon Land and Water Co.
#4
#7

Los Flores Water Co. Well #2

Oak Grove Ranger Station
Oak Grove Park
Devils Gate Reservoir
Spreading Grounds

GOULD AVE
WY AVE
HAMPTON RD
CROWN RD
VIRO RD
BLVD
FOOTHILL AVE
LOMA ALTA
LINCOLN AVE
MARIPOSA AVE
ALTADENA DR
CASITAS AVE
HARRIET
OLIVE DR
GLENROSE ST
VENTURA ST
WINDSOR AVE
FIGUEROA
CROSBY ST

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well

Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 1-1

Locations of JPL Groundwater Monitoring Wells and Nearby Municipal Production Wells

Jet Propulsion Laboratory
Pasadena, California

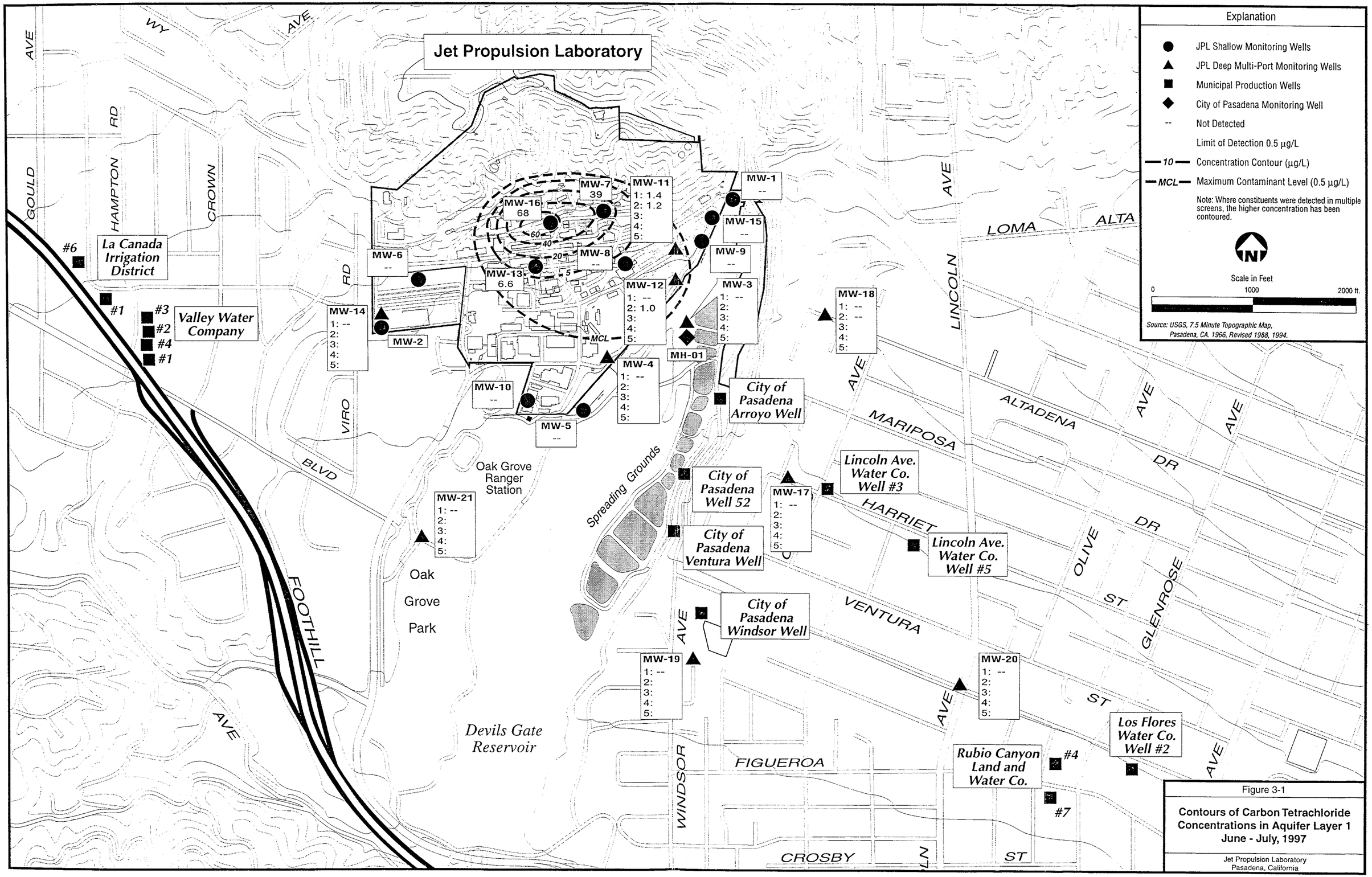


Figure 3-1

Contours of Carbon Tetrachloride Concentrations in Aquifer Layer 1 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-1
1:
2:
3: 0.7
4:
5:

MW-2
1:
2: --
3: --
4:
5:

MW-3
1:
2: --
3: 1.2
4:
5:

MW-4
1:
2: 6.2
3: --
4:
5:

MW-5

MW-6

MW-7

MW-8

MW-9

MW-10

MW-11
1:
2:
3: 0.7
4:
5:

MW-12
1:
2:
3: 20
4:
5:

MW-13

MW-14
1:
2: --
3: --
4:
5:

MW-15

MW-16

MW-17
1:
2: --
3: 1.3
4:
5:

MW-18
1:
2:
3: 0.6
4:
5:

MW-19
1:
2: --
3: --
4:
5:

MW-20
1:
2: --
3:
4:
5:

MW-21
1:
2: --
3: --
4:
5:

MH-01

20

5

MCL

MCL

#6

#1

#3

#2

#4

#1

La Canada Irrigation District

Valley Water Company

City of Pasadena Arroyo Well

City of Pasadena Well 52

City of Pasadena Ventura Well

City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3

Lincoln Ave. Water Co. Well #5

Rubio Canyon Land and Water Co.

#4

#7

Los Flores Water Co. Well #2

Oak Grove Ranger Station

Oak Grove Park

Devils Gate Reservoir

Spreading Grounds

GOULD AVE

WY AVE

HAMPTON RD

CROWN RD

VIRO RD

BLVD

FOOTHILL AVE

LOMA ALTA

LINCOLN AVE

CASITAS AVE

MARIPOSA

ALTADENA DR

AVE

DR

HARRIET

OLIVE ST

GLENROSE AVE

VENTURA ST

FIGUEROA

WINDSOR AVE

CROSBY ST

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- -- Not Detected
- Limit of Detection 0.5 µg/L
- 10 Concentration Contour (µg/L)
- MCL Maximum Contaminant Level (0.5 µg/L)

Note: Where constituents were detected in multiple screens, the higher concentration has been contoured.

N

Scale in Feet

0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 3-2

Contours of Carbon Tetrachloride Concentrations in Aquifer Layer 2 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-1
MW-2
MW-3
1:
2:
3:
4: --
5: --
MW-4
1:
2:
3:
4: --
5: --
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
1:
2:
3:
4: --
5: --
MW-12
1:
2:
3:
4: 4.9
5: 1.9
MW-13
MW-14
1:
2:
3:
4: --
5: --
MW-15
MW-16
MW-17
1:
2:
3:
4: --
5: --
MW-18
1:
2:
3:
4: 1.9
5: --
MW-19
1:
2:
3:
4: --
5: --
MW-20
1:
2:
3: --
4: --
5:
MW-21
1:
2:
3:
4: --
5: --
MH-01

La Canada Irrigation District
#6
#1
Valley Water Company
#3
#2
#4
#1
City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well
Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5
Rubio Canyon Land and Water Co.
#4
#7
Los Flores Water Co. Well #2
Oak Grove Ranger Station
Oak Grove Park
Devils Gate Reservoir
Spreading Grounds
MCL
5

GOULD AVE
WY AVE
HAMPTON RD
CROWN RD
VIRO RD
BLVD
FOOTHILL AVE
LOMA ALTA
LINCOLN AVE
MARIPOSA AVE
ALTADENA DR
HARRIET DR
OLIVE ST
GLENROSE ST
VENTURA ST
WINDSOR AVE
FIGUEROA ST
CROSBY LN
ST

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- -- Not Detected
- Limit of Detection 0.5 µg/L
- 10 Concentration Contour (µg/L)
- MCL Maximum Contaminant Level (0.5 µg/L)

Note: Where constituents were detected in multiple screens, the higher concentration has been contoured.

N

Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 3-3

Contours of Carbon Tetrachloride Concentrations in Aquifer Layer 3 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-7 23
MW-16 25
MW-11 1: -- 2: -- 3: 4: 5:
MW-1 --
MW-15 --
MW-13 24
MW-8 --
MW-9 --
MW-6 --
MW-12 1: -- 2: -- 3: 4: 5:
MW-3 1: 2: 3: 4: 5:
MW-18 1: -- 2: -- 3: 4: 5:
MW-14 1: -- 2: 3: 4: 5:
MW-2
MH-01
MW-4 1: -- 2: 3: 4: 5:
MW-10 2.3
MW-5 --
MW-17 1: -- 2: 3: 4: 5:
MW-21 1: 20 2: 3: 4: 5:
MW-19 1: -- 2: 3: 4: 5:
MW-20 1: -- 2: 3: 4: 5:

La Canada Irrigation District
#6
#1
Valley Water Company
#3
#2
#4
#1
City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well
Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5
Rubio Canyon Land and Water Co.
#4
#7
Los Flores Water Co. Well #2

Oak Grove Ranger Station
Oak Grove Park
Devils Gate Reservoir
Spreading Grounds

20
10
MCL
? ? ?

WY AVE
GOULD AVE
HAMPTON RD
CROWN RD
VIRGINIA RD
BLVD
FOOTHILL AVE
LINCOLN AVE
LOMA ALTA
ALTADENA DR
MARIPOSA AVE
HARRIET ST
OLIVE DR
GLENROSE ST
VENTURA ST
WINDSOR AVE
FIGUEROA ST
CROSBY ST
AVE

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- -- Not Detected
- Limit of Detection 0.5 µg/L
- 10 Concentration Contour (µg/L)
- MCL Maximum Contaminant Level (5 µg/L)

Note: Where constituents were detected in multiple screens, the higher concentration has been contoured.

Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 3-4

Contours of Trichloroethene Concentrations in Aquifer Layer 1 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-1
MW-2
MW-3
1: 2: -- 3: 0.8 4: 5:
MW-4
1: 2: 8.6 3: -- 4: 5:
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
1: 2: 3: -- 4: 5:
MW-12
1: 2: 3: -- 4: 5:
MW-13
MW-14
1: 2: 1.1 3: -- 4: 5:
MW-15
MW-16
MW-17
1: 2: -- 3: 5.9 4: 5:
MW-18
1: 2: 3: 2.4 4: 5:
MW-19
1: 2: -- 3: -- 4: 5:
MW-20
1: 2: -- 3: 4: 5:
MW-21
1: 2: -- 3: -- 4: 5:
MH-01

La Canada Irrigation District
#6
#1

Valley Water Company
#3
#2
#4
#1

City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5

Rubio Canyon Land and Water Co.
#4
#7

Los Flores Water Co. Well #2

Oak Grove Ranger Station

Oak Grove Park

Devils Gate Reservoir

Spreading Grounds

MCL

GOULD AVE
WY AVE
HAMPTON RD
CROWN RD
VIRO RD
BLVD
FOOTHILL AVE
LOMA ALTA
LINCOLN AVE
CASTAS AVE
MARIPOSA
ALTADENA DR
AVE
HARRIET
OLIVE ST
GLENROSE AVE
VENTURA
FIGUEROA
WINDSOR AVE
CROSBY ST

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- -- Not Detected
- Limit of Detection 0.5 µg/L
- 10 Concentration Contour (µg/L)
- MCL Maximum Contaminant Level (5 µg/L)

Note: Where constituents were detected in multiple screens, the higher concentration has been contoured.

Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 3-5

Contours of Trichloroethene Concentrations in Aquifer Layer 2 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-1
MW-2
MW-3
1:
2:
3:
4: --
5: --
MW-4
1:
2:
3:
4: --
5: --
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
1:
2:
3:
4: --
5: --
MW-12
1:
2:
3:
4: --
5: --
MW-13
MW-14
1:
2:
3:
4: --
5: --
MW-15
MW-16
MW-17
1:
2:
3:
4: 4.5
5: 11
MW-18
1:
2:
3:
4: --
5: --
MW-19
1:
2:
3:
4: 0.7
5: --
MW-20
1:
2:
3: --
4: --
5:
MW-21
1:
2:
3:
4: --
5: --
MH-01

La Canada Irrigation District
#6
#1
Valley Water Company
#3
#2
#4
#1
City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well
Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5
Rubio Canyon Land and Water Co.
#4
#7
Los Flores Water Co. Well #2

Oak Grove Ranger Station
Oak Grove Park
Devils Gate Reservoir
Spreading

GOULD AVE
HAMPTON RD
CROWN WY
VIRO RD
BLVD
FOOTHILL AVE
LINCOLN AVE
LOMA ALTA
CASITAS AVE
MARIPOSA
ALTADENA DR
HARRIET
OLIVE DR
GLENROSE ST
VENTURA
WINDSOR AVE
FIGUEROA
CROSBY ST
AVE
ST
DR

10
MCL

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- -- Not Detected
- Limit of Detection 0.5 µg/L
- 10 Concentration Contour (µg/L)
- MCL Maximum Contaminant Level (5 µg/L)

Note: Where constituents were detected in multiple screens, the higher concentration has been contoured.

N

Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 3-6

Contours of Trichloroethene Concentrations in Aquifer Layer 3 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-7 0.8
MW-11 1: -- 2: -- 3: 4: 5:
MW-1 --
MW-16 2.1
MW-15 --
MW-9 --
MW-6 --
MW-8 --
MW-13 0.9
MW-12 1: -- 2: -- 3: 4: 5:
MW-3 1: -- 2: 3: 4: 5:
MW-18 1: -- 2: -- 3: 4: 5:
MW-14 1: -- 2: 3: 4: 5:
MW-2
MH-01
MW-4 1: -- 2: 3: 4: 5:
MW-10 --
MW-5 --

10 MCL 2.0

La Canada Irrigation District
#6
#1
#3
#2
#4
#1
Valley Water Company
City of Pasadena Arroyo Well
Lincoln Ave. Water Co. Well #3
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well
Lincoln Ave. Water Co. Well #5
Rubio Canyon Land and Water Co.
#4
#7
Los Flores Water Co. Well #2

MW-17 1: -- 2: 3: 4: 5:
MW-21 1: -- 2: 3: 4: 5:
MW-19 1: -- 2: 3: 4: 5:
MW-20 1: -- 2: 3: 4: 5:

Oak Grove Ranger Station
Oak Grove Park
Devils Gate Reservoir
Spreading Grounds

GOULD AVE
WY AVE
HAMPTON RD
CROWN RD
VIRO RD
BLVD
FOOTHILL AVE
LOMA ALTA
LINCOLN AVE
MARIPOSA AVE
ALTADENA DR
HARRIET
OLIVE ST
GLENROSE AVE
VENTURA ST
WINDSOR AVE
FIGUEROA ST
CROSBY LN

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- -- Not Detected
- Limit of Detection 0.5 µg/L
- 10 Concentration Contour (µg/L)
- MCL Maximum Contaminant Level (0.5 µg/L)

Note: Where constituents were detected in multiple screens, the higher concentration has been contoured.

N

Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 3-7

Contours of 1,2 - Dichloroethane Concentrations in Aquifer Layer 1 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-16 1.1 | MW-7 0.7 | MW-11 1: -- 2: -- 3: 4: 5: | MW-1 -- | MW-15 -- | MW-9 -- | MW-6 -- | MW-8 -- | MW-13 -- | MW-12 1: -- 2: -- 3: 4: 5: | MW-3 1: -- 2: 3: 4: 5: | MW-18 1: -- 2: -- 3: 4: 5: | MW-14 1: -- 2: 3: 4: 5: | MW-2 | MH-01 | MW-4 1: -- 2: 3: 4: 5: | MW-10 -- | MW-5 -- | MW-21 1: -- 2: 3: 4: 5: | MW-17 1: -- 2: 3: 4: 5: | MW-19 1: -- 2: 3: 4: 5: | MW-20 1: -- 2: 3: 4: 5:

0.5 | 1.0

#6 | #1 | #3 | #2 | #4 | #1 | #7

La Canada Irrigation District

Valley Water Company

City of Pasadena Arroyo Well

City of Pasadena Well 52

City of Pasadena Ventura Well

City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3

Lincoln Ave. Water Co. Well #5

Rubio Canyon Land and Water Co.

Los Flores Water Co. Well #2

Oak Grove Ranger Station

Oak Grove Park

Devils Gate Reservoir

Spreading Grounds

GOULD AVE | WY AVE | HAMPTON RD | CROWN RD | VIRO RD | BLVD | FOOTHILL AVE | LOMA ALTA | LINCOLN AVE | MARIPOSA AVE | ALTADENA DR | HARRIET | OLIVE DR | GLENROSE ST | VENTURA | AVE | WINDSOR AVE | FIGUEROA | CROSBY LN | ST

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- -- Not Detected
- Limit of Detection 0.5 µg/L
- 10 Concentration Contour (µg/L)
- MCL Maximum Contaminant Level (0.5 µg/L)

Note: Where constituents were detected in multiple screens, the higher concentration has been contoured.

N

Scale in Feet

0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 3-8

Contours of Tetrachloroethene Concentrations in Aquifer Layer 1 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-16
MW-17
MW-18
MW-19
MW-20
MW-21
MH-01

La Canada Irrigation District
#6
#1
#3
#2
#4
#1
Valley Water Company

City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5
Rubio Canyon Land and Water Co.
#4
#7
Los Flores Water Co. Well #2

Oak Grove Ranger Station
Oak Grove Park
Devils Gate Reservoir
Spreading Grounds

1.0
0.5
?

GOULD AVE
HAMPTON RD
CROWN WY
VIRO AVE
FOOTHILL BLVD
LINCOLN AVE
LOMA ALTA
MARIPOSA
ALTADENA DR
OLIVE AVE
GLENROSE ST
HARRIET ST
VENTURA ST
WINDSOR AVE
FIGUEROA ST
CROSBY ST

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- -- Not Detected
- Limit of Detection 0.5 µg/L
- 10 Concentration Contour (µg/L)
- MCL Maximum Contaminant Level (0.5 µg/L)

Note: Where constituents were detected in multiple screens, the higher concentration has been contoured.

Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 3-9

Contours of Tetrachloroethene Concentrations in Aquifer Layer 2 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-1
MW-2
MW-3
1:
2:
3:
4: --
5:

MW-4
1:
2:
3:
4: --
5: --

MW-5

MW-6
--

MW-7

MW-8
--

MW-9

MW-10

MW-11
1:
2:
3:
4: --
5: --

MW-12
1:
2:
3:
4: --
5: --

MW-13
--

MW-14
1:
2:
3:
4: --
5: --

MW-15

MW-16

MW-17
1:
2:
3:
4: --
5: 0.7

MW-18
1:
2:
3:
4: 0.7
5: --

MW-19
1:
2:
3:
4: --
5: 1.5

MW-20
1:
2:
3: --
4: --
5:

MW-21
1:
2:
3:
4: 2.8
5: 3.0

MH-01

#6
#1
#3
#2
#4
#1

La Canada Irrigation District

Valley Water Company

City of Pasadena Arroyo Well

City of Pasadena Well 52

City of Pasadena Ventura Well

City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3

Lincoln Ave. Water Co. Well #5

Rubio Canyon Land and Water Co.
#4
#7

Los Flores Water Co. Well #2

Oak Grove Ranger Station

Oak Grove Park

Devils Gate Reservoir

Spreading Grounds

0.5

1.0

?

?

?

GOULD AVE
WY AVE
HAMPTON RD
CROWN AVE
VIRO AVE
BLVD
FOOTHILL AVE
LOMA ALTA
LINCOLN AVE
MARIPOSA
ALTADENA DR
AVE
HARRIET
OLIVE DR
ST
GLENROSE AVE
VENTURA ST
AVE
FIGUEROA
WINDSOR AVE
CROSBY ST
ST
AVE

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- -- Not Detected
- Limit of Detection 0.5 µg/L
- 10 Concentration Contour (µg/L)
- MCL Maximum Contaminant Level (0.5 µg/L)

Note: Where constituents were detected in multiple screens, the higher concentration has been contoured.

N

Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 3-10

Contours of Tetrachloroethene Concentrations in Aquifer Layer 3 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

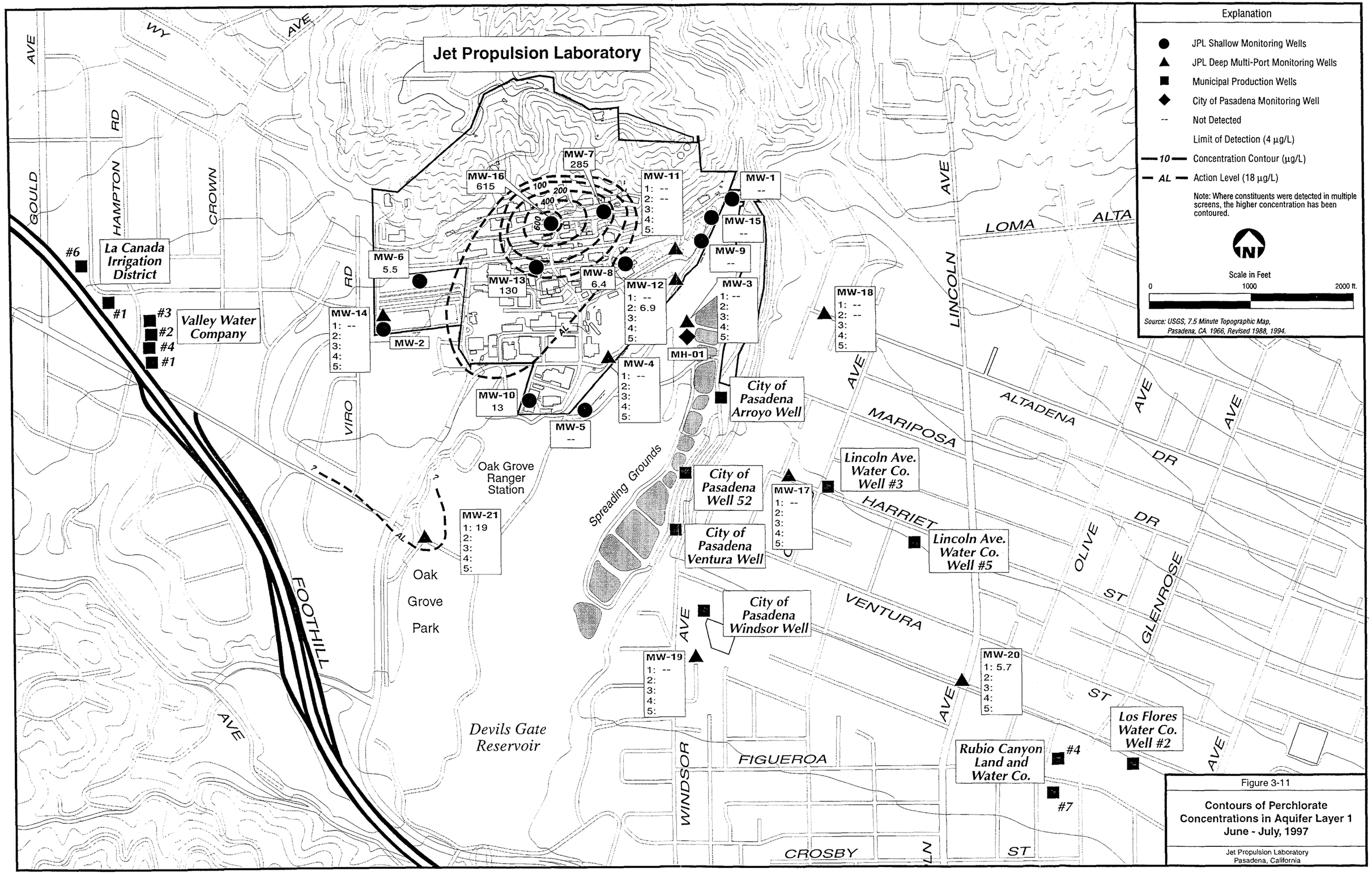


Figure 3-11

Contours of Perchlorate Concentrations in Aquifer Layer 1 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-1
MW-2
MW-3
1: 2: -- 3: 21 4: 5:
MW-4
1: 2: 51 3: -- 4: 5:
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
1: 2: 3: -- 4: 5:
MW-12
1: 2: 3: 5.7 4: 5:
MW-13
MW-14
1: 2: -- 3: 4.3 4: 5:
MW-15
MW-16
MW-17
1: 2: -- 3: 12 4: 5:
MW-18
1: 2: 3: -- 4: 5:
MW-19
1: 2: -- 3: 4.1 4: 5:
MW-20
1: 2: -- 3: 4: 5:
MW-21
1: 2: -- 3: -- 4: 5:
MH-01

La Canada Irrigation District
#6
#1

Valley Water Company
#3
#2
#4
#1

City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5

Rubio Canyon Land and Water Co.
#4
#7

Los Flores Water Co. Well #2

Oak Grove Ranger Station

Oak Grove Park

Devils Gate Reservoir

Spreading Grounds

50

AL

GOULD AVE
WY AVE
HAMPTON RD
CROWN RD
VIRO RD
BLVD
FOOTHILL AVE
LOMA ALTA
LINCOLN AVE
MARIPOSA AVE
ALTADENA DR
HARRIET
OLIVE DR
GLENROSE AVE
VENTURA ST
WINDSOR AVE
FIGUEROA ST
CROSBY LN
ST

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well
- -- Not Detected
- Limit of Detection (4 µg/L)
- 10 Concentration Contours (µg/L)
- AL Action Level (18 µg/L)

Note: Where constituents were detected in multiple screens, the higher concentration has been contoured.

N

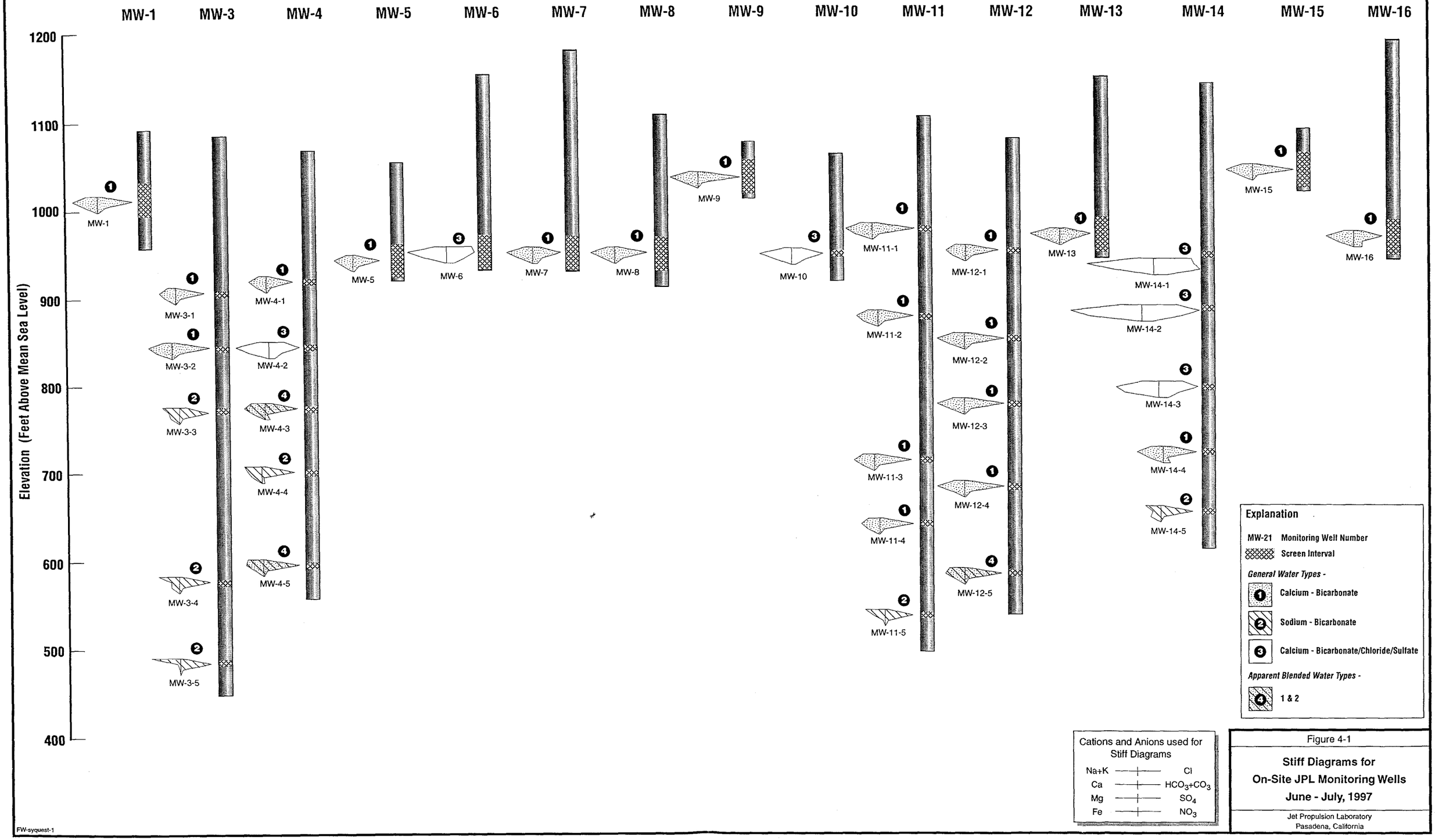
Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 3-12

Contours of Perchlorate Concentrations in Aquifer Layer 2 June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

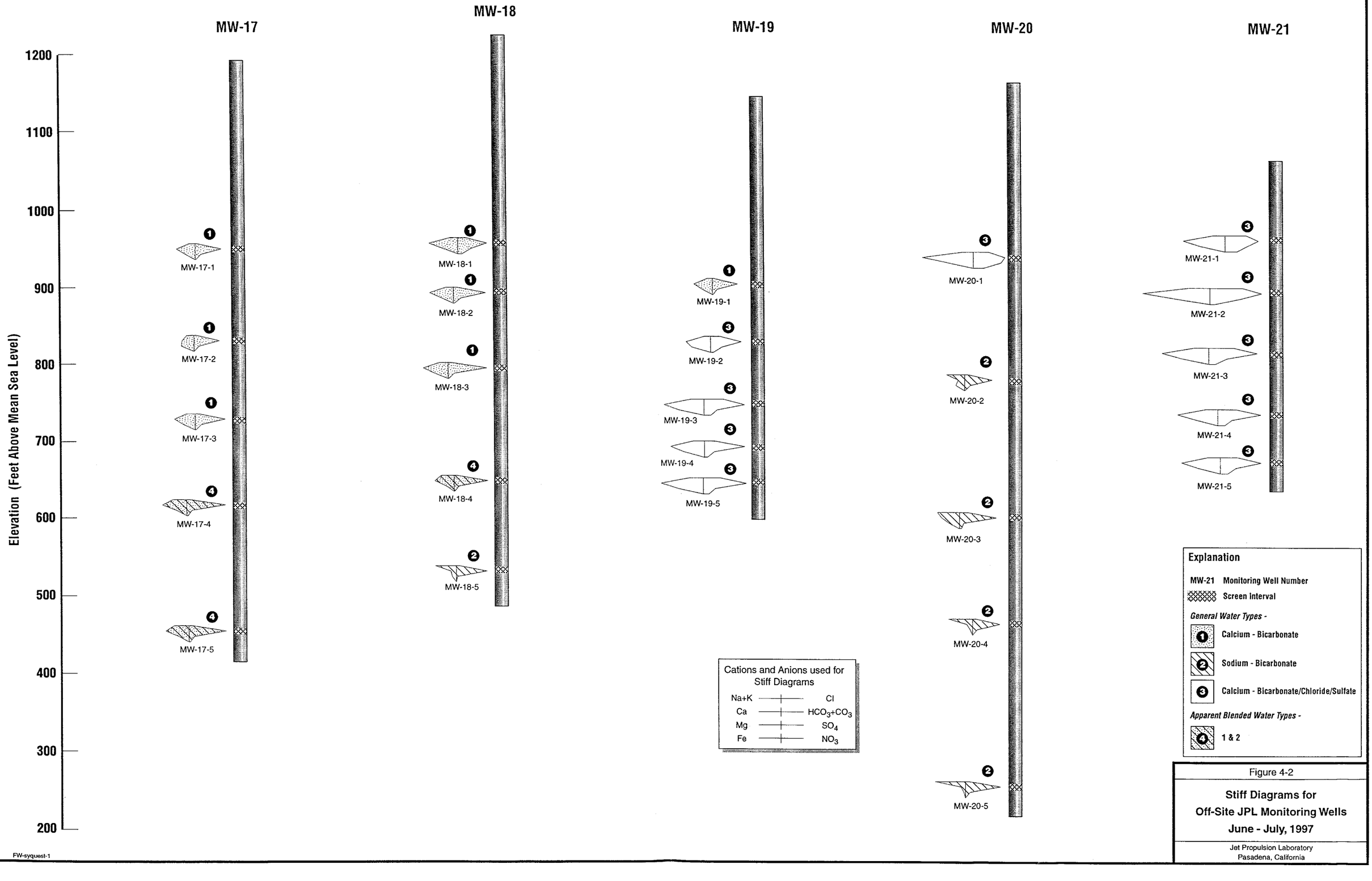


FW-syquest-1

Figure 4-1

Stiff Diagrams for On-Site JPL Monitoring Wells June - July, 1997

Jet Propulsion Laboratory
Pasadena, California



FW-syquest-1

Figure 4-2

Stiff Diagrams for Off-Site JPL Monitoring Wells June - July, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-1 1093.95
MW-7 975.53
MW-16 976.08
MW-15 1092.57
MW-11 1021.71
MW-13 976.35
MW-6 984.17
MW-8 976.84
MW-9 1088.07
MW-12 981.36
MW-3 965.76
MW-18 962.64
MW-14 986.10
MW-2
MW-4 974.64
MH-01
MW-10 974.12
MW-5 973.43
MW-17 968.40
MW-21 980.44
MW-19 959.05
MW-20 948.02

1080 1060 1040 1020 1000 990 980 970

985 990 980 970 960 965 960 955 950 945

La Canada Irrigation District
#6 #1

Valley Water Company
#3 #2 #4 #1

City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well

Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5

Rubio Canyon Land and Water Co. #4 #7

Los Flores Water Co. Well #2

Oak Grove Ranger Station

Spreading Grounds

Oak Grove Park

Devils Gate Reservoir

GOULD AVE
WY AVE
HAMPTON RD
CROWN RD
VIRO RD
BLVD
FOOTHILL
LOMA ALTA
LINCOLN AVE
MARIPOSA AVE
ALTADENA DR
CASITAS AVE
HARRIET ST
OLIVE DR
GLENROSE ST
VENTURA ST
WINDSOR AVE
FIGUEROA ST
CROSBY LN ST
AVE

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well

Note: Contours Represent Feet Above Mean Sea Level

N

Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 5-1

Water-Table Elevation Contour Map
June 11 and 12, 1997

Jet Propulsion Laboratory
Pasadena, California

Jet Propulsion Laboratory

MW-1 1089.58
MW-7 967.90
MW-16 968.85
MW-15 1088.02
MW-11 1018.95
MW-6 977.38
MW-13 969.26
MW-8 969.29
MW-9 1083.74
MW-12 973.00
MW-14 979.41
MW-3 961.34
MW-18 956.71
MW-2
MW-4 967.35
MH-01
MW-10 967.15
MW-5 966.11
MW-17 960.28
MW-21 973.13
MW-19 953.17
MW-20 942.71

1080 1060 1040 1020 1000 980 970 965 960 955 950 945 940 975 970 965 960 955 950 945 940 960

La Canada Irrigation District
#6
#1
#3
#2
#4
#1
Valley Water Company
City of Pasadena Arroyo Well
City of Pasadena Well 52
City of Pasadena Ventura Well
City of Pasadena Windsor Well
Lincoln Ave. Water Co. Well #3
Lincoln Ave. Water Co. Well #5
Rubio Canyon Land and Water Co.
#4
#7
Los Flores Water Co. Well #2
Oak Grove Ranger Station
Oak Grove Park
Devils Gate
Spreading Grounds

GOULD AVE
WY AVE
HAMPTON RD
CROWN RD
VIRO RD
LINCOLN AVE
LOMA ALTA
ALTADENA DR
MARIPOSA AVE
HARRIET ST
CASITAS AVE
OLIVE DR
GLENROSE ST
VENTURA ST
WINDSOR AVE
FIGUEROA ST
CROSBY ST
BLVD
FOOTHILL AVE

Explanation

- JPL Shallow Monitoring Wells
- JPL Deep Multi-Port Monitoring Wells
- Municipal Production Wells
- City of Pasadena Monitoring Well

Note: Contours Represent Feet Above Mean Sea Level

N

Scale in Feet
0 1000 2000 ft.

Source: USGS, 7.5 Minute Topographic Map, Pasadena, CA. 1966, Revised 1988, 1994.

Figure 5-2

Water-Table Elevation Contour Map
July 16, 1997

Jet Propulsion Laboratory
Pasadena, California

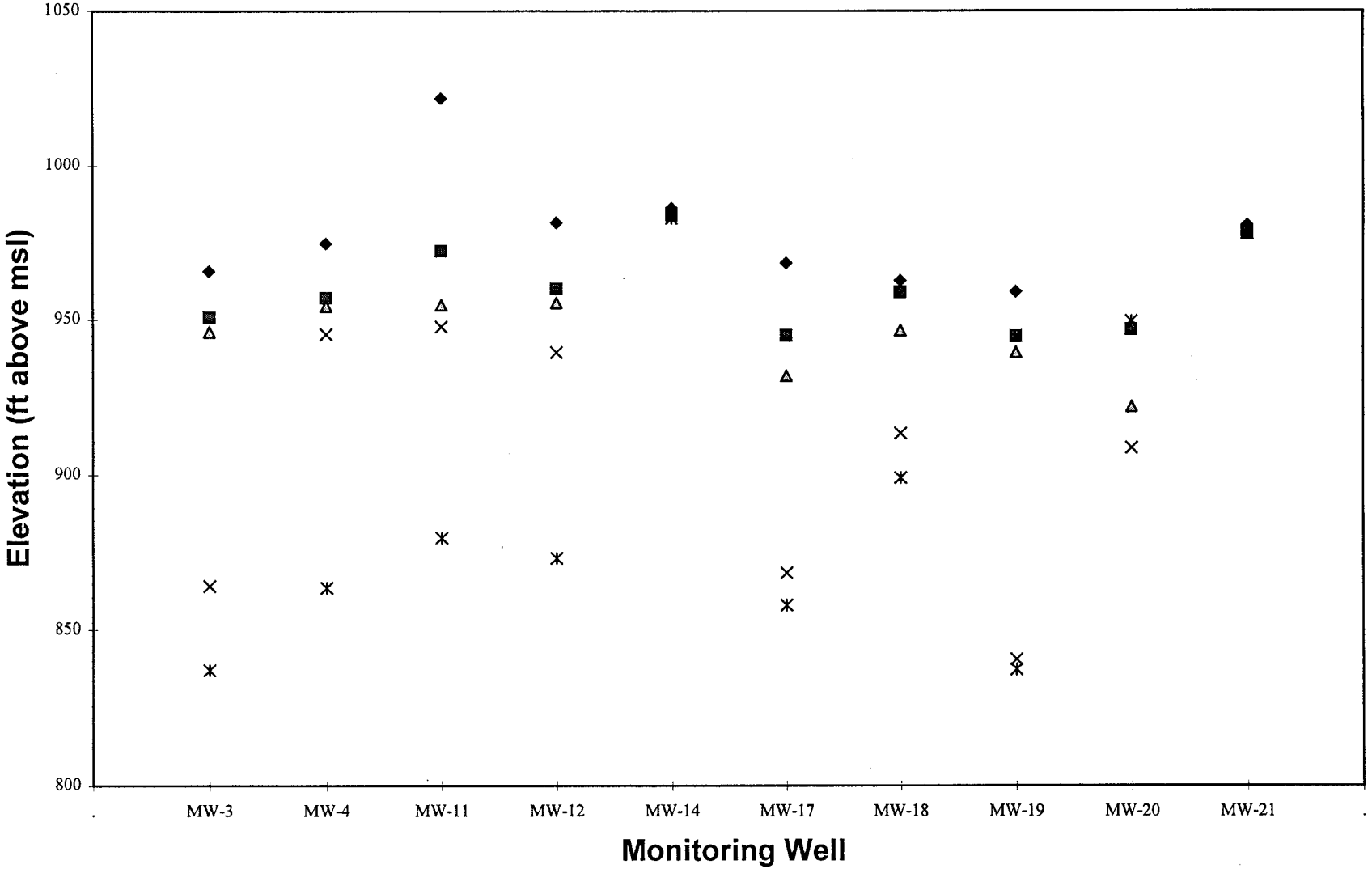


Figure 5-3

PIEZOMETRIC WATER LEVELS

FROM DEEP (MP) WELLS

June 11 and 12, 1997

Jet Propulsion Laboratory
Pasadena, California

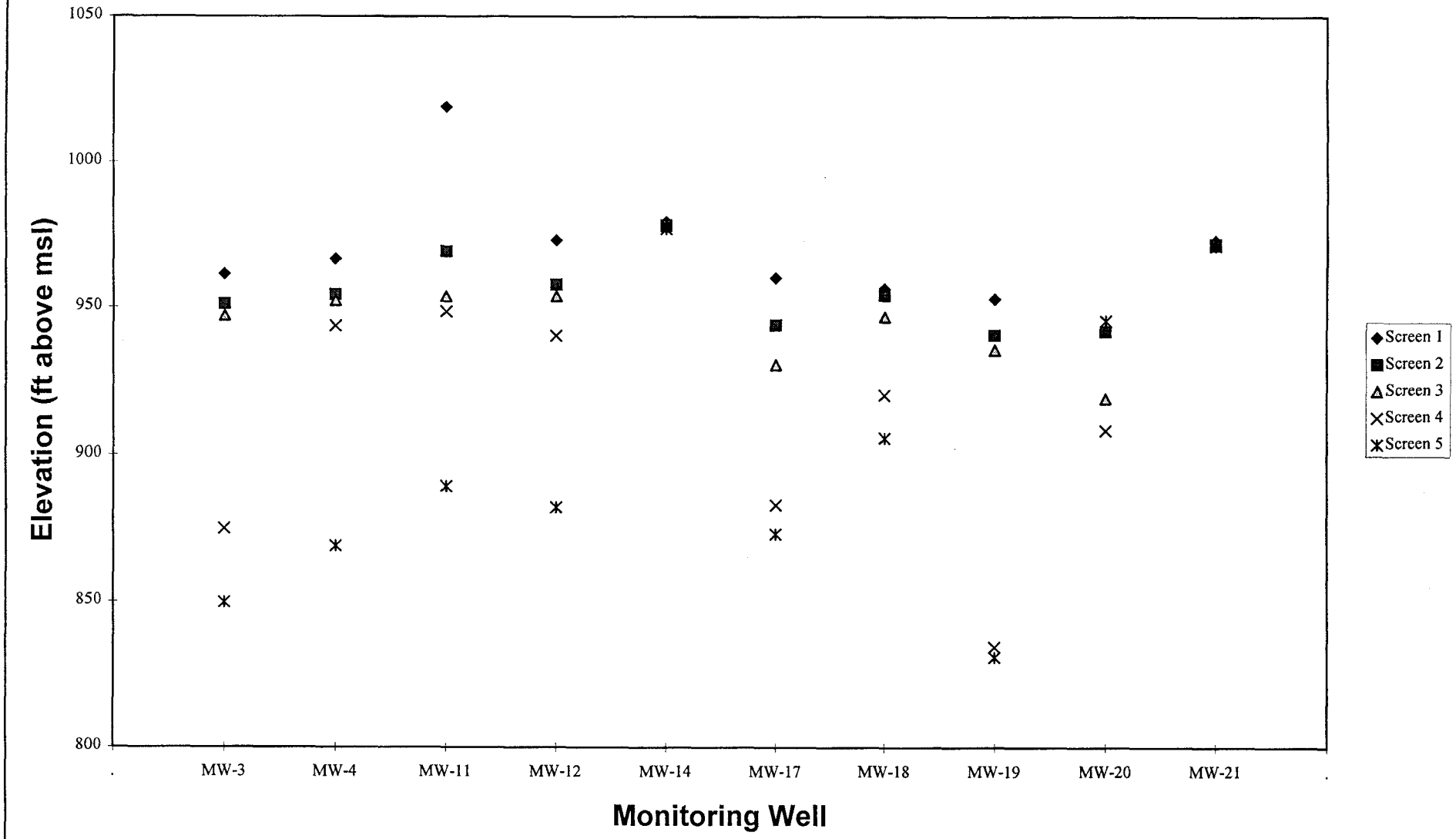


Figure 5-4

PIEZOMETRIC WATER LEVELS

FROM DEEP (MP) WELLS

July 16, 1997

Jet Propulsion Laboratory

Pasadena, California

APPENDIX A

WELL DEVELOPMENT/WELL SAMPLING LOG FORMS FOR SHALLOW WELLS

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572 02:8
Date : 6/18/97
Site Engineer : T. BLANEY

Well Number : MW-1
Equipment : DRT-15L
YSI 3500
Contractor : N/A

	Before	Reference Point	After
Depth to Water (ft)	22.18	TOP OF 4" CASING	22.18
Depth to Sediment (ft)	119.25	TOP OF 4" CASING	119.25
Thickness of Sediment (ft)	0.75		0.75

Depth of Well (ft) 120.00
Diameter of Casing (ft) 0.333
Water Column Height (ft) 97.07
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = 63.36
Casing Volumes Purged 1.74

Total Volume Purged (gals) 110

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0815					2.75	START Pumping @ MW-1
						Control Box @ 2100 Hz
0818	10.1	7.89	20.6	483	2.75	water clear
0823	8.71	18.0	16.4	419	2.75	water sl cloudy
0828	8.08	16.5	16.5	414	2.75	water sl cloudy
0833	7.75	6.52	16.6	409	2.75	water clear
0838	7.57	3.57	16.3	402	2.75	water v clear
0843	7.46	2.83	16.7	407	2.75	water v clear
0846	7.43	2.34	16.7	405	2.75	water v clear
0849	7.41	1.92	16.4	404	2.75	water v clear
0855					0.02	Reduce Flow
0900					0.02	Sample MW-972-E4
0905						STOP Pump.

Notes Sampling Procedures: Set pump @ 25 ft bgs prior to purging

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6/16/97
Site Engineer : T. BLANEY

Well Number : MW-5
Equipment : YSI 3500, DRT-15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	99.41	TOP OF 4" CAS. NO	99.41
Depth to Sediment (ft)	133.80	TOP OF 4" CAS. NO	133.80
Thickness of Sediment (ft)	6.20		6.20

Depth of Well (ft) 140.00
Diameter of Casing (ft) 0.333
Water Column Height (ft) 34.39

Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = 22.4
Casing Volumes Purged 3.9

Total Volume Purged (gals) 85

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1415	—	—	—	—	2.0	START PUMPING AT
						MW-5; CONTROL BOX SET
						@ 250 Hz
1417	8.14	10.0	19.0	296	2.0	WATER SL CLEAR
1422	7.48	8.8	19.3	300	2.0	WATER CLEAR
1427	7.25	10.4	19.3	307	2.0	WATER SL CLEAR
1432	7.18	10.3	18.3	304	2.0	WATER SL CLEAR
1437	7.15	13.5	18.4	303	2.0	WATER SL CLEAR
1442	7.14	9.0	19.4	308	2.0	WATER CLEAR
1447	7.10	8.5	18.2	306	2.0	WATER CLEAR
1452	7.07	5.1	20.5	307	2.0	WATER CLEAR
1457	7.04	4.7	19.7	306	2.0	WATER V. CLEAR
1459	7.07	4.5	18.9	303	2.0	WATER V CLEAR
1459					0.02	REDUCE FLOW
1500					0.02	SAMPLE MW-972-52
1510	—	—	—	—	—	PUMP OFF

Notes Sampling Procedures: PUMP SET @ 104' BTOC

F4

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6/16/97
Site Engineer : T. BLANEY
Well Number : MW-6
Equipment : DRT-15C & YSI 350
Contractor : N/A

	Before	Reference Point	After
Depth to Water (ft)	205.22	TOP of 4" CASING	205.22
Depth to Sediment (ft)	224.60	TOP OF 4" CASING	224.60
Thickness of Sediment (ft)	20.40		20.40

Depth of Well (ft) 245.0
Diameter of Casing (ft) 0.333
Water Column Height (ft) 19.38
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = 12.6
Casing Volumes Purged 4.04
Total Volume Purged (gals) 51

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1220					1.7	START Pumping @ MW-6. Control Box Set @ 350 Hz.
1223	7.13	22.8	22.3	0.497	1.7	Water sl. clear
1228	7.02	31.6	22.4	0.573	1.7	water clear
1233	6.93	15.3	22.2	0.717	1.7	water clearing
1238	6.91	6.99	22.4	0.760	1.7	water clear
1243	6.87	4.30	22.3	0.767	1.7	water v. clear
1246	6.89	3.90	22.4	0.769	1.7	water v clear
1249	6.91	2.50	22.4	0.772	1.7	water v clear
1250					0.02	Reduce Flow
1300					0.02	Sample MW-972-51
1305					0.02	Sample MW-972-51-MS
1310					0.02	Sample MW-972-51-MSD
						SHUT DOWN Pump

Notes Sampling Procedures: Place Pump @ 209' BGS prior to pumping

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6/18/97
Site Engineer : T. Bonney

Well Number : MW-7
Equipment : DRT-15C
YSI 3500
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	239.20	TOC	239.20
Depth to Sediment (ft)	268.90	TOC	268.90
Thickness of Sediment (ft)	6.1		6.1

Depth of Well (ft) 275.0
Diameter of Casing (ft) 0.333
Water Column Height (ft) 29.7
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = 19.4
Casing Volumes Purged 3.8
Total Volume Purged (gals) 74

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1337					2.0	Start pumping MW-7
						Control Box @ 375 Hz
1340	7.64	12.80	24.7	485	2.0	water sl cloudy
1345	7.10	10.40	23.5	472	2.0	water sl cloudy
1350	7.07	9.5	23.4	475	2.0	water cloudy
1355	7.07	9.91	24.8	480	2.0	water cloudy
1400	7.13	1.90	23.3	479	2.0	water v cloudy
1405	7.19	2.03	23.3	477	2.0	water v cloudy
1408	7.19	1.95	23.5	476	2.0	water v cloudy
1411	7.20	0.98	23.5	475	2.0	Water v. Clear
1414					0.02	Reduce Flow
1415					0.02	Sample MW-972-50
1420						Shut Down Pump
1430						Sample MW-972-200

Notes Sampling Procedures: Set pump @ 243' bgs prior to pumping

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6/17/97
Site Engineer : T. BLANEY

Well Number : MW-8
Equipment : DRT-15C, YSI 3500
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	164.18	TOP OF 4" CASING	164.18
Depth to Sediment (ft)	202.45	TOP OF 4" CASING	202.45
Thickness of Sediment (ft)	2.55		2.55

Depth of Well (ft) 205.00
Diameter of Casing (ft) 0.333
Water Column Height (ft) 38.27
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = 24.9
Casing Volumes Purged 6.9
Total Volume Purged (gals) 173.25

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1235	—	—	—	—	2.25	START PUMPING GW
						CONTROL BOX @ 315 H.
1238	8.33	70.0	20.7	405	2.25	WATER CLOUDY
1243	7.34	51.1	19.7	383	2.25	WATER CLOUDY
1248	7.14	39.6	20.4	385	2.25	WATER CLOUDY
1253	7.04	35.3	20.4	386	2.25	WATER CLOUDY
1258	7.01	26.7	20.9	388	2.25	WATER CLOUDY
1303	6.98	21.4	21.4	392	2.25	WATER CLOUDY
1308	6.97	22.1	21.7	392	2.25	WATER CLOUDY
1313	6.98	17.2	21.2	392	2.25	WATER CLOUDY
1318	6.95	12.5	21.1	393	2.25	WATER CLEARING
1323	6.94	11.5	21.0	393	2.25	WATER CLEARING
1328	6.94	9.1	21.6	395	2.25	WATER SL CLEAR
1333	6.91	8.7	22.3	399	2.25	WATER SL CLEAR
1338	6.93	7.35	20.3	392	2.25	WATER SL CLEAR
1343	6.92	8.21	20.0	390	2.25	WATER SL CLEAR
1347	6.90	4.90	20.5	390	2.25	WATER V CLEAR
1350	6.85	4.61	20.6	391	2.25	WATER V. CLEAR
1352					0.02	REDUCE FLOW
1355					0.02	SAMPLE MW-972-49
1400					—	TEMPORP

Notes Sampling Procedures:
PUMP SET AT 167' BTOC

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : IDL
Project Number : 1572 0218
Date : 6/18/97
Site Engineer : T. SVANUM

Well Number : MW-9
Equipment : DDT-15C
YSI 350
Contractor : N/A

	Before	Reference Point	After
Depth to Water (ft)	17.22	TOC	17.22
Depth to Sediment (ft)	69.78	TOC	69.78
Thickness of Sediment (ft)	Ø		Ø

Depth of Well (ft) 68.0
Diameter of Casing (ft) 0.333
Water Column Height (ft) 52.56
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = 34.3
Casing Volumes Purged 2.18
Total Volume Purged (gals) 75

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0945					2.5	START Pumping @ MW-9
						Control Box @ 260 Hz.
0947	6.88	18.27	18.4	401	2.5	Water sl. clear
0952	6.66	11.34	16.7	418	2.5	Water sl. clear.
0957	6.80	10.17	17.3	413	2.5	Water sl. clear
1002	6.53	4.85	17.2	413	2.5	Water V. clear
1007	6.82	3.67	17.1	415	2.5	Water V. clear
1010	6.81	3.50	17.2	413	2.5	Water V. clear
1013	6.83	3.22	17.2	414	2.5	Water V. clear
1015					0.02	Reduce Flow
1020					0.02	Sample MW-972-48
1025						STOP Pumping

Notes Sampling Procedures: Set Pump @ 21' BGS Purge to Pumping

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572 0218
Date : 6/17/97
Site Engineer : T. BLANEY

Well Number : MW-10
Equipment : DRT-15C + YSI 3500
Contractor : N/A

	Before	Reference Point	After
Depth to Water (ft)	114.98	TOC	114.98
Depth to Sediment (ft)	154.00	TOC	154.00
Thickness of Sediment (ft)	1.0		1.0

Depth of Well (ft) 155.0
Diameter of Casing (ft) 0.333
Water Column Height (ft) 39.02
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = 25.5
Casing Volumes Purged 2.8
Total Volume Purged (gals) 72

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1432					2.0	Start pumping @ MW-10
						control box @ 365 Hz
1435	8.31	4.80	20.6	525	2.0	water v clear
1440	7.03	5.40	20.7	526	2.0	water v clear
1445	6.93	3.92	20.9	532	2.0	water v clear
1450	6.87	4.90	20.8	533	2.0	water v clear
1455	6.84	4.88	20.9	532	2.0	water v clear
1500	6.81	4.52	21.0	537	2.0	water v clear
1503	6.80	3.81	21.3	539	2.0	water v clear
1506	6.8	2.92	21.1	542	2.0	water v clear
1508					0.02	Reduce Flow
1510					0.02	Sample MW-972-46
1525					0.02	Sample MW-972-47 (Dup of MW-972-46).
1525						Shut off Pump

Notes Sampling Procedures: Set pump 118' bgs prior to pumping

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572 0218
Date : 6/17/97
Site Engineer : T. BLANEY

Well Number : MW-13
Equipment : DRT-15C & YSI 3500
Contractor : N/A

	Before	Reference Point	After
Depth to Water (ft)	208.55	TOP OF 4" CASING	208.55
Depth to Sediment (ft)	234.90	TOP OF 4" CASING	234.90
Thickness of Sediment (ft)	0.10		0.10

Depth of Well (ft) 235.00
Diameter of Casing (ft) 0.333
Water Column Height (ft) 26.35
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = 17.2
Casing Volumes Purged 3.6
Total Volume Purged (gals) 62.5

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0940					1.25	START Pumping @ MW-13 Control Box @ 335 Hz.
0950	7.70	4.00	23.9	550	1.25	water ✓ clear
0955	7.18	3.59	22.9	543	1.25	water ✓ clear
1000	7.08	2.59	23.3	548	1.25	water ✓ clear
1005	7.09	2.60	23.5	547	1.25	water ✓ clear
1010	7.02	2.57	23.5	549	1.25	water ✓ clear
1015	7.05	2.22	23.3	549	1.25	water ✓ clear
1020	7.05	1.34	23.6	551	1.25	water ✓ clear
1023	7.05	1.18	23.5	552	1.25	water ✓ clear
1026	7.05	1.21	23.3	550	1.25	water ✓ clear
1030					0.02	Reduce Flow
1035					0.02	Sample MW-972-[illegible]33
1045						Sample MW-972-[illegible]34 (Dup of MW-972-33)
1050						SHUT OFF Pump

Notes Sampling Procedures: Set pump @ 212' Bgs prior to Pumping

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6/18/97
Site Engineer : T. Bianchi

Well Number : MW-15
Equipment : DRT-15C
YSI 3500
Contractor : N/A

	Before	Reference Point	After
Depth to Water (ft)	27.25	TOC	27.25
Depth to Sediment (ft)	75.04	TOC	75.04
Thickness of Sediment (ft)	Ø		Ø

Depth of Well (ft) 74.00
Diameter of Casing (ft) 0.333
Water Column Height (ft) 47.79
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = 31.2
Casing Volumes Purged 2.6
Total Volume Purged (gals) 80

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1108					2.0	START Pumping @ MW-15
						Control Box @ 145 Hz
1111	7.38	2.34	19.7	429	2.0	water v clear
1116	6.96	3.80	20.0	425	2.0	water v clear
1121	6.84	0.53	19.8	426	2.0	water v clear
1126	6.87	0.46	20.1	430	2.0	water v clear
1131	6.88	0.43	19.6	430	2.0	water v clear
1136	6.90	0.63	19.9	431	2.0	water v clear
1141	6.92	0.69	19.7	430	2.0	water v clear
1144	6.93	0.65	19.8	429	2.0	water v clear
1147	6.93	0.21	19.8	431	2.0	water v clear
1150					0.02	Reduce flow
1155						Sample MW-97227
1200						Shut Down Pump

Notes Sampling Procedures: Set Pump @ 21' BGS Prior to Pumping

F4

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572 0218
Date : 6/17/97
Site Engineer : T. Blaney
Well Number : MW-16
Equipment : DRT-15C + YSI 3500
Contractor : N/A

	Before	Reference Point	After
Depth to Water (ft)	261.60	Top of 4" Casing	261.60
Depth to Sediment (ft)	285.10	Top of 4" Casing	285.10
Thickness of Sediment (ft)	0		0

Depth of Well (ft) 285.0
Diameter of Casing (ft) 0.333
Water Column Height (ft) 23.5
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = 15.3
Casing Volumes Purged 1.7
Total Volume Purged (gals) 26.5

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0805						START Pumping @ MW-16.
						Control Box @ 395 Hz.
0807						Pump Quits. Reduce Flow
0808					0.5	Control Box @ 375 Hz.
0814	9.53	1.62	23.5	522	0.5	water v clear
0819	8.51	1.19	25.1	536	0.5	water v clear
0824	7.45	0.72	24.1	527	0.5	water v clear
0829	7.50	0.69	24.3	536	0.5	water v clear
0834	7.24	0.41	24.6	537	0.5	water v clear
0839	7.19	0.23	24.5	538	0.5	water v clear
0844	7.15	0.29	24.6	538	0.5	water v clear
0849	7.13	0.38	24.4	539	0.5	water v clear
0852	7.11	0.12	24.6	539	0.5	water v clear
0855	7.13	0.09	24.6	539	0.5	water v clear
0858	7.13	0.12	24.6	540	0.5	water v clear
0900					0.02	Reduce Flow
0905						Sample MW-972.26
0910						Shut off Pump

Notes Sampling Procedures: Move pump to 266 fbgs

APPENDIX B

WELL DEVELOPMENT/WELL SAMPLING LOG FORMS, PIEZOMETRIC PRESSURE PROFILE RECORDS, AND GROUNDWATER SAMPLING FIELD DATA SHEETS FOR DEEP MULTI-PORT WELLS

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6-16-97
Site Engineer : J.BRENNER/T.CHOI

Well Number : MW-18
Equipment : YSI 3500
HF SCIENTIFIC DRT-CE
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	*SEE PRESSURE PROFILES FOR 40 LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) ____
Diameter of Casing (ft) ____
Water Column Height (ft) ____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = ____
Casing Volumes Purged ____
Total Volume Purged (gals) ____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1012	8.76	3.97	19.3	283	—	1ST RUN @ SCREEN 5; INITIAL PARAMETERS
1050	—	—	—	—	—	2ND RUN; SAMPLE MW-972-16
1135	8.96	3.79	22.1	304	—	3RD RUN SAMPLE MW-972-16, FINAL PARAMETERS
1205	7.93	3.58	21.8	379	—	1ST RUN @ SCREEN 4; INITIAL PARAMETERS
1235	—	—	—	—	—	2ND RUN; SAMPLE MW-972-17
1310	7.92	2.58	23.9	397	—	LAST RUN @ SCREEN 4; FINAL PARAMETER
1334	~~7.83~~ ~~5.39~~	5.39	21.0	433	—	1ST RUN @ SCREEN 3; INITIAL PARAMETERS
1400	4.30	—	—	—	—	2ND RUN; SAMPLE MW-972-18
1425	7.88	3.88	24.7	478	—	LAST RUN @ SCREEN 3; FINAL PARAMETERS
~~1452~~ 1452	7.32	1.53	22.8	423	—	1ST RUN @ SCREEN 2; INITIAL PARAMETERS
1515	—	—	—	—	—	2ND RUN: SAMPLE MW-972-19
1545	—	—	—	—	—	3RD RUN: SAMPLE MW-972-19
1605	7.29	2.24	20.2	410	—	LAST RUN @ SCREEN 2; FINAL PARAMETERS

Notes Sampling Procedures: ____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6-17-97
Site Engineer : T.CHOI
Well Number : MW-18
Equipment : YSI 3500
HF SCIENTIFIC DRT-CE
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0832	7.24	0.42	18.3	477	—	1ST RUN @ SCREEN / : INITIAL PARAMETERS
0900	—	—	—	—	—	2ND RUN: SAMPLE MW-972-20
0923	—	—	—	—	—	3RD RUN: SAMPLE MW-972-20
0950	7.07	1.66	19.5	491	—	LAST RUN: FINAL PARAMETERS

Notes Sampling Procedures: _____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.028
Date : 6-17-97
Site Engineer : T.CHOI
Well Number : MW-97
Equipment : YSI 3500
HF SCIENTIFIC DRT-CE
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) ____
Diameter of Casing (ft) ____
Water Column Height (ft) ____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = ____
Casing Volumes Purged ____
Total Volume Purged (gals) ____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1100	8.02	3200	19.2	422	—	1ST RUN @ SCREEN 5: INITIAL PARAMETERS
1145	8.08	62.7	21.3	441	—	2ND RUN: ATTEMPTING TO REDUCE TURBIDITY
1255	7.94	38.4	20.4	432	—	3RD RUN: " " "
1330	7.86	28.7	21.9	454	—	4TH RUN " " "
						LEAVING THIS SCREEN WILL RETURN LATER
1400	7.84	4.09	19.7	437	—	1ST RUN @ SCREEN 4: INITIAL PARAMETERS
1435	—	—	—	—	—	2ND RUN: SAMPLE MW-972-22
1508	7.83	5.29	23.4	252	—	LAST RUN: FINAL PARAMETERS
1536	7.39	2.23	20.8	312	—	1ST RUN @ SCREEN 1: INITIAL PARAM.
1600	—	—	—	—	—	2ND RUN. SAMPLE MW-972-25
1618	—	—	—	—	—	3RD RUN: SAMPLE MW-972-25
1632	7.53	1.91	20.8	313	—	LAST RUN: FINAL PARAMETERS

Notes Sampling Procedures: ____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6-18-97
Site Engineer : T.CHOI/J.BRENNER
Well Number : MW-17
Equipment : YSI 3500
HF SCIENTIFIC DRT-CE
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft)
Diameter of Casing (ft)
Water Column Height (ft)
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) =
Casing Volumes Purged
Total Volume Purged (gals)

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0840	8.59	4.49	18.7	274	—	1ST RUN @ SCREEN 2: INITIAL PARAM.
0900	—	—	—	—	—	2ND RUN AT SCREEN 2; SAMPLE MW-972-24 COLLECTED
0930	8.66	4.80	21.2	290	—	3RD RUN; FINAL PARAMETERS
0945	7.86	14.01	19.0	480	—	1ST RUN TO SCREEN 5; INITIAL PARAMETERS
1055	7.96	18.01	20.6	437	—	2ND RUN TO SCREEN 5; ATTEMPTING TO REDUCE TURBIDITY
1140	8.14	24.4	20.4	441	—	3RD RUN TO SCREEN 5: ATTEMPTING TO REDUCE TURBIDITY
*1555	7.93	32.4	21.3	453	—	4TH RUN: ATTEMPTING TO REDUCE TURB.
1633	7.75	22.9	24.1	470	—	5TH RUN: ATTEMPTING TO REDUCE TURBIDITY

Notes Sampling Procedures: * BAIL DOWN & PURGE SCREEN 5 ≈ 7.67 gallons

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6-19-97
Site Engineer : J.BRENNER/T.CHOI

Well Number : MW-17
Equipment : YSI 3500
HF SCIENTIFIC DRT-CE
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR WATER LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft)
Diameter of Casing (ft)
Water Column Height (ft)
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) =
Casing Volumes Purged
Total Volume Purged (gals)

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1110	7.86	8.93	21.0	429	—	1ST RUN @ SCREEN 5: INITIAL PARAMETERS
1150	8.37	23.4	21.2	448	—	2ND RUN: ATTEMPTING TO REDUCE TURBIDITY
						PURGED ≈ 7 GALLONS
						YESTERDAY & TODAY, HAVE PURGED
						A TOTAL OF ≈ 17 GALLONS TO
						REDUCE TURBIDITY
1625	8.10	34.0	20.5	446	—	3RD RUN: INITIAL PARAMETERS
						SAMPLE MW-972-21
1700	7.90	27.2	24.1	460	—	4TH RUN: SAMPLE MW-972-21
						FINAL PARAMETERS

Notes Sampling Procedures:

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : IPL
Project Number : 1572.0218
Date : 6/20/97
Site Engineer : J.BRENNEK/M.LOSI
Well Number : MW-17
Equipment : YSI 3500
DRS-15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0925	7.73	4.83	19.4	364	—	1ST RUN AT SCREEN 3: INITIAL PARAMETERS, RINSE BOTTLES
1000	—	—	—	—	—	2ND RUN; MW-972-23 COLLECTED
1040	7.70	9.93	23.3	400		3RD RUN AT SCREEN 3; FINAL PARMS

Notes Sampling Procedures: _____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6/20/97
Site Engineer : J. BRENNER/M. LOSI
Well Number : MW-20
Equipment : YSI 3500
DRT-15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1205	9.11	1.94	21.6	364	—	1ST RUN AT SCREEN 5; INITIAL PARAMETERS
1300	—	—	—	—	—	2ND RUN AT SCREEN 5; MW-972-CG COLLECTED
1330	9.07	0.29	23.3	385	—	3RD RUN AT SCREEN 5; FINAL PARAMETERS

Notes Sampling Procedures: _____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6-23-97
Site Engineer : T. CHOI / J. BRENNER
Well Number : MW-20
Equipment : YSI 3500
HF SCIENTIFIC DRT-CE
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVEL		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0857	8.4	1.29	18.0	301	—	1ST RUN @ SCREEN 4: INITIAL PARAMETERS PRIOR SAMPLING
0930	—	—	—	—	—	2ND RUN: SAMPLE MW-972-07
1010	8.19	0.76	18.4	298	—	3RD RUN: FINAL PARAMETERS
1030	8.05	2.14	19.0	451	—	1ST RUN @ SCREEN 3: PRIOR SAMPLING INITIAL PARAMETERS
1109	—	—	—	—	—	2ND RUN: SAMPLE MW-972-08
1135	7.87	1.5	20.1	471	—	3RD RUN: FINAL PARAMETERS
~~1140~~ 1200	8.79	2.54	18.6	306	—	1ST RUN @ SCREEN 2: PRIOR SAMPLING INITIAL PARAMETERS
1225	—	—	—	—	—	2ND RUN: SAMPLE MW-972-09 MW-972-09 MS/MSD
1245	—	—	—	—	—	3RD RUN: SAMPLE MW-972-09
1313	8.85	3.54	20.5	308	—	4TH RUN: FINAL PARAMETERS
1325	7.72	0.16	22.4	806	—	1ST RUN @ SCREEN 1 PRIOR SAMPLING: INITIAL PARAMETERS
1400	—	—	—	—	—	2ND RUN: SAMPLE MW-972-10
1420	—	—	—	—	—	3RD RUN: SAMPLE MW-972-10
1435	7.55	1.16	20.8	302	—	4TH RUN: FINAL PARAMETERS

Notes Sampling Procedures: _____

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6/24/97
Site Engineer : T. CHOI / J. BRENNER
Well Number : MW-21
Equipment : YSI 3500
HF SCIENTIFIC DRT-CE
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1315	7.14	2.76	24.8	882	—	1ST RUN TO SCREEN # / PRIOR TO SAMPLING, INITIAL PARAMETERS
1335	—	—	—	—	—	2ND RUN, COLLECT MW-972-05
1355	—	—	—	—	—	3RD RUN, COLLECT MW-972-05
1420	7.03	2.53	29.4	956	—	4TH RUN, FINAL PARAMETERS

Notes Sampling Procedures: _____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6-24-97
Site Engineer : T.CHOI/J. BRENNER

Well Number : MW-21
Equipment : YSI 3500
HF SCIENTIFIC
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR WATER LEVEL MEASUREMENTS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0925	7.89	19.3	19.9	726	—	1ST RUN @ SCREEN 5 PRIOR SAMPLING: INITIAL PARAMETERS
0950	7.89	32.8	20.1	717	—	2ND RUN: ATTEMPTING TO REDUCE TURBIDITY WILL RETURN TO THIS SCREEN LATER
1018	7.40	2.46	20.1	731	—	1ST RUN @ SCREEN 4 PRIOR SAMPLING: INITIAL PARAMETERS
1045	—	—	—	—	—	2ND RUN: SAMPLE MW-972-02
1105	7.27	1.40	21.4	743	—	3RD RUN: FINAL PARAMETERS
1124	7.35	1.40	20.5	878	—	1ST RUN @ SCREEN 3 PRIOR SAMPLING: INITIAL PARAMETERS
1150	—	—	—	—	—	2ND RUN: SAMPLE MW-972-03
1204	7.22	0.24	22.1	908	—	3RD RUN: FINAL PARAMETERS
1224	7.66	1.68	21.0	1096	—	1ST RUN PRIOR SAMPLING: INITIAL PARAMETERS
1250	—	—	—	—	—	2ND RUN: SAMPLE MW-972-04
1300	7.53	1.56	24.6	816	—	3RD RUN: FINAL PARAMETERS

Notes Sampling Procedures: _____

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6-25-97
Site Engineer : T.CHOI / M.LOSI / S SHAW
Well Number : MW-21
Equipment : YSI 3500
HF SCIENTIFIC, DRT-15CE
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	** SEE PRESSURE	PROFILES FOR WATER LEVELS	
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0910	7.82	11.32	20.5	730	—	1st RUN @ SCREEN 5 PRIOR SAMPLING
0945	7.69	12.31	21.2	739	—	INITIAL PARAMETERS ATTEMPTING TO REDUCE TURBIC
1010	7.67	22.5	21.0	742	—	3rd RUN ATTEMPTING TO REDUCE TURB.
1040	7.67	25.4	21.5	747	—	4th RUN ATTEMPTING TO REDUCE TURBIDITY
1410	—	—	—	—	—	PURGED 1 PACKER VOLUME ≈ 56 gal
1441	7.72	17.5	22.7	787	—	5th RUN ATTEMPTING TO REDUCE TURB.
1640	—	—	—	—	—	PURGED 2 PACKER VOLUMES ≈ 112 GAL
1738	7.39	26.4	25.5	~~934~~ 825	—	
1710	—	—	—	—	—	SAMPLE MW-972-01
1735	7.40	24.9	24.8	830	—	SAMPLE MW-972-01, FINAL PARAMS

Notes Sampling Procedures: _____

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6/26/97
Site Engineer : M. LOSI / G. SHAW

Well Number : MW-19
Equipment : YSI 3500
HFS DRT 15L
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0900	7.41	0.78	18.3	292		1ST RUN @ SCREEN 1, INITIAL PARAMETERS
0930	—	—	—	—	—	2ND RUN, SAMPLE MW-972-15
1010	—	—	—	—	—	3RD RUN, SAMPLE MW-972-15
1040	7.00	4.49	18.9	294		LAST RUN, FINAL PARAMETERS
1106	6.88	2.80	18.3	494		1ST RUN @ SCREEN 2, INITIAL PARAMETERS
1140	—	—	—	—	—	2ND RUN SAMPLE MW-972-14
1200	6.68	1.68	22.3	370		3RD RUN SAMPLE MW-972-14 FINAL PARAMETERS
1313	6.88	11.68	21.6	754		1ST RUN @ SCREEN 3, INITIAL PARAMETERS
1341	6.93	4.88	22.3	775		2ND RUN ATTEMPT TO REDUCE TURBID SAMPLE MW-972-13
1405	—	—	—	—	—	3RD RUN, SAMPLE 972-13
1430	7.01	4.67	22.0	777		LAST RUN, FINAL PARAMETERS
1516	7.46	4.27	20.8	593		1ST RUN @ SCREEN 4, INITIAL PARAMETERS
1630	—	—	—	—		2ND RUN, SAMPLE MW-972-12
1715	—	—	—	—		SAMPLE TOOL MALFUNCTION

Notes Sampling Procedures: SEE PRESSURE PROFILES

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 6/27/97
Site Engineer : T CHOI
Well Number : MW-19
Equipment : YSI 3500 HFS DRT 15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1350	7.63	9.88	25.6	662	—	FIRST RUN PRIOR TO SAMPLING INITIAL PARAMETERS
1415	—	—	—	—	—	2nd RUN: SAMPLING MW-972-12
1500	—	—	—	—	—	3rd RUN: SAMPLING MW-972-12
1530	6.5	4.72	21.6	634	—	4th RUN: SAMPLE MW-972-12' FINAL PARAMETERS

Notes Sampling Procedures: _____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 7/2/97
Site Engineer : TCHOI

Well Number : MW-14
Equipment : YSI 3500
DRT 15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1545	7.62	2.21	25.6	1,308		1ST RUN @ SCREEN 1: INITIAL PARAMETERS
1615	—	—	—	—	—	2nd RUN SAMPLE MW 972-32
1646	—	—	—	—	—	3RD RUN SAMPLE MW 972-32
1709	7.35	9.79	24.8	714		LAST RUN FINAL PARAMETERS

Notes Sampling Procedures: _____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 7/3/97
Site Engineer : TCHOI

Well Number : MW-14
Equipment : YSI 3560
HFS DRTISCE
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1026	7.75	4.97	22.9	1282	–	FIRST RUN @ SCREEN 2 INITAL PARAMETERS
1048	–	–	–	–	–	2ND RUN SAMPLE MW-9772-3
1105	6.88	4.92	24.7	1323		LAST RUN FINAL PARAMETERS SCREEN 2

Notes Sampling Procedures: _____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 7/7/97
Site Engineer : T CHOI

Well Number : MW-19
Equipment : YSI 3500
HF3 DRT 15c
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1400	7.28	2.15	25.7	839	—	1 ST RUN. SCREEN 3 INITIAL PARAMETERS
1426	—	—	—	—	—	2ND RUN SAMPLE MW-972-11
1455	7.53	2.54	27.3	869	—	3RD RUN SAMPLE MW-972-11 FINAL PARAMETERS

Notes Sampling Procedures: _____

F4

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0208
Date : 7/7/97
Site Engineer : TCitol

Well Number : MW-14
Equipment : YSI 3500
HFS DRT 15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROBES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft)
Diameter of Casing (ft)
Water Column Height (ft)
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) =
Casing Volumes Purged
Total Volume Purged (gals)

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0850	7.40	0.70	20.0	830	—	1ST RUN @ SCREEN 5 INITIAL PARAMETERS
0915	—	—	—	—	—	2ND RUN: SAMPLE MW972-30
0940	7.78	0.27	20.9	847	—	3RD RUN: SAMPLE MW972-30 FINAL PARAMETERS
1008	7.90	2.31	20.6	487	—	1ST RUN @ SCREEN 4 INITIAL PARAMETERS
1040	—	—	—	—	—	2ND RUN: SAMPLE MW-972-29
1105	7.83	2.63	20.8	492	—	3RD RUN SAMPLE MW-972-29 FINAL PARAMETERS
1138	8.50	1.90	21.5	312	—	1ST RUN @ SCREEN 5 INITIAL PARAMETERS
1200	—	—	—	—	—	2ND RUN @, SAMPLE MW-972-28
1231	8.64	2.62	23.1	333	—	3RD RUN, SAMPLE MW-972-28 FINAL PARAMETERS

Notes Sampling Procedures:

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : IPL
Project Number : 1572.0218
Date : 7/7/97
Site Engineer : TCCHOI

Well Number : MW-4
Equipment : YSI 5560
HFS DRT 15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PIEZOMETER PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1545	6.92	57.2	24.5	361	—	1ST RUN, SCREEN 1, INITIAL PARAMETERS
1604	6.83	41.1	22.2	342	—	2ND RUN ATTEMPTING TO REDUCE TURBIDITY
						WILL RETURN LATER

Notes Sampling Procedures: _____

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 7/8/97
Site Engineer : T. CHOI

Well Number : MW-12
Equipment : YSI 3500
HF SCIENTIFIC DRT-15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) ____
Diameter of Casing (ft) ____
Water Column Height (ft) ____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = ____
Casing Volumes Purged ____
Total Volume Purged (gals) ____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0823	6.89	4.97	21.1	405	—	1ST RUN TO SCREEN # 5; INITIAL PARAMETERS
0855	—	—	—	—	—	2ND RUN; COLLECT MW-972-35
0925	7.80	3.43	21.5	406	—	3RD RUN; FINAL PARAMETERS
0955	7.82	2.49	21.4	444	—	1ST RUN TO SCREEN #4; INITIAL PARAMETERS
1030	—	—	—	—	—	2ND RUN TO SCREEN #4 COLLECT MW-972-36
1050	—	—	—	—	—	3RD RUN; COLLECT MW-972-36
1119	7.75	4.52	22.5	458	—	4TH RUN; FINAL PARAMETERS
1145	7.89	7.98	23.3	475	—	1ST RUN TO SCREEN # 3; INITIAL PARAMETERS
1200	7.96	4.79	23.0	473	—	2ND RUN; COLLECT MW-972-37
1227	—	—	—	—	—	3RD RUN; COLLECT MW-972-37
1248	7.88	4.63	22.3	468	—	FINAL RUN; FINAL PARAMETERS
1308	7.52	3.16	23.0	485	—	1ST RUN @ SCREEN # 2; INITIAL PARAMETERS
1332	—	—	—	—	—	2ND RUN; COLLECT MW-972-38
1353	—	—	—	—	—	3RD RUN; COLLECT MW-972-38
1403	—	—	—	—	—	4TH RUN; COLLECT MW-972-38
1424	—	—	—	—	—	5TH RUN; COLLECT MW-972-38
1443	—	—	—	—	—	6TH RUN; COLLECT MW-972-38
1508	7.94	3.72	23.2	493	—	LAST RUN; FINAL PARAMETERS

Notes Sampling Procedures: ____

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 7/9/97
Site Engineer : MLOSI

Well Number : MW-12
Equipment : YSI 3500
HFS DRT 15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0844	8.60	7.35	19.5	364	—	1ST RUN@SCREEN 1, INITIAL PARAMETERS
0905	7.98	13.41	19.6	361	—	2ND RUN, ATTEMPT TO REDUCE TURBIDITY
0928	7.97	15.30	20.8	376	—	3RD RUN, ATTEMPT TO REDUCE TURBIDITY
1218	7.47	4.80	21.2	431	—	4TH RUN AFTER PURGING 4.2 gal
1240	—	—	—	—	—	5TH RUN SAMPLE MW-972-39,40
1306	—	—	—	—	—	6TH RUN SAMPLE MW-972-39,40
1324	—	—	—	—	—	7TH RUN SAMPLE MW-972-39,40
1343	—	—	—	—	—	8TH RUN SAMPLE MW-972-39,40
1401	—	—	—	—	—	9TH RUN SAMPLE MW-972-39,40
1419	—	—	—	—	—	10TH RUN SAMPLING MW-972-39,40
1440	—	—	—	—	—	11TH RUN SAMPLE MW-972-39,40
1458	—	—	—	—	—	12TH RUN SAMPLE MW-972-39,40
1517	—	—	—	—	—	13TH RUN SAMPLE MW-972-39,40
1540	—	—	—	—	—	14TH RUN SAMPLE MW-972-39,40
1559	—	—	—	—	—	15TH RUN SAMPLE MW-972-39,40
1625	24.1	7.65	22.1	414	—	16TH RUN SAMPLE MW-972-39,40
						FINAL PARAMETERS

Notes Sampling Procedures: _____

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 7/10/97
Site Engineer : M. LOSI

Well Number : MW-4
Equipment : YSI 3500
HFS DRT 15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	*SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0835	7.21	3.98	21.3	373	—	1ST RUN @ SCREEN 5, INITIAL PARAMETERS
0903	—	—	—	—	—	2ND RUN, SAMPLE MW-972-53
0930	7.81	4.73	22.1	378	—	3RD RUN, SAMPLE MW-972-53 FINAL PARAMETERS
1002	8.07	4.62	22.2	369	—	1ST RUN @ SCREEN 4 INITIAL PARAMETERS
1025	—	—	—	—	—	2ND RUN SAMPLE MW-972-54
1047	7.97	4.45	22.4	379	—	3RD RUN SAMPLE MW-972-54 FINAL PARAMETERS
1112	7.86	1.98	22.5	432	—	1ST RUN @ SCREEN 3, INITIAL PARAMETERS
1135	—	—	—	—	—	2ND RUN, SAMPLE MW-972-55
1155	7.83	1.53	23.0	441	—	3RD RUN, SAMPLE MW-972-55 FINAL PARAMETERS
~~12~~		~~2.69~~				
1222	7.26	2.69	23.1	665	—	1ST RUN @ SCREEN 2, INITIAL PARAMETERS
1245	—	—	—	—	—	2ND RUN, SAMPLE MW-972-56,57
1303	—	—	—	—	—	3RD RUN, SAMPLE MW-972-56,57
1321	—	—	—	—	—	4TH RUN, SAMPLE MW-972-56, 57
1338	—	—	—	—	—	5TH RUN, SAMPLE MW-972-56, 57
1357	—	—	—	—	—	6TH RUN, SAMPLE MW-972-56,57
1413	7.51	4.78	23.4	535	—	7TH RUN SAMPLE MW-972-56,57 FINAL PARAMETERS
1440	7.13	2.79	24.2	362	—	1ST RUN @ SCREEN 1, INITIAL PARAMETERS
1500	—	—	—	—	—	2ND RUN SAMPLE MW-972-58

Notes Sampling Procedures: _____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0208
Date : 7/10/97
Site Engineer : M. LOSI
Well Number : MW-4
Equipment : YSI 3500
HFS DRT 15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft)
Diameter of Casing (ft)
Water Column Height (ft)
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) =
Casing Volumes Purged
Total Volume Purged (gals)

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
1515	—	—	—	—	—	3RD RUN @ SCREEN 1 SAMPLE MW-972-58
1534	—	—	—	—	—	4TH RUN SAMPLE MW-972-58
1550	—	—	—	—	—	5TH RUN SAMPLE MW-972-58
1606	—	—	—	—	—	6TH RUN SAMPLE MW-972-58
1623	7.11	5.24	23.9	3741	—	7TH RUN SAMPLE MW-972-58
						FINAL PARAMETERS

Notes Sampling Procedures:

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.0218
Date : 7/11/97
Site Engineer : M. LOSI
Well Number : MW-11
Equipment : YSI 3500
HFS DRT 15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PIEZOMETER PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0847	7.66	0.69	19.1	297	–	1ST RUN @ SCREEN 5, INITIAL PARAMETERS
0918	–	–	–	–	–	2ND RUN, SAMPLE MW-972-41
0958	8.13	2.91	18.5	300	–	3RD RUN SAMPLE MW-972-41 FINAL PARAMETERS
1029	8.05	8.10	18.9	345	–	1ST RUN @ SCREEN 4, INITIAL PARAMETERS
1100	8.13	4.80	18.7	352	–	2ND RUN ATTEMPT TO REDUCE TURB SAMPLE MW-972-42
1129	7.99	4.18	19.3	313	–	3RD RUN SAMPLE MW-972-42 FINAL PARAMETERS
1158	8.04	1.85	19.3	371	–	1ST RUN @ SCREEN 3, INITIAL PARAMETERS
1224	–	–	–	–	–	2ND RUN SAMPLE MW-972-43
1248	8.12	1.84	19.4	360	–	3RD RUN - SAMPLE MW-972-43 FINAL PARAMETERS
1311	8.00	4.67	19.2	373	–	1ST RUN @ SCREEN 2 INITIAL PARAMETERS
1330	–	–	–	–	–	2ND RUN @ SAMPLE MW-972-44
1349	7.98	4.91	20.3	400	–	3RD RUN, SAMPLE MW-972-44 FINAL PARAMETERS
1415	7.87	1.53	20.8	472	–	1ST RUN @ SCREEN 1, INITIAL PARAMETERS
1432	–	–	–	–	–	2ND RUN SAMPLE MW-972-45
1447	–	–	–	–	–	3RD RUN SAMPLE MW-972-45
1515	7.74	4.39	22.0	490	–	LAST RUN, FINAL PARAMETERS

Notes Sampling Procedures: _____

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.021.8
Date : 7/14/97
Site Engineer : M. LOSI

Well Number : MW-3
Equipment : YSI 3502
HFS DRT 15C
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0910	8.70	0.83	21.9	351	–	1ST RUN @ SCREEN 5, INITIAL PARAMETERS
0944	–	–	–	–	–	2ND RUN, SAMPLE MW972-59
1020	–	–	–	–	–	3RD RUN, UNABLE TO ACTIVATE SHG
1333	8.79	1.60	23.8	333	–	LAST RUN, SAMPLE MW-972-59 FINAL PARAMETERS
1504	8.48	2-71	23.7	346	–	1ST RUN @ SCREEN 4 INITIAL PARAMETERS
1550	–	–	–	–	–	2ND RUN, SAMPLE MW-972-60
1631	8.49	2.48	25.6	363		LAST RUN, SAMPLE MW972-60 FINAL PARAMETERS

Notes Sampling Procedures: _____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

WELL DEVELOPMENT LOG / WELL SAMPLING LOG

Project Name : JPL
Project Number : 1572.8218
Date : 7/15/97
Site Engineer : M. LOSI

Well Number : MW-3
Equipment : YSI 3500
DRT 15C (HFS)
Contractor : NONE

	Before	Reference Point	After
Depth to Water (ft)	* SEE PRESSURE PROFILES FOR H_2O LEVELS		
Depth to Sediment (ft)			
Thickness of Sediment (ft)			

Depth of Well (ft) _____
Diameter of Casing (ft) _____
Water Column Height (ft) _____
Casing Volume (gals) = π(Diam. of Casing (ft)/2)^2 (Water Column Height (ft))(7.48 gals/ft^3) = _____
Casing Volumes Purged _____
Total Volume Purged (gals) _____

Time	pH	Turbidity (NTU)	Temp. (°C)	Conductivity (µmhos)	Pump Rate (gpm)	Comments
0832	8.47	3.41	20.7	339	–	1ST RUN @ SCREEN 3, INITIAL PARAMETERS
0855	—	—	—	—	—	2ND RUN @ SAMPLE MW-972-61
0918	—	—	—	—	—	3RD RUN SAMPLE MW-972-61
0940	8.68	5.14	20.8	343	–	LAST RUN FINAL PARAMETERS
~~1005~~						
1005	7.65	1.13	20.9	446	–	1ST RUN @ SCREEN 2, INITIAL PARAMETERS
1030	—	—	—	—	—	2ND RUN SAMPLE MW-972-62
1048	—	—	—	—	—	3RD RUN SAMPLE MW-972-62
1105	7.44	4.08	20.5	445	—	LAST RUN, FINAL PARAMETERS
			~~30~~			
1125	7.70	2.61	20.4	337	–	1ST RUN @ SCREEN 1 INITIAL PARAMETERS
1150	—	—	—	—	—	2ND RUN SAMPLE MW-972-63
1206	7.63	3.83	20.8	350	–	3RD RUN SAMPLE MW-972-63

Notes Sampling Procedures: _____

F4

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 6/11/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-3

Elevation of Datum(ft msl): 1100.34 | Range: 0 to 750 psia | Weather: 60 deg, overcast | Client: Jet Propulsion Laboratory | Casing Size: 1.5-inch Westbay Casing | Operator: T. Choi / J. Brenner

Ambient Reading (Pressure/Temperature/Time) Start: 14.29/18.58/1642 | Finish: 14.29/19.40/1659

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	653	179.23			22.16	1647	271.12	263.24	837.10
			182.65						
			182.68						
			182.65						
				179.26					
4	558	138.02			23.04	1650	271.63	236.24	864.10
			153.37						
			153.35						
			153.37						
				138.02					
3	346	45.99			21.95	1653	272.66	154.27	946.07
			97.31						
			97.33						
			97.33						
				46.01					
2	252	14.34			20.44	1653	0.00	149.61	950.73
			58.74						
			58.70						
			58.74						
				14.34					
1	172	14.19			19.58	1658	0.00	134.58	965.76
			30.44						
			30.41						
			30.46						
				14.24					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 6/11/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-4

Elevation of Datum(ft msl): 1082.84 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: 60 deg, overcast | Casing Size: 1.5-inch Westbay Casing

Operator: T. Choi / J. Brenner

Ambient Reading (Pressure/Temperature/Time) Start: 14.27/21.11/1601 | Finish: 14.37/20.43/1630

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	513	126.43			22.09	1604	253.11	219.29	863.55
			141.09						
			141.09						
			141.09						
				126.43					
4	392	73.84			21.85	1608	253.69	137.53	945.31
			123.52						
			123.52						
			125.54						
				73.84					
3	322	43.45			21.71	1610	254.01	128.54	954.30
			97.84						
			97.82						
			97.87						
				43.45					
2	240	14.37			21.12	1615	0.00	125.84	957.00
			63.85						
			63.88						
			63.88						
				14.39					
1	150	14.27			20.45	1625	0.00	108.20	974.64
			32.42						
			32.44						
			32.42						
				14.34					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 6/11/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-11

Elevation of Datum(ft msl): 1139.30 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: 60 deg, overcast | Casing Size: 1.5-inch Westbay Casing

Operator: T. Choi / J. Brenner

Ambient Reading (Pressure/Temperature/Time) Start: 14.27/19.19/1720 | Finish: 14.27/19.19/1740

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	639	158.73			21.41	1725	301.54	259.63	879.67
			176.90						
			176.90						
			176.90						
				158.73					
4	524	109.52			21.93	1729	301.69	191.54	947.76
			157.25						
			157.25						
			157.27						
				109.49					
3	429	68.63			20.41	1734	302.11	184.35	954.95
			119.69						
			119.69						
			119.69						
				68.65					
2	259	14.32			19.57	1738	0.00	167.04	972.26
			54.23						
			54.25						
			54.25						
				14.44					
1	149	14.31			19.12	1740	0.00	117.59	1021.71
			27.95						
			27.92						
			27.95						
				14.34					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 6/11/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-12

Elevation of Datum(ft msl): 1102.14 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: 60 deg, overcast | Casing Size: 1.5-inch Westbay Casing

Operator: T. Choi / J. Brenner

Ambient Reading (Pressure/Temperature/Time) Start: 14.25/21.55/1625 | Finish: 14.17/18.13/1640

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	548	191.86			21.07	1625	137.72	229.02	873.12
			152.35						
			152.37						
			152.35						
				192.01					
4	436	143.16			21.04	1628	138.28	162.68	939.46
			132.60						
			132.62						
			132.60						
				143.21					
3	323	93.85			19.51	1631	138.83	146.70	955.44
			90.55						
			90.52						
			90.52						
				94.03					
2	243	59.25			18.99	1633	139.23	142.18	959.96
			57.98						
			58.00						
			57.96						
				59.27					
1	140	14.26			18.23	1636	0.00	120.78	981.36
			22.56						
			22.58						
			22.58						
				14.22					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 6/11/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-14

Elevation of Datum(ft msl): 1173.47 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: 60 deg, overcast | Casing Size: 1.5-inch Westbay Casing

Operator: T. Choi / J. Brenner

Ambient Reading (Pressure/Temperature/Time) Start: 14.24/20.09/1540 | Finish: 14.27/19.72/1600

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	540	144.37			20.83	1541	239.42	190.68	982.79
			165.49						
			165.52						
			165.50						
				144.38					
4	456	108.01			21.04	1544	239.87	189.68	983.79
			129.76						
			129.74						
			129.74						
				107.97					
3	382	75.69			20.70	1548	240.22	189.40	984.07
			97.71						
			97.74						
			97.74						
				75.71					
2	277	30.15			20.13	1552	240.74	189.06	984.41
			52.52						
			52.55						
			52.55						
				30.12					
1	207	14.34			19.78	1558	0.00	187.37	986.10
			22.90						
			22.88						
			22.88						
				14.41					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 6/12/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-17

Elevation of Datum(ft msl): 1191.21 | Range: 0 to 750 psia | Weather: 60 deg, overcast | Client: Jet Propulsion Laboratory | Casing Size: 1.5-inch Westbay Casing | Operator: T. Choi / J. Brenner

Ambient Reading (Pressure/Temperature/Time) Start: 14.22/15.60/1306 | Finish: 14.22/15.60/13.26

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	726	214.60			20.70	1306	263.31	333.22	857.99
			184.32						
			184.29						
			184.32						
				214.63					
4	582	152.17			18.41	1312	264.10	322.82	868.39
			126.66						
			126.66						
			126.66						
				152.06					
3	468	102.52			17.41	1315	264.58	259.18	932.03
			104.88						
			104.88						
			104.88						
				102.56					
2	370	59.95			16.72	1316	265.04	246.29	944.92
			68.09						
			68.09						
			68.09						
				59.97					
1	250	14.26			15.61	1320	0.00	222.81	968.40
			26.04						
			26.06						
			26.04						
				14.26					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 6/11/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-18

Elevation of Datum(ft msl): 1225.41 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: 60 deg, overcast | Casing Size: 1.5-inch Westbay Casing

Operator: T. Choi / J. Brenner

Ambient Reading (Pressure/Temperature/Time) Start: 14.19/18.07/1335 | Finish: 14.19/17.35/1355

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	684	150.71			19.88	1338	368.31	326.25	899.16
			168.93						
			168.95						
			168.93						
				150.70					
4	564	98.55			19.65	1342	368.89	311.87	913.54
			123.27						
			123.25						
			123.25						
				98.53					
3	424	37.85			19.53	1345	369.64	278.81	946.60
			77.22						
			77.19						
			77.24						
				37.83					
2	330	14.39			17.53	1348	0.00	266.54	958.87
			41.85						
			41.87						
			41.90						
				14.34					
1	270	14.29			17.41	1352	0.00	262.77	962.64
			17.43						
			17.41						
			17.46						
				14.31					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 6/12/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-19

Elevation of Datum(ft msl): 1142.94 | Range: 0 to 750 psia | Weather: 60 deg, overcast | Client: Jet Propulsion Laboratory | Casing Size: 1.5-inch Westbay Casing | Operator: T. Choi / J. Brenner

Ambient Reading (Pressure/Temperature/Time) Start: 14.31/19.59/1445 | Finish: 14.19/16.84/1500

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings: Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)	Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
5	498	139.85			18.82	1446	206.83	305.60	837.34
			97.06						
			97.04						
			97.08						
				139.90					
4	444	116.44			18.14	1450	206.95	302.46	840.48
			75.06						
			75.03						
			75.06						
				116.47					
3	392	93.98			18.37	1453	207.06	203.45	939.49
			95.54						
			95.57						
			95.57						
				94.01					
2	314	60.10			18.11	1456	207.24	198.30	944.64
			64.00						
			63.98						
			63.97						
				60.12					
1	242	29.02			17.23	1458	207.40	183.89	959.05
			39.19						
			39.21						
			39.19						
				28.99					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 6/12/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-20

Elevation of Datum(ft msl): 1165.05 | Range: 0 to 750 psia | Weather: 60 deg, overcast | Client: Jet Propulsion Laboratory | Casing Size: 1.5-inch Westbay Casing | Operator: T. Choi / J. Brenner

Ambient Reading (Pressure/Temperature/Time) Start: 14.24/19.08/1413 | Finish: 14.17/17.51/1440

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	900	269.36			21.52	1417	310.28	215.57	949.48
			310.38						
			310.38						
			310.40						
				269.30					
4	700	182.39			22.36	1422	311.24	256.31	908.74
			206.21						
			206.19						
			206.21						
				182.39					
3	562	122.36			20.97	1426	311.95	242.93	922.12
			152.30						
			152.27						
			152.27						
				122.36					
2	392	48.54			18.66	1429	312.79	218.19	946.86
			89.56						
			89.56						
			89.56						
				48.56					
1	230	14.34			17.70	1435	0.00	217.03	948.02
			20.01						
			19.97						
			19.98						
				14.39					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 6/12/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-21

Elevation of Datum(ft msl): 1059.10 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: 60 deg, overcast | Casing Size: 1.5-inch Westbay Casing

Operator: T. Choi / J. Brenner

Ambient Reading (Pressure/Temperature/Time) Start: 14.29/18.92/1518 | Finish: 14.27/19.19/1529

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	372	131.53			19.49	1520	101.39	81.55	977.55
			140.13						
			140.13						
			140.13						
				131.53					
4	310	104.59			20.12	1522	101.69	81.51	977.59
			113.34						
			113.31						
			113.34						
				104.57					
3	240	74.58			19.85	1524	102.04	81.26	977.84
			83.59						
			83.59						
			83.59						
				74.58					
2	161	40.32			19.43	1526	102.39	80.60	978.50
			49.76						
			49.76						
			49.78						
				40.32					
1	90	14.31			19.25	1527	0.00	78.66	980.44
			19.24						
			19.22						
			19.22						
				14.31					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 7/16/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-3

Elevation of Datum(ft msl): 1100.34 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: Warm/humid/cloudy | Casing Size: 1.5-inch Westbay Casing

Operator: M. Losi / G. Shaw

Ambient Reading (Pressure/Temperature/Time) Start: 13.40/28.14/1431 | Finish: 13.43/21.32/1544

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	653	159.21			25.86	1439	316.50	250.58	849.76
			187.78						
			187.79						
			187.76						
				159.19					
4	558	117.92			24.95	1443	317.02	225.45	874.89
			157.63						
			157.66						
			157.62						
				117.96					
3	346	25.84			23.68	1536	317.97	153.18	947.16
			97.26						
			97.23						
			97.29						
				25.81					
2	252	13.76			22.62	1539	0.00	149.22	951.12
			58.31						
			58.28						
			58.32						
				13.74					
1	172	13.65			22.04	1541	0.00	139.00	961.34
			27.94						
			27.91						
			27.96						
				13.61					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 7/16/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-4

Elevation of Datum(ft msl): 1082.84 | Range: 0 to 750 psia | Weather: Warm/humid/cloudy | Client: Jet Propulsion Laboratory | Casing Size: 1.5-inch Westbay Casing | Operator: M. Losi / G. Shaw

Ambient Reading (Pressure/Temperature/Time) Start: 13.50/22.38/931 | Finish: 13.94/21.24/958

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings: Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)	Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
5	513	125.73			23.65	937	254.45	213.83	869.01
			143.32						
			143.35						
			143.38						
				125.75					
4	392	73.12			23.33	944	253.98	139.12	943.72
			122.90						
			122.88						
			122.91						
				73.09					
3	322	42.66			22.67	948	254.15	130.45	952.39
			96.30						
			96.27						
			96.34						
				42.70					
2	240	13.68			22.05	953	0.00	128.44	954.40
			62.03						
			62.06						
			62.05						
				13.69					
1	150	13.59			21.57	955	0.00	116.27	966.57
			28.57						
			28.51						
			28.59						
				13.60					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 7/16/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-11

Elevation of Datum(ft msl): 1139.30 | Range: 0 to 750 psia | Weather: Warm/humid/cloudy | Client: Jet Propulsion Laboratory | Casing Size: 1.5-inch Westbay Casing | Operator: M. Losi / G. Shaw

Ambient Reading (Pressure/Temperature/Time) Start: 13.42/23.22/705 | Finish: 13.48/19.39/823

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings: Inside Casing (psia)	Fluid Pressure Readings: Outside Casing (psia)	Fluid Pressure Readings: Inside Casing (psia)	Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
5	639	158.11			23.83	757	302.10	249.89	889.41
			180.77						
			180.74						
			180.70						
				158.10					
4	524	108.66			22.50	804	302.63	190.68	948.62
			157.19						
			157.20						
			157.20						
				108.67					
3	429	67.75			21.45	810	303.02	185.52	953.78
			118.68						
			118.71						
			118.65						
				67.74					
2	259	13.63			20.13	816	0.00	170.19	969.11
			52.14						
			52.17						
			52.11						
				13.65					
1	149	13.60			19.68	820	0.00	120.35	1018.95
			26.02						
			26.05						
			26.02						
				13.62					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 7/16/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-12

Elevation of Datum(ft msl): 1102.14 | Range: 0 to 750 psia | Weather: Warm/humid/cloudy | Client: Jet Propulsion Laboratory | Casing Size: 1.5-inch Westbay Casing | Operator: M. Losi / G. Shaw

Ambient Reading (Pressure/Temperature/Time) Start: 13.42/22.04/835 | Finish: 13.39/19.52/920

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	548	97.20			23.46	855	355.55	219.92	882.22
			156.02						
			156.01						
			155.99						
				97.22					
4	436	48.56			22.01	900	356.06	161.78	940.36
			132.77						
			132.74						
			132.80						
				48.55					
3	323	13.82			20.76	905	0.00	148.25	953.89
			89.53						
			89.57						
			89.56						
				13.78					
2	243	13.64			20.41	907	0.00	144.39	957.75
			56.39						
			56.42						
			56.34						
				13.63					
1	140	13.67			19.76	913	0.00	129.14	973.00
			18.38						
			18.41						
			18.31						
				13.65					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 7/16/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-14

Elevation of Datum(ft msl): 1173.47 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: Warm/humid/cloudy | Casing Size: 1.5-inch Westbay Casing

Operator: M. Losi / G. Shaw

Ambient Reading (Pressure/Temperature/Time) Start: 13.41/26.91/1359 | Finish: 13.43/21.13/1418

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	540	143.35			24.05	1406	240.81	196.53	976.94
			162.55						
			162.59						
			162.53						
				143.37					
4	456	106.79			23.34	1408	241.22	195.45	978.02
			126.67						
			126.60						
			126.64						
				106.80					
3	382	74.64			22.28	1411	241.60	195.45	978.02
			94.66						
			94.59						
			94.63						
				74.60					
2	277	28.88			21.43	1414	242.06	195.09	978.38
			49.22						
			49.19						
			49.25						
				28.84					
1	207	13.62			21.15	1416	0.00	194.06	979.41
			19.23						
			19.20						
			19.23						
				13.60					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 7/16/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-17

Elevation of Datum(ft msl): 1191.21 | Range: 0 to 750 psia | Weather: Warm/humid/cloudy | Client: Jet Propulsion Laboratory | Casing Size: 1.5-inch Westbay Casing | Operator: M. Losi / G. Shaw

Ambient Reading (Pressure/Temperature/Time) Start: 13.79/28.83/1122 Finish: 13.69/17.22/1150

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings: Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)	Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
5	726	167.71			23.36	1133	371.10	317.99	873.22
			190.72						
			190.75						
			190.72						
				167.70					
4	582	105.16			20.33	1137	371.16	308.05	883.16
			132.52						
			132.55						
			132.52						
				105.18					
3	468	55.58			18.70	1141	372.24	260.42	930.79
			104.06						
			104.03						
			104.09						
				55.59					
2	370	13.72			17.48	1144	0.00	247.04	944.17
			66.99						
			67.02						
			67.01						
				13.69					
1	250	13.67			17.19	1147	0.00	230.93	960.28
			21.96						
			21.89						
			21.94						
				13.66					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 7/16/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-18

Elevation of Datum(ft msl): 1225.41 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: Warm/humid/cloudy | Casing Size: 1.5-inch Westbay Casing

Operator: M. Losi / G. Shaw

Ambient Reading (Pressure/Temperature/Time) Start: 13.40/24.49/1015 | Finish: 13.47/23.40/1112

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	684	149.94			23.46	1021	369.10	319.52	905.89
			171.40						
			171.43						
			171.37						
				149.89					
4	564	97.73			22.78	1026	369.62	304.93	920.48
			125.78						
			125.81						
			125.76						
				97.75					
3	424	36.88			20.25	1031	370.31	278.43	946.98
			76.71						
			76.65						
			76.74						
				36.86					
2	330	13.68			19.31	1035	0.00	271.07	954.34
			39.26						
			39.20						
			39.23						
				13.69					
1	270	13.61			19.63	1059	0.00	268.70	956.71
			14.20						
			14.16						
			14.19						
				13.63					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 7/16/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-19

Elevation of Datum(ft msl): 1142.94 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: Warm/humid/cloudy | Casing Size: 1.5-inch Westbay Casing

Operator: M. Losi / G. Shaw

Ambient Reading (Pressure/Temperature/Time) Start: 13.98/28.33/1243 | Finish: 13.82/19.14/1308

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	498	47.56			22.86	1248	419.64	311.89	831.05
			94.28						
			94.31						
			94.25						
				47.58					
4	444	23.99			20.20	1253	419.95	308.38	834.56
			72.40						
			72.36						
			72.37						
				24.00					
3	392	13.73			19.34	1300	0.00	207.11	935.83
			93.90						
			93.87						
			93.90						
				13.75					
2	314	13.67			19.44	1303	0.00	202.14	940.80
			62.16						
			62.20						
			62.16						
				13.69					
1	242	13.64			19.25	13.06	0.00	189.77	953.17
			36.27						
			36.31						
			36.30						
				13.66					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 7/16/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-20

Elevation of Datum(ft msl): 1165.05 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: Warm/humid/cloudy | Casing Size: 1.5-inch Westbay Casing

Operator: M. Losi / G. Shaw

Ambient Reading (Pressure/Temperature/Time) Start: 13.42/25.02/1203 | Finish: 13.52/19.06/1224

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	900	268.24			24.90	1208.00	311.60	219.28	945.77
			308.26						
			208.23						
			308.26						
				268.23					
4	700	181.41			24.09	1213	312.60	256.45	908.60
			205.74						
			205.73						
			205.77						
				181.40					
3	562	121.27			22.98	1216	313.30	245.64	919.41
			150.64						
			150.67						
			150.61						
				121.35					
2	392	47.50			20.43	1219	314.14	222.99	942.06
			87.01						
			86.98						
			87.00						
				47.47					
1	230	13.70			19.15	1222	0.00	222.34	942.71
			17.03						
			17.06						
			17.00						
				13.72					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

PIEZOMETRIC PRESSURES/LEVELS

FIELD DATA SHEET FOR MULTI-PORT MONITORING WELLS

Datum: Top of 1.5" Casing | Probe Type: Westbay | Date: 7/16/97 | Job No.: 1572

Serial No.: 1455 | Well Name: MW-21

Elevation of Datum(ft msl): 1059.10 | Range: 0 to 750 psia | Client: Jet Propulsion Laboratory

Weather: Warm/humid/cloudy | Casing Size: 1.5-inch Westbay Casing

Operator: M. Losi / G. Shaw

Ambient Reading (Pressure/Temperature/Time) Start: 13.48/26.44/1325 | Finish: 13.47/20.72/13.43

Screen No.:	Depth (ft btoc)	Fluid Pressure Readings			Temp. (C)	Time (hrs:min)	Depth to Water (ft)	Piezometric Level Outside Port (ft)	Water Level Elevation (ft)
		Inside Casing (psia)	Outside Casing (psia)	Inside Casing (psia)					
5	372	115.09			23.61	1331	138.56	87.82	971.28
			137.08						
			137.10						
			137.06						
				115.08					
4	310	88.10			22.41	1334	138.82	87.85	971.25
			110.20						
			110.17						
			110.23						
				88.11					
3	240	58.05			21.36	1337	139.14	87.57	971.53
			80.38						
			80.42						
			80.99						
				58.03					
2	161	23.61			20.86	1340	139.52	87.15	971.95
			46.33						
			46.30						
			46.35						
				23.64					
1	90	13.66			20.71	1342	0.00	85.97	973.13
			15.40						
			15.37						
			15.34						
				13.59					

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 684 Date: 6-16-97

Well Name: MW-18 Sampling Zone No.: 5 Starting Time: 0945 Finishing Time: 1135

Technicians: J. BRENNER/T. CHOI

Water Level Inside MP Casing (Beginning of Session) 152.55 PSIA (End of Session) 152.48 PSIA

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	152.55 ~~150.71~~	✓	1003	1007	✓	152.53	1.0	1ST RUN; RINSING BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	152.50	✓	1038	1041	✓	152.53	1.0	2ND RUN; SAMPLE MW-972-16; 2 VOAS, METALS, ANIONS, Cr+6
3	✓	✓	✓	✓	✓	✓	152.46	✓	1111	1114	✓	152.48	1.0	3RD RUN; ClO_2, ClO_2 SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

F2

Comments:

Total Volume: 3.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 330 Date: 6-16-97

Well Name: MW-18 Sampling Zone No.: SCREEN 2 Starting Time: 1435 Finishing Time: 1600

Technicians J. BRENNER / T. CHOI

Water Level Inside MP Casing (Beginning of Session) 14.32 TSIP (End of Session) 1605 TSIP

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	14.32	✓	1442	1447	✓	14.28	1.0	1ST RUN: INITIAL PARAMETERS; RINSE BOTTLES
2	✓	✓	✓	✓	✓	✓	14.40	✓	1505	1510	✓	14.30	1.0	2ND RUN; SAMPLE MW-972-19: VOA's, METALS, ANIONS, ½ Cr^{+6}
3	✓	✓	✓	✓	✓	✓	14.59	✓	1529	1533	✓	14.30	1.0	3RD RUN: FINISH SAMPLING MW-972-19: ½ Cr^{+6}, PERCHLORATE, PERCHLORATE SPLIT
4	✓	✓	✓	✓	✓	✓	14.69	✓	1555	1558	✓	14.38	0.5	4TH RUN: FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.5L [F2]

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 424 Date: 6-16-97

Well Name: MW-18 Sampling Zone No.: SCREEN 3 Starting Time: 1315 Finishing Time: 1425

Technicians J.BRENNER/T.CHOI

Water Level Inside MP Casing (Beginning of Session) 39.42 PSIA (End of Session) 39.42 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	39.42	✓	1323	1327	✓	39.44	1.0	1ST RUN; INITIAL PARAMETERS; RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	39.45	✓	1348	1351	✓	39.46	1.0	2ND RUN; SAMPLE MW-972-18; 2 VOA'S, METALS, ANIONS, ½ Cr^{+6}
3	✓	✓	✓	✓	✓	✓	39.43	✓	1414	1418	✓	39.42	1.0	3RD RUN; ½ Cr^{+6}, PERCHLORATE, PERCHLORATE SPLIT,
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0 L

F2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 564 Date: 6-16-97

Well Name: MW-18 Sampling Zone No.: SCREEN 4 Starting Time: 1140 Finishing Time: 1310

Technicians J. BRENNER / T. CHOI

Water Level Inside MP Casing (Beginning of Session) 100.19 PSIA (End of Session) 100.26 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	100.19	✓	1152	1155	✓	100.26	1.0	1ST RUN: INITIAL PARAMETERS + RINSE BOTTLES W/ FORMATION WATER
2	✓	✓	✓	✓	✓	✓	100.19	✓	1225	1228	✓	100.28	1.0	2ND RUN: SAMPLE MW-972-17; 2 VOAs, METALS, ANIONS, Cr^{+6}
3	✓	✓	✓	✓	✓	✓	100.21	✓	1251	1254	✓	100.26	1.0	3RD RUN; PERCHLORATE, PERCHLORATE SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

F2

Comments:

Total Volume: 3.0L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 270 Date: 6-17-97

Well Name: MW-18 Sampling Zone No.: SCREEN 1 Starting Time: 0816 Finishing Time: 0945

Technicians J. BRENNER / T. CHOI

Water Level Inside MP Casing (Beginning of Session) 14.20 FS1A (End of Session) 14.29 FS1A

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	14.20	✓	0820	0827	✓	14.29	1.0	1ST RUN, INITIAL PARAMETERS
2	✓	✓	✓	✓	✓	✓	14.34	✓	0843	0852	✓	14.36	1.0	2ND RUN: SAMPLE MW-972-20: VOAS, METALS, ½ ANIONS
3	✓	✓	✓	✓	✓	✓	14.30	✓	0909	0917	✓	14.29	1.0	3RD RUN: SAMPLE MW-972-20: ½ ANIONS, Cr^{+6}, PERCHLORATE; ½ PERCHLORATE SPLIT
4	✓	✓	✓	✓	✓	✓	14.35	✓	0932	0941	✓	14.29	1.0	4TH RUN: SAMPLE MW-972-20: ½ PERCHLORATE SPLIT: FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 4.0L

F2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 250 Date: 6/17/97

Well Name: MW-17 Sampling Zone No.: SCREEN 1 Starting Time: 1519 Finishing Time: 1645

Technicians: T. CHOI.

Water Level Inside MP Casing (Beginning of Session) 14.70 PSIA (End of Session) 14.27 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	14.70	✓	1524	1531	✓	14.22	1.0	1ST RUN: INITIAL PARAMETERS: RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	14.44	✓	1542	1550	✓	14.20	1.0	2ND RUN: SAMPLE MW-972-25: 2 VOA's, METALS, ANIONS 1/2
3	✓	✓	✓	✓	✓	✓	14.52	✓	1605	1612	✓	14.19	1.0	3RD RUN: SAMPLE MW-972-25: 1/2 ANIONS, Cr^{+6}, PERCHLORATE, PERCHLORATE SPLIT
4	✓	✓	✓	✓	✓	✓	14.51	✓	1626	1631	✓	14.20	1.0	4TH RUN: FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 4.0 L

F2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 582 Date: 6-17-97

Well Name: MW-17 Sampling Zone No.: SCREEN 4 Starting Time: 1340 Finishing Time: 1505

Technicians T.CHOI, J.BRENNER

Water Level Inside MP Casing (Beginning of Session) 114.05 PSIA (End of Session) 113.85 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	114.05	✓	1351	1355	✓	113.91	1.0	1ST RUN: INITIAL PARAMETERS; RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	113.83	✓	1419	1422	✓	113.92	1.0	2ND RUN: SAMPLE MW-972-22 VOCS, METALS, ANIONS, HEX Cr.
3	✓	✓	✓	✓	✓	✓	113.83	✓	1451	1455	✓	113.85	1.0	3RD RUN: SAMPLE MW-972-22 PERCHLORATE; FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 726 Date: 6-17-97

Well Name: MW-17 Sampling Zone No.: SCREEN 5 Starting Time: 1028 Finishing Time: 1315

Technicians T.CHOI / J.BRENNER

Water Level Inside MP Casing (Beginning of Session) 176.78 PSIA (End of Session) 176.58 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ll)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ll) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	176.78	✓	1042	1048	✓	176.80	1.0	1ST RUN: INITIAL PARAMETERS: RINSE BOTTLES W/FORMATION WATER, NTUs >200
2	✓	✓	✓	✓	✓	✓	176.73	✓	1128	1135	✓	176.73	1.0	2ND RUN: ATTEMPTING TO REDUCE TURBIDITY, NTUs = 62.7 >200 = NTUs
3	✓	✓	✓	✓	✓	✓	176.56	✓	1238	1241	✓	176.58	1.0	3RD RUN: ATTEMPTING TO REDUCE TURBIDITY, NTUs = 38.4
4	✓	✓	✓	✓	✓	✓	176.51	✓	1309	1313	✓	176.58	1.0	4TH RUN: ATTEMPTING TO REDUCE TURBIDITY, NTUs = 28.7
5														
6														
7														
8														
9														
10														
11														
12														

F2

Comments:

Total Volume: 4.0L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: _____ Depth: 370 Date: 6/18/97

Well Name: MW-17 Sampling Zone No.: SCREEN 2 Starting Time: 0815 Finishing Time: 0930

Technicians T. CHOI / J. BRENNER

Water Level Inside MP Casing (Beginning of Session) 21.75 PSIA (End of Session) 21.77 PSIA

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	21.75 ~~21.85~~	✓	0824	0827	✓	21.80	1.0	1ST RUN: INITIAL PARAMETERS; RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	21.73	✓	0850	0855	✓	21.82	1.0	2ND RUN; MW-972-24 COLLECTED; 2 VOAS, METALS, ANIONS.
3	✓	✓	✓	✓	✓	✓	21.78	✓	0919	0924	✓	21.77	1.0	3RD RUN: PERCHLORATE; FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments: _____

Total Volume: 3.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: MW-17 Depth: 726 FT. Date: 6/18/97

Well Name: MW-17 Sampling Zone No.: 5 Starting Time: 0947 Finishing Time: 1635

Technicians: J. BRENNER, T. CHOI

Water Level Inside MP Casing (Beginning of Session) 176.33 (PSIA) (End of Session) * 152.91 (PSIA)

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	176.33	✓	1003	1008	✓	176.26	1.0	1ST RUN; INITIAL PARAMETERS NTU'S = 14.01
2	✓	✓	✓	✓	✓	✓	176.29	✓	1040	1045	✓	176.28	1.0	2ND RUN; TRYING TO REDUCE TURBIDITY NTU'S = 18.01
3	✓	✓	✓	✓	✓	✓	176.27	✓	1117	1122	✓	176.26	1.0	3RD RUN; ATTEMPTING TO REDUCE TURBIDITY NTU'S = 24.4
4													*	PURGING THIS SCREEN IN ATTEMPT TO REDUCE TURBIDITY
5	✓	✓	✓	✓	✓	✓	152.93	✓	1534	1540	✓	152.94	1.0	4TH RUN; ATTEMPTING TO REDUCE TURBIDITY NTU'S = 32.4
6	✓	✓	✓	✓	✓	✓	152.91	✓	1611	1616	✓	152.91	1.0	5TH RUN; ATTEMPTING TO REDUCE TURBIDITY NTU'S = 22.9
7														
8														
9														
10														
11														
12														

F-2

Comments: * ≈ 7.67 gallons were purged from this screen today in an attempt to reduce turbidity

Total Volume: *

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: _____ Depth: 726 Date: 6-19-97

Well Name: MW-17 Sampling Zone No.: SCREEN 5 Starting Time: 1035 Finishing Time: 1650

Technicians T.CHOI / J.BRENNER

Water Level Inside MP Casing (Beginning of Session) *176.81 (End of Session) 170.12

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	*176.81	✓	1052	1056	✓	176.80	1.0	1ST RUN PRIOR SAMPLING: INITIAL PARAMETERS, RINSE BOTTLES W/FORMATION H2O
2	✓	✓	✓	✓	✓	✓	176.81	✓	1126	1130	✓	176.80	1.0	2ND RUN: ATTEMPTING TO REDUCE TURBIDITY; NTU's = 23.4
3	✓													** UNABLE TO REDUCE TURBIDITY: CONTINUE PURGING 3 CASING VOLUMES
4	✓	✓	✓	✓	✓	✓	**170.16	✓	1600	1605	✓	170.20	1.0	3RD RUN AFTER PURGING: INITIAL PARAMETERS SAMPLE: MW-972-21: VOA's, METALS, ANIONS
5	✓	✓	✓	✓	✓	✓	170.13	✓	1636	1641	✓	170.12	1.0	4TH RUN: SAMPLE MW-972-21: Cr^{+6}, PERCHLORATE, PERCHLORATE SPLIT, FINAL PARAMETERS,
6														
7														
8														
9														
10														
11														
12														

F-2

Comments: * PURGED ≈ 5 GALLONS INTO INNER CASING FROM FORMATION PRIOR TO TODAY'S 1ST RUN

** PURGED ≈ 7 GALLONS INTO INNER CASING FROM FORMATION

Total Volume: *

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JRL Location: MW-17 Depth: 468 FT. Date: 6/20/97

Well Name: MW-17 Sampling Zone No.: 3 Starting Time: 0900 Finishing Time: 1030

Technicians: J. BRENNER / M. LOSI

Water Level Inside MP Casing (Beginning of Session) 58.08 PSIA (End of Session) 58.07 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	58.02	✓	0911	0914	✓	58.09	1.0	1ST RUN; INITIAL PARAMETERS: NTU'S = 4.83
2	✓	✓	✓	✓	✓	✓	58.02	✓	0946	0949	✓	58.04	1.0	2ND RUN; SAMPLE MW-972-23 COLLECTED: VOAS, METALS, ANIONS
3	✓	✓	✓	✓	✓	✓	58.01	✓	1020	1023	✓	58.07	1.0	3RD RUN; PERCHLORATE SPLIT SAMPLE FOR PERCHLORATE; FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: MW-20 Depth: 900 Date: 6/20/97

Well Name: MW-20 Sampling Zone No.: 5 Starting Time: 1140 Finishing Time: 1350

Technicians: J. BRENNER / M. LOSI

Water Level Inside MP Casing (Beginning of Session) 271.09 TSIA (End of Session) 271.02 TSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	271.09	✓	1153	1156	✓	271.11	1.0	1ST RUN; INITIAL PARAMETERS; RINSE BOTTLES; NTU'S = 4.83
2	✓	✓	✓	✓	✓	✓	271.04	✓	1239	1242	✓	271.06	1.0	2ND RUN; SAMPLE MW-972-06; VOA'S, METALS, ANIONS, HEX. CR.
3	✓	✓	✓	✓	✓	✓	271.04	✓	1323	1325	✓	271.02	1.0	3RD RUN; PERCHLORATE, [redacted] FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0 L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 230 Date: 6/23/97

Well Name: MW-20 Sampling Zone No.: SCREEN #1 Starting Time: 1309 Finishing Time: 1435

Technicians T. CHOI / J. BRENNER

Water Level Inside MP Casing (Beginning of Session) 14.53 FS,A (End of Session) 14.33 FS,A

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	14.53	✓	1314	1320	✓	14.35	1.0	1ST RUN PRIOR TO SAMPLING; INITIAL PARAMETERS
2	✓	✓	✓	✓	✓	✓	14.39	✓	1342	1350	✓	14.34	1.0	2ND RUN; COLLECT MW-972-10; 2 VOAs, METALS, ANIONS
3	✓	✓	✓	✓	✓	✓	14.39	✓	1405	1412	✓	14.35	1.0	3RD RUN; HEX. Cr., PERCHLORATE, PERCHLORATE SPLIT
4	✓	✓	✓	✓	✓	✓	14.38	✓	1425	1430	✓	14.33	0.5	4TH RUN; FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.5L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: ~~314~~ 312 Date: 6-23-97

Well Name: MW-20 Sampling Zone No.: SCREEN 2 Starting Time: 1140 Finishing Time: 1303

Technicians T.CHOI / J.BRENNER

Water Level Inside MP Casing (Beginning of Session) 50.06 (End of Session) 48.98

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	50.06	✓	1149	1151	✓	50.10	1.0	1ST RUN PRIOR SAMPLING; INITIAL PARAM. RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	50.10	✓	1208	1211	✓	50.09	1.0	2ND RUN; SAMPLE MW-972-09; VOA'S, METALS, ANIONS / MW-972-09 MS/MSD
3	✓	✓	✓	✓	✓	✓	50.07 ~~49.97~~	✓	1232	1235	✓	50.03	1.0	3RD RUN: SAMPLE MW-972-09: Cr^{+6}, PERCHLORATE, PERCHLORATE SPLIT, ~~FIABL PARAM~~
4	✓	✓	✓	✓	✓	✓	49.04	✓	1252	1254	✓	~~48.98~~	0.5	4TH RUN: FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

F-2

Comments: Total Volume: 3.5L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 562 Date: 6/23/97

Well Name: MW-20 Sampling Zone No.: SCREEN #3 Starting Time: 1011 Finishing Time: 1132

Technicians T. CHOI / J. BRENNER

Water Level Inside MP Casing (Beginning of Session) 123.98 PSIA (End of Session) 123.99 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	123.98	✓	1021	1024	✓	123.99	1.0	1ST RUN PRIOR TO SAMPLING; INITIAL PARAMETERS
2	✓	✓	✓	✓	✓	✓	124.00	✓	1050	1053	✓	124.01	1.0	2ND RUN; COLLECT MW-972-08; 2 VOAs METALS, ANIONS HEX. Cr.
3	✓	✓	✓	✓	✓	✓	124.01	✓	1117	1119	✓	123.99	1.0	3RD RUN; PERCHLORATE, PERCHLORATE SPLIT. FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 30L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: ~~444~~ 700 Date: 6-23-97

Well Name: MW-20 Sampling Zone No.: SCREEN 4 Starting Time: 0824 Finishing Time: 1000

Technicians T.CHOI / J.BRENNER

Water Level Inside MP Casing (Beginning of Session) 184.10 PSIA (End of Session) ~~1000~~ 184.04

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	184.10	✓	0837	0839	✓	184.09	1.0	1ST RUN PRIOR SAMPLING: INITIAL PARAMETERS RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	184.09	✓	0911	0914	✓	184.04	1.0	2ND RUN: SAMPLE MW-972-07-200A; METALS, ANIONS, Cr+6
3	✓	✓	✓	✓	✓	✓	184.05	✓	0949	0951	✓	184.04	1.0	3RD RUN: SAMPLE MW-972-07: PERCHLORATE PERCHLORATE SPLIT; FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

F2

Comments:

Total Volume: 3.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 90 Date: 6-24-97

Well Name: MW-21 Sampling Zone No.: SCREEN 1 Starting Time: 1304 Finishing Time: 1425

Technicians T.CHOI / J.BRENNER

Water Level Inside MP Casing (Beginning of Session) 14.63 PSIA (End of Session) ~~1425~~ 14.99 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	14.63	✓	1305	1313	✓	14.25	1.0	1ST RUN PRIOR SAMPLING: INITIAL PARAMETERS, RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	14.50	✓	1323	1330	✓	14.31	1.0	2ND RUN: SAMPLE MW-972-05: VOAs, METALS, ANIONS
3	✓	✓	✓	✓	✓	✓	14.49	✓	1340	1347	✓	14.32	1.0	3RD RUN; HEX. Cr, PERCHLORATE
4	✓	✓	✓	✓	✓	✓	15.15	✓	1410	1415	✓	14.99	1.0	4TH RUN; PERCHLORATE; FINAL PARAMETERS
5														
6														
7														
8														
9					⌒									
10														
11														
12														

Comments:

Total Volume: 4.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 161 Date: 6/24/97

Well Name: MW-21 Sampling Zone No.: SCREEN 2 Starting Time: 1210 Finishing Time: 1256

Technicians T. CHOI / J. BRENNER

Water Level Inside MP Casing (Beginning of Session) 41.90 PSIA (End of Session) 41.91 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	41.90	✓	1213	1219	✓	41.90	1.0	1ST RUN PRIOR SAMPLING: INITIAL PARAMETERS RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	41.90	✓	1229	1233	✓	41.93	1.0	2ND RUN: SAMPLE MW-972-04: 200.8 METALS, ANIONS, Cr^{+6}
3	✓	✓	✓	✓	✓	✓	41.96	✓	1246	1251	✓	41.91	1.0	3RD RUN: SAMPLE MW-972-04: PERCHLORATE PERCHLORATE SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 240 Date: 6-24-97

Well Name: MW-21 Sampling Zone No.: SCREEN 3 Starting Time: 1109 Finishing Time: 1204

Technicians T. CHOI / J. BRENNER

Water Level Inside MP Casing (Beginning of Session) 76.35 PSIA (End of Session) 76.29 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	76.35	✓	1115	1118	✓	76.36	1.0	1ST RUN PRIOR SAMPLING: INITIAL PARAMETERS RINSE BOTTLES W/ FORMATION WATER NTU=140
2	✓	✓	✓	✓	✓	✓	76.34	✓	1135	1139	✓	76.33	1.0	2ND RUN: SAMPLE MW-972-03: 2VOAS, METALS, ANIONS, Cr^{+6}
3	✓	✓	✓	✓	✓	✓	76.30	✓	1154	1157	✓	76.29	1.0	3RD RUN: SAMPLE MW-972-03: PERCHLORATE, PERCHLORATE SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0L F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 310 Date: 6-24-97

Well Name: MW-21 Sampling Zone No.: SCREEN 4 Starting Time: 1000 Finishing Time: 1105

Technicians T. CHOI / J. BRENNER

Water Level Inside MP Casing (Beginning of Session) 106.41 PSIA (End of Session) 106.34 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	106.41	✓	1005	1008	✓	106.40	1.0	1ST RUN PRIOR SAMPLING: INITIAL PARAMETERS RINSE BOTTLES W/FORMATION WATER, NTUs = 2.46
2	✓	✓	✓	✓	✓	✓	106.40	✓	1025	1028	✓	106.40	1.0	2ND RUN: SAMPLE MW-972-02 VOA's, METALS, ANIONS, CR+6
3	✓	✓	✓	✓	✓	✓	106.30	✓	1055	1058	✓	106.34	1.0	3RD RUN: SAMPLE MW-972-02: PERCHLORATE PERCHLORATE SPLIT, FINAL PARAMETERS, NTUs = 1.40
4														
5														
6														
7														
8														
9														
10														
11														
12														

F-2

Comments:

Total Volume: 3.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: _____ Depth: 372 Date: 6-24-97

Well Name: MW-2L Sampling Zone No.: SCREEN 5 Starting Time: 0900 Finishing Time: 0945

Technicians T.CHOI/J.BRENNER

Water Level Inside MP Casing (Beginning of Session) 133.50 PSIA (End of Session) 133.43 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	133.50	✓	0910	0912	✓	133.50	1.0	1ST RUN PRIOR SAMPLING: INITIAL PARAMETERS RINSE BOTTLES NTU'S NTU'S = 19.3
2	✓	✓	✓	✓	✓	✓	133.46	✓	0938 ~~0949~~	0941	✓	133.43	1.0	2ND RUN: ATTEMPTING TO REDUCE TURBIDITY! NTU'S = 32.8
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														

F-2

Comments: _____ Total Volume: 2.0L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 370 Date: 6-25-97

Well Name: MW-21 Sampling Zone No.: SCREEN 5 Starting Time: 0840 Finishing Time: 1740

Technicians: T. CHOI

Water Level Inside MP Casing (Beginning of Session) 99.50 PSIA (End of Session) * 117.41 PSIA **

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	99.50	✓	0857	0900	✓	99.57	1.0	1ST RUN PRIOR SAMPLING: INITIAL PARAMETERS RINSING BOTTLE W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	99.50	✓	0927	0929	✓	99.53	1.0	2ND RUN ATTEMPTING TO REDUCE TURBIDITY
3	✓	✓	✓	✓	✓	✓	99.50	✓	0958	1001	✓	99.50	1.0	3rd run ATTEMPTING TO REDUCE TURBIDITY
4	✓	✓	✓	✓	✓	✓	99.50	✓	1026	1029	✓	99.50	1.0	4TH RUN: ATTEMPTING TO REDUCE TURBIDITY
5	✓	✓	✓	✓	✓	✓	* 68.49	✓	1428	1431	✓	68.52	1.0	*5TH RUN AFTER PURGING 1 PACKER VOLUME
6	✓	✓	✓	✓	✓	✓	117.48	✓	1658	1701	✓	117.45	1.0	**6TH RUN: SAMPLE MW-972-01 AFTER PURGING 3 VOLUMES: 2VOA's MOTALS, ANIONS, EV
7	✓	✓	✓	✓	✓	✓	117.41	✓	1721	1725	✓	117.41	1.0	7TH RUN: SAMPLE MW-972-01 PERCHLORATE, PERCHLORATE SPLIT, FIVAL/FRAM.
8														
9														
10														
11														
12														

Comments: * PURGED ≈ 1 PACKER VOLUME IN AN ATTEMPT TO REDUCE TURBIDITY ≈ 5.6 gal

** PURGED ≈ 2 PACKER VOLUMES IN AN ATTEMPT TO REDUCE TURBIDITY ≈ 11.2 GALLONS

Total Volume: 18.6 GALS F2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 242' Date: 6/26/97

Well Name: MW-19- Sampling Zone No.: Screen 1 Starting Time: 0840 Finishing Time: 10:40

Technicians MLOSI / TCHOI

Water Level Inside MP Casing (Beginning of Session) 14.36 PSIA (End of Session) 14:36 PSIA

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	14.36	✓	0947	0852	✓	14.36	1.0	FIRST RUN PRIOR TO SAMPLING INITIAL PARAMETERS 2 VOAS BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	14.35	✓	0910	0917	✓	14.37	1.0	2ND RUN 2 VOAS, 1 METAL, 1 ANIONS SAMPLE MW-972-15
3	✓	✓	✓	✓	✓	✓	14.30	✓	0949	0955	✓	14.34	1.0	3RD RUN SAMPLE MW-972-15 Cr6+, PERCHLORATE, PETCH-SPLIT
4	✓	✓	✓	✓	✓	✓	14.32	✓	1019	1025	✓	14.34	0,5	4TH RUN. FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.5 L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 314' Date: 6/26/97

Well Name: MW-19-2 Sampling Zone No.: SCREEN 2 Starting Time: 10:45 Finishing Time: 12:00

Technicians MLOSI / TCHOI

Water Level Inside MP Casing (Beginning of Session) 23.80 PSIA (End of Session) 23.79 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	23.80	✓	10:54	10:58	✓	23.80	1.0	FIRST RUN PRIOR TO SAMPLING INITIAL PARAMETERS RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	23.8	✓	1120	1126	✓	23.80	1.0	2ND RUN SAMPLE MW-972-14 2 VOAs 1 METAL 1 ANIONS
3	✓	✓	✓	✓	✓	✓	23.7	✓	1151	1155	✓	23.75	1.0	3rd RUN SAMPLE MW-972-14 Cr^{6+}, PERCHLORATE, PERCH. SPLIT,
4														FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 392' Date: 6/26/97

Well Name: MW-19 Sampling Zone No.: SCREEN 3 Starting Time: Finishing Time: 14:30

Technicians MLOSI/TCHOI

Water Level Inside MP Casing (Beginning of Session) 57.60 PSIA (End of Session) 57.60 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	57.60	✓	1300	1303	✓	57.60	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES W/ FORMATION WATER
2	✓	✓	✓	✓	✓	✓	57.51	✓	1325	1329	✓	57.57	1.0	2ND RUN, ATTEMPT TO REDUCE TURBID SAMPLE MW-972-13 VOAS, METALS, Cr(VI), ANIONS
3	✓	✓	✓	✓	✓	✓	57.50	✓	1352	1358	✓	57.58	1.0	3RD RUN, SAMPLE MW-972-13 PERC4, PERC4 SPLIT
4	✓	✓	✓	✓	✓	✓	57.64	✓	1417	1421	✓	57.60	1.0	LAST RUN, FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 4.0L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: _____ Depth: 444' Date: 6/26/97

Well Name: MW-19 Sampling Zone No.: SCREEN 4 Starting Time: 1437 Finishing Time: 1725

Technicians MLOSI/TCHEN

Water Level Inside MP Casing (Beginning of Session) 80.00 (56.38*) (End of Session) 17.

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	80.00	✓	1453	1456	✓	80.02	1.0	1ST RUN, INITIAL PARAMETERS DINSE BOTTLES W/FORM'N WATER
2														*BAIL WELL/INNER CASING
3	✓	✓	✓	✓	✓	✓	56.38	✓	1619	1622	✓	56.42	1.0	2ND RUN, SAMPLE MW-972-12 2VOAS, METALS, ANIONS, Cr(VI)
4	✓	✓	✓	✓	✓	✓	56.50	✓	1715	—	—	—	0	UNABLE TO CLOSE VALVE - WILL RETURN TOMORROW
5														
6														
7														
8														
9														
10														
11														
12														

F-2

Comments: *BAILED ~5 GAL FROM INNER CASING TO ENSURE 15 PSI DIFFERENCE

Total Volume: _____

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 444 Date: 6-27-97

Well Name: MW-19 Sampling Zone No.: SCREEN 4 Starting Time: 1300 Finishing Time: 1545

Technicians MLOSI CHOI

Water Level Inside MP Casing (Beginning of Session) 14.58 FS.A (End of Session) 14.53 FS.A

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	14.58	✓	1313	1316	✓	14.56	1.0	FIRST RUN PRIOR TO SAMPLING INITIAL PARAMETERS RINSE BOTTLES W/ FORM. WATER
2	✓	✓	✓	✓	✓	✓	14.53	✓	~~1407~~ 1407	~~1410~~ 1410	✓	14.55	1.0	2ND RUN: SAMPLE MW-972-12: 200.7 METALS, ANIONS, ½ Cr+6
3	✓	✓	✓	✓	✓	✓	14.50	✓	~~1440~~ 1440	~~1443~~ 1443	✓	14.52	0.25	3RD RUN: SAMPLE MW-972-12: ½ Cr ½ PERCHLORATE
4	✓	✓	✓	✓	✓	✓	14.57	✓	1519	1523	✓	14.53	1.0	4TH RUN: SAMPLE MW-972-12: ½ PERCHLORATE, PERCHLORATE SPLIT, FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.25 L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: ~~SCREEN~~ Depth: 207' Date: 7/2/97

Well Name: MW-14 Sampling Zone No.: SCREEN 1 Starting Time: 1520 Finishing Time: 1715

Technicians MLOSI / TCHOI

Water Level Inside MP Casing (Beginning of Session) 13.52 PSIA (End of Session) 13.53 PSIA

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	13.52	✓	1528	1535	✓	13.63	1.0	1ST RUN INIMAL PARAMETERS: RINSE BOTTLES W/FORM WATER
2	✓	✓	✓	✓	✓	✓	13.42	✓	1553	1600	✓	13.54	1.0	2ND RUN SAMPLE MW-972-32 2 VOAS, METALS, ½ ANIONS
3	✓	✓	✓	✓	✓	✓	13.48	✓	1624	1633	✓	13.58	1.0	3RD RUN SAMPLE MW-972-32 ½ ANIONS, Cr6+, PERCHLORATE, ½ PERCH. SPLIT
4	✓	✓	✓	✓	✓	✓	13.45	✓	1653	1700	✓	13.53	1.0	FINAL PARAMETERS, ½ PERCH. SPLIT
5														
6														
7														
8														
9														
10														
11														
12														

F-2

Comments: Total Volume: 4.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 540' Date: 7/3/97

Well Name: MW-14 Sampling Zone No.: SCREEN #2 Starting Time: 0718 Finishing Time: 1110

Technicians

Water Level Inside MP Casing (Beginning of Session) 31.76 PSIA (End of Session) 31.68 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	31.76	✓	1013	1018	✓	31.8	1.0	FIRST RUN, INITIAL PARAMETERS RINSE BOTTLES W/FORM'N WATER
2	✓	✓	✓	✓	✓	✓	31.44	✓	1034	1039	✓	31.40	1.0	2ND RUN, SAMPLE MW97Z-31 VOAS, METALS, ANIONS, ½ CLOT
3	✓	✓	✓	✓	✓	✓	31.39		1053	1057	✓	31.16	1.0	3RD RUN, SAMPLE MW97Z-31 ½ CLOT PERCH. PERCH SPLIT, FIELD PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments: Total Volume: 3.0L F2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 498' Date: 7/7/97

Well Name: MW-19 Sampling Zone No.: EXTRACTION 1 Starting Time: 1323 Finishing Time: 1515

Technicians MCOSI / TC ITOI

Water Level Inside MP Casing (Beginning of Session) 49.16 FSIA (End of Session) 49.14 FSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	49.16	✓	1334	1339	~~49.14~~	49.13	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	49.15	✓	1412	1415	✓	49.10	1.0	2ND RUN. SAMPLE MW-972-11 3 VOAs, METALS, ANIONS, ½ Cr(VI)
3	✓	✓	✓	✓	✓	✓	49.13	✓	1440	1443	✓	49.14	1.0	3RD RUN. SAMPLE MW-972-11, ½ Cr(VI), PERCHLORATE, PERC & SPLIT, FINAL PARAMS.
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 150 Date: 7/7/97

Well Name: MW-4 Sampling Zone No.: SCREEN # 1 Starting Time: 1525 Finishing Time: 1606

Technicians M. LOSI / T. CHOI

Water Level Inside MP Casing (Beginning of Session) 13.72 PSIA (End of Session) 13.73 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	13.72	✓	1532	1539	✓	13.69	1.0	1ST RUN; INITAL PARAMETERS
2	✓	✓	✓	✓	✓	✓	13.67	✓	1553	1559	✓	13.73	1.0	2ND RUN; ATTEMPTING TO REDUCE TURBIDITY
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														

F-2

Comments:

Total Volume: 2.0L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: _____ Depth: 550 Date: 7/7/97

Well Name: MW-1V Sampling Zone No.: SCREEN 5 Starting Time: 1111 Finishing Time: 1235

Technicians MLOSI/CHOI,T

Water Level Inside MP Casing (Beginning of Session) 145.54 PSIA (End of Session) 145.45 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	145.51	✓	1121	1125	✓	145.50	1.0	1ST RUN: INITIAL PARAMETERS; RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	145.60	✓	1148	1151	✓	148.46	1.0	2ND RUN, SAMPLE MW-972-28 2 VOAs, METALS, AN IONS, Cr(VI)
3	✓	✓	✓	✓	✓	✓	145.54	✓	1216	1219	✓	145.45	1.0	3RD RUN, SAMPLE MW-972-28 PERCHLORATE, FOR LAB. SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments: _____ Total Volume: 3.0L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 456 Date: 7/7/97

Well Name: MW-14 Sampling Zone No.: SCREEN 4 Starting Time: 0953 Finishing Time: 1110

Technicians MLOSI / TCHOI

Water Level Inside MP Casing (Beginning of Session) 109.09 PSIA (End of Session) 109.03 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	109.09	✓	1001	1005	✓	109.06	1.0	1ST RUN: INITIAL PARAMETERS, RINSE BOTTLES W/FORMATION BOTTLES
2	✓	✓	✓	✓	✓	✓	109.08	✓	1025	1028	✓	109.05	1.0	2ND RUN: SAMPLE MW-972-27 VOAS(2), MS, MSD, METALS, ANIONS
3	✓	✓	✓	✓	✓	✓	109.10	✓	1053	1056	✓	109.03	1.0	3RD RUN SAMPLE MW-972-27 Cr(VI), PERCHLORATE, PERCH. SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 382' Date: 7/7/97

Well Name: MW-14 Sampling Zone No.: SCREEN 3 Starting Time: 0823 Finishing Time: 0950

Technicians MLOSI / TCHOI

Water Level Inside MP Casing (Beginning of Session) 76.96 PSIA (End of Session) 76.86 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	76.96	✓	0831	0835	~~76.93~~ ✓	76.93	1.0	1ST RUN: INITIAL PARAMETERS RINSE BOTTLES W/FORM. WATER
2	✓	✓	✓	✓	✓	✓	76.93	✓	0859	0902	✓	76.89	1.0	2ND RUN: SAMPLE MW-972-30 VOAS(2), METALS, ANIONS, ½Cr(VI)
3	✓	✓	✓	✓	✓	✓	~~77.91~~ 76.87	✓	0928	0932	✓	76.86	1.0	3RD RUN: SAMPLE MW-972-30 ½Cr(VI), PERCH, PERCH SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments: Total Volume: 3.0

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: IPL Location: Depth: 243 Date: 7/8/97

Well Name: MW-12 Sampling Zone No.: SCREEN 2 Starting Time: 1252 Finishing Time: 1515

Technicians MLOSI/TCHOI

Water Level Inside MP Casing (Beginning of Session) 13.62 FS,A (End of Session) 13.79 FS,A

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	13.62	✓	12.58	1301	✓	13.76	1.0	1ST RUN @ SCREEN 2, INITIAL PARAMETERS
2	✓	✓	✓	✓	✓	✓	13.61	✓	1319	1322	✓	13.79	1.0	2ND RUN, SAMPLE MW-972-38 2 VOCs, TBT
3	✓	✓	✓	✓	✓	✓	13.61	✓	1340	1343	✓	13.75	1.0	3RD RUN, SAMPLING MW-972-38 TBT
4	✓	✓	✓	✓	✓	✓	13.58	✓	1400	1403	✓	13.80	1.0	~~4TH~~ RUN, SAMPLE MW 972-38 TBT
5	✓	✓	✓	✓	✓	✓	13.59	✓	1419	1422	✓	13.77	1.0	5TH RUN, SAMPLE MW972-38 TBT, ANIONS
6	✓	✓	✓	✓	✓	✓	13.58	✓	1440	1442	✓	13.76	1.0	6TH RUN SAMPLE MW-972-38 ~~TBT~~ A Cr^{6+}, PERCH, PERCH, SPLIT
7	✓	✓	✓	✓	✓	✓	13.57	✓	1459	1501	✓	13.79	0.5	LAST RUN, FINAL PARAMETERS
8														
9														
10														
11														
12														

Comments: Total Volume: 6.5 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 323 Date: 7/8/97

Well Name: MW-12 Sampling Zone No.: SCREEN #3 Starting Time: 1124 Finishing Time: 1250

Technicians M. LOSI / T. CHOI

Water Level Inside MP Casing (Beginning of Session) 13.63 PSIA (End of Session) 13.84 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	13.63	✓	1130	1133	✓	13.61	1.0	1ST RUN; INITIAL PARAMETERS; NTU'S = 7.98
2	✓	✓	✓	✓	✓	✓	13.58	✓	1152	1155	✓	13.78	1.0	2ND RUN; COLLECT MW-972-37 2 VOAS METALS, ANIONS
3	✓	✓	✓	✓	✓	✓	13.63	✓	1215	1218	✓	13.80	1.0	3RD RUN; HEX. CR, PERCHLORATE; PERCHLORATE SPLIT
4	✓	✓	✓	✓	✓	✓	13.65	✓	1236	1239	✓	13.84	1.0	4TH RUN; FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
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12														

Comments:

Total Volume: 4.0L F2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 436 Date: 7/8/97

Well Name: MW-12 Sampling Zone No.: SCREEN 4 Starting Time: 0933 Finishing Time: 1119

Technicians MLOSI/TCITOI

Water Level Inside MP Casing (Beginning of Session) 30.32 PSIA (End of Session) 30.27 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	30.32	✓	0944	0946	✓	30.29	1.0	1ST RUN INITIAL PARAMETERS, RINSE BOTTLES WITH FORMATION WATER
2	✓	✓	✓	✓	✓	✓	30.33	✓	1012	1014	✓	30.31	1.6	2ND RUN, SAMPLE MW-972-36 2 VOAS, METALS, ANIONS, Cr(VI)
3	✓	✓	✓	✓	✓	✓	30.31	✓	1038	1040	✓	30.34	1.0	3RD RUN, SAMPLE MW-972-36 PERCHLORATE, PERCHLORATE SPLIT
4	✓	✓	✓	✓	✓	✓	30.28	✓	1103	1106	✓	30.27	1.0	LAST RUN, FINAL PARAMETERS
5														
6														
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12														

Comments: Total Volume: 4.0L F2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: _____ Depth: 548 Date: 7/8/97

Well Name: MW-12 Sampling Zone No.: SCREEN 5 Starting Time: 0800 Finishing Time: 0927

Technicians MLOSI/TCITOI

Water Level Inside MP Casing (Beginning of Session) 79.01 PSIA (End of Session) 79.02 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	79.01	✓	0811	0813	✓	79.02	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	79.02	✓	0840	0842	✓	78.99	1.0	2ND RUN, SAMPLE MW-972-35 VOAs(2) METALS, ANIONS, C, 6t
3	✓	✓	✓	✓	✓	✓	78.99	✓	0910	0912	✓	79.02	1.0	3RD RUN, SAMPLE MW-972-35, PERCHLORATE, PERCHLORATE SPLIT, FINAL PARAMETERS
4														
5														
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12														

Comments: _____ Total Volume: 3.0L [2]

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 140 Date: 7/9/97

Well Name: MW-12 Sampling Zone No.: SCREEN 1 Starting Time: 0822 Finishing Time: 1630

Technicians MLOSI / GSHAW

Water Level Inside MP Casing (Beginning of Session) 13.53 PSIA (End of Session) 13.68 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	13.53	✓	0829	0835	✓	13.61	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	13.50	✓	0851	0857	✓	13.64	1.0	2ND RUN, ATTEMPT TO REDUCE TURBIDITY (735)
3	✓	✓	✓	✓	✓	✓	13.49	✓	0911	0919	✓	13.60	1.0	3RD RUN, ATTEMPTING TO REDUCE TURBIDITY
4	✓	✓	✓	✓	✓	✓	13.50	✓	1204	1211	✓	13.65	1.0	4TH RUN (AFTER PURGING 2 V)
5	✓	✓	✓	✓	✓	✓	13.49	✓	1229	1236	✓	13.69	1.0	5TH RUN SAMPLE MW-972-39+40 4 VOAs, TBT
6	✓	✓	✓	✓	✓	✓	13.48	✓	1254	1300	✓	13.79	1.0	6TH RUN, SAMPLE MW-972-39,40 TBT
7	✓	✓	✓	✓	✓	✓	13.47	✓	1312	1318	✓	13.72	1.0	7TH RUN SAMPLE MW-972-39+40 TBT
8	✓	✓	✓	✓	✓	✓	13.49	✓	1330	1336	✓	13.77	1.0	8TH RUN SAMPLE MW-972-39,40 TBT
9	✓	✓	✓	✓	✓	✓	13.56	✓	1348	1355	✓	13.60	1.0	9TH RUN SAMPLE MW-972-39,40 TBT
10	✓	✓	✓	✓	✓	✓	13.49	✓	1407	1414	✓	13.62	1.0	10TH RUN SAMPLE MW-972-39,40 TBT
11	✓	✓	✓	✓	✓	✓	13.47	✓	1426	1432	✓	13.66	1.0	11TH RUN SAMPLE MW-972-39,40 TBT
12	✓	✓	✓	✓	✓	✓	13.51	✓	1446	1452	✓	13.68	1.0	12TH RUN SAMPLE MW-972-39,40 TBT

Comments:

Total Volume: 16.0L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 140 Date: 7/9/97

Well Name: MW-12 Sampling Zone No.: SCREEN 1 Starting Time: 0822 Finishing Time: 1630

Technicians MLOSI / GSHAW

Water Level Inside MP Casing (Beginning of Session) 13.53 PSIA (End of Session) 13.68 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	13.53	✓	1504	1511	✓	13.66	1.0	13TH RUN SAMPLE MW-972-39,40 TBT, METALS, ANIONS
2	✓	✓	✓	✓	✓	✓	13.51	✓	1524	1532	✓	13.62	1.0	14TH RUN SAMPLE MW-972-39,40 ANIONS, Cr(VI), PERCH.
3	✓	✓	✓	✓	✓	✓	13.49	✓	1546	1553	✓	13.65	1.0	15TH RUN SAMPLE MW-972-39,40 Cr 6+, ½ PERCHLORATE, ½ PERCH SPLIT
4	✓	✓	✓	✓	✓	✓	13.48	✓	1613	1620	✓	13.68	1.0	16TH RUN, SAMPLING MW-972-39,40 ½ PERCH. SPLIT, FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

Comments: Total Volume: 16.0L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 513 Date: 7/10/97

Well Name: MW-4 Sampling Zone No.: SCREEN 5 Starting Time: 0803 Finishing Time: 0936

Technicians MLOSI / GSHAW

Water Level Inside MP Casing (Beginning of Session) 127.83 PSIA (End of Session) 127.78 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	127.83	✓	0816	0819	✓	127.82	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES WITH FORMATION WATER
2	✓	✓	✓	✓	✓	✓	127.81	✓	0847	0848	✓	127.76	1.0	2ND RUN SAMPLE MW-4-972-53 2VOAS, METALS, ANIONS, Cr(VI)
3	✓	✓	✓	✓	✓	✓	127.80	✓	0915	0917	✓	127.78	1.0	3RD RUN SAMPLE MW-4-972-57 PERCH, PERCH SPLIT, FINAL PARAM.
4														
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8														
9														
10														
11														
12														

F2

Comments: Total Volume: 3.0L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 392 Date: 7/10/98

Well Name: MW-4 Sampling Zone No.: SCREEN 4 Starting Time: 0937 Finishing Time: 1048

Technicians MLOSI / GSHAW

Water Level Inside MP Casing (Beginning of Session) 75.20 PSIA (End of Session) 75.18 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	75.20	✓	0944	0946	✓	75.21	1.0	1ST RUN, INITIAL PARAMETERS RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	75.22	✓	1010	1013	✓	75.19	1.0	2ND RUN, SAMPLE MW-972-54 2VOAS, METALS, ANIONS, Cr(VI)
3	✓	✓	✓	✓	✓	✓	75.21	✓	1034	1036	✓	75.18	1.0	3RD RUN, SAMPLE MW-972-54 PERCH, PERCH SPLIT, FINAL PERAM.
4														
5														
6														
7														
8														
9														
10														
11														
12														

F-2

Comments: Total Volume: 3.0L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 322 Date: 9/10/97

Well Name: MW-4 Sampling Zone No.: SCREEN 3 Starting Time: 1053 Finishing Time: 1156

Technicians MLOSI/GSHAW

Water Level Inside MP Casing (Beginning of Session) 44.73 PSIA (End of Session) 44.71 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	44.73	✓	1101	1103	✓	44.72	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES WITH FORMATION WATER
2	✓	✓	✓	✓	✓	✓	44.71	✓	1120	1123	✓	44.70	1.0	2ND RUN, SAMPLE MW-972-55 2VOAs, METALS, ANIONS, Cr(VI)
3	✓	✓	✓	✓	✓	✓	44.73	✓	1143	1145	✓	44.71	1.0	3RD RUN, SAMPLE MW-972-55 PERCH., PERCH. SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
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9														
10														
11														
12														

Comments: Total Volume: 3.0L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 240 Date: 7/10/97

Well Name: MW-4 Sampling Zone No.: SCREEN 2 Starting Time: 1202 Finishing Time: 1414

Technicians MLOSI / GSHAN

Water Level Inside MP Casing (Beginning of Session) 13.60 PSIA (End of Session) 13.74 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	13.60	✓	1207	1210	✓	13.68	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES WITH FORMATION WATER
2	✓	✓	✓	✓	✓	✓	13.61	✓	1229	1232	✓	13.76	1.0	2ND RUN, SAMPLE MW972-56,57 4VOAS, TBT
3	✓	✓	✓	✓	✓	✓	13.62	✓	1253	1256	✓	13.75	1.0	3RD RUN SAMPLE MW-972-56, TBT
4	✓	✓	✓	✓	✓	✓	13.60	✓	1310	1312	✓	13.71	1.0	4TH RUN SAMPLE MW-972-56, TBT
5	✓	✓	✓	✓	✓	✓	13.61	✓	1327	1329	✓	13.70	1.0	5TH RUN SAMPLE MW972-56, TBT, METALS
6	✓	✓	✓	✓	✓	✓	13.62	✓	1345	1349	✓	13.69	1.0	6TH RUN SAMPLE MW 972-56,57 METALS, ANIONS, Cr(VI), ½ PERCH
7	✓	✓	✓	✓	✓	✓	1359	✓	1402	1404	✓	13.74	1.0	7TH RUN, SAMPLE MW-972-56,57 ½ PERCH, PERCH SPLIT, FINAL PARAMS
8														
9														
10														
11														
12														

Comments: Total Volume: 7.0L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 150 Date: 8/10/97

Well Name: MW-4 Sampling Zone No.: Screen 1 Starting Time: 1417 Finishing Time: 1626

Technicians MLOSI / GSHAW

Water Level Inside MP Casing (Beginning of Session) 13.59 PSIA (End of Session) ~~1626~~ 13.73 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	13.59	✓	1431	1436	✓	13.70	1.0	1ST RUN, INITIAL PARAMETERS RINSE BOTTLES W/ FORM. WATER
2	✓	✓	✓	✓	✓	✓	13.52	✓	1448	1452	✓	13.68	1.0	2ND RUN SAMPLE MW-972-58 2 VOAS, TBT
3	✓	✓	✓	✓	✓	✓	13.55	✓	1506	1510	✓	13.74	1.0	3RD RUN SAMPLE MW-972-58 TBT
4	✓	✓	✓	✓	✓	✓	13.54	✓	1521	1525	✓	13.76	1.0	4TH RUN SAMPLE MW-972-58 TBT
5	✓	✓	✓	✓	✓	✓	13.55	✓	1538	1542	✓	13.76	1.0	5TH RUN SAMPLE MW-972-58 TBT, ½ METALS
6	✓	✓	✓	✓	✓	✓	13.54	✓	1554	1558	✓	13.75	1.0	6TH RUN SAMPLE MW-972-58 ½ METALS, ANIONS, Cr(VI), ½ PERCH.
7	✓	✓	✓	✓	✓	✓	13.52	✓	1613	1617	✓	13.73	1.0	7TH RUN SAMPLE MW-972-58 ½ PERCH, PERCH SPLIT, FINAL PARAMS
8														
9														
10														
11														
12														

Comments:

Total Volume: 7.0L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: IPL Location: Depth: 149 Date: 7/11/97

Well Name: MW-11 Sampling Zone No.: SCREEN 1 Starting Time: 1352 Finishing Time: 1516

Technicians MALOSI / GSHAW

Water Level Inside MP Casing (Beginning of Session) 13.61 PSIA (End of Session) 13.66 PSIA

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	13.61	✓	1357	1401	✓	13.67	1.0	1ST RUN, INITIAL PARAMETERS RINSE BOTTLES W/ FORMATION WATER
2	✓	✓	✓	✓	✓	✓	13.57	✓	1419	1424	✓	13.65	1.0	2ND RUN SAMPLE MW-972-45 2 VOAS, METALS, ANIONS, Cr(VI) ½
3	✓	✓	✓	✓	✓	✓	13.60	✓	1438	1442	✓	13.64	1.0	3RD RUN SAMPLE MW-972-45 ½ Cr(VI), PERCH, PERCH SPLIT (½)
4	✓	✓	✓	✓	✓	✓	13.58	✓	1501	1505	✓	13.66	1.0	LAST RUN SAMPLE MW-972-45 ½ PERCH SPLIT, FINAL PARAMS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 4.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 639 Date: 7/11/97

Well Name: MW-11 Sampling Zone No.: SCREEN 5 Starting Time: 0904 Finishing Time: 1000

Technicians MLOSI/GSHAW

Water Level Inside MP Casing (Beginning of Session) 160.33 PSIA (End of Session) ~~1000~~ 160.27 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	160.33	~~0827~~ ✓	0827	0829	✓	160.32	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES WITH FORMATION WATER
2	✓	✓	✓	✓	✓	✓	160.30	✓	0900	0903	✓	160.31	1.0	2ND RUN, SAMPLE MW-972-41 2 VOAS, METALS, ANIONS, Cr(VI)
3	✓	✓	✓	✓	✓	✓	160.31	✓	0934	0936	✓	160.27	1.0	3RD RUN, SAMPLE MW-972-41 PERCH, PERCH SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0L

F2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 524 Date: 7/11/97

Well Name: MW-11 Sampling Zone No.: SCREEN 4 Starting Time: 1003 Finishing Time: 1130

Technicians MLOSI/GSHAW

Water Level Inside MP Casing (Beginning of Session) 110.69 PSIA (End of Session) 1130 110.69 PSIA

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	110.69	✓	1012	1014	✓	110.68	1.0	1ST RUN, INITIAL PARAMETERS RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	110.72	✓	1042	1044	✓	110.71	1.0	2ND RUN ATTEMPT TO REDUCE TURB. (8.1) SAMPLE MW-972-42 VOAS, METALS, ANIONS, CN
3	✓	✓	✓	✓	✓	✓	110.71	✓	1114	1116	✓	110.69	1.0	3RD RUN SAMPLE MW-972-42 PERCH, PERCH SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 429 Date: 7/11/97

Well Name: MW-11 Sampling Zone No.: SCREEN 3 Starting Time: 1135 Finishing Time: 1253

Technicians MLOSI/GSIKAN

Water Level Inside MP Casing (Beginning of Session) 69.80 TS.A (End of Session) 69.80 TS.A

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	✓	✓	✓	69.80	✓	1142	1144	✓	69.82	1.0	1ST RUN, INITIAL PARAMETERS RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	69.82	✓	1210	1213	✓	69.79	1.0	2ND RUN, SAMPLE MW-972-43 2 VOAS, METALS, ANIONS, Cr(VI)
3	✓	✓	✓	✓	✓	✓	69.79	✓	1235	1238	✓	69.80	1.0	3RD RUN SAMPLE MW-972-43 PERCH, ARCH. SPLIT, FINAL PARAMETERS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 259' Date: 7/11/97

Well Name: MW-11 Sampling Zone No.: SCREEN 2 Starting Time: 1255 Finishing Time: 1350

Technicians MLOSI/GOLHAN

Water Level Inside MP Casing (Beginning of Session) 13.65 PSIA (End of Session) 13.70 PSIA

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	13.65	✓	1259	1302	✓	13.63	1.0	FIRST RUN, INITIAL PARAMETERS RINSE BOTTLE W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	13.62	✓	1318	1321	✓	13.66	1.0	2ND RUN, SAMPLE MW-972-44 2 VOAS, METALS, ANIONS, Cr(VI)
3	✓	✓	✓	✓	✓	✓	13.59	✓	1337	1340	✓	13.70	1.0	3RD RUN, SAMPLE MW-972-44 PERCH, PERCH=SPLIT, FINAL PARAMS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0 L

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 653' Date: 7/14/97

Well Name: MW-3 Sampling Zone No.: SCREEN 5 Starting Time: 0812 Finishing Time: 1332

Technicians MLOSI / GSHAW

Water Level Inside MP Casing (Beginning of Session) 161.59 PSIA (End of Session) 161.51 PSIA

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	161.59	✓	0833	0835	✓	161.61	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES W/ FORMATION WATER
2	✓	✓	✓	✓	✓	✓	161.57	✓	0926	0928	✓	161.57	1.0	2ND RUN SAMPLE MW-972-59 2VOAS, METALS, ANIONS, Cr(VI)
3	✓	✓	✓	✓	✓	✓	161.56	✓	—	—	—	—	—	3RD RUN, ~~SAMPLE MW-972-59~~ RECHARGE UNABLE TO OBTAIN SHOE ~~PERCH, PERCH SPLIT, FINAL PARAMETERS~~
4	✓	✓	✓	✓	✓	✓	161.51	✓	1318	1320	✓	161.51	1.0	4TH RUN SAMPLE MW-972-59 PERCH, PERCH SPLIT, FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 2.0L

F2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 558' Date: 7/14/97

Well Name: MW-3 Sampling Zone No.: SCREEN 4 Starting Time: 1334 Finishing Time: 1631

Technicians MLOSI, GSITAW

Water Level Inside MP Casing (Beginning of Session) 120.25 PSIA (End of Session) 120.17 PSIA

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	120.25	✓	1453	1455	✓	120.23	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	120.23	✓	1536	1538	✓	120.21	1.0	2ND RUN, SAMPLE#9772-60 2 VOLS, METALS, ANIONS, Cr (VI)
3	✓	✓	✓	✓	✓	✓	120.19	✓	1614	1616	✓	120.17	1.0	3RD RUN, SAMPLE#9774-60 PERCH, PERCH SPLIT, FINAL PARAMS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 3.0L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: SPL Location: _____ Depth: 172 Date: 7/15/97

Well Name: MW-3 Sampling Zone No.: SCREEN 1 Starting Time: 1108 Finishing Time: 1208

Technicians MLOSI/GSHAW

Water Level Inside MP Casing (Beginning of Session) 13.62 FS,A (End of Session) 1208 FS,A

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	—	—	—	—	13.62	✓	1115	1119	13.72	~~13.72~~ 13.69	1.0	1ST RUN @ INITIAL PARAMETERS, RINSE BOTTLES W/FORMATIONAL WATER
2	✓	✓	✓	—	—	✓	13.59	✓	1133	1140	~~13.69~~	~~13.69~~ 13.69	1.0	2ND RUN SAMPLE MW-972-63 2VOAS, METALS, ANIONS, ½Cr(VI)
3	✓	✓	✓	✓	✓	✓	13.65	✓	1156	1201	✓	13.70	1.0	3RD RUN, SAMPLE MW-972-63 ½Cr(VI), REDOX, PERCH SOLIDS, FINAL PARAMS
4														
5														
6														
7														
8														
9														
10														
11														
12														

Comments: _____ Total Volume: 3.0L

F-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 252' Date: 7/15/97

Well Name: MW-3 Sampling Zone No.: SCREEN 2 Starting Time: 0945 Finishing Time: 1108

Technicians MLOSI / GSHAN

Water Level Inside MP Casing (Beginning of Session) 13.76 PSIA (End of Session) 13.80 PSIA

Run No.	Surface Function Checks: Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Position Sampler: Deactivate Set Arm Locate Port	Surface Collection Checks: Water Level in MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level in MP (ft) Remove Tape	Volume Retrieved (liters)	Comments
1	✓	✓	✓	✓	✓	✓	13.76	✓	0949	0953	✓	13.77	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES WITH FORMATION WATER
2	✓	✓	✓	✓	✓	✓	13.69	✓	1015	1019	✓	13.80	1.0	2ND RUN, SAMPLE MW-9-97-62 2 VOAs, UMS/MSD, METALS, ½ ANIONS
3	✓	✓	✓	✓	✓	✓	13.68	✓	1036	1039	✓	13.81	1.0	3RD RUN, SAMPLE MW-9-97-62 ½ ANIONS, DUP (VOA), PORCH, PORCH SPLIT
4	✓	✓	✓	✓	✓	✓	13.67	✓	1054	1057	✓	13.80	1.0	LAST RUN, FINAL PARAMETERS
5														
6														
7														
8														
9														
10														
11														
12														

F-2

Comments:

Total Volume: 4.0

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Groundwater Sampling
Field Data Sheet for Multi-Port Well

Project: JPL Location: Depth: 346 Date: 7/15/97

Well Name: MW-3 Sampling Zone No.: SCREEN 3 Starting Time: 0800 Finishing Time: 0944

Technicians MLOSI / OSHMAN

Water Level Inside MP Casing (Beginning of Session) 27.84 PS,A (End of Session) 27.84 PS,A

Run No.	Surface Function Checks					Position Sampler	Surface Collection Checks							Comments
	Activate	Vacuum Check Valve Closed	Valve Open	Evacuate Container	Valve Closed	Deactivate Set Arm Locate Port	Water Level In MP (ft)	Activate	Valve Open Time	Valve Closed Time	Deactivate	Water Level In MP (ft) Remove Tape	Volume Retrieved (liters)	
1	✓	✓	✓	—	—	✓	27.84	✓	0817	0819	✓	27.83	1.0	1ST RUN, INITIAL PARAMETERS, RINSE BOTTLES W/FORMATION WATER
2	✓	✓	✓	✓	✓	✓	27.82	✓	0842	0844	✓	27.84	1.0	2ND RUN SAMPLE MW-972-61 2 VOAs, METALS, ANIONS, ½ Cr(VI)
3	✓	✓	✓	✓	✓	✓	27.81	✓	0903	0905	✓	27.79	1.0	3RD RUN SAMPLE MW-972-61 ½ Cr(VI), PERCH, PERCH SPLIT
4	✓	✓	✓	✓	✓	✓	27.80	✓	0928	0930	✓	27.84	1.0	LAST RUN, FINAL PARAMS
5														
6														
7														
8														
9														
10														
11														
12														

Comments:

Total Volume: 4.0L

F-2

APPENDIX C

FIELD INSTRUMENT CALIBRATION FORMS

CONDUCTIVITY/SALINITY/TEMPERATURE METER
FIELD CALIBRATION FORM

Project Name: JPL

Calibration by: T. BLANEY Date: 6/16/97

Instrument Manufacturer: YSI Model: 3500

Serial Number: 3800

Probe Manufacturer: YSI Model: 3520

Serial Number: 95A93966

Calibration Solution Manufacturer: YSI

Solution Conductivity: 1,000 µS/cm Solution Expiration Date: 12/97

FIELD CALIBRATION

Time: 1134 Temperature of Solution: 24.8

Temperature Compensated Solution Conductivity (µ S/cm) * 996

Instrument Response to Calibration Solution: 1035

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No: ____

Time: 1520 Temperature of Solution: 25.0

Temperature Compensated Solution Conductivity (µ S/cm) * 1,000

Instrument Response to Calibration Solution: 1058

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No: ____

The Temperature Compensated Solution Conductivity May Be Computed Using Following Equation:
Conductivity (µ S/cm) = (Conductivity at 25°C) $(A + BT + CT^2)$
Where T = Temperature in °C

And

Conductivity @ 25°C (µ S/cm)	A	B	C
1,000	0.5407	0.0173	0.000043
10,000	0.5538	0.0168	0.000042
100,000	0.5825	0.0157	0.000040

Instrument is Calibrated if Response is:
± 6% of calibration solution if reading is ≤ 150 mmhos/cm on 500 scale;
≤ 1500 mmhos/cm on 5000 Scale; or ≤ 15,000 mmhos/cm on 50,000 scale.
± 4.5% to 6% of calibration solution if reading is > 150 and < 300
mmhos/cm on 500 scale; > 1500 and < 3000 mmhos/cm an 5000 scale;
and > 15,000 and < 30,000 mmhos/cm on 50,000 Scale.
± 4.5% of calibration solution if reading is ≥ 300 mmhos/cm on 500 scale;
≥ 3000 mmhos/cm on 5000 scale; and ≥ 30,000 mmhos/cm on 50,000 scale.

CONDUCTIVITY/SALINITY/TEMPERATURE METER
FIELD CALIBRATION FORM

Project Name: IPL

Calibration by: T.CHOI Date: 6-16-97

Instrument Manufacturer: YSI Model: 3500

Serial Number: 92F039500

Probe Manufacturer: YSI Model: 3520

Serial Number: 94B7013

Calibration Solution Manufacturer: YSI 3167

Solution Conductivity: 1,000 µS/cm Solution Expiration Date: 9/98

FIELD CALIBRATION

Time: 0909 Temperature of Solution: 19.0

Temperature Compensated Solution Conductivity (µ S/cm) * 885

Instrument Response to Calibration Solution: 915

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No: ____

Time: 1415 Temperature of Solution: 35.6

Temperature Compensated Solution Conductivity (µ S/cm) * 1211

Instrument Response to Calibration Solution: 1230

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No: ____

The Temperature Compensated Solution Conductivity May Be Computed Using Following Equation:
Conductivity (µ S/cm) = (Conductivity at 25°C) $(A + BT + CT^2)$
Where T = Temperature in °C

And

Conductivity @ 25°C (µ S/cm)	A	B	C
1,000	0.5407	0.0173	0.000043
10,000	0.5538	0.0168	0.000042
100,000	0.5825	0.0157	0.000040

Instrument is Calibrated if Response is:
± 6% of calibration solution if reading is ≤ 150 mmhos/cm on 500 scale;
≤ 1500 mmhos/cm on 5000 Scale; or ≤ 15,000 mmhos/cm on 50,000 scale.
± 4.5% to 6% of calibration solution if reading is > 150 and < 300
mmhos/cm on 500 scale; > 1500 and < 3000 mmhos/cm an 5000 scale;
and > 15,000 and < 30,000 mmhos/cm on 50,000 Scale.
± 4.5% of calibration solution if reading is ≥ 300 mmhos/cm on 500 scale;
≥ 3000 mmhos/cm on 5000 scale; and ≥ 30,000 mmhos/cm on 50,000 scale.

CONDUCTIVITY/SALINITY/TEMPERATURE METER
FIELD CALIBRATION FORM

Project Name: JPL

Calibration by: J. BRENNER Date: 6/17/97

Instrument Manufacturer: YSI Model: 3500

Serial Number: 92F039500

Probe Manufacturer: YSI Model: 3520

Serial Number: 94BT7013

Calibration Solution Manufacturer: YSI

Solution Conductivity: 1,000 µS/cm Solution Expiration Date: 9/98

FIELD CALIBRATION

Time: 0750 Temperature of Solution: 18.6

Temperature Compensated Solution Conductivity (µ S/cm) * 877

Instrument Response to Calibration Solution: 904

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No: ____

Time: 1640 Temperature of Solution: 33.9

Temperature Compensated Solution Conductivity (µ S/cm) * 1177

Instrument Response to Calibration Solution: 1209

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No: ____

The Temperature Compensated Solution Conductivity May Be Computed Using Following Equation:
Conductivity (µ S/cm) = (Conductivity at 25°C) $(A + BT + CT^2)$
Where T = Temperature in °C

And

Conductivity @ 25°C (µ S/cm)	A	B	C
1,000	0.5407	0.0173	0.000043
10,000	0.5538	0.0168	0.000042
100,000	0.5825	0.0157	0.000040

Instrument is Calibrated if Response is:
± 6% of calibration solution if reading is ≤ 150 mmhos/cm on 500 scale;
≤ 1500 mmhos/cm on 5000 Scale; or ≤ 15,000 mmhos/cm on 50,000 scale.
± 4.5% to 6% of calibration solution if reading is > 150 and < 300 mmhos/cm on 500 scale; > 1500 and < 3000 mmhos/cm an 5000 scale; and > 15,000 and < 30,000 mmhos/cm on 50,000 Scale.
± 4.5% of calibration solution if reading is ≥ 300 mmhos/cm on 500 scale;
≥ 3000 mmhos/cm on 5000 scale; and ≥ 30,000 mmhos/cm on 50,000 scale.

CONDUCTIVITY/SALINITY/TEMPERATURE METER FIELD CALIBRATION FORM

Project Name: JPL

Calibration by: T. Blaney Date: 6/17/97

Instrument Manufacturer: YSI Model: 3500

Serial Number: 3800

Probe Manufacturer: YSI Model: 3520

Serial Number: 95A 93966

Calibration Solution Manufacturer: YSI

Solution Conductivity: 1,000 µS/cm Solution Expiration Date: 12/97

FIELD CALIBRATION

Time: 0745 Temperature of Solution: 24.2

Temperature Compensated Solution Conductivity (µ S/cm) *

Instrument Response to Calibration Solution: 983

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No:

Time: 1540 Temperature of Solution: 25.0

Temperature Compensated Solution Conductivity (µ S/cm) * 1,000

Instrument Response to Calibration Solution: 1011

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No:

The Temperature Compensated Solution Conductivity May Be Computed Using Following Equation:
Conductivity (µ S/cm) = (Conductivity at 25°C) $(A + BT + CT^2)$
Where T = Temperature in °C

And

Conductivity @ 25°C (µ S/cm)	A	B	C
1,000	0.5407	0.0173	0.000043
10,000	0.5538	0.0168	0.000042
100,000	0.5825	0.0157	0.000040

Instrument is Calibrated if Response is:
± 6% of calibration solution if reading is ≤ 150 mmhos/cm on 500 scale;
≤ 1500 mmhos/cm on 5000 Scale; or ≤ 15,000 mmhos/cm on 50,000 scale.
± 4.5% to 6% of calibration solution if reading is > 150 and < 300
mmhos/cm on 500 scale; > 1500 and < 3000 mmhos/cm an 5000 scale;
and > 15,000 and < 30,000 mmhos/cm on 50,000 Scale.
± 4.5% of calibration solution if reading is ≥ 300 mmhos/cm on 500 scale;
≥ 3000 mmhos/cm on 5000 scale; and ≥ 30,000 mmhos/cm on 50,000 scale.

CONDUCTIVITY/SALINITY/TEMPERATURE METER
FIELD CALIBRATION FORM

Project Name: JPL

Calibration by: J. BRENNER Date: 6/18/97

Instrument Manufacturer: YSI Model: 3500

Serial Number: 92F039500

Probe Manufacturer: YSI Model: 3520

Serial Number: 94B79013

Calibration Solution Manufacturer: YSI

Solution Conductivity: 1,000 µS/cm Solution Expiration Date: 9/98

FIELD CALIBRATION

Time: 0750 Temperature of Solution: 19.0

Temperature Compensated Solution Conductivity (µ S/cm) * 885

Instrument Response to Calibration Solution: 915

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No: ____

Time: 1655 Temperature of Solution: 33.5

Temperature Compensated Solution Conductivity (µ S/cm) * 1169

Instrument Response to Calibration Solution: 1203

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No: ____

The Temperature Compensated Solution Conductivity May Be Computed Using Following Equation:
Conductivity (µ S/cm) = (Conductivity at 25°C) $(A + BT + CT^2)$
Where T = Temperature in °C

And

Conductivity @ 25°C (µ S/cm)	A	B	C
1,000	0.5407	0.0173	0.000043
10,000	0.5538	0.0168	0.000042
100,000	0.5825	0.0157	0.000040

Instrument is Calibrated if Response is:
± 6% of calibration solution if reading is ≤ 150 mmhos/cm on 500 scale;
≤ 1500 mmhos/cm on 5000 Scale; or ≤ 15,000 mmhos/cm on 50,000 scale.
± 4.5% to 6% of calibration solution if reading is > 150 and < 300
mmhos/cm on 500 scale; > 1500 and < 3000 mmhos/cm an 5000 scale;
and > 15,000 and < 30,000 mmhos/cm on 50,000 Scale.
± 4.5% of calibration solution if reading is ≥ 300 mmhos/cm on 500 scale;
≥ 3000 mmhos/cm on 5000 scale; and ≥ 30,000 mmhos/cm on 50,000 scale.

CONDUCTIVITY/SALINITY/TEMPERATURE METER
FIELD CALIBRATION FORM

Project Name: JPL

Calibration by: T. Blaney Date: 6/18/97

Instrument Manufacturer: YSI Model: 3500

Serial Number: 3800

Probe Manufacturer: YSI Model: 3520

Serial Number: 95A93966

Calibration Solution Manufacturer: YSI

Solution Conductivity: 1,000 µS/cm Solution Expiration Date: 12/97

FIELD CALIBRATION

Time: 0745 Temperature of Solution: 23.2

Temperature Compensated Solution Conductivity (µ S/cm) * 967

Instrument Response to Calibration Solution: 950

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No: ____

Time: 1435 Temperature of Solution: 25.5

Temperature Compensated Solution Conductivity (µ S/cm) * 1010

Instrument Response to Calibration Solution: 1005

Instrument Response within Instrument and Probe Limits of Error: ** Yes: ✓ No: ____

The Temperature Compensated Solution Conductivity May Be Computed Using Following Equation:
Conductivity (µ S/cm) = (Conductivity at 25°C) $(A + BT + CT^2)$
Where T = Temperature in °C

And

Conductivity @ 25°C (µ S/cm)	A	B	C
1,000	0.5407	0.0173	0.000043
10,000	0.5538	0.0168	0.000042
100,000	0.5825	0.0157	0.000040

Instrument is Calibrated if Response is:
± 6% of calibration solution if reading is ≤ 150 mmhos/cm on 500 scale;
≤ 1500 mmhos/cm on 5000 Scale; or ≤ 15,000 mmhos/cm on 50,000 scale.
± 4.5% to 6% of calibration solution if reading is > 150 and < 300
mmhos/cm on 500 scale; > 1500 and < 3000 mmhos/cm an 5000 scale;
and > 15,000 and < 30,000 mmhos/cm on 50,000 Scale.
± 4.5% of calibration solution if reading is ≥ 300 mmhos/cm on 500 scale;
≥ 3000 mmhos/cm on 5000 scale; and ≥ 30,000 mmhos/cm on 50,000 scale.