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Supplemental Information to the Expanded Site Inspection Report on the NASA - Jet Propulsion Laboratory

Hazard Ranking System Documentation

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November 1990

SUPPLEMENTAL INFORMATION TO THE EXPANDED SITE
INSPECTION REPORT ON THE NASA - JET PROPULSION LABORATORY

HAZARD RANKING SYSTEM DOCUMENTATION

Prepared For:
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PASADENA, CALIFORNIA 91109

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NOVEMBER 1990

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1.0 INTRODUCTION

The NASA-Jet Propulsion Laboratory (JPL) is currently responsible for research and development in aeronautics, space technology, and space transportation. To accomplish these goals a variety of support functions and laboratories using various chemicals are and have been present at the site.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, stipulates that federal facilities such as the Jet Propulsion Laboratory (JPL), where hazardous materials may have entered the environment, perform a Preliminary Assessment of potential environmental releases. Ebasco Services Incorporated conducted a Preliminary Assessment/Site Inspection (PA/SI) of JPL in 1988 (Ebasco, 1988a, 1988b). The data collected during this PA/SI was used to calculate a preliminary Hazard Ranking System (HRS) score for JPL. The HRS score is used by the Environmental Protection Agency (EPA) to rank sites for potential listing on the National Priorities List (NPL). From January to March 1990, Ebasco Services Incorporated conducted an Expanded Site Inspection (ESI) of JPL (Ebasco, 1990a) to provide additional supporting data and documentation for the EPA who will ultimately provide the final HRS score for JPL. This report which contains additional information on waste characteristics, migration pathways of water, and air and exposure pathways, is intended to supplement the data and information provided in the ESI report.

1.1 Purpose

In the Federal Register, Volume 53, Number 247, dated December 3, 1988, the EPA proposed extensive revisions to the existing Hazard Ranking System (HRS). The revisions increased the amount and detail of data required by the EPA to evaluate potential threats to public health and the environment while scoring a site for potential inclusion on the National Priorities List (NPL). The supplemental information presented in this report is required by the EPA to complete an HRS score for JPL using the newly revised HRS.

1.2 Report Organization

This balance of this report is organized into five sections. The sections are organized to facilitate inserting information into the new HRS scoring model. Each section contains data and information not previously presented in the PA/SI or the ESI reports. The following sections include:

- o Section 2.0 - Waste Characteristics
- o Section 3.0 - Ground Water Migration Pathway
- o Section 4.0 - Surface Water Migration Pathway
- o Section 5.0 - Air Migration Pathway
- o Section 6.0 - Onsite Exposure Pathway

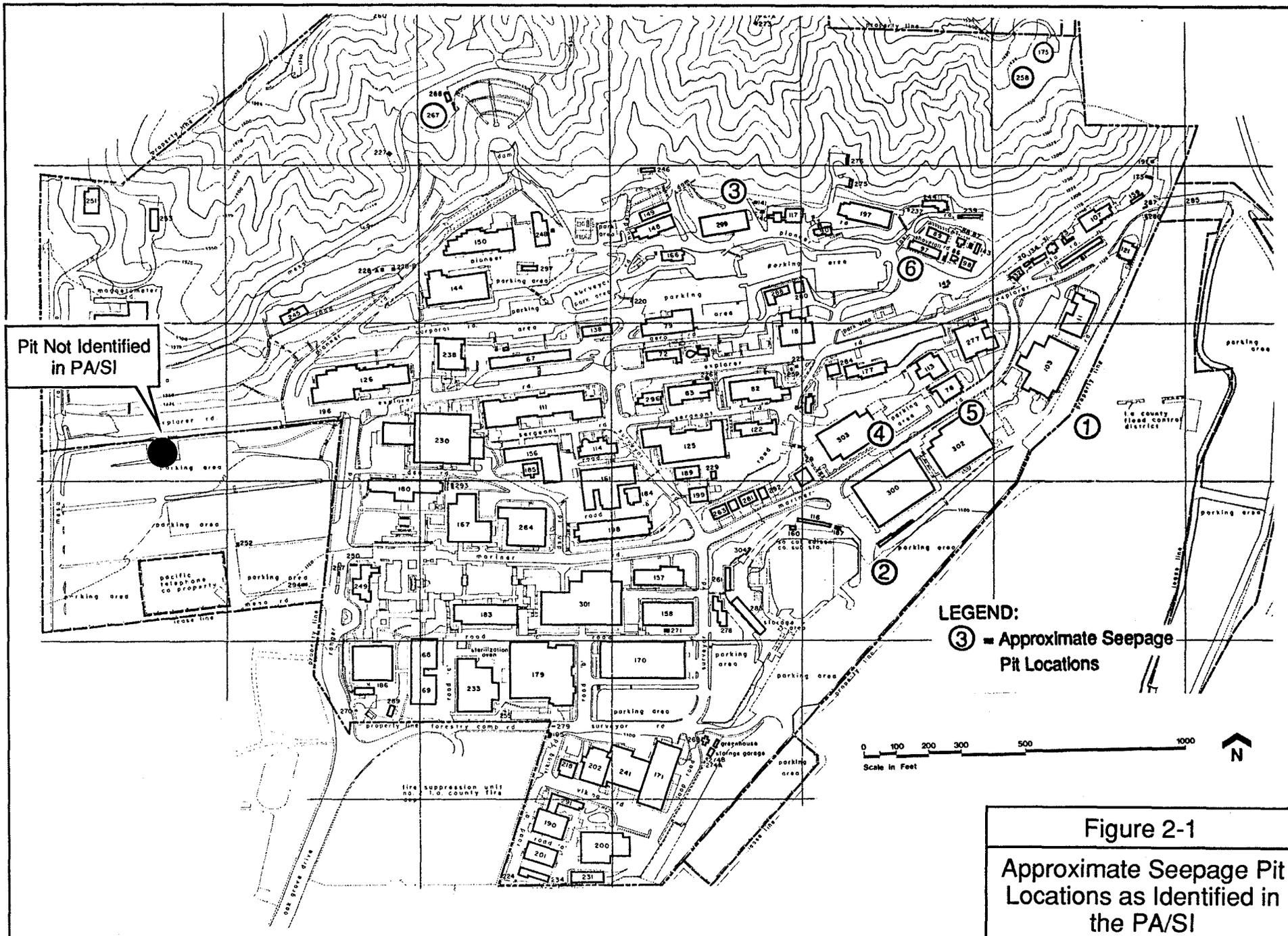
2.0 WASTE CHARACTERISTICS

This section presents the latest information concerning contaminant source identification and location subsequent to the completion of the Preliminary Assessment/Site Inspection (PA/SI) and the Extended Site Inspection (ESI) of JPL. New information gathered from interviews of long-time JPL employees, from evaluating numerous historical aerial photographs, and from evaluating historical building and facility diagrams are incorporated.

The PA/SI identified and discussed six seepage pits where waste disposal had apparently occurred in the past. Figure 2-1 was taken from the PA/SI report and shows the locations of the seepage pits previously identified. A former pit not identified in the PA/SI, but identified prior to field work for the ESI, is also shown on Figure 2-1. This unlined pit was reportedly used to primarily dispose of scrap wood, pipes, debris, and small quantities of identified materials. During the ESI, monitoring well EMW-6 was drilled immediately south of this former pit. Ground water samples collected from monitoring Well EMW-6 during the ESI and during a subsequent sampling event (see Section 3.3) have not contained any contaminants of concern.

After the ESI was completed, several long-time JPL employees and retired JPL personnel that were involved in, or had knowledge about, past JPL waste disposal activities and procedures were interviewed to further clarify the waste characteristics of JPL. The interviews took place on July 17, and July 26, 1990. The personnel interviewed are listed in Table 2-1.

During the interviews, it was learned that of the six waste pits previously identified in the PA/SI, only Pits 2 and 3 on Figure 2-1 were apparently constructed solely for regular waste disposal. Pit 2 on Figure 2-1 is shown on the aerial photograph in Figure 2-2. This unlined pit was mainly used for glass and metal shaving disposal. Pit 2 can be seen on historical aerial photographs taken from 1947 to 1953, but is not present on an aerial photograph taken in 1959. Pit 3, on Figure 2-1, is shown on the historical aerial photograph in Figure 2-3. During the interviews it was learned Pit 3 may have been a fluorine scrubber; however, the purpose of Pit 3 has not been





Notice large waste disposal pit in the lower right hand corner of photo. (Identified as Pit #2 in PA/SI)
(Aerial Photo #JP 931 C from JPL Photo Lab.)

FIGURE 2-2
Aerial Photograph Looking
North at JPL.
Photo Taken September 1950.



Notice pit at bottom of photo. (Identified as Pit #3 in PA/SI)
(Aerial Photo #JB 1110 Z crop from JPL Photo Lab.)

FIGURE 2-3

Aerial Photograph Looking
South at part of JPL.
Date photo taken unknown

TABLE 2-1

PERSONNEL RECENTLY INTERVIEWED AT JPL

Name	Title/Area
Roscoe "Junior" Edwards	JPL Facilities Maintenance and Operation Section
Rich MacGillivray	JPL Facilities Maintenance and Operation Section
Rudy Russ	JPL Facilities Maintenance and Operation Section
Steve Stefanovich	JPL Facilities Maintenance and Operation Section
Lane Prior (Retired)	JPL Safety Officer
Don Boyer	Propulsion Section Administrator
Willis Thurston (Retired)	Test Pit Technician, Section Safety Coordinator
Bill Fehlings	JPL Facilities Maint. and Operation Section

completely determined. Historical building diagrams on file at JPL show two pipelines running directly from former Building #77, an experimental chemistry lab, to this pit. Pit 3 may be critical in a contaminant source evaluation since it is located upgradient and near monitoring Well EMW-7. Ground water samples from Well EMW-7 contain a number of organic volatile compounds. Pit 3 can be located on historical aerial photographs taken between 1940 and 1956, but is not present on an aerial photograph taken in 1958. Both former Pit 2 and Pit 3, as identified in the PA/SI, can be seen on the historical aerial photograph in Figure 2-4.

From the interviews it was learned that Pit 1 and Pit 6 as identified in the PA/SI (Figure 2-1) were not actual "pits", but were open areas where wastes may have been conveniently disposed. Pit 1 was identified as an area where spent mercury was at one time deposited.

During the interviews it was also learned that in the 1940's and 1950's nearly every building at JPL used a cesspool to dispose of sanitary liquid and solid wastes. These cesspools were designed to allow liquid wastes to



Notice Pit 2 from PA/SI in the Arroyo and Pit 3 from the PA/SI along lower edge of JPL.
(Aerial Photo #JP 931 H from JPL Photo Lab.)

FIGURE 2-4
Aerial Photograph Looking
South at JPL.
Photo Taken September 1950.

seep into the surrounding soil, and have apparently been referred to as seepage pits in the past. Pits 4 and 5 as identified in the PA/SI (Figure 2-1) are apparently cesspool seepage pits that have been abandoned. Information gathered during the interviews indicated that most of the cesspool seepage pits at JPL probably received various quantities of chemical wastes since most of the buildings at JPL either stored or used various chemicals. It is believed that these cesspool seepage pits may be important potential sources of soil and ground water contamination at JPL.

As a result of preliminary reviews of historical JPL facility records on file at JPL, 27 cesspool seepage pits were identified at the approximate locations shown in Figure 2-5. The older buildings of JPL, where cesspools were used, were located in the northeast section of JPL. Historical aerial photographs did not have enough resolution to aid in locating these seepage pits. Listed in Table 2-2 are the building-identification numbers that each corresponding seepage pit served. Based on the interviews with JPL personnel, there may be between 5 and 10 additional cesspool seepage pits not currently identified on Figure 2-5.

Also based on the interviews, the cesspool seepage pits were approximately 4 to 5 feet in diameter and from 20 to possibly 40 feet deep. The walls of the pits were probably lined with unmortared bricks. It is believed that the cesspool seepage pits were backfilled sometime between 1960 and 1963 when a sewer system was being installed at JPL. It appears that approximately one-quarter to one-third of the identified cesspool seepage pits may currently be covered by buildings. The remaining identified seepage pits appear to be currently covered by roads, parking lots, flower beds, etc.



FIGURE 2-5
Approximate Locations of Identified
Cesspool Seepage Pits

TABLE 2-2

BUILDING NUMBERS AND THEIR CORRESPONDING CESSPOOL SEEPAGE PITS
 (Seepage Pit Numbers Correspond to Numbers on Figure 2-5)

Seepage Pit No.	Building No.	Building Name
1, 2	3	*
1, 2	4	*
3, 4	11	Electrical and Plumbing Shops and Stores
9	13	Offices, Lab and Shop
1, 2	17	*
1, 2	22	Thermocouple Lab
15	34	Shop-test Cell #33 (Liquid Propellants)
9	44	Credit Union
14	46	Shop-test Cell #42 (Liquid Propellants)
18, 19	52	*
17	55	Solid Propellant Mixing Lab
16	59	Paint Shop
20, 21	63	*
8, 13	65	Materials Lab
23, 24, 25	67	Engineering Building and Labs
5	68	*
5	71	Mechanics Stores
12	74	Chemistry Test Cell
26	77	Experimental Chemistry Lab
10	78	Hydraulics Lab
18, 19	90	Shop-test Cell #51 (Solid Propellants)
11	101	Transportation Offices and Shop
7	103	Fabrication Shop and Inspection
11	104	First Aid and Fire Dept.
27	246	Soils Test Lab
6	*	*
22	*	*

* Currently Unknown

Source: Historic facility maps and historic building diagrams stored at JPL.

3.0 GROUND WATER MIGRATION PATHWAY

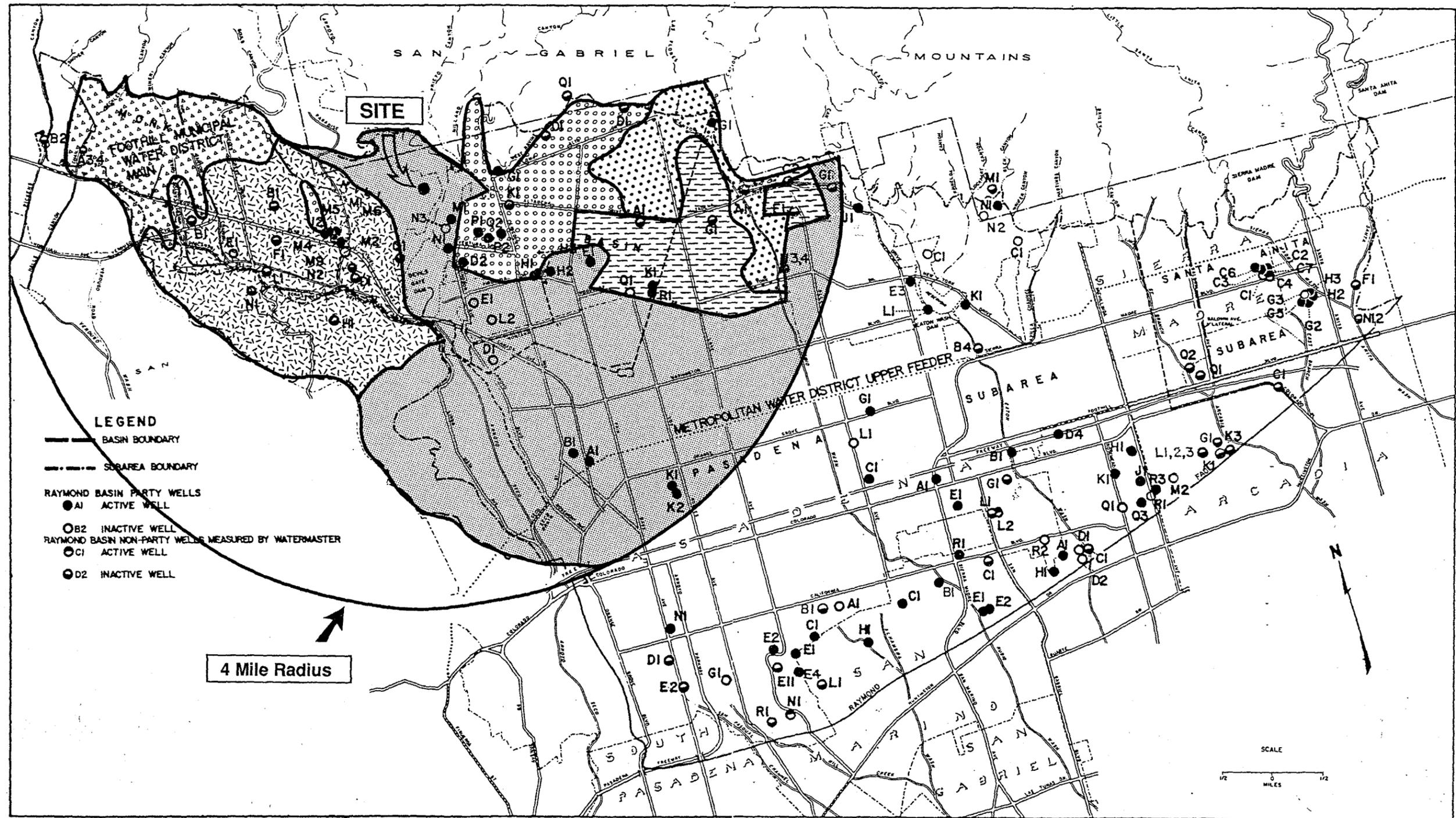
Data not previously presented regarding the ground water migration pathway at JPL is presented in the following paragraphs.

3.1 Local Ground Water Production Wells

Figure 3-1 illustrates the location of ground water supply wells within a four mile radius of JPL. Data within 4 miles of JPL is required for the Hazard Ranking System ground water pathway. All of the identified wells lie within the jurisdiction of the Raymond Basin Management Board which acts as Watermaster for the basin.

Six water supply agencies operate the area wells as shown in Table 3-1. During the latest reporting period, July 1988 to June 1989, the six water supply agencies each withdrew from 0.19 to 11,382 ac-ft of water from the wells within the four-mile radius of JPL (Raymond Basin Management Board, 1989). Estimates of the population served by the wells are based on discussions with representatives of the two largest water supply agencies (based on population served): the City of Pasadena and the Valley Water Company.

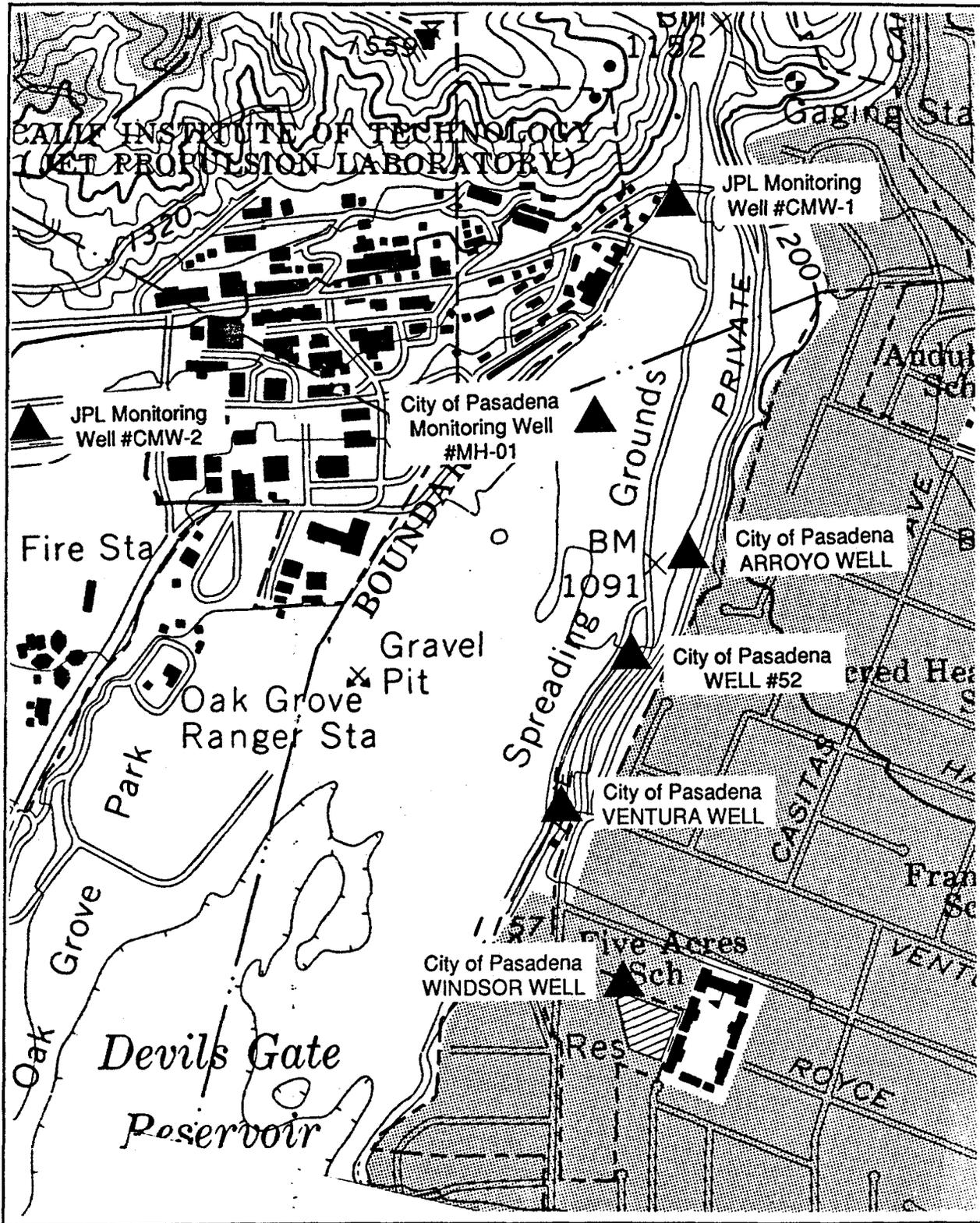
The City of Pasadena is the largest producer of water from the basin and pumped 11,382 ac-ft of water from its wells within the four-mile radius of JPL (Raymond Basin Management Board, 1989). The well water is transferred to reservoirs where it is blended with imported water from the Colorado River and northern California supplied by the Metropolitan Water District (MWD). Pasadena typically uses about 40% well water and 60% imported water. Most residents of Pasadena receive blended water, although those residents farthest from JPL are likely to have a greater proportion of imported water (E. Benson, City of Pasadena, 1990, personal communication, Appendix G). The population of Pasadena is approximately 133,000 (Los Angeles County Department of Regional Planning, 1989) which indicates an average use of about 0.24 ac-ft water per person/year.



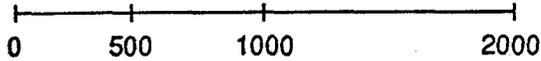
- La Canada Irrigation District
- Valley Water Company
- City of Pasadena
- Las Flores Water Company
- Lincoln Avenue Water Company
- Rubio Canyon Land and Water Association

Source: Adapted from Watermaster Service in Raymond Basin, September, 1989.

FIGURE 3-1
Groundwater supply wells within a four-mile radius of JPL.



Scale (in feet)



▲ Well Locations

Figure 3-2

Locations of Wells
Near JPL

TABLE 3-1

GROUND WATER USE WITHIN A FOUR-MILE RADIUS OF JPL

Water Supply Agency	State Well Number	Water Pumped (Ac/ft)	Imported Water (Ac/ft)	Population Served
La Canada Irrigation District	1N/12W-6M5	150	2,243	8,500 ⁽¹⁾
Las Flores Water Company	1N/12W-8H2	655	139	2,800 ⁽¹⁾
Lincoln Avenue Water Company	1N/12W-5P1 1N/12W-5Q2	0.19	2,243	8,000 ⁽¹⁾
Pasadena, City of	1N/12W-5M1 1N/12W-5N3 1N/12W-17D1 1N/12W-20B1 1N/12W-21K2 1N/11W-11J1 1N/12W-20A1 1N/12W-21K1 1N/12W-5N1 1N/12W-8D2	11,382	17,028	133,000
Rubio Canyon Land and Water	1N/12W-8H3 1N/12W-8H4	1,400	658	7,350 ⁽¹⁾
Valley Water Company	1N/12W-6M6 1N/12W-6M4 1N/12W-6M1 1N/12W-6M9	1,134	2,228	10,500
			TOTAL POPULATION	170,150

(1) Population estimate based on average use of approximately 0.28 ac-ft per person/year.

Source: Raymond Basin Management Board 1989; City of Pasadena (E. Benson 1990, personal communication); Valley Water Company (A. Harrel 1990, personal communication).

The second largest water supply company (based on population served) using well water within a four-mile radius of JPL is the Valley Water Company in La Canada-Flintridge, which pumped 1,134 ac-ft of water in the 1988-1989 period (Raymond Basin Management Board, 1989). The Valley Water Company blends its water with MWD imported water, ending up with a mix of about 25-30% well water and 70-75% imported water (A. Harrel, Valley Water Company, 1990, personal communication, Appendix G). This company supplies approximately 10,500 persons for an average use of about 0.32 ac-ft water per person/year.

Table 3-1 also provides an estimate of the total population served by the wells within the four-mile radius of JPL.

3.2 Logs of Nearby Off-Site Wells

Figure 3-2 shows the locations of ground water monitoring and production wells near JPL. JPL monitoring Wells CMW-1 and CMW-2 were installed by the Army Corps of Engineers in 1989. The boring logs for these wells and the electric log for Well CMW-2 are in Appendix A. The electric log for Well CMW-1 could not be obtained.

The City of Pasadena ground water monitoring Well MH-01 was installed by Geotechnical Consultants, Inc., in 1982. The boring log and electrical log for this well are included in Appendix A. The City of Pasadena also has four municipal water production wells located near JPL: the Arroyo Well, Well #52, the Ventura Well, and the Windsor Well (Figure 3-2). The boring logs of these wells are also included in Appendix A. Table 3-2 summarizes general information about the monitoring and production wells near JPL.

3.3 Additional Ground Water Analytical Results

Prior to beginning the Expanded Site Inspection (ESI), of JPL, Ebasco Environmental sampled the four City of Pasadena municipal water production wells nearest JPL (the Arroyo Well, Well #52, the Ventura Well, and the Windsor Well). This sampling was conducted in November, 1989. After the ESI was completed in early 1990, the newly installed JPL monitoring wells were resampled and surveyed in June, 1990. This section discusses the analytical results from these two sampling events.

TABLE 3-2

GENERAL INFORMATION ON THE MONITORING
AND PRODUCTION WELLS NEAR JPL

Well Name Or Number	Type of Well	Owner of Well	Depth Drilled (Feet)	Year Drilled
CMW-1	Monitoring	JPL	162	1989
CMW-2	Monitoring	JPL	179	1989
MH-01	Monitoring	City of Pasadena	399	1982
Arroyo Well	Production	City of Pasadena	668	1930
Well #52	Production	City of Pasadena	647	1977
Ventura Well	Production	City of Pasadena	489	1924
Windsor Well	Production	City of Pasadena	573	1918

November 1989 Sampling of City Production Wells

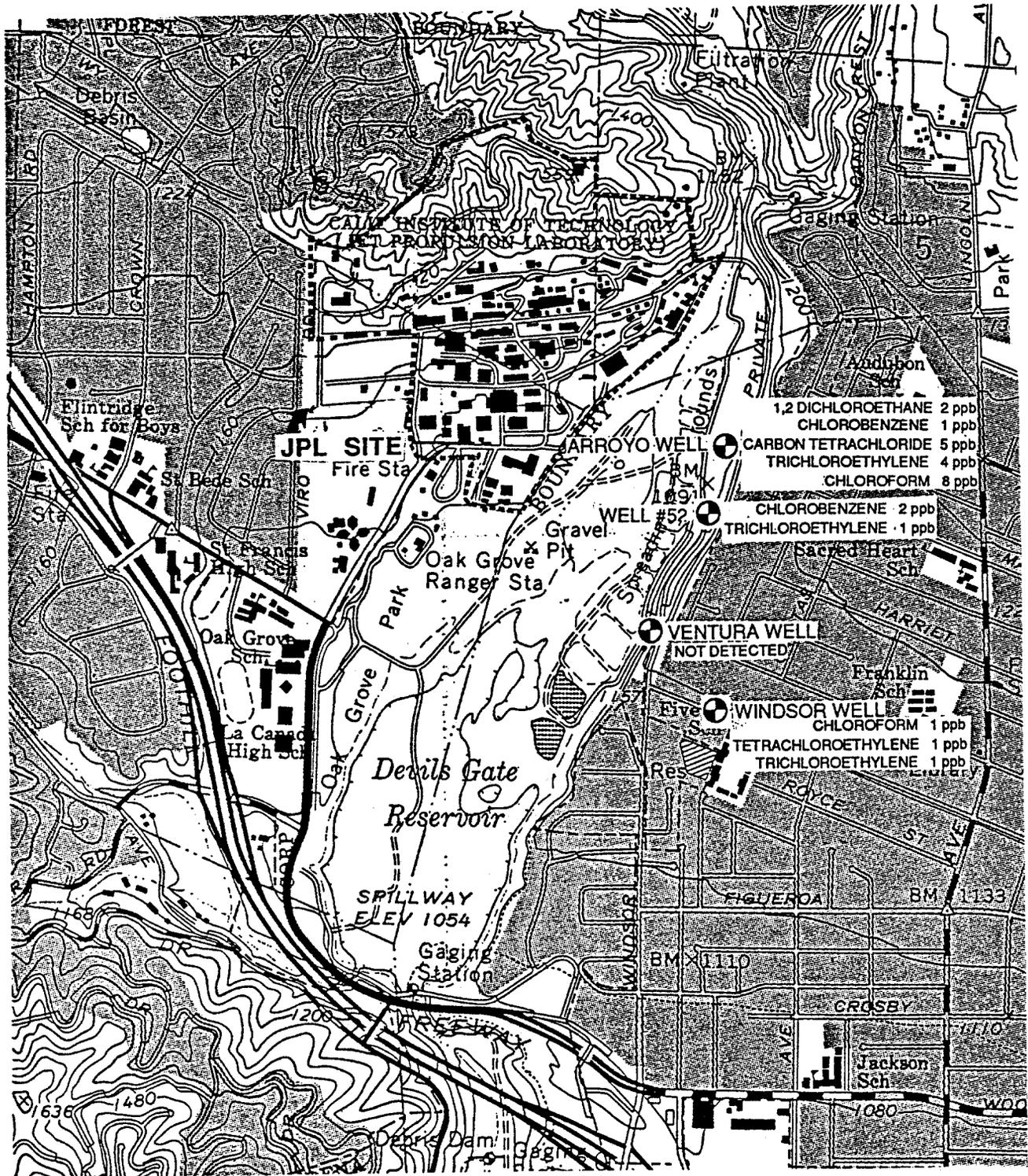
On November 1, 1989, a representative from Ebasco Environmental, along with City of Pasadena Water and Power Department personnel, collected ground water samples from the Arroyo Well, Well #52, the Ventura Well, and the Windsor Well. All four of the wells sampled contain permanently installed centrifugal turbine pumps. The discharge capacity of these pumps is very high (1500 - 2500 gpm) creating turbulence in the discharged water. The pump assemblies could not be disassembled from each well for the purpose of collecting samples. As a result, water samples were collected at a small spigot on the discharge pipe that, when opened, introduced air into the samples. This approach for sampling is not recommended if accurate volatile organic analysis of samples is desired. The correct sampling procedure would require each high capacity pump to be removed and water samples to be collected with a bailer or a low capacity pump (≤ 100 ml/minute).

Before proceeding to describe the ground water sampling procedure used, it should be mentioned that these wells were not designed to serve as monitoring wells. There are wide variabilities in the depths of screened intervals within each well and between wells. The water samples collected probably represent a mixture of water produced from the many different screened depths in each well. Thus it is difficult to compare the water quality results between these wells.

The sampling procedure used consisted of pumping 5 to 10 casing volumes of water, the minimum standard for well purging, from each well. Temperature, pH and conductivity of the purged water was monitored. The stabilization of these parameters was used to indicate that the well purging operation was completed and that all stagnant water in the well was removed and formation water was being extracted.

Ground water samples were then collected to be analyzed for volatile organics (EPA Method 624), semi-volatile organics (EPA Method 625), general minerals, nitrates, and selected metals including magnesium, copper, iron, manganese, zinc, aluminum, arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. The laboratory analytical reports are included in Appendix B. Each ground water sample collected was sealed, labeled, immediately placed in a cooler full of ice and shipped under chain-of-custody to a certified laboratory for analyses.

Figure 3-3 shows the concentration of volatile organic compounds detected in each well. The results indicate that volatiles were present in three of the four wells sampled, but in concentrations generally below state and federal drinking water standards. In the Arroyo Well, only carbon tetrachloride and 1, 2-dichloroethane were present in concentrations above drinking water standards. The semi-volatile bis(2-ethyhexyl)phthalate was detected in the Arroyo Well (12 µg/L) and Well #52 (10 µg/L). Bis(2-ethyhexyl)phthalate was also detected in the laboratory blank (13 µg/L) indicating it is probably a laboratory contaminant and not in the ground water.



● PASADENA WELLS

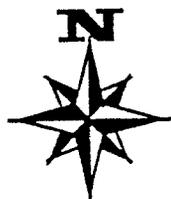


Figure 3-3
 Detected Volatile Organic
 Constituents in the Pasadena City
 Production Wells, November 1989.

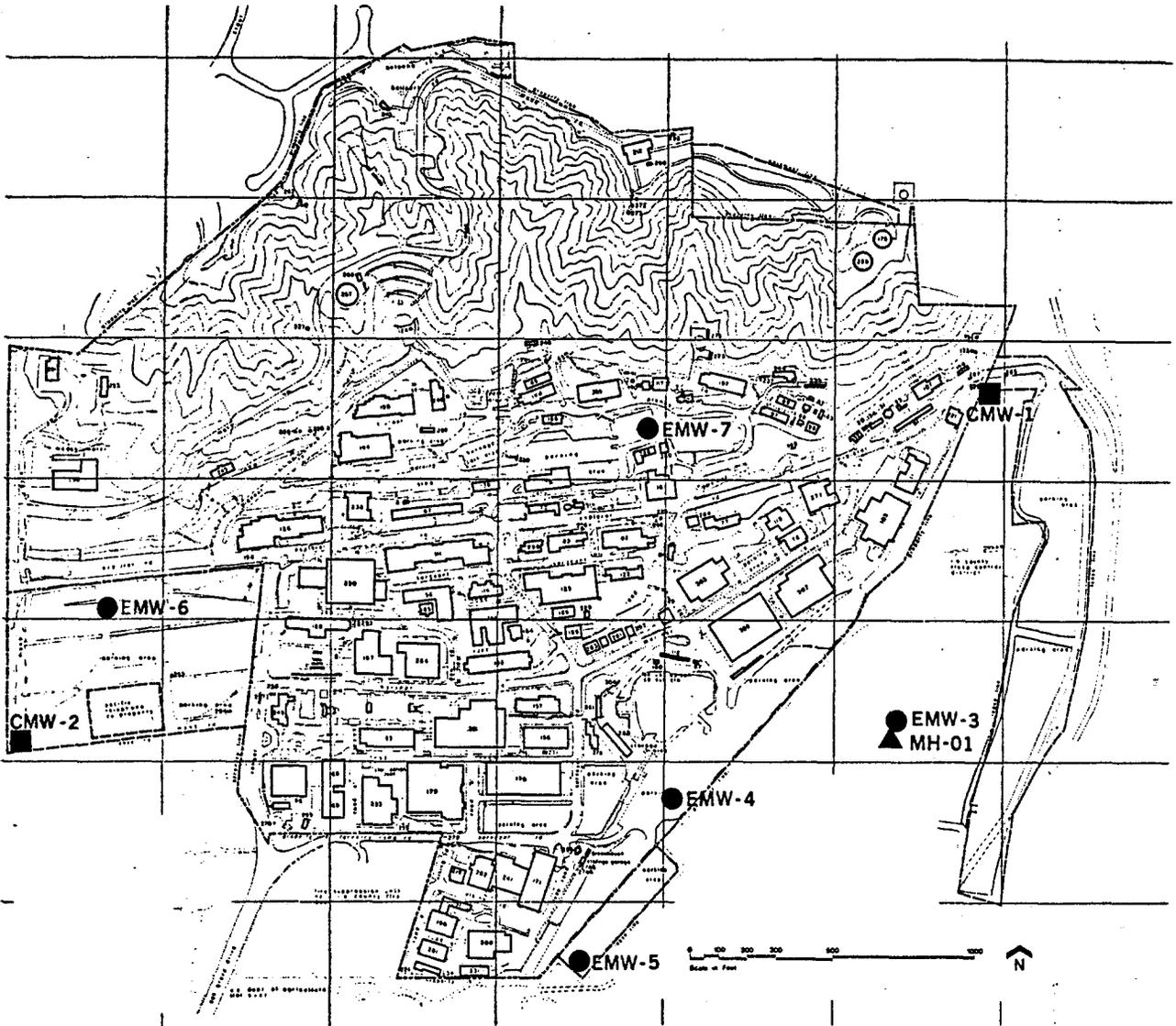
The metals analyses indicated barium was present in samples from all wells in concentrations from 0.073 mg/L to 0.14 mg/L. These concentrations are much lower than the State of California Department of Health Services Maximum Contaminant Level (MCL) of 1.0 mg/L for barium. Lead was found in only one well, Well #52, at a concentration of 0.006 mg/L. The State of California, Department of Health Services MCL for lead is 0.05 mg/L. No other metals of concern were detected.

The laboratory results also indicated nitrate (reported as N and reported as NO_3) was present in all wells. Only the Ventura Well had nitrate reported as N (13 mg/L) and nitrate reported as NO_3 , (57 mg/L) in concentrations above the respective State of California Department of Health Services MCL's of 10 mg/L and 45 mg/L.

June 1990 Resampling of JPL Monitoring Wells

Between June 25, 1990 and July 3, 1990, JPL monitoring Wells EMW-3 through EMW-7 were resampled by Ebasco Environmental personnel. Figure 3-4 shows the locations of the wells. Water level data were also collected and are presented on Figure 3-5. Monitoring Wells EMW-3 and EMW-4 are deep wells completed with five separate screened intervals each, and monitoring Wells EMW-5, EMW-6, and EMW-7 are standpipe wells, each with a single screened interval located at the top of the aquifer. All sampling procedures and decontamination procedures used were identical to those procedures used during the Expanded Site Inspection of JPL (ESI) and are described in the ESI Report dated May 1990. The water samples were analyzed for volatile organics using EPA Method 624, for Na, K, Ca, Mg, Fe, Cl, SO_4 , NO_3 , CO_3 , HCO_3 , F, PO_4 , Mass Balance and Charge Balance, Total Organic Carbon (TOC), and Total Dissolved Solids (TDS). The laboratory analytical reports are included in Appendix C.

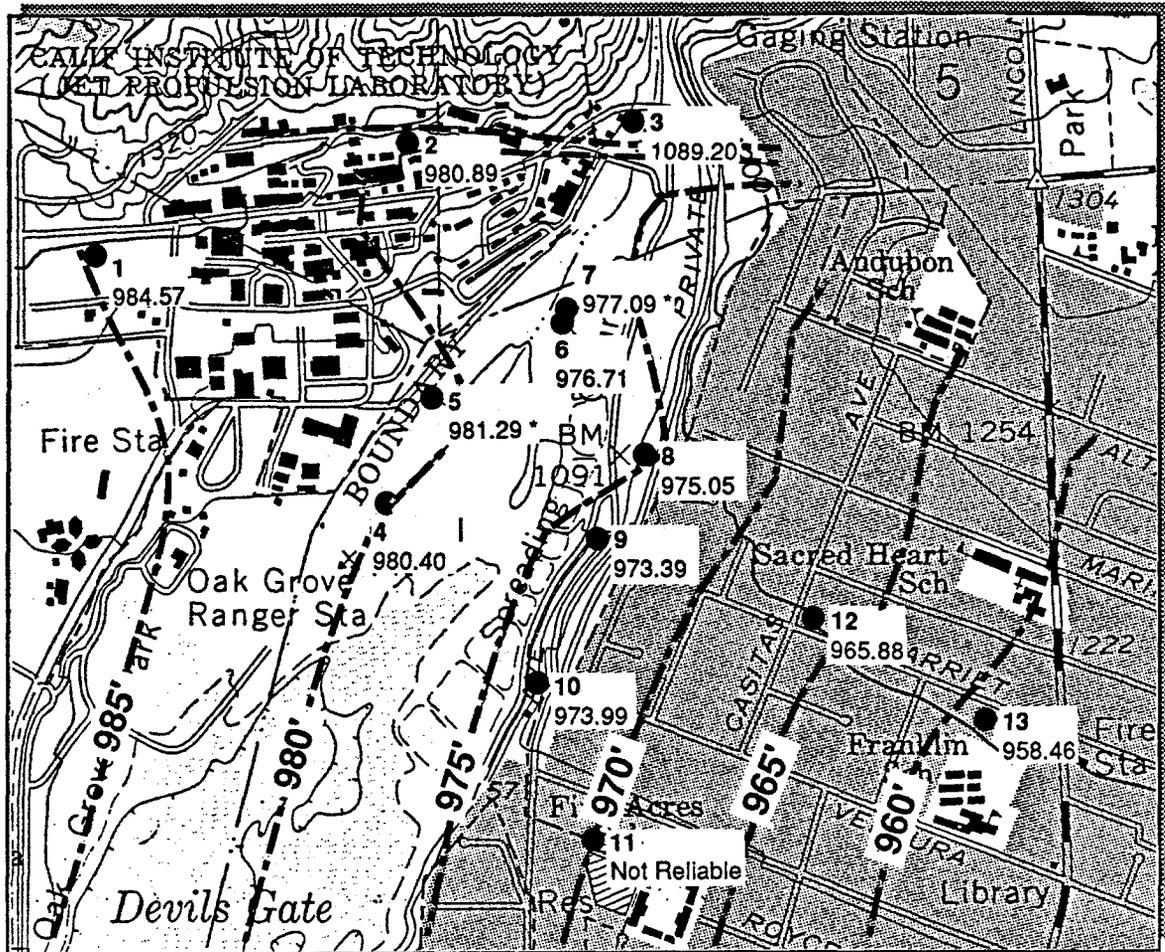
Results of the volatile organic analyses are summarized in Table 3-3. The upper two screened intervals of multi-port well EMW-3 contained chloroform at levels below State of California, Department of Health Services drinking water standards. Toluene was detected in Wells EMW-5, 6, and 7 at levels slightly above the analytical detection limit of 5 $\mu\text{g/l}$. Xylene was also detected in Well EMW-5 at a concentration of 11 $\mu\text{g/l}$. Several volatile



Legend:

- Installed during the ESI investigation
- Installed by the Army Corps of Engineers in 1989.
- ▲ Installed by Geotechnical Consultants, Inc. in 1982.

Figure 3-4
Locations of Groundwater Monitoring Wells
On or Near JPL



- | | |
|--|-------------------------------------|
| 1 - JPL MONITORING WELL EMW-6 | 7 - JPL MONITORING WELL EMW-3 |
| 2 - JPL MONITORING WELL EMW-7 | 8 - CITY OF PASADENA ARROYO WELL |
| 3 - JPL MONITORING WELL CMW-1 | 9 - CITY OF PASADENA WELL #52 |
| 4 - JPL MONITORING WELL EMW-5 | 10 - CITY OF PASADENA VENTURA WELL |
| 5 - JPL MONITORING WELL EMW-4 | 11 - CITY OF PASADENA WINDSOR WELL |
| 6 - CITY OF PASADENA MONITORING WELL MH-01 | 12 - LINCOLN AVE. WATER CO. WELL #3 |
| | 13 - LINCOLN AVE. WATER CO. WELL #5 |

Note: WATER LEVELS MEASURED 6/21/90 EXCEPT FOR EMW-3 ON 6/26/90 & EMW-4 ON 6/25/90.

* WATER LEVELS MEASURED WITH ELECTRONIC WATER METER EXCEPT FOR EMW-3 & EMW-4 WHERE A PRESSURE TRANSDUCER WAS USED.

Figure 3-5
GROUNDWATER ELEVATIONS IN FEET
ON AND ADJACENT TO JPL, JUNE, 1990

**Table 3-3
 DETECTED VOLATILE ORGANIC COMPOUNDS IN GROUND WATER SAMPLES
 COLLECTED DURING THE JUNE 1990 RESAMPLING OF JPL MONITORING WELLS**

(Concentrations reported in µg/l)

Well Number	Chloroform	Toluene	Total Xylenes	Carbon Tetrachloride	1,1-Dichloroethene (1,1-DCE)	Trichloroethene (TCE)	Tetrachloroethene (PCE)
EMW-3, screen 1	44	--	--	--	--	--	--
EMW-3, screen 2	6	--	--	--	--	--	--
EMW-3, screen 3	--	--	--	--	--	--	--
EMW-3, screen 4	--	--	--	--	--	--	--
EMW-3, screen 5	--	--	--	--	--	--	--
EMW-4, screen 1	--	--	--	--	--	--	--
EMW-4, screen 2	--	--	--	--	--	--	--
EMW-4, screen 3	--	--	--	--	--	--	--
EMW-4, screen 4	--	--	--	--	--	--	--
EMW-4, screen 5	--	--	--	--	--	--	--
EMW-5	--	6	11	--	--	--	--
EMW-6	--	6	--	--	--	--	--
EMW-7	19	5	--	200*	6	27	9
Primary Standard**	100†	100††	1,750	0.5	6	5	5

Notes:

- not detected.
- * Dilution factor of 2.5.
- ** Maximum contaminant level established by The State of California, Department of Health Services.
- † Total trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane, and bromoform).
- †† Drinking water action level recommended by The State of California, Department of Health Services.

organics were detected in the sample from Well EMW-7, including 1,1-Dichloroethane (6 µg/L), trichloroethane (27 µg/L), tetrachloroethene (9 µg/L), carbon tetrachloride (200 µg/L), and chloroform (19 µg/L) (Table 3-3).

Results from the analyses of major cation and anion species are presented in Table 3-4. When coupled with similar data that may be collected in the future, these results may be useful for 1) evaluating the effect of inorganic constituents on the performance of potential remediation equipment, and 2) evaluating the possible effect of surface water run-off on ground water quality. Determining whether ground water collected at the monitoring wells contains contributions from surface run-off will be done by comparing the chemical signatures of various water samples.

The quality of the data presented in Table 3-4 is generally good, but the alkalinity data is questionable. Relatively large charge-balance values (Table 3-4) indicate inconsistencies in the data. In general, the cation-anion charge balance for natural waters with low TDS should be about $\pm 1-2\%$, (Hem, 1985). Greater charge balance discrepancies indicate that an anion or cation species may have been overlooked, (which is unlikely for the JPL samples), or that an analytical error is present. Reanalyses for several samples and spiked samples indicated acceptable accuracy and precision for all constituents except for alkalinity. The difference in alkalinity is a result of sample degradation during the time between analyses.

During June 1990, the elevations and locations of the JPL monitoring wells were also surveyed. On June 21, 25, and 36, 1990 Robert Wada and Associates, a licensed land surveying company located in Fullerton, California, determined the elevations and locations of the JPL monitoring wells using benchmarks previously established on JPL. Well locations and elevations were surveyed for JPL monitoring Wells EMW-3 through EMW-7 installed by Ebasco, monitoring Well CMW-1 installed by the Army Corps of Engineers, and monitoring Well MH-01 installed by the City of Pasadena. The results of this survey are summarized in Table 3-5.

Table 3-4
MAJOR ANION AND CATION CONSTITUENTS IN GROUND WATER SAMPLES
COLLECTED DURING THE JUNE 1990 RESAMPLING OF THE JPL MONITORING WELLS

(Concentrations for all constituents are reported in mg/l except Charge Balance, pH, and Conductivity — see notes)

Well Number	F ⁻	Cl ⁻	NO ₃ ⁻	SO ₄ ²⁻	PO ₄ ³⁻	Na ⁺	K ⁺	Mg ²⁺	Ca ²⁺	Fe ²⁺	Alk HCO ₃ ⁻	Alk CO ₃ ²⁻	Charge Bal. (%)	TDS	TOC	pH	Cond. (µmho/cm)
EMW-3 screen 1	0.0	28	6.2	56	ND	23	3.2	25	78	3.2	350	ND	-23.5	470	ND	7.0	568
EMW-3 screen 2	1.0	13	3.9	32	ND	22	3.0	19	54	0.2	250	ND	-14.8	300	22	7.5	440
EMW-3 screen 3	1.6	16	0.0	2.6	ND	97	2.4	3.0	10	0.5	180	42	+0.42	290	34	8.7	422
EMW-3 screen 4	1.0	9.2	0.0	15	ND	60	3.7	7.6	23	0.3	180	30	-7.1	260	15	8.0	355
EMW-3 screen 5	2.4	11	0.0	26	ND	79	2.8	3.6	16	0.3	150	30	-0.42	270	ND	8.2	383
EMW-4 screen 1	0.0	20	9.2	45	ND	24	3.4	22	70	0.3	360	ND	-31.4	388	ND	7.2	481
EMW-4 screen 2	0.0	41	32	50	ND	30	2.7	24	73	0.2	300	ND	-21.8	520	ND	6.9	608
EMW-4 screen 3	0.8	11	16	6	ND	33	2.0	11	34	0.7	300	ND	-48.2	260	ND	7.5	348
EMW-4 screen 4	0.0	9.2	9.2	11	ND	42	2.0	10	30	0.4	300	ND	-44.6	260	ND	7.7	349
EMW-4 screen 5	0.9	7.7	1.4	18	ND	49	3.2	9.3	32	2.0	340	ND	-46.4	260	ND	7.8	379
EMW-5	0.7	15	10	31	ND	18	4	22	69	1.3	420	ND	-43.8	350	ND	6.8	455
EMW-6	ND	48	32	73	ND	27	3	25	74	4	300	ND	-27.1	560	ND	7.0	710
EMW-7	ND	18	24	31	ND	26	3	16	45	6	320	ND	-45.6	310	ND	7.7	490

Notes:

- Alkalinity (bicarbonate and carbonate fractions) values are expressed in terms of mg/l of CaCO₃.
- Reported pH and Conductivity values are averages of field measurements taken immediately before and after sampling.
- Charge balance was calculated by:

$$\text{Charge balance} = \left(\frac{(\sum \text{Cations} - \sum \text{Anions})}{(\sum \text{Cations} + \sum \text{Anions}) / 2} \right) * 100$$

where: Cations = [Na⁺], [K⁺], [Mg²⁺], [Ca²⁺], and [Fe²⁺]
 Anions = [F⁻], [Cl⁻], [NO₃²⁻], [SO₄²⁻], [PO₄³⁻], [HCO₃⁻], and [CO₃²⁻]
 [OH⁻] is insignificant and was disregarded
 (all mg/l concentrations expressed as meq/l for charge balance calculation)

TABLE 3-5

SURVEYED ELEVATIONS AND LOCATIONS FOR JPL MONITORING WELLS

Well Number	Coordinates *		Elevations in Feet	
	Northing	Easting	Top of Traffic Box	Top of 4" Casing
EMW-3 (Multi-port Well)	5044.80	6983.90	1099.59**	1099.82
EMW-4 (Multi-port Well)	4779.16	6251.47	1083.69	1082.72
EMW-5	4190.86	5909.38	1072.22	1071.60
EMW-6	5462.57	4177.47	1189.01	1188.46
EMW-7	6077.04	6098.21	1213.45	1212.90
CMW-1	6233.82	7337.19	1158.80	1117.05
MH-01	5007.47	6982.78	Not Applicable	1099.78***

* Add 4,180,000 to all Northing coordinates and 4,230,000 to all Easting coordinates to obtain Lambert coordinates.

** Relative to concrete pad.

*** Relative to top of 6" casing.

4.0 SURFACE WATER MIGRATION PATHWAY

Data not previously presented regarding the surface water migration pathway at JPL is presented in the following paragraphs.

4.1 Physical Characteristics

JPL covers an area of approximately 176 acres. JPL's main facilities are located on the southern half of the site and can be divided into a northeastern area developed by the military and a southwestern area developed by NASA (Boyle Engineering, 1988).

The northern, primarily undeveloped, half of the site is mountainous, while the southern half of the site is moderately sloping and has been extensively graded. JPL varies in elevation from 1075 feet to 1550 feet above mean sea level. Surface runoff on JPL is generally from north to south. Surface water from the mountains to the north is collected and transmitted by an underground storm drain system through the developed southern portion of the site and is then discharged into the Arroyo Seco. The storm drain system includes four major pipelines (24 to 48 inches in diameter) and several smaller branch lines (12 to 24 inches in diameter) (Boyle Engineering, 1988). The pipelines are constructed of materials that include vitrified clays, reinforced concrete pipe, and corrugated metal pipe. Figure 4-1 illustrates the storm drainage system at JPL.

Presently, over 150 structures and buildings are present at JPL. The total area occupied by these buildings is approximately 1,330,000 square feet, of which about 40,164 square feet is taken up by temporary trailers and vans (Boyle Engineering, 1988). Table 4-1 presents the approximate percentage of JPL covered by various ground surface features. There are two major off-site parking lots and one on-site lot currently used by JPL personnel: the West Lot, with 1,165 parking spaces, the East Lot with 1,160 parking spaces, and the Arroyo Lot (on-site) with 826 parking spaces. Additional parking is provided by smaller parking lots located throughout the site.

TABLE 4-1

GROUND SURFACE CHARACTERISTICS OF JPL

Feature	Acres*	% of Total Area
Parking Lots	20	11
Buildings/Structures	26	15
Roads	8	5
Sidewalks/Other Pavement	29	16
Grass/Open Areas	23	13
Native Vegetation	<u>70</u>	<u>40</u>
Total	176	100

* Acreage for each feature estimated by tracing the JPL plot plan on a piece of fine grid paper and counting the number of squares each feature covered.

In general, there are three biotic habitats at JPL. The largest is a man made habitat located on the developed, southern part of the facility. Native chaparral vegetation is found in the mountainous northern section of the facility, and a riparian habitat is located along the Arroyo Seco (Ebasco, 1990b).

The Arroyo Seco originates north of JPL within the Angeles National Forest. Figure 4-2 illustrates the surface drainage pattern into the Arroyo near JPL. The U.S.G.S. stream gaging station nearest JPL is Station No. 11098000. This station is located on the right bank of the Arroyo Seco, 0.7 miles east of Angeles Crest Highway and 1.5 miles upstream from Millard Canyon (USGS, 1966) (Figure 4-3). The average stream discharge measured at this station is 9.79 cubic feet per second (7,090 acre-feet/year) for a 74-year period of record. Maximum recorded discharge at this station was 8,620 cubic feet per second on March 2, 1938 (USGS, 1989).

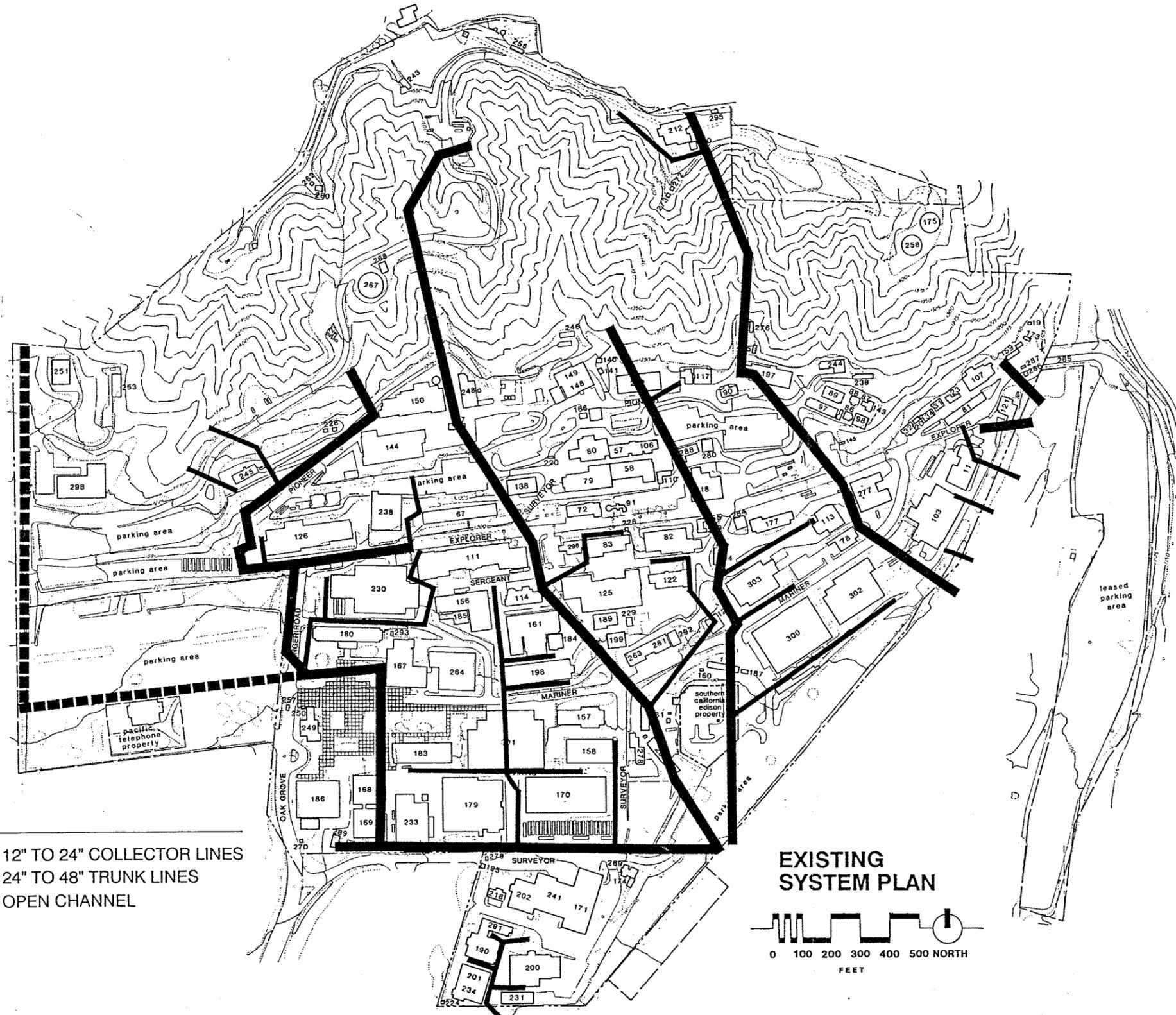
The California Department of Water Resources (DWR) operates a surface water runoff gaging station (No. 62250) at the mouth of Millard Canyon near the mouth of the Arroyo Seco Canyon (Figure 4-3). During fiscal year 1988-1989, the average stream discharge measured at this station was 2.53 second-feet (1792.50 acre-feet/year) (Raymond Basin Management Board, 1989).

In the winter months a small stream meanders through the Arroyo adjacent to JPL towards the Devil's Gate Dam into the Devil's Gate Reservoir (Figure 4-3). The Devil's Gate Reservoir has a capacity to hold 2,750 acre-feet. Flow through the Arroyo Seco is monitored and regulated by the Los Angeles County Flood Control District. Devil's Gate Reservoir, along with the surface water spreading grounds along the Arroyo Seco, northeast of Devil's Gate Reservoir and east of JPL, are used by the Los Angeles County Flood Control District as part of the flood control system in the Los Angeles River Basin. The Arroyo is currently being used commercially by gravel mining operations, and recreationally for jogging, bicycling, hiking and horseback riding.

Oak Grove Park, a Los Angeles County Department of Parks and Recreation Facility, is located about 1/4 mile south of JPL (Figure 4-3). This 53-acre park is just east of Oak Grove Drive and just west of Devil's Gate

LEGEND

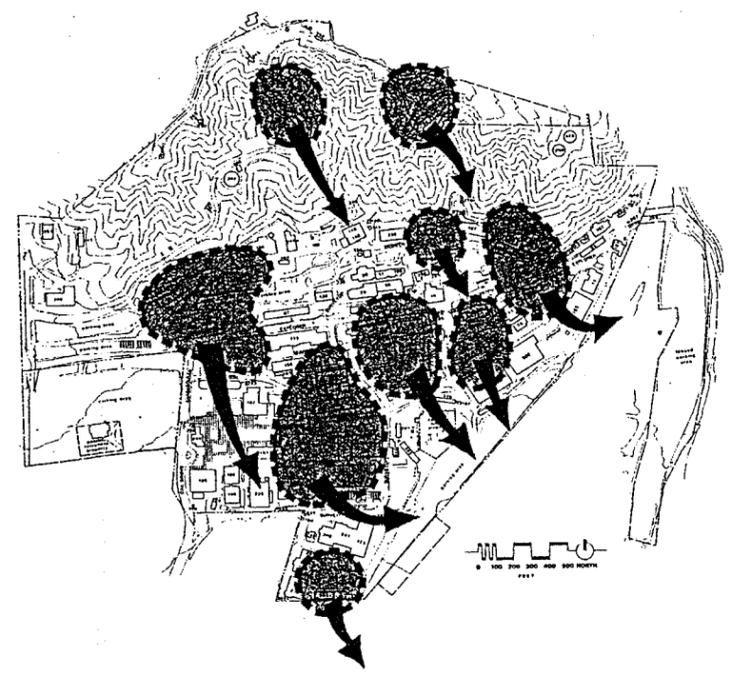
- 12" TO 24" COLLECTOR LINES
- 24" TO 48" TRUNK LINES
- ▬▬▬▬ OPEN CHANNEL



EXISTING SYSTEM PLAN

0 100 200 300 400 500 NORTH
FEET

Source: Adapted from Boyle Engineering, 1988.



EXISTING SYSTEM SCHEMATIC LEGEND

- ▬▬▬▬ TRIBUTARY AREA
- ➔ FLOW COMPONENT



FIGURE 4-1
Storm Drainage System at JPL

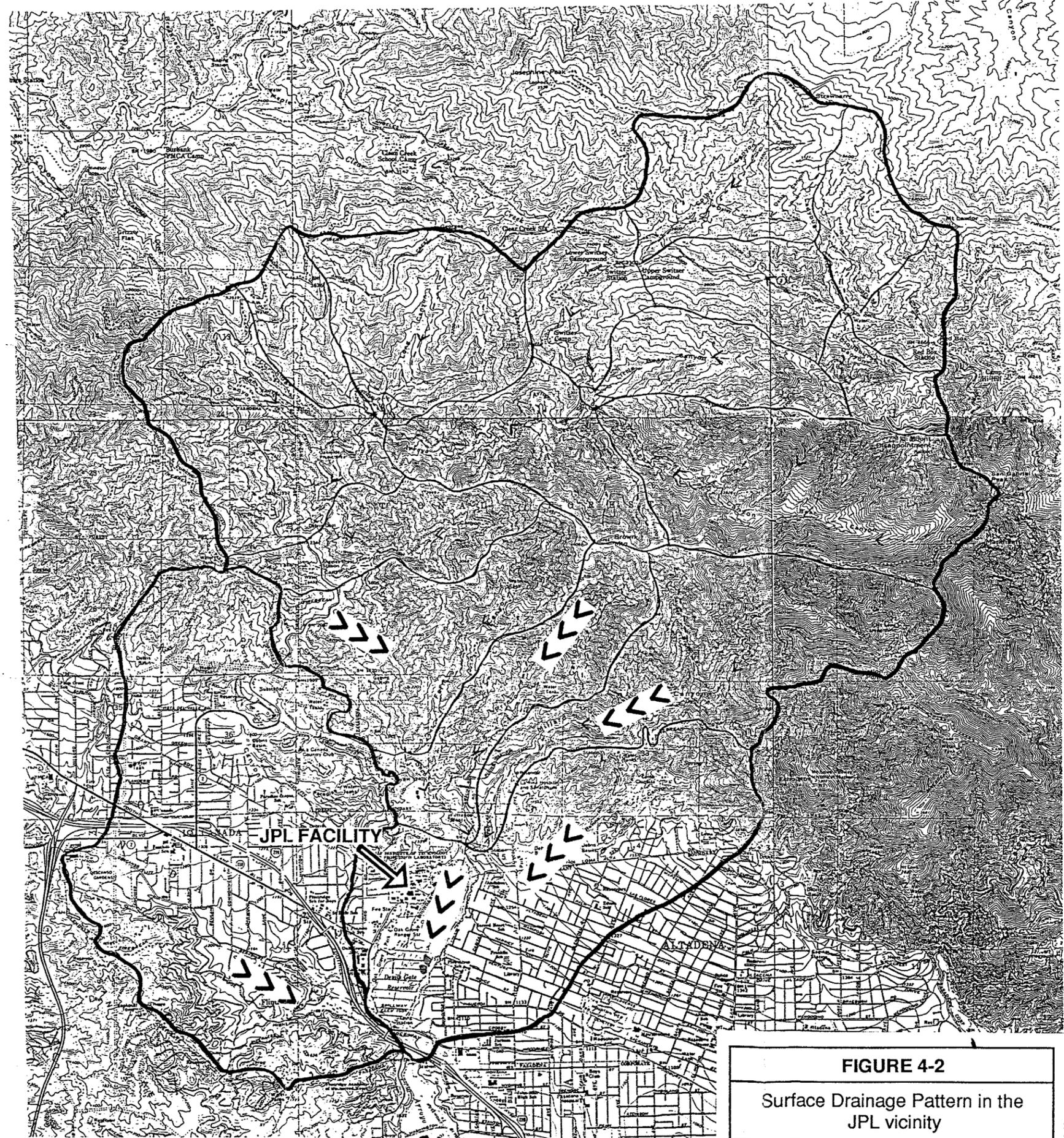
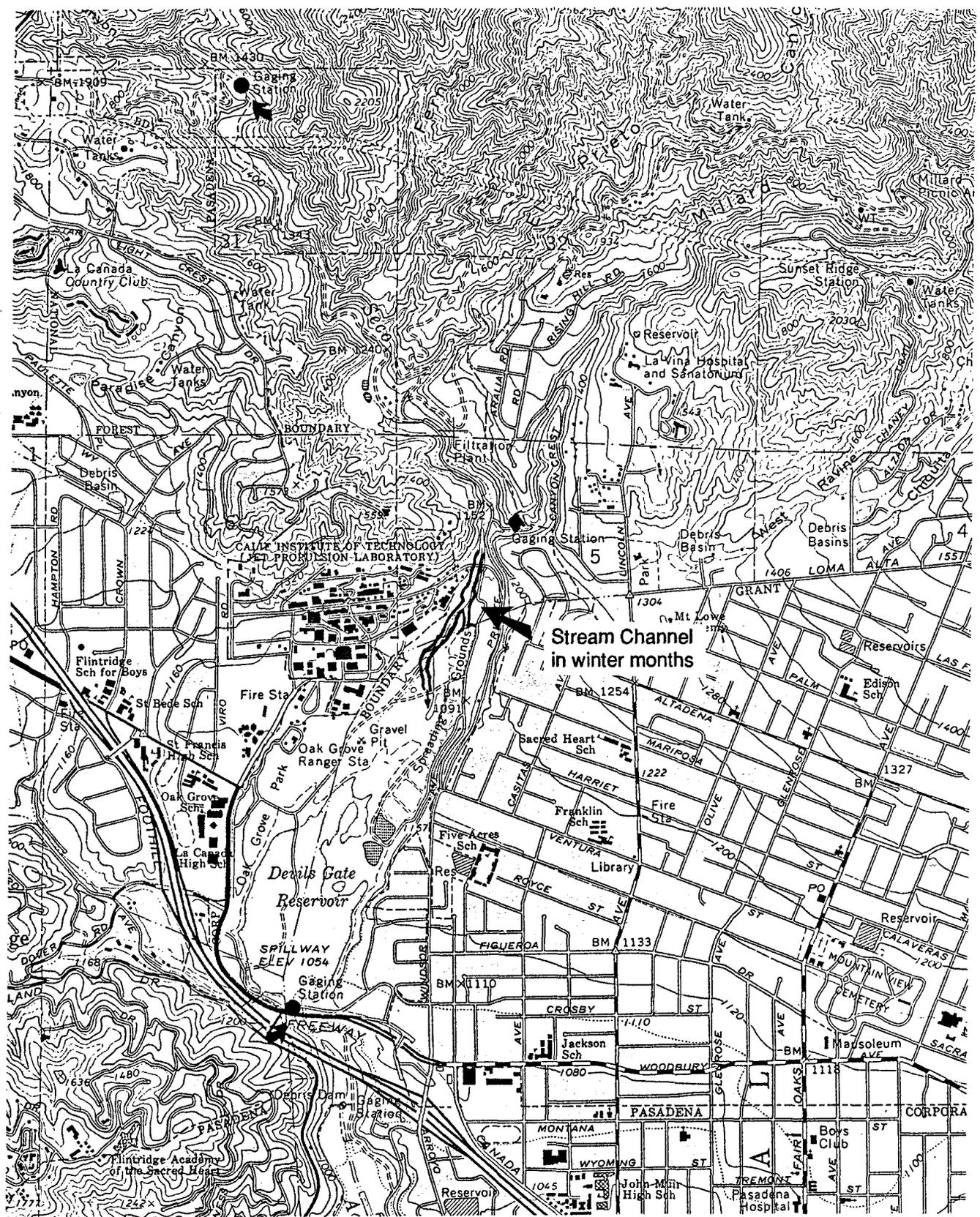


FIGURE 4-2
Surface Drainage Pattern in the
JPL vicinity



- USGS Gaging Station
- ◆ Dept. Water Resources Gaging Station



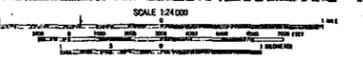
Source: Adopted from USGS 1989 and 1966. SCALE 1:24 000

FIGURE 4-3

USGS Stream Gaging Stations and Topographic Features



◆ Indicates downstream miles from JPL



Source: Adapted from USGS 1964; USGS 1966a and b.

FIGURE 4-4
Topographic Features 15 miles
Downstream of JPL.

Reservoir. Oak Grove Park has a large number of facilities including a baseball diamond, a multi-purpose field, a frisbee golf course, picnic tables, restrooms, and a ranger station. About 16,650 people annually use the park including 3,500 people using the frisbee golf course, 3,500 people using the commercial camp, 2,400 people a year playing football, and 3,600 people a year playing baseball (M. Mayne, Los Angeles County Parks Department, 1990, personal communication, Appendix G).

Currently there is a proposal by the City of Pasadena Water and Power Department for a multi-use Project for the Devil's Gate Reservoir area. This area is immediately southeast of JPL and extends from the mouth of the Arroyo Seco Canyon south to the Devil's Gate Dam.

The Devil's Gate Multi-Use Project (DGMUP) is designed to capture and preserve the natural resources and water resources of the area for use by the regional community. Some of the activities associated with this project include: reservoir basin cleanout, reconfiguration of flood handling facilities above the dam, possible rehabilitation of Devil's Gate Dam, establishment and enhancement of wildlife habitat, establishment of a Hall of Science and a separate interpretive center, facilities for delivering imported water to the mouth of the canyon, the use of a heat exchanger to adsorb some of the air conditioning loads from JPL, establishment of pedestrian and equestrian trails, enhancement of green spaces in Oak Grove Park, and provide ground water recharge areas not only at the Devil's Gate Dam but also at other locations in the Raymond ground water basin (Cotton/Beland/Associates, Inc., 1989).

Part of a Land Use Concept Plan associated with the DGMUP includes the relocation of JPL parking currently located east of the Arroyo to the west of the Arroyo. Several two-story parking structures with approximately 4,000 available parking spaces would also be constructed (Cotton/Beland/Associates, Inc., 1989).

4.2 Downstream Targets

A summary of targets, or human populations, resources, or environments potentially at risk from hazardous substances within 15 miles downstream from JPL is provided in Table 4-2. Figure 4-4 presents the topographic features 15 miles downstream of JPL. The banks of the Arroyo Seco stream channel below the Devil's Gate Dam have been replaced with riprap and concrete for the most part. The Arroyo Seco stream channel intersects the Los Angeles River approximately 10½ miles downstream from JPL (Figure 4-4).

4.3 Surface Sediment Sampling

On October 5, 1990, a representative of Ebasco Environmental collected five surface sediment samples from the stream channel in the Arroyo Seco, including a background sample and a duplicate QA/QC background sample. Figure 4-5 shows the sampled locations. After 2 to 3 inches of sediment were removed, sediment samples were collected by driving a 2-inch by 6-inch stainless steel sample tube into the sediment with a hand held, sliding hammer drive sampler. The sediment was predominantly a brown, fine to coarse grained, moderately graded sand with trace to abundant granitic gravel and cobbles. After collecting each sample, the cylinder that held the sample tube was hand scrubbed in a solution of trisodium phosphate and rinsed with de-ionized water before being used again. This decontamination procedure was followed to eliminate the potential for cross contamination between samples. The ends of the sample tubes containing the sediment were secured with teflon sheets and plastic end caps. The sample tubes were then labeled, placed in a cooler full of ice, and delivered by courier that same day with a completed chain-of-custody form to a state certified analytical laboratory.

The sediment samples were analyzed for volatile organics (EPA Method 8240), semi-volatile organics (EPA Method 8270), California Administrative Code Title 22 metals plus strontium (EPA Method 6010/7000), organochlorine pesticides and PCBs (EPA Method 8080), Total Petroleum Hydrocarbons (EPA Method 418.1), and cyanide (EPA Method 335.2). A QA/QC field blank was also collected and analyzed for volatile organics (EPA Method 624). The QA/QC

TABLE 4-2

TARGETS 15 MILES DOWNSTREAM OF JPL
(From Tables 2-18 and 2-19 of Proposed Revised HRS)

SENSITIVE ENVIRONMENTS	STATUS	REFERENCE
Critical habitat for endangered/ threatened species	None identified	Calif Department of Fish & Game Natural Diversity Data Base, John Hamlon, U.S. Fish & Wildlife Service (personnel communication 1990, Appendix G)
Marine Sanctuary	None within 15 mi downstream; Nearest marine area is approx 24 miles away	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
National Park	None within 15 mi downstream	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
Federal Wilderness Area	None within 15 mi downstream	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
Coastal Zone Management Act area	None within 15 mi downstream; Nearest marine area is approx 24 miles away	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
National Estuary Program area	None within 15 mi downstream; Nearest marine area is approx 24 miles away	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
Near Coastal Waters Program area	None within 15 mi downstream; Nearest marine area is approx 24 miles away	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
Clean Lakes Program area	No lakes within 15 mi downstream	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
Area exceeds State toxic water qual stand	None identified	State Water Resources Control Board, Water Quality Control Plan, 1975
National Monument	None within Arroyo Seco floodplain; Three historical bridges identified crossing the Arroyo (See Appendix E for list of Pasadena sites)	A. Scheed, City of Pasadena Urban Conservation Dept, personnel communi- cation, 1990 US Dept of the Interior National Register of Historical Places (Federal Register)
National Seashore Recreational Area	None within 15 mi downstream; Nearest marine area is approx 24 miles away	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
National Lakeshore Recreational Area	None within 15 mi downstream; Nearest marine area is approx 24 miles away	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)

TABLE 4-2
(CONTINUED)

TARGETS 15 MILES DOWNSTREAM OF JPL
(From Tables 2-18 and 2-19 of Proposed Revised HRS)

SENSITIVE ENVIRONMENTS	STATUS	REFERENCE
Habitat for Fed endangered/threatened species	Nevin's Barberrry, a Federal Candidate 1 species and State Endangered species has been observed in Arroyo Seco Canyon approx one-half mile downstream from JPL	Calif Department of Fish & Game Natural Diversity Data Base John Hamlon, U.S. Fish & Wildlife Service (personnel communication 1990)
Wetlands	None within 15 mi downstream Natural stream bank replaced with riprap and concrete for most of 15 mile downstream section	Ebasco, 1990, field observations
National Preserve	None within 15 mi downstream	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981) John Hamlon, U.S. Fish & Wildlife Service (personnel communication 1990)
National or State Wildlife Refuge	None within 15 mi downstream	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
Coastal Barrier Res System area	None within 15 mi downstream; Nearest marine area is approx 24 miles away	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
Coastal Barrier	None within 15 mi downstream; Nearest marine area is approx 24 miles away	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
Fed land for prot of natural ecosystems	None identified	John Hamlon, U.S. Fish & Wildlife Service (personnel communication 1990)
Admin Proposed Fed Wilderness Area	None identified	John Hamlon, U.S. Fish & Wildlife Service (personnel communication 1990)
Critical Spawing Area	None identified	John Hamlon, U.S. Fish & Wildlife Service (personnel communication 1990)
Fish migratory pathway	No anadromous or migratory fish within 15 mi downstream; stream is intermittant and blocked by Devil's Gate Dam	Ebasco, 1990, field observations
Critical fish feeding area	None identified	John Hamlon, U.S. Fish & Wildlife Service (personnel communication 1990)
Designated Nat river reach for recreation	Natural stream bank replaced with riprap and concrete for most of 15 mile downstream section	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981) Ebasco, 1990, site investigations

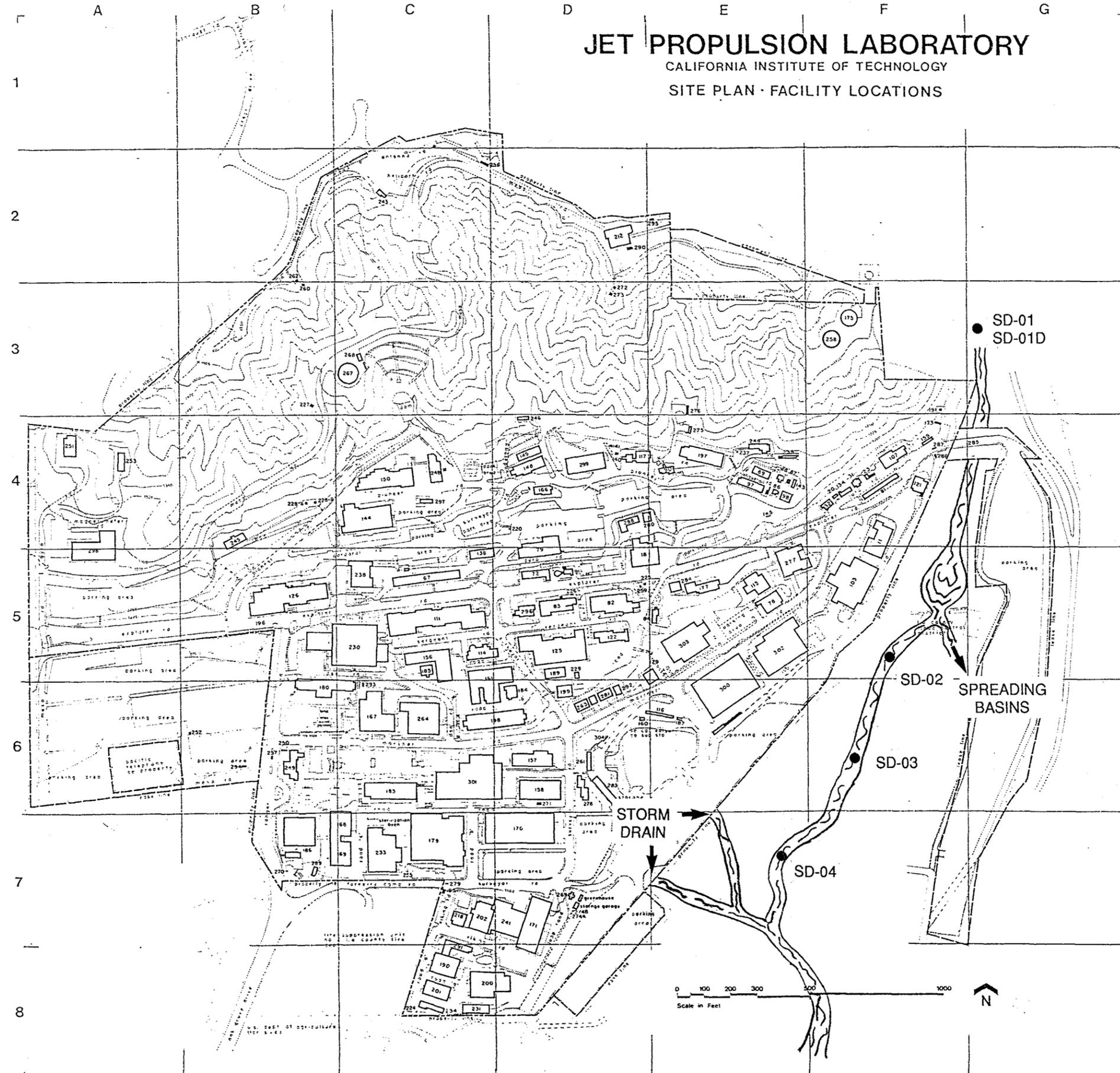
TABLE 4-2
(CONTINUED)

TARGETS 15 MILES DOWNSTREAM OF JPL
(From Tables 2-18 and 2-19 of Proposed Revised HRS)

SENSITIVE ENVIRONMENTS	STATUS	REFERENCE
Habitat for State endangered/threatened species	Nevin's Barberrry, a Federal Candidate 1 species and State Endangered species has been observed in Arroyo Seco Canyon approx one-half mile downstream from JPL	Calif Department of Fish & Game Natural Diversity Data Base John Hamlon, U.S. Fish & Wildlife Service (personnel communication 1990)
Habitat for species under rev as Fed endangered/threatened	None identified	Calif Department of Fish & Game Natural Diversity Data Base
State designated for prot'n of aquat life	None identified	Calif Department of Fish & Game Natural Diversity Data Base
Coastal Barrier (partially developed)	None within 15 miles downstream; Nearest marine area is approx 24 miles away	USGS Topo Map: Pasadena, Los Angeles, & South Gate quads (Revised 1981)
Fed Scenic or Wild River	None within 15 mi downstream	Environmental Reporter, 1990, p71;8301
State designated for wildlife management	None identified	City of Pasadena, 1989, Devils Gate Multi-use Project Land Use Plan
State Scenic or Wild River	None within 15 mi downstream Natural stream bank replaced with riprap and concrete for most of 15 mile downstream section	City of Pasadena, 1989, Devils Gate Multi-use Project Land Use Plan
State Natural Area	None identified	City of Pasadena, 1989, Devils Gate Multi-use Project Land Use Plan
Unique biotic community	Southern Coast Live Oak Riparian Forest community has been reported approx one mile downstream from JPL; This community does not have Fed or State status but has been listed in the Ca Dept F&G Natural Diversity Data Base as a Community of special concern	Calif Department of Fish & Game Natural Diversity Data Base

JET PROPULSION LABORATORY

CALIFORNIA INSTITUTE OF TECHNOLOGY
SITE PLAN · FACILITY LOCATIONS



Facility Locations

No.	Facility Title	Location	No.	Facility Title	Location
11	Space Sciences Laboratory	4-F	202	Procurement and Communications Support	7-C
18	Structural Test Laboratory	5-D	212	Antenna Laboratory	2-D
20	Thermionic Converter Laboratory	4-F	218	Credit Union	7-C
23	Vacuum Furnace Laboratory	4-F	220	ICS Terminal	4-D
31	Metallographic Laboratory	4-F	224	Sewage Lift Station	8-C
32	Thermionic Converter Laboratory	4-F	225	Nitrogen Facility Office	5-D
67	Material Research	5-C	226	Solvent Storage	5-D
72	Engineering Offices	5-D	227	Pistol Range Storage	3-B
78	Hydraulics Laboratory	5-E	228	Cooling Tower (A-B)	4-B
79	Wind Tunnel (20 inch)	4-D	229	Shielded Room Building	5-D
81	Space Sciences Laboratory	4-F	230	Space Flight Operation Facility	5-C
92	High Vacuum Laboratory	3-D	231	Paint Shop	8-C
83	Quality Assurance	5-D	233	System Development	7-C
84	Chemical Materials Laboratory	5-E	234	Lumber Storage	8-C
86	Solid Oxidizer Laboratory	4-E	237	Cooling Tower	5-C
87	Propellant Conditioning Laboratory	4-E	238	Telecommunications	4-E
88	Mixing Laboratory	4-E	239	Propellant Conditioning Laboratory	4-E
89	Laser Laboratory	4-E	241	Receiving and Shipping	7-D
90	Pyrotechnics Laboratory	4-E	243	Remote Antenna Range Control	2-C
91	Air Dryer	5-D	244	Chemical Engineering	4-E
97	Development Laboratory and Offices	4-E	245	Spectroscopy Laboratory	4-B
98	Solid Fuel Laboratory	4-E	246	Soils Test Laboratory	4-D
103	Fabrication Shop	5-F	248	10-Foot Space Simulator	4-C
107	Laser Research Laboratory	4-F	249	Visitor Reception	6-B
111	Technical Information Laboratory	5-C	250	Main Guard Shelter	6-B
113	Pneumatics Laboratory	5-E	251	Gyro Laboratory	4-A
114	Electronics Development	5-C	252	Guard Shelter	4-A
116	Propellant Storage Dock	6-E	253	Magnetic Laboratory	7-C
117	Liquid and Solid Propellant Laboratory	25-D	254	Sewage Lift Station	7-C
121	Analytical Instruments Laboratory	4-F	256	Model Range Control	2-C
122	Energy Conservation Systems	5-D	257	Main Guard Island	6-B
125	Combined Engineering Support	5-D	258	Water Reservoir	3-F
127	Information Systems Development	5-E	259	Liquid Nitrogen Battling Storage	5-D
129	Combustion Research Laboratory	5-E	260	Illuminator Equipment	3-B
134	Thermionic Assembly Laboratory	4-F	261	Controlled Storage	6-D
138	Mission Operations	5-C	262	Radiometer	2-B
140	Propulsion Materials Storage	4-D	263	First Aid	6-D
141	Propulsion Materials Storage	4-D	264	Space Flight Support	6-C
143	Solid Rocket Dock	4-E	267	Water Reservoir	3-C
144	Environmental Laboratory	4-C	268	Pump House	7-D
145	Magazine - Propellant	4-E	269	Grounds Maintenance	7-B
148	Energy Conservation Laboratory	4-D	270	Sewage Metering Station	6-D
149	Energy Conservation Development	4-D	271	Oil Storage	6-D
150	25-Foot Space Simulator	4-C	272	East Illuminator	3-D
155	Computer Program Offices	5-C	273	Antenna Tower	3-D
157	Applied Mechanics	6-D	274	Cooling Tower (A-B)	7-D
158	Material Research Processing Laboratory	6-D	275	Pyrotechnic Storage	4-E
159	Pump House (water)	4-F	276	Propellant Storage	3-E
160	Pump House (sewage)	6-D	277	Isotope Thermoelec. Sys. Appl. Lab.	5-E
161	Telecommunications Laboratory	6-D	278	Robotics Laboratory	6-D
166	Cooling Tower	4-D	279	Guard Island	7-C
167	Cafeteria	6-C	280	Static Test Tower	4-D
168	Instrument System Laboratory	7-C	281	Fire and Guard Headquarters	6-D
169	Earth Space Science	7-C	283	Metal Storage	6-D
170	Fabrication Shop	7-D	284	Transportation Office	5-E
171	Material Services	7-D	285	Arroyo Bridge	4-G
173	Test Shelter	4-F	286	Guard Shelter	4-F
175	Water Reservoir	3-F	287	Guard Island	4-F
177	Transportation Garage	5-E	288	Project Equipment Storage	4-D
179	Spacecraft Assembly Facility	7-C	289	Main Sewage Lift Station	7-B
180	Administration	6-B	290	Antenna Inspection	2-D
183	Physical Science Laboratory	6-C	291	Procurement Services	8-C
184	Electronic Stores	6-D	292	Fire Station	6-D
185	Programming Office	5-C	293	Instrumentation Cable Amplifier Building	6-C
186	Science Exhibits and Engineering	7-B	294	Guard Shelter (Visitor Lot)	6-B
187	Chemical Storage	6-E	295	Antenna Test Facility	2-E
189	Electronics Laboratory Annex	5-D	296	Central Cooling Tower Water System	5-D
190	Procurement Offices	8-C	297	Xenon Test Laboratory	4-C
191	Materials Compatibility Laboratory	3-F	298	Frequency Standard Laboratory	4-A
195	Guard Shelter	7-C	299	Assembly Handling & Shpg. Equip. Fac.	4-D
196	Guard Shelter	5-B	300	Earth and Space Science Laboratory	6-E
197	Solid Propellant Engineering Laboratory	4-F	301	Central Engineering Building	6-C
198	Control Systems Laboratory	6-D	302	Microdevices Laboratory	5-E
199	Celestial Simulator	6-D	303	Engineering Support Building	5-E
200	Facilities Engineering and Services	8-C	304	Disintegrator	6-D
201	Carpenter Shop	6-C			

LEGEND:

● SD-01 SEDIMENT SAMPLE LOCATION

Figure 4-5
SURFACE SEDIMENT SAMPLE LOCATIONS

field blank consisted of two 40 ml vials filled with de-ionized water which was exposed during sampling and analyzed to detect accidental or incidental contamination (Barth et al., 1984).

Sediment sample SD-01 and QA/QC duplicate sample SD-01D were collected as background samples upstream from JPL in the Arroyo Seco Canyon (Figure 4-5). Sediment sample SD-02 was collected immediately down gradient from former Pit 1 (as identified in the PA/SI) (Figure 4-5) and sediment sample SD-03 was collected immediately down gradient from former Pit 2 (as identified in the PA/SI) (Figure 4-5). Sediment sample SD-04 was collected downstream from all other sediment samples and upstream from JPL's two major storm drain outfalls (Figure 4-5). The storm drains discharge storm runoff from the City of LaCanada-Flintridge as well as from JPL, and any contaminants in the effluent cannot be totally attributable to JPL.

The constituents detected in the samples are presented in Table 4-3 with complete laboratory reports included in Appendix D. No volatile organics, semi-volatile organics, organochlorine pesticides or PCBs were detected in any surface sediment sample.

The analytical results indicate several metals and cyanide were detected in the sediment samples collected. The concentrations of the metals detected are below state regulatory threshold levels (Table 4-3). The metals detected include barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, zinc, and strontium.

Among the constituents detected in the sediments, only beryllium, mercury, and cyanide were not detected in the background sediment sample or its duplicate. The concentration of beryllium detected (0.56 mg/kg in sample SD-04) is less than published concentrations of beryllium in typical sandstones (0.8 mg/kg) or granite (3 mg/kg) (Table 4-3). Mercury was detected in the sediments in concentrations of 0.13 mg/kg in sample SD-03 and 0.12 mg/kg in sample SD-04. These concentrations are an order of magnitude greater than the concentration of mercury that may be expected in a typical sandstone or granite (Table 4-3). Cyanide was detected in sediment sample SD-04 in a concentration of 0.4 mg/kg.

TABLE 4-3

CONSTITUENTS DETECTED IN SURFACE SEDIMENT SAMPLES AND ASSOCIATED
QA/QC FIELD BLANK

Constituent	Units	Analytical Detection Limit	Sample Number						Regulatory Limits ^a	Typical Concentrations of Elements in:	
			SD-01	SD-01D	SD-02	SD-03	SD-04	SD-QA/QC		Sandstone ^b	Granite ^c
Volatile Organics											
Acetone	ug/L	10	ND*	ND	ND	ND	ND	ND	12		
Metals											
Barium	mg/kg	0.5	23	22	41	75	75	NA**	1000	38-170	600
Beryllium	mg/kg	0.5	ND	ND	ND	ND	0.56	NA	7.5	0.8	3
Cadmium	mg/kg	0.5	0.5	ND	0.76	1.2	1.2	NA	10	-	0.13
Chromium	mg/kg	0.5	2.8	2.8	4.6	8.0	8.4	NA	5600	2.0-39	10
Cobalt	mg/kg	0.5	2.6	2.5	3.9	7.2	7.3	NA	800	1.6-7.4	4
Copper	mg/kg	1.0	5.3	5.3	13	18	16	NA	250	1.2-8.4	20
Lead	mg/kg	2.5	16	5.5	15	36	26	NA	50	5-17	17
Mercury	mg/kg	0.1	ND	ND	ND	0.13	0.12	NA	2	.0079-.016	0.03
Nickel	mg/kg	0.5	1.2	ND	3.4	4.5	4.3	NA	200	1.2-18	10
Vanadium	mg/kg	1.0	6.3	5.6	9.6	18	19	NA	240	5.3-38	50
Zinc	mg/kg	0.5	18	16	37	69	48	NA	2500	5.2-31	50
Strontium	mg/kg	5.0	20	21	21	61	56	NA	-	13-99	250
Cyanide	mg/kg	0.3	ND	ND	ND	ND	0.4	NA	-	-	-
Total Petroleum Hydrocarbons	mg/kg	10	ND	14	71	56	19	NA	-	-	-

^a 10X Soluble Threshold Limit Concentration (STLC). STLC from California Administration Code Title 22

^b Source: Brownlow, A.H., 1979. Geochemistry. Prentice - Hall, Inc., Englewood Cliffs, N.J.

^c Source: Drever, J.I., 1982. The Geochemistry of Natural Waters. Prentice-Hall, Inc. Englewood Cliffs, N.J.

* Not Detected

** Not Analyzed

The metals detected in the background sample, its duplicate, and the downstream samples include barium, cadmium, chromium, cobalt, copper, lead, nickel, vanadium, zinc, and strontium. The analytical results become noteworthy when the concentrations of metals in the downstream samples are 2 to 3 times the concentrations of metals in the background sample. All of the metals mentioned are present in one or more downstream sample in concentrations 2 to 3 times its background concentration (Table 4-3). The concentrations of barium, chromium, cobalt, nickel, vanadium, and strontium in the downstream samples are within the range of concentrations that would be expected in a typical sandstone or granite, even though they are, in some instances, 2 to 3 times their background concentrations (Table 4-3). The concentrations of cadmium, copper, lead, and zinc in one or more downstream sample are greater than would be expected in a typical sandstone or granite (Table 4-3). Generally, the concentrations of metals detected were the highest in the samples collected furthest downstream.

Total Petroleum Hydrocarbons (TPH) were also detected in low levels in four of the five sediment samples collected. TPH in concentrations of 14 mg/kg, 71 mg/kg, 56 mg/kg and 19 mg/kg were detected in sediment samples SD-01D (background duplicate), SD-02, SD-03, and SD-04 respectively (Table 4-3).

Acetone was detected in the QA/QC field blank in a concentration of 12 ug/L (Table 4-3). The fact that acetone was not detected in any of the sediment samples suggests possible laboratory or sample container contamination.

In addition to collecting a QA/QC field blank and a duplicate sediment sample, the analytical laboratories QA/QC results were evaluated as part of the quality control program implemented during this sampling. This evaluation followed the same procedures described in the QA/QC section of the Expanded Site Inspection Report (Ebasco, 1990a) and indicated all of the laboratory QA/QC results were within acceptable limits established by the EPA.

5.0 AIR MIGRATION PATHWAY

Data not previously presented regarding the air migration pathway at JPL is presented in the following paragraphs.

5.1 Nearby Population Counts

Nearby population counts were estimated based upon U.S. Census Tract Data from the 1980 Census (U.S. Department of Commerce, 1983). Using the census tract map, a series of concentric rings with varying diameters were drawn around JPL (Figure 5-1). The area within each census tract falling within each ring was estimated as a percent of total census tract area. This percentage was then used to calculate the resident population within each ring.

As indicated on Table 5-1, total resident population within a circle with a 4 mile radius from JPL is approximately 120,848 people.

TABLE 5-1

POPULATION COUNTS WITHIN CONCENTRIC RINGS AROUND JPL

Radius	Population*	Cumulative Population
0 - 1/4 mi	407	407
1/4 - 1/2 mi	677	1084
1/2 - 1 mi	5830	6914
1 - 2 mi	22,912	29,826
2 - 3 mi	39,547	69,373
3 - 4 mi	51,475	120,848

* Population estimates based on U.S. Census, 1980 Census Test Data (U.S. Department of Commerce, 1983).

5.2 Nearby Land Use

Land uses within concentric rings around JPL are illustrated in Figure 5-2 (in pocket). As illustrated on Figure 5-2, the majority of land uses near JPL is residential. Commercial areas are mainly located along Foothill Boulevard with some scattered among residential areas. Industrial land use is minimal, scattered mostly within a 3-4 mile distance of JPL. Native vegetation is prevalent to the north and northeast of JPL as part of the San Gabriel Mountains.



San Gabriel Mountains

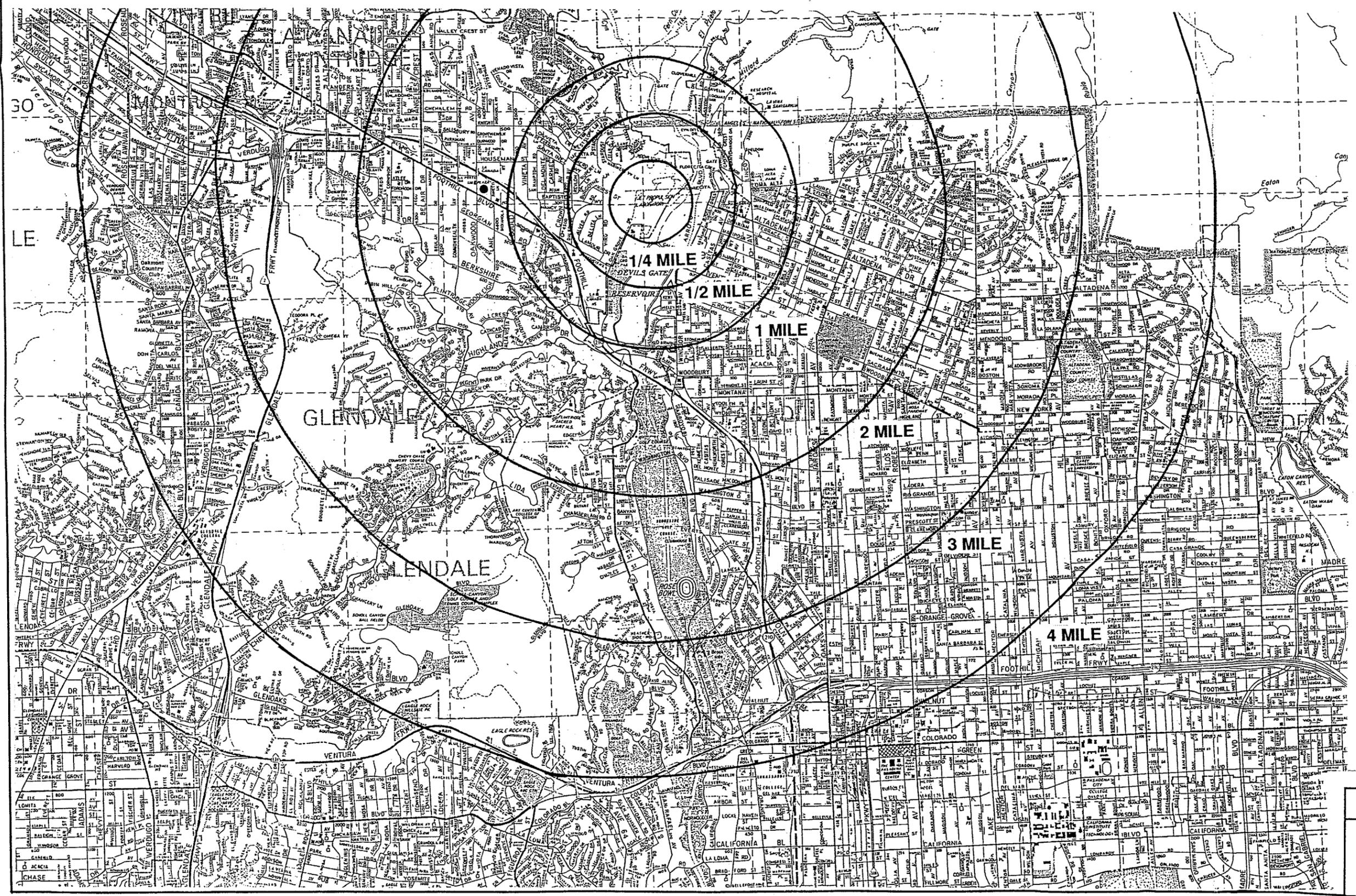


Figure 5-1

Jet Propulsion Laboratory,
Pasadena California and
Concentric Ring Distance

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

STANDARD LAND USE LEGEND

July 1981

The minimum breakdown of land use is according to the "Class" symbol. More detail is obtained by adding the subclass number to the class symbol, or by use of special condition symbols. Any or all of the following information can be delineated.

1. Types of agriculture, urban, or recreational development, and kinds of native vegetation.
2. Kinds of crops for a given period.
3. Intercrop practices.
4. Source of water supply.
5. Irrigated or nonirrigated agricultural classes.
 - (i) Denotes an irrigated crop and precedes the class symbol.
Example: iG1 - irrigated barley
 - (n) Indicates a dry farmed crop and precedes the class symbol.
Example: nG1 - dry farmed barley

LAND USE UNIT
SOUTHERN DISTRICT

AGRICULTURAL CLASSES

(precede with "i" or "n")

G - GRAIN AND HAY CROPS (subclasses not mapped unless specified)

- | | |
|-----------|---|
| 1. Barley | 3. Oats |
| 2. Wheat | 6. Miscellaneous and mixed
hay and grain |

R - RICE

F - FIELD CROPS

- | | |
|--------------------------|---------------------------------|
| 1. Cotton | 7. Grain sorghums |
| 2. Safflower | 8. Sudan |
| 3. Flax | 9. Castor beans |
| 4. Hops | 10. Beans (dry); lima, garbanzo |
| 5. Sugar beets | 11. Miscellaneous field |
| 6. Corn (field or sweet) | 12. Sunflowers |

P - PASTURE

- | | |
|-------------------------------|---|
| 1. Alfalfa & alfalfa mixtures | 4. Native pasture |
| 2. Clover | 5. Induced high water
native pasture |
| 3. Mixed pasture | 7. Turf farms |

T - TRUCK AND BERRY CROPS

- | | |
|---|---------------------------------|
| 1. Artichokes | 13. Sweet potatoes |
| 2. Asparagus | 14. Spinach |
| 3. Beans (green) | 15. Tomatoes |
| 4. Cole crops | 16. Flowers and nursery |
| 6. Carrots | 18. Miscellaneous truck |
| 7. Celery | 19. Bushberries |
| 8. Lettuce (all types) | 20. Strawberries |
| 9. Melons, squash, and cucumbers
(all types) | 21. Peppers (chili, bell, etc.) |
| 10. Onions and garlic | 22. Broccoli |
| 11. Peas | 23. Cabbage |
| 12. Potatoes | 24. Cauliflower |
| | 25. Brussels sprouts |

D - DECIDUOUS FRUITS AND NUTS

- | | |
|---------------------------|-----------------------------|
| 1. Apples | 8. Prunes |
| 2. Apricots | 9. Figs |
| 3. Cherries | 10. Miscellaneous deciduous |
| 5. Peaches and nectarines | 12. Almonds |
| 6. Pears | 13. Walnuts |
| 7. Plums | 14. Pistachios |

C - CITRUS AND SUBTROPICAL FRUITS

- | | |
|---------------|--|
| 1. Grapefruit | 5. Avocados |
| 2. Lemons | 6. Olives |
| 3. Oranges | 7. Miscellaneous subtropical
fruits |
| 4. Dates | 8. Kiwis, Kumquats |

V - VINEYARDS

(Subclasses not mapped unless specified)

1. Table grapes
2. Wine grapes
3. Raisin grapes

S - SEMIAGRICULTURAL AND INCIDENTAL TO AGRICULTURE

(Precede subclasses 1, 2, and 3 with "n", 4 and 6 with "i", and 5 with "n" or "i" as the case may be)

1. Farmsteads
2. Feed lots (livestock and poultry)
3. Dairies
4. Lawn areas
5. Cemeteries
6. Ornamental landscaping (excluding lawn areas)

I - IDLE (Indicate whether irrigated "i" or nonirrigated "n")

1. Land cropped within the past three years but not tilled at the time of survey.
Exception: If it can be determined that the land was cropped during one of the three previous "growing seasons", map the condition by indicating the crop and season.
2. New lands being prepared for crop production.

Fallow or Tilled Note (see special conditions for description and usage.)

Fallow - Cultivated land allowed to lie dormant during the growing season.

Tilled - Land prepared by plowing or harrowing, for raising of crops.

NATIVE CLASSES

(do not precede with "n" or "i")
(subclasses not mapped unless specified)

NV - NATIVE VEGETATION

1. Grass land
2. Light brush
3. Medium brush
4. Heavy brush
5. Brush and timber
6. Forest

NR - RIPARIAN VEGETATION

1. Marsh lands, tules and sedges
2. Natural high water table meadow
3. Trees, shrubs or other larger streamside or watercourse vegetation
4. Seasonal duck marsh dry or only partially wet during summer
5. Permanent duck marsh, flooded during summer

NB - BARREN AND WASTELAND

1. Dry stream channels
2. Mine tailing
3. Barren land
4. Salt flats
5. Sand dunes

NW - WATER SURFACE

Lakes, reservoirs, and rivers

NC - NATIVE CLASSES UNSEGREGATED

NS - NOT SURVEYED (same as ABC)

URBAN CLASSES

(do not precede with "n" or "i")

U - URBAN -- residential, commercial, and industrial

(may be used alone when further breakdown is not required)

UR - RESIDENTIAL

(may be used alone when further breakdown is not required)

Residential development within an urbanized area.

1. Low density
0.5 to 6.0 houses per acre (single family dwellings, estate type areas).
3. High density
7 or more lots or dwelling units per acre (trailer courts, bungalows)
4. Multiple Unit
3 or more dwelling units per structure (apartments and barracks type housing; can include condominiums)

SR - SUBURBAN RESIDENTIAL

Residential housing in a suburban setting (rural areas).

1. Large percentage of the area in lawns, gardens, small orchards, etc., and has a high water use.
2. Large percentage of the area in nonirrigated native plants, and hence, has a low water use.

(should not be used without subclass unless specified)

UC - COMMERCIAL

(may be used alone when further breakdown is not required)

1. Miscellaneous establishments
(office and retailers)
 2. Hotels
 3. Motels
 4. ~~Apartments, Barracks (3 family units and larger)~~
 5. Institutions (hospitals, prisons, reformatories, asylums, etc., having a reasonably stable 24 hour resident population)
 6. Schools (yards to be mapped separately if large enough)
 7. Municipal auditoriums, theaters, churches, buildings and stands associated with race tracks, football stadiums, baseball parks, rodeo arenas, etc.
 8. Miscellaneous high water use
(specify use: to be used to indicate a high water use condition not covered by the above categories.)
- UC4 relocated and classified as UR4

UI - INDUSTRIAL

(should not be used without subclasses unless specified)

1. Manufacturing, assembling, and general processing
2. Extractive industries
(oil fields, rock quarries, gravel pits, public dumps, rock and gravel processing plants, etc.)
3. Storage and distribution
(warehouses, substations, railroad marshalling yards, tank farms, etc.)
6. Saw mills
7. Oil refineries
8. Paper mills
9. Meat packing plants
10. Steel and aluminum mills
11. Fruit and vegetable canneries and general food processing
12. Miscellaneous high water use
(specify use: to be used to indicate a high water use condition not covered by the above categories.)
13. Sewage treatment plant including ponds

UV - VACANT

(should not be used without subclass unless specified)

1. Miscellaneous unpaved areas
(vacant lots, graveled surfaces, playing fields, nonirrigated freeway strips, raw lands within metropolitan areas, etc.)
4. Miscellaneous paved areas (parking lots, runways, freeways, oiled surfaces, flood control channels, tennis court areas, auto sales lots, etc.)
(freeways are to be mapped UV4-K see (K) in special conditions)

RECREATIONAL CLASSES

RR - RESIDENTIAL

Permanent and summer home tracts within a primarily recreational area. The estimated number of houses per acre is indicated by a number in the symbol. Example: RR-3 (3 homes per acre).

RC - COMMERCIAL

Commercial areas within a primarily recreational area. (Includes motels, resorts, hotels, stores, etc.)

RV - VACANT

Recreational vacant. The estimated number of lots per acre is indicated by a number in the symbol. Example: RV-4 (4 lots per acre)

RT - RECREATIONAL VEHICLE AND CAMP SITES

Camp and trailer sites within a primarily recreation area.

SPECIAL CONDITIONS

(only one can be used per parcel)

(A) - ABANDONED ORCHARDS AND VINEYARDS

Trees or vines must be in such a condition that renewal of cultural practices would restore economic production. Indicated by (A) following the crop symbol.

Example: iD1-A -- indicates an apple orchard previously irrigated but now abandoned.

(B) - BURNED OVER AREAS (not mapped unless specified)

Indicated by "B". The type and density of natural cover destroyed by fire is obtained by examination of aerial photo. Example: NV2-B

(C) - CONDOMINIUMS

(E) - ENTRY DENIED

Example: Field mapper denied access to a ranch and the photo shows a citrus orchard. Indicate iC-E, no subclass identification possible.

(F) - FALLOW LANDS

Must be tilled at time of survey.

(1) If no crop residue is apparent or identifiable, then the "F" symbol will follow the agricultural class symbol for the crop most representative of those grown in the area.

Example: iT-F -- Fallow truck crop land (with facilities for irrigation.)

(2) If the crop residue is apparent and identifiable; but is not from the current crop season covered by the survey, then the field is considered fallow and mapped as the class of the crop residue.

Example: Surveyor found an old sugar beet residue not from current season. Land would be mapped iF-F.

(3) However, if the crop residue is identifiable as that of a crop which was grown during the survey period, then map the field as though the crop existed.

Example: iT6 - Carrot residue from current growing season.

(I) - BUSINESS/INDUSTRIAL PARK

The land use is a mixture of commercial, light industrial and storage and distribution. Should be used only with UC (urban commercial).

Example: UC-I or UC1-I

(K) - FREEWAYS

Major transportation corridors, such as 4-lane freeways.

(M) - MILITARY AREAS

Indicates lands owned or controlled by the military and is used following the land use symbol.

Example: iF1-M -- irrigated cotton within a military area.

(P) - PARKS

Indicates all types of parks, both public and private and is used following the land use symbol.

Example: iS4-P -- irrigated lawn area within a park.

(S) - SEED CROP

Indicates any crop grown for seed and is used following crop symbol.

Example: iP1-S -- irrigated alfalfa seed crop.

(T) - TILLED FIELDS

To be used for tilled fields in areas where multiple cropping occurs.

- (1) Field must be tilled, as a result of multiple cropping.
- (2) No crop residue is apparent or identifiable as a result of clean tillage practice.
- (3) The "T" symbol will follow the agricultural class symbol for the crop most representative from the adjacent fields.

Example: iT-T -- Surveyor finds a field recently tilled, undergoing cultivation for the next crop. The field has been clean tilled and no crop residue remains. Green beans (iT3) are the predominant crop mapped in the adjacent fields, so the tilled field is mapped as a TRUCK field.

(X) - PARTIALLY IRRIGATED CROPS

Crops irrigated for only part of their normal irrigation season.

Example: iP3-X -- partially irrigated mixed pasture.

(Y) - YOUNG NON-BEARING ORCHARDS AND VINEYARDS

Follows crop symbol.

Example: iC3-Y -- young non-bearing irrigated oranges.

(Z) - RECLAMATION

Land being leached for the removal of harmful salts. This symbol will be used following either the "Idle" symbol or symbols of crops grown as a step in the reclamation process.

Examples: iI2-Z, iI1-Z, or iR-Z

SEASON

Indicated by appropriate symbol following crop symbol: "a" -spring, "b" -summer, "c" - fall, "d" - winter.

Examples: iT12-d -- winter potatoes; iT12-a--spring potatoes

INTERCROPPING (fraction)

Indicated by a fractional symbol. The crop symbol appearing first in order in the preceding legend will be mapped in the numerator.

Exception: When orchard or vineyard is intercropped with some other crop class, the orchard or vineyard symbol will appear in the numerator.

Examples: $i \frac{D5}{G1}$ peaches intercropped with barley
 $i \frac{D5}{D13}$ peaches intercropped with walnuts

MIXED LAND USE (percentages)

Indicated by percentages following land use symbols. No more than 3 symbols are to be used in describing the area.

Example: iD5 - 40
 NV - 20
 UC3 - 40

Use increments no smaller than and in intervals of 20%.

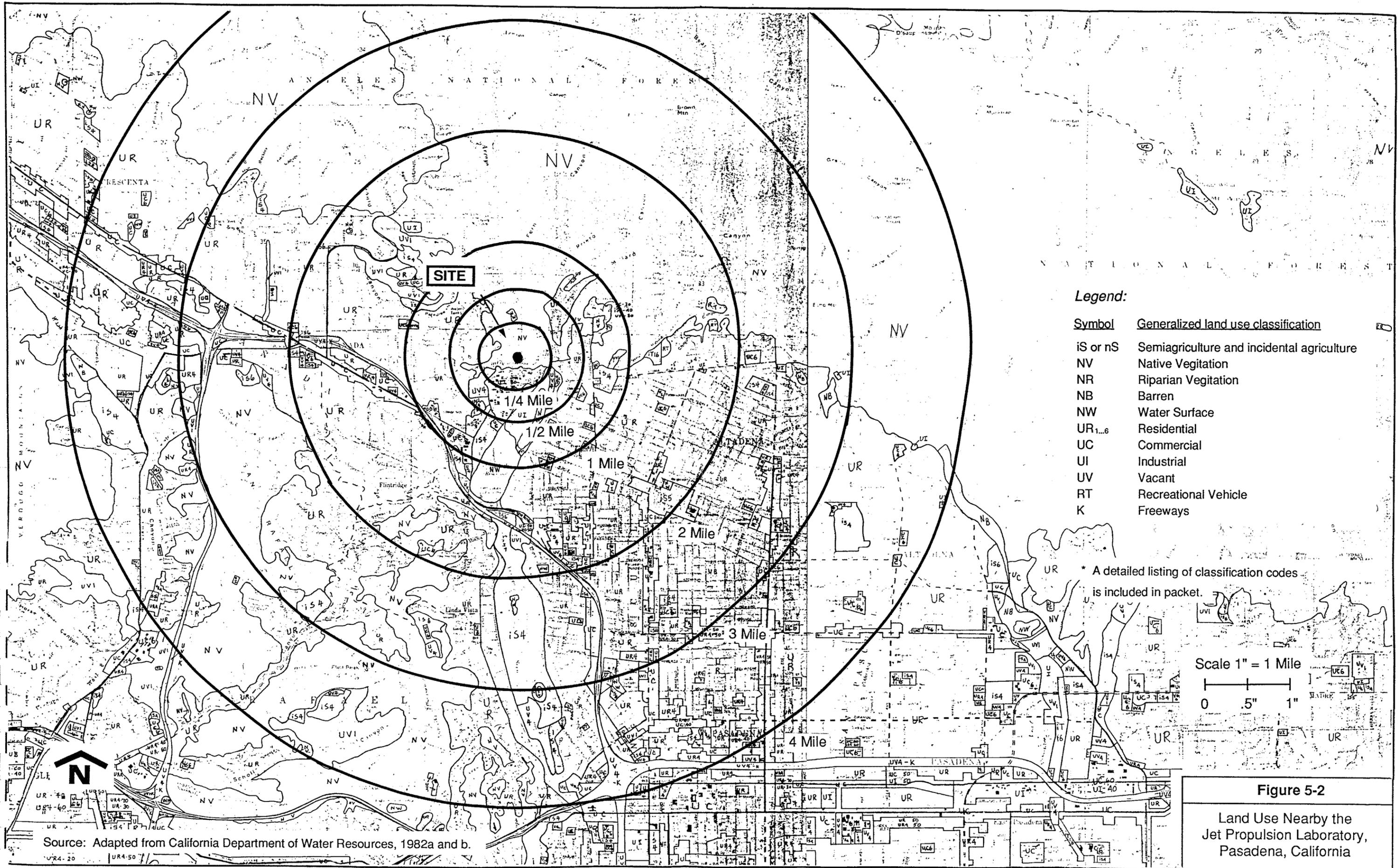
DOUBLE CROPS

First crop indicated by enclosed parenthesis.

Examples: (iG) iF6 -- irrigated grain followed by field corn
 (iT24) iT8 -- irrigated cauliflower followed by lettuce.

SOURCE OF IRRIGATION WATER

	PUMP	GRAVITY
Natural stream	1 	5 <input type="checkbox"/>
Drain	2 	6 <input type="checkbox"/>
Well	3 	7 <input type="checkbox"/>
Other sources including lake, pond, reservoir, and oxbow	4 	8 <input type="checkbox"/>



Legend:

Symbol	Generalized land use classification
is or nS	Semiagriculture and incidental agriculture
NV	Native Vegetation
NR	Riparian Vegetation
NB	Barren
NW	Water Surface
UR _{1...6}	Residential
UC	Commercial
UI	Industrial
UV	Vacant
RT	Recreational Vehicle
K	Freeways

* A detailed listing of classification codes is included in packet.

Scale 1" = 1 Mile

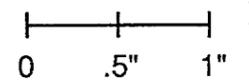


Figure 5-2

Land Use Nearby the Jet Propulsion Laboratory, Pasadena, California

Source: Adapted from California Department of Water Resources, 1982a and b.

UR4-20 UR4-50

6.0 ONSITE EXPOSURE PATHWAY

Data not previously presented regarding the onsite exposure pathway at JPL is presented in the following paragraphs.

6.1 Access and Population

For the Hazard Ranking System the resident population around JPL includes residents and school populations within 1 mile of JPL and the JPL population itself.

As presented previously (Section 5.1), the resident population within 1 mile of JPL is estimated to be 6,914. Additionally, JPL currently employs approximately 8,000 people. Access to JPL is restricted via fencing that completely surrounds the site, and three access gates that are either monitored by guards 24 hours/day or are closed (during non-working hours).

In addition to the resident population, there are eight schools identified within 1 mile of JPL. Five child-care centers were also identified within 1 mile of JPL. The total student population within this distance is about 3,984. Schools and child-care facilities within 1 mile of JPL and their available enrollment data are presented in Table 6-1.

6.2 Soil Sampling Results

Since two of the seepage pits identified in the PA/SI (Pits 1 and 2) may have been located wholly or partially outside the current JPL property limits, soil borings were drilled and soil samples were collected to assess the possibility of human exposure to substances that may have been deposited in these pits.

On October 5, 1990, a representative of Ebasco Environmental hand drilled four soil borings and collected five soil samples, including a background sample and a QA/QC duplicate sample. Figure 6-1 shows the soil boring locations. As Figure 6-1 shows, soil boring SS-01 was drilled for background

TABLE 6-1

SCHOOLS WITHIN 1 MILE OF JPL

Schools/Child-Care Facilities	Enrollment	Dates of Attendance
SCHOOLS:		
ALTADENA:		
Franklin Elementary	283	September - June
Five-Acres (private)	110	Year-Round
LA CANADA-FLINTRIDGE:		
La Canada High School	1,608	September - June
Paradise Canyon Elementary	644	September - June
Flintridge Preparatory (Private)	499	September - June
St. Francis High School	611	September - June
St. Bede The Venerable	57	September - June
Crestview Preparatory	<u>172</u>	September - June
TOTAL	3,984	
CHILD-CARE FACILITIES:		
ALTADENA:		
Headstart State Pre-School	604	
Wee-Can Pre-School	37	
Sacred Heart School	--	
LA CANADA-FLINTRIDGE:		
Child Education Center	242	
La Canada United Methodist Church	--	
La Canada Presbyterian Church	<u>75</u>	
TOTAL	958+	

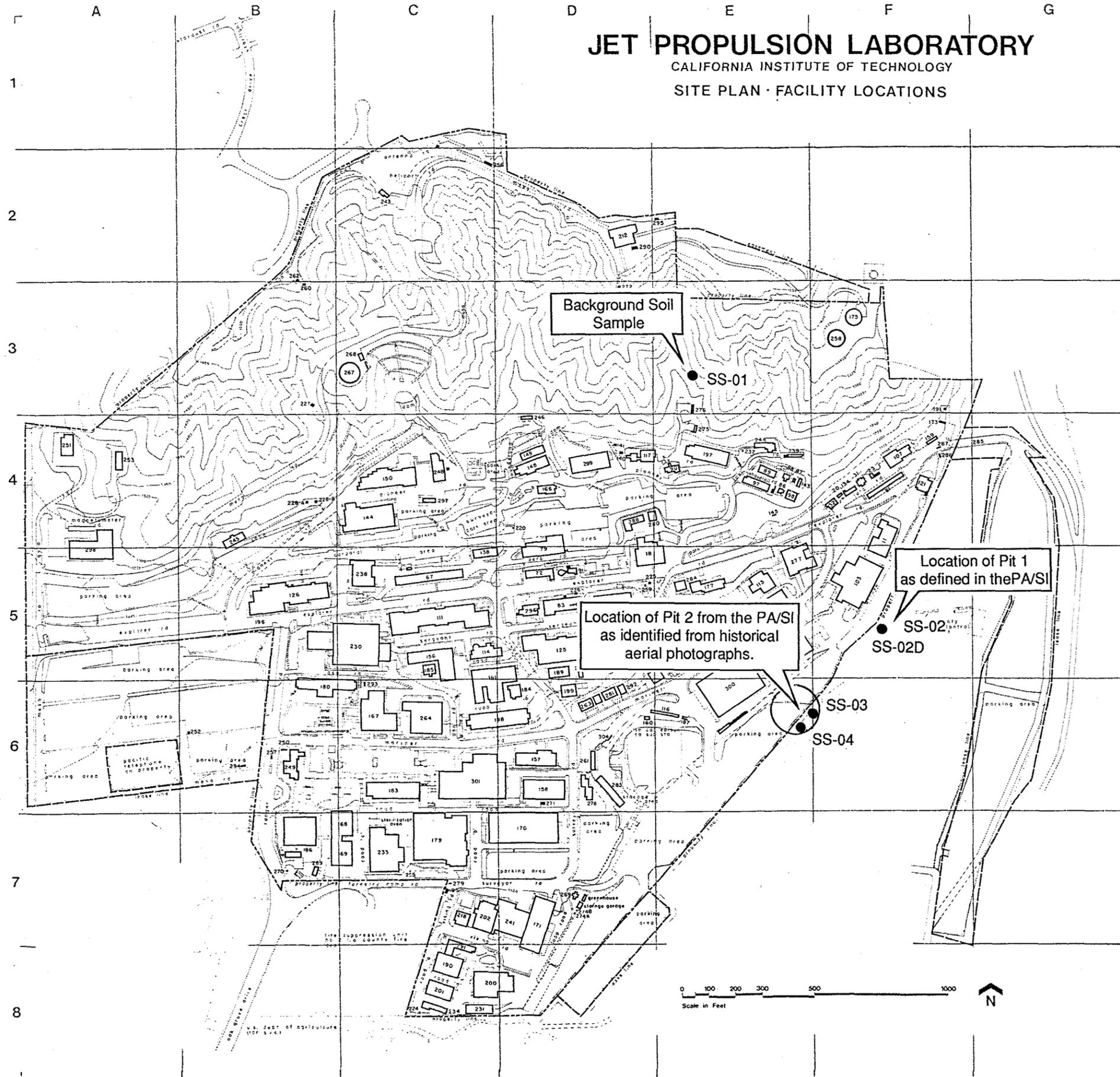
Source: T. Stockman, La Canada-Flintridge Unified School District, personal communication, 1990, Appendix G.

J. Mysteara, Pasadena Unified School District, personal communication, 1990, Appendix G.

R. Walling, Five-Acres School, personal communication, 1990, Appendix G.

JET PROPULSION LABORATORY

CALIFORNIA INSTITUTE OF TECHNOLOGY
SITE PLAN · FACILITY LOCATIONS



Facility Locations

No.	Facility Title	Location	No.	Facility Title	Location
11	Space Sciences Laboratory	4-F	202	Procurement and Communications Support	7-C
18	Structural Test Laboratory	5-D	212	Antenna Laboratory	2-D
20	Thermionic Converter Laboratory	4-F	218	Credit Union	7-C
23	Vacuum Furnace Laboratory	4-F	220	ICS Terminal	4-D
31	Metallographic Laboratory	4-F	224	Sewage Lift Station	8-C
32	Thermionic Converter Laboratory	4-F	225	Nitrogen Facility Office	5-D
67	Material Research	5-C	226	Solvent Storage	5-D
72	Engineering Offices	5-D	227	Pistol Range Storage	3-B
78	Hydraulics Laboratory	5-E	228	Cooling Tower (A-B)	4-B
79	Wind Tunnel (20 inch)	4-D	229	Shielded Room Building	5-D
81	Space Sciences Laboratory	4-F	230	Space Flight Operation Facility	5-C
82	High Vacuum Laboratory	5-D	231	Paint Shop	8-C
83	Quality Assurance	5-D	233	System Development	7-C
84	Chemical Materials Laboratory	5-E	234	Lumber Storage	8-C
85	Solid Oxidizer Laboratory	4-E	237	Cooling Tower	4-E
87	Propellant Conditioning Laboratory	4-E	238	Telecommunications	5-C
88	Mixing Laboratory	4-E	239	Propellant Conditioning Laboratory	4-E
89	Laser Laboratory	4-E	241	Receiving and Shipping	7-D
90	Pyrotechnics Laboratory	4-E	243	Remote Antenna Range Control	2-C
91	Dryer	4-E	244	Chemical Engineering	4-E
97	Development Laboratory and Offices	4-E	245	Spectroscopy Laboratory	4-B
98	Solid Fuel Laboratory	4-E	246	Soils Test Laboratory	4-D
103	Fabrication Shop	5-F	248	10-Foot Space Simulator	4-C
107	Laser Research Laboratory	5-F	249	Visitor Reception	6-B
111	Technical Information	5-C	250	Main Guard Shelter	6-B
113	Pneumatics Laboratory	5-E	251	Gyro Laboratory	4-A
114	Electronics Development	5-C	252	Guard Shelter	6-B
116	Propellant Storage Bldg	4-A	253	Magnetic Laboratory	4-A
117	Liquid and Solid Propellant Laboratory	4-D	255	Sewage Lift Station	7-C
121	Analytical Instruments Laboratory	4-F	256	Model Range Control	2-C
122	Energy Conservation Systems	5-D	257	Main Guard Island	6-B
123	Combined Engineering Support	5-D	258	Water Reservoir	3-F
126	Information Systems Development	5-B	259	Liquid Nitrogen Bottling Storage	5-D
129	Combustion Research Laboratory	5-E	260	Illuminator Equipment	3-B
134	Thermionic Assembly Laboratory	4-F	261	Controlled Storage	6-D
138	Mission Operations	5-C	262	Radiometer	2-B
140	Propulsion Materials Storage	6-D	263	First Aid	6-D
141	Propulsion Materials Storage	4-D	264	Space Flight Support	6-C
143	Solid Rocket Dock	4-E	267	Water Reservoir	3-C
144	Environmental Laboratory	4-C	268	Pump House	3-C
145	Magazine - Propellant	4-E	269	Grounds Maintenance	7-D
148	Energy Conservation Laboratory	4-D	270	Sewage Metering Station	7-B
149	Energy Conservation Development	4-D	271	Oil Storage	6-D
150	25-Foot Space Simulator	4-C	272	East Illuminator	3-D
156	Computer Program Offices	5-C	273	Antenna Tower	3-D
157	Applied Mechanics	6-D	274	Cooling Tower (A-B)	7-D
158	Material Research Processing Laboratory	6-D	275	Pyrotechnic Storage	4-E
159	Pump House (water)	4-F	276	Propellant Storage	3-E
160	Pump House (sewage)	6-D	277	Isotope Thermoelec. Sys. Appl. Lab.	6-D
161	Telecommunications Laboratory	5-C	278	Robotics Laboratory	6-D
166	Cooling Tower	4-D	279	Guard Island	7-C
167	Cafeteria	6-C	280	Static Test Tower	4-D
168	Instrument System Laboratory	7-C	281	Fire and Guard Headquarters	6-D
169	Earth Space Science	7-C	283	Metal Storage	6-E
170	Fabrication Shop	7-D	284	Transportation Office	5-E
171	Material Services	7-D	285	Arroyo Bridge	4-G
173	Test Shelter	4-F	286	Guard Shelter	4-F
175	Water Reservoir	3-F	287	Guard Island	4-F
177	Transportation Garage	5-E	288	Project Equipment Storage	4-D
179	Spacecraft Assembly Facility	7-C	289	Main Sewage Lift Station	7-B
180	Administration	6-B	290	Antenna Inspection	2-D
183	Physical Science Laboratory	6-C	291	Procurement Services	8-C
184	Electronic Stores	6-D	292	Fire Station	6-D
185	Programming Office	5-C	293	Instrumentation Cable Amplifier Building	6-C
186	Science Exhibits and Engineering	7-B	294	Guard Shelter (Visitor Lot)	6-B
187	Chemical Storage	6-E	295	Antenna Test Facility	2-E
189	Electronics Laboratory Annex	5-D	296	Central Cooling Tower Water System	5-D
190	Procurement Offices	8-C	297	Xenon Test Laboratory	4-C
191	Materials Compatibility Laboratory	3-F	298	Frequency Standard Laboratory	4-A
195	Guard Shelter	7-C	299	Assembly Handling & Shpg. Equip. Fac.	4-D
196	Guard Shelter	3-D	300	Earth and Space Science Laboratory	6-E
197	Solid Propellant Engineering Laboratory	4-E	301	Central Engineering Building	6-C
198	Control Systems Laboratory	6-D	302	Microdevices Laboratory	5-E
199	Celestial Simulator	6-D	303	Engineering Support Building	5-E
200	Facilities Engineering and Services	8-C	304	Disintegrator	6-D
201	Carpenter Shop	8-C			

LEGEND:

● SD-01 SOIL SAMPLE LOCATION

Figure 6-1

Locations of Soil Samples Recently Collected at JPL

information, soil boring SS-02 was drilled where former Pit 1 was located (See PA/SI), and soil borings SS-03 and SS-04 were drilled where a portion of former Pit 2 (See PA/SI) may have extended outside the current property line of JPL. After the soil borings were drilled to a depth of 1.5 feet with a three-inch diameter hand auger, soil samples were collected from 1.5 to 2 feet in depth by driving 2-inch by 6-inch stainless steel sample tubes into the soil with a hand held, sliding hammer drive soil sampler. One duplicate soil sample (SS-02D) was collected by driving the soil sampler immediately adjacent to where the original sample (SS-02) was collected. The soil was predominantly a brown, fine to coarse grained, moderately graded sand with trace to abundant granitic gravel and cobbles. After collecting each sample, the cylinder that held the sample tube was hand scrubbed in a solution of trisodium phosphate and rinsed with de-ionized water before being used again. This decontamination procedure was followed to eliminate cross contamination between samples. The ends of the sample tubes containing the soil were secured with teflon sheets and plastic end caps. The sample tubes were then labeled, placed in a cooler full of ice, and delivered by courier that same day with a completed chain-of-custody form to a state certified analytical laboratory.

The soil samples were analyzed for volatile organics (EPA Method 8240), semi-volatile organics (EPA Method 8270), California Administrative Code Title 22 metals plus strontium (EPA Methods 6010/7000), organochlorine pesticides and PCBs (EPA Method 8080), Total Petroleum Hydrocarbons (EPA Method 418.1), and cyanide (EPA Method 335.2). A QA/QC field blank was also collected and analyzed for volatile organics (EPA Method 624). The QA/QC field blank consisted of two 40 ml vials filled with de-ionized water which was exposed during sampling and analyzed to detect accidental or incidental contamination (Barth et al., 1984).

The constituents detected in the soil samples are presented in Table 6-2 with complete laboratory reports included in Appendix D. No volatile organics, semi-volatile organics, organochlorine pesticides, PCBs, or cyanide were detected in any soil sample. Volatile organics were also not detected in the QA/QC field blank.

TABLE 6-2

CONSTITUENTS DETECTED IN SOIL SAMPLES
(ALL RESULTS IN MG/KG)

Constituent	Analytical Detection Limit	Sample Number					Regulatory Limits ^a	Typical Concentrations of Elements in:	
		SS-01 (background)	SS-02	SS-02D	SS-03	SS-04		Sandstone ^b	Granite ^c
Metals									
Barium	0.5	170	78	110	31	30	1000	38-170	600
Cadmium	0.5	1.2	ND*	0.65	0.71	0.62	10	-	0.13
Chromium	0.5	2.6	2.3	2.6	4.9	2.7	5600	2-39	10
Cobalt	0.5	8.5	4.7	5.6	3.6	2.7	800	1.6-7.4	4
Copper	1.0	6.1	6.0	6.3	7.0	5.2	250	1.2-8.4	20
Lead	2.5	ND	4.9	8.0	11	ND	50	5-17	17
Nickel	0.5	1.8	1.8	1.9	2.2	1.1	200	1.2-18	10
Vanadium	1.0	15	7.5	11	6.8	5.9	240	5.3-38	50
Zinc	0.5	45	33	29	69	18	2500	5.2-31	50
Strontium	5.0	21	14	19	13	20	-	13-99	250
Total Petroleum Hydrocarbons									
Total Petroleum Hydrocarbons	10	ND	12	ND	29	ND	-	-	-

^a 10X Soluble Threshold Limit Concentration (STLC). STLC from California Administration Code Title 22.

^b Source: Brownlow, A.H., 1979. Geochemistry. Prentice-Hall, Inc. Englewood Cliffs, N.J.

^c Source: Drever, J.I., 1982. The Geochemistry of Natural Waters. Prentice-Hall, Inc. Englewood Cliffs, N.J.

* Not Detected

The analytical results indicate some metals are present in the soil. The concentrations of the detected metals are below state regulatory threshold levels (Table 6-2). The metals detected include barium, cadmium, chromium, cobalt, copper, lead, nickel, vanadium, zinc and strontium. Of the above detected metals, only lead was not detected in the background soil sample (SS-01). Lead was present in samples SS-02, SS-02D, and SS-03 in concentrations of 4.9 mg/kg, 8.0 mg/kg, and 11 mg/kg respectively (Table 6-2). The concentration of lead detected in the soil is within the range of concentrations for lead in a typical sandstone or granite (Table 6-2).

The metals detected in both the background sample and the other soil samples include barium, cadmium, chromium, cobalt, copper, nickel, vanadium, zinc, and strontium. The analytical results become noteworthy when the concentrations of metals in the soil samples are 2 to 3 times their concentrations in the background sample. None of the metals detected are present in any soil sample in a concentration 2 to 3 times its background concentration (Table 6-2). The concentrations of barium, cadmium, cobalt, vanadium, and strontium are slightly greater in the background sample than in the other soil samples. The concentrations of barium, chromium, cobalt, copper, nickel, vanadium, and strontium in the soil samples are within the range of concentrations that would be expected in a typical sandstone or granite (Table 6-2). The concentrations of cadmium and zinc in some soil samples are slightly above the range of concentrations that would be expected in a typical sandstone or granite (Table 6-2).

Total Petroleum Hydrocarbons (TPH) were also detected in two of the five soil samples collected. TPH in concentrations of 12 mg/kg and 29 mg/kg were detected in samples SS-02 and SS-03 respectively (Table 6-2).

In addition to collecting a QA/QC field blank and a duplicate soil sample, the analytical laboratories QA/QC results were evaluated as part of the quality control program implemented during sampling. This evaluation followed the same procedures described in the QA/QC section of the Expanded Site Inspection Report (Ebasco, 1990a) and indicated all of the laboratory QA/QC results were within acceptable limits established by the EPA.

7.0 REFERENCES

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APPENDIX A

LOGS OF NEARBY OFF-SITE WELLS

GEO-HYDRO-DATA

INCORPORATED ELECTRIC WELL LOG

COMPANY: SAUNDERS
WELL: MW-2
FIELD: PASADENA
COUNTY: LOS ANGELES STATE: CALIFORNIA

COMPANY: MARMAC
WELL: CMW-2
FIELD: PASADENA
COUNTY: LOS ANGELES STATE: CALIFORNIA

LOCATION: Sec. 6 Twp. 11 Rge. 12W
TYPE LOG: OF, PP, 6' LATERAL

Permanent Datum: GROUND LEVEL Elev.: K.B.
Log Measured From: G.L. 0 Ft. Above Perm. Datum D.F.
Drilling Measured From: GROUND LEVEL O.L. 1'70

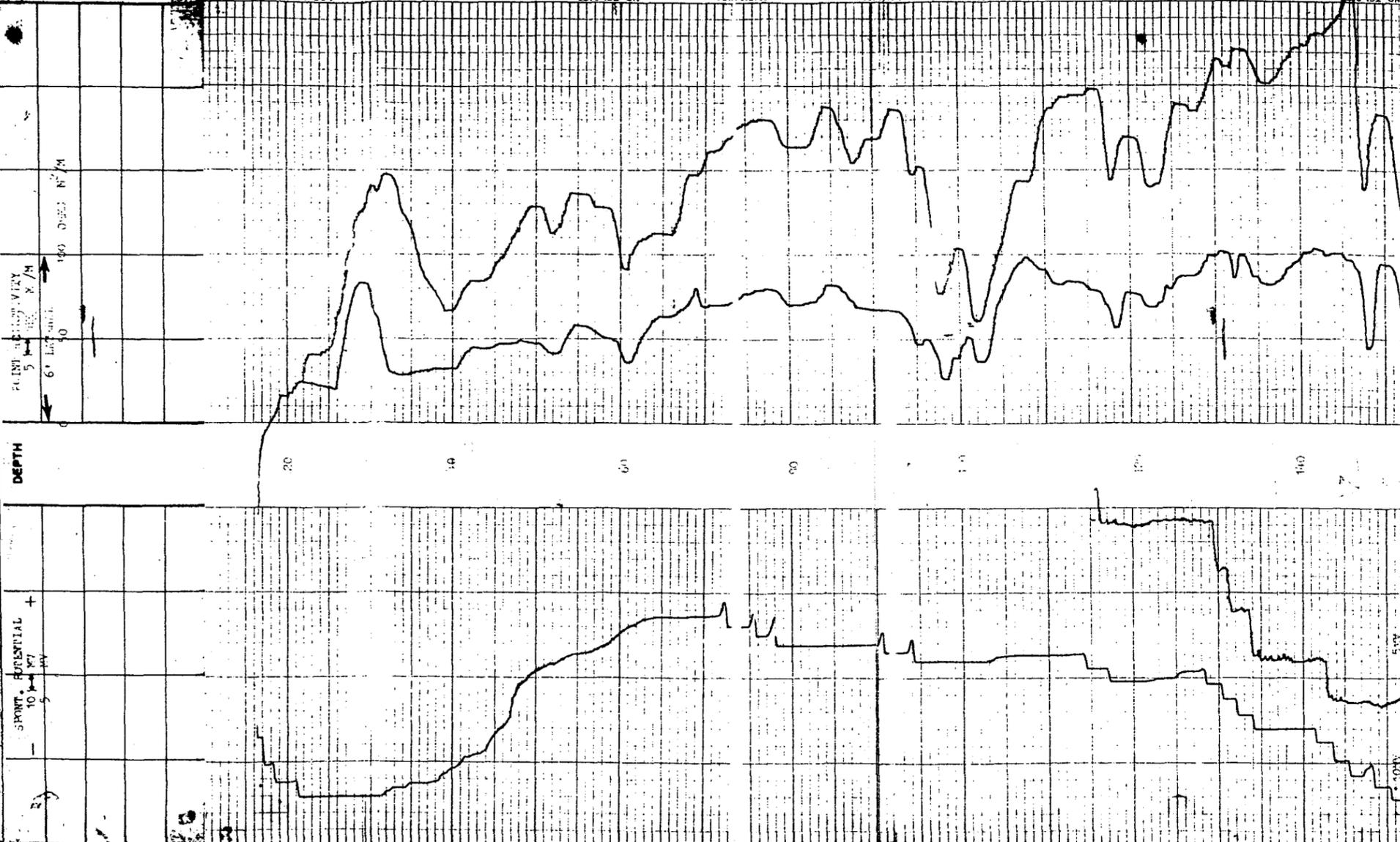
Date	17 Aug 89
Run No.	one
Depth - Driller	160 R.
Depth - GHD	158 R.
Stat. Log Inter.	158 R.
Top Log Inter.	16 R.
Casing - Driller	10 in. @ 17 R.
Casing - GHD	R.
BH Size	9 7/8 in. TD R.
BH Size	R.
BH Size	R.
Type Fluid in Hole	gel
Source of Sample	ditch
PPM TDS	350
Fluid Level	full R.
Dens.	W.C.
pH	Fluid Loss
Rm @ Meas. Temp.	
Rwf @ Meas. Temp.	
Rwc @ Meas. Temp.	
Time Since Circ.	
Logging Speed	30 R/min.
Tool Type and No.	combo
Unit No.	4
Location	Chafter
Invoice No.	6518
Recorded By	Mike Alexander Geoc. Geologist
Witnessed By	Red Powers
Other	

P.O. Box 418 Tehachapi, California 93581 (805) 822-6875

SCALE CHANGES: Scale Up Hole, Scale Down Hole

REMARKS: DRILL METHOD: STANDARD SOFARY
CONSULTANT: GEOTECHNICAL CONSULTANTS
DILLED BY: BRYLICK DRILLING
LA HABRA, CA

All interpretations are dependent on information from electrical other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations. All interpretations are dependent on information from electrical other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations. All interpretations are dependent on information from electrical other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations.





2747 Sherwin Ave. Unit #1
Ventura, CA 93003
(805) 644-9621/9622

(805) 647-3281

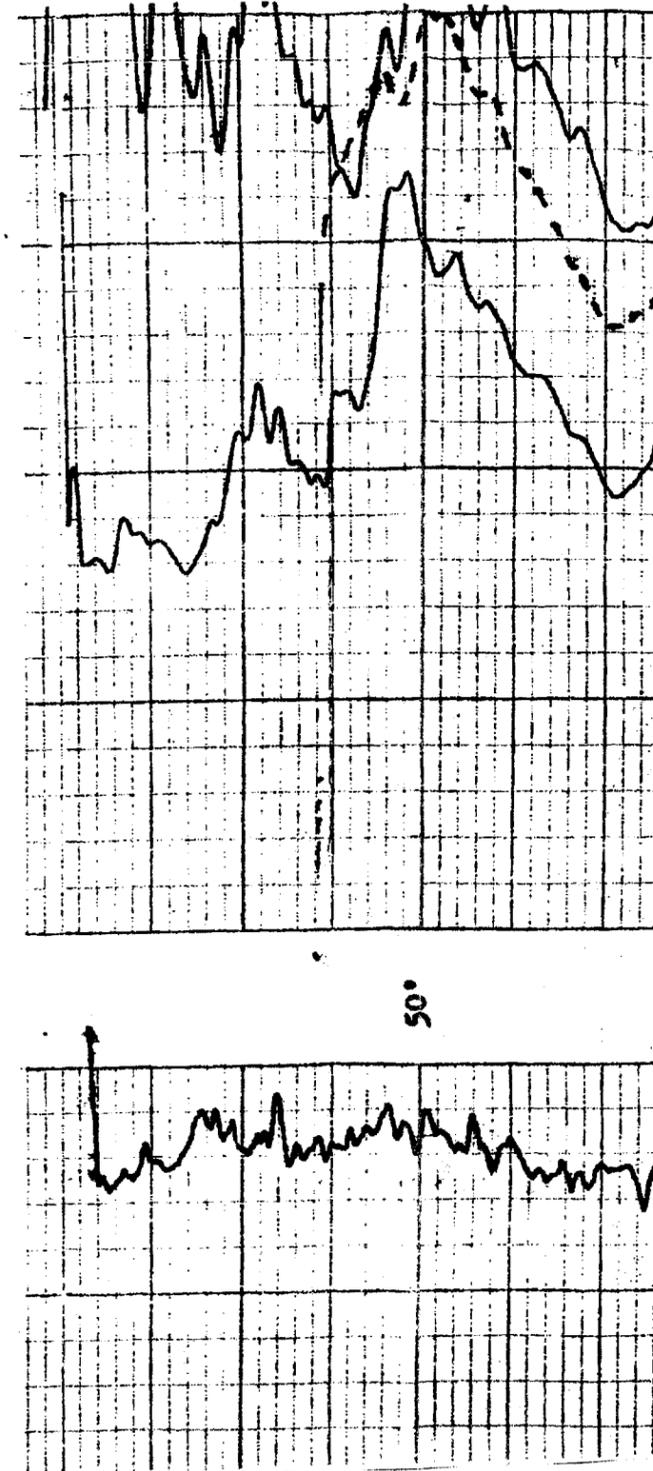
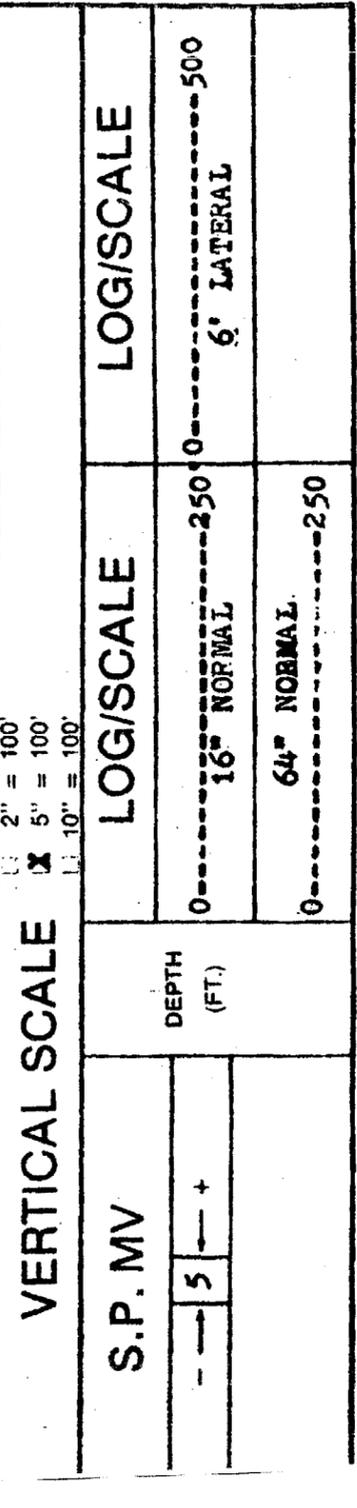
Sherwin Ave., #1, Ventura, CA 93003

COMPANY	GEOTECHNICAL CONSULTANTS INC. CITY OF PASADENA		
WELL	MONITERING WELL #MH-01		
FIELD	ARROYO SECO AREA		
COUNTY	LOS ANGELES STATE	CALIFORNIA	
Location	Other Services:		
Sec	5	Twp	1 NORTH Rge 12 WEST
Permanent Datum	GL	Elev	K B
Log Measured From	GL	Ft Above Perm Datum	D F
Drilling Measured From	GL		GL
Date	12-6-82		
Run No	ONE		
Depth—Driller	399'		
Depth—Logger	392'		
Btm Log Inter.	391'		
Top Log Inter	10'		
Casing—Driller	@	@	@
Casing—Logger			
Bit Size	8 3/8" to 119"	7 7/8" to	T.D.
Type Fluid in Hole	BENTONITE		
Dens. Visc.	67 30		
pH Fluid Loss			
Source of Sample	MUD RETURN TRENCH		
R _m @ Meas. Temp.	12.5 @ 77 °F	@ °F	795 @ 77 °F
R _m @ Meas. Temp.	@ °F	@ °F	@ °F
R _m @ Meas. Temp.	@ °F	@ °F	@ °F
Source R _m R _m			
R _m @ BHT	@ °F	@ °F	@ °F
Time Since Circ.	45 min.		
Max. Rec. Temp.	°F @	°F @	°F @
Equip. Location	E-2 VENTURA		
Recorded By	BRIAN COSNER		
Witnessed By	RICHARD SLADE		

Service Ticket No.	Remarks	Type Log		Depth		Horizontal Scale	
		S.P.	Normal	Normal	Lateral	mV/div.	ohm-M/div.
		16" NORMAL	391'	391'	5 mV/div.	20 ohm-M/div.	
		64" NORMAL	391'	391'	20 ohm-M/div.	20 ohm-M/div.	
		6" LATERAL	391'	391'	50 ohm-M/div.	50 ohm-M/div.	

EQUIPMENT DATA	
Run No.	ONE
Tool Type and No.	ELM-31277
Pad Type	FREE
Tool Position	
Other	

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expense incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees.





50°

100°

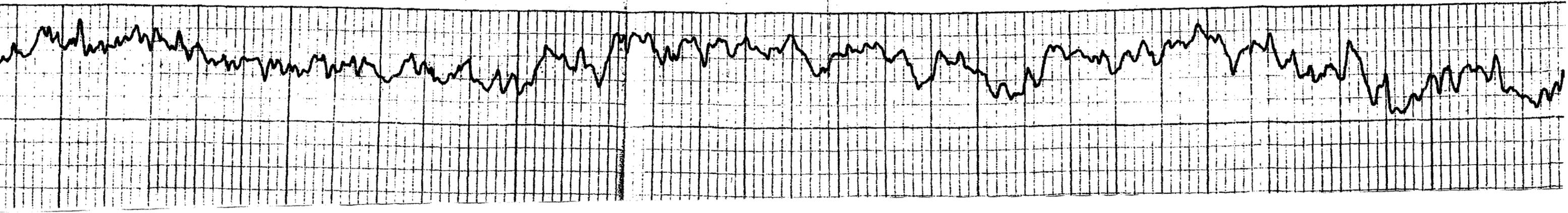
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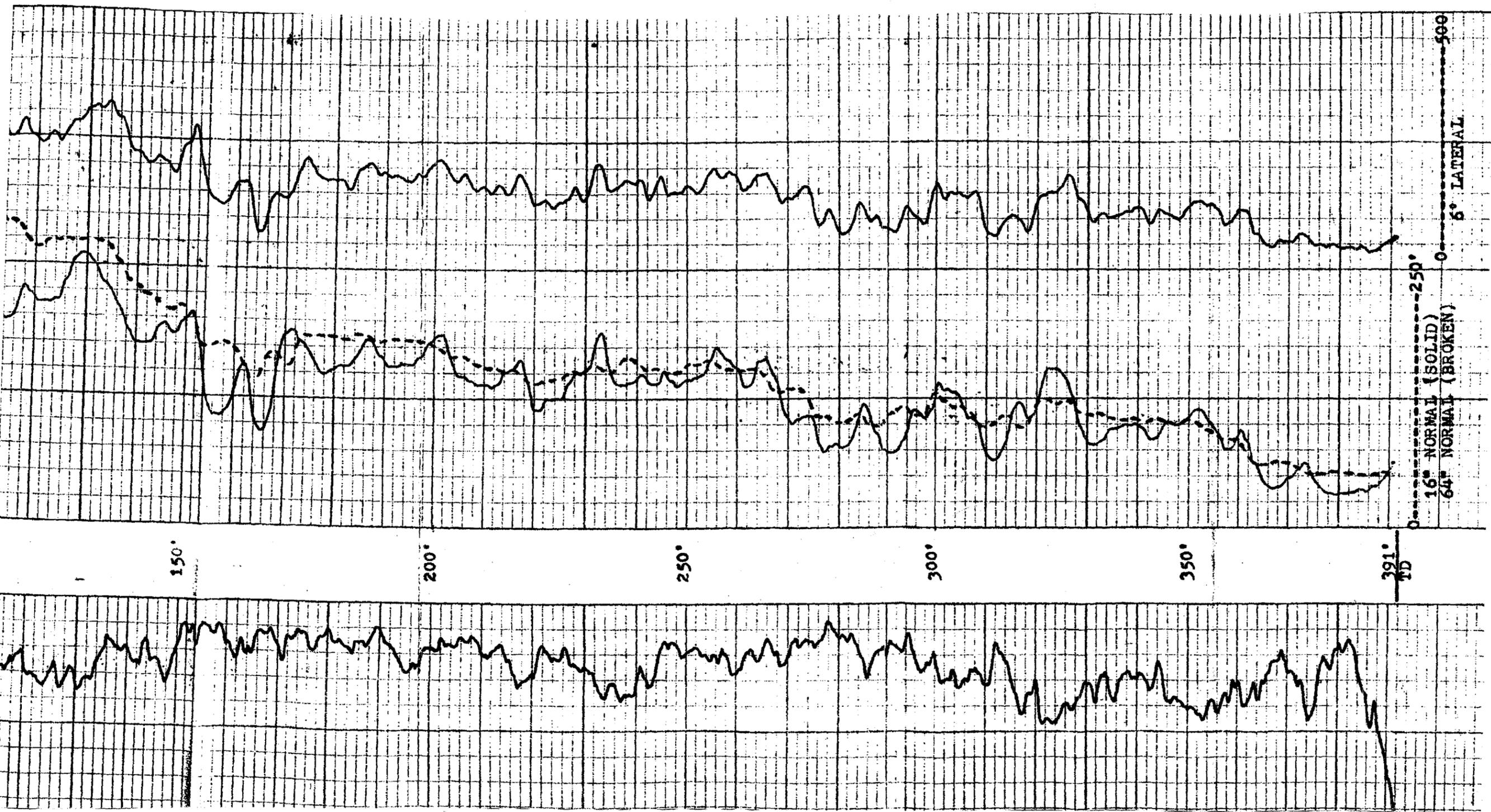
200°

250°

300°

350°





LOG OF DRILL HOLE

JOB NO.: S88042
 PROJECT: JPL Upgradient Wells
 LOCATION: Pasadena, California
 DRILLING METHOD: Rotary Mud, 9 7/8-in.

LOGGED BY: E. Powers
 CHECKED BY: C. Kendall

DRILL HOLE NO.: CMW-1
 DRILLING DATE: August 22, 1989
 DATUM: USGS, PP1339, Plate 2.6
 REFERENCE EL.: 1115 Feet

ELEVATION (FEET) DEPTH	DRILLING RATE	REAL TIME/DEPTH	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		TORVANE (PSF)	ADDITIONAL TESTS
									LIQUID LIMIT (%)	PLASTIC LIMIT (%)		
1110					[Symbolic representation of silty sand with cobbles]	"ALLUVIUM (Qal)" SILTY SAND (SM) with cobbles and boulders, light brown, dry, loose.						
10												
1100						set 10" conductor to 15 feet, end of shift 8/22/89.						
20												
1090					[Symbolic representation of sand with quartz and feldspar]	"ALLUVIUM (Qal)" SAND (SP) brown with white quartz and feldspar, medium to very coarse grained, angular with traces of clayey silt.						
30					[Symbolic representation of cobbles]	cobbles.						
1080					[Symbolic representation of cobbles]	cobbles.						
40					[Symbolic representation of boulders]	boulders.						
1070					[Symbolic representation of silty clay with sand and cobbles]	"ALLUVIUM (Qal)" SILTY CLAY (CL) brown, soft, soluble, with very fine grained sand and lenses of cobbles.						
50					[Symbolic representation of cobbles]	cobbles.						
1060												
60												
1050					[Symbolic representation of sand with gravel and cobbles]	"ALLUVIUM (Qal)" SAND (SP) brown, medium to coarse grained, angular with scattered gravel and cobbles.						

LOG OF DRILL HOLE

JOB NO.: S88042
 PROJECT: JPL Upgradient Wells
 LOCATION: Pasadena, California
 DRILLING METHOD: Rotary Mud, 9 7/8-in.

LOGGED BY: E. Powers
 CHECKED BY: C. Kendall

DRILL HOLE NO.: CMW-1
 DRILLING DATE: August 22, 1989
 DATUM: USGS, PP1339, Plate 2.6
 REFERENCE EL.: 1115 Feet

ELEVATION (FEET) DEPTH	DRILLING RATE	REAL TIME/DEPTH	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		TORVANE (PSF)	ADDITIONAL TESTS
									LIQUID LIMIT (%)	PLASTIC LIMIT (%)		
70						"ALLUVIUM (Qal)" SAND (SP) brown, medium to coarse grained, angular with scattered gravel and cobbles.						
1040						grading to fine to medium grained sand, with lenses of clayey silt.						
80						becoming coarse to very coarse grained.						
1030						end of shift 8/23/89.						
90												
1020												
100												
1010												
110						"ALLUVIUM (Qal)" CLAYEY SAND (SC) brown, very fine to coarse grained, large amount fines as seen in thickening mud, occasional cobbles.						
1000												
120						cobble lens.						
990												
130						traces of weathered feldspar in CLAYEY SAND.						

LOG OF DRILL HOLE

JOB NO.: S88042
 PROJECT: JPL Upgradient Wells
 LOCATION: Pasadena, California
 DRILLING METHOD: Rotary Mud, 9 7/8-in.

LOGGED BY: E. Powers
 CHECKED BY: C. Kendall

DRILL HOLE NO.: CMW-1
 DRILLING DATE: August 22, 1989
 DATUM: USGS, PP1339, Plate 2.6
 REFERENCE EL.: 1115 Feet

ELEVATION (FEET) DEPTH	DRILLING RATE	REAL TIME/DEPTH	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		TORVANE (PSF)	ADDITIONAL TESTS
									LIQUID LIMIT (%)	PLASTIC LIMIT (%)		
980 140 970 150 960 160						<p>"ALLUVIUM (Qal)" CLAYEY SAND (SC) brown, very fine to coarse grained, large amount fines as seen in thickening mud, occasional cobbles.</p> <p>becoming finer grained.</p> <p>becoming coarser grained.</p>						
						<p>Bottom of drill hole at 162 feet, on 8/24/89. Groundwater estimated at approximate depth of 85 feet based on electric log. Boring completed as Monitoring Well MW-1, water level measured September 5, 1989 at depth of 39.04 feet.</p>						

LOG OF DRILL HOLE

JOB NO.: S88042
 PROJECT: JPL Upgradient Wells
 LOCATION: Pasadena, California
 DRILLING METHOD: Rotary Mud, 9 7/8-in.

LOGGED BY: E. Powers
 CHECKED BY: C. Kendall

DRILL HOLE NO.: CMW-2
 DRILLING DATE: August 14, 1989
 DATUM: USGS, PP1339, Plate 2.6
 REFERENCE EL.: 1168 Feet

ELEVATION (FEET) DEPTH	DRILLING RATE	REAL TIME/DEPTH	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		TORVANE (PSF)	ADDITIONAL TESTS
									LIQUID LIMIT (%)	PLASTIC LIMIT (%)		
1160 10						Parking lot pavement, 4" over 8" base. "ALLUVIUM (Qal)" SANDY SILT (ML) light brown, soft, dry, with moderate amount very fine grained sand and scattered rock fragments. becomes damp at 5 feet. cobbles at 8 feet.						
1150 20						set 10" conductor to 17 feet, end of shift 8/14/89. "ALLUVIUM (Qal)" SAND (SP) multi-colored, predominantly very coarse grained and rounded, with appreciable fines or silt beds. numerous cobbles below 22 feet, primarily granitic fragments, with fine to coarse sand.						
1140 30						"ALLUVIUM (Qal)" SAND (SP) multi colored, medium to very coarse grained, with scattered gravel.						
1130 40						thinned mud, end of shift 8/15/89. increasing gravel.						
1120 50						numerous cobbles below 61 feet, predominantly granitic with sand. Clear and milky quartz, white and pink feldspar, rare green (metamorphic?), rock fragments, considerable fines as seen in thickening mud.						
1110 60												

LOG OF DRILL HOLE

JOB NO.: S88042
 PROJECT: JPL Upgradient Wells
 LOCATION: Pasadena, California
 DRILLING METHOD: Rotary Mud, 9 7/8-in.

LOGGED BY: E. Powers
 CHECKED BY: C. Kendall

DRILL HOLE NO.: CMW-2
 DRILLING DATE: August 14, 1989
 DATUM: USGS, PP1339, Plate 2.6
 REFERENCE EL.: 1168 Feet

ELEVATION (FEET) DEPTH	DRILLING RATE	REAL TIME/DEPTH	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		TORVANE (PSF)	ADDITIONAL TESTS
									LIQUID LIMIT (%)	PLASTIC LIMIT (%)		
1100 70						"ALLUVIUM (Qal)" SAND (SP) with cobbles, multi-colored, medium to very coarse grained.						
1090 80						"ALLUVIUM (Qal)" SILT (ML) brown, micaceous, slightly clayey, with some very fine grained sand. Below 80 feet, becoming thinly interbedded as noted. cobbles, primarily granitic rock fragments, with fine-coarse sand and fines.						
1080 90						silt lenses.						
						cobbles, as above.						
1070 100						SILTY SAND (SM) brown, very fine sand with large amount of silt.						
						CLAYEY SAND (SC) brown, soft, with fine-coarse sand.						
1060 110						cobbles, granitic rock fragments with fine-coarse sand and silt lenses.						
1050 120						SILTY SAND (SM) brown, soft, slightly clayey with very fine to medium sand.						
1040 130												

LOG OF DRILL HOLE

JOB NO.: S88042
 PROJECT: JPL Upgradient Wells
 LOCATION: Pasadena, California
 DRILLING METHOD: Rotary Mud, 9 7/8-in.

LOGGED BY: E. Powers
 CHECKED BY: C. Kendall

DRILL HOLE NO. CMW-2
 DRILLING DATE: August 14, 1989
 DATUM: USGS, PP1339, Plate 2.6
 REFERENCE EL.: 1168 Feet

ELEVATION (FEET) DEPTH	DRILLING RATE	REAL TIME/DEPTH	SAMPLE NO.	BLOW COUNT (BLOWS PER FOOT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	ATTERBERG LIMITS		TORVANE (PSF)	ADDITIONAL TESTS
									LIQUID LIMIT (%)	PLASTIC LIMIT (%)		
1030 140						Cobbles, primarily granitic rock fragments with traces of dark gray metamorphic (?) fragments, with fine to coarse grained sand and silt. end of shift 8/16/89. SAND (SP) primarily quartz and feldspar, very fine to coarse grained, with some fines.						
1020 150						Cobbles, granitic rock fragments with large amount of very fine to coarse grained sand and soluble clay as seen in thickening mud. CLAYEY SAND (SC) brown, fine to coarse grained sand with SILTY CLAY matrix.						
1010 160						Ran E-LOG to 158 feet. SAND (SP) white quartz and feldspar, medium to very coarse grained.						
1000 170						Cobbles, granitic rock fragments with medium to very coarse grained sand.						
990						SAND (SP) predominantly quartz and feldspar, medium to very coarse grained, with traces of mottled gray brown clay.						
						Bottom of drill hole at 179 feet, on 8/17/89. Possible groundwater zones below depth 140 feet based on electric log. Boring completed as Monitoring Well MW-2. As of September 5, 1989 no free water has entered the well.						

City of Pasadena
Monitoring Well #MH-01
LOG OF WELL NO. 4030F

FROM	TO	CLASSIFICATION OF MATERIALS	FROM	TO	CLASSIFICATION OF MATERIALS
0	10	Artificial fill, silty sand with gravel, tan, fine to coarse, loose	46	56	Gravelly sand, occasional small cobbles, fine to coarse, subrounded grains, no cobbles from 51 to 55', mainly fine to coarse sand, boulders at 55'.
10	12	Cobbles.			
12	16	Alluvium: sandy gravel, fine to coarse grained			
16	23	Cobbles, boulders, sandy, medium to coarse sandy below 20'.	56	76	Silty sand & sand, loose to medium dense, fine to medium, occasionally coarse, occasionally gravel & silty clayey layers of gravel and cobbles.
23	32	Silty sand with gravel, fine to coarse, loose, fine gravel, small amount of clay.			
32	34	Sandy gravel with cobbles, fine to coarse	76	81	Sandy gravel with cobbles, fine to coarse, occasional boulders.
34	35	Silty sand, fine to medium, small amount of clay and gravel.	81	86	Sand and silty sand with fine gravel.
35	37	Clayey sand: gray-brown to yellow-brown, damp, medium dense, fine to medium grains, gradational contact.	86	113	Gravelly sand with cobbles, uncemented, fine to coarse boulders, sandy and silty matrix.
37	46	Silty sand & sand, fine to coarse, becomes coarse at 45', small amount of gravel.	113	116	Clayey sand with small amount of gravel, yellow-brown, medium dense, fine to coarse.
			116	151	Sandy clay with small amount of gravel, yellow-brown, firm.

Perforations _____

Struck water at _____

Water level before part _____ after part _____

Remarks _____

City of Pasadena
Monitoring Well #MH-01 (cont.)

LOG OF WELL NO. 4030F

DOWN	TO	CLASSIFICATION OF MATERIALS	FROM	TO	CLASSIFICATION OF MATERIALS
116	151	uncemented, fine to coarse, occasional clayey sand, yellow-brown, fine to coarse occasional greenish brown 1/2' layer of cobbles at 134', sandy clay and clayey sand increasing sand and gravel.	241	256	Sandy clay & interbeds of clayey sand; yellowish brown, fine, fine to medium, thin layer of cobbles at 252'.
			256	257	Gravelly sand with clay.
			257	266	Sandy clay and clayey sand, silty, fine to medium, dense, yellow-brown.
151	156	Gravel and cobbles with silt or clay.			
156	180	Sandy clay & clayey sand, yellow to gray-brown, silty, fine to medium, dense, firm. Quartzose, gravel at 163', interbeds of sandy silt and silty sand, clayey sand and sandy clay.	266	272	Silty sand with fine gravel.
			272	293	Clayey sand and sandy clay, fine to medium, firm.
			293	297	Gravelly clay with sand.
180	189	Silty sand and clayey sand; brown, fine to medium.	297	353	Sandy clay and silty sand with clay below 315' mainly sandy clay 322' very sandy 326' clayier, firm 337' increasing clay, predominant clay. 349' sandy clay and gravel.
189	241	Silty sand; fine to coarse, dense clay at 204 to 205', cobbles at 207', increasing clay content at 226', layer of gravel and cobbles at 232'.			
			353	363	Sandy clay and clayey sand with gravel and

Perforations _____

Struck water at _____

Water level before perf. _____

after perf. _____

Remarks _____

FROM	TO	CLASSIFICATION OF MATERIALS	FROM	TO	CLASSIFICATION OF MATERIALS
353	363	cobbles.			
363	369	Gravelly clay, sandy			
369	375	Sandy clay and clayey sand.			
375	393	Sandy clay and silty clay, sand fine to medium 382' gravel.			
393	399	Sandy clay with gravel, yellow brown, medium to firm, fine to coarse, un cemented, and rounded grains.			

Perforations _____

Struck water at _____

Water level before perf. _____ after perf. _____

Remarks _____

PASADENA WATER DEPARTMENT
WELL RECORD

PWD NO. 082 E 11
LACFCD NO. 4086 E

LOG

ARROYO WELL

ELEVATION OF
LOG REFERENCE POINT 1089.75 USGS

ELEVATION	THICKNESS OF MATERIAL	DISTANCE BELOW REF. POINT	DESCRIPTION
1089.75		0	Gravel and soil with large boulders.
		4	Silty gravel and soil with large boulders
		9	Dirty gravel with large boulders
		18	Fine sand in gravel with large boulders
		23	Brown clayey sand in gravel with large boulders
		26	Gravel with large boulders
		58	Sand
		59	Light gravel to 8" rocks
		66	Coarse sand
		68	Gravel with 6" to 8" rocks, large boulders started at 61
		86	Large boulders filled with brown sand
		91	Boulders filled with tight brown gravel
		116	Gravel - rocks to 12"
		121	Gravel - rocks to 12" with more silt
		124	Gravel and boulders
		127	Bottom of pit Sand, gravel and boulders - tight
		144	Clay and gravel
		145	Clay, sand, gravel and boulders 17½°C
		175	Loose, dirty sand and gravel 4" 17½°C
		180	Tight sand, gravel and boulders 17½°C
		190	Tight sand and gravel 4" 17½°C
		197	Clay, sandy brown 17½°C
		198	Loose, dirty sand and gravel
		223	Log continued on next sheet

PASADENA WATER DEPARTMENT
WELL RECORD

PWD NO. 05a-2-11
LACFCD NO. 4370.2

LOG

ARROYO WELL (cont.)

ELEVATION OF
LOG REFERENCE POINT 1089.75 USGS

ELEVATION	THICKNESS OF MATERIAL	DISTANCE BELOW REF. POINT	DESCRIPTION	TEMPERATURE
		333	Tight clay and gravel.	18°C
		338	Tight sand, gravel and boulders loose streaks	18°C
		270	Loose dirty sand and gravel - 1"	18°C
		260	Tight gravel and boulders	18°C
		257	Loose, dirty sand and gravel - 2"	18°C
		259	Hard, sandy brown clay	18°C
		306	Tight, dirty sand, gravel and boulders	19°C
		319	Clay, sand and gravel - 1"	19½°C
		331	Soft, sandy brown clay	19½°C
		340	Hard, fine, sandy clay	19½°C
		346	Coarse packed sand and clay - hard	19½°C
		348	Sandy clay - fine brown	19½°C
		367	Clay and coarse gravel - 3"	20°C
		372	Hard sandy clay	20°C
		379	Clay and gravel	20°C
		381	Very tough brown clay with decomposed grains	20°C
		389	Tough, red, sandy clay	20½°C
		398	Tight clay and gravel	20½°C
		401	Sandy clay with gravel - Tough	20½°C
		425	Tight gravel and clay with decomposed grain	21°C
		431	Sandy clay with decomposed grains	21°
		436	Very tough, sandy clay	21°C
		457	Log continued on next sheet.	

PASADENA WATER DEPARTMENT
WELL RECORD

PWD NO. C5a-3-11
LACFCD NO. 4070 D

LOG

ARROYO WELL (cont.)

ELEVATION OF
LOG REFERENCE POINT 1089.75 USGS

ELEVATION	THICKNESS OF MATERIAL	DISTANCE BELOW REF. POINT	DESCRIPTION	
		457		
			Loose dirty sand and gravel - 1"	21°
		471		
			Semi-cemented gravel - 4"	21°
		475		
			Hard packed sharp clean sand	22°
		485		
			Tight sand gravel and 6" nigger-heads	22°
		489		
			Sandy clay	22°
		493		
			Clay sand and gravel - 1"	22°
		503		
			Tough sandy clay	22°
		508		
			Semi-cemented sand and gravel 3"	22°
		514		
			Dirty loose sand and gravel 2"	22°
		517		
			Clay gravel and boulders	22°
		521		
			Tough sandy clay	22°
		530		
			Hard, chocolate brown sandy clay	22°
		538		
			Cemented sand and gravel	22°
		549		
			Tight sand and gravel 4"	22°
		554		
			Soft, sandy clay (silt)	22°
		560		
			Hard chocolate brown, sandy clay	22°
		568		
			Tight sand and gravel - 4"	
		580		
			Yellow, sandy clay	
		581		
			Tight sand and gravel 4"	22°
		594		
			Yellow, sandy clay	22°
		598		
			Tight sand, gravel and boulders up to 12" - well rounded	22°
		612		
			Decomposed gravel and clay (sandy)	22°
		615		
			Cemented gravel and clay - 2"	22°
		618		
			Log continued on next sheet.	

PASADENA WATER DEPARTMENT
WELL RECORD

PWD NO. 05a-E-11
LACFCD NO. 4971 D

LOG

ARROYO WELL (cont.)

ELEVATION OF
LOG REFERENCE POINT 1069.75 USGS

ELEVATION	THICKNESS OF MATERIAL	DISTANCE BELOW REF. POINT	DESCRIPTION
		618	
			Tight sand and gravel 2" 22°
		624	
			Sand gravel and small boulders in clay 23°
		660	
			Decomposed blue granite - bedrock 23°
		668	
			Hole filled with crushed rock to bottom of starter at 660 ft.
			Crushed rock packing recovered from well at 660 ft. depth
			Mills Perforator used.
		127	
			12 holes per 14"
		302	
		306	
			12 holes per 14"
		331	
		367	
			12 holes per 14"
		372	
		398	
			12 holes per 14"
		404	
		457	
			12 holes per 14"
		489	
		498	
			8 holes per 14"
		506	
		508	
			12 holes per 14"
		524	
		538	
			12 holes per 14"
		554	
		568	
			12 holes per 14"
		594	
		598	
			12 holes per 14"
		627	See next sheet for drilling date.

Well #52 Job No. 126

Water & Power Dept. City of Pasadena

100 North Garfield,

Pasadena, California 91109

T R Sec.

Windsor Avenue

Work 10-30-1977

Work 11-24-1977

Depth Drilled 642'

Water First Encountered 170'

MATERIALS

Conductor Casing

Material mild steel

OD (ID) 2 1/2 in. Wall Thickness 1/4 in.

Run From 0' ft. To 50' ft.

Run From 12' ft. To 50' ft.

Size Shoe 24"x8"x1"

Well Casing

DIA. (OD)(ID)	WALL OR GAUGE	MATERIAL	FROM	TO
20	3x8	Kal-well	0'	640'
4' left in job to be used for stickup				
total - 644'				

Shoe Used 23' ft. of 3 ply 8 wall or gauge

Shoe 20"x14"x 1 1/4"

PERFORATIONS

Perforator Used Hydraulic - Louver Cut

FROM	TO	WIDTH	LENGTH	HOLES PER FOOT	SQ. INCH PER FOOT
50	360	3/16	2-1/2	20	
0	367	3/16	2-1/2	10	
72	556	3/16	2-1/2	10	
56	630	3/16	2-1/2	20	

Development & Test Record

Well Swabbed? Yes

Wire Line

Hours 20

0	15	Sandy clay, gravel & boulders to 2 1/2"
15	30	Sand, gravel, & boulders.
30	35	Sand, clay, & boulders.
35	50	Gravel & boulders.
50	75	Sand, clay, & gravel.
75	85	Sand, clay, gravel, & boulders.
85	110	Gravel, & boulders.
110	130	Sand, gravel, some boulder clay - hard.
130	215	Sand, clay, & gravel.
215	252	Sand, gravel, clay streak - hard.
252	268	Sand, gravel to 4" some clay.
268	272	Clay and gravel to 2"
272	284	Sand, gravel to 4", some boulders to 10".
284	292	Sand, gravel, hard a little clay.
292	296	Sand and gravel - tight.
296	300	Sand & gravel to 6" loose.
300	312	Sand, gravel, little clay - hard.
312	320	Sand, gravel, some boulders.
320	324	Sand, gravel, tight.
324	336	Fine sand & gravel.
336	344	Sand, gravel & clay - 1"
344	348	Sand, gravel some clay.
348	352	Sand, gravel & clay - hard.
352	356	Clay & small gravel to 3/4" - hard.
356	360	Clay & gravel to 1"
360	368	Hard clay.
368	372	Sand.
372	424	Hard clay.
424	444	Hard clay, some sandy clay streaks.
444	449	Sandy clay & small gravel to 1/2".

See back

If Well Is Reduced, Indicate:
 Amount of Lap at Reduction _____ ft.
 Amount of Lap at Reduction _____ ft.
 Amount of Lap at Reduction _____ ft.
 Method of Sealing at Reduction _____

Give any additional data which may be of future value
 Cemented conductor pipe from 12' to 50' on outside, using 6yds of cement. Water level ran up at 155' to depth of 360' started dropping down, at time of completion of well water was at 255'.

Well #52 (cont.)

48 ft. to 457 ft.	Hard sandy clay with small gravel to 1/2"
457	512 Hard clay with sand gravel imbedded.
512	516 Sandy clay.
516	520 Sandy clay with some gravel to 1/2"
520	544 Cemented sand & rock gravel to 6" very hard.
544	548 Sand, gravel, some clay - hard.
548	592 Cemented sand & gravel to 6" - hard.
592	612 Decomposed rock with clay & gravel - hard.
612	647 Cement, sand, & gravel some clay streaks - hard.

PASADENA WATER DEPARTMENT
WELL RECORD

PWD NO. 05-E-11
LACFCD NO. 4172 B

LOG

VENTURA WELL

ELEVATION OF
LOG REFERENCE POINT 1070.91 USGS

ELEVATION	THICKNESS OF MATERIAL	DISTANCE BELOW REF. POINT	DESCRIPTION
1070.91		0	Loose Rock and Dirt Fill
		18	Boulders and Gravel
		30	Clay
		32	Gravel
		34	Clay
		36	Sand and Rock
		38	Tight Rock and Gravel
		54	Silt and sand
		61	Rock, gravel and cement
		78	Sand and Gravel
		80	Boulders and Gravel
		90	Bottom of dug shaft
		90	Start of drilling Sand and coarse gravel
		127	Sand gravel and clay mixed
		140	Clay
		157	Clay, sand and gravel
		163	Packed sand and gravel
		180	Sand and gravel
		217	Clay, sand and gravel
		241	Sand and gravel
		244	Clay-little sand and gravel
		259	Packed sand and gravel
		270	Clay, sand and gravel
		293	Sand and Gravel
		311	Log continued on next sheet

LOG

VENTURA WELL (cont.)

ELEVATION OF
LOG REFERENCE POINT 1070.91 USGS

ELEVATION	THICKNESS OF MATERIAL	DISTANCE BELOW REF. POINT	DESCRIPTION
		311	Clay
		351	Clay, sand and gravel
		353	Hard clay
		385	Clay, sand and gravel
		409	Sand, gravel and little clay
		412	Packed sand and gravel
		461	Packed sand and coarse gravel
		472	Packed sand, gravel and boulders
		462	Gravel
581.41		489	
		463	Stuck on boulder; spent 4 days driving
		485.5	Used 12" bit
		489.5	
			See next sheet for perforations.

State No. C-6-E-11

CITY OF PASADENA, WINDSOR WELL

Location No. 4030C

Location and description: Altadena; 370 feet southeast of Windsor Avenur along Mountain View Road,
320 feet southwest of Mountain View Road. 285.53, 238.33

Elevation at ground: 1150

Diameter of casing: 26 inches

Date drilled: August, 1918

Driller: Clampitt and Moss.

Log obtained from: Pasadena Water Department

<u>Depth</u>	<u>Material</u>	<u>Depth</u>	<u>Material</u>
0-150	Dug Pit	468-472	Gravel
150-182	Rocks and gravel	472-499	Clay
182-244	Sandy clay and cemented gravel	499-500	Gravel
244-314	Clay	500-534	Clay
314-353	Gravel	534-563	Gravel
353-468	Clay	563-573	Granite

Performed: 316-351, 468-472, 536-561

APPENDIX B

LABORATORY ANALYTICAL REPORTS FROM NOVEMBER 1989

SAMPLING OF CITY OF PASADENA WELLS



BROWN AND CALDWELL LABORATORIES

ANALYTICAL REPORT

801 WESTERN AVENUE, GLENDALE, CA 91201
(818) 247-5737

FAX: (818) 247-9797

LOG NO: G89-11-009

Received: 01 NOV 89

Reported: 17 NOV 89

Ms. Elizabeth Stetz
JPL, Mail Stop 190-112
4800 Oak Grove Drive
Pasadena, CA 91109

Purchase Order: 7822

Requisition: SK-879000

CC: EBASCO

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES				DATE SAMPLED
11-009-1	Windsor				01 NOV 89
11-009-2	Arroyo				01 NOV 89
11-009-3	Well 52				01 NOV 89
11-009-4	Ventura				01 NOV 89
PARAMETER	11-009-1	11-009-2	11-009-3	11-009-4	
Alkalinity					
Carbonate Alk (as CaCO3), mg/L	<1	<1	<1	<1	
Bicarbonate Alk (as CaCO3), mg/L	200	160	160	170	
Hydroxide Alk (as CaCO3), mg/L	<1	<1	<1	<1	
Total Alkalinity (as CaCO3), mg/L	200	160	160	170	
Calcium (EDTA Titration), mg/L	110	60	79	100	
Magnesium, mg/L	23	13	17	23	
Chloride, mg/L	53	23	39	55	
Copper, mg/L	<0.02	<0.02	0.02	<0.02	
Surfactants (MBAS), mg/L	<0.1	<0.1	<0.1	<0.1	
Iron, mg/L	<0.1	<0.1	<0.1	<0.1	
Manganese, mg/L	<0.01	<0.01	<0.01	<0.01	
pH, Units	7.6	7.6	7.5	7.3	
Potassium, mg/L	2.0	2.1	1.7	1.9	
Sodium, mg/L	25	22	25	27	
Sulfate, mg/L	67	31	41	69	
Specific Conductance, umhos/cm	680	420	540	700	
Filterable Residue (TDS), mg/L	400	250	320	430	
Zinc, mg/L	<0.03	<0.03	<0.03	<0.03	
Ion Balance, .	ATTACHED	ATTACHED	ATTACHED	ATTACHED	



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11-009-1	Windsor				01 NOV 89
11-009-2	Arroyo				01 NOV 89
11-009-3	Well 52				01 NOV 89
11-009-4	Ventura				01 NOV 89
PARAMETER	11-009-1	11-009-2	11-009-3	11-009-4	
Nitrate Nitrogen					
Nitrate (as NO3), mg/L	26	12	29	57	
Nitrate (as N), mg/L	5.9	2.7	6.5	13	
Nitric Acid Digestion, Date	11/08/89	11/08/89	11/08/89	11/08/89	
Aluminum, mg/L	<0.2	<0.2	<0.2	<0.2	
Arsenic, mg/L	<0.002	<0.002	<0.002	<0.002	
Barium, mg/L	0.11	0.073	0.097	0.14	
Cadmium, mg/L	<0.001	<0.001	<0.001	<0.001	
Chromium, mg/L	<0.005	<0.005	<0.005	<0.005	
Lead, mg/L	<0.002	<0.002	0.006	<0.002	
Mercury, mg/L	<0.0005	<0.0005	<0.0005	<0.0005	
Selenium, mg/L	<0.004	<0.004	<0.004	<0.004	
Silver, mg/L	<0.02	<0.02	<0.02	<0.02	



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REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED			
11-009-1	Windsor	01 NOV 89			
11-009-2	Arroyo	01 NOV 89			
11-009-3	Well 52	01 NOV 89			
11-009-4	Ventura	01 NOV 89			
PARAMETER	11-009-1	11-009-2	11-009-3	11-009-4	
B/N,A Ext.Pri.Poll. (EPA-625)					
Date Extracted	11/03/89	11/03/89	11/03/89	11/03/89	
Date Analyzed	11/14/89	11/14/89	11/14/89	11/14/89	
Dilution Factor, Times 1	1	1	1	1	
1,2,4-Trichlorobenzene, ug/L	<10	<10	<10	<10	
1,2-Dichlorobenzene, ug/L	<10	<10	<10	<10	
1,2-Diphenylhydrazine, ug/L	<10	<10	<10	<10	
1,3-Dichlorobenzene, ug/L	<10	<10	<10	<10	
1,4-Dichlorobenzene, ug/L	<10	<10	<10	<10	
2,4,6-Trichlorophenol, ug/L	<10	<10	<10	<10	
2,4-Dichlorophenol, ug/L	<10	<10	<10	<10	
2,4-Dimethylphenol, ug/L	<10	<10	<10	<10	
2,4-Dinitrotoluene, ug/L	<10	<10	<10	<10	
2,4-Dinitrophenol, ug/L	<25	<25	<25	<25	
2,6-Dinitrotoluene, ug/L	<10	<10	<10	<10	
2-Chloronaphthalene, ug/L	<10	<10	<10	<10	
2-Methylnaphthalene, ug/L	<10	<10	<10	<10	
2-Methylphenol, ug/L	<10	<10	<10	<10	
2-Nitrophenol, ug/L	<10	<10	<10	<10	
2-Nitroaniline, ug/L	<50	<50	<50	<50	
2,4,5-Trichlorophenol, ug/L	<10	<10	<10	<10	
2-Chlorophenol, ug/L	<10	<10	<10	<10	
2-Methyl-4,6-dinitrophenol, ug/L	<50	<50	<50	<50	
3,3'-Dichlorobenzidine, ug/L	<10	<10	<10	<10	



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Pasadena, CA 91109

Purchase Order: 7822
Requisition: SK-879000
CC: EBASCO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED			
11-009-1	Windsor	01 NOV 89			
11-009-2	Arroyo	01 NOV 89			
11-009-3	Well 52	01 NOV 89			
11-009-4	Ventura	01 NOV 89			
PARAMETER	11-009-1	11-009-2	11-009-3	11-009-4	
3-Nitroaniline, ug/L	<50	<50	<50	<50	
4-Bromophenylphenylether, ug/L	<10	<10	<10	<10	
4-Chloro-3-methylphenol, ug/L	<10	<10	<10	<10	
4-Chlorophenylphenylether, ug/L	<10	<10	<10	<10	
4-Chloroaniline, ug/L	<20	<20	<20	<20	
4-Methylphenol, ug/L	<10	<10	<10	<10	
4-Nitrophenol, ug/L	<25	<25	<25	<25	
4-Nitroaniline, ug/L	<50	<50	<50	<50	
Acenaphthene, ug/L	<10	<10	<10	<10	
Acenaphthylene, ug/L	<10	<10	<10	<10	
Aniline, ug/L	<20	<20	<20	<20	
Anthracene, ug/L	<10	<10	<10	<10	
Bis(2-ethylhexyl)phthalate, ug/L	<10	12	10	<10	
Benzidine, ug/L	<40	<40	<40	<40	
Benzoic acid, ug/L	<50	<50	<50	<50	
Benzyl Alcohol, ug/L	<20	<20	<20	<20	
Bis(2-chloroethyl)ether, ug/L	<10	<10	<10	<10	
Bis(2-chloroisopropyl)ether, ug/L	<10	<10	<10	<10	
Bis(2-chloroethoxy)methane, ug/L	<10	<10	<10	<10	
Benzo(a)anthracene, ug/L	<10	<10	<10	<10	
Benzo(a)pyrene, ug/L	<10	<10	<10	<10	
Benzo(b)fluoranthene, ug/L	<10	<10	<10	<10	
Benzo(g,h,i)perylene, ug/L	<10	<10	<10	<10	
Benzo(k)fluoranthene, ug/L	<10	<10	<10	<10	



801 WESTERN AVENUE, GLENDALE, CA 91201
(818) 247-5737

FAX: (818) 247-9797

LOG NO: G89-11-009

Received: 01 NOV 89
Reported: 17 NOV 89

Ms. Elizabeth Stetz
JPL, Mail Stop 190-112
4800 Oak Grove Drive
Pasadena, CA 91109

Purchase Order: 7822

Requisition: SK-879000
CC: EBASCO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED			
11-009-1	Windsor	01 NOV 89			
11-009-2	Arroyo	01 NOV 89			
11-009-3	Well 52	01 NOV 89			
11-009-4	Ventura	01 NOV 89			
PARAMETER		11-009-1	11-009-2	11-009-3	11-009-4
Butylbenzylphthalate, ug/L		<10	<10	<10	<10
Chrysene, ug/L		<10	<10	<10	<10
Di-n-octylphthalate, ug/L		<10	<10	<10	<10
Dibenzo(a,h)anthracene, ug/L		<10	<10	<10	<10
Dibutylphthalate, ug/L		<50	<50	<50	<50
Diethylphthalate, ug/L		<10	<10	<10	<10
Dimethylphthalate, ug/L		<25	<25	<25	<25
Dibenzofuran, ug/L		<10	<10	<10	<10
Fluorene, ug/L		<10	<10	<10	<10
Fluoranthene, ug/L		<10	<10	<10	<10
Hexachlorobenzene, ug/L		<10	<10	<10	<10
Hexachlorobutadiene, ug/L		<10	<10	<10	<10
Hexachlorocyclopentadiene, ug/L		<10	<10	<10	<10
Hexachloroethane, ug/L		<10	<10	<10	<10
Indeno(1,2,3-c,d)pyrene, ug/L		<10	<10	<10	<10
Isophorone, ug/L		<10	<10	<10	<10
N-Nitrosodi-n-propylamine, ug/L		<40	<40	<40	<40
N-Nitrosodimethylamine, ug/L		<80	<80	<80	<80
N-Nitrosodiphenylamine, ug/L		<10	<10	<10	<10
Naphthalene, ug/L		<10	<10	<10	<10
Nitrobenzene, ug/L		<10	<10	<10	<10
Pentachlorophenol, ug/L		<10	<10	<10	<10
Phenanthrene, ug/L		<10	<10	<10	<10
Phenol, ug/L		<10	<10	<10	<10



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REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED			
11-009-1	Windsor	01 NOV 89			
11-009-2	Arroyo	01 NOV 89			
11-009-3	Well 52	01 NOV 89			
11-009-4	Ventura	01 NOV 89			
PARAMETER		11-009-1	11-009-2	11-009-3	11-009-4
Pyrene, ug/L		<10	<10	<10	<10



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Purchase Order: 7822
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CC: EBASCO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-009-1	Windsor	01 NOV 89
11-009-2	Arroyo	01 NOV 89
11-009-3	Well 52	01 NOV 89
11-009-4	Ventura	01 NOV 89

PARAMETER	11-009-1	11-009-2	11-009-3	11-009-4
Vol.Pri.Poll. (EPA-624)				
Date Analyzed	11/14/89	11/14/89	11/14/89	11/14/89
Dilution Factor, Times 1	1	1	1	1
1,1,1-Trichloroethane, ug/L	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane, ug/L	<1	<1	<1	<1
1,1,2-Trichloroethane, ug/L	<1	<1	<1	<1
1,1-Dichloroethane, ug/L	<1	<1	<1	<1
1,1-Dichloroethene, ug/L	<1	<1	<1	<1
1,2-Dichloroethane, ug/L	<1	2	<1	<1
1,2-Dichlorobenzene, ug/L	<1	<1	<1	<1
1,2-Dichloropropane, ug/L	<1	<1	<1	<1
1,3-Dichlorobenzene, ug/L	<1	<1	<1	<1
cis-1,3-Dichloropropene, ug/L	<1	<1	<1	<1
1,4-Dichlorobenzene, ug/L	<1	<1	<1	<1
2-Chloroethylvinylether, ug/L	<1	<1	<1	<1
2-Hexanone, ug/L	<10	<10	<10	<10
Acetone, ug/L	<50	<50	<50	<50
Acrolein, ug/L	<50	<50	<50	<50
Acrylonitrile, ug/L	<20	<20	<20	<20
Bromodichloromethane, ug/L	<1	<1	<1	<1
Bromomethane, ug/L	<1	<1	<1	<1
Benzene, ug/L	<1	<1	<1	<1
Chlorobenzene, ug/L	<1	1	2	<1
Carbon Tetrachloride, ug/L	<1	5	<1	<1



801 WESTERN AVENUE, GLENDALE, CA 91201
(818) 247-5737

FAX: (818) 247-9797
LOG NO: G89-11-009

Received: 01 NOV 89
Reported: 17 NOV 89

Ms. Elizabeth Stetz
JPL, Mail Stop 190-112
4800 Oak Grove Drive
Pasadena, CA 91109

Purchase Order: 7822
Requisition: SK-879000
CC: EBASCO

REPORT OF ANALYTICAL RESULTS

Log Number : 89-11-009-1
Sample Description: Windsor

General Mineral Analysis
Sampled Date 01 NOV 89

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	26	0.42	Hydroxide Alk (as CaCO3)	<1
Chloride	53	1.5	Carbonate Alk (as CaCO3)	<1
Sulfate	67	1.4	Bicarbonate Alk (as CaCO3)	200
Bicarbonate (as HCO3)	240	4	Ca Hardness (as CaCO3)	270
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	95
Total Milliequivalents per Liter			Total Hardness (as CaCO3)	365
			Iron	<0.1
			Manganese	<0.01
Cations	mg/L	meq/L	Copper	<0.02
			Zinc	<0.03
Sodium	25	1.1	Surfactants (MBAS)	<0.1
Potassium	2.0	0.051	Filterable Residue (TDS)	400
Calcium (EDTA Titration)	110	5.5	Sp. Conductance, umhos/cm	680
Magnesium	23	1.9	pH, units	7.6
Total Milliequivalents per Liter				8.6

* Conforms to Title 22, California Administrative Code



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LOG NO: G89-11-009

Received: 01 NOV 89
Reported: 17 NOV 89

Ms. Elizabeth Stetz
JPL, Mail Stop 190-112
4800 Oak Grove Drive
Pasadena, CA 91109

Purchase Order: 7822

Requisition: SK-879000
CC: EBASCO

REPORT OF ANALYTICAL RESULTS

Log Number : 89-11-009-2
Sample Description: Arroyo

General Mineral Analysis
Sampled Date 01 NOV 89

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	12	0.19	Hydroxide Alk (as CaCO3)	<1
Chloride	23	0.65	Carbonate Alk (as CaCO3)	<1
Sulfate	31	0.65	Bicarbonate Alk (as CaCO3)	160
Bicarbonate (as HCO3)	200	3.2	Ca Hardness (as CaCO3)	150
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	53
Total Milliequivalents per Liter			Total Hardness (as CaCO3)	203
			Iron	<0.1
			Manganese	<0.01
Cations	mg/L	meq/L	Copper	<0.02
			Zinc	<0.03
Sodium	22	0.96	Surfactants (MBAS)	<0.1
Potassium	2.1	0.054	Filterable Residue (TDS)	250
Calcium (EDTA Titration)	60	3	Sp. Conductance, umhos/cm	420
Magnesium	13	1.1	pH, units	7.6
Total Milliequivalents per Liter				5.1

* Conforms to Title 22, California Administrative Code



BROWN AND CALDWELL LABORATORIES

ANALYTICAL REPORT

801 WESTERN AVENUE, GLENDALE, CA 91201
(818) 247-5737

FAX: (818) 247-9797
LOG NO: G89-11-009

Received: 01 NOV 89
Reported: 17 NOV 89

Ms. Elizabeth Stetz
JPL, Mail Stop 190-112
4800 Oak Grove Drive
Pasadena, CA 91109

Purchase Order: 7822
Requisition: SK-879000
CC: EBASCO

REPORT OF ANALYTICAL RESULTS

Page 9

Bis(2-ethylhexyl)phthalate was found in the blank
at 13 ug/L. -- H. Cochran 11/16/89

Jeffrey A. Erion, Laboratory Manager



801 WESTERN AVENUE, GLENDALE, CA 91201
(818) 247-5737

FAX: (818) 247-9797
LOG NO: G89-11-009

Received: 01 NOV 89
Reported: 17 NOV 89

Ms. Elizabeth Stetz
JPL, Mail Stop 190-112
4800 Oak Grove Drive
Pasadena, CA 91109

Purchase Order: 7822
Requisition: SK-879000
CC: EBASCO

REPORT OF ANALYTICAL RESULTS

Log Number : 89-11-009-3
Sample Description: Well 52

General Mineral Analysis
Sampled Date 01 NOV 89

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	29	0.47	Hydroxide Alk (as CaCO3)	<1
Chloride	39	1.1	Carbonate Alk (as CaCO3)	<1
Sulfate	41	0.85	Bicarbonate Alk (as CaCO3)	160
Bicarbonate (as HCO3)	200	3.2	Ca Hardness (as CaCO3)	200
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	70
Total Milliequivalents per Liter			Total Hardness (as CaCO3)	270
			Iron	<0.1
			Manganese	<0.01
Cations	mg/L	meq/L	Copper	0.02
			Zinc	<0.03
Sodium	25	1.1	Surfactants (MBAS)	<0.1
Potassium	1.7	0.043	Filterable Residue (TDS)	320
Calcium (EDTA Titration)	79	3.9	Sp. Conductance, umhos/cm	540
Magnesium	17	1.4	pH, units	7.5
Total Milliequivalents per Liter				6.4

* Conforms to Title 22, California Administrative Code



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LOG NO: G89-11-009

Received: 01 NOV 89

Reported: 17 NOV 89

Ms. Elizabeth Stetz
JPL, Mail Stop 190-112
4800 Oak Grove Drive
Pasadena, CA 91109

Purchase Order: 7822

Requisition: SK-879000

CC: EBASCO

REPORT OF ANALYTICAL RESULTS

Page 11

Log Number : 89-11-009-4
Sample Description: Ventura

General Mineral Analysis
Sampled Date 01 NOV 89

Anions	mg/L	meq/L	Determination	mg/L	
Nitrate (as NO3)	57	0.92	Hydroxide Alk (as CaCO3)	<1	
Chloride	55	1.6	Carbonate Alk (as CaCO3)	<1	
Sulfate	69	1.4	Bicarbonate Alk (as CaCO3)	170	
Bicarbonate (as HCO3)	210	3.4	Ca Hardness (as CaCO3)	250	
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	95	
Total Milliequivalents per Liter			7.3	Total Hardness (as CaCO3)	345
Cations				Iron	<0.1
				Manganese	<0.01
				Copper	<0.02
				Zinc	<0.03
Sodium	27	1.2	Surfactants (MBAS)	<0.1	
Potassium	1.9	0.049	Filterable Residue (TDS)	430	
Calcium (EDTA Titration)	100	5	Sp. Conductance, umhos/cm	700	
Magnesium	23	1.9	pH, units	7.3	
Total Milliequivalents per Liter			8.1		

* Conforms to Title 22, California Administrative Code

Jeffrey A. Erion, Laboratory Manager

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
 3000 West MacArthur Boulevard, Santa Ana, California 92704
 (714) 662-4000

CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS

EBASCO



Project Name: <i>JPL</i> Project Address: Ebasco OFS #	Sampling Date: <i>11-1-89</i>	HAZARD IDENTIFICATION: Reactive <input type="checkbox"/> Nonhazard <input checked="" type="checkbox"/> Toxic <input type="checkbox"/> Flammable <input type="checkbox"/> Infectious <input type="checkbox"/> Skin Irritant <input type="checkbox"/>	TURNAROUND TIME REQUIRED Normal <input checked="" type="checkbox"/> Rush <input type="checkbox"/>
Sampler: (Name) <i>DAVID P. NYE</i>	Shipment Date: <i>11-1-89</i>		
Sampler: (Signature) <i>David P. Nye</i>	Shipping Number:		

Analysis Laboratory: <i>BCL</i>	ANALYSES REQUIRED
California DHS Certification Number:	pH & m (General) (7) metals Oil and Grease Halogenated Volatile Organics Aromatic Volatile Organics CHAM-Metals (2) Metals Title 22 WET Test Chromium (Total) Chromium (Hexavalent) Lead-Nickel-Cadmium Arsenic Zinc Mercury Total Sulfides Total Filterable Solids Total Dissolved Solids Nonhalogenated Volatile Organics PCB's Turpentine Polynuclear Aromatic Hydrocarbons Organophosphorus Pesticides Chlorinated Herbicides Routine Water Analysis Other: <i>VQA's EPA 194</i> Other: <i>3NA's EPA 625</i>
Laboratory Contact: <i>JAYNE FREEMER</i>	
Reports to Be Sent to: <i>JAMSHID SAMSCHUR</i>	
Laboratory Instructions: <i>Regular Turnaround</i>	

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION			pH	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CHAM-Metals (2) Metals	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead-Nickel-Cadmium	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other: <i>VQA's EPA 194</i>	Other: <i>3NA's EPA 625</i>			
					WATER	SOIL	OTHER (Describe)																											
<i>Well 52</i>	<i>PM</i>	<i>ICE 40</i>		<i>40ml vial</i>	X																													
"	"	"		<i>1/16 oz</i>	X																												X	
"	"	"		<i>1/16 oz</i>	X				X																									
"	"	"		<i>400 gal</i>	X						X						X																	
<i>Ventura</i>	<i>PM</i>	"		<i>40ml vial</i>	X																												X	
"	"	"		<i>1/16 oz</i>	X																												X	
"	"	"		<i>1/16 oz</i>	X				X																									
"	"	"		<i>400 gal</i>	X						X						X																	

COMMENTS:
DO NOT ANALYZE SAMPLES UNTIL YOU CONTACT JAMSHID SAMSCHUR
AT 714-662-4038

Relinquished by: (Signature) <i>David P. Nye</i>	Date: <i>11-1-89</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Date:	Received by: (Signature)
Company: <i>[Company]</i>	Time:	Company: <i>JPL</i>	Company:	Time:	Company:

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
 3000 West MacArthur Boulevard, Santa Ana, California 92704
 (714) 662-4000

CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS

EBASCO



Project Name: <u>JPL</u>	Sampling Date: <u>11/18/99</u>	HAZARD IDENTIFICATION: Reactive <input type="checkbox"/> Nonhazard <input checked="" type="checkbox"/> Toxic <input type="checkbox"/> Flammable <input type="checkbox"/> Infectious <input type="checkbox"/> Skin Irritant <input type="checkbox"/>	TURNAROUND TIME REQUIRED Normal <input checked="" type="checkbox"/> Rush <input type="checkbox"/>
Project Address: Ebasco OFS #	Shipment Date: <u>11/18/99</u>		
Sampler: (Name): <u>DAVID P NYE</u>	Shipping Number:		
Sampler: (Signature): <u>[Signature]</u>			

Analysis Laboratory: BCL

California DHS Certification Number:

Laboratory Contact: JAYNE FRANKER

Reports to Be Sent to: JAMSHID SADEGHIAN

Laboratory Instructions: REGULAR TRIMONITRONS

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION			Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	Chlorinated Volatile Organics	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Asbestos	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	Other
					WATER	SOIL	OTHER (Describe)																							
<u>6/10/00</u>	<u>AM</u>	<u>ILS 49</u>		<u>40 ml</u>	X																									X
<u>11</u>	<u>"</u>	<u>"</u>		<u>1 L</u>	X																									X
<u>11</u>	<u>"</u>	<u>"</u>		<u>1 L</u>	X			X																						
<u>11</u>	<u>"</u>	<u>"</u>		<u>1 L</u>	X				X																					
<u>11</u>	<u>"</u>	<u>"</u>		<u>40 ml</u>	X									X																X
<u>11</u>	<u>"</u>	<u>"</u>		<u>1 L</u>	X																									X
<u>11</u>	<u>"</u>	<u>"</u>		<u>1 L</u>	X			X																						
<u>11</u>	<u>"</u>	<u>"</u>		<u>1 L</u>	X																									

COMMENTS:
DO NOT ANALYZE SAMPLES UNTIL YOU CONTACT JAMSHID SADEGHIAN AT THE EBASCO OFFICE AT 714-662-4000

Relinquished by: (Signature) <u>[Signature]</u>	Date: <u>11/18/99</u>	Received by: (Signature) <u>[Signature]</u>	Relinquished by: (Signature)	Date:	Received by: (Signature)
Company: <u>EBASCO</u>	Time:	Company: <u>JPL</u>	Company:	Time:	Company:

APPENDIX C

LABORATORY ANALYTICAL REPORTS FROM JUNE 1990

RESAMPLING OF JPL MONITORING WELLS



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 06/27/90

DATE REPORTED: 07/13/90

PAGE 1 OF 14

LAB NUMBER: 26228

CLIENT: EBASCO SERVICES INCORPORATED

REPORT ON: FIVE WATER SAMPLES

PROJECT #: JPL

LOCATION: PASADENA

RESULTS: SEE ATTACHED

Reviewed By

Laboratory Director

LABORATORY NUMBER: 26228-1
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL PASADENA
 SAMPLE ID: EMW-3-2

DATE RECEIVED: 06/27/90
 DATE ANALYZED: 07/06/90
 DATE REPORTED: 07/13/90
 PAGE 2 OF 14

METHOD: EPA 624
 VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
		--ug/L--
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	6	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS		

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT		

1,2-Dichloroethane-d4	101	
Toluene-d8	105	
Bromofluorobenzene	113	



LABORATORY NUMBER: 26228-2
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL PASADENA
SAMPLE ID: EMW-3-3

DATE RECEIVED: 06/27/90
DATE ANALYZED: 07/07/90
DATE REPORTED: 07/13/90
PAGE 3 OF 14

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
		--ug/L--
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	100
Toluene-d8	103
Bromofluorobenzene	109



LABORATORY NUMBER: 26228-3
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL PASADENA
SAMPLE ID: EMW-3-4

DATE RECEIVED: 06/27/90
DATE ANALYZED: 07/07/90
DATE REPORTED: 07/13/90
PAGE 4 OF 14

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	105
Toluene-d8	105
Bromofluorobenzene	110



LABORATORY NUMBER: 26228-4
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL PASADENA
SAMPLE ID: EMW-3-5

DATE RECEIVED: 06/27/90
DATE ANALYZED: 07/07/90
DATE REPORTED: 07/13/90
PAGE 5 OF 14

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	105
Toluene-d8	107
Bromofluorobenzene	113



LABORATORY NUMBER: 26228-5
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL PASADENA
SAMPLE ID: EMW-3-2E

DATE RECEIVED: 06/27/90
DATE ANALYZED: 07/07/90
DATE REPORTED: 07/13/90
PAGE 6 OF 14

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
		--ug/L--
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS		

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT		

1,2-Dichloroethane-d4	101	
Toluene-d8	105	
Bromofluorobenzene	111	



LABORATORY NUMBER: 26228-1
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-3-2

DATE RECEIVED: 06/27/90
DATE ANALYZED: 06/27-05
DATE REPORTED: 07/13/90
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ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY	250	mg/l as CaCO ₃	3	SMWW 406
CHLORIDE	13	mg/l	1.5	EPA 300.0
NITRATE	3.9	mg/l	1	EPA 300.0
SULFATE	32	mg/l	7.5	EPA 300.0
FLUORIDE	1.0	mg/l	0.2	EPA 300.0
SODIUM	22	mg/l	0.5	EPA 200.0
POTASSIUM	3.0	mg/l	0.5	EPA 200.0
CALCIUM	54	mg/l	0.5	EPA 200.0
MAGNESIUM	19	mg/l	0.2	EPA 200.0
TOTAL DISSOLVED SOLIDS	300	mg/l	10	EPA 160.1
BALANCE	-0.9%			

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
TOTAL DISSOLVED SOLIDS	5	--
CHLORIDE	<1	100
NITRATE	<1	96
SULFATE	2	92
CALCIUM	1	97
MAGNESIUM	<1	100
SODIUM	<1	104
POTASSIUM	2	107

LABORATORY NUMBER: 26228-2
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL
 LOCATION: PASADENA
 SAMPLE ID: EMW-3-3

DATE RECEIVED: 06/27/90
 DATE ANALYZED: 06/27-05
 DATE REPORTED: 07/13/90
 PAGE 8 OF 14

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY	220	mg/l as CaCO ₃	3	SMWW 406
CHLORIDE	16	mg/l	1.5	EPA 300.0
NITRATE	0	mg/l	1	EPA 300.0
SULFATE	2.6	mg/l	7.5	EPA 300.0
FLUORIDE	1.6	mg/l	1.5	EPA 300.0
SODIUM	97	mg/l	0.5	EPA 200.0
POTASSIUM	2.4	mg/l	0.5	EPA 200.0
CALCIUM	10	mg/l	0.5	EPA 200.0
MAGNESIUM	3.0	mg/l	0.2	EPA 200.0
TOTAL DISSOLVED SOLIDS	290	mg/l	10	EPA 160.1
BALANCE	-18.0%			

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
TOTAL DISSOLVED SOLIDS	5	--
CHLORIDE	<1	100
NITRATE	<1	96
SULFATE	2	92
CALCIUM	1	97
MAGNESIUM	<1	100
SODIUM	<1	104
POTASSIUM	2	107

LABORATORY NUMBER: 26228-3
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL
 LOCATION: PASADENA
 SAMPLE ID: EMW-3-4

DATE RECEIVED: 06/27/90
 DATE ANALYZED: 06/27-05
 DATE REPORTED: 07/13/90
 PAGE 9 OF 14

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY	210	mg/l as CaCO3	3	SMWW 406
CHLORIDE	9.2	mg/l	1.5	EPA 300.0
NITRATE	0	mg/l	1	EPA 300.0
SULFATE	15	mg/l	7.5	EPA 300.0
FLUORIDE	1	mg/l	1.5	EPA 300.0
SODIUM	60	mg/l	0.5	EPA 200.0
POTASSIUM	3.7	mg/l	0.5	EPA 200.0
CALCIUM	23	mg/l	0.5	EPA 200.0
MAGNESIUM	7.6	mg/l	0.2	EPA 200.0
TOTAL DISSOLVED SOLIDS	260	mg/l	10	EPA 160.1
BALANCE	-9.6%			

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
TOTAL DISSOLVED SOLIDS	5	--
CHLORIDE	<1	100
NITRATE	<1	96
SULFATE	2	92
CALCIUM	1	97
MAGNESIUM	<1	100
SODIUM	<1	104
POTASSIUM	2	107



LABORATORY NUMBER: 26228-4
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL
 LOCATION: PASADENA
 SAMPLE ID: EMW-3-5

DATE RECEIVED: 06/27/90
 DATE ANALYZED: 06/27-05
 DATE REPORTED: 07/13/90
 PAGE 10 OF 14

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY	180	mg/l as CaCO ₃	3	SMWW 406
CHLORIDE	11	mg/l	1.5	EPA 300.0
NITRATE	0	mg/l	1	EPA 300.0
SULFATE	26	mg/l	7.5	EPA 300.0
FLUORIDE	2.4	mg/l	1.5	EPA 300.0
SODIUM	79	mg/l	0.5	EPA 200.0
POTASSIUM	2.8	mg/l	0.5	EPA 200.0
CALCIUM	16	mg/l	0.5	EPA 200.0
MAGNESIUM	3.6	mg/l	0.2	EPA 200.0
TOTAL DISSOLVED SOLIDS	270	mg/l	10	EPA 160.1
BALANCE	-15.8%			

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
TOTAL DISSOLVED SOLIDS	5	--
CHLORIDE	<1	100
NITRATE	<1	96
SULFATE	2	92
CALCIUM	1	97
MAGNESIUM	<1	100
SODIUM	<1	104
POTASSIUM	2	107



LABORATORY NUMBER: 26228-1
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-3-2

DATE RECEIVED: 06/27/90
DATE ANALYZED: 07/02-05
DATE REPORTED: 07/13/90
PAGE 11 OF 14

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
WET CHEMISTRY:				
CARBONATE ALKALINITY	ND	mg/L as CaCO3	3	EPA 310.1
BICARBONATE ALKALINITY	250	mg/L as CaCO3	3	EPA 310.1
PHOSPHATE	ND	mg/L	1.5	EPA 300.0
IRON	0.2	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	22	mg/L	10	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	<1	8
Accuracy (Spike % Recovery):	95	99	101



LABORATORY NUMBER: 26228-2
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-3-3

DATE RECEIVED: 06/27/90
DATE ANALYZED: 07/02-05
DATE REPORTED: 07/13/90
PAGE 12 OF 14

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
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WET CHEMISTRY:

CARBONATE ALKALINITY	42	mg/L as CaCO3	3	EPA 310.1
BICARBONATE ALKALINITY	180	mg/L as CaCO3	3	EPA 310.1
PHOSPHATE	ND	mg/L	1.5	EPA 300.0
IRON	0.5	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	34	mg/L	10	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	<1	8
Accuracy (Spike % Recovery):	95	99	101



LABORATORY NUMBER: 26228-3
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-3-4

DATE RECEIVED: 06/27/90
DATE ANALYZED: 07/02-05
DATE REPORTED: 07/13/90
PAGE 13 OF 14

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
WET CHEMISTRY:				
CARBONATE ALKALINITY	30	mg/L as CaCO3	3	EPA 310.1
BICARBONATE ALKALINITY	180	mg/L as CaCO3	3	EPA 310.1
PHOSPHATE	ND	mg/L	1.5	EPA 300.0
IRON	0.3	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	15	mg/L	10	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	<1	8
Accuracy (Spike % Recovery):	95	99	101



LABORATORY NUMBER: 26228-4
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-3-5

DATE RECEIVED: 06/27/90
DATE ANALYZED: 07/02-05
DATE REPORTED: 07/13/90
PAGE 14 OF 14

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
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WET CHEMISTRY:

CARBONATE ALKALINITY	30	mg/L as CaCO3	3	EPA 310.1
BICARBONATE ALKALINITY	150	mg/L as CaCO3	3	EPA 310.1
PHOSPHATE	ND	mg/L	1.5	EPA 300.0
IRON	0.3	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	ND	mg/L	10	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	<1	8
Accuracy (Spike % Recovery):	95	99	101

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
 3000 West MacArthur Boulevard, Santa Ana, California 92704
 (714) 662-4000

CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS

EBASCO



198

Project Name Project Address Ebasco OFS #	JPL Pasadena, CA	Sampling Date:	6-27-90	HAZARD IDENTIFICATION: Reactive <input type="checkbox"/> Nonhazard <input checked="" type="checkbox"/> Toxic <input type="checkbox"/> Flammable <input type="checkbox"/> Infectious <input type="checkbox"/> Skin Irritant <input type="checkbox"/>	TURNAROUND TIME REQUIRED Normal <input checked="" type="checkbox"/> Rush <input type="checkbox"/>
Sampler: (Name)	J. LEWIS	Shipment Date:	6-27-90		
Sampler: (Signature)	Jonathan Lewis	Shipping Number:			

Analysis Laboratory:	Curtis & Tompkins	ANALYSES REQUIRED
California DHS Certification Number:		
Laboratory Contact:	JACK or Tony	
Reports to Be Sent to:	M. Cutler	
Laboratory Instructions:		

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION			EPA 624	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Extractable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	SEE COMMENTS
					WATER	SOIL	OTHER (Describe)																								
EMW-3-2	0900	NONE TO HNO3		4-40 ml + 1-4oz filter	X			X													X									X	
EMW-3-3	1030	"		" "																											
EMW-3-4	1157	"		" "																											
EMW-3-5	1555	"		" "																											
EMW-3-2E	745	NONE		2-40 ml																											

COMMENTS: USE DRINKING WATER DETECTION LIMITS, IN ADDITION TO ABOVE, ANALYZE FOR TOTAL ORGANIC CARBON (TOC), Na, K, Ca, Mg, Fe, Cl, SO4, NO3, CO2, HCO3, F, PO4. MASS BALANCE AND CHARGE BALANCE DONE BEFORE RESULTS ARE TABULATED. FOR ALL INORGANIC ANALYSES EXCEPT CO3 AND HCO3, FILTER WATER THROUGH 0.45µm POLYCARBONATE NUCLEOPORE FILTER MEMBRANE. NOTE: CO2 & HCO3 TO BE DONE AS SOON AS SAMPLES ARE RECEIVED.

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
Jonathan Lewis	6/27/90	Gaul Head			
ny: []	Time: []	ny: []	ny: []	Time: []	ny: []



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 06/25/90

DATE REPORTED: 07/13/90

PAGE 1 OF 4

LAB NUMBER: 26213

CLIENT: EBASCO SERVICES INCORPORATED

REPORT ON: ONE WATER SAMPLE

PROJECT #: JPL

LOCATION: PASADENA

RESULTS: SEE ATTACHED

Reviewed By

Anthony Nagel

Laboratory Director



LABORATORY NUMBER: 26213-1
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL PASADENA
SAMPLE ID: EMW-4-1

DATE RECEIVED: 06/25/90
DATE ANALYZED: 07/06/90
DATE REPORTED: 07/13/90
PAGE 2 OF 4

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
		--ug/L--
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	114
Toluene-d8	99
Bromofluorobenzene	97



LABORATORY NUMBER: 26213-1
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL
 LOCATION: PASADENA
 SAMPLE ID: EMW-4-1

DATE RECEIVED: 06/25/90
 DATE ANALYZED: 06/25-05
 DATE REPORTED: 07/13/90
 PAGE 3 OF 4

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY	360	mg/l as CaCO3	3	SMWW 406
CHLORIDE	20	mg/l	15	EPA 300.0
NITRATE	9.2	mg/l	5	EPA 300.0
SULFATE	45	mg/l	7.5	EPA 300.0
FLUORIDE	0	mg/l	15	EPA 300.0
SODIUM	24	mg/l	0.5	EPA 200.0
POTASSIUM	3.4	mg/l	0.5	EPA 200.0
CALCIUM	70	mg/l	0.5	EPA 200.0
MAGNESIUM	22	mg/l	0.2	EPA 200.0
TOTAL DISSOLVED SOLIDS	388	mg/l	10	EPA 160.1
BALANCE	15.9%			

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
TOTAL DISSOLVED SOLIDS	6	--
CHLORIDE	1	99
NITRATE	<1	93
SULFATE	<1	88
CALCIUM	1	97
MAGNESIUM	<1	100
SODIUM	<1	104
POTASSIUM	2	107



LABORATORY NUMBER: 26213-1
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-4-1

DATE RECEIVED: 06/25/90
DATE ANALYZED: 07/02-05
DATE REPORTED: 07/13/90
PAGE 4 OF 4

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
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WET CHEMISTRY:

CARBONATE ALKALINITY	ND	mg/L as CaCO3	3	EPA 310.1
BICARBONATE ALKALINITY	360	mg/L as CaCO3	3	EPA 310.1
PHOSPHATE	ND	mg/L	7.5	EPA 300.0
IRON	0.3	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	ND	mg/L	10	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	<1	5
Accuracy (Spike % Recovery):	83	99	101

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
 3000 West MacArthur Boulevard, Santa Ana, California 92704
 (714) 662-4000

CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS

EBASCO



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Project Name SPL	Project Address PASADENA, CALIF.	Ebasco OFS #	Sampling Date: 6-25-90	HAZARD IDENTIFICATION: Reactive <input type="checkbox"/> Nonhazard <input checked="" type="checkbox"/> Toxic <input type="checkbox"/> Flammable <input type="checkbox"/> Infectious <input type="checkbox"/> Skin Irritant <input type="checkbox"/>	TURNAROUND TIME REQUIRED Normal <input checked="" type="checkbox"/> Rush <input type="checkbox"/>
Sampler: (Name) M. CUTLER	Shipment Date: 6-25-90				
Sampler: (Signature) M. Cutler	Shipping Number:				

Analysis Laboratory: CURTIS + TOMPKINS	ANALYSES REQUIRED EPA 624 Oil and Grease Halogenated Volatile Organics Aromatic Volatile Organics CAM Metals (17) Title 22 WET Test Chromium (Total) Chromium (Hexavalent) Lead Arsenic Zinc Mercury Total Sulfides Total Filterable Solids Total Dissolved Solids Nonhalogenated Volatile Organics PCB's Turpentine Polynuclear Aromatic Hydrocarbons Organophosphorus Pesticides Chlorinated Herbicides Routine Water Analysis Other <u>SEE COMMENTS</u> Other
California DHS Certification Number:	
Laboratory Contact: TONY / JACK	
Reports to Be Sent to: M. CUTLER	
Laboratory Instructions:	

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION			EPA 624	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other <u>SEE COMMENTS</u>	Other
					WATER	SOIL	OTHER (Describe)																								
EMW-4-1	2:35 PM	NONE TO HNO3	-	40 ML 4.00 LITER	X			X														X									X
EMW-4-1		---	---	---				X														X									X

COMMENTS: USE DRINKING WATER DETECTION LIMITS.

IN ADDITION TO ABOVE PLEASE DO TOTAL ORGANIC CARBON, Na, K, Ca, Mg, Fe, Cl, SO4, NO3, CO2, HCO3, F, PO4
 MASS BALANCE AND CHARGE BALANCE DONE BEFORE RESULTS ARE TABULATED, FOR ALL INORGANIC ANALYSES EXCEPT
 HCO3 AND CO3 FILTER WATER THROUGH 0.45 UM POLYCARBONATE NUCLEOPORE FILTER MEMBRANE, SOON AS POSSIBLE.
 CO2 AND HCO3 DONE AS

Relinquished by: (Signature) M. Cutler	Date: 6-25-90	Received by: (Signature) Keith Collins	Relinquished by: (Signature)	Date:	Received by: (Signature)
Company: EBASCO	Time: 4:45 PM	Company: C&T LABS	Company:	Time:	Company:



Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878

1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 06/26/90

DATE REPORTED: 07/13/90

PAGE 1 OF 16

LAB NUMBER: 26222

CLIENT: EBASCO SERVICES INCORPORATED

REPORT ON: FIVE WATER SAMPLES

PROJECT #: JPL

LOCATION: PASADENA

RESULTS: SEE ATTACHED

Reviewed By

Laboratory Director

LABORATORY NUMBER: 26222-1
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL PASADENA
 SAMPLE ID: EMW-4-2

 DATE RECEIVED: 06/26/90
 DATE ANALYZED: 07/07/90
 DATE REPORTED: 07/13/90
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 METHOD: EPA 624
 VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
		--ug/L--
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS		

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT		

1,2-Dichloroethane-d4	101	
Toluene-d8	103	
Bromofluorobenzene	111	



LABORATORY NUMBER: 26222-2
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL PASADENA
SAMPLE ID: EMW-4-3

DATE RECEIVED: 06/26/90
DATE ANALYZED: 07/07/90
DATE REPORTED: 07/13/90
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METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
		--ug/L--
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS		
acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT		
1,2-Dichloroethane-d4	99	
Toluene-d8	109	
Bromofluorobenzene	105	



LABORATORY NUMBER: 26222-3
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL PASADENA
SAMPLE ID: EMW-4-4

DATE RECEIVED: 06/26/90
DATE ANALYZED: 07/07/90
DATE REPORTED: 07/13/90
PAGE 4 OF 16

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
		--ug/L--
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS		

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT		

1,2-Dichloroethane-d4	102	
Toluene-d8	106	
Bromofluorobenzene	110	



LABORATORY NUMBER: 26222-4
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL PASADENA
SAMPLE ID: EMW-4-5

DATE RECEIVED: 06/26/90
DATE ANALYZED: 07/07/90
DATE REPORTED: 07/13/90
PAGE 5 OF 16

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	103
Toluene-d8	107
Bromofluorobenzene	110

LABORATORY NUMBER: 26222-5
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL PASADENA
 SAMPLE ID: EMW-3-1

DATE RECEIVED: 06/26/90
 DATE ANALYZED: 07/07/90
 DATE REPORTED: 07/13/90
 PAGE 6 OF 16

METHOD: EPA 624
 VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
		--ug/L--
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	44	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS		

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT		

1,2-Dichloroethane-d4	104	
Toluene-d8	105	
Bromofluorobenzene	112	



LABORATORY NUMBER: 26222-1
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-4-2

DATE RECEIVED: 06/26/90
DATE ANALYZED: 06/26-05
DATE REPORTED: 07/13/90
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ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY	300	mg/l as CaCO3	3	SMWW 406
CHLORIDE	41	mg/l	15	EPA 300.0
NITRATE	32	mg/l	5	EPA 300.0
SULFATE	50	mg/l	7.5	EPA 300.0
FLUORIDE	0	mg/l	1.0	EPA 300.0
SODIUM	30	mg/l	0.5	EPA 200.0
POTASSIUM	2.7	mg/l	0.5	EPA 200.0
CALCIUM	73	mg/l	0.5	EPA 200.0
MAGNESIUM	24	mg/l	0.2	EPA 200.0
TOTAL DISSOLVED SOLIDS	520	mg/l	10	EPA 160.1
BALANCE	8.7%			

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
TOTAL DISSOLVED SOLIDS	6	--
CHLORIDE	3	100
NITRATE	<1	83
SULFATE	<1	82
CALCIUM	1	97
MAGNESIUM	<1	100
SODIUM	<1	104
POTASSIUM	2	107



LABORATORY NUMBER: 26222-2
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL
 LOCATION: PASADENA
 SAMPLE ID: EMW-4-3

DATE RECEIVED: 06/26/90
 DATE ANALYZED: 06/26-05
 DATE REPORTED: 07/13/90
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ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY	300	mg/l as CaCO3	3	SMWW 406
CHLORIDE	11	mg/l	1.5	EPA 300.0
NITRATE	16	mg/l	5	EPA 300.0
SULFATE	6	mg/l	1.5	EPA 300.0
FLUORIDE	0.8	mg/l	0.2	EPA 300.0
SODIUM	33	mg/l	0.5	EPA 200.0
POTASSIUM	2.0	mg/l	0.5	EPA 200.0
CALCIUM	34	mg/l	0.5	EPA 200.0
MAGNESIUM	11	mg/l	0.2	EPA 200.0
TOTAL DISSOLVED SOLIDS	260	mg/l	10	EPA 160.1
BALANCE	32.0%			

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
TOTAL DISSOLVED SOLIDS	6	--
CHLORIDE	3	100
NITRATE	<1	83
SULFATE	<1	82
CALCIUM	1	97
MAGNESIUM	<1	100
SODIUM	<1	104
POTASSIUM	2	107



LABORATORY NUMBER: 26222-3
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-4-4

DATE RECEIVED: 06/26/90
DATE ANALYZED: 06/26-05
DATE REPORTED: 07/13/90
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ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY	300	mg/l as CaCO ₃	3	SMWW 406
CHLORIDE	9.2	mg/l	1.5	EPA 300.0
NITRATE	9.2	mg/l	5	EPA 300.0
SULFATE	11	mg/l	7.5	EPA 300.0
FLUORIDE	0	mg/l	1.0	EPA 300.0
SODIUM	42	mg/l	0.5	EPA 200.0
POTASSIUM	2.0	mg/l	0.5	EPA 200.0
CALCIUM	30	mg/l	0.5	EPA 200.0
MAGNESIUM	10	mg/l	0.2	EPA 200.0
TOTAL DISSOLVED SOLIDS	260	mg/l	10	EPA 160.1
BALANCE	27.8%			

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
TOTAL DISSOLVED SOLIDS	6	--
CHLORIDE	3	100
NITRATE	<1	83
SULFATE	<1	82
CALCIUM	1	97
MAGNESIUM	<1	100
SODIUM	<1	104
POTASSIUM	2	107



LABORATORY NUMBER: 26222-4
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL
 LOCATION: PASADENA
 SAMPLE ID: EMW-4-5

DATE RECEIVED: 06/26/90
 DATE ANALYZED: 06/26-05
 DATE REPORTED: 07/13/90
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ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY	340	mg/l as CaCO ₃	3	SMWW 406
CHLORIDE	7.7	mg/l	1.5	EPA 300.0
NITRATE	1.4	mg/l	1	EPA 300.0
SULFATE	18	mg/l	7.5	EPA 300.0
FLUORIDE	0.9	mg/l	0.2	EPA 300.0
SODIUM	49	mg/l	0.5	EPA 200.0
POTASSIUM	3.2	mg/l	0.5	EPA 200.0
CALCIUM	32	mg/l	0.5	EPA 200.0
MAGNESIUM	9.3	mg/l	0.2	EPA 200.0
TOTAL DISSOLVED SOLIDS	260	mg/l	10	EPA 160.1
BALANCE	30.7%			

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
TOTAL DISSOLVED SOLIDS	6	--
CHLORIDE	3	100
NITRATE	<1	83
SULFATE	<1	82
CALCIUM	1	97
MAGNESIUM	<1	100
SODIUM	<1	104
POTASSIUM	2	107



LABORATORY NUMBER: 26222-5
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL
 LOCATION: PASADENA
 SAMPLE ID: EMW-3-1

DATE RECEIVED: 06/26/90
 DATE ANALYZED: 06/26-05
 DATE REPORTED: 07/13/90
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ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY	350	mg/l as CaCO ₃	3	SMWW 406
CHLORIDE	28	mg/l	15	EPA 300.0
NITRATE	6.2	mg/l	5	EPA 300.0
SULFATE	56	mg/l	7.5	EPA 300.0
FLUORIDE	0	mg/l	1	EPA 300.0
SODIUM	23	mg/l	0.5	EPA 200.0
POTASSIUM	3.2	mg/l	0.5	EPA 200.0
CALCIUM	78	mg/l	0.5	EPA 200.0
MAGNESIUM	25	mg/l	0.2	EPA 200.0
TOTAL DISSOLVED SOLIDS	470	mg/l	10	EPA 160.1
BALANCE	10.2%			

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
TOTAL DISSOLVED SOLIDS	6	--
CHLORIDE	3	100
NITRATE	<1	83
SULFATE	<1	82
CALCIUM	1	97
MAGNESIUM	<1	100
SODIUM	<1	104
POTASSIUM	2	107



LABORATORY NUMBER: 26222-1
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-4-2

DATE RECEIVED: 06/26/90
DATE ANALYZED: 06/26-05
DATE REPORTED: 07/13/90
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ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
WET CHEMISTRY:				
CARBONATE ALKALINITY	ND	mg/L as CaCO3	3	EPA 310.1
BICARBONATE ALKALINITY	300	mg/L as CaCO3	3	EPA 310.1
PHOSPHATE	ND	mg/L	7.5	EPA 300.0
IRON	0.2	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	ND	mg/L	10	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	<1	<1
Accuracy (Spike % Recovery):	87	99	101



LABORATORY NUMBER: 26222-2
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-4-3

DATE RECEIVED: 06/26/90
DATE ANALYZED: 06/26-05
DATE REPORTED: 07/13/90
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ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
WET CHEMISTRY:				
CARBONATE ALKALINITY	ND	mg/L as CaCO3	3	EPA 310.1
BICARBONATE ALKALINITY	300	mg/L as CaCO3	3	EPA 310.1
PHOSPHATE	ND	mg/L	1.5	EPA 300.0
IRON	0.7	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	ND	mg/L	10	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	<1	<1
Accuracy (Spike % Recovery):	87	99	101



LABORATORY NUMBER: 26222-3
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-4-4

DATE RECEIVED: 06/26/90
DATE ANALYZED: 06/26-05
DATE REPORTED: 07/13/90
PAGE 14 OF 16

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
WET CHEMISTRY:				
CARBONATE ALKALINITY	ND	mg/L as CaCO3	3	EPA 310.1
BICARBONATE ALKALINITY	300	mg/L as CaCO3	3	EPA 310.1
PHOSPHATE	ND	mg/L	7.5	EPA 300.0
IRON	0.4	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	ND	mg/L	10	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	<1	<1
Accuracy (Spike % Recovery):	87	99	101



LABORATORY NUMBER: 26222-4
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-4-5

DATE RECEIVED: 06/26/90
DATE ANALYZED: 06/26-05
DATE REPORTED: 07/13/90
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ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
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WET CHEMISTRY:

CARBONATE ALKALINITY	ND	mg/L as CaCO3	3	EPA 310.1
BICARBONATE ALKALINITY	340	mg/L as CaCO3	3	EPA 310.1
PHOSPHATE	ND	mg/L	1.5	EPA 300.0
IRON	2.0	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	ND	mg/L	10	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	<1	<1
Accuracy (Spike % Recovery):	87	99	101



LABORATORY NUMBER: 26222-5
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA
SAMPLE ID: EMW-3-1

DATE RECEIVED: 06/26/90
DATE ANALYZED: 06/26-05
DATE REPORTED: 07/13/90
PAGE 16 OF 16

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
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WET CHEMISTRY:

CARBONATE ALKALINITY	ND	mg/L as CaCO3	3	EPA 310.1
BICARBONATE ALKALINITY	350	mg/L as CaCO3	3	EPA 310.1
PHOSPHATE	ND	mg/L	7.5	EPA 300.0
IRON	3.2	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	ND	mg/L	10	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	<1	<1
Accuracy (Spike % Recovery):	87	99	101

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
 3000 West MacArthur Boulevard, Santa Ana, California 92704
 (714) 662-4000

CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS

EBASCO



197

Project Name: JPL Project Address: MSADENA, CALIF. Ebasco OFS #: Sampler: (Name): M. CUTLER Sampler: (Signature): M. Cutler	Sampling Date: 6-26-90 Shipment Date: 6-26-90 Shipping Number:	HAZARD IDENTIFICATION: Reactive <input type="checkbox"/> Nonhazard <input checked="" type="checkbox"/> Toxic <input type="checkbox"/> Flammable <input type="checkbox"/> Infectious <input type="checkbox"/> Skin Irritant <input type="checkbox"/>	TURNAROUND TIME REQUIRED Normal <input checked="" type="checkbox"/> Rush <input type="checkbox"/>
---	--	---	--

Analysis Laboratory: CURTIS + TOMPKINS California DHS Certification Number: Laboratory Contact: JACK / TONY Reports to Be Sent to: M. CUTLER Laboratory Instructions:	ANALYSES REQUIRED
--	--------------------------

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION			EM 624	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other SEE COMMENTS	Other	
					WATER	SOIL	OTHER (Describe)																									
EMW-4-2	8:30 AM	NONE TO HNO ₂	-	40 ml (4) x 1.02L (1) x 1.02L (1)	X			X													X									X		
EMW-4-3	10:05 AM	NONE TO HNO ₂	-	" "	X			X													X										X	
EMW-4-4	11:25 AM	" "	-	" "	X			X													X										X	
EMW-4-5	1:00 pm	" "	-	" "	X			X													X										X	
EMW-3-1	4:15 pm	" "	-	" "	X			X													X										X	

COMMENTS: USE DRINKING WATER DETECTION LIMITS.
 IN ADDITION TO ABOVE ANALYZE FOR TOTAL ORGANIC CARBON, Na, K, Ca, Mg, Fe, Cl, SO₄, NO₂, CO₂, HCO₃, F, PO₄
 MASS BALANCE AND CHARGE BALANCE DONE BEFORE RESULTS ARE TABULATED. FOR ALL INORGANIC ANALYSES
 EXCEPT CO₂ AND HCO₃ FILTER WATER THROUGH 0.45 μm POLYCARBONATE NUCLEOPORE FILTER MEMBRANE.
 CO₂ AND HCO₃ TO BE DONE AS SOON AS SAMPLES ARE RECEIVED.

Relinquished by: (Signature) Mark G. Des	Date: 6-26-90	Received by: (Signature) Paul Mead	Relinquished by: (Signature)	Date:	Received by: (Signature)
--	-------------------------	--	------------------------------	-------	--------------------------

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
 3000 West MacArthur Boulevard, Santa Ana, California 92704
 (714) 662-4000

CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS

EBASCO



197

Project Name: <u>JPL</u> Project Address: <u>MSADENA, CALIF.</u> Ebasco OFS #: Sampler: (Name): <u>M. CUTLER</u> Sampler: (Signature): <u>M. Cutler</u>	Sampling Date: <u>6-26-90</u> Shipment Date: <u>6-26-90</u> Shipping Number:	HAZARD IDENTIFICATION: Reactive <input type="checkbox"/> Nonhazard <input checked="" type="checkbox"/> Toxic <input type="checkbox"/> Flammable <input type="checkbox"/> Infectious <input type="checkbox"/> Skin Irritant <input type="checkbox"/>	TURNAROUND TIME REQUIRED Normal <input checked="" type="checkbox"/> Rush <input type="checkbox"/>
---	--	--	---

Analysis Laboratory: <u>CURTIS + TOMPKINS</u> California DHS Certification Number: Laboratory Contact: <u>JACK FONG</u> Reports to Be Sent to: <u>M. CUTLER</u> Laboratory Instructions:	ANALYSES REQUIRED
--	-------------------

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION			EM 624	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other <u>SEE COMMENTS</u>	Other	
					WATER	SOIL	OTHER (Describe)																									
EMW-4-2	8:30 AM	NONE TO HNO ₂	-	40 ML (4) + 4 OZ. + 1 LITER	X			X													X									X		
EMW-4-3	10:05 AM	NONE TO HNO ₂	-	" "	X			X													X										X	
EMW-4-4	11:25 AM	" "	-	" "	X			X													X										X	
EMW-4-5	1:00 PM	" "	-	" "	X			X													X										X	
EMW-3-1	4:15 PM	" "	-	" "	X			X													X										X	

COMMENTS: USE DRINKING WATER DETECTION LIMITS.
 IN ADDITION TO ABOVE ANALYZE FOR TOTAL ORGANIC CARBON, Na, K, Ca, Mg, Fe, Cl, SO₄, NO₂, CO₂, HCO₃, F, PO₄
 MASS BALANCE AND CHARGE BALANCE DONE BEFORE RESULTS ARE TABULATED. FOR ALL INORGANIC ANALYSES
 EXCEPT CO₂ AND HCO₃ FILTER WATER THROUGH 0.45 μm POLYCARBONATE NUCLEOPORE FILTER MEMBRANE.
 CO₂ AND HCO₃ TO BE DONE AS SOON AS SAMPLES ARE RECEIVED.

Relinquished by: (Signature) <u>M. Cutler</u>	Date: <u>6-26-90</u>	Received by: (Signature) <u>[Signature]</u>	Relinquished by: (Signature)	Date:	Received by: (Signature)
Company: <u>EBASCO</u>	Time: <u>4:40 PM</u>	Company: <u>Curtis + Tompkins</u>	Company:	Time:	Company:



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DATE RECEIVED: 07/02/90
DATE REPORTED: 07/18/90
PAGE 1 OF 4

LAB NUMBER: 26245

CLIENT: EBASCO ENVIRONMENTAL

REPORT ON: ONE WATER SAMPLE

PROJECT #: JPL

LOCATION: PASADENA, CA

RESULTS: SEE ATTACHED

Reviewed By



Laboratory Director



LABORATORY NUMBER: 26245-1
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL PASADENA
SAMPLE ID: EMW-5-1

DATE RECEIVED: 07/02/90
DATE ANALYZED: 07/10/90
DATE REPORTED: 07/18/90
PAGE 2 OF 4

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	6	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	11	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	101 %
Toluene-d8	107 %
Bromofluorobenzene	114 %

LABORATORY NUMBER: 26245-1
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL
 LOCATION: PASADENA
 SAMPLE ID: EMW-5-1

DATE RECEIVED: 07/03/90
 DATE CORRECTED: 08/06/90
 DATE REPORTED: 08/06/90
 PAGE 3 OF 4

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
ALKALINITY*				
HCO3 as CaCO3	174 (244**)	mg/l	3	SMWW 406
CO3 as CaCO3	ND	mg/l	3	SMWW 406
CHLORIDE	15	mg/l	15	EPA 300.0
NITRATE	10	mg/l	5	EPA 300.0
SULFATE	31	mg/l	7.5	EPA 300.0
FLUORIDE	0.72	mg/l	0.30	EPA 300.0
SODIUM	18	mg/l	0.5	EPA 200.0
POTASSIUM	4.0	mg/l	0.5	EPA 200.0
CALCIUM	69	mg/l	0.5	EPA 200.0
MAGNESIUM	22	mg/l	0.2	EPA 200.0

BALANCE (ANALYTICAL) -25.6%

BALANCE (MATHEMATICAL) 0%

ND = NOT DETECTED (0 FOR CALCULATIONS)

* The alkalinity was re-analyzed on 8/6/90

** Mathematical alkalinity value assuming all alkalinity is bicarbonate

LABORATORY NUMBER: 26245-1
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL
 LOCATION: PASADENA, CA
 SAMPLE ID: EMW-5-1

DATE RECEIVED: 07/03/90
 DATE ANALYZED: 07/10-17
 DATE REPORTED: 07/18/90
 PAGE 4 of 4

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
WET CHEMISTRY:				
PHOSPHATE	ND	mg/L	7.5	EPA 300.0
IRON	1.3	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	ND	mg/L	10	EPA 9060

ND = NOT DETECTED

QA/QC DATA SUMMARY:

	PHOSPHATE	IRON	TOC
Precision (Relative % Difference):	<1	2	<1
Accuracy (Spike % Recovery):	84	102	NR

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
 3000 West MacArthur Boulevard, Santa Ana, California 92704
 (714) 662-4000

CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS

EBASCO



203

Project Name Project Address Ebasco OFS #	JPL PASADENA, CA	Sampling Date:	07/02/90	HAZARD IDENTIFICATION: Reactive <input type="checkbox"/> Nonhazard <input checked="" type="checkbox"/> Toxic <input type="checkbox"/> Flammable <input type="checkbox"/> Infectious <input type="checkbox"/> Skin Irritant <input type="checkbox"/>	TURNAROUND TIME REQUIRED Normal <input checked="" type="checkbox"/> Rush <input type="checkbox"/>
Sampler: (Name)	JONATHAN LEWIS EBASCO	Shipment Date:	07/02/90		
Sampler: (Signature)	<i>Jonathan Lewis</i>	Shipping Number			

Analysis Laboratory:				ANALYSES REQUIRED																										
California DHS Certification Number:				EPA 624	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	Other			
Laboratory Contact:																														
Reports to Be Sent to:																														
Laboratory Instructions:																														
SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	WATER	SOIL	OTHER (Describe)																							
EMW-5-1	1125	NONE TO HNO ₃		4-40ml VOA 17-40ml/iter	X			X									X											X		

COMMENTS: USE DRINKING WATER DETECTION LIMITS. IN ADDITION TO ABOVE ANALYZE FOR TOTAL ORGANIC CARBON (TOC), Na, K, Ca, Mg, Fe, Cl, SO₄, NO₃, CO₂, HCO₃, F, & PO₄. DO MASS BALANCE AND CHARGE BEFORE RESULTS ARE TABULATED. FOR ALL INORGANIC ANALYSES EXCEPT CO₂ AND HCO₃, FILTER THROUGH 0.45 μm POLYCARBONATE NUCLEOPORE FILTER MEMBRANE.
 NOTE: CO₂ AND HCO₃ TO BE DONE AS SOON AS SAMPLES ARE RECEIVED

Relinquished by: (Signature)	Date:	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
<i>Jonathan Lewis</i>	7/2/90	<i>[Signature]</i>			
any:	Time:	Company:	Company:	Company:	Company:
	14 ²				



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1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 07/03/90

DATE REPORTED: 07/18/90

PAGE 1 OF 7

LAB NUMBER: 26251

CLIENT: EBASCO SERVICES INC.

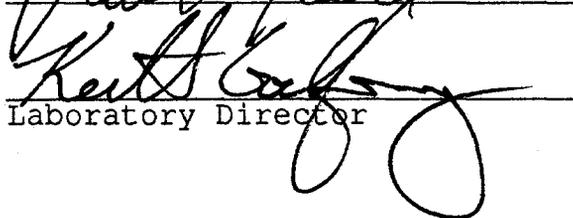
REPORT ON: TWO WATER SAMPLES

PROJECT #: JPL

LOCATION: PASADENA, CA

RESULTS: SEE ATTACHED

Reviewed By



Laboratory Director



LABORATORY NUMBER: 26251-1
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL, PASADENA, CA
SAMPLE ID: EMW-6-1

DATE RECEIVED: 07/03/90
DATE ANALYZED: 07/10/90
DATE REPORTED: 07/18/90
PAGE 2 OF 7

METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	ND	5
toluene	6	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS		

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT		

1,2-Dichloroethane-d4	84%	
Toluene-d8	99%	
Bromofluorobenzene	99%	

LABORATORY NUMBER: 26251-2
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL, PASADENA, CA
 SAMPLE ID: EMW-7-1

DATE RECEIVED: 07/03/90
 DATE ANALYZED: 07/10/90
 DATE REPORTED: 07/18/90
 PAGE 3 OF 7

METHOD: EPA 624
 VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
	--ug/L--	
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	6	5
1,1-dichloroethane	ND	5
1,2-dichloroethene (total)	ND	5
chloroform	19	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	*200	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	27	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethene	9	5
toluene	5	5
chlorobenzene	ND	5
ethyl benzene	ND	5

HSL COMPOUNDS

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	87%	* (1:2.5 Dilution)
Toluene-d8	97%	
Bromofluorobenzene	99%	



LABORATORY NUMBER: 26251-1
 CLIENT: EBASCO SERVICES INCORPORATED
 PROJECT #: JPL
 LOCATION: PASADENA, CA
 SAMPLE ID: EMW-6-1

DATE RECEIVED: 07/03/90
 DATE ANALYZED: 07/12-13
 DATE REPORTED: 07/18/90
 PAGE 4 OF 7

ANALYSIS	RESULT	UNITS	DETECTION METHOD LIMIT
ALKALINITY	300	mg/l as CaCO3	SMWW406
CHLORIDE	48	mg/L	15.0 EPA 300.0
NITRATE	32	mg/L	5.0 EPA 300.0
SULFATE	73	mg/L	7.5 EPA 300.0
FLUORIDE	ND	mg/L	1.5 EPA 300.0
SODIUM	27	mg/L	0.5 EPA 200.0
POTASSIUM	3	mg/L	0.5 EPA 200.0
CALCIUM	74	mg/L	0.5 EPA 200.0
MAGNESIUM	25	mg/L	0.2 EPA 200.0
TOTAL DISSOLVED SOLIDS	560	mg/L	10.0 EPA 160.1
BALANCE	17.1		

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
CHLORIDE	2	115
NITRATE	8	114
SULFATE	5	97
FLUORIDE	<1	108
SODIUM	1	98
POTASSIUM	1	101
CALCIUM	<1	89
MAGNESIUM	1	95
TOTAL DISSOLVED SOLIDS	1	---



LABORATORY NUMBER: 26251-2
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA, CA
SAMPLE ID: EMW-7-1

DATE RECEIVED: 07/03/90
DATE ANALYZED: 07/12-13
DATE REPORTED: 07/18/90
PAGE 5 OF 7

ANALYSIS	RESULT	UNITS	DETECTION METHOD LIMIT
ALKALINITY, TOTAL	320	mg/L as CaCO ₃	SMWW 406
CHLORIDE	18	mg/L	15.0 EPA 300.0
NITRATE	24	mg/L	5.0 EPA 300.0
SULFATE	31	mg/L	7.5 EPA 300.0
FLUORIDE	ND	mg/L	1.5 EPA 300.0
SODIUM	26	mg/L	0.5 EPA 200.0
POTASSIUM	3	mg/L	0.5 EPA 200.0
CALCIUM	45	mg/L	0.5 EPA 200.0
MAGNESIUM	16	mg/L	0.2 EPA 200.0
TOTAL DISSOLVED SOLIDS	310	mg/L	10.0 EPA 160.1
BALANCE	34.8		

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	RPD	RECOVERY
CHLORIDE	2	115
NITRATE	8	114
SULFATE	5	97
FLUORIDE	<1	108
SODIUM	1	98
POTASSIUM	1	101
CALCIUM	<1	89
MAGNESIUM	1	95
TOTAL DISSOLVED SOLIDS	1	---



LABORATORY NUMBER: 26251-1
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA, CA
SAMPLE ID: EMW-6-1

DATE RECEIVED: 07/03/90
DATE ANALYZED: 07/12/90
DATE REPORTED: 07/18/90
PAGE 6 OF 7

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
WET CHEMISTRY:				
CARBONATE ALKALINITY	ND	mg/L as Ca	3.0	EPA 310.1
BICARBONATE ALKALINITY	300	mg/L as Ca	3.0	EPA 310.1
PHOSPHATE	ND	mg/L	7.5	EPA 300.0
IRON	4	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	ND	mg/L	10.0	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	TOC	IRON	PHOSPHATE
Precision (Relative % Difference):	<1	<1	<1
Accuracy (Spike % Recovery):	---	97	86



LABORATORY NUMBER: 26251-2
CLIENT: EBASCO SERVICES INCORPORATED
PROJECT #: JPL
LOCATION: PASADENA, CA
SAMPLE ID: EMW-7-1

DATE RECEIVED: 07/03/90
DATE ANALYZED: 07/12/90
DATE REPORTED: 07/18/90
PAGE 7 OF 7

ANALYSIS	RESULT	UNITS	DETECTION LIMIT	METHOD
WET CHEMISTRY:				
CARBONATE ALKALINITY	ND	mg/L as Ca	3.0	EPA 310.1
BICARBONATE ALKALINITY	320	mg/L as Ca	3.0	EPA 310.1
PHOSPHATE	ND	mg/L	1.5	EPA 300.0
IRON	6	mg/L	0.1	EPA 6010
TOTAL ORGANIC CARBON	ND	mg/L	10.0	EPA 9060

ND = NOT DETECTED.

QA/QC DATA SUMMARY:

	TOC	IRON	PHOSPHATE
Precision (Relative % Difference):	<1	<1	<1
Accuracy (Spike % Recovery):	---	97	86

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
3000 West MacArthur Boulevard, Santa Ana, California 92704
(714) 662-4000

CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS

EBASCO



188

Project Name Project Address Ebasco OFS #	JPL PASADENA, CA	Sampling Date:	07 03 90	HAZARD IDENTIFICATION: Reactive <input type="checkbox"/> Toxic <input type="checkbox"/> Infectious <input type="checkbox"/> Nonhazard <input checked="" type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/>	TURNAROUND TIME REQUIRED Normal <input checked="" type="checkbox"/> Rush <input type="checkbox"/>
Sampler: (Name)	J. LEWIS	Shipment Date:	07 03 90		
Sampler: (Signature)	<i>Jonathan Lewis</i>	Shipping Number:			

Analysis Laboratory:	CURTIS & TOMPKINS	ANALYSES REQUIRED
California DHS Certification Number:		
Laboratory Contact:	JACK OR TONY	
Reports to Be Sent to:	M. CUTLER	
Laboratory Instructions:	SEE BELOW	

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION			EPA 624	Oil and Grease	Halogenated Volatile Organics	Aromatic Volatile Organics	CAM Metals (17)	Title 22 WET Test	Chromium (Total)	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other
					WATER	SOIL	OTHER (Describe)																							
EMW-6-1	1115 AM	NONE TO HNO3		4-40ml VBA 1-1 liter 1-4 oz	X			X														X							X	
EMW-7-1	4:30pm	" "		8-40ml VBA 1-1 liter 2-4 oz	X			X														X							X	

COMMENTS: USE DRINKING WATER DETECTION LIMITS. IN ADDITION TO ABOVE, ANALYZE FOR TOTAL ORGANIC CARBON (TOC), Na, K, Ca, Mg, Fe, Cl, SO4, NO3, CO2, HCO3, F, PO4. MASS BALANCE AND CHARGE BALANCE DONE BEFORE RESULTS ARE TABULATED, FOR ALL INORGANIC ANALYSES. EXCEPT CO2 & HCO3, FILTER WATER THROUGH 0.45µm POLYCARBONATE FILTER MEMBRANE. NOTE: CO2 & HCO3 TO BE DONE AS SOON AS SAMPLES ARE RECEIVED.

Relinquished by: (Signature)	Date: 070390	Received by: (Signature)	Relinquished by: (Signature)	Date:	Received by: (Signature)
<i>Jonathan Lewis</i>		<i>Paul [Signature]</i>			

SEE COMMENTS

APPENDIX D

LABORATORY ANALYTICAL REPORTS FROM RECENT

SURFACE SEDIMENT SAMPLING AND

RECENT SOIL SAMPLING



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

1250 S. Boyle Ave., Los Angeles, CA 90023, Phone (213) 269-7421, Fax (213) 268-5328

DATE RECEIVED: 10/05/90

DATE REPORTED: 10/18/90

PAGE 1 OF 56

LAB NUMBER: 200761

CLIENT: EBASCO SERVICES, INC.

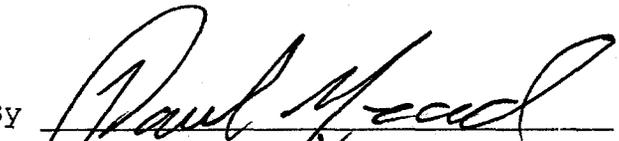
REPORT ON

PROJECT #: JPL 2006.001

LOCATION: JPL, PASADENA

RESULTS: SEE ATTACHED

Reviewed By




Laboratory Director



LABORATORY NUMBER: 200761
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/16/90
DATE REPORTED: 10/18/90
PAGE 2 OF 56

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS IN SOILS AND WASTES BY IR

LAB ID	SAMPLE ID	TPH (mg/Kg)
1	SD-01	ND (10)
2	SD-01D	14
3	SD-02	71
4	SD-03	56
5	SD-04	19
7	SS-01	ND (10)
8	SS-02	12
9	SS-02D	ND (10)
10	SS-03	29
11	SS-04	ND (10)

QA/QC DATA SUMMARY:

Precision (Relative % Difference): 3
Accuracy (Spike % Recovery): 100

LABORATORY NUMBER: 200761-1
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SD-01

DATE RECEIVED: 10/05/90
 DATE EXTRACTED: 10/09/90
 DATE ANALYZED: 10/09/90
 DATE REPORTED: 10/18/90
 PAGE 3 OF 56

METHOD: EPA 8080
 ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
 EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	PQL
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
4,4'-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Endosulfan Sulfate	ND	50
4,4'-DDD	ND	50
Endrin Aldehyde	ND	50
4,4'-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

PQL PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	14
Accuracy (Spike % Recovery)	94



LABORATORY NUMBER: 200761-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SD-01D

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/09/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
PAGE 4 OF 56

METHOD: EPA 8080
ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	PQL
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
4,4'-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Endosulfan Sulfate	ND	50
4,4'-DDD	ND	50
Endrin Aldehyde	ND	50
4,4'-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

PQL PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference) 14
Accuracy (Spike % Recovery) 94



LABORATORY NUMBER: 200761-3
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SD-02

DATE RECEIVED: 10/05/90
 DATE EXTRACTED: 10/09/90
 DATE ANALYZED: 10/09/90
 DATE REPORTED: 10/18/90
 PAGE 5 OF 56

METHOD: EPA 8080
 ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
 EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	PQL
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
4,4'-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Endosulfan Sulfate	ND	50
4,4'-DDD	ND	50
Endrin Aldehyde	ND	50
4,4'-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

PQL PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	14
Accuracy (Spike % Recovery)	94



LABORATORY NUMBER: 200761-4
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SD-03

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/09/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
PAGE 6 OF 56

METHOD: EPA 8080
ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	PQL
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
4,4'-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Endosulfan Sulfate	ND	50
4,4'-DDD	ND	50
Endrin Aldehyde	ND	50
4,4'-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

PQL PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	14
Accuracy (Spike % Recovery)	94

LABORATORY NUMBER: 200761-5
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SD-04

DATE RECEIVED: 10/05/90
 DATE EXTRACTED: 10/09/90
 DATE ANALYZED: 10/09/90
 DATE REPORTED: 10/18/90
 PAGE 7 OF 56

METHOD: EPA 8080
 ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
 EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	PQL
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
4,4'-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Endosulfan Sulfate	ND	50
4,4'-DDD	ND	50
Endrin Aldehyde	ND	50
4,4'-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

PQL PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	14
Accuracy (Spike % Recovery)	94



LABORATORY NUMBER: 200761-7
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-01

DATE RECEIVED: 10/05/90
 DATE EXTRACTED: 10/09/90
 DATE ANALYZED: 10/09/90
 DATE REPORTED: 10/18/90
 PAGE 8 OF 56

METHOD: EPA 8080
 ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
 EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	PQL
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
4,4'-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Endosulfan Sulfate	ND	50
4,4'-DDD	ND	50
Endrin Aldehyde	ND	50
4,4'-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

PQL PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	14
Accuracy (Spike % Recovery)	94



LABORATORY NUMBER: 200761-8
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-02

DATE RECEIVED: 10/05/90
 DATE EXTRACTED: 10/09/90
 DATE ANALYZED: 10/09/90
 DATE REPORTED: 10/18/90
 PAGE 9 OF 56

METHOD: EPA 8080
 ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
 EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	PQL
		--ug/Kg--
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
4,4'-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Endosulfan Sulfate	ND	50
4,4'-DDD	ND	50
Endrin Aldehyde	ND	50
4,4'-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

PQL PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference) 14
 Accuracy (Spike % Recovery) 94



LABORATORY NUMBER: 200761-9
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SS-02D

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/09/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
PAGE 10 OF 56

METHOD: EPA 8080
ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	PQL
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
4,4'-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Endosulfan Sulfate	ND	50
4,4'-DDD	ND	50
Endrin Aldehyde	ND	50
4,4'-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

PQL PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	14
Accuracy (Spike % Recovery)	94

LABORATORY NUMBER: 200761-10
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-03

DATE RECEIVED: 10/05/90
 DATE EXTRACTED: 10/09/90
 DATE ANALYZED: 10/09/90
 DATE REPORTED: 10/18/90
 PAGE 11 OF 56

METHOD: EPA 8080
 ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
 EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	PQL
	--ug/Kg--	
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
4,4'-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Endosulfan Sulfate	ND	50
4,4'-DDD	ND	50
Endrin Aldehyde	ND	50
4,4'-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

PQL PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference) 14
 Accuracy (Spike % Recovery) 94



LABORATORY NUMBER: 200761-11
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-04

DATE RECEIVED: 10/05/90
 DATE EXTRACTED: 10/09/90
 DATE ANALYZED: 10/09/90
 DATE REPORTED: 10/18/90
 PAGE 12 OF 56

METHOD: EPA 8080
 ORGANOCHLORINE PESTICIDES AND PCBS IN SOILS AND WASTES
 EXTRACTION METHOD: EPA 3550 SONICATION

COMPOUND	RESULT	PQL
		--ug/Kg--
alpha-BHC	ND	50
beta-BHC	ND	50
gamma-BHC	ND	50
delta-BHC	ND	50
Heptachlor	ND	50
Aldrin	ND	50
Heptachlor Epoxide	ND	50
Endosulfan I	ND	50
Dieldrin	ND	50
4,4'-DDE	ND	50
Endrin	ND	50
Endosulfan II	ND	50
Endosulfan Sulfate	ND	50
4,4'-DDD	ND	50
Endrin Aldehyde	ND	50
4,4'-DDT	ND	50
Chlordane	ND	500
Toxaphene	ND	500
Methoxychlor	ND	500
PCB 1016	ND	500
PCB 1221	ND	500
PCB 1232	ND	500
PCB 1242	ND	500
PCB 1248	ND	500
PCB 1254	ND	500
PCB 1260	ND	500

ND = NONE DETECTED.

PQL PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	14
Accuracy (Spike % Recovery)	94



LABORATORY NUMBER: 200761-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SD-01

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/12/90
DATE REPORTED: 10/18/90
PAGE 13 OF 56

METHOD: EPA 8240
VOLATILE ORGANICS IN SOIL

COMPOUND	RESULT	PQL
		--ug/Kg--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	102 %
Toluene-d8	109 %
Bromofluorobenzene	77 %



LABORATORY NUMBER: 200761-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SD-01D

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/13/90
DATE REPORTED: 10/18/90
PAGE 14 OF 56

METHOD: EPA 8240
VOLATILE ORGANICS IN SOIL

COMPOUND	RESULT	PQL
		--ug/Kg--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	106 %
Toluene-d8	114 %
Bromofluorobenzene	86 %



LABORATORY NUMBER: 200761-3
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SD-02

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/13/90
 DATE REPORTED: 10/18/90
 PAGE 15 OF 56

METHOD: EPA 8240
 VOLATILE ORGANICS IN SOIL

COMPOUND	RESULT	PQL
		--ug/Kg--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	103 %
Toluene-d8	110 %
Bromofluorobenzene	74 %



LABORATORY NUMBER: 200761-4
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SD-03

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/15/90
 DATE REPORTED: 10/18/90
 PAGE 16 OF 56

METHOD: EPA 8240
 VOLATILE ORGANICS IN SOIL

COMPOUND	RESULT	PQL
		--ug/Kg--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	98 %
Toluene-d8	114 %
Bromofluorobenzene	83 %



LABORATORY NUMBER: 200761-5
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SD-04

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/13/90
DATE REPORTED: 10/18/90
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METHOD: EPA 8240
VOLATILE ORGANICS IN SOIL

COMPOUND	RESULT	PQL
		--ug/Kg--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	110 %
Toluene-d8	108 %
Bromofluorobenzene	74 %



LABORATORY NUMBER: 200761-6
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SD-QA/QC

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/16/90
DATE REPORTED: 10/18/90
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METHOD: EPA 624
VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
	--ug/L--	
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	12	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	102 %
Toluene-d8	101 %
Bromofluorobenzene	101 %



LABORATORY NUMBER: 200761-7
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SS-01

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/13/90
DATE REPORTED: 10/18/90
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METHOD: EPA 8240
VOLATILE ORGANICS IN SOIL

COMPOUND	RESULT	PQL
		--ug/Kg--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	103 %
Toluene-d8	97 %
Bromofluorobenzene	95 %



LABORATORY NUMBER: 200761-8
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-02

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/15/90
 DATE REPORTED: 10/18/90
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METHOD: EPA 8240
 VOLATILE ORGANICS IN SOIL

COMPOUND	RESULT	PQL
		--ug/Kg--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	99 %
Toluene-d8	103 %
Bromofluorobenzene	99 %



LABORATORY NUMBER: 200761-9
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SS-02D

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/17/90
DATE REPORTED: 10/18/90
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METHOD: EPA 8240
VOLATILE ORGANICS IN SOIL

COMPOUND	RESULT	PQL
		--ug/Kg--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	98 %
Toluene-d8	110 %
Bromofluorobenzene	84 %

LABORATORY NUMBER: 200761-10
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-03

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/17/90
 DATE REPORTED: 10/18/90
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METHOD: EPA 8240
 VOLATILE ORGANICS IN SOIL

COMPOUND	RESULT	PQL
		--ug/Kg--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	100 %
Toluene-d8	108 %
Bromofluorobenzene	89 %



LABORATORY NUMBER: 200761-11
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-04

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/15/90
 DATE REPORTED: 10/18/90
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METHOD: EPA 8240
 VOLATILE ORGANICS IN SOIL

COMPOUND	RESULT	PQL
		--ug/Kg--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	101 %
Toluene-d8	101 %
Bromofluorobenzene	102 %



LABORATORY NUMBER: 200761-12
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-QA/QC

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/16/90
 DATE REPORTED: 10/18/90
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METHOD: EPA 624
 VOLATILE ORGANICS IN WATER

COMPOUND	RESULT	PQL
		--ug/L--
Chloromethane	ND	10
Bromomethane	ND	10
Vinyl chloride	ND	10
Chloroethane	ND	10
Methylene chloride	ND	5
Acetone	ND	10
Carbon disulfide	ND	5
Trichlorofluoromethane	ND	5
1,1-Dichloroethene	ND	5
1,1-Dichloroethane	ND	5
cis-1,2-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
Chloroform	ND	5
Freon 113	ND	5
1,2-Dichloroethane	ND	5
2-Butanone	ND	10
1,1,1-Trichloroethane	ND	5
Carbon tetrachloride	ND	5
Vinyl acetate	ND	10
Bromodichloromethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
Trichloroethylene	ND	5
Dibromochloromethane	ND	5
1,1,2-Trichloroethane	ND	5
Benzene	ND	5
trans-1,3-Dichloropropene	ND	5
2-Chloroethylvinyl ether	ND	10
Bromoform	ND	5
2-Hexanone	ND	10
4-Methyl-2-pentanone	ND	10
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
Chlorobenzene	ND	5
Ethyl benzene	ND	5
Styrene	ND	5
Total xylenes	ND	5

QA/QC SUMMARY: SURROGATE RECOVERIES PQL = PRACTICAL QUANTITATION LIMIT

1,2-Dichloroethane-d4	102 %
Toluene-d8	103 %
Bromofluorobenzene	106 %



LABORATORY NUMBER: 200761-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL PASADENA
SAMPLE ID: SD-01

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/08/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
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METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	PQL
		--ug/Kg--
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650

BASE/NEUTRAL COMPOUNDS

Bis(2-chloroethyl) ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl) ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy) methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

CONTINUED ON NEXT PAGE

LABORATORY NUMBER: 200761-1
SAMPLE ID: SD-01EPA 8270
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BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	PQL
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

HSL COMPOUNDS

Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

2-Fluorophenol	65 %
Phenol-d5	91 %
2,4,6-Tribromophenol	59 %
Nitrobenzene-d5	80 %
2-Fluorobiphenyl	80 %
Terphenyl-d14	80 %



LABORATORY NUMBER: 200761-2
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL PASADENA
SAMPLE ID: SD-01D

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/08/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
PAGE 27 OF 56

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	PQL
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650

BASE/NEUTRAL COMPOUNDS		

Bis(2-chloroethyl) ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl) ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy) methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

CONTINUED ON NEXT PAGE

LABORATORY NUMBER: 200761-2
 SAMPLE ID: SD-01D

 EPA 8270
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 BASE/NEUTRAL COMPOUNDS (CONT.)

RESULT

PQL

--ug/Kg--

4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

 HSL COMPOUNDS

Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

 ND = NONE DETECTED.

 QA/QC DATA SUMMARY:

2-Fluorophenol	64 %
Phenol-d5	90 %
2,4,6-Tribromophenol	57 %
Nitrobenzene-d5	80 %
2-Fluorobiphenyl	82 %
Terphenyl-d14	81 %



LABORATORY NUMBER: 200761-3
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL PASADENA
SAMPLE ID: SD-02

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/08/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
PAGE 29 OF 56

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	PQL
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650

BASE/NEUTRAL COMPOUNDS

Bis (2-chloroethyl) ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis (2-chloroisopropyl) ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis (2-chloroethoxy) methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

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LABORATORY NUMBER: 200761-3
SAMPLE ID: SD-02EPA 8270
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BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	PQL
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

HSL COMPOUNDS

Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

2-Fluorophenol	70 %
Phenol-d5	99 %
2,4,6-Tribromophenol	61 %
Nitrobenzene-d5	87 %
2-Fluorobiphenyl	84 %
Terphenyl-d14	89 %



LABORATORY NUMBER: 200761-4
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL PASADENA
SAMPLE ID: SD-03

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/08/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
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METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	PQL
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650

BASE/NEUTRAL COMPOUNDS

Bis (2-chloroethyl) ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis (2-chloroisopropyl) ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis (2-chloroethoxy) methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

CONTINUED ON NEXT PAGE

LABORATORY NUMBER: 200761-4
SAMPLE ID: SD-03EPA 8270
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BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	PQL
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

HSL COMPOUNDS

Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

2-Fluorophenol	75 %
Phenol-d5	99 %
2,4,6-Tribromophenol	62 %
Nitrobenzene-d5	83 %
2-Fluorobiphenyl	82 %
Terphenyl-d14	88 %



LABORATORY NUMBER: 200761-5
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL PASADENA
SAMPLE ID: SD-04

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/08/90
DATE ANALYZED: 10/10/90
DATE REPORTED: 10/18/90
PAGE 33 OF 56

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	PQL
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650

BASE/NEUTRAL COMPOUNDS

Bis (2-chloroethyl) ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis (2-chloroisopropyl) ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis (2-chloroethoxy) methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

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LABORATORY NUMBER: 200761-5
SAMPLE ID: SD-04EPA 8270
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BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	PQL
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

HSL COMPOUNDS

Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

QA/QC DATA SUMMARY:

2-Fluorophenol	80 %
Phenol-d5	91 %
2,4,6-Tribromophenol	95 %
Nitrobenzene-d5	97 %
2-Fluorobiphenyl	85 %
Terphenyl-d14	87 %



LABORATORY NUMBER: 200761-7
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL PASADENA
SAMPLE ID: SS-01

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/08/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
PAGE 35 OF 56

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	PQL
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650

BASE/NEUTRAL COMPOUNDS

Bis(2-chloroethyl) ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl) ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy) methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

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LABORATORY NUMBER: 200761-7
 SAMPLE ID: SS-01

 EPA 8270
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 BASE/NEUTRAL COMPOUNDS (CONT.)

RESULT

PQL

--ug/Kg--

4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

 HSL COMPOUNDS

Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

QA/QC DATA SUMMARY: -----

2-Fluorophenol	82 %
Phenol-d5	91 %
2,4,6-Tribromophenol	90 %
Nitrobenzene-d5	97 %
2-Fluorobiphenyl	88 %
Terphenyl-d14	97 %



LABORATORY NUMBER: 200761-8
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL PASADENA
SAMPLE ID: SS-02

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/08/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
PAGE 37 OF 56

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS

RESULT

PQL

--ug/Kg--

Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650

BASE/NEUTRAL COMPOUNDS

Bis (2-chloroethyl) ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis (2-chloroisopropyl) ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis (2-chloroethoxy) methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

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LABORATORY NUMBER: 200761-8
 SAMPLE ID: SS-02

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 BASE/NEUTRAL COMPOUNDS (CONT.)

RESULT

PQL

 --ug/Kg--

4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

 HSL COMPOUNDS

Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

 QA/QC DATA SUMMARY:

2-Fluorophenol	87 %
Phenol-d5	95 %
2,4,6-Tribromophenol	87 %
Nitrobenzene-d5	97 %
2-Fluorobiphenyl	98 %
Terphenyl-d14	95 %



LABORATORY NUMBER: 200761-9
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL PASADENA
SAMPLE ID: SS-02D

DATE RECEIVED: 10/05/90
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DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
PAGE 39 OF 56

METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS

RESULT

PQL

--ug/Kg--

Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650

BASE/NEUTRAL COMPOUNDS

Bis (2-chloroethyl) ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis (2-chloroisopropyl) ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis (2-chloroethoxy) methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

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LABORATORY NUMBER: 200761-9
SAMPLE ID: SS-02DEPA 8270
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BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	PQL
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

HSL COMPOUNDS		

Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.		

QA/QC DATA SUMMARY:		

2-Fluorophenol	67 %	
Phenol-d5	90 %	
2,4,6-Tribromophenol	57 %	
Nitrobenzene-d5	85 %	
2-Fluorobiphenyl	82 %	
Terphenyl-d14	84 %	



LABORATORY NUMBER: 200761-10
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL PASADENA
SAMPLE ID: SS-03

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/08/90
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DATE REPORTED: 10/18/90
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METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	PQL
		--ug/Kg--
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650

BASE/NEUTRAL COMPOUNDS		

Bis (2-chloroethyl) ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis (2-chloroisopropyl) ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis (2-chloroethoxy) methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

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LABORATORY NUMBER: 200761-10
SAMPLE ID: SS-03EPA 8270
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BASE/NEUTRAL COMPOUNDS (CONT.)	RESULT	PQL
	--ug/Kg--	
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

HSL COMPOUNDS		
Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.		

QA/QC DATA SUMMARY:		
2-Fluorophenol	67	⊘
Phenol-d5	93	⊘
2,4,6-Tribromophenol	59	⊘
Nitrobenzene-d5	88	⊘
2-Fluorobiphenyl	81	⊘
Terphenyl-d14	89	⊘



LABORATORY NUMBER: 200761-11
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL PASADENA
SAMPLE ID: SS-04

DATE RECEIVED: 10/05/90
DATE EXTRACTED: 10/08/90
DATE ANALYZED: 10/09/90
DATE REPORTED: 10/18/90
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METHOD: EPA 8270
BASE/NEUTRAL AND ACID EXTRACTABLES IN SOIL
EXTRACTION: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT	PQL
	--ug/Kg--	
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1,650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	330
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1,650
4-Nitrophenol	ND	1,650
4,6-Dinitro-2-methylphenol	ND	1,650
Pentachlorophenol	ND	1,650

BASE/NEUTRAL COMPOUNDS

Bis(2-chloroethyl) ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl) ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy) methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

CONTINUED ON NEXT PAGE



LABORATORY NUMBER: 200761-11
 SAMPLE ID: SS-04

EPA 8270
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 BASE/NEUTRAL COMPOUNDS (CONT.)

RESULT

PQL

 --ug/Kg--

4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1,650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	330
Dibenzo (a,h) anthracene	ND	330
Benzo (g,h,i) perylene	ND	330

 HSL COMPOUNDS

Benzoic Acid	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650

ND = NONE DETECTED.

 QA/QC DATA SUMMARY:

2-Fluorophenol	63 %
Phenol-d5	89 %
2,4,6-Tribromophenol	57 %
Nitrobenzene-d5	83 %
2-Fluorobiphenyl	82 %
Terphenyl-d14	80 %



LABORATORY NUMBER: 200761-1
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SD-01

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/10-12
DATE REPORTED: 10/18/90
PAGE 45 OF 56

METHODS: EPA 6010/7000
CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS	
		10 x STLC	TTLC
--mg/Kg--			
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	23	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	0.5	10	100
Chromium	2.8	5,600	2,500
Cobalt	2.6	800	8,000
Copper	5.3	250	2,500
Lead	16	50	1,000
Mercury	ND (0.10)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	1.2	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	6.3	240	2,400
Zinc	18	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	106	Mercury	10	92
Arsenic	6	101	Molybdenum	1	101
Barium	2	104	Nickel	2	106
Beryllium	<1	107	Selenium	8	104
Cadmium	1	102	Silver	2	96
Chromium	2	107	Thallium	4	103
Cobalt	2	108	Vanadium	<1	106
Copper	2	106	Zinc	<1	109
Lead	12	103			

LABORATORY NUMBER: 200761-2
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SD-01D

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/10-12
 DATE REPORTED: 10/18/90
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METHODS: EPA 6010/7000
 CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS	
		10 x STLC	TTLC
--mg/Kg--			
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	22	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	ND (0.5)	10	100
Chromium	2.8	5,600	2,500
Cobalt	2.5	800	8,000
Copper	5.3	250	2,500
Lead	5.5	50	1,000
Mercury	ND (0.10)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	ND (0.5)	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	5.6	240	2,400
Zinc	16	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	106	Mercury	10	92
Arsenic	6	101	Molybdenum	1	101
Barium	2	104	Nickel	2	106
Beryllium	<1	107	Selenium	8	104
Cadmium	1	102	Silver	2	96
Chromium	2	107	Thallium	4	103
Cobalt	2	108	Vanadium	<1	106
Copper	2	106	Zinc	<1	109
Lead	12	103			



LABORATORY NUMBER: 200761-3
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SD-02

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/10-12
 DATE REPORTED: 10/18/90
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METHODS: EPA 6010/7000
 CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS	
		10 x STLC	TTLIC
		--mg/Kg--	
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	41	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	0.76	10	100
Chromium	4.6	5,600	2,500
Cobalt	3.9	800	8,000
Copper	13	250	2,500
Lead	15	50	1,000
Mercury	ND (0.10)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	3.4	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	9.6	240	2,400
Zinc	37	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	106	Mercury	10	92
Arsenic	6	101	Molybdenum	1	101
Barium	2	104	Nickel	2	106
Beryllium	<1	107	Selenium	8	104
Cadmium	1	102	Silver	2	96
Chromium	2	107	Thallium	4	103
Cobalt	2	108	Vanadium	<1	106
Copper	2	106	Zinc	<1	109
Lead	12	103			



LABORATORY NUMBER: 200761-4
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SD-03

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/10-12
 DATE REPORTED: 10/18/90
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METHODS: EPA 6010/7000
 CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS	
		10 x STLC	TTLIC
		--mg/Kg--	
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	75	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	1.2	10	100
Chromium	8.0	5,600	2,500
Cobalt	7.2	800	8,000
Copper	18	250	2,500
Lead	36	50	1,000
Mercury	0.13	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	4.5	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	18	240	2,400
Zinc	69	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	106	Mercury	10	92
Arsenic	6	101	Molybdenum	1	101
Barium	2	104	Nickel	2	106
Beryllium	<1	107	Selenium	8	104
Cadmium	1	102	Silver	2	96
Chromium	2	107	Thallium	4	103
Cobalt	2	108	Vanadium	<1	106
Copper	2	106	Zinc	<1	109
Lead	12	103			

LABORATORY NUMBER: 200761-5
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SD-04

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/10-12
 DATE REPORTED: 10/18/90
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METHODS: EPA 6010/7000
 CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS	
		10 x STLC	TTLC
			--mg/Kg--
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	75	1,000	10,000
Beryllium	0.56	7.5	75
Cadmium	1.2	10	100
Chromium	8.4	5,600	2,500
Cobalt	7.3	800	8,000
Copper	16	250	2,500
Lead	26	50	1,000
Mercury	0.12	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	4.3	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	19	240	2,400
Zinc	48	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	106	Mercury	10	92
Arsenic	6	101	Molybdenum	1	101
Barium	2	104	Nickel	2	106
Beryllium	<1	107	Selenium	8	104
Cadmium	1	102	Silver	2	96
Chromium	2	107	Thallium	4	103
Cobalt	2	108	Vanadium	<1	106
Copper	2	106	Zinc	<1	109
Lead	12	103			



LABORATORY NUMBER: 200761-7
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA
SAMPLE ID: SS-01

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/10-12
DATE REPORTED: 10/18/90
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METHODS: EPA 6010/7000
CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS	
		10 x STLC	TTLIC
		--mg/Kg--	
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	170	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	1.2	10	100
Chromium	2.6	5,600	2,500
Cobalt	8.5	800	8,000
Copper	6.1	250	2,500
Lead	ND (2.5)	50	1,000
Mercury	ND (0.10)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	1.8	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	15	240	2,400
Zinc	45	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	106	Mercury	10	92
Arsenic	6	101	Molybdenum	1	101
Barium	2	104	Nickel	2	106
Beryllium	<1	107	Selenium	8	104
Cadmium	1	102	Silver	2	96
Chromium	2	107	Thallium	4	103
Cobalt	2	108	Vanadium	<1	106
Copper	2	106	Zinc	<1	109
Lead	12	103			

LABORATORY NUMBER: 200761-8
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-02

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/10-12
 DATE REPORTED: 10/18/90
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METHODS: EPA 6010/7000
 CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS	
		10 x STLC	TTLc
--mg/Kg--			
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	78	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	ND (0.5)	10	100
Chromium	2.3	5,600	2,500
Cobalt	4.7	800	8,000
Copper	6.0	250	2,500
Lead	4.9	50	1,000
Mercury	ND (0.10)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	1.8	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	7.5	240	2,400
Zinc	33	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	106	Mercury	10	92
Arsenic	6	101	Molybdenum	1	101
Barium	2	104	Nickel	2	106
Beryllium	<1	107	Selenium	8	104
Cadmium	1	102	Silver	2	96
Chromium	2	107	Thallium	4	103
Cobalt	2	108	Vanadium	<1	106
Copper	2	106	Zinc	<1	109
Lead	12	103			



LABORATORY NUMBER: 200761-9
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-02D

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/10-12
 DATE REPORTED: 10/18/90
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METHODS: EPA 6010/7000
 CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS	
		10 x STLC	TTLIC
			--mg/Kg--
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	110	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	0.65	10	100
Chromium	2.6	5,600	2,500
Cobalt	5.6	800	8,000
Copper	6.3	250	2,500
Lead	8.0	50	1,000
Mercury	ND (0.10)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	1.9	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	11	240	2,400
Zinc	29	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	106	Mercury	10	92
Arsenic	6	101	Molybdenum	1	101
Barium	2	104	Nickel	2	106
Beryllium	<1	107	Selenium	8	104
Cadmium	1	102	Silver	2	96
Chromium	2	107	Thallium	4	103
Cobalt	2	108	Vanadium	<1	106
Copper	2	106	Zinc	<1	109
Lead	12	103			

LABORATORY NUMBER: 200761-10
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-03

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/10-12
 DATE REPORTED: 10/18/90
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METHODS: EPA 6010/7000
 CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS	
		10 x STLC	TTLc
--mg/Kg--			
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	31	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	0.71	10	100
Chromium	4.9	5,600	2,500
Cobalt	3.6	800	8,000
Copper	7.0	250	2,500
Lead	11	50	1,000
Mercury	ND (0.10)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	2.2	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	6.8	240	2,400
Zinc	69	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	106	Mercury	10	92
Arsenic	6	101	Molybdenum	1	101
Barium	2	104	Nickel	2	106
Beryllium	<1	107	Selenium	8	104
Cadmium	1	102	Silver	2	96
Chromium	2	107	Thallium	4	103
Cobalt	2	108	Vanadium	<1	106
Copper	2	106	Zinc	<1	109
Lead	12	103			

LABORATORY NUMBER: 200761-11
 CLIENT: EBASCO SERVICES, INC.
 PROJECT #: JPL 2006.001
 LOCATION: JPL, PASADENA
 SAMPLE ID: SS-04

DATE RECEIVED: 10/05/90
 DATE ANALYZED: 10/10-12
 DATE REPORTED: 10/18/90
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METHODS: EPA 6010/7000
 CAC TITLE 22 METALS

ELEMENT	RESULT	REGULATORY LIMITS	
		10 x STLC	TTLIC
		--mg/Kg--	
Antimony	ND (5.0)	150	500
Arsenic	ND (2.5)	50	500
Barium	30	1,000	10,000
Beryllium	ND (0.5)	7.5	75
Cadmium	0.62	10	100
Chromium	2.7	5,600	2,500
Cobalt	2.7	800	8,000
Copper	5.2	250	2,500
Lead	ND (2.5)	50	1,000
Mercury	ND (0.10)	2	20
Molybdenum	ND (0.5)	3,500	3,500
Nickel	1.1	200	2,000
Selenium	ND (2.5)	10	100
Silver	ND (1.0)	50	500
Thallium	ND (5.0)	70	700
Vanadium	5.9	240	2,400
Zinc	18	2,500	5,000

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES.

QA/QC DATA SUMMARY:

	RPD	SPIKE		RPD	SPIKE
Antimony	<1	106	Mercury	10	92
Arsenic	6	101	Molybdenum	1	101
Barium	2	104	Nickel	2	106
Beryllium	<1	107	Selenium	8	104
Cadmium	1	102	Silver	2	96
Chromium	2	107	Thallium	4	103
Cobalt	2	108	Vanadium	<1	106
Copper	2	106	Zinc	<1	109
Lead	12	103			



LABORATORY NUMBER: 200761
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/15/90
DATE REPORTED: 10/18/90
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TOTAL STRONTIUM ANALYSIS IN SOIL AND WASTE, EPA 7000 SERIES

LAB ID	SAMPLE ID	STRONTIUM mg/Kg
1	SD-01	20
2	SD-01D	21
3	SD-02	21
4	SD-03	61
5	SD-04	56
7	SS-01	21
8	SS-02	14
9	SS-02D	19
10	SS-03	13
11	SS-04	20

LIMIT OF DETECTION = 5.0 mg/Kg.

QA/QC DATA SUMMARY:

Precision (Relative % Difference)	4
Accuracy (Spike % Recovery)	96



LABORATORY NUMBER: 200761
CLIENT: EBASCO SERVICES, INC.
PROJECT #: JPL 2006.001
LOCATION: JPL, PASADENA

DATE RECEIVED: 10/05/90
DATE ANALYZED: 10/17/90
DATE REPORTED: 10/18/90
PAGE 56 OF 56

TOTAL CYANIDE
METHOD: EPA 9010

LAB ID	SAMPLE ID	RESULT	UNITS	PQL
1	SD-01	ND	mg/Kg	0.3
2	SD-01D	ND	mg/Kg	0.3
3	SD-02	ND	mg/Kg	0.3
4	SD-03	ND	mg/Kg	0.3
5	SD-04	0.4	mg/Kg	0.3
7	SS-01	ND	mg/Kg	0.3
8	SS-02	ND	mg/Kg	0.3
9	SS-02D	ND	mg/Kg	0.3
10	SS-03	ND	mg/Kg	0.3
11	SS-04	ND	mg/Kg	0.3

ND = NOT DETECTED.

PQL = PRACTICAL QUANTITATION LIMIT

QA/QC DATA SUMMARY:

Precision (Relative % Difference) 2
Accuracy (Spike % Recovery): 100

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
 3000 West MacArthur Boulevard, Santa Ana, California 92704
 (714) 662-4000

CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS

EBASCO



227

Project Name JPL-HRS Data Acquisition/Cwo #9 Project Address Pasadena, CA Ebasco OFS # JPL 2006-001	Sampling Date: 10-5-90 Shipment Date: 10-5-90 Shipping Number: _____	HAZARD IDENTIFICATION: Reactive <input type="checkbox"/> Nonhazard <input checked="" type="checkbox"/> Toxic <input type="checkbox"/> Flammable <input type="checkbox"/> Infectious <input type="checkbox"/> Skin Irritant <input type="checkbox"/>	TURNAROUND TIME REQUIRED Normal <input checked="" type="checkbox"/> Rush <input type="checkbox"/>
Sampler: (Name) Hans Papengeth	Sampler: (Signature) <i>Hans Papengeth</i>	ANALYSES REQUIRED	

Analysis Laboratory: **Curtis and Tompkins**

California DHS Certification Number: _____

Laboratory Contact: **Tony, Jack**

Reports to Be Sent to: **Mark Cutler**

Laboratory Instructions: **see below**

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION			Title 26 metals	Strontium	Volatile organics	Semivolatile organics	Pesticides/PCBs	TPH	Cyanide	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfoxides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCBs	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	Other		
					WATER	SOIL	OTHER (Describe)																										
SD-01	11:50	ice	-	2" x 6" ss sleeve		✓		✓	✓	✓	✓	✓	✓																				
SD-01D	11:55	"	-	"		✓		✓	✓	✓	✓	✓	✓																				
SD-02	9:35	"	-	"		✓		✓	✓	✓	✓	✓	✓																				
SD-03	9:00	"	-	"		✓		✓	✓	✓	✓	✓	✓																				
SD-04	8:30	"	-	"		✓		✓	✓	✓	✓	✓	✓																				
SD-GA/QC		"	-	2 VOA vials	✓				✓																								

COMMENTS: **Title 26 metals (EPA 6010/7000)**
Strontium (EPA 7000)
volatile organics (8240/624)
Semivolatile organics (8270)

Pesticides and PCBs (EPA 8080)
total petroleum hydrocarbons (EPA 418.1)
cyanide (EPA 335.2)

Relinquished by: (Signature) <i>Hans W Papengeth</i>	Date: 10/5/90	Received by: (Signature) <i>Paul Mead</i>	Relinquished by: (Signature)	Date:	Received by: (Signature)
Company: Ebasco	Time: 12:35	Company: Curtis & Tompkins	Company:	Time:	Company:

EBASCO SERVICES INCORPORATED / ENVIROSPHERE DIVISION
 3000 West MacArthur Boulevard, Santa Ana, California 92704
 (714) 662-4000

CHAIN OF CUSTODY RECORD REQUEST FOR ANALYSIS

EBASCO



228

Project Name JPL-HRS Data Acquisition/CWO #9 Project Address Pasadena, CA Ebasco OFS # JPL 2006.001	Sampling Date: 10-5-90	HAZARD IDENTIFICATION: Reactive <input type="checkbox"/> Nonhazard <input checked="" type="checkbox"/> Toxic <input type="checkbox"/> Flammable <input type="checkbox"/> Infectious <input type="checkbox"/> Skin Irritant <input type="checkbox"/>	TURNAROUND TIME REQUIRED Normal <input checked="" type="checkbox"/> Rush <input type="checkbox"/>
Sampler: (Name) Hans Papengeth	Shipment Date: 10-5-90		
Sampler: (Signature) <i>Hans Papengeth</i>	Shipping Number: _____		

Analysis Laboratory: Curtis and Tompkins	ANALYSES REQUIRED																																																
California DHS Certification Number: _____	<table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <tr> <td style="width: 10%;">Title 26 Metals</td> <td style="width: 10%;">Strontium</td> <td style="width: 10%;">Volatile Organics</td> <td style="width: 10%;">Semi-volatile Organics</td> <td style="width: 10%;">Pesticides/PCBs</td> <td style="width: 10%;">TPH</td> <td style="width: 10%;">Cyanide</td> <td style="width: 10%;">Chromium (Hexavalent)</td> <td style="width: 10%;">Lead</td> <td style="width: 10%;">Arsenic</td> <td style="width: 10%;">Zinc</td> <td style="width: 10%;">Mercury</td> <td style="width: 10%;">Total Sulfides</td> <td style="width: 10%;">Total Filterable Solids</td> <td style="width: 10%;">Total Dissolved Solids</td> <td style="width: 10%;">Nonhalogenated Volatile Organics</td> <td style="width: 10%;">PCB's</td> <td style="width: 10%;">Turpentine</td> <td style="width: 10%;">Polynuclear Aromatic Hydrocarbons</td> <td style="width: 10%;">Organophosphorus Pesticides</td> <td style="width: 10%;">Chlorinated Herbicides</td> <td style="width: 10%;">Routine Water Analysis</td> <td style="width: 10%;">Other</td> <td style="width: 10%;">Other</td> </tr> <tr> <td> </td><td> </td></tr> </table>	Title 26 Metals	Strontium	Volatile Organics	Semi-volatile Organics	Pesticides/PCBs	TPH	Cyanide	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	Other																								
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Laboratory Contact: Tony; Jack																																																	
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Laboratory Instructions: see below																																																	

SAMPLE NUMBER	TIME COLLECTED	SAMPLE PRESERVATIVE(S)	SAMPLE TAG NUMBER	CONTAINER SIZE AND TYPE	SAMPLE DESCRIPTION			Title 26 Metals	Strontium	Volatile Organics	Semi-volatile Organics	Pesticides/PCBs	TPH	Cyanide	Chromium (Hexavalent)	Lead	Arsenic	Zinc	Mercury	Total Sulfides	Total Filterable Solids	Total Dissolved Solids	Nonhalogenated Volatile Organics	PCB's	Turpentine	Polynuclear Aromatic Hydrocarbons	Organophosphorus Pesticides	Chlorinated Herbicides	Routine Water Analysis	Other	Other		
					WATER	SOIL	OTHER (Describe)																										
SS-01	12:20	ice	—	2" x 6" SS sleeve		✓		✓	✓	✓	✓	✓	✓	✓																			
SS-02	10:10	"	—	"		✓		✓	✓	✓	✓	✓	✓	✓																			
SS-02D	10:20	"	—	"		✓		✓	✓	✓	✓	✓	✓	✓																			
SS-03	11:00	"	—	"		✓		✓	✓	✓	✓	✓	✓	✓																			
SS-04	11:20	"	—	"		✓		✓	✓	✓	✓	✓	✓	✓																			
SS-QA/QC		"	—	2 VOA vials	✓			✓																									

COMMENTS: Title 26 metals (EPA 6010/7000) Pesticides and PCBs (EPA 8080)
 Strontium (EPA 7000) Total petroleum hydrocarbons (EPA 418.1)
 Volatile organics (EPA 8240/624) Cyanide (EPA 335.2)
 Semivolatile Organics (EPA 8270)

Relinquished by: (Signature) <i>Hans W. Papengeth</i>	Date: 10/5/90	Received by: (Signature) <i>Paul Hood</i>	Relinquished by: (Signature)	Date:	Received by: (Signature)
Company: EBASCO	Time: 2:30	Company: Curtis and Tompkins	Company:	Time:	Company:

APPENDIX E

HISTORIC RESOURCES INVENTORY

The following list of cultural heritage landmarks, points of historical interest, and national registered historic places is a compilation of data obtained from the following:

- o City of Pasadena, Urban Conservation Department
- o Altadena Chamber of Commerce
- o La Canada Flintridge Chamber of Commerce
- o California Department of Parks and Recreation,
Office of Historic Preservation
- o U.S. Department of the Interior, National Park Service,
National Register of Historic Places

CITY OF PASADENA

CULTURAL HERITAGE LANDMARKS

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DESIGNATION DATE</u>	<u>NO.</u>
Arroyo Seco	Holly Street Bridge south to South Pasadena border	4/12/79	21
Banbury House	209 Carlton Unknown 1888	9/15/86	29
Batchelder House	626 South Arroyo Boulevard Ernest A. Batchelder 1910	8/10/76	1
Black Residence	877 Lincoln Avenue Unknown 1890	4/6/87	41
Blinn, Edmund House	160 North Oakland Avenue George Maher 1905	5/31/77	16
Casa del Mar Apartments	306 South El Molino Avenue Richard A. Hill	1/5/87	36
Church of the Angels	1100 North Avenue 64 Arthur Edmond Street & Ernest A. Coxhead 1889	4/18/78	19

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DESIGNATION DATE</u>	<u>NO.</u>
Church of Truth	690 East Orange Grove Blvd. 1912 - Unknown 1939 - H. A. Reuter	4/6/87	42
City Hall	100 North Garfield Avenue Bakewell and Brown Jan. 1926 - Dec. 1927	8/10/76	2
Civic Auditorium	300 East Green Street Bergstrom, Bennett & Haskell 1932	8/10/76	3
Clapp House	549 La Loma Road Probably Jabez Banbury 1874	8/10/76	4
Colorado Street Bridge	Colorado Boulevard Waddell & Harrington of Kansas City, Engineers 1913	8/10/76	5
Fenyés Estate	470 West Walnut Street Robert D. Farquhar (1905) & Sylvanus B. Marston (1911) 1900 (Addition 1911)	2/3/81	25
Friendship Baptist Church	80 West Dayton Avenue Norman Foote Marsh 1925	2/7/78	18
Gamble House & Garage	4 Westmoreland Place Greene and Greene 1908	8/10/76	6
Gartz Court	745 North Pasadena Avenue Unknown 1910	8/28/84	26
Gilman, Charlotte Perkins House	239 South Catalina Avenue ca. 1900	3/12/80	23
Grace United Methodist Church	119-121 East Washington Blvd. C. A. Dudley 1905	9/15/86	30
Hen's Teeth Square	2053-57 N. Los Robles Ave. Theodore Pletsch 1930	8/28/84	27

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DESIGNATION DATE</u>	<u>NO.</u>
Hermitage, The	2121 Monte Vista Street Unknown c.1870 (adobe)	8/10/76	7
Hill Street Library	55 South Hill Street Marston, Van Pelt & Maybury 1925	1/5/87	37
Humane Society, Pasadena	361 South Raymond Avenue Robert H. Ainsworth (Main office building) 1932 (Main office building)	8/28/84	28
Hutchins House	206 North Grand Avenue Unknown 1895	9/15/86	31
La Casita del Arroyo	177 South Arroyo Boulevard Myron Hunt 1932	8/10/76	8
La Pintoresca Library	1335 North Raymond Avenue Bennett & Haskell 1930	9/15/86	32
(Public) Library, Pasadena	285 East Walnut Street Myron Hunt & H.C.Chambers 1927	8/10/76	11
Little Cloister	948-950 North Oakland Ave. Irving Gill 1924	9/15/80	24
1165 North Los Robles Avenue	1165 North Los Robles Avenue Parker Wright 1911	9/15/86	34
Mannheim, Jean Residence & Studio	500 & 492 South Arroyo Blvd. Jean Mannheim 1909-Residence; 1925-Studio	1/11/77	14
Mead House	380 West Del Mar Boulevard Louis B. Easton 1910	12/26/79	22
Moreton Bay Fig Tree	170 South Marengo Avenue Planted 1880	8/10/76	9
Nicholson, Grace Building	46 North Los Robles Avenue Marston, Van Pelt & Maybury 1924-26	8/10/76	10

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DESIGNATION DATE</u>	<u>NO.</u>
Perkins, Constance M. Residence	1540 Poppy Peak Drive Richard J. Neutra 1955	1/11/77	15
Playhouse, Pasadena	39 South El Molino Avenue Elmer Grey 1925	4/18/78	20
734 North Raymond Avenue	734 North Raymond Avenue Unknown 1905	1/5/87	40
Raymond Penn Court	1673-93 North Raymond Ave. A. J. Williams (1930) 1895, 1930	1/5/87	38
Red Farmhouse	701 South Oakland Avenue Unknown 1892	12/20/76	13
Reynolds & Eberle Mortuary	825 East Orange Grove Blvd. Bennett & Haskell 1926	9/15/86	33
Santa Catalina Library	999 East Washington Blvd. Marston & Maybury 1930	1/5/87	39
1320 North Summit	1320 North Summit Avenue Unknown 1891	4/6/87	43
War Memorial Flagstaff	Northeast corner, West Colorado and North Orange Grove Blvd. Bertram Goodhue 1927	10/21/86	35
Wrigley Estate	391 South Orange Grove Blvd. G. Lawrence Stimson 1905-1914	8/10/76	12
Young Women's Christian Assn.	78 North Marengo Avenue Julia Morgan 1921	2/6/78	17

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DESIGNATION DATE</u>	<u>NO.</u>
	<u>POINT OF HISTORICAL INTEREST</u>		
Richardson House	Mt. Wilson Trail Park Sierra Madre	6/1/76	
Lizzie's Trails End Inn	Mt. Wilson Trail Park Sierra Madre	6/1/76	

PASADENA PROPERTIES LISTED ON THE
NATIONAL REGISTER OF HISTORIC PLACES

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DATE OF LISTING</u>
1. Gamble House	4 Westmoreland Place Greene and Greene 1908	9/3/71
2. Pasadena Playhouse	39 South El Molino Avenue Elmer Grey 1925 Cyril Bennett 1935 Annex Addition	11/11/75
3. Millard House	645 Prospect Crescent Frank Lloyd Wright 1923	12/12/76
4. Grace Nicholson Building	46 North Los Robles Avenue Marston, Van Pelt & Maybury 1924-26	7/21/77
5. Pasadena Athletic Club	425 Green Street Marston, Van Pelt & Maybury 1926	11/11/77 (Demolished 1979)
6. Bentz House	657 Prospect Boulevard Greene & Greene 1906	12/2/77
7. Friendship Baptist Church	80 West Dayton Street Norman Foote Marsh 1925	11/20/78
8. Batchelder House	626 South Arroyo Boulevard Ernest A. Batchelder 1910	12/14/78
9. Easton House	530 South Marengo Avenue Louis B. Easton 1905	9/13/79
10. Holly Street Livery Barn	100 East Holly Street 1904	10/25/79
11. Bolton House	370 West Del Mar Boulevard Greene & Greene 1906	7/9/80

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DATE OF LISTING</u>
12. Pasadena Civic Center District:		7/28/80
Main Post Office	281 East Colorado Boulevard Oscar Wenderoth 1914-1915	
YWCA	78 North Marengo Avenue Julia Morgan 1922	
Turner and Stevens Building	95 North Marengo Avenue Marston & Van Pelt 1922	
American Legion Building	125-137 North Marengo Avenue Marston, Van Pelt & Maybury 1924	
First Baptist Church	75 North Marengo Avenue Carleton Winslow, Frederick Kennedy, Jr. 1925 Carlton Winslow 1930 Annex Addition	
YMCA	235 East Holly Street Arthur Benton 1910 Marston & Van Pelt 1925 Remodeling	
Public Library	285 East Walnut Street Myron Hunt, H.C. Chambers 1925 Haynes & Oakley 1968 Addition	
Pasadena City Hall	100 North Garfield Avenue John Bakewell & Arthur Brown 1925-1927	
Gas Company Building	281 Ramona Street Original architect unknown; 1929 John Galbraith 1967	
Police Department Building	142 North Arroyo Parkway J. J. Blick & West Warren 1930 Palmer Sabin 1950 Addition	

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DATE OF LISTING</u>
Pasadena Civic Auditorium	300 East Green Street Edwin Bergstrom, Cyril Bennett, Fitch Haskell 1931-1932	
County Court Building	200 North Garfield Avenue Breo Freeman 1952	
Memorial Park	Bounded by Holly Street, Raymond Avenue, Walnut Street and Santa Fe Railroad tracks. First laid out in 1902.	
All Saints Episcopal Church	132 North Euclid Avenue Reginald Johnson 1925 Bennett & Haskell 1929-30 Parish House and Rectory	
Town House Apartments	80 North Euclid Avenue Edward B. Rust 1926	
13. Stoutenburgh House	255 South Marengo Avenue J. H. Bradbeer 1893	11/25/80
14. Colorado Street Bridge	Dr. John Alexander Low Waddell 1912	2/12/81
15. Vista del Arroyo Hotel and Bungalows	125 South Grand Avenue Marston, Van Pelt & Maybury; Myron Hunt and others 1920-1937	4/2/81
16. Haskett Court	824-834 East California Blvd. Charles E. Ruhe 1924	2/25/82
17. Longfellow-Hastings House (Octagon House)	85 South Allen Avenue Gilbert Longfellow 1893 (moved c. 1917)	3/2/82
18. Hotel Green	99 South Raymond Avenue Frederick L. Roehrig, Charles Strange 1887, 1898, 1903	3/23/82

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DATE OF LISTING</u>
19. South Marengo Historic District:		6/2/82
	462 South Marengo Avenue C. W. Buchanan 1904	
	476 South Marengo Avenue John H. Simpson, builder 1910	
	491 South Marengo Avenue John H. Simpson, builder 1912	
	501 South Marengo Avenue John H. Simpson, builder 1912	
	510 South Marengo Avenue 1916	
	511 South Marengo Avenue 1909	
	530 South Marengo Avenue Louis B. Easton 1905	
	531 South Marengo Avenue John H. Simpson, builder 1909	
	540 South Marengo Avenue Louis B. Easton 1905	
	547 South Marengo Avenue 1909	
	553 South Marengo Avenue L. P. Pomeroy, builder 1908	
	569 South Marengo Avenue 1901	
20. Newcomb House	675-677 North El Molino Ave. Bert Williams 1914	9/2/82

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DATE OF LISTING</u>
21. Civic Center Financial District:		10/29/82
Security Pacific Building	230-234 East Colorado Blvd. Curlett & Beelman 1924	
Citizens Bank Building	225 East Colorado Boulevard Parkinson & Bergstrom 1914	
MacArthur Building	24-26 North Marengo Avenue Benjamin G. Horton 1926	
Mutual Building	30-38 North Marengo Avenue W. B. Edwards 1905-1909	
Crown Building	32-38 North Marengo Avenue C. F. Driscoll 1907 Leon C. Brockway 1928 Remodeling	
22. Prospect Historic District		4/7/83
	Predominantly Prospect and Armada bounded by Westgate, Forest and Orange Grove Boulevard.	
23. Bungalow Court Thematic Nomination:		
Las Casitas Court	656 North Summit Avenue 1916	7/11/83
Colonial Court	291-301 North Garfield Avenue Cyril Bennett 1916	7/11/83
Mission Court	567 North Oakland Avenue J. F. Walker 1913	7/11/83
Bowen Court	539 East Villa Street Arthur Heineman 1910-1911	6/17/82
Gartz Court	745 North Pasadena Avenue (previous location 270 North Madison Avenue) 1910 1984 Relocated	8/25/83

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DATE OF LISTING</u>
Court	497-503 1/2 North Madison Ave. A. Ritter 1928	7/11/83
Cypress Court	623-641 North Madison Ave. Arthur G. Gehrig, contractor 1928	7/11/83
Orange Grove Court	745 East Orange Grove Blvd. 1924	7/11/83
Court	732-744 Santa Barbara Street D. Hoffman, contractor 1922	7/11/83
Palmetto Court	100 Palmetto Drive A. C. Parlee, contractor 1915	7/11/83
Don Carlos Court	374-386 South Marengo Avenue Carlence Hudson Burrell, contractor 1927	7/11/83
Sara-Thel Court	618-630 South Marengo Avenue James Humphreys 1921	7/11/83
Cottage Court	642-654 South Marengo Avenue 1923	7/11/83
Court	744-756 1/2 South Marengo Ave. D. J. Ringle, contractor 1931	7/11/83
Marengo Gardens	982, 986, 990 South Marengo and 221-241 Ohio Street 1913	7/11/83
Euclid Court	545 South Euclid Avenue The Postle Company 1921	7/11/83
Rose Court	449-457 South Hudson Avenue Stewart, Young & Stewart 1921-1922	7/11/83
Haskett Court	824-834 East California Blvd. Charles E. Ruhe 1926	2/25/82

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DATE OF LISTING</u>
24. Old Pasadena Historic District	Predominantly Union, Colorado Green, Raymond and Fair Oaks, roughly bounded at the furthest north by Corson, furthest east by Arroyo Parkway, furthest south by Del Mar, and furthest west by Pasadena Avenue.	9/15/83
25. Lukens House	267 North El Molino Avenue Harry Ridgeway 1886-1887	3/29/84
26. Evanston Inn	381-395 South Marengo Avenue/ 181 Evanston Street 1897	9/13/84
27. Villa Verde	800 South San Rafael Avenue Marston, Van Pelt & Maybury 1927	9/13/84
28. Singer Building	16 South Oakland Avenue Everett, Phillips, Babcock 1926	5/16/85
29. Odd Fellows Temple	175 North Los Robles Avenue Kenneth A. Gordon 1933	8/1/85
30. Fenyés Estate:		9/5/85
Fenyés Mansion	470 West Walnut Street Robert Farquhar 1905 Sylvanus Marston 1911 Addition	
Curtin House	160 North Orange Grove Blvd. Marston and Van Pelt 1915	
Finnish Folk Art	470 West Walnut Street Museum Frederick L. Roehrig 1911 Relocated to site in 1949	
31. Culbertson House	1188 Hillcrest Avenue Greene and Greene 1911	9/12/85

<u>NAME</u>	<u>LOCATION, ARCHITECT & CONSTRUCTION DATE</u>	<u>DATE OF LISTING</u>
32. Blacker House	1177 Hillcrest Avenue	2/6/86
33. Bryan Court	427 S. Morengo Avenue	4/16/86
34. Hale Solar Laboratory	740 Holladay Road	1/23/86
35. Space Flight Operations Facility	JPL	10/3/85
36. Twenty-Five Foot Space Simulator	JPL	10/3/85

SOUTH PASADENA

1. Adobe Flores	1804 Foothill Street.	6/18/73
2. Garfield House	1001 Buena Vista St.	4/24/73
3. Longley House	1005 Buena Vista St.	4/16/74
4. Miltimore House	1301 S. Chelton Way	3/24/72
5. Oaklawn Bridge and Waiting Station	Bet. Oaklawn & Fair Oaks	7/16/73
6. Rialto Theater	1019-1023 Fair Oaks Ave.	5/24/78
7. Wynyate	851 Lyndon St.	4/24/73

OTHER AREAS

1. Keyes Bungalow	1337 E. Boston St. Altadena	11/14/78
2. Pacific Electric Railway Co. Substation No. 8	2245 No. Lake Ave. Altadena	11/9/77
3. El Molino Viejo	1120 Old Mill Rd. San Marino	5/6/71
4. Hubble House	1340 Woodstock Rd. San Marino	12/8/76
5. San Gabriel Mission	Junipero St. & W. Mission Dr. San Gabriel	5/6/71
6. Episcopal Church of the Ascension	25 E. Laural Ave. Sierra Madre	8/19/77

APPENDIX F

CALIFORNIA DEPARTMENT OF FISH AND GAME
NATURAL DIVERSITY DATA BASE REPORT

* CALIFORNIA DEPARTMENT OF FISH AND GAME *
* Natural Diversity Data Base Report *

The following report represents a certified and valid use of the California Department of Fish and Game's Natural Diversity Data Base (NDDB). Special note should be made of the dates displayed at the bottom of each page. These dates show when the report was made and when the data upon which the report is based was purchased. An elapse time between these dates of greater than six (6) months render the report results invalid. Any attempt to alter these data or the programs provided by the NDDB for their retrieval will, likewise, invalidate report results.

The information included in the NDDB is complete and accurate to the best of our knowledge, however, an NDDB report does not constitute an official opinion by the Department on the possible impacts of proposed projects on California's biota or environment. Such an opinion can only be rendered by the Director of the Department of Fish and Game upon formal consultation with the appropriate lead agency as specified by the California Environmental Quality Act (CEQA) or the National Environmental Protection Act (NEPA). Absence of information for a specific species or area does not constitute the basis for a negative declaration. The project sponsor must still conduct field surveys in the affected area to determine project impacts to local flora and fauna.

ATTENTION: THE USE OF THIS APPLICATION DOES NOT ELIMINATE THE NEED TO CONDUCT FIELD SURVEYS IN AN APPROPRIATE MANNER AND DURING THE PROPER SEASON(S).

Date of Report: 10/04/89

Data Expiration Date: 12/10/89

CALIFORNIA DEPARTMENT OF FISH AND GAME
NATURAL DIVERSITY DATA BASE

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Species/Community Location Summary Report

CNDDDB

CLEMMYS MARMORATA PALLIDA (SACDS86)

NDDDB Inventory Priority: G2G3 - S2S3

SOUTHWESTERN POND TURTLE

Fed Status: CANDIDATE 2

State Status: NONE

SENSITIVE-> Occ #: 112 Map #: 6 Quad Code & Name: 3411812/110C - LOS ANGELES County: LAX
Directions: SENSITIVE RECORD -- LOCATIONAL INFO SUPPRESSED 580 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R12W-SXX-XX/XX Merid=S; Lat/Long=XXdXXmXXs/XXXdXXmXXs

PHRYNOSOMA CORONATUM BLAINVILLEI (SACKH72)

NDDDB Inventory Priority: G2G3 - S2S3

SAN DIEGO HORNED LIZARD

Fed Status: CANDIDATE 2

State Status: NONE

Occ #: 66 Map #: 4 Quad Code & Name: 3411812/110C - LOS ANGELES County: LAX
Directions: ALHAMBRA. 480 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R12W-S16- / Merid=S; Lat/Long=34d05m15s/118d08m14s

Occ #: 81 Map #: 2 Quad Code & Name: 3411822/110B - PASADENA County: LAX
Directions: PASADENA. 865 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1N-R12W-S - / Merid=S; Lat/Long=34d09m16s/118d08m07s

Occ #: 82 Map #: 7 Quad Code & Name: 3411821/110A - MT. WILSON County: LAX
Directions: SIERRA MADRE. 720 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1N-R12W-S - / Merid=S; Lat/Long=34d09m39s/118d02m33s

GONE?-----> Occ #: 135 Map #: 12 Quad Code & Name: 3411823/111A - BURBANK County: LAX
Directions: GLENDALE. 550 ft
Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1N-R13W-S - / Merid=S; Lat/Long=34d08m46s/118d15m07s

GONE?-----> Occ #: 137 Map #: 17 Quad Code & Name: 3411821/110A - MT. WILSON County: LAX
1911 Directions: PASADENA. 820 ft
Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1N-R12W-S - / Merid=S; Lat/Long=34d09m16s/118d06m04s

GONE-----> Occ #: 153 Map #: 4 Quad Code & Name: 3311881/089A - WHITTIER County: LAX
Directions: DOWNEY. 115 ft
Cond: EXTIRPATED, THIS SITE Prec: 5 MILES ; T 3S-R12W-S - / Merid=S; Lat/Long=33d56m20s/118d07m23s

GONE?-----> Occ #: 234 Map #: 5 Quad Code & Name: 3311881/089A - WHITTIER County: LAX
1974 Directions: PICO RIVERA. 155 ft
: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 2S-RY S - / Merid=S; Lat/Long=33d58m33s/118d05m47s

GONE?-----> Occ #: 236 Map #: 7 Quad Code & Name: 3411812/110C - LOS ANGELES County: LAX
1974 Directions: MONTEREY PARK (MONTEREY HILLS), 1 MI SE OF CSULA. 500 ft
Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 1 MILE ; T 1S-R12W-S28- /SW Merid=S; Lat/Long=34d03m10s/118d08m52s

ELANUS CAERULEUS (SADFE78) NDDB Inventory Priority: G3 - S3
BLACK SHOULDERED KITE Fed Status: NONE State Status: FULLY PROTECTED

Occ #: 2 Map #: 3 Quad Code & Name: 3411811/110D - EL MONTE County: LAX
Directions: EL MONTE. 270 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R11W-S21- / Merid=S; Lat/Long=34d04m10s/118d02m08s

Date of Report: 10/04/89 --- Data Expiration Date: 12/10/89 Page 1

ASIO OTUS (SADV676) NDDB Inventory Priority: G? - S2

LONG EARED OWL Fed Status: NONE State Status: NONE

Occ #: 4 Map #: 3 Quad Code & Name: 3411811/110D - EL MONTE County: LAX
Directions: EL MONTE 280 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R12W-S21- / Merid=S; Lat/Long=34d04m10s/118d02m08s

EMPIDONAX TRAILLII (SAEA405) NDDB Inventory Priority: G? - S2

WILLOW FLYCATCHER Fed Status: NONE State Status: NONE

Occ #: 21 Map #: 3 Quad Code & Name: 3411811/110D - EL MONTE County: LAX
Directions: EL MONTE 280 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R12W-S21- / Merid=S; Lat/Long=34d04m10s/118d02m08s

Occ #: 23 Map #: 5 Quad Code & Name: 3411823/111A - BURBANK County: LAX
Directions: BURBANK 724 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1N-R14W-S - / Merid=S; Lat/Long=34d11m25s/118d18m35s

RIPARIA RIPARIA (SAEB901) NDDB Inventory Priority: G? - S2S3

BANK SWALLOW Fed Status: NONE State Status: CANDIDATE

GONE-----> Occ #: 105 Map #: 4 Quad Code & Name: 3411812/110C - LOS ANGELES County: LAX
1902 Directions: ALHAMBRA 470 ft
Cond: EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1S-R12W-S16- / Merid=S; Lat/Long=34d05m13s/118d08m08s

VIREO BELLII PUSILLUS (SAEL468) NDDB Inventory Priority: G? - S2

LEAST BELLS VIREO Fed Status: ENDANGERED State Status: ENDANGERED

GONE?-----> Occ #: 49 Map #: 5 Quad Code & Name: 3411823/111A - BURBANK County: LAX
1913 Directions: BURBANK. 720 ft
Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1N-R14W-S - / Merid=S; Lat/Long=34d11m24s/118d18m35s

GONE?-----> Occ #: 50 Map #: 2 Quad Code & Name: 3411822/110B - PASADENA County: LAX
1911 Directions: PASADENA. 865 ft
Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1N-R12W-S - / Merid=S; Lat/Long=34d09m16s/118d08m07s

DENDROICA PETECHIA BREWSTERI (SAEM397) NDDB Inventory Priority: G? - S2

YELLOW WARBLER Fed Status: NONE State Status: NONE

Occ #: 10 Map #: 3 Quad Code & Name: 3411811/110D - EL MONTE County: LAX
Directions: EL MONTE. 280 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R11W-S21- / Merid=S; Lat/Long=34d04m11s/118d02m08s

ICTER (RENS (SAEME99)

NDDB Inventory Priority: G? - S3

YELLOW BREASTED CHAT

Fed Status: NONE

State Status: NONE

Occ #: 6 Map #: 5 Quad Code & Name: 3411823/111A - BURBANK

County: LAX

Directions: BURBANK.

724 ft

Cond: PRESUMED EXTANT

Prec: 5 MILES ; T 1N-R14W-S - / Merid=S; Lat/Long=34d11m25s/118d18m35s

ORCUTIA CALIFORNICA (SPGHEV2)

NDDB Inventory Priority: G2 - S2.1

CALIFORNIA ORCUTT GRASS

Fed Status: CANDIDATE 1

State Status: ENDANGERED

GONE-----> Occ #: 14 Map #: 2 Quad Code & Name: 3311881/089A - WHITTIER

County: LAX

Directions: W LOS ANGELES CO. NEAR DOWNEY.

125 ft

Cond: EXTIRPATED, THIS SITE

Prec: 5 MILES ; T 2S-R 0 -S - / Merid=S; Lat/Long=33d56m53s/118d06m46s

RORIPPA GAMBELLII (SPKPF51) NDDB Inventory Priority: G1 - S1.1
GAMBELL'S YELLOW CRESS Fed Status: CANDIDATE 2 State Status: CANDIDATE

GONE-----> Occ #: 7 Map #: 4 Quad Code & Name: 3411813/111D - HOLLYWOOD County: LAX
 1904 Directions: CIENAGA.
 Cond: EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1S-R14W-S - / Merid=S; Lat/Long=34d02m41s/118d20m21s

DUDLEYA MULTICAULIS (SPLAEK7) NDDB Inventory Priority: G2 - S2.1
MANY-STEMMED DUDLEYA Fed Status: CANDIDATE 2 State Status: NONE

Occ #: 22 Map #: 3 Quad Code & Name: 3411813/111D - HOLLYWOOD County: LAX
 Directions: HOLLYWOOD HILLS. 700 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R14W-S 2- / Merid=S; Lat/Long=34d07m01s/118d19m08s

RIBES DIVARICATUM VAR PARISHII (SPLBMA2) NDDB Inventory Priority: G? - S?
PARISH'S GOOSEBERRY Fed Status: NONE State Status: NONE

Occ #: 4 Map #: 5 Quad Code & Name: 3311881/089A - WHITTIER County: LAX
 Directions: PICO RIVERA.
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 2S-R12W-S - / Merid=S; Lat/Long=33d58m34s/118d05m47s

ASTRAGALUS BRAUNTONII (SPLDDS7) NDDB Inventory Priority: G2 - S2.1
BRAUNTON'S MILK VETCH Fed Status: CANDIDATE 2 State Status: NONE

GONE?-----> Occ #: 5 Map #: 2 Quad Code & Name: 3411813/111D - HOLLYWOOD County: LAX
 1904 Directions: CIENEGA. (1904 RECORD MAPPED AROUND CIENEGA RR SIDING.) 120 ft
 Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1S-R14W-S - / Merid=S; Lat/Long=34d01m15s/118d19m38s

ASTRAGALUS TENER VAR TITI (SPLDDU6) NDDB Inventory Priority: G2G3T1 - S1.1
COASTAL DUNES MILK VETCH Fed Status: CANDIDATE 2 State Status: ENDANGERED

Occ #: 4 Map #: 3 Quad Code & Name: 3311883/090A - INGLEWOOD County: LAX
 Directions: NEAR HYDE PARK, WITHIN PRESENT DAY INGLEWOOD. 150 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 2S-R14W-S23- /NW Merid=S; Lat/Long=33d59m03s/118d19m35s

LINANTHUS ORCUTTII (SPNFES3) NDDB Inventory Priority: G3? - S2.2
ORCUTT'S LINANTHUS Fed Status: CANDIDATE 2 State Status: NONE

Occ #: 14 Map #: 17 Quad Code & Name: 3411821/110A - MT. WILSON County: LAX
 Directions: PASADENA.
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1N-R12W-S - / Merid=S; Lat/Long=34d09m16s/118d06m04s

HELIAN () NUTTALLII SSP PARISHII (SPNXFH7) NDDB Inventory Priority: G5TH - SH

GONE?-----> Occ #: 2 Map #: 5 Quad Code & Name: 3411812/110C - LOS ANGELES

County: LAX

1903 Directions: OAK KNOLL, PASADENA

Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 1/5 MILE; T 1N-R12W-S - / Merid=S; Lat/Long=34d07m26s/118d08m10s

* CALIFORNIA DEPARTMENT OF FISH AND GAME *
* Natural Diversity Data Base Report *

The following report represents a certified and valid use of the California Department of Fish and Game's Natural Diversity Data Base (NDDB). Special note should be made of the dates displayed at the bottom of each page. These dates show when the report was made and when the data upon which the report is based was purchased. An elapse time between these dates of greater than six (6) months render the report results invalid. Any attempt to alter these data or the programs provided by the NDDB for their retrieval will, likewise, invalidate report results.

The information included in the NDDB is complete and accurate to the best of our knowledge, however, an NDDB report does not constitute an official opinion by the Department on the possible impacts of proposed projects on California's biota or environment. Such an opinion can only be rendered by the Director of the Department of Fish and Game upon formal consultation with the appropriate lead agency as specified by the California Environmental Quality Act (CEQA) or the National Environmental Protection Act (NEPA). Absence of information for a specific species or area does not constitute the basis for a negative declaration. The project sponsor must still conduct field surveys in the affected area to determine project impacts to local flora and fauna.

ATTENTION: THE USE OF THIS APPLICATION DOES NOT ELIMINATE THE NEED TO CONDUCT FIELD SURVEYS IN AN APPROPRIATE MANNER AND DURING THE PROPER SEASON(S).

Date of Report: 10/04/89

Data Expiration Date: 12/10/89

CALIFORNIA DEPARTMENT OF FISH AND GAME
 NATURAL DIVERSITY DATA BASE

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Species/Community Location Summary Report

CNDDDB

SOUTHERN COAST LIVE OAK RIPARIAN FOREST (NC61310)

NDDDB Inventory Priority: G3 - S3

Fed Status: NONE

State Status: NONE

GONE-----> Occ #: 76 Map #: 11 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 1935 Directions: INTERMITTENT CREEK TO WEST OF LINDA VISTA SCHOOL, LINDA VISTA. 1100 ft
 Cond: EXTIRPATED, THIS SITE Prec: 1/5 MILE; T 1N-R12W-S - / Merid=S; Lat/Long=34d10m10s/118d10m54s

GONE-----> Occ #: 77 Map #: 16 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 1935 Directions: EAST OF VERDUGO DR, SOUTH OF MONTECITO DR. BETWEEN MONTROSE & GLENDALE. 1080 ft
 Cond: EXTIRPATED, THIS SITE Prec: 1/5 MILE; T 1N-R13W-S - / Merid=S; Lat/Long=34d11m36s/118d13m26s

GONE-----> Occ #: 78 Map #: 17 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 1935 Directions: EAST OF VERDUGO CANYON, BETWEEN MONTICELLO DR & FERN LANE; BETW MONTROSE & GLENDALE. 1040 ft
 Cond: EXTIRPATED, THIS SITE Prec: 1/5 MILE; T 1N-R13W-S - / Merid=S; Lat/Long=34d11m20s/118d13m11s

GONE-----> Occ #: 79 Map #: 18 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 1935 Directions: EAST OF VERDUGO CANYON ALONG FERN LANE. 1080 ft
 Cond: EXTIRPATED, THIS SITE Prec: 1/5 MILE; T 1N-R13W-S - / Merid=S; Lat/Long=34d11m03s/118d13m09s

GONE-----> Occ #: 80 Map #: 19 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 1935 Directions: FLINTRIDGE, TRIBUTARIES TO DEVILS GATE RESERVOIR. BETWEEN FOOTHILL FREEWAY & CERRO NEGRO 1120 ft
 Cond: EXTIRPATED, THIS SITE Prec: 1/5 MILE; T 1N-R13W-S - / Merid=S; Lat/Long=34d11m32s/118d11m27s

Occ #: 81 Map #: 21 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: GOSS CANYON, NORTH OF LA CRESCENTA, W OF BRIGGS TERRACE. 2280 ft
 Cond: PRESUMED EXTANT Prec: 1/5 MILE; T 2N-R13W-S22- /SE Merid=S; Lat/Long=34d14m35s/118d13m40s

Occ #: 98 Map #: 24 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: ENGLEHEARD CANYON, WEST OF VERDUGO CITY, VERDUGO MOUNTAINS. 1320 ft
 Cond: PRESUMED EXTANT Prec: 1/5 MILE; T 2N-R13W-S33-S /S Merid=S; Lat/Long=34d12m30s/118d14m53s

Occ #: 99 Map #: 26 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: INTERMITTENT CR SOUTH OF FLINTRIDGE ACADEMY OF THE SACRED HEART. 1280 ft
 Cond: PRESUMED EXTANT Prec: 1/5 MILE; T 1N-R12W-S - / Merid=S; Lat/Long=34d10m39s/118d10m59s

SOUTHERN SYCAMORE ALDER RIPARIAN WOODLAND (NC62400)

NDDDB Inventory Priority: G3 - S3

No con

name

Fed Sta : NONE

State Status: NONE

GONE-----> Occ #: 68 Map #: 10 Quad Code & Name: 3411822/110B - PASADENA County: LAX
1935 Directions: SCHOLL CANYON SOUTH OF FLINT PEAK. 920 ft
Cond: EXTIRPATED, THIS SITE Prec: 1/5 MILE; T 1N-R13W-S - / Merid=S; Lat/Long=34d09m11s/118d12m05s

Occ #: 69 Map #: 12 Quad Code & Name: 3411822/110B - PASADENA County: LAX
Directions: SYCAMORE CANYON TRIBUTARY ON NE SLOPE OF FLINT PEAK, SAN RAFAEL HILLS. 1160 ft
Cond: DAMAGED OR DECLINING Prec: 1/5 MILE; T 1N-R13W-S - / Merid=S; Lat/Long=34d10m05s/118d11m41s

Occ #: 70 Map #: 13 Quad Code & Name: 3411822/110B - PASADENA County: LAX
Directions: ARROYO SECO & MANY TRIBUTARIES, U/S OF DEVILS GATE RESER- VOIR. 2120 ft
Cond: PRESUMED EXTANT Prec: 1/5 MILE; T 2N-R12W-S - / Merid=S; Lat/Long=34d14m49s/118d10m03s

SOUTHERN SYCAMORE ALDER RIPARIAN WOODLAND (cont)

GONE-----> Occ #: 71 Map #: 14 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 1978 Directions: VERDUGO WASH, NEAR VERDUGO PARK, & TRIBUTARY FROM WEST. 880 ft
 Cond: EXTIRPATED, THIS SITE Prec: 1/5 MILE; T 1N-R13W-S - / Merid=M; Lat/Long=34d10m37s/118d13m51s

GONE-----> Occ #: 72 Map #: 15 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 1935 Directions: MONTROSE, NEAR JCT OF MONTROSE AVE & VERDUGO BLVD. 1200 ft
 Cond: EXTIRPATED, THIS SITE Prec: 1/5 MILE; T 1N-R13W-S - / Merid=S; Lat/Long=34d12m16s/118d13m21s

Occ #: 73 Map #: 20 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: PICKENS, SUTTON & MULLALLY CANYONS, NORTH OF LA CRESCENTA. 2400 ft
 Cond: PRESUMED EXTANT Prec: 1/5 MILE; T 2N-R13W-S23- /W Merid=S; Lat/Long=34d14m41s/118d13m11s

Occ #: 112 Map #: 22 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: EAGLE CANYON, N OF LA CRESCENTA. 2720 ft
 Cond: PRESUMED EXTANT Prec: 1/5 MILE; T 2N-R13W-S22-N /NW Merid=S; Lat/Long=34d14m57s/118d14m05s

Occ #: 113 Map #: 25 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: HALL BECKLEY CANYON, EAST OF LA CRESCENTA. 2120 ft
 Cond: PRESUMED EXTANT Prec: 1/5 MILE; T 2N-R13W-S26- / Merid=S; Lat/Long=34d13m59s/118d12m31s

CLEMMYS MARMORATA PALLIDA (SACDS86) NDDB Inventory Priority: G2G3 - S2S3
SOUTHWESTERN POND TURTLE Fed Status: CANDIDATE 2 State Status: NONE

SENSITIVE-> Occ #: 105 Map #: 9 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: SENSITIVE RECORD -- LOCATIONAL INFO SUPPRESSED 2000 ft
 Cond: PRESUMED EXTANT Prec: 1/5 MILE; T 1N-R12W-SXX-XX/XX Merid=S; Lat/Long=XXdXXmXXs/XXdXXmXXs

PHRYNOSOMA CORONATUM BLAINVILLEI (SACKH72) NDDB Inventory Priority: G2G3 - S2S3
SAN DIEGO HORNED LIZARD Fed Status: CANDIDATE 2 State Status: NONE

Occ #: 61 Map #: 3 Quad Code & Name: 3411833/137D - SUNLAND County: LAX
 Directions: UPPER TUJUNGA. 1922 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 2N-R14W-S 2- / Merid=S; Lat/Long=34d17m14s/118d19m15s

Occ #: 65 Map #: 3 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: LA CRESCENTA. 1752 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 2N-R13W-S - / Merid=S; Lat/Long=34d13m33s/118d13m40s

Occ #: 66 Map #: 4 Quad Code & Name: 3411812/110C - LOS ANGELES County: LAX
 Directions: ALHAMBRA. 480 ft
 C PRESUMED EXTANT Prec: 5 MILES ; T 1S-R12-16- / Merid=S; Lat/Long=34d05m15s/118d08m14s

Occ #: 67 Map #: 6 Quad Code & Name: 3411831/136D - CHILAO FLAT County: LAX
Directions: BARLEY FLATS. 5400 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 2N-R11W-S 7- / Merid=S; Lat/Long=34d16m46s/118d04m27s

Occ #: 81 Map #: 2 Quad Code & Name: 3411822/110B - PASADENA County: LAX
Directions: PASADENA. 865 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1N-R12W-S - / Merid=S; Lat/Long=34d09m16s/118d08m07s

Occ #: 82 Map #: 7 Quad Code & Name: 3411821/110A - MT. WILSON County: LAX
Directions: SIERRA MADRE. 720 ft
Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1N-R12W-S - / Merid=S; Lat/Long=34d09m39s/118d02m33s

PHRYNOSOMA CORONATUM BLAINVILLEI (cont)

Occ #: 128 Map #: 9 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: MILLARD CANYON, NEAR PASADENA. 2000 ft
 Cond: PRESUMED EXTANT Prec: 1 MILE ; T 2N-R12W-S33- /NW Merid=S; Lat/Long=34d13m04s/118d08m43s

Occ #: 129 Map #: 11 Quad Code & Name: 3411823/111A - BURBANK County: LAX
 Directions: TUJUNGA, VERDUGO MTNS, N OF BURBANK. 2200 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 2N-R14W-S25- / Merid=S; Lat/Long=34d13m26s/118d17m53s

GONE?-----> Occ #: 135 Map #: 12 Quad Code & Name: 3411823/111A - BURBANK County: LAX
 Directions: GLENDALE. 550 ft
 Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1N-R13W-S - / Merid=S; Lat/Long=34d08m46s/118d15m07s

GONE?-----> 1911 Occ #: 137 Map #: 17 Quad Code & Name: 3411821/110A - MT. WILSON County: LAX
 Directions: PASADENA. 820 ft
 Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1N-R12W-S - / Merid=S; Lat/Long=34d09m16s/118d06m04s

Occ #: 149 Map #: 13 Quad Code & Name: 3411833/137D - SUNLAND County: LAX
 Directions: DIRT RD TO BOULDER CANYON, 2.5 MI N N MILE HIGH, ANGELES NF. 2400 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 3N-R14W-S26- / Merid=S; Lat/Long=34d19m02s/118d18m31s

Occ #: 200 Map #: 22 Quad Code & Name: 3411821/110A - MT. WILSON County: LAX
 Directions: RED BOX CANYON, SAN GABRIEL MOUNTAINS. 5100 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 2N-R12W-S - / Merid=S; Lat/Long=34d14m27s/118d05m29s

Occ #: 201 Map #: 6 Quad Code & Name: 3411832/136C - CONDOR PEAK County: LAX
 Directions: ON ANGELES CREST HWY, 6 MI NE LA CANADA. 3000 ft
 Cond: PRESUMED EXTANT Prec: 1 MILE ; T 2N-R12W-S - / Merid=S; Lat/Long=34d15m37s/118d11m03s

ELANUS CAERULEUS (SADFE78) NDDB Inventory Priority: G3 - S3
BLACK SHOULDERED KITE Fed Status: NONE State Status: FULLY PROTECTED

Occ #: 2 Map #: 3 Quad Code & Name: 3411811/110D - EL MONTE County: LAX
 Directions: EL MONTE. 270 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R11W-S21- / Merid=S; Lat/Long=34d04m10s/118d02m08s

ASIO OTUS (SADV676) NDDB Inventory Priority: G? - S2
LONG EARED OWL Fed Status: NONE State Status: NONE

Occ #: 4 Map #: 3 Quad Code & Name: 3411811/110D - EL MONTE County: LAX
 Directions: EL MONTE 280 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R1 21- / Merid=S; Lat/Long=34d04m10s/118d02m08s

WILLOW FLYCATCHER

Fed Status: NONE

State Status: NONE

Occ #: 21 Map #: 3 Quad Code & Name: 3411811/110D - EL MONTE County: LAX
 Directions: EL MONTE 280 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R12W-S21- / Merid=S; Lat/Long=34d04m10s/118d02m08s

Occ #: 23 Map #: 5 Quad Code & Name: 3411823/111A - BURBANK County: LAX
 Directions: BURBANK 724 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1N-R14W-S - / Merid=S; Lat/Long=34d11m25s/118d18m35s

RIPARIA RIPARIA (SAEB901) NDDB Inventory Priority: G? - S2S3
BANK SWALLOW Fed Status: NONE State Status: CANDIDATE

GONE-----> Occ #: 105 Map #: 4 Quad Code & Name: 3411812/110C - LOS ANGELES County: LAX
 1902 Directions: ALHAMBRA 470 ft
 Cond: EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1S-R12W-S16- / Merid=S; Lat/Long=34d05m13s/118d08m08s

POLIOPTILA MELANURA CALIFORNICA (SAEJL03) NDDB Inventory Priority: G? - S3
CALIFORNIA BLACK TAILED GNATCATCHER Fed Status: CANDIDATE 2 State Status: NONE

Occ #: 37 Map #: 6 Quad Code & Name: 3411833/137D - SUNLAND County: LAX
 Directions: TUJUNGA WASH IN TUJUNGA FOREST, VICINITY SUNLAND. 1300 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 2N-R14W-S11- /NE Merid=S; Lat/Long=34d16m27s/118d18m45s

VIREO BELLII PUSILLUS (SAEL468) NDDB Inventory Priority: G? - S2
LEAST BELLS VIREO Fed Status: ENDANGERED State Status: ENDANGERED

GONE?-----> Occ #: 49 Map #: 5 Quad Code & Name: 3411823/111A - BURBANK County: LAX
 1913 Directions: BURBANK. 720 ft
 Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1N-R14W-S - / Merid=S; Lat/Long=34d11m24s/118d18m35s

GONE?-----> Occ #: 50 Map #: 2 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 1911 Directions: PASADENA. 865 ft
 Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 1N-R12W-S - / Merid=S; Lat/Long=34d09m16s/118d08m07s

DENDROICA PETECHIA BREWSTERI (SAEM397) NDDB Inventory Priority: G? - S2
YELLOW WARBLER Fed Status: NONE State Status: NONE

Occ #: 10 Map #: 3 Quad Code & Name: 3411811/110D - EL MONTE County: LAX
 Directions: EL MONTE. 280 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R11W-S21- / Merid=S; Lat/Long=34d04m11s/118d02m08s

Occ #: 11 Map #: 9 Quad Code & Name: 3411821/110A - MT. WILSON County: LAX
 Directions: WEST FORK. 3071 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 2N-R11W-S20- / Merid=S; Lat/Long=34d14m40s/118d03m20s

ICTERIA VIRENS (SAEME99) NDDB Inventory Priority: G? - S3
YELLOW BREASTED CHAT Fed Status: NONE State Status: NONE

Occ #: 6 Map #: 5 Quad Code & Name: 3411823/111A - BURBANK County: LAX
 Directions: BURBANK. 724 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1N-R14W-S - / Merid=S; Lat/Long=34d11m25s/118d18m35s

GONE?-----> Occ #: 8 Map #: 5 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 1961 Directions: ARROYO SECO, S. PASADENA. 1 MI N OF PASADENA FREEWAY. (MAP- PED ON PASADENA.) 1000 ft
 Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 1/5 MILE; T 1N-R12W-S - / Merid=M; Lat/Long=34d07m59s/118d09m55s

GONE?-----> Occ #: 9 Map #: 6 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 1927 Directions: DEVILS GATE IN ARROYO SECO, PASADENA. 1000 ft
 Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 1 MILE ; T 1N-R12W-S - / Merid=M; Lat/Long=34d11m07s/118d10m27s

MAHONIA NEVINII (cont)

GONE?-----> Occ #: 10 Map #: 8 Quad Code & Name: 3411833/137D - SUNLAND County: LAX
 1904 Directions: BIG TEJUNGA (TUJUNGA) WASH. NEAR SAN FERNANDO. 1120 ft
 Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 2N-R14W-S - / Merid:S; Lat/Long=34d16m06s/118d20m21s

Occ #: 13 Map #: 7 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: EAST BANK OF ARROYO SECO, HALF MI N OF ROSE BOWL, CORNER OF ARROYO AND WASHINGTON STS. 960 ft
 Cond: PRESUMED EXTANT Prec: 1/5 MILE; T 1N-R12W-S - / Merid:S; Lat/Long=34d10m14s/118d09m58s

Occ #: 18 Map #: 8 Quad Code & Name: 3411822/110B - PASADENA County: LAX
 Directions: W-FACING SLOPE RIM ARROYO SECO, NEAR CORNER ARROYO BLVD & WASHINGTON BLVD, PASADENA. 960 ft
 Cond: PRESUMED EXTANT Prec: 1/5 MILE; T 1N-R12W-S - / Merid:S; Lat/Long=34d10m27s/118d10m22s

CENTROSTEGIA LEPTOCERAS (SPJTEB2) NDDB Inventory Priority: G1 - S1.1
SLENDER-HORNED SPINEFLOWER Fed Status: ENDANGERED State Status: ENDANGERED

GONE-----> Occ #: 8 Map #: 11 Quad Code & Name: 3411821/110A - MT. WILSON County: LAX
 Directions: RUBIO WASH, ALTADENA. 1640 ft
 Cond: EXTIRPATED, THIS SITE Prec: 1 MILE ; T 1N-R12W-S 3- /E Merid:S; Lat/Long=34d12m05s/118d07m16s

CHORIZANTHE PARRYI VAR FERNANDINA (SPJTEC2) NDDB Inventory Priority: G3TH - SH
SAN FERNANDO VALLEY SPINEFLOWER Fed Status: CANDIDATE 1 State Status: NONE

GONE?-----> Occ #: 1 Map #: 10 Quad Code & Name: 3411833/137D - SUNLAND County: LAX
 1920 Directions: LITTLE TUJUNGA WASH. MAPPED ALONG LITTLE TUJUNGA RD IN LITTLE TUJUNGA CYN. 1600 ft
 Cond: POSSIBLY EXTIRPATED, THIS SITE Prec: 5 MILES ; T 3N-R14W-S27- / Merid:S; Lat/Long=34d19m11s/118d20m19s

Occ #: 4 Map #: 15 Quad Code & Name: 3411821/110A - MT. WILSON County: LAX
 Directions: MT LOWE. MAPPED NEAR SUMMIT. 5600 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 2N-R12W-S26- / Merid:S; Lat/Long=34d13m54s/118d06m24s

DUDLEYA MULTICAULIS (SPLAEK7) NDDB Inventory Priority: G2 - S2.1
MANY-STEMMED DUDLEYA Fed Status: CANDIDATE 2 State Status: NONE

Occ #: 22 Map #: 3 Quad Code & Name: 3411813/111D - HOLLYWOOD County: LAX
 Directions: HOLLYWOOD HILLS. 700 ft
 Cond: PRESUMED EXTANT Prec: 5 MILES ; T 1S-R14W-S 2- / Merid:S; Lat/Long=34d07m01s/118d19m08s

LINANTHUS ORCUTTII (SPNFES3) NDDB Inventory Priority: G3? - S2.2
ORCUTT'S LINANTHUS Fed Status: CANDIDATE 2 State Status: NONE

Occ #: 14 Map #: 17 Quad Code & Name: 3411821/110A - MT. WILSON County: LAX

Locations: PASADENA.

Cond: PRESUMED EXTANT

Prec: 5 MILES ; T 1N-R12W-S - / Merid=S; Lat/Long=34d09m16s/118d06m04s

GALIUM GRANDE (SPNUFG2)

NDDB Inventory Priority: G1 - S1.2

SAN GABRIEL BEDSTRAW

Fed Status: CANDIDATE 2

State Status: NONE

Occ #: 5 Map #: 14 Quad Code & Name: 3411821/110A - MT. WILSON

County: LAX

Directions: MT WILSON TRAIL, NEAR CAMP (WALTER)?

4900 ft

Cond: PRESUMED EXTANT

Prec: 5 MILES ; T 2N-R11W-S32- / Merid=S; Lat/Long=34d12m44s/118d03m29s

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APPENDIX G

RECORD OF TELEPHONE CONVERSATIONS

FILE NUMBER: JPL 2006.001
PROJECT TITLE: JPL HRS

RECORD OF CONVERSATION

TELEPHONE MEETING VISIT

TO: Al Harrel, Mgr. FROM: Dwight Mudry
WITH: Valley Water Company DATE: 9/28/90 TIME: 10:15 A.M.
AT: _____ PHONE: (818) 790-5516
 AREA CODE/NUMBER

SUMMARY OF DISCUSSION: Serves mostly residential customers (3,500). He uses a factor of 3.5 to get a population of about 12,250 for their service area. They pump about 800 Ac/ft yr. The well water is high in NO₂ and PCE and needs to be blended with import water from MWD. They end up with about 25-30% well water in the blend to get down to 1-2 parts PCE.

In past years all of the import water was from the Colorado River, but recently it is about 50/50 from Colorado River & N. California.

REMARKS:

cc: PROGRAM MANAGER
PROJECT MANAGER
C-FILE

RECORD OF CONVERSATION

TELEPHONE MEETING VISIT

TO: JoAnn Mysteara FROM: D. Eckstein
WITH: Pasadena United School District DATE: 10/26/90 TIME: 2:35 P.M.
AT: Research + evaluation testing PHONE: (818) 795-6981, X205
AREA CODE/NUMBER

SUMMARY OF DISCUSSION: 9/10/90 enrollment

Discussed school enrollments:

Franklin K-9 - 283

Jackson - out at 1 mile (Woodbury & Lincoln) - 372

John Muir High School - out at 1 mile (Woodbury & Lincoln) - 1955

Five acres is private

No longer Audubon School

Sept. June schedule

REMARKS:

cc: PROGRAM MANAGER
PROJECT MANAGER
C-FILE

FILE NUMBER: JPL 2006.001

PROJECT TITLE: JPL HRS

RECORD OF CONVERSATION

TELEPHONE MEETING VISIT

TO: Rod Walling FROM: D. Eckstein

WITH: Five Acres School DATE: 10/26/90 TIME: 2:45 P.M.

AT: _____ PHONE: (818) 798-6793
AREA CODE/NUMBER

SUMMARY OF DISCUSSION: _____

Total Enrollment: 110

Residential treatment program - 54 year round

Non-public school (Sept. Aug.) - 24

Group home (6 bed respite) - 24

Foster land protective - 8

REMARKS: _____

cc: PROGRAM MANAGER
PROJECT MANAGER
C-FILE