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KEN MALLOY HARBOR REGIONAL PARK DEVELOPMENT PROGRAM

VOLUME I

Habitat Restoration and Lake Water Quality Improvement Design Development Report

Prepared for

City of Los Angeles Department of Recreation and Parks
and
Palos Verdes/Southbay Audubon Society

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KEN MALLOY HARBOR REGIONAL PARK
HABITAT IMPROVEMENT AND LAKE WATER QUALITY IMPROVEMENT
DESIGN DEVELOPMENT REPORT

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2.3 EXISTING MITIGATION PROJECTS

Several areas within the KMHRP have been used as an environmental mitigation site for agencies which are required to provide off-site mitigation of environmental impacts. There are two current habitat enhancement projects within the boundaries of the park including:

1. **Mitigation Plan for Emergency Channel Maintenance Activities at Agro Ditch, Los Angeles International Airport (LAX).** This project proposed to restore and enhance a total of three acres of wetland areas (eight different sites) south of Machado Lake. The status report received from Sapphos Environmental Inc., a consultant working on this project, on January 9, 2001, revealed that six out of eight areas were planted but the plants did not survive the first year mostly because of the vandalism by off-road vehicles. Planting at areas 7 and 8 were reportedly successful.
2. **Revegetation Plan for the Wilmington Drain Outlet Clearing Project, Los Angeles County Department of Public Works (DPW).** This project is required to fulfill the Steambed Alteration Agreement issued by California Department of Fish and Game to DPW as a condition for granting a permission to DPW to cut a 130 foot wide by 1350 foot drainage way through the willow forest of Machado Lake to enhance water flow during the rainy season. Two sites were identified, one is located near the east side of the Lake and another is located near the Pacific Coast Highway (PCH) for a total of four acres. The first site was originally planned for native willow planting but later was proposed by Ultrasystem Environmental Incorporated, DPW's consultant, for revision to plant coast live oak instead. Sycamore and cottonwood are the species to be planted at the site near PCH. The planting activities are on-going.

Another potential mitigation project is proposed by the California Department of Transportation (Caltrans). Caltrans is required by Fish and Game Code section 1601 to perform off-site mitigation to compensate for impacts associated with construction of the Route 710 bridge over Compton Creek to allow for the protection and continuance of existing fish and wildlife resources that may be substantially adversely affected by those activities. A Memorandum of Understanding (MOU) between the City of Los Angeles and Caltrans was drafted in early 2001 but the agreement has not been finalized. The draft MOU stated that Caltrans will fund the Audubon Society for the removal of exotic weeds from the Blackberry Draw area within the KMHRP. Weed removal will take place between April 15 and October 15 to take advantage of most efficient time for the removal. In addition, Caltrans will fund The Audubon Society for native plant restoration, per mutually agreed upon plans, at Blackberry Draw within KMHRP.

Other agencies which may be required to provide offsite environmental mitigation may include, but are not limited to, the Port of Long Beach, the Port of Los Angeles, petroleum refineries in the Dominguez Channel watershed area, etc. However, no potential projects have been identified as of this date.

2.4 LAKE WATER QUALITY CHARACTERISTICS

Machado Lake is approximately 103.5 acres in total size. The upper portion, including open water, is approximately 40 acres and the lower seasonal wetland is about 63.5 acres. The lake surface is held at approximately ten feet above MSL by the low dam separating the upper lake and the lower wetland portion. Below the dam, the wetland system is hydrologically controlled by an outlet weir with a low water culvert set at about five feet above MSL and a high water box weir set at about 8 feet above MSL.

Figure 2-14
Concrete dam separating Machado Lake and the lower wetland area.

Machado Lake is a receiving body of urban and stormwater runoff from storm drain systems covering an approximately 20 square-mile watershed. Figure 2-1 shows a schematic layout of drainage system discharging to Machado Lake. The lake water has a constant brownish-yellow color with a red tint in the summer months. The lake is bordered by a golf course on the east side and a grassy park area on the west side. There is a marsh area at the upper north end of the lake downstream of the Wilmington Drain discharge point. This area is heavily vegetated with aquatic plants including cattails and reed plants. The lower end of the lake is bounded by a concrete dam. Water from the lake overflows the concrete dam to a wetland area prior to flowing out to the ocean through the Harbor Outflow located at the southeast corner of the park. The Harbor Outflow structure is connected to the West Basin of Los Angeles Harbor.

Limited lake water quality data are available for review. The following subsections summarize lake water quality data from various references as well as field sample collection conducted as part of this project study.

2.4.1 Monitoring Program Performed in 1974-1977

This monitoring program for Machado Lake was conducted during the period between August 1974 and September 1977. The program included basic water quality monitoring on a bi-weekly basis and water chemistry monitoring on a quarterly basis. Four sampling stations were located in the lake and four stations in Wilmington Drain (Figures 2-2 and 2-3). Sediment samples were collected from the same stations in the lake for analysis on an annual basis.

Sampling stations in Machado Lake:

Station	**Description**
L-1	North end of lake in heavy growth of tules (5 to 8 feet feet tall)
L-2	Central portion of lake with depths up to 8 feet, no rooted vegetation
L-3	Off the boat dock in the south end of the lake

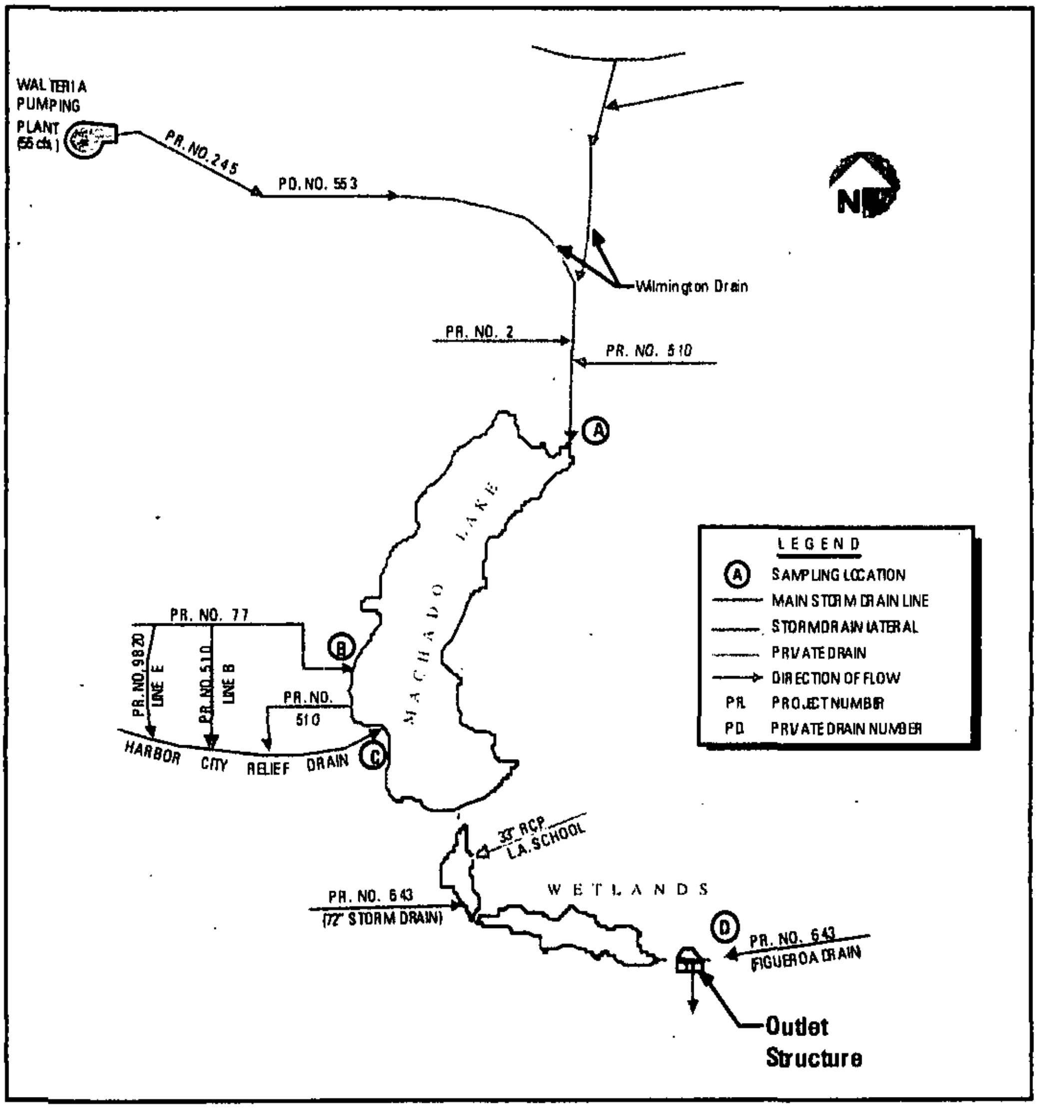

Figure 2-1
Schematic Layout of Drainage Systems Discharging to Machado Lake

L-4	South end of the lake, tules growing along the eastern side across from the boat-house
L-5	Outlet of Harbor Lake (now known as Machado Lake)
L-6	Leachate from landfill at the south end of the lake (note: doesn't exist at present
L-7	Lake water into which leachate drain (doesn't exist at present)

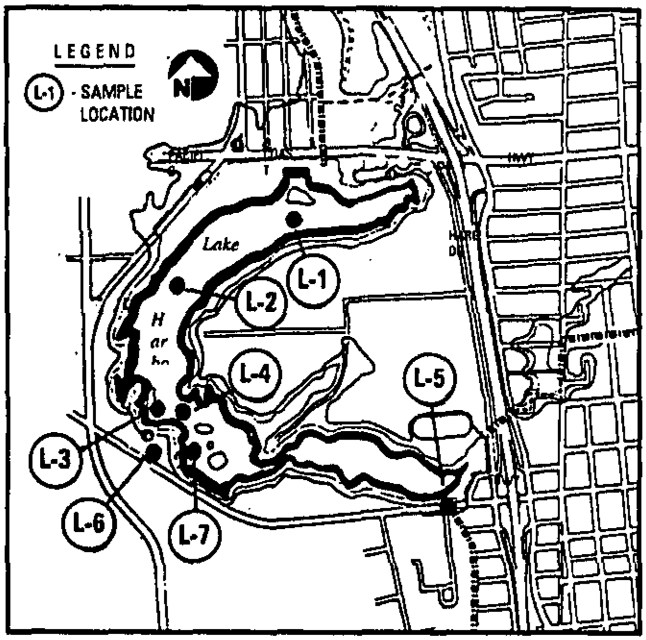

Figure 2-2
Sample Locations Within Harbor Lake (1974-1977)

Sampling stations in Wilmington Drain:

Station	Description
D-1	SD1201 at Sepulveda and Figueroa Street
D-2	PD553 at Harbor Freeway
D-3	Under Harbor Freeway at the Joint Water Pollution Control Plant (JWPCP)
D-4	Southern end of culvert under Pacific Coast Highway

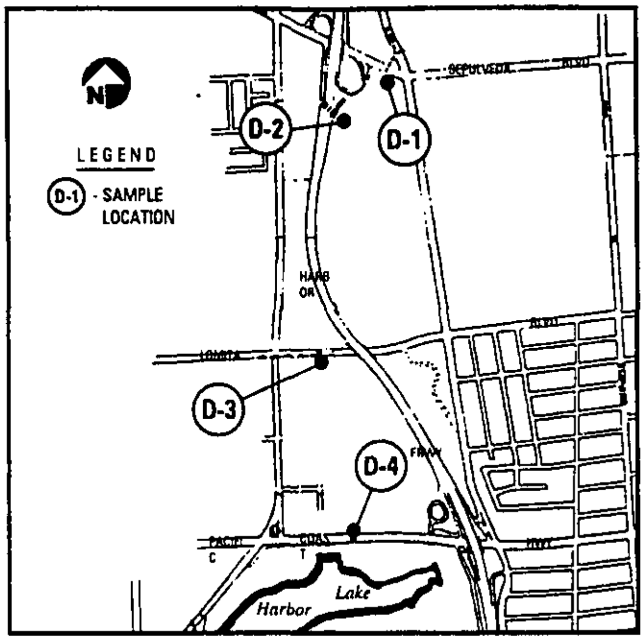

Figure 2-3
Sample Locations Within Wilmington Drain

Water Analyses of Harbor Lake

Only slight differences in the water quality parameters were recorded between the Harbor Lake stations at any given bi-weekly or quarterly sampling date. Much larger differences exist between samples taken on different dates. Two-way analysis of variance was used to determine the significance of these two types of variation for several of the water quality parameters.

Nitrate (NO_3), phosphate (PO_4), total dissolved solids (TDS), biochemical oxygen demand (BOD_5), chemical oxygen demand (COD), dissolved oxygen (DO) and temperature were found to be not significantly different between the four stations during 1975 on any given sampling date. In contrast, all parameters except temperature exhibited significant seasonal differences. Based on the conclusion of the report, the data collected from Harbor Lake during the course of the monitoring program indicated that the water quality objective for inland surface waters were being met. Although the concentration of dissolved oxygen periodically dropped below the 5.0 mg/l water quality objective, it was the result of natural, non-controllable, water quality factors. TDS concentrations within the lake water were below 500 mg/l during all but one of the quarterly samplings. During July 1976, the mean TDS concentration was 730 mg/l. This elevated value is directly attributable to the drought condition at that time.

Other water quality parameters that were monitored included oil and grease, conductivity, and pH. Oil and grease concentrations were normally 1 mg/l or less. Conductivity fluctuated within a range from 225 μohms to 975 μohms, and pH within a range from 6.9 to 8.8.

Sediment Analyses of Harbor Lake

Mercury (Hg) and lead (Pb) concentrations increased throughout the lake since the first sampling. The mean concentration of Hg was 0.12 mg/l, 0.14 mg/l, and 0.37 mg/l for the years 1975, 1976, and 1977, respectively. During the same period, mean lead concentrations were 64 mg/l, 194 mg/l, and 224 mg/l.

Similarly, oil and grease concentrations showed a consistent increase throughout the lake. The mean oil and grease concentration was 695 mg/l, 988 mg/l, 2,338 mg/l for the three respective years. Total organic matter increased from an average of 2.4 and 7.1 percentage dry weight composition in 1975 and 1976 to 56.8 percent in 1977.

Nickel (Ni) was consistently found in the highest concentrations at the northern station, L-1. Concentrations of Chromium (Cr), Cadmium (Cd), Copper (Cu), Ni, and Zinc (Zn) were always the lowest at station L-3. The study suggested that constant agitation of the shallow water at station L-3 by paddle boat traffic (at that time) may be partially responsible for this decrease in deposition.

The total identifiable chlorinated hydrocarbons (TICH) in the samples were uniformly low in 1975. Biological samplings of sediment at all four stations in Harbor Lake were conducted on January 7, 1975. Station L-3 had the highest density of oligochaetes (annelid worms) and was the only station to have chironomid (midge) larvae. Oligochaetes were found at all other stations, but in lesser quantities.

Bottom sediments were not found to be homogeneous throughout the lake. The general characteristics of each sample are summarized below:

Station	Observations
L-1	Gray-black, plant fragments plentiful, no sulfide odor
L-2	Gray-black mud, sulfide odor present
L-3	Grainy mud, much sand, no sulfide odor
L-4	Dark brown surface mud, gray-green clay beneath mud, no sulfide odor

Wilmington Drain Analyses

The sampling stations exhibited similar trends throughout the period of observation. Both algae and surface scum were most frequently observed at Station D-1. Insects were observed throughout the year at Station D-3, and only during the summer months at Stations D-1 and D-4, and were never observed at Station D-2. Gnats and dragonflies were the insects most commonly recorded.

In summary the report concluded that during the monitoring period the lake did not appear to have been adversely affected by man-induced changes in the surrounding environment. The high turbidity of the lake is largely attributable to the composition of the soil in that area. The increase in water temperature and TDS were a reflection of the continuing drought condition that existed in this area.

2.4.2 Monitoring Program Performed in 1991-1993

The "Evaluation of Water Quality for Selected Lakes in the Los Angeles Hydrologic Basin – Final Report" submitted to the California Regional Water Quality Control Board, Los Angeles Region by the University of California, Riverside in April 1994, provided the results of a water quality study for 23 lakes in the Los Angeles area, including Machado Lake (then Harbor Lake), during the period 1992-1993.

Machado Lake was sampled 12 times from July 1992 to June 1993. Because the lake was so shallow, only surface samples could be collected. A single sampling station was located in the middle of the lake near the east side (Figure 2-4). Water parameters analyzed included physical characteristics, general minerals, nutrients, organics, volatile organics, and trace elements.

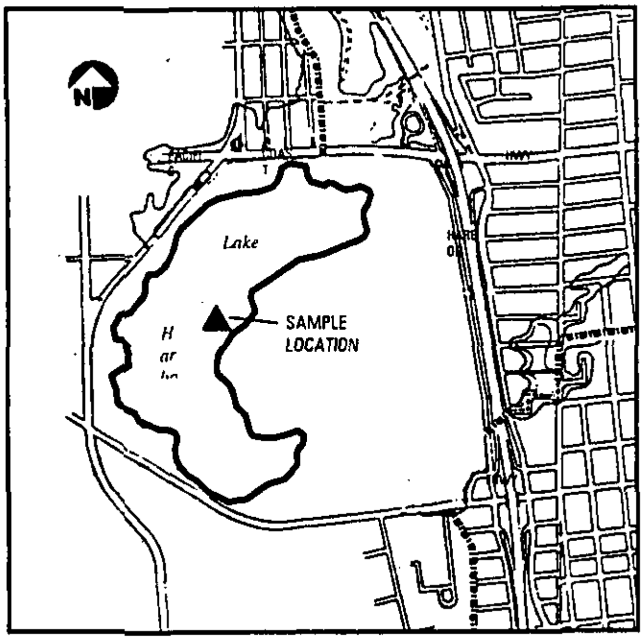

Figure 2-4
Sample Location at Machado Lake (1992-1993)

Fish tissue analysis was also conducted during the period 1991 and 1992 by the California Department of Fish and Game.

Results of Machado Lake (then Harbor Lake) water quality study are summarized below:

Physical Condition. Water temperatures varied greatly with time of sampling with the lowest average of 11°C in December 1992 and the highest average of 30°C in August, 1992. The shallow water limited temperature stratification in the water column. Usually the temperature decreased slightly with depth. The DO levels were always greater than 5 mg/l. Secchi depths[1] ranged from 1 to 5 feet.

[1] Secchi Depth is a simple method for assessing the clarity of the lake. A Secchi disk is a circular plate divided into quarters painted alternately black and white. The disk is attached to a rope and lowered into the water until it is no longer visible. Secchi disk depth, then, is a measure of water clarity. Higher Secchi readings mean more rope was let out before the disk disappeared from sight and indicates clearer water.

Minerals and Nutrients. The quality of the water in Machado Lake varied greatly during the year of sampling. The major cause of the variation was storm water runoff in the lake in December 1992 and January 1993. Major cations found in the lake were sodium and calcium. Alkalinity, chloride and sulfate all contributed to the anions in the water. The lake has the second highest average phosphorus content among the 23 lakes in Southern California monitored, and thus ranked high according to the Carlson's Trophic State Index (TSI) for total phosphorus.

Trace Elements. Generally trace element concentrations were below the Inland Surface Waters Plan water quality objectives. Cu and Pb were found in elevated levels for two sampling times.

Toxicity. Some organics were detected but mostly at the levels below standards. Heptachlor and heptachlor epoxide were found at levels above the Department of Health Services maximum contaminant level (MCL) of 0.01 µg/l in a few samples. A suite of organics (chlordane, dieldrin, oxadiazon, and polychlorinated biphenyls (PCB) was found in a 1991 fish tissue sample, but none were detected in a sample from 1992.

The study rated the Machado Lake water quality as highly impaired based on nutrients, organics, productivity, and aesthetics. The most likely source of nutrients is from fertilizers applied to lawns, parks, and golf courses. To improve the water quality of the Machado Lake, the report recommended park cleanup, nutrient reduction, and metal reduction.

2.4.3 Current Water Quality Sampling

During the course of this project study, three lake water quality sampling events were conducted. One sampling event occurred during the wet period (March 6, 2001) and two sampling events occurred during the dry period (May 22, 2001 and June 27, 2001).

Seven sampling locations were identified within KMHRP for this study (Figure 2-5). These sampling locations represent runoff influent to Machado Lake and the wetland area, lake water, and effluent from KMHRP.

The sampling locations are described below.

Station	Description
A	Wilmington Drain outlet at the north end of KMHRP
B	Project 77 - Drain outlet west side of lake
C	Project 510 - Harbor City Relief Drain outlet west side of lake immediately north of the Boat House
D	Project No. 643 - Figueroa Street Drain outlet at southeast corner of KMHRP off of Figueroa Place
E	Harbor Outflow structure, southeast corner of KMHRP off of Anaheim Street
F	Lake water in northern portion of lake
G	Lake water in southern portion of lake

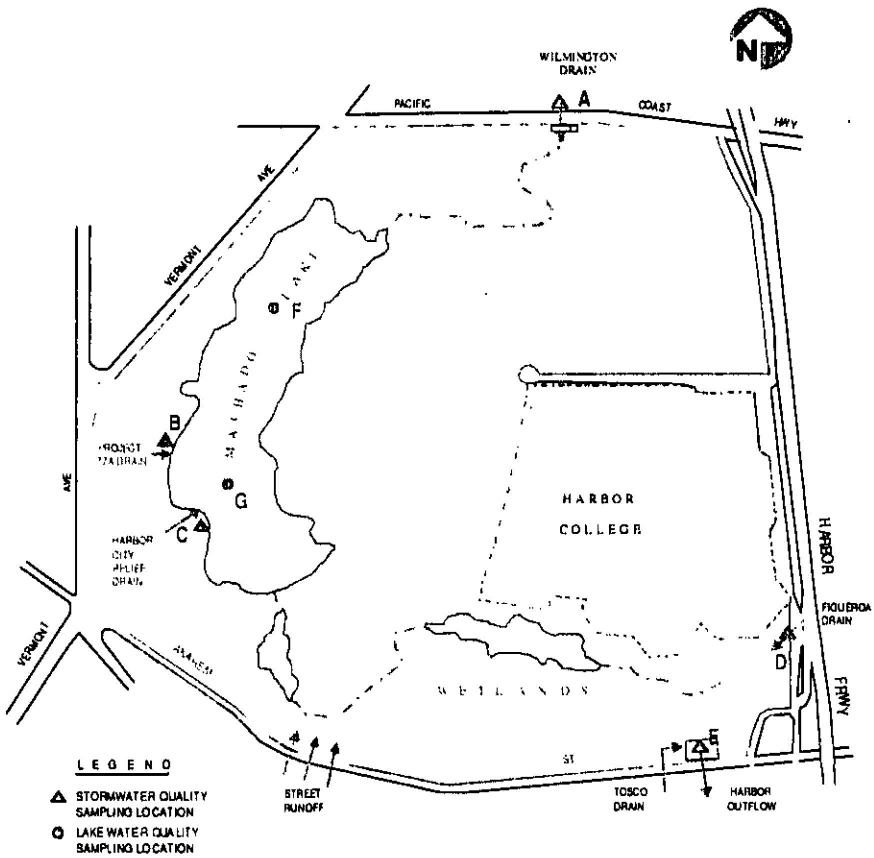

Figure 2-5 Current Water Quality Sampling Locations at Machado Lake

Water samples were analyzed for physical characteristics, nutrients, coliform bacteria, trace metals, organochlorine pesticides, polychlorinated biphenyls (PCB), and polynuclear aromatic hydrocarbons (PAH). A summary of the results of the wet weather and first dry weather sampling events is provided below.

Wet Weather Sampling Event (March 6, 2001)

The 100 percent chance of precipitation predicted for March 6, 2001 did not materialize. However, heavy rainfall occurred on March 5 and runoff was still discharging to and from KMHRP during the sampling activities. The water level of the lake was very high, with water discharging over the concrete dam and blocking the dam from sight. Discharge at the Harbor Outfall structure was extremely heavy. Water was discharging over the concrete wall surrounding the outfall structure. The top of the concrete wall is the same elevation as the concrete dam south of the lake. A lot of floating trash was observed discharging into the lake (i.e., styrofoam cups, plastic bottles, aluminum cans, paper goods, etc.).

Physical Conditions. The pH values for the influent to KMHRP ranged from 7.9 to 8.3. The pH of the lake water was 7.4 to 7.5, and the effluent pH was 7.3. The temperature of the water samples did not vary greatly. The temperatures of the influent ranged from 16.5°C to 18.0°C, while the temperature of the lake water was 15.1°C to 16.5°C. The temperature at the outfall was 17.1°C. DO concentrations were above 5 mg/l for all samples. BOD_5 concentrations measured in the influent samples averaged less than 5 mg/l. The lake water samples and the effluent sample had BOD_5 concentrations ≤ 2 mg/l. TSS concentrations in the influent samples ranged from 5 mg/l to 172 mg/l with the highest concentration measured at the Wilmington Drain. TSS concentrations in the lake water varied between 35 mg/l to 72 mg/l with the highest concentration being measured in the northern portion of the lake, which is immediately downstream of Wilmington Drain. The effluent had a TSS concentration of 77 mg/l.

Nutrients. Total phosphorus concentrations in the influent samples ranged from 0.23 mg/l to 0.92 mg/l and the lake water samples showed a total phosphorus concentration approximately 0.44 mg/l. The total phosphorus concentration at the outfall was 0.38 mg/l. NO_3 concentrations in the influent ranged from 0.67 mg/l to 0.92 mg/l while the NO_3 concentrations in the lake water were around 0.30 mg/l and the effluent was 0.35 mg/l.

Coliform Bacteria. All seven samples showed total and fecal bacteria results to be >1,600 MPN/100 ml. The test for coliform bacteria did not utilize the correct dilutions to show counts above 1,600 MPN/100 ml.

Trace Metals. Of the 17 trace metals analyzed, only four were consistently measured at less than the practical quantitative limits (PQLs) at all sampling locations (beryllium, mercury, selenium, and silver). Sampling Station B showed a copper (Cu) concentration of 97 µg/l, while the other influent samples had Cu concentrations around 16 µg/l. Lake water samples had Cu concentrations around 12 µg/l and the effluent was measured at approximately 9 µg/l. Lead (Pb) concentrations in the influent samples averaged around 9 µg/l with lake water measuring around 6.5 µg/l and the effluent measuring around 5 µg/l. Zinc (Zn) concentrations were also high, ranging from 77 µg/l to 93 µg/l in the influent samples, around 68 µg/l in the lake, and 49 µg/l in the effluent sample. Trace metals results were compared to ecological data quality levels (EDQL) (USEPA, 2001). EDQLs are initial screening levels identify which parameters are most likely to pose an unacceptable risk to the environment. Water with which site contaminant concentrations can be compared to quality sample results exceeded the EDQLs for five metals: Cu, Pb, thallium (Th), vanadium (V), and Zn. Cu, Pb, and Th concentrations exceeded the EDQLs (5 µg/l, 1.3 µg/l, and 0.56 µg/l respectively) at all of the sampling locations. Zn concentrations exceeded the EDQL for Zn (58.9 µg/l) at all of the sampling locations with the exception of the outfall. V concentrations exceeded the EDQL for V (19 µg/l) in the samples collected at Sampling Stations A and B.

Toxicity. Organochlorine pesticides, PCBs, and PAHs were all detected below the PQLs at all seven sampling stations.

Dry Weather Sampling Event (May 22, 2001)

The first dry weather sample was collected on May 22, 2001. Only four sampling locations were sampled due to lack of runoff flow at some sampling locations. The water level of the lake was approximately 6 to 12 inches below the concrete dam at the south side of the lake. Influent samples were collected at Sampling Stations B and C and both lake stations were sampled. There was no dry weather runoff entering KMHRP from the Wilmington Drain and Figueroa Drain. There was also no discharge from KMHRP at the outfall structure. Floating trash was observed in the discharge to the lake.

Physical Conditions. The pH values for the influent to KMHRP were in the low 8s while the pH values in the lake water were in the high 7s. The temperature of the water samples did not vary greatly, however, the influent temperatures were a few degrees less than the lake water (temperatures in the low 20s°C). DO concentrations were above 5 mg/l for all samples, with influent samples measuring around 9 mg/l. BOD_5 concentrations measured in the influent samples ranged from <2 mg/l to 25 mg/l (Sampling Station B) and 26 mg/l in the lake water. TSS concentrations in the influent samples were low measuring 6 mg/l while the TSS concentrations in the lake water samples were around 26 mg/l.

Nutrients. Total phosphorus concentrations in the influent samples ranged from 0.24 mg/l to 2.09 mg/l and the lake water samples showed a total phosphorus concentration approximately 1.2 mg/l. NO_3 concentrations in the influent ranged from 0.5 mg/l to 0.83 mg/l while the NO_3 concentrations in the lake water were less than the detection limit (0.4 mg/l).

Coliform Bacteria. Sampling Station B showed total and fecal coliform bacteria counts of 59,400 MPN/100 ml and 6,790 MPN/100 ml, respectively and Sampling Station C showed total and fecal coliform bacteria counts of 2,070 MPN/100 ml and 402 MPN/100 ml, respectively. The lake water samples showed total and fecal coliform bacteria counts to be <200 MPN/100 ml.

Trace Metals. Of the 17 trace metals analyzed, only four were consistently measured at less than the PQLs at all sampling locations (beryllium, selenium, silver, and thallium). The equipment blank (collected using the sampling equipment for the lake water sampling) for this sampling event showed contamination for several of the metals (Cd, Cu, Pb, Hg, Ni, and Zn). Cu concentrations in the influent samples ranged from 15 to 24 µg/l and the lake water samples had Cu concentrations below the PQL for Cu (10 µg/l). Pb concentrations in the influent samples ranged from17.6 µg/l to 19 µg/l. The lake water sample results are questionable due to contamination of the equipment blank. The Ni concentration at Sampling Station C was 65 µg/l. Zn concentrations were also high, ranging from 79 µg/l to 116 µg/l in the influent samples. Again lake water Zn concentrations are suspect due to contamination of the equipment blank for lake water sampling. As for the wet weather sample results, trace metals results were compared to EDQLs (USEPA, 2001). Cu and Pb concentrations exceeded the EDQL for Cu and Pb (5 µg/l and 1.3 µg/l, respectively) at all dry weather sampling stations. Cu concentrations in the lake are suspect because the equipment blank had a Cu concentration of 6.5 µg/l. Zn concentrations exceeded the EDQL for Zn (58.9 µg/l) at Sampling Stations B and C.

Toxicity. Organochlorine pesticides, PCBs, and PAHs were all detected below the PQLs at all four sampling stations.

Based on water quality results from the wet and dry weather sampling events, water quality in Machado Lake is impaired due to metals and aesthetics. Influent to the lake shows elevated concentrations of metals, fecal coliform, and trash. To improve the water quality of the lake, trash needs to be removed along with reducing metals influent to the lake.

Dry Weather Sampling Event (June 27, 2001)

The second dry weather sample was collected on June 27, 2001. Only five sampling locations were sampled due to unavailability of runoff flow at some sampling locations. The water level of the lake was approximately 6 to 12 inches below the concrete dam at the south side of the lake. Influent samples were collected at Sampling Stations A, B, and C and both lake water sampling locations were sampled. There was no dry weather runoff entering KMHRP from the Figueroa Drain. There was also no discharge from KMHRP at the outfall structure. Field parameters (pH, temperature, conductivity, and DO) for Sampling Stations B and C were not measured due to a lack of sample.

Physical Conditions. The pH values for the influent to KMHRP from Sampling Station A was 7.4 while the pH values in the lake water were in the high 7s. The temperature of the water samples did not vary greatly, however, the influent temperature was slightly lower than the lake water (temperatures in the mid 20s°C). DO concentrations were above 5 mg/l for all samples, with influent samples measuring around 6 mg/l. BOD_5 concentrations measured in the influent samples ranged from <4.9 mg/l to 57 mg/l (Sampling Station B) and 4.2 mg/l to 8.9 mg/l in the lake water. TSS concentrations in the influent samples were low measuring <4 mg/l, with the exception of Sampling Station B which measured 100 mg/L. TSS concentrations in the lake water samples ranged from 14 mg/l to 23 mg/l. Total dissolved solids (TDS) concentrations in the influent ranged from 405 mg/l to 1,780 mg/l (Sampling Station A) while the TDS concentrations in the lake were in the mid to high 500 mg/l range.

Nutrients. Total phosphorus concentrations in the influent samples ranged from 0.34 mg/l to 0.5 mg/l and the lake water samples showed a total phosphorus concentration approximately 1.2 mg/l. NO_3 concentrations in the influent ranged from <0.4 mg/l to 0.6 mg/l while the NO_3 concentrations in the lake water were less than the detection limit (0.2 mg/l).

Coliform Bacteria. Sampling Station A showed total and fecal coliform bacteria counts of 2,860 MPN/100 ml, while Sampling Station B showed total and fecal coliform bacteria counts >1,600 MPN/100 ml. Sampling Station C showed total and fecal coliform bacteria counts of 300 MPN/100 ml. The lake water samples showed total and fecal coliform bacteria counts for 170 MPN/100 ml to 300 MPN/100ml.

Trace Metals. Of the 17 trace metals analyzed, eight were consistently measured at less than the PQLs at all sampling locations (antimony, arsenic, beryllium, cobalt, selenium, silver, thallium, and vanadium). The equipment blank for this sampling event showed some contamination for Zn. Cu concentrations in the influent samples ranged from 14 μg/l to 83 μg/l (Sampling Station B) and the lake water samples had Cu concentrations below the PQL for Cu (10 μg/l). Mercury (Hg) concentrations were a little higher in the influent 0.7 μg/l to

1.8 μg/l (Sampling Station C) than in the lake water 0.5 μg/l to 1.0 μg/l. Sampling Station B had elevated levels of both Pb (16 μg/l) and Zn (159 μg/l). Sampling Station A had the highest Ni concentration at 31 μg/l. As for the other two sample results, trace metals results were compared to EDQLs (USEPA, 2001). Cu concentrations exceeded the EDQL for Cu (5 μg/l) at Sampling Stations B and C. Pb and Zn concentrations exceeded the EDQL for Pb (1.3 μg/l) and Zn (58.9 μg/l) at Sampling Station B. Ni concentrations exceeded the EDQL for Ni (24 μg/l) at Sampling Station A. Hg concentrations exceeded the EDQL for Hg (0.0013 μg/l) at Sampling Stations B, C, F, and G.

Toxicity. Organochlorine pesticides, PCBs, and PAHs were all detected below the PQLs at all five sampling stations.

Based on water quality results from the wet and dry weather sampling events, water quality in Machado Lake is impaired due to metals and aesthetics. Influent to the lake shows elevated concentrations of metals, fecal coliform, and trash. To improve the water quality of the lake, trash needs to be removed along with reducing metals influent to the lake.

2.5 LAKE BATHYMETRY

An updated bathymetric map, using new depth measurements, of Lake Machado was required for:

1. analysis of sedimentation patterns, which reveal long-term circulation patterns;
2. evaluation and design of a sediment dredging scenario; and
3. design of the artificial islands.

On April 10, 2001, Parsons performed a field survey to collect bathymetric data in Lake Machado. Bathymetric data are the distance from the water surface, which is a horizontal planar surface, to the sediment surface of the lake bottom. The data were gathered with a multi-frequency acoustic profiler in conjunction with a multi-channel global positioning system (GPS) to simultaneously record the bathymetric data and the location of the data points. The acoustic profiler utilized multi-frequency sonar to derive depth measurements while the GPS utilizes satellites to obtain position fixes. Both the acoustic profiler and the GPS unit were connected to a laptop field computer that digitally recorded the information generated by each unit.

The field survey equipment was mounted in an inflatable boat driven by an electric trolling motor. An earlier optical survey established an elevation datum so that the absolute elevation of the water surface could be recorded during the bathymetric survey. During the bathymetric survey, the depth data from the acoustic profiler, along with the location data from the GPS, were continuously recorded along transects along the length and width of the lake to provide sufficient spatial coverage to allow contouring of the data points for the development of a detailed lake bathymetric map. The boat moved in relatively straight transect lines at a speed of 3 to 4 miles per hour. More than 3,000 depth measurements were obtained during the field survey.

KEN MALLOY HARBOR REGIONAL PARK (WET WEATHER SAMPLING)

SAMPLING EVENT: March 6, 2001

								Lake Water		FD	EB
Station ID		**PQL**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H (C)**	**I**
Grab 1	Time		11:05	10:35	10:25	10:48	10:30	12:45	1:10	10:25	9:55
Grab 2	Time		11:50	11:30	11:25	11:20	11:10			11:27	
Grab 3	Time		12:30	12:15	12:05	12:12	12:00			12:02	
Composite	pH		7.9	8.3	8.0	8.0	7.3	7.5	7.4	8.0	7.3
	Flow (cfs)										
	Temp. (°F)		16.5	17.1	17.6	17.6	17.1	16.5	15.1	18.3	19.4
	Cond. (umhos/cm)		0.17	0.44	0.21	0.21	0.12	0.09	0.09	0.22	0.002
	DO (mg/l)		7.9	7.5	7.7	7.7	7.1	6.6	6.9	7.3	7.6
Laboratory Analysis	Ammonia (mg/l)	0.2	0.2	0.3	0.1	<0.2	<0.2	<0.2	<0.2	0.2	<0.2
	BOD5 (mg/l)	2	4.4	5.1	5.3	2	2	1	<2	4.6	<2
	Chlorophyll (mg/l)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ortho Phosphorus (mg/l)	0.02	0.41	0.62	0.43	0.21	0.27	0.28	0.29	0.45	<0.02
	Total Phosphorous (mg/l)	0.1	0.61	0.92	0.59	0.23	0.38	0.43	0.46	0.53	<0.1
	TSS (mg/l)	4	172	59	94	5	34	72	35	77	<4
	TVS (mg/l)	10	67	78	49	<10	25	23	20	53	<10
	Chromium (VI) (mg/l)	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Total Coliform (MPN/100 ml)		>1600	>1600	>1600	>1600	>1600	>1600	>1600	>1600	>1600
	Fecal Coliform (MPN/100 ml)		>1600	>1600	>1600	>1600	>1600	>1600	>1600	>1600	>1600
	Nitrate (mg/l)	0.04	0.67	0.85	0.89	0.23	0.35	0.31	0.32	0.94	0.02
	Nitrite (mg/l)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	TTLC 17 Metals										
	Antimony (ug/L)	10	<10	4.8	<10	<10	<10	<10	<10	<10	<10
	Arsenic (ug/L)	5	4.3	7.4	6.7	4	3.6	3.4	3.7	5.7	<5
	Barium (ug/L)	10	123	118	76	17	48	62	60	83	<10
	Beryllium (ug/L)	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Cadmium (ug/L)	2	1.2	0.7	0.7	0.3	0.4	0.6	0.63	0.42	<2

								Lake Water		EB	FD
Station ID		PQL	A	B	C	D	E	F	G	H	I (C)
	Chromium (ug/l)	5	17	10	10	4.1	5.9	13.0	13.6	11	2.6
Laboratory Analysis (con't)	Cobalt (ug/L)	5	3.3	2.0	2.8	0.66	1.1	1.5	1.8	2.7	0.45
	Copper (ug/L)	10	16.4	96.8	16.6	8	8.8	12.4	11.1	17.2	<10
	Lead (ug/L)	5	5.2	7.7	17.8	5.2	5.1	6.8	6.1	8.4	<5
	Mercury (ug/L)	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Molybdenum (ug/L)	5	6.0	8.3	3.7	<5	4.0	2.7	3.1	3.4	<5
	Nickel (ug/L)	5	23.3	21.2	11.6	3.4	7.6	11.7	16.4	12.8	<5
	Selenium (ug/L)	10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Silver (ug/L)	10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Thallium (ug/L)	10	1.8	2.7	2.5	3.1	3.3	3.8	<10	<10	<10
	Vanadium (ug/L)	10	33.8	22.2	17.0	4	9.5	15.9	16.2	18.8	<10
	Zinc (ug/L)	10	77.4	92.5	83.8	78.8	48.7	68.8	67.9	91.7	<10
	Organochlorine Pesticides										
	Aldrin (ug/L)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Beta BHC (ug/L)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Alpha BHC (ug/L)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Delta BHC (ug/L)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Gamma BHC (Lindane) (ug/L)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Alpha-chlordane (ug/L)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Gamma-chlordane (ug/L)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	P,P'-DDD (ug/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	P,P'-DDE (ug/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	P,P'-DDT (ug/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Dieldrin (ug/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Alpha Endosulfan (ug/L)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Beta Endosulfan (ug/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endosulfan sulfate (ug/L)	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endrin (ug/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endrin Aldehyde (ug/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Endrin Ketone (ug/L)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Heptachlor (ug/L)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Heptachlor Epoxide (ug/L)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Methoxychlor (ug/L)	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Toxaphene (ug/L)	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	PCBs										

Station ID		PQL	A	B	C	D	E	F	G	H	I (C)
								Lake Water		EB	FD
	PCB-1016 (Arochlor 1016) (ug/L)	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Laboratory Analysis (con't)	PCB-1221 (Arochlor 1221) (ug/L)	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	PCB-1232 (Arochlor 1232) (ug/L)	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	PCB-1242 (Arochlor 1242) (ug/L)	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	PCB-1248 (Arochlor 1248) (ug/L)	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	PCB-1254 (Arochlor 1254) (ug/L)	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	PCB-1260 (Arochlor 1260) (ug/L)	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Polynuclear Aromatic HC (PAH)										
	Acenaphthene (ug/L)	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Acenaphthylene (ug/L)	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Anthracene (ug/L)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Benzo(A)anthracene (ug/L)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Benzo(A)pyrene (ug/L)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Benzo(B)fluranthene (ug/L)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Benzo(G,H,I)perylene (ug/L)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Benzo(K)fluoranthene (ug/L)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Chrysene (ug/L)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Dibenz(A,H)anthracene (ug/L)	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene (ug/L)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Fluorene (ug/L)	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Indeno(1,2,3-C,D)pyrene (ug/L)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Naphtalene (ug/L)	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Phenathrene (ug/L)	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Pyrene (ug/L)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

FD = Field Duplicate, EB = Equipment Blank

PQL = Practical Quantitation Limit

Remark:

Duplicate sample for Sampling Location C was designated as Sample Location H

KEN MALLOY HARBOR REGIONAL PARK (DRY WEATHER SAMPLING)

SAMPLING EVENT: MAY 22, 2001

							Lake Water		FD	EB
Station ID		PQL	A	B	C	D	E	F	G	H (G)	I
Grab 1	Time		-	9:16	9:00	-	-	11:30	11:55	11:55	10:10
Grab 2	Time		-	10:05	10:00	-	-				
Grab 3	Time		-	11:05	11:00	-	-				
Composite											
	pH		-	8.2	8.4	-	-	7.9	7.8	8.1	6.3
	Flow (cfs)										
	Temp. (°F)		-	21.3	20.5	-	-	22.8	23.3	24	21.4
	Cond. (umhos/cm)		-	1.20	0.67	-	-	0.78	0.77	0.77	0.008
	DO (mg/l)		-	9.2	8.9	-	-	5.9	6.3	6.2	8.9
Laboratory Analysis	Ammonia (mg/l)	0.2	-	0.41	0.3	-	-	0.1J	0.1J	0.2J	<0.2
	BOD5 (mg/l)	2	-	25	<2	-	-	8.1	5.1	4.6	<2
	Chlorophyll (mg/l)	0.1	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
	Ortho Phosphorus (mg/l)	0.02	-	1.40	0.18	-	-	0.84	0.72	0.69	<0.02
	Total Phosphorous (mg/l)	0.1	-	2.09	0.24	-	-	1.2	1.4	1.0	<0.1
	TSS (mg/l)	4	-	6	6	-	-	26	25	28	<4
	TVS (mg/l)	10	-	67	59	-	-	110	110	78	<10
	Chromium (VI) (mg/l)	0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01
	Total Coliform (MPN/100 ml)		-	59,400	2,070	-	-	<200	45J	<200	<2
	Fecal Coliform (MPN/100 ml)		-	6,790	402	-	-	<200	<200	<200	<2
	Nitrate (mg/l)	0.04	-	0.50	0.83	-	-	<0.4	0.4	<0.4	0.06
	Nitrite (mg/l)	0.05	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.05
	TTLC 17 Metals										
	Antimony (ug/L)	10	-	5.0J	<10	-	-	3.2J	4.2J	3.7J	<10
	Arsenic (ug/L)	5	-	<5	<5	-	-	1.9J	<5	<5	<5
	Barium (ug/L)	10	-	67.7	57	-	-	95	104	105	1.7J
	Beryllium (ug/L)	2	-	<2	<2	-	-	<2	<2	<2	<2
	Cadmium (ug/L)	2	-	2.2	1.9J	-	-	1.9J	1.9J	1.8J	2.3

								Lake Water		FD	EB
Station ID		PQL	A	B	C	D	E	F	G	H (G)	I
	Chromium (ug/l)	5	-	1.8J	2.8J	-	-	<5	<5	<5	<5
Laboratory Analysis (con't)	Cobalt (ug/L)	5	-	0.85J	1.1J	-	-	0.27J	0.45J	0.32J	<5
	Copper (ug/L)	10	-	23.7	15.5	-	-	5.8J	7.2J	4.2J	6.5J
	Lead (ug/L)	5	-	17.6	19	-	-	17.5	17.1	15.4	15.3
	Mercury (ug/L)	0.5	-	0.24J	0.20J	-	-	0.20J	0.22J	0.20J	0.20J
	Molybdenum (ug/L)	5	-	8.4	5.1	-	-	5.6	5.7	5.5	<5
	Nickel (ug/L)	5	-	8.3	65.4	-	-	4.9J	7.6	5.1	1.2J
	Selenium (ug/L)	10	-	<10	<10	-	-	<10	<10	<10	<10
	Silver (ug/L)	10	-	<10	<10	-	-	<10	<10	<10	<10
	Thallium (ug/L)	10	-	<10	<10	-	-	<10	<10	<10	<10
	Vanadium (ug/L)	10	-	4.9J	4.4J	-	-	4.3J	5.3J	5.0J	<10
	Zinc (ug/L)	10	-	116	79	-	-	52	44.7	29.6	42.6
	Organochlorine Pesticides										
	Aldrin (ug/L)	0.05	-	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Beta BHC (ug/L)	0.05	-	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Alpha BHC (ug/L)	0.05	-	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Delta BHC (ug/L)	0.05	-	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Gamma BHC (Lindane) (ug/L)	0.05	-	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Alpha-chlordane (ug/L)	0.05	-	<2	<2	-	-	<2	<2	<2	<2
	Gamma-chlordane (ug/L)	0.05	-			-	-				
	P,P'-DDD (ug/L)	0.1	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
	P,P'-DDE (ug/L)	0.1	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
	P,P'-DDT (ug/L)	0.1	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
	Dieldrin (ug/L)	0.1	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
	Alpha Endosulfan (ug/L)	0.05	-	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Beta Endosulfan (ug/L)	0.1	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
	Endosulfan sulfate (ug/L)	0.5	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5
	Endrin (ug/L)	0.1	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
	Endrin Aldehyde (ug/L)	0.1	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
	Endrin Ketone (ug/L)	0.1	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
	Heptachlor (ug/L)	0.05	-	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Heptachlor Epoxide (ug/L)	0.05	-	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Methoxychlor (ug/L)	2	-	<2	<2	-	-	<2	<2	<2	<2
	Toxaphene (ug/L)	5	-	<5	<5	-	-	<5	<5	<5	<5
	PCBs										

								Lake Water		FD	EB
Station ID		PQL	A	B	C	D	E	F	G	H (G)	I
	PCB-1016 (Arochlor 1016) (ug/L)	2	-	<2	<2	-	-	<2	<2	<2	<2
Laboratory Analysis (con't)	PCB-1221 (Arochlor 1221) (ug/L)	5	-	<5	<5	-	-	<5	<5	<5	<5
	PCB-1232 (Arochlor 1232) (ug/L)	2	-	<2	<2	-	-	<2	<2	<2	<2
	PCB-1242 (Arochlor 1242) (ug/L)	2	-	<2	<2	-	-	<2	<2	<2	<2
	PCB-1248 (Arochlor 1248) (ug/L)	2	-	<2	<2	-	-	<2	<2	<2	<2
	PCB-1254 (Arochlor 1254) (ug/L)	1	-	<1	<1	-	-	<1	<1	<1	<1
	PCB-1260 (Arochlor 1260) (ug/L)	1	-	0.1J	<1	-	-	<1	0.2J	0.2J	0.1J
	Polynuclear Aromatic HC (PAH)										
	Acenaphthene (ug/L)	5	-	<5	<5	-	-	<5	<5	<5	<5
	Acenaphthylene (ug/L)	2	-	<2	<2	-	-	<2	<2	<2	<2
	Anthracene (ug/L)	0.2	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Benzo(A)anthracene (ug/L)	0.2	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Benzo(A)pyrene (ug/L)	0.2	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Benzo(B)fluranthene (ug/L)	0.2	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Benzo(G,H,I)perylene (ug/L)	0.2	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Benzo(K)fluoranthene (ug/L)	0.2	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Chrysene (ug/L)	0.2	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Dibenz(A,H)anthracene (ug/L)	0.5	-	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5
	Fluoranthene (ug/L)	0.2	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Fluorene (ug/L)	1	-	<1	<1	-	-	<1	<1	<1	<1
	Indeno(1,2,3-C,D)pyrene (ug/L)	0.2	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Naphtalene (ug/L)	5	-	<5	<5	-	-	<5	<5	<5	<5
	Phenathrene (ug/L)	1	-	<1	<1	-	-	<1	<1	<1	<1
	Pyrene (ug/L)	0.2	-	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2

FD = Field Duplicate, EB = Equipment Blank

\- = Samples were not collected from Sampling Locations A, D and E due to no flow.

PQL = Practical Quantitation Limit

J = reported between PQL and Method Detection Limit (MDL)

Remark:

Duplicate sample for Sampling Location G was designated as Sample Location H

KEN MALLOY HARBOR REGIONAL PARK (DRY WEATHER SAMPLING)

SAMPLING EVENT: June 27, 2001

			1			2		Lake Water		FD	EB
Station ID		**PQL**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H (B)**	**I**
Grab 1	Time		8:55	8:15	8:30	-	-	10:25	10:45	8:15	7:35
Grab 2	Time		9:53	9:15	9:25	-	-	-	-	9:15	-
Grab 3	Time		10:55	10:13	10:25	-	-	-	-	10:25	-
Composite	pH		7.4	*	*	-	-	7.9	7.7	*	6.9
	Flow (cfs)										
	Temp. (^{o}F)		24.5	*	*	-	-	24.8	25.5	*	20.1
	Cond. (umhos/cm)		2.13	*	*	-	-	0.85	0.85	*	0.03
	DO (mg/l)		6.2	*	*	-	-	6.0	6.1	*	7.2
Laboratory Analysis	Ammonia (mg/l)	0.2	0.3	0.52	0.49	-	-	0.3	0.3	0.4	0.2
	BOD5 (mg/l)	2	4.9	57	7.2	-	-	8.9	4.2	5.3	<2
	Chlorophyll (mg/l)	0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
	Ortho Phosphorus (mg/l)	0.02	0.49	0.40	0.33	-	-	1.02	1.19	0.37	<0.02
	Total Phosphorous (mg/l)	0.1	0.5	0.42	0.34	-	-	1	1.2	0.7	<0.1
	TSS (mg/l)	4	<4	100	<4	-	-	23	14	119	<4
	TDS (mg/l)	10	1,780	851	405	-	-	536	590	860	16
	Chromium (VI) (mg/l)	0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01
	Total Coliform (MPN/100 ml)		2,860	>1,600	300	-	-	300	170	19,000	<2
	Fecal Coliform (MPN/100 ml)		2,860	>1,600	300	-	-	300	170	2,860	<2
	Nitrate (mg/l)	0.04	<0.4	0.60	0.59	-	-	<0.2	<0.2	0.50	0.05
	Nitrite (mg/l)	0.05	<0.5	<0.5	<0.25	-	-	<0.25	<0.25	<0.5	<0.05
	TTLC 17 Metals										
	Antimony (ug/L)	10	<10	<10	<10	-	-	<10	<10	<10	<10
	Arsenic (ug/L)	5	<5	<5	<5	-	-	<5	<5	<5	<5
	Barium (ug/L)	10	115	127	58	-	-	135	123	129	<10
	Beryllium (ug/L)	2	<2	<2	<2	-	-	<2	<2	<2	<2

	Cadmium (ug/L)	2	<2	<2	<2	-	-	<2	<2	<2	<2

			1			2		Lake Water		FD	EB
Station ID		**PQL**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H (G)**	**I**
	Chromium (ug/l)	5	<5	<5	9	-	-	<5	5.8	8.8	<5
Laboratory Analysis (con't)	Cobalt (ug/L)	5	<5	<5	<5	-	-	<5	<5	<5	<5
	Copper (ug/L)	10	<10	83	14	-	-	<10	<10	74	<10
	Lead (ug/L)	5	<5	16	<5	-	-	<5	<5	7.1	<5
	Mercury (ug/L)	0.5	<0.5	0.7	1.8	-	-	0.52	0.99	<0.5	<0.5
	Molybdenum (ug/L)	5	40.0	5	<5	-	-	6.3	5.6	6.9	<5
	Nickel (ug/L)	5	31	12	<5	-	-	9.3	6.3	10.1	<5
	Selenium (ug/L)	10	<10	<10	<10	-	-	<10	<10	<10	<10
	Silver (ug/L)	10	<10	<10	<10	-	-	<10	<10	<10	<10
	Thallium (ug/L)	10	<10	<10	<10	-	-	<10	<10	<10	<10
	Vanadium (ug/L)	10	<10	<10	<10	-	-	<10	<10	<10	<10
	Zinc (ug/L)	10	31	159	50	-	-	30	30	93	17
	Organochlorine Pesticides										
	Aldrin (ug/L)	0.34	<0.34	<0.34	<0.34	-	-	<0.34	<0.34	<0.34	<0.34
	Beta BHC (ug/L)	0.23	<0.23	<0.23	<0.23	-	-	<0.23	<0.23	<0.23	<0.23
	Alpha BHC (ug/L)	0.35	<0.35	<0.35	<0.35	-	-	<0.35	<0.35	<0.35	<0.35
	Delta BHC (ug/L)	0.24	<0.24	<0.24	<0.24	-	-	<0.24	<0.24	<0.24	<0.24
	Gamma BHC (Lindane) (ug/L)	0.25	<0.25	<0.25	<0.25	-	-	<0.25	<0.25	<0.25	<0.25
	Chlordane (ug/L)	0.8	<0.8	<0.8	<0.8	-	-	<0.8	<0.8	<0.8	<0.8
	P,P'-DDD (ug/L)	0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5
	P,P'-DDE (ug/L)	0.58	<0.58	<0.58	<0.58	-	-	<0.58	<0.58	<0.58	<0.58
	P,P'-DDT (ug/L)	0.81	<0.81	<0.81	<0.81	-	-	<0.81	<0.81	<0.81	<0.81
	Dieldrin (ug/L)	0.44	<0.44	<0.44	<0.44	-	-	<0.44	<0.44	<0.44	<0.44
	Alpha Endosulfan (ug/L)	0.3	<0.3	<0.3	<0.3	-	-	<0.3	<0.3	<0.3	<0.3
	Beta Endosulfan (ug/L)	0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4
	Endosulfan sulfate (ug/L)	0.35	<0.35	<0.35	<0.35	-	-	<0.35	<0.35	<0.35	<0.35
	Endrin (ug/L)	0.39	<0.39	<0.39	<0.39	-	-	<0.39	<0.39	<0.39	<0.39
	Endrin Aldehyde (ug/L)	0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5
	Heptachlor (ug/L)	0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4
	Heptachlor Epoxide (ug/L)	0.32	<0.32	<0.32	<0.32	-	-	<0.32	<0.32	<0.32	<0.32
	Methoxychlor (ug/L)	0.86	<0.86	<0.86	<0.86	-	-	<0.86	<0.86	<0.86	<0.86

	Toxaphene (ug/L)	0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5
	PCBs										
			1			**2**		**Lake Water**		**FD**	**EB**
Station ID		**PQL**	A	B	C	D	E	F	G	H (G)	I
	PCB-1016 (Arochlor 1016) (ug/L)	1	<1	<1	<1	-	-	<1	<1	<1	<1
Laboratory Analysis (con't)	PCB-1221 (Arochlor 1221) (ug/L)	2	<2	<2	<2	-	-	<2	<2	<2	<2
	PCB-1232 (Arochlor 1232) (ug/L)	1	<1	<1	<1	-	-	<1	<1	<1	<1
	PCB-1242 (Arochlor 1242) (ug/L)	1	<1	<1	<1	-	-	<1	<1	<1	<1
	PCB-1248 (Arochlor 1248) (ug/L)	1	<1	<1	<1	-	-	<1	<1	<1	<1
	PCB-1254 (Arochlor 1254) (ug/L)	1	<1	<1	<1	-	-	<1	<1	<1	<1
	PCB-1260 (Arochlor 1260) (ug/L)	1	<1	<1	<1	-	-	<1	<1	<1	<1
	Polynuclear Aromatic HC (PAH)										
	Acenaphthene (ug/L)	5	<5	<5	<5	-	-	<5	<5	<5	<5
	Acenaphthylene (ug/L)	2	<2	<2	<2	-	-	<2	<2	<2	<2
	Anthracene (ug/L)	0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Benzo(A)anthracene (ug/L)	0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Benzo(A)pyrene (ug/L)	0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Benzo(B)fluranthene (ug/L)	0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Benzo(G,H,I)perylene (ug/L)	0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Benzo(K)fluoranthene (ug/L)	0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Chrysene (ug/L)	0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Dibenz(A,H)anthracene (ug/L)	0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<0.5
	Fluoranthene (ug/L)	0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Fluorene (ug/L)	1	<1	<1	<1	-	-	<1	<1	<1	<1
	Indeno(1,2,3-C,D)pyrene (ug/L)	0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2
	Naphtalene (ug/L)	5	<5	<5	<5	-	-	<5	<5	<5	<5
	Phenathrene (ug/L)	1	<1	<1	<1	-	-	<1	<1	<1	<1
	Pyrene (ug/L)	0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2

FD = Field Duplicate, EB = Equipment Blank

\- = Samples were not collected from Sampling Locations A, D and E due to no flow.

* = Field tests not run due to lack of sample

PQL = Practical Quantitation Limit

Remark:

Duplicate sample for Sampling Location B was designated as Sample Location H

Appendix C

Sediment Characterization Data

Applied P & Ch Laboratory

13760 Magnolia Ave. Chino CA 91710
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APCL Analytical Report

Submitted to:
Parsons Engineering Science
Attention: Devin Thor
100 W. Walnut Street
Pasadena CA 91124
Tel: (626)585-6000 Fax: (626)440-6200

Service ID #: 801-013584
Collected by:
Collected on: 05/14-15/01

Received: 05/16/01
Extracted: 05/17-18/01
Tested: 05/17-25/01
Reported: 05/30/01

Sample Description: Soil from KMHRP
Project Description:

Analysis of Soil Samples

Component Analyzed	Method	Unit	PQL	Analysis Result LT6 01-03584-1	LT1-W,C,E 01-03584-(2 to 4)	LT2-W,C,E 01-03584-(5 to 7)
CARBON, TOTAL ORGANIC (TOC)	415.1	mg/kg	100	-	10,400	4,620
CHROMIUM (VI)	7196	mg/kg	0.05	<0.05	<0.05	<0.05
TTLC 17 METALS						
Dilution Factor				1	1	1
ANTIMONY	SW6010B	mg/kg	5	0.15J	0.33J	0.22J
ARSENIC	SW6010B	mg/kg	0.3	2.2	2.9	3.2
BARIUM	SW6010B	mg/kg	1	127	186	168
BERYLLIUM	SW6010B	mg/kg	0.2	<0.2	<0.2	<0.2
CADMIUM	SW6010B	mg/kg	0.2	0.72	1.6	1.6
CHROMIUM	SW6010B	mg/kg	0.5	24.1	29.1	28.2
COBALT	SW6010B	mg/kg	0.5	4.7	6.2	5.2
COPPER	SW6010B	mg/kg	0.5	16.1	28.9	29.0
LEAD	SW6010B	mg/kg	0.3	15.5	34.0	61.7
MERCURY	SW7471A	mg/kg	0.2	0.056J	0.10J	0.10J
MOLYBDENUM	SW6010B	mg/kg	0.2	<0.2	1.5	1.6
NICKEL	SW6010B	mg/kg	0.3	18.3	27.9	26.5
SELENIUM	SW6010B	mg/kg	0.5	0.29J	0.99	0.93
SILVER	SW6010B	mg/kg	0.5	<0.5	<0.5	<0.5
THALLIUM	SW6010B	mg/kg	0.5	<0.5	<0.5	<0.5
VANADIUM	SW6010B	mg/kg	0.5	40.8	46.8	41.3
ZINC	SW6010B	mg/kg	0.5	49.3	130	141
Dilution Factor				1	5	5
PHC AS DIESEL FUEL	M8015E	mg/kg	10	17	140	120
Dilution Factor				1	5	5
MOTOR OILS	M8015E	mg/kg	10	33	320	250

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Component Analyzed	Method	Unit	PQL	Analysis Result LT6 01-03584-1	LT1-W,C,E 01-03584-(2 to 4)	LT2-W,C,E 01-03584-(5 to 7)
VOLATILE ORGANICS						
Dilution Factor				1	1	1
ACETONE	SW8260B	µg/kg	100	39J	49J	52J
BENZENE	SW8260B	µg/kg	5	<5	<5	<5
BROMOBENZENE	SW8260B	µg/kg	5	<5	<5	<5
BROMOCHLOROMETHANE	SW8260B	µg/kg	5	<5	<5	<5
BROMODICHLOROMETHANE	SW8260B	µg/kg	5	<5	<5	<5
BROMOFORM	SW8260B	µg/kg	5	<5	<5	<5
2-BUTANONE	SW8260B	µg/kg	100	<100	<100	<100
N-BUTYLBENZENE	SW8260B	µg/kg	5	<5	<5	<5
SEC-BUTYLBENZENE	SW8260B	µg/kg	5	<5	<5	<5
T-BUTYLBENZENE	SW8260B	µg/kg	5	<5	<5	<5
CARBON DISULFIDE	SW8260B	µg/kg	5	<5	<5	3J
CARBON TETRACHLORIDE	SW8260B	µg/kg	5	<5	<5	<5
CHLOROBENZENE	SW8260B	µg/kg	5	<5	<5	<5
DIBROMOCHLOROMETHANE	SW8260B	µg/kg	5	<5	<5	<5
CHLOROETHANE	SW8260B	µg/kg	5	<5	<5	<5
2-CHLOROETHYL VINYL ETHER	SW8260B	µg/kg	50	<50	<50	<50
CHLOROFORM	SW8260B	µg/kg	5	0.7J	1J	1J
1-CHLOROHEXANE	SW8260B	µg/kg	5	<5	<5	<5
CHLOROMETHANE	SW8260B	µg/kg	5	<5	<5	<5
2-CHLOROTOLUENE	SW8260B	µg/kg	5	<5	<5	<5
4-CHLOROTOLUENE	SW8260B	µg/kg	5	<5	<5	<5
1,2-DIBROMO-3-CHLOROPROPANE	SW8260B	µg/kg	5	<5	<5	<5
1,2-DIBROMOETHANE	SW8260B	µg/kg	5	<5	<5	<5
DIBROMOMETHANE	SW8260B	µg/kg	5	<5	<5	<5
1,2-DICHLOROBENZENE	SW8260B	µg/kg	5	<5	<5	<5
1,3-DICHLOROBENZENE	SW8260B	µg/kg	5	<5	<5	<5
1,4-DICHLOROBENZENE	SW8260B	µg/kg	5	<5	<5	<5
DICHLORODIFLUOROMETHANE	SW8260B	µg/kg	5	<5	<5	<5
1,1-DICHLOROETHANE	SW8260B	µg/kg	5	<5	<5	<5
1,2-DICHLOROETHANE	SW8260B	µg/kg	5	<5	<5	<5
1,1-DICHLOROETHENE	SW8260B	µg/kg	5	<5	<5	<5
CIS-1,2-DICHLOROETHENE	SW8260B	µg/kg	5	<5	<5	<5
TRANS-1,2-DICHLOROETHENE	SW8260B	µg/kg	5	<5	<5	<5
1,2-DICHLOROPROPANE	SW8260B	µg/kg	5	<5	<5	<5
1,3-DICHLOROPROPANE	SW8260B	µg/kg	5	<5	<5	<5
2,2-DICHLOROPROPANE	SW8260B	µg/kg	5	<5	<5	<5
1,1-DICHLOROPROPENE	SW8260B	µg/kg	5	<5	<5	<5
CIS-1,3-DICHLOROPROPENE	SW8260B	µg/kg	5	<5	<5	<5
TRANS-1,3-DICHLOROPROPENE	SW8260B	µg/kg	5	<5	<5	<5

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result LT6 01-03584-1	LT1-W,C,E 01-03584-(2 to 4)	LT2-W,C,E 01-03584-(5 to 7)
ETHYLBENZENE	SW8260B	µg/kg	5	<5	<5	<5
HEXACHLOROBUTADIENE	SW8260B	µg/kg	5	<5	<5	<5
2-HEXANONE	SW8260B	µg/kg	50	<50	<50	<50
ISOPROPYLBENZENE (CUMENE)	SW8260B	µg/kg	5	<5	<5	<5
P-CYMENE (P-ISOPROPYLTOLUENE)	SW8260B	µg/kg	5	<5	<5	<5
METHYLENE CHLORIDE	SW8260B	µg/kg	5	2J	<5	2J
4-METHYL-2-PENTANONE	SW8260B	µg/kg	50	<50	<50	<50
NAPHTHALENE	SW8260B	µg/kg	5	<5	0.5J	<5
N-PROPYLBENZENE	SW8260B	µg/kg	5	<5	<5	<5
STYRENE	SW8260B	µg/kg	5	<5	<5	<5
1,1,1,2-TETRACHLOROETHANE	SW8260B	µg/kg	5	<5	<5	<5
1,1,2,2-TETRACHLOROETHANE	SW8260B	µg/kg	5	<5	<5	<5
TETRACHLOROETHENE(PCE)	SW8260B	µg/kg	5	<5	<5	<5
TOLUENE	SW8260B	µg/kg	5	<5	<5	<5
1,2,3-TRICHLOROBENZENE	SW8260B	µg/kg	5	<5	<5	<5
1,2,4-TRICHLOROBENZENE	SW8260B	µg/kg	5	<5	<5	<5
1,1,1-TRICHLOROETHANE	SW8260B	µg/kg	5	<5	<5	<5
1,1,2-TRICHLOROETHANE	SW8260B	µg/kg	5	<5	<5	<5
TRICHLOROETHENE (TCE)	SW8260B	µg/kg	5	<5	<5	<5
TRICHLOROFLUOROMETHANE	SW8260B	µg/kg	5	<5	<5	<5
1,2,3-TRICHLOROPROPANE	SW8260B	µg/kg	3.1	<3.1	<3.1	<3.1
1,2,4-TRIMETHYLBENZENE	SW8260B	µg/kg	5	<5	<5	<5
1,3,5-TRIMETHYLBENZENE	SW8260B	µg/kg	5	<5	<5	<5
VINYL ACETATE	SW8260B	µg/kg	5	<5	<5	<5
VINYL CHLORIDE	SW8260B	µg/kg	5	<5	<5	<5
O-XYLENE	SW8260B	µg/kg	5	<5	<5	<5
M,P-XYLENE	SW8260B	µg/kg	5	<5	<5	<5
SEMI-VOC						
Dilution Factor				1	2	2
ACENAPHTHENE	SW8270C	µg/kg	500	<500	<1000	<1000
ACENAPHTHYLENE	SW8270C	µg/kg	500	<500	<1000	<1000
ANTHRACENE	SW8270C	µg/kg	500	<500	<1000	<1000
BENZO(A)ANTHRACENE	SW8270C	µg/kg	500	<500	<1000	<1000
BENZO(A)PYRENE	SW8270C	µg/kg	62	<62	<120	<120
BENZO(B)FLUORANTHENE	SW8270C	µg/kg	500	<500	<1000	<1000
BENZO(G,H,I)PERYLENE	SW8270C	µg/kg	500	<500	<1000	<1000
BENZO(K)FLUORANTHENE	SW8270C	µg/kg	500	<500	<1000	<1000
BENZOIC ACID	SW8270C	µg/kg	2500	<2500	<5000	<5000
BENZYL ALCOHOL	SW8270C	µg/kg	1000	<1000	<2000	<2000
BIS(2-CHLOROETHOXY) METHANE	SW8270C	µg/kg	500	<500	<1000	<1000
BIS(2-CHLOROETHYL) ETHER	SW8270C	µg/kg	210	<210	<420	<420
BIS(2-CHLOROISOPROPYL) ETHER	SW8270C	µg/kg	500	<500	<1000	<1000
BIS(2-ETHYLHEXYL) PHTHALATE	SW8270C	µg/kg	500	<500	570J	280J
4-BROMOPHENYL PHENYL ETHER	SW8270C	µg/kg	500	<500	<1000	<1000
BENZYL BUTYL PHTHALATE	SW8270C	µg/kg	500	<500	<1000	<1000
4-CHLORO-3-METHYLPHENOL	SW8270C	µg/kg	1000	<1000	<2000	<2000
4-CHLOROANILINE	SW8270C	µg/kg	1000	<1000	<2000	<2000

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result LT6 01-03584-1	LT1-W,C,E 01-03584-(2 to 4)	LT2-W,C,E 01-03584-(5 to 7)
2-CHLORONAPHTHALENE	SW8270C	μg/kg	500	<500	<1000	<1000
2-CHLOROPHENOL	SW8270C	μg/kg	500	<500	<1000	<1000
4-CHLOROPHENYL PHENYL ETHER	SW8270C	μg/kg	500	<500	<1000	<1000
CHRYSENE	SW8270C	μg/kg	500	<500	<1000	<1000
DI-N-BUTYL PHTHALATE	SW8270C	μg/kg	500	<500	<1000	<1000
DI-N-OCTYLPHTHALATE	SW8270C	μg/kg	500	<500	<1000	<1000
DIBENZ(A,H)ANTHRACENE	SW8270C	μg/kg	500	<500	<1000	<1000
DIBENZOFURAN	SW8270C	μg/kg	500	<500	<1000	<1000
1,2-DICHLOROBENZENE	SW8270C	μg/kg	500	<500	<1000	<1000
1,3-DICHLOROBENZENE	SW8270C	μg/kg	500	<500	<1000	<1000
1,4-DICHLOROBENZENE	SW8270C	μg/kg	500	<500	<1000	<1000
3,3'-DICHLOROBENZIDINE	SW8270C	μg/kg	1000	<1000	<2000	<2000
2,4-DICHLOROPHENOL	SW8270C	μg/kg	500	<500	<1000	<1000
DIETHYL PHTHALATE	SW8270C	μg/kg	500	<500	<1000	<1000
DIMETHYL PHTHALATE	SW8270C	μg/kg	500	<500	<1000	<1000
2,4-DIMETHYLPHENOL	SW8270C	μg/kg	500	<500	<1000	<1000
4,6-DINITRO-2-METHYLPHENOL	SW8270C	μg/kg	2500	<2500	<5000	<5000
2,4-DINITROPHENOL	SW8270C	μg/kg	2500	<2500	<5000	<5000
2,4-DINITROTOLUENE	SW8270C	μg/kg	500	<500	<1000	<1000
2,6-DINITROTOLUENE	SW8270C	μg/kg	500	<500	<1000	<1000
FLUORANTHENE	SW8270C	μg/kg	500	<500	<1000	<1000
FLUORENE	SW8270C	μg/kg	500	<500	<1000	<1000
HEXACHLOROBENZENE	SW8270C	μg/kg	300	<300	<600	<600
HEXACHLOROBUTADIENE	SW8270C	μg/kg	500	<500	<1000	<1000
HEXACHLOROCYCLOPENTADIENE	SW8270C	μg/kg	500	<500	<1000	<1000
HEXACHLOROETHANE	SW8270C	μg/kg	500	<500	<1000	<1000
INDENO(1,2,3-C,D)PYRENE	SW8270C	μg/kg	500	<500	<1000	<1000
ISOPHORONE	SW8270C	μg/kg	500	<500	<1000	<1000
2-METHYLNAPHTHALENE	SW8270C	μg/kg	500	<500	<1000	<1000
4-METHYLPHENOL (P-CRESOL)	SW8270C	μg/kg	500	<500	<1000	<1000
2-METHYLPHENOL (O-CRESOL)	SW8270C	μg/kg	500	<500	<1000	<1000
NAPHTHALENE	SW8270C	μg/kg	500	<500	<1000	<1000
2-NITROANILINE	SW8270C	μg/kg	2500	<2500	<5000	<5000
3-NITROANILINE	SW8270C	μg/kg	2500	<2500	<5000	<5000
4-NITROANILINE	SW8270C	μg/kg	2500	<2500	<5000	<5000
NITROBENZENE	SW8270C	μg/kg	500	<500	<1000	<1000
2-NITROPHENOL	SW8270C	μg/kg	500	<500	<1000	<1000
4-NITROPHENOL	SW8270C	μg/kg	2500	<2500	<5000	<5000
N-NITROSODI-N-PROPYLAMINE	SW8270C	μg/kg	69	<69	<140	<140
N-NITROSODIPHENYLAMINE	SW8270C	μg/kg	500	<500	<1000	<1000
PENTACHLOROPHENOL	SW8270C	μg/kg	2500	<2500	<5000	<5000
PHENANTHRENE	SW8270C	μg/kg	500	<500	<1000	<1000
PHENOL	SW8270C	μg/kg	500	<500	<1000	<1000
PYRENE	SW8270C	μg/kg	500	<500	<1000	<1000
1,2,4-TRICHLOROBENZENE	SW8270C	μg/kg	500	<500	<1000	<1000
2,4,5-TRICHLOROPHENOL	SW8270C	μg/kg	500	<500	<1000	<1000
2,4,6-TRICHLOROPHENOL	SW8270C	μg/kg	500	<500	<1000	<1000

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Component Analyzed	Method	Unit	PQL	Analysis Result LT6 01-03584-1	LT1-W,C,E 01-03584-(2 to 4)	LT2-W,C,E 01-03584-(5 to 7)
ORGANOCHLORINE PESTICIDES						
Dilution Factor				1	1	1
ALDRIN	SW8081A	µg/kg	1	<1	<1	<1
BETA BHC	SW8081A	µg/kg	1	<1	<1	<1
ALPHA BHC	SW8081A	µg/kg	1	<1	<1	<1
DELTA BHC	SW8081A	µg/kg	1	<1	<1	<1
GAMMA BHC (LINDANE)	SW8081A	µg/kg	1	<1	<1	<1
ALPHA-CHLORDANE	SW8081A	µg/kg	1	<1	2.4	0.4J
GAMMA-CHLORDANE	SW8081A	µg/kg	1	<1	3.4	1
P,P'-DDD	SW8081A	µg/kg	2	<2	<2	<2
P,P'-DDE	SW8081A	µg/kg	2	0.8J	5.8	4.4
P,P'-DDT	SW8081A	µg/kg	2	<2	<2	<2
DIELDRIN	SW8081A	µg/kg	2	<2	<2	<2
ALPHA ENDOSULFAN	SW8081A	µg/kg	1	<1	<1	<1
BETA ENDOSULFAN	SW8081A	µg/kg	2	<2	<2	<2
ENDOSULFAN SULFATE	SW8081A	µg/kg	5	<5	<5	<5
ENDRIN	SW8081A	µg/kg	2	<2	<2	<2
ENDRIN ALDEHYDE	SW8081A	µg/kg	2	<2	<2	<2
ENDRIN KETONE	SW8081A	µg/kg	2	<2	<2	<2
HEPTACHLOR	SW8081A	µg/kg	1	<1	<1	<1
HEPTACHLOR EPOXIDE	SW8081A	µg/kg	1	<1	<1	<1
METHOXYCHLOR	SW8081A	µg/kg	10	<10	<10	<10
TOXAPHENE	SW8081A	µg/kg	100	<100	<100	<100
PCBS						
Dilution Factor				1	1	1
PCB-1016 (AROCHLOR 1016)	SW8082	µg/kg	50	<50	<50	<50
PCB-1221 (AROCHLOR 1221)	SW8082	µg/kg	100	<100	<100	<100
PCB-1232 (AROCHLOR 1232)	SW8082	µg/kg	50	<50	<50	<50
PCB-1242 (AROCHLOR 1242)	SW8082	µg/kg	50	<50	<50	<50
PCB-1248 (AROCHLOR 1248)	SW8082	µg/kg	50	<50	<50	<50
PCB-1254 (AROCHLOR 1254)	SW8082	µg/kg	25	<25	<25	<25
PCB-1260 (AROCHLOR 1260)	SW8082	µg/kg	25	6J	34	3J
Dilution Factor				1	1	1
TRIBUTYL TIN	NOAA	µg/kg	10	<10	<10	<10

Component Analyzed	Method	Unit	PQL	Analysis Result LT3-W,C,E 01-03584-(08 to 10)	LT4-W,C,E 01-03584-(11 to 13)	LT5-W,C,E 01-03584-(14 to 16)
CARBON, TOTAL ORGANIC (TOC)	415.1	mg/kg	100	6,420	2,310	2,000
CHROMIUM (VI)	7196	mg/kg	0.05	<0.05	<0.05	<0.05

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Component Analyzed	Method	Unit	PQL	Analysis Result LT3-W,C,E 01-03584-(08 to 10)	LT4-W,C,E 01-03584-(11 to 13)	LT5-W,C,E 01-03584-(14 to 16)
TTLC 17 METALS						
Dilution Factor				1	1	1
ANTIMONY	SW6010B	mg/kg	5	0.48J	<5	<5
ARSENIC	SW6010B	mg/kg	0.3	2.7	2.8	3.0
BARIUM	SW6010B	mg/kg	1	151	141	163
BERYLLIUM	SW6010B	mg/kg	0.2	<0.2	<0.2	<0.2
CADMIUM	SW6010B	mg/kg	0.2	1.3	0.73	0.69
CHROMIUM	SW6010B	mg/kg	0.5	25.8	22.4	22.3
COBALT	SW6010B	mg/kg	0.5	5.2	5.8	5.9
COPPER	SW6010B	mg/kg	0.5	26.9	30.8	18.7
LEAD	SW6010B	mg/kg	0.3	32.0	23.1	22.9
MERCURY	SW7471A	mg/kg	0.2	0.078J	0.060J	0.049J
MOLYBDENUM	SW6010B	mg/kg	0.2	1.3	0.082J	<0.2
NICKEL	SW6010B	mg/kg	0.3	21.9	21.2	15.6
SELENIUM	SW6010B	mg/kg	0.5	0.52	0.53	0.71
SILVER	SW6010B	mg/kg	0.5	<0.5	<0.5	<0.5
THALLIUM	SW6010B	mg/kg	0.5	<0.5	<0.5	<0.5
VANADIUM	SW6010B	mg/kg	0.5	42.0	38.3	35.2
ZINC	SW6010B	mg/kg	0.5	119	70.7	57.1
Dilution Factor				1	1	1
PHC AS DIESEL FUEL	M8015E	mg/kg	10	74	35	43
Dilution Factor				1	1	1
MOTOR OILS	M8015E	mg/kg	10	180	94	[illegible]
VOLATILE ORGANICS						
Dilution Factor				1	1	1
ACETONE	SW8260B	µg/kg	100	50J	58J	43J
BENZENE	SW8260B	µg/kg	5	<5	<5	<5
BROMOBENZENE	SW8260B	µg/kg	5	<5	<5	<5
BROMOCHLOROMETHANE	SW8260B	µg/kg	5	<5	<5	<5
BROMODICHLOROMETHANE	SW8260B	µg/kg	5	<5	<5	<5
BROMOFORM	SW8260B	µg/kg	5	<5	<5	<5
2-BUTANONE	SW8260B	µg/kg	100	<100	<100	<100
N-BUTYLBENZENE	SW8260B	µg/kg	5	<5	<5	<5
SEC-BUTYLBENZENE	SW8260B	µg/kg	5	2J	<5	<5
T-BUTYLBENZENE	SW8260B	µg/kg	5	<5	<5	<5
CARBON DISULFIDE	SW8260B	µg/kg	5	3J	1J	2J
CARBON TETRACHLORIDE	SW8260B	µg/kg	5	<5	<5	<5
CHLOROBENZENE	SW8260B	µg/kg	5	<5	<5	<5
DIBROMOCHLOROMETHANE	SW8260B	µg/kg	5	<5	<5	<5
CHLOROETHANE	SW8260B	µg/kg	5	<5	<5	<5
2-CHLOROETHYL VINYL ETHER	SW8260B	µg/kg	50	<50	<50	<50
CHLOROFORM	SW8260B	µg/kg	5	0.8J	0.9J	0.8J
1-CHLOROHEXANE	SW8260B	µg/kg	5	<5	<5	<5
CHLOROMETHANE	SW8260B	µg/kg	5	<5	<5	<5
2-CHLOROTOLUENE	SW8260B	µg/kg	5	<5	<5	<5

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Component Analyzed	Method	Unit	PQL	Analysis Result LT3-W,C,E 01-03584-(08 to 10)	LT4-W,C,E 01-03584-(11 to 13)	LT5-W,C,E 01-03584-(14 to 16)
4-CHLOROTOLUENE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,2-DIBROMO-3-CHLOROPROPANE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,2-DIBROMOETHANE	SW8260B	μg/kg	5	< 5	< 5	< 5
DIBROMOMETHANE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,2-DICHLOROBENZENE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,3-DICHLOROBENZENE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,4-DICHLOROBENZENE	SW8260B	μg/kg	5	< 5	< 5	< 5
DICHLORODIFLUOROMETHANE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,1-DICHLOROETHANE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,2-DICHLOROETHANE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,1-DICHLOROETHENE	SW8260B	μg/kg	5	< 5	< 5	< 5
CIS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	< 5	< 5	< 5
TRANS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,2-DICHLOROPROPANE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,3-DICHLOROPROPANE	SW8260B	μg/kg	5	< 5	< 5	< 5
2,2-DICHLOROPROPANE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,1-DICHLOROPROPENE	SW8260B	μg/kg	5	< 5	< 5	< 5
CIS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	< 5	< 5	< 5
TRANS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	< 5	< 5	< 5
ETHYLBENZENE	SW8260B	μg/kg	5	< 5	< 5	< 5
HEXACHLOROBUTADIENE	SW8260B	μg/kg	5	< 5	< 5	< 5
2-HEXANONE	SW8260B	μg/kg	50	< 50	< 50	< 50
ISOPROPYLBENZENE (CUMENE)	SW8260B	μg/kg	5	24	< 5	< 5
P-CYMENE (P-ISOPROPYLTOLUENE)	SW8260B	μg/kg	5	< 5	< 5	< 5
METHYLENE CHLORIDE	SW8260B	μg/kg	5	< 5	21	< 5
4-METHYL-2-PENTANONE	SW8260B	μg/kg	50	< 50	< 50	< 50
NAPHTHALENE	SW8260B	μg/kg	5	< 5	< 5	< 5
N-PROPYLBENZENE	SW8260B	μg/kg	5	< 5	< 5	< 5
STYRENE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,1,1,2-TETRACHLOROETHANE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,1,2,2-TETRACHLOROETHANE	SW8260B	μg/kg	5	< 5	< 5	< 5
TETRACHLOROETHENE(PCE)	SW8260B	μg/kg	5	< 5	< 5	< 5
TOLUENE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,2,3-TRICHLOROBENZENE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,2,4-TRICHLOROBENZENE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,1,1-TRICHLOROETHANE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,1,2-TRICHLOROETHANE	SW8260B	μg/kg	5	< 5	< 5	< 5
TRICHLOROETHENE (TCE)	SW8260B	μg/kg	5	< 5	< 5	< 5
TRICHLOROFLUOROMETHANE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,2,3-TRICHLOROPROPANE	SW8260B	μg/kg	3.1	< 3.1	< 3.1	< 3.1
1,2,4-TRIMETHYLBENZENE	SW8260B	μg/kg	5	< 5	< 5	< 5
1,3,5-TRIMETHYLBENZENE	SW8260B	μg/kg	5	< 5	< 5	< 5
VINYL ACETATE	SW8260B	μg/kg	5	< 5	< 5	< 5
VINYL CHLORIDE	SW8260B	μg/kg	5	< 5	< 5	< 5
O-XYLENE	SW8260B	μg/kg	5	< 5	< 5	< 5
M,P-XYLENE	SW8260B	μg/kg	5	< 5	< 5	< 5

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Component Analyzed	Method	Unit	PQL	Analysis Result LT3-W,C,E 01-03584-(08 to 10)	LT4-W,C,E 01-03584-(11 to 13)	LT5-W,C,E 01-03584-(14 to 16)
SEMI-VOC						
Dilution Factor				2	2	1
ACENAPHTHENE	SW8270C	μg/kg	500	<1000	<1000	<500
ACENAPHTHYLENE	SW8270C	μg/kg	500	<1000	<1000	<500
ANTHRACENE	SW8270C	μg/kg	500	<1000	<1000	<500
BENZO(A)ANTHRACENE	SW8270C	μg/kg	500	<1000	<1000	<500
BENZO(A)PYRENE	SW8270C	μg/kg	62	<120	<120	<62
BENZO(B)FLUORANTHENE	SW8270C	μg/kg	500	<1000	<1000	<500
BENZO(G,H,I)PERYLENE	SW8270C	μg/kg	500	<1000	<1000	<500
BENZO(K)FLUORANTHENE	SW8270C	μg/kg	500	<1000	<1000	<500
BENZOIC ACID	SW8270C	μg/kg	2500	<5000	<5000	<2500
BENZYL ALCOHOL	SW8270C	μg/kg	1000	<2000	<2000	<1000
BIS(2-CHLOROETHOXY) METHANE	SW8270C	μg/kg	500	<1000	<1000	<500
BIS(2-CHLOROETHYL) ETHER	SW8270C	μg/kg	210	<420	<420	<210
BIS(2-CHLOROISOPROPYL) ETHER	SW8270C	μg/kg	500	<1000	<1000	<500
BIS(2-ETHYLHEXYL) PHTHALATE	SW8270C	μg/kg	500	500J	130J	<500
4-BROMOPHENYL PHENYL ETHER	SW8270C	μg/kg	500	<1000	<1000	<500
BENZYL BUTYL PHTHALATE	SW8270C	μg/kg	500	<1000	<1000	<500
4-CHLORO-3-METHYLPHENOL	SW8270C	μg/kg	1000	<2000	<2000	<1000
4-CHLOROANILINE	SW8270C	μg/kg	1000	<2000	<2000	<1000
2-CHLORONAPHTHALENE	SW8270C	μg/kg	500	<1000	<1000	<500
2-CHLOROPHENOL	SW8270C	μg/kg	500	<1000	<1000	<500
4-CHLOROPHENYL PHENYL ETHER	SW8270C	μg/kg	500	<1000	<1000	<500
CHRYSENE	SW8270C	μg/kg	500	<1000	<1000	<500
DI-N-BUTYL PHTHALATE	SW8270C	μg/kg	500	<1000	<1000	<500
DI-N-OCTYLPHTHALATE	SW8270C	μg/kg	500	<1000	<1000	<500
DIBENZ(A,H)ANTHRACENE	SW8270C	μg/kg	500	<1000	<1000	<500
DIBENZOFURAN	SW8270C	μg/kg	500	<1000	<1000	<500
1,2-DICHLOROBENZENE	SW8270C	μg/kg	500	<1000	<1000	<500
1,3-DICHLOROBENZENE	SW8270C	μg/kg	500	<1000	<1000	<500
1,4-DICHLOROBENZENE	SW8270C	μg/kg	500	<1000	<1000	<500
3,3'-DICHLOROBENZIDINE	SW8270C	μg/kg	1000	<2000	<2000	<1000
2,4-DICHLOROPHENOL	SW8270C	μg/kg	500	<1000	<1000	<500
DIETHYL PHTHALATE	SW8270C	μg/kg	500	<1000	<1000	<500
DIMETHYL PHTHALATE	SW8270C	μg/kg	500	<1000	<1000	<500
2,4-DIMETHYLPHENOL	SW8270C	μg/kg	500	<1000	<1000	<500
4,6-DINITRO-2-METHYLPHENOL	SW8270C	μg/kg	2500	<5000	<5000	<2500
2,4-DINITROPHENOL	SW8270C	μg/kg	2500	<5000	<5000	<2500
2,4-DINITROTOLUENE	SW8270C	μg/kg	500	<1000	<1000	<500
2,6-DINITROTOLUENE	SW8270C	μg/kg	500	<1000	<1000	<500
FLUORANTHENE	SW8270C	μg/kg	500	<1000	<1000	<500
FLUORENE	SW8270C	μg/kg	500	<1000	<1000	<500
HEXACHLOROBENZENE	SW8270C	μg/kg	300	<600	<600	<300
HEXACHLOROBUTADIENE	SW8270C	μg/kg	500	<1000	<1000	<500
HEXACHLOROCYCLOPENTADIENE	SW8270C	μg/kg	500	<1000	<1000	<500

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Component Analyzed	Method	Unit	PQL	Analysis Result LT3-W,C,E 01-03584-(08 to 10)	LT4-W,C,E 01-03584-(11 to 13)	LT5-W,C,E 01-03584-(14 to 16)
HEXACHLOROETHANE	SW8270C	μg/kg	500	< 1000	< 1000	< 500
INDENO(1,2,3-C,D)PYRENE	SW8270C	μg/kg	500	< 1000	< 1000	< 500
ISOPHORONE	SW8270C	μg/kg	500	< 1000	< 1000	< 500
2-METHYLNAPHTHALENE	SW8270C	μg/kg	500	< 1000	< 1000	< 500
4-METHYLPHENOL (P-CRESOL)	SW8270C	μg/kg	500	< 1000	< 1000	< 500
2-METHYLPHENOL (O-CRESOL)	SW8270C	μg/kg	500	< 1000	< 1000	< 500
NAPHTHALENE	SW8270C	μg/kg	500	< 1000	< 1000	< 500
2-NITROANILINE	SW8270C	μg/kg	2500	< 5000	< 5000	< 2500
3-NITROANILINE	SW8270C	μg/kg	2500	< 5000	< 5000	< 2500
4-NITROANILINE	SW8270C	μg/kg	2500	< 5000	< 5000	< 2500
NITROBENZENE	SW8270C	μg/kg	500	< 1000	< 1000	< 500
2-NITROPHENOL	SW8270C	μg/kg	500	< 1000	< 1000	< 500
4-NITROPHENOL	SW8270C	μg/kg	2500	< 5000	< 5000	< 2500
N-NITROSODI-N-PROPYLAMINE	SW8270C	μg/kg	69	< 140	< 140	< 69
N-NITROSODIPHENYLAMINE	SW8270C	μg/kg	500	< 1000	< 1000	< 500
PENTACHLOROPHENOL	SW8270C	μg/kg	2500	< 5000	< 5000	< 2500
PHENANTHRENE	SW8270C	μg/kg	500	< 1000	< 1000	< 500
PHENOL	SW8270C	μg/kg	500	< 1000	< 1000	< 500
PYRENE	SW8270C	μg/kg	500	< 1000	< 1000	< 500
1,2,4-TRICHLOROBENZENE	SW8270C	μg/kg	500	< 1000	< 1000	< 500
2,4,5-TRICHLOROPHENOL	SW8270C	μg/kg	500	< 1000	< 1000	< 500
2,4,6-TRICHLOROPHENOL	SW8270C	μg/kg	500	< 1000	< 1000	< 500
ORGANOCHLORINE PESTICIDES						
Dilution Factor				1	5	1
ALDRIN	SW8081A	μg/kg	1	< 1	< 5	< 1
BETA BHC	SW8081A	μg/kg	1	< 1	< 5	< 1
ALPHA BHC	SW8081A	μg/kg	1	< 1	< 5	< 1
DELTA BHC	SW8081A	μg/kg	1	< 1	< 5	< 1
GAMMA BHC (LINDANE)	SW8081A	μg/kg	1	< 1	< 5	< 1
ALPHA-CHLORDANE	SW8081A	μg/kg	1	1J	4J	1
GAMMA-CHLORDANE	SW8081A	μg/kg	1	1	3J	2
P,P'-DDD	SW8081A	μg/kg	2	< 2	< 10	< 2
P,P'-DDE	SW8081A	μg/kg	2	2J	< 10	2
P,P'-DDT	SW8081A	μg/kg	2	< 2	< 10	< 2
DIELDRIN	SW8081A	μg/kg	2	< 2	< 10	< 2
ALPHA ENDOSULFAN	SW8081A	μg/kg	1	< 1	< 5	< 1
BETA ENDOSULFAN	SW8081A	μg/kg	2	< 2	< 10	< 2
ENDOSULFAN SULFATE	SW8081A	μg/kg	5	< 5	< 25	< 5
ENDRIN	SW8081A	μg/kg	2	< 2	< 10	< 2
ENDRIN ALDEHYDE	SW8081A	μg/kg	2	< 2	< 10	< 2
ENDRIN KETONE	SW8081A	μg/kg	2	< 2	< 10	< 2
HEPTACHLOR	SW8081A	μg/kg	1	< 1	< 5	< 1
HEPTACHLOR EPOXIDE	SW8081A	μg/kg	1	< 1	< 5	< 1
METHOXYCHLOR	SW8081A	μg/kg	10	< 10	< 50	< 10
TOXAPHENE	SW8081A	μg/kg	100	< 100	< 500	< 100

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result LT3-W,C,E 01-03584-(08 to 10)	LT4-W,C,E 01-03584-(11 to 13)	LT5-W,C,E 01-03584-(14 to 16)
PCBS						
Dilution Factor				1	1	1
PCB-1016 (AROCHLOR 1016)	SW8082	μg/kg	50	<50	<50	<50
PCB-1221 (AROCHLOR 1221)	SW8082	μg/kg	100	<100	<100	<100
PCB-1232 (AROCHLOR 1232)	SW8082	μg/kg	50	<50	<50	<50
PCB-1242 (AROCHLOR 1242)	SW8082	μg/kg	50	<50	<50	<50
PCB-1248 (AROCHLOR 1248)	SW8082	μg/kg	50	<50	<50	<50
PCB-1254 (AROCHLOR 1254)	SW8082	μg/kg	25	<25	<25	<25
PCB-1260 (AROCHLOR 1260)	SW8082	μg/kg	25	7J	5J	6J
Dilution Factor				1	1	1
TRIBUTYL TIN	NOAA	μg/kg	10	<10	<10	<10

Component Analyzed	Method	Unit	PQL	Analysis Result M1-W,E 01-03584-(17 to 18)	OF1 01-03584-19
CARBON, TOTAL ORGANIC (TOC)	415.1	mg/kg	100	6,530	[illegible]
CHROMIUM (VI)	7196	mg/kg	0.05	<0.05	<0.05
TTLC 17 METALS					
Dilution Factor				1	1
ANTIMONY	SW6010B	mg/kg	5	0.21J	0.54J
ARSENIC	SW6010B	mg/kg	0.3	4.6	6.5
BARIUM	SW6010B	mg/kg	1	308	345
BERYLLIUM	SW6010B	mg/kg	0.2	<0.2	<0.2
CADMIUM	SW6010B	mg/kg	0.2	1.7	[illegible].5
CHROMIUM	SW6010B	mg/kg	0.5	47.6	[illegible].2
COBALT	SW6010B	mg/kg	0.5	9.1	[illegible]
COPPER	SW6010B	mg/kg	0.5	55.3	[illegible].5
LEAD	SW6010B	mg/kg	0.3	112	[illegible]70
MERCURY	SW7471A	mg/kg	0.2	0.19J	0.23
MOLYBDENUM	SW6010B	mg/kg	0.2	<0.2	3.5
NICKEL	SW6010B	mg/kg	0.3	37.0	51.5
SELENIUM	SW6010B	mg/kg	0.5	0.46J	1.7
SILVER	SW6010B	mg/kg	0.5	<0.5	<0.5
THALLIUM	SW6010B	mg/kg	0.5	<0.5	<0.5
VANADIUM	SW6010B	mg/kg	0.5	77.2	[illegible]2.1
ZINC	SW6010B	mg/kg	0.5	188	[illegible]20
Dilution Factor				1	[illegible]
PHC AS DIESEL FUEL	M8015E	mg/kg	10	51	[illegible]
Dilution Factor				1	[illegible]
MOTOR OILS	M8015E	mg/kg	10	140	[illegible]

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result M1-W,E 01-03584-(17 to 18)	OF1 01-03584-19
VOLATILE ORGANICS					
Dilution Factor				1	1
ACETONE	SW8260B	μg/kg	100	72J	25J
BENZENE	SW8260B	μg/kg	5	< 5	< 5
BROMOBENZENE	SW8260B	μg/kg	5	< 5	< 5
BROMOCHLOROMETHANE	SW8260B	μg/kg	5	< 5	< 5
BROMODICHLOROMETHANE	SW8260B	μg/kg	5	< 5	< 5
BROMOFORM	SW8260B	μg/kg	5	< 5	< 5
2-BUTANONE	SW8260B	μg/kg	100	< 100	< 100
N-BUTYLBENZENE	SW8260B	μg/kg	5	< 5	< 5
SEC-BUTYLBENZENE	SW8260B	μg/kg	5	< 5	< 5
T-BUTYLBENZENE	SW8260B	μg/kg	5	< 5	< 5
CARBON DISULFIDE	SW8260B	μg/kg	5	1J	< 5
CARBON TETRACHLORIDE	SW8260B	μg/kg	5	< 5	< 5
CHLOROBENZENE	SW8260B	μg/kg	5	< 5	< 5
DIBROMOCHLOROMETHANE	SW8260B	μg/kg	5	< 5	< 5
CHLOROETHANE	SW8260B	μg/kg	5	< 5	< 5
2-CHLOROETHYL VINYL ETHER	SW8260B	μg/kg	50	< 50	< 50
CHLOROFORM	SW8260B	μg/kg	5	0.7J	0.7J
1-CHLOROHEXANE	SW8260B	μg/kg	5	< 5	< 5
CHLOROMETHANE	SW8260B	μg/kg	5	< 5	< 5
2-CHLOROTOLUENE	SW8260B	μg/kg	5	< 5	< 5
4-CHLOROTOLUENE	SW8260B	μg/kg	5	< 5	< 5
1,2-DIBROMO-3-CHLOROPROPANE	SW8260B	μg/kg	5	< 5	< 5
1,2-DIBROMOETHANE	SW8260B	μg/kg	5	< 5	< 5
DIBROMOMETHANE	SW8260B	μg/kg	5	< 5	< 5
1,2-DICHLOROBENZENE	SW8260B	μg/kg	5	< 5	< 5
1,3-DICHLOROBENZENE	SW8260B	μg/kg	5	< 5	< 5
1,4-DICHLOROBENZENE	SW8260B	μg/kg	5	< 5	< 5
DICHLORODIFLUOROMETHANE	SW8260B	μg/kg	5	< 5	< 5
1,1-DICHLOROETHANE	SW8260B	μg/kg	5	< 5	< 5
1,2-DICHLOROETHANE	SW8260B	μg/kg	5	< 5	< 5
1,1-DICHLOROETHENE	SW8260B	μg/kg	5	< 5	< 5
CIS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	< 5	< 5
TRANS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	< 5	< 5
1,2-DICHLOROPROPANE	SW8260B	μg/kg	5	< 5	< 5
1,3-DICHLOROPROPANE	SW8260B	μg/kg	5	< 5	< 5
2,2-DICHLOROPROPANE	SW8260B	μg/kg	5	< 5	< 5
1,1-DICHLOROPROPENE	SW8260B	μg/kg	5	< 5	< 5
CIS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	< 5	< 5
TRANS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	< 5	< 5

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result M1-W,E 01-03584-(17 to 18)	OF1 01-03584-19
ETHYLBENZENE	SW8260B	µg/kg	5	< 5	< 5
HEXACHLOROBUTADIENE	SW8260B	µg/kg	5	< 5	< 5
2-HEXANONE	SW8260B	µg/kg	50	< 50	< 50
ISOPROPYLBENZENE (CUMENE)	SW8260B	µg/kg	5	< 5	< 5
P-CYMENE (P-ISOPROPYLTOLUENE)	SW8260B	µg/kg	5	< 5	4J
METHYLENE CHLORIDE	SW8260B	µg/kg	5	< 5	< 5
4-METHYL-2-PENTANONE	SW8260B	µg/kg	50	< 50	< 50
NAPHTHALENE	SW8260B	µg/kg	5	< 5	< 5
N-PROPYLBENZENE	SW8260B	µg/kg	5	< 5	< 5
STYRENE	SW8260B	µg/kg	5	< 5	< 5
1,1,1,2-TETRACHLOROETHANE	SW8260B	µg/kg	5	< 5	< 5
1,1,2,2-TETRACHLOROETHANE	SW8260B	µg/kg	5	< 5	< 5
TETRACHLOROETHENE(PCE)	SW8260B	µg/kg	5	< 5	< 5
TOLUENE	SW8260B	µg/kg	5	< 5	< 5
1,2,3-TRICHLOROBENZENE	SW8260B	µg/kg	5	< 5	< 5
1,2,4-TRICHLOROBENZENE	SW8260B	µg/kg	5	< 5	< 5
1,1,1-TRICHLOROETHANE	SW8260B	µg/kg	5	< 5	< 5
1,1,2-TRICHLOROETHANE	SW8260B	µg/kg	5	< 5	< 5
TRICHLOROETHENE (TCE)	SW8260B	µg/kg	5	< 5	< 5
TRICHLOROFLUOROMETHANE	SW8260B	µg/kg	5	< 5	< 5
1,2,3-TRICHLOROPROPANE	SW8260B	µg/kg	3.1	< 3.1	< 3.1
1,2,4-TRIMETHYLBENZENE	SW8260B	µg/kg	5	< 5	< 5
1,3,5-TRIMETHYLBENZENE	SW8260B	µg/kg	5	< 5	< 5
VINYL ACETATE	SW8260B	µg/kg	5	< 5	< 5
VINYL CHLORIDE	SW8260B	µg/kg	5	< 5	< 5
O-XYLENE	SW8260B	µg/kg	5	< 5	< 5
M,P-XYLENE	SW8260B	µg/kg	5	< 5	< 5
SEMI-VOC					
Dilution Factor				1	2
ACENAPHTHENE	SW8270C	µg/kg	500	< 500	< 1000
ACENAPHTHYLENE	SW8270C	µg/kg	500	< 500	< 1000
ANTHRACENE	SW8270C	µg/kg	500	< 500	< 1000
BENZO(A)ANTHRACENE	SW8270C	µg/kg	500	< 500	< 1000
BENZO(A)PYRENE	SW8270C	µg/kg	62	< 62	< 120
BENZO(B)FLUORANTHENE	SW8270C	µg/kg	500	< 500	140J
BENZO(G,H,I)PERYLENE	SW8270C	µg/kg	500	< 500	< 1000
BENZO(K)FLUORANTHENE	SW8270C	µg/kg	500	< 500	170J
BENZOIC ACID	SW8270C	µg/kg	2500	< 2500	< 5000
BENZYL ALCOHOL	SW8270C	µg/kg	1000	< 1000	< 2000
BIS(2-CHLOROETHOXY) METHANE	SW8270C	µg/kg	500	< 500	< 1000
BIS(2-CHLOROETHYL) ETHER	SW8270C	µg/kg	210	< 210	< 420
BIS(2-CHLOROISOPROPYL) ETHER	SW8270C	µg/kg	500	< 500	< 1000
BIS(2-ETHYLHEXYL) PHTHALATE	SW8270C	µg/kg	500	< 500	420J
4-BROMOPHENYL PHENYL ETHER	SW8270C	µg/kg	500	< 500	< 1000
BENZYL BUTYL PHTHALATE	SW8270C	µg/kg	500	< 500	140J
4-CHLORO-3-METHYLPHENOL	SW8270C	µg/kg	1000	< 1000	< 2000
4-CHLOROANILINE	SW8270C	µg/kg	1000	< 1000	< 2000

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result M1-W,E 01-03584-(17 to 18)	OF1 01-03584-19
2-CHLORONAPHTHALENE	SW8270C	μg/kg	500	<500	<1000
2-CHLOROPHENOL	SW8270C	μg/kg	500	<500	<1000
4-CHLOROPHENYL PHENYL ETHER	SW8270C	μg/kg	500	<500	<1000
CHRYSENE	SW8270C	μg/kg	500	<500	90J
DI-N-BUTYL PHTHALATE	SW8270C	μg/kg	500	<500	<1000
DI-N-OCTYLPHTHALATE	SW8270C	μg/kg	500	<500	<1000
DIBENZ(A,H)ANTHRACENE	SW8270C	μg/kg	500	<500	<1000
DIBENZOFURAN	SW8270C	μg/kg	500	<500	<1000
1,2-DICHLOROBENZENE	SW8270C	μg/kg	500	<500	<1000
1,3-DICHLOROBENZENE	SW8270C	μg/kg	500	<500	<1000
1,4-DICHLOROBENZENE	SW8270C	μg/kg	500	<500	<1000
3,3'-DICHLOROBENZIDINE	SW8270C	μg/kg	1000	<1000	<2000
2,4-DICHLOROPHENOL	SW8270C	μg/kg	500	<500	<1000
DIETHYL PHTHALATE	SW8270C	μg/kg	500	<500	<1000
DIMETHYL PHTHALATE	SW8270C	μg/kg	500	<500	<1000
2,4-DIMETHYLPHENOL	SW8270C	μg/kg	500	<500	<1000
4,6-DINITRO-2-METHYLPHENOL	SW8270C	μg/kg	2500	<2500	<5000
2,4-DINITROPHENOL	SW8270C	μg/kg	2500	<2500	<5000
2,4-DINITROTOLUENE	SW8270C	μg/kg	500	<500	<1000
2,6-DINITROTOLUENE	SW8270C	μg/kg	500	<500	<1000
FLUORANTHENE	SW8270C	μg/kg	500	<500	140J
FLUORENE	SW8270C	μg/kg	500	<500	<1000
HEXACHLOROBENZENE	SW8270C	μg/kg	300	<300	<600
HEXACHLOROBUTADIENE	SW8270C	μg/kg	500	<500	<1000
HEXACHLOROCYCLOPENTADIENE	SW8270C	μg/kg	500	<500	<1000
HEXACHLOROETHANE	SW8270C	μg/kg	500	<500	<1000
INDENO(1,2,3-C,D)PYRENE	SW8270C	μg/kg	500	<500	<1000
ISOPHORONE	SW8270C	μg/kg	500	<500	<1000
2-METHYLNAPHTHALENE	SW8270C	μg/kg	500	<500	<1000
4-METHYLPHENOL (P-CRESOL)	SW8270C	μg/kg	500	<500	<1000
2-METHYLPHENOL (O-CRESOL)	SW8270C	μg/kg	500	<500	<1000
NAPHTHALENE	SW8270C	μg/kg	500	<500	<1000
2-NITROANILINE	SW8270C	μg/kg	2500	<2500	<5000
3-NITROANILINE	SW8270C	μg/kg	2500	<2500	<5000
4-NITROANILINE	SW8270C	μg/kg	2500	<2500	<5000
NITROBENZENE	SW8270C	μg/kg	500	<500	<1000
2-NITROPHENOL	SW8270C	μg/kg	500	<500	<1000
4-NITROPHENOL	SW8270C	μg/kg	2500	<2500	<5000
N-NITROSODI-N-PROPYLAMINE	SW8270C	μg/kg	69	<69	<140
N-NITROSODIPHENYLAMINE	SW8270C	μg/kg	500	<500	<1000
PENTACHLOROPHENOL	SW8270C	μg/kg	2500	<2500	<5000
PHENANTHRENE	SW8270C	μg/kg	500	<500	<1000
PHENOL	SW8270C	μg/kg	500	<500	<1000
PYRENE	SW8270C	μg/kg	500	<500	130J
1,2,4-TRICHLOROBENZENE	SW8270C	μg/kg	500	<500	<1000
2,4,5-TRICHLOROPHENOL	SW8270C	μg/kg	500	<500	<1000
2,4,6-TRICHLOROPHENOL	SW8270C	μg/kg	500	<500	<1000

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result M1-W,E 01-03584-(17 to 18)	Analysis Result OF1 01-03584-19
ORGANOCHLORINE PESTICIDES					
Dilution Factor				1	1
ALDRIN	SW8081A	μg/kg	1	<1	<1
BETA BHC	SW8081A	μg/kg	1	<1	<1
ALPHA BHC	SW8081A	μg/kg	1	<1	<1
DELTA BHC	SW8081A	μg/kg	1	<1	2.0
GAMMA BHC (LINDANE)	SW8081A	μg/kg	1	<1	<1
ALPHA-CHLORDANE	SW8081A	μg/kg	1	4.4	12
GAMMA-CHLORDANE	SW8081A	μg/kg	1	5.2	26
P,P'-DDD	SW8081A	μg/kg	2	<2	<2
P,P'-DDE	SW8081A	μg/kg	2	1J	2
P,P'-DDT	SW8081A	μg/kg	2	<2	4.9
DIELDRIN	SW8081A	μg/kg	2	<2	2J
ALPHA ENDOSULFAN	SW8081A	μg/kg	1	<1	<1
BETA ENDOSULFAN	SW8081A	μg/kg	2	<2	<2
ENDOSULFAN SULFATE	SW8081A	μg/kg	5	<5	<5
ENDRIN	SW8081A	μg/kg	2	<2	<2
ENDRIN ALDEHYDE	SW8081A	μg/kg	2	<2	<2
ENDRIN KETONE	SW8081A	μg/kg	2	<2	<2
HEPTACHLOR	SW8081A	μg/kg	1	<1	<1
HEPTACHLOR EPOXIDE	SW8081A	μg/kg	1	<1	<1
METHOXYCHLOR	SW8081A	μg/kg	10	<10	<10
TOXAPHENE	SW8081A	μg/kg	100	<100	<100
PCBS					
Dilution Factor				1	1
PCB-1016 (AROCHLOR 1016)	SW8082	μg/kg	50	<50	<50
PCB-1221 (AROCHLOR 1221)	SW8082	μg/kg	100	<100	<100
PCB-1232 (AROCHLOR 1232)	SW8082	μg/kg	50	<50	<50
PCB-1242 (AROCHLOR 1242)	SW8082	μg/kg	50	<50	<50
PCB-1248 (AROCHLOR 1248)	SW8082	μg/kg	50	<50	<50
PCB-1254 (AROCHLOR 1254)	SW8082	μg/kg	25	<25	<25
PCB-1260 (AROCHLOR 1260)	SW8082	μg/kg	25	20J [a]	18J [a]
Dilution Factor				1	1
TRIBUTYL TIN	NOAA	μg/kg	10	<10	<10

PQL: Practical Quantitation Limit. MDL: Method Detection Limit. CRDL: Contract Required Detection Limit
N.D.: Not Detected or less than the practical quantitation limit. "-": Analysis is not required.
J: Reported between PQL and MDL.
† All results are reported on dry basis for soil samples.
Listed Dilution Factors (DF) are relative to the method default DF. All unlisted DFs are 1.0
[a] Result estimated due to interference from Pesticides.

Respectfully submitted,

Dominic Lau
Laboratory Director
Applied P & Ch Laboratory

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APCL Analytical Report

Submitted to:
Parsons Engineering Science
Attention: Devin Thor
100 W. Walnut Street
Pasadena CA 91124
Tel: (626)585-6000 Fax: (626)440-6200

Service ID #: 801-013585
Collected by:
Collected on: 05/14-15/01

Received: 05/16/01
Extracted: XXXXXX
Tested: N/A
Reported: 06/26/01

Sample Description: Soil from KMRHP
Project Description:

Analysis of Soil Samples

Component Analyzed	Method	Unit	PQL	Analysis Result LT1-W,C,E 01-03585-(1 to 3)	LT2-W,C,E 01-03585-(4 to 6)	LT3-W,C,E 01-03585-(7 to 9)
PARTICLE SIZE [a]	ASTM-D422	ft^3/day				

Component Analyzed	Method	Unit	PQL	Analysis Result LT4-W,C,E 01-03585-(10 to 12)	LT5-W,C,E 01-03585-(13 to 15)	M1-W,E 01-03585-(16 to 17)
PARTICLE SIZE [a]	ASTM-D422	ft^3/day				

Component Analyzed	Method	Unit	PQL	Analysis Result LT1-W,C,E 01-03585-(1 to 3)	LT4-W,C,E 01-03585-(10 to 12)
DIOXINS AND FURANS [b]					

PQL: Practical Quantitation Limit. MDL: Method Detection Limit. CRDL: Contract Required Detection Limit
N.D.: Not Detected or less than the practical quantitation limit. "-": Analysis is not required.
J: Reported between PQL and MDL.
† All results are reported on dry basis for soil samples.
Listed Dilution Factors (DF) are relative to the method default DF. All unlisted DFs are 1.0
[a] Subcontracted to PTS labs.
[b] Subcontracted to Triangle Labs.

Respectfully submitted,

Dominic Lau
Laboratory Director
Applied P & Ch Laboratory

PTS Laboratories, Inc.

Applied P & Ch Laboratory
PTS File No: 31298

PARTICLE SIZE SUMMARY
(METHODOLOGY: ASTM D4464M)

PROJECT NAME: N/A
PROJECT NO: N/A

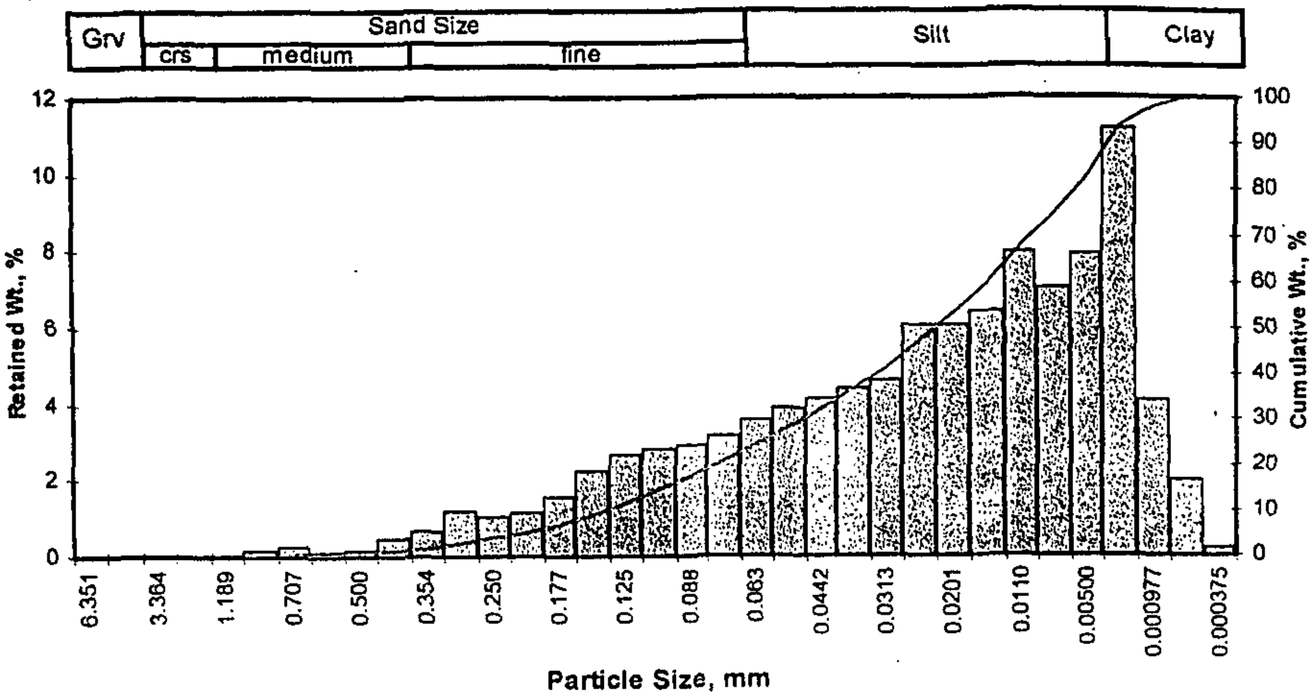
Sample ID	Depth, ft.	Description USCS/ASTM (1)	Median Grain Size mm	Particle Size Distribution, wt. percent						Silt & Clay
				Gravel	Sand Size			Silt	Clay	
					Coarse	Medium	Fine			
M1	N/A	Silt	0.023	0.00	0.00	1.19	19.38	61.98	17.44	79.43
LT1	N/A	Silt	0.022	0.00	0.00	1.15	22.71	56.89	19.26	76.15
LT2	N/A	Silt	0.019	0.00	0.00	0.13	15.51	63.08	21.27	84.36
LT3	N/A	Silt	0.015	0.00	0.00	0.01	12.93	62.89	24.17	87.06
LT4	N/A	Silt	0.013	0.00	0.00	0.00	7.36	68.13	24.51	92.64
LT5	N/A	Silt	0.025	0.00	0.00	2.67	11.38	70.72	15.24	85.96

(1) based on Mean from Trask

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	Applied P & Ch Laboratory	**PTS File No:**	31298
Project:	N/A	**Sample ID:**	M1
Project No:	N/A	**Depth, ft:**	N/A



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.87	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.16	0.16	0.16
0.0278	0.707	0.50	25	0.24	0.24	0.40
0.0234	0.595	0.75	30	0.13	0.12	0.53
0.0197	0.500	1.00	35	0.18	0.18	0.71
0.0166	0.420	1.25	40	0.49	0.49	1.19
0.0139	0.354	1.50	45	0.68	0.68	1.88
0.0117	0.297	1.75	50	1.18	1.18	3.06
0.0098	0.250	2.00	60	1.04	1.04	4.10
0.0083	0.210	2.25	70	1.16	1.16	5.26
0.0070	0.177	2.50	80	1.57	1.57	6.83
0.0059	0.149	2.75	100	2.22	2.22	9.05
0.0049	0.125	3.00	120	2.64	2.64	11.68
0.0041	0.105	3.25	140	2.80	2.80	14.48
0.0035	0.088	3.50	170	2.91	2.91	17.39
0.0029	0.074	3.75	200	3.18	3.18	20.57
0.0025	0.063	4.00	230	3.55	3.55	24.12
0.0021	0.053	4.25	270	3.88	3.88	28.00
0.00174	0.0442	4.50	325	4.14	4.14	32.14
0.00146	0.0372	4.75	400	4.38	4.38	36.52
0.00123	0.0313	5.00	450	4.58	4.58	41.10
0.000986	0.0250	5.32	500	6.07	6.07	47.17
0.000790	0.0201	5.64	635	6.04	6.04	53.21
0.000615	0.0156	6.00		6.43	6.43	59.64
0.000435	0.0110	6.50		7.96	7.96	67.60
0.000308	0.00781	7.00		7.05	7.05	74.65
0.000197	0.00500	7.65		7.91	7.91	82.56
0.000077	0.00195	9.00		11.17	11.17	93.73
0.000038	0.000977	10.00		4.09	4.09	97.82
0.000019	0.000488	11.00		1.98	1.98	99.80
0.000015	0.000375	11.38		0.20	0.20	100.00
TOTALS				100.00	100.00	100.00

Cumulative Weight Percent greater than			
Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	2.19	0.0086	0.218
10	2.84	0.0055	0.140
16	3.38	0.0038	0.096
25	4.06	0.0024	0.060
40	4.94	0.0013	0.033
50	5.47	0.0009	0.023
60	6.02	0.0006	0.015
75	7.03	0.0003	0.008
84	7.82	0.0002	0.004
90	8.55	0.0001	0.003
95	9.31	0.0001	0.002

Measure	Trask	Inman	Folk-Ward
Median, phi	5.47	5.47	5.47
Median, in.	0.0009	0.0009	0.0009
Median, mm	0.023	0.023	0.023
Mean, phi	4.88	5.60	5.56
Mean, in.	0.0013	0.0008	0.0008
Mean, mm	0.034	0.021	0.021
Sorting	0.357	2.220	2.188
Skewness	0.951	0.059	0.069
Kurtosis	0.191	0.603	0.981

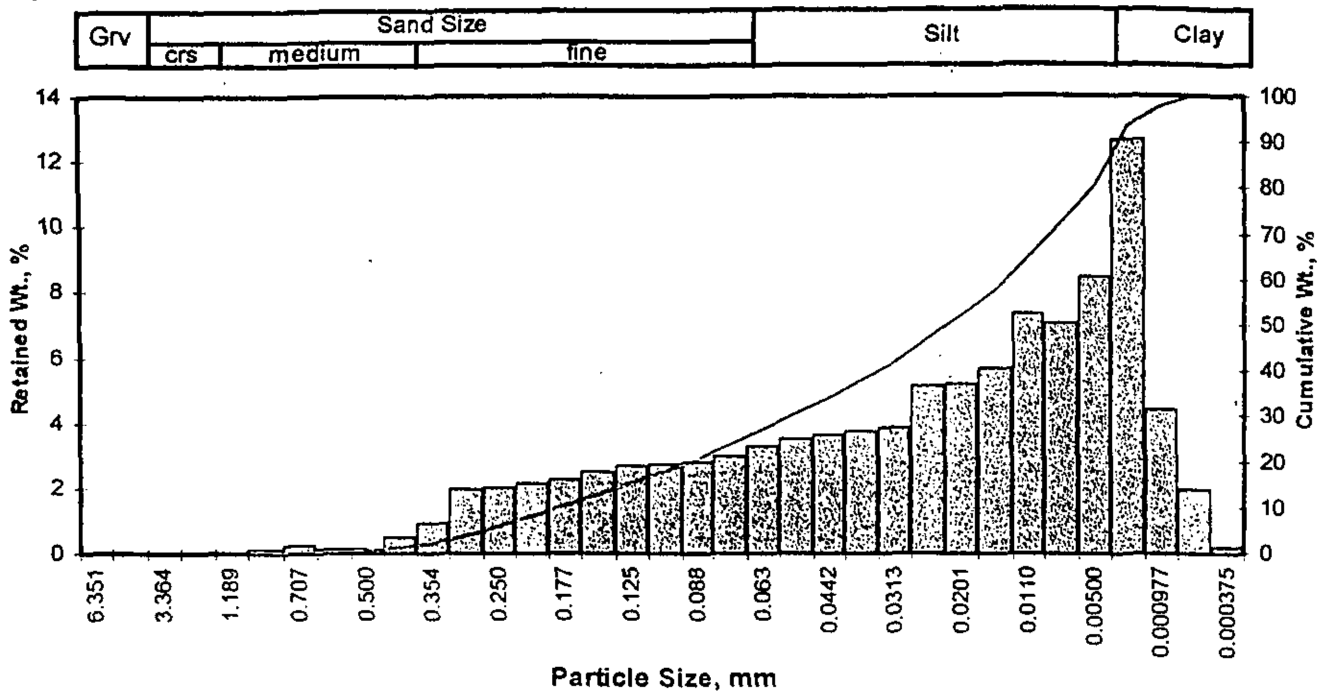
Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	1.19
Fine Sand	200	19.38
Silt	>0.005 mm	61.98
Clay	<0.005 mm	17.44
	Total	100

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	Applied P & Ch Laboratory	**PTS File No:**	31298
Project:	N/A	**Sample ID:**	LT1
Project No:	N/A	**Depth, ft:**	N/A



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.13	0.13	0.13
0.0278	0.707	0.50	25	0.25	0.25	0.38
0.0234	0.595	0.75	30	0.15	0.15	0.53
0.0197	0.500	1.00	35	0.14	0.14	0.66
0.0166	0.420	1.25	40	0.49	0.49	1.15
0.0139	0.354	1.50	45	0.90	0.90	2.04
0.0117	0.297	1.75	50	1.93	1.93	3.97
0.0098	0.250	2.00	60	1.98	1.98	5.95
0.0083	0.210	2.25	70	2.11	2.11	8.06
0.0070	0.177	2.50	80	2.25	2.25	10.31
0.0059	0.149	2.75	100	2.50	2.50	12.81
0.0049	0.125	3.00	120	2.64	2.64	15.45
0.0041	0.105	3.25	140	2.69	2.69	18.14
0.0035	0.088	3.50	170	2.75	2.75	20.89
0.0029	0.074	3.75	200	2.96	2.96	23.85
0.0025	0.063	4.00	230	3.23	3.23	27.08
0.0021	0.053	4.25	270	3.48	3.48	30.56
0.00174	0.0442	4.50	325	3.65	3.65	34.21
0.00146	0.0372	4.75	400	3.77	3.77	37.98
0.00123	0.0313	5.00	450	3.87	3.87	41.85
0.000986	0.0250	5.32	500	5.11	5.11	46.96
0.000790	0.0201	5.64	635	5.20	5.20	52.16
0.000615	0.0156	6.00		5.67	5.67	57.83
0.000435	0.0110	6.50		7.37	7.37	65.20
0.000308	0.00781	7.00		7.04	7.04	72.24
0.000197	0.00500	7.65		8.50	8.50	80.74
0.000077	0.00195	9.00		12.67	12.67	93.41
0.000038	0.000977	10.00		4.43	4.43	97.84
0.000019	0.000488	11.00		1.96	1.96	99.80
0.000015	0.000375	11.38		0.20	0.20	100.00
TOTALS				100.00	100.00	100.00

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	1.88	0.0107	0.272
10	2.47	0.0071	0.181
16	3.05	0.0048	0.121
25	3.84	0.0028	0.070
40	4.88	0.0013	0.034
50	5.51	0.0009	0.022
60	6.15	0.0006	0.014
75	7.21	0.0003	0.007
84	7.99	0.0002	0.004
90	8.63	0.0001	0.003
95	9.36	0.0001	0.002

Measure	Trask	Inman	Folk-Ward
Median, phi	5.51	5.51	5.51
Median, in.	0.0009	0.0009	0.0009
Median, mm	0.022	0.022	0.022
Mean, phi	4.71	5.52	5.52
Mean, in.	0.0015	0.0009	0.0009
Mean, mm	0.038	0.022	0.022
Sorting	0.311	2.471	2.369
Skewness	0.988	0.006	0.018
Kurtosis	0.177	0.513	0.909

Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	1.15
Fine Sand	200	22.71
Silt	>0.005 mm	56.89
Clay	<0.005 mm	19.26
	Total	100

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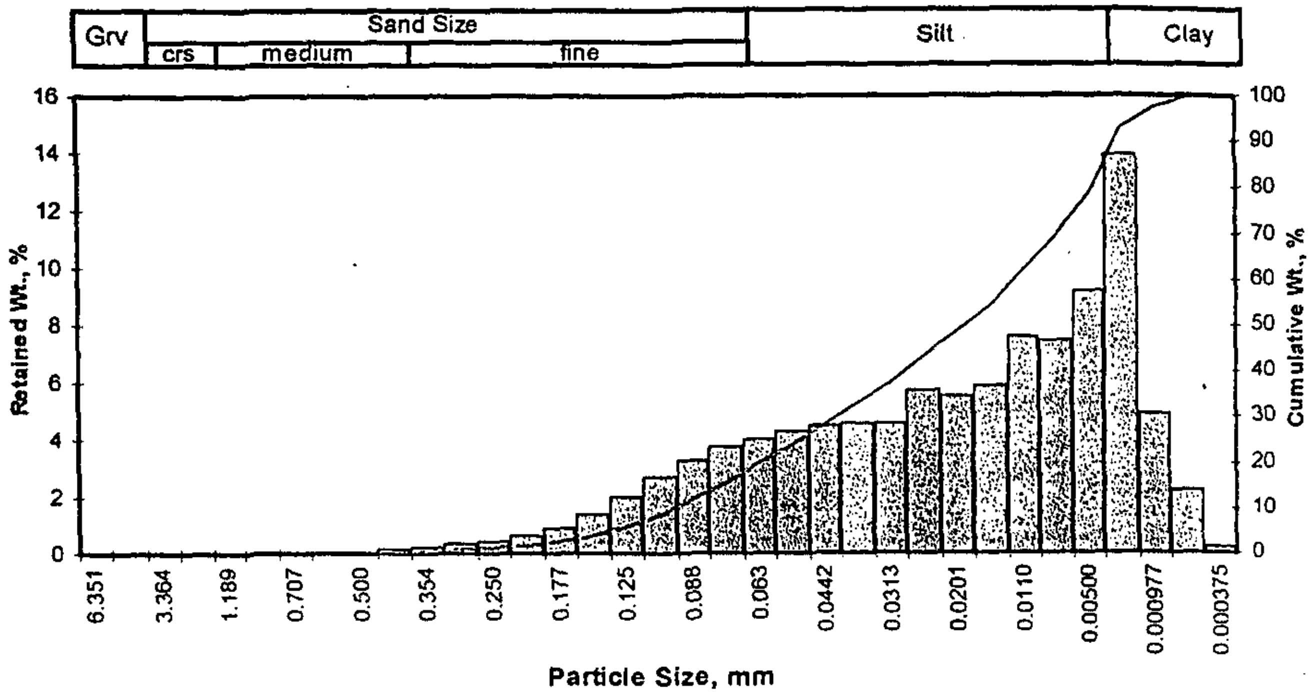
PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	Applied P & Ch Laboratory	**PTS File No:**	31298
Project:	N/A	**Sample ID:**	LT2
Project No:	N/A	**Depth, ft:**	N/A



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.00	0.00	0.00
0.0278	0.707	0.50	25	0.00	0.00	0.00
0.0234	0.595	0.75	30	0.00	0.00	0.00
0.0197	0.500	1.00	35	0.02	0.02	0.02
0.0166	0.420	1.25	40	0.11	0.11	0.13
0.0139	0.354	1.50	45	0.18	0.18	0.32
0.0117	0.297	1.75	50	0.37	0.37	0.69
0.0098	0.250	2.00	60	0.43	0.43	1.12
0.0083	0.210	2.25	70	0.59	0.59	1.70
0.0070	0.177	2.50	80	0.88	0.88	2.58
0.0059	0.149	2.75	100	1.40	1.40	3.98
0.0049	0.125	3.00	120	2.02	2.02	6.00
0.0041	0.105	3.25	140	2.68	2.68	8.68
0.0035	0.088	3.50	170	3.25	3.25	11.93
0.0029	0.074	3.75	200	3.71	3.71	15.64
0.0025	0.063	4.00	230	4.01	4.01	19.65
0.0021	0.053	4.25	270	4.26	4.26	23.91
0.00174	0.0442	4.50	325	4.45	4.45	28.36
0.00146	0.0372	4.75	400	4.55	4.55	32.91
0.00123	0.0313	5.00	450	4.52	4.52	37.43
0.000986	0.0250	5.32	500	5.69	5.69	43.12
0.000790	0.0201	5.64	635	5.52	5.52	48.65
0.000615	0.0156	6.00		5.87	5.87	54.52
0.000435	0.0110	6.50		7.60	7.60	62.12
0.000308	0.00781	7.00		7.43	7.43	69.55
0.000197	0.00500	7.65		9.18	9.18	78.73
0.000077	0.00195	9.00		13.91	13.91	92.64
0.000038	0.000977	10.00		4.91	4.91	97.55
0.000019	0.000488	11.00		2.23	2.23	99.78
0.000015	0.000375	11.38		0.22	0.22	100.00
TOTALS				100.00	100.00	100.00

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	2.88	0.0054	0.136
10	3.35	0.0039	0.098
16	3.77	0.0029	0.073
25	4.31	0.0020	0.050
40	5.14	0.0011	0.028
50	5.72	0.0007	0.019
60	6.36	0.0005	0.012
75	7.38	0.0002	0.006
84	8.16	0.0001	0.003
90	8.74	0.0001	0.002
95	9.48	0.0001	0.001

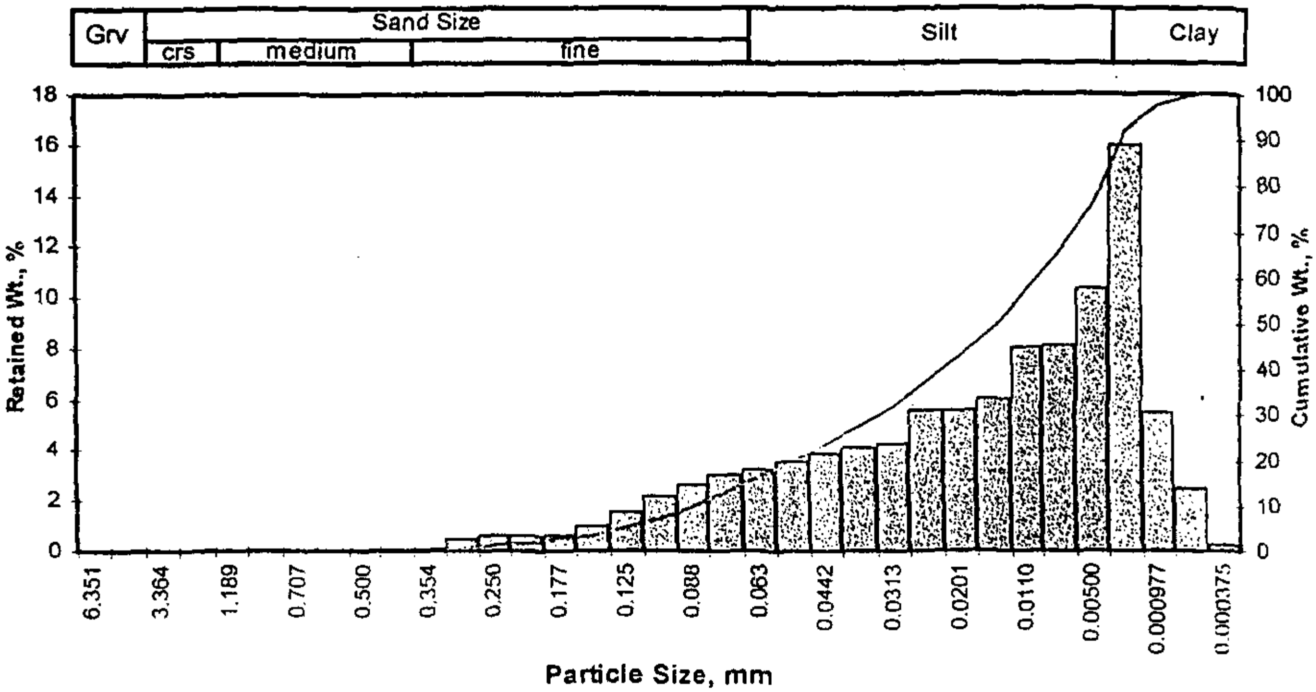
Measure	Trask	Inman	Folk-Ward
Median, phi	5.72	5.72	5.72
Median, in.	0.0007	0.0007	0.0007
Median, mm	0.019	0.019	0.019
Mean, phi	5.15	5.97	5.88
Mean, in.	0.0011	0.0006	0.0007
Mean, mm	0.028	0.016	0.017
Sorting	0.345	2.193	2.098
Skewness	0.918	0.111	0.124
Kurtosis	0.232	0.506	0.881
Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)		

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	0.13
Fine Sand	200	15.51
Silt	>0.005 mm	63.08
Clay	<0.005 mm	21.27
	Total	100

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	Applied P & Ch Laboratory	**PTS File No:**	31298
Project:	N/A	**Sample ID:**	LT3
Project No:	N/A	***Depth, ft:***	N/A



Opening Inches	Opening Millimeters	Phi of Screen	U.S. No.	Sample Weight, grams	Increment Weight, percent	Cumulative Weight, percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.00	0.00	0.00
0.0278	0.707	0.50	25	0.00	0.00	0.00
0.0234	0.595	0.75	30	0.00	0.00	0.00
0.0197	0.500	1.00	35	0.00	0.00	0.00
0.0166	0.420	1.25	40	0.01	0.01	0.01
0.0139	0.354	1.50	45	0.09	0.09	0.10
0.0117	0.297	1.75	50	0.47	0.47	0.56
0.0098	0.250	2.00	60	0.64	0.63	1.20
0.0083	0.210	2.25	70	0.65	0.65	1.84
0.0070	0.177	2.50	80	0.66	0.66	2.50
0.0059	0.149	2.75	100	0.99	0.99	3.49
0.0049	0.125	3.00	120	1.58	1.58	5.07
0.0041	0.105	3.25	140	2.20	2.20	7.27
0.0035	0.088	3.50	170	2.66	2.66	9.93
0.0029	0.074	3.75	200	3.01	3.01	12.94
0.0025	0.063	4.00	230	3.28	3.28	16.22
0.0021	0.053	4.25	270	3.57	3.57	19.79
0.00174	0.0442	4.50	325	3.86	3.86	23.65
0.00146	0.0372	4.75	400	4.11	4.11	27.76
0.00123	0.0313	5.00	450	4.26	4.26	32.02
0.000986	0.0250	5.32	500	5.58	5.58	37.60
0.000790	0.0201	5.64	635	5.60	5.60	43.20
0.000615	0.0156	6.00		6.08	6.08	49.28
0.000435	0.0110	6.50		8.05	8.05	57.33
0.000308	0.00781	7.00		8.13	8.13	65.46
0.000197	0.00500	7.65		10.37	10.37	75.83
0.000077	0.00195	9.00		15.95	15.95	91.78
0.000038	0.000977	10.00		5.53	5.53	97.31
0.000019	0.000488	11.00		2.45	2.45	99.76
0.000015	0.000375	11.38		0.24	0.24	100.00
TOTALS				100.00	100.00	100.00

Cumulative Weight Percent greater than			
Weight percent	**Phi Value**	**Particle Size Inches**	**Particle Size Millimeters**
5	2.99	0.0050	0.126
10	3.51	0.0035	0.088
16	3.98	0.0025	0.063
25	4.58	0.0016	0.042
40	5.46	0.0009	0.023
50	6.04	0.0006	0.015
60	6.66	0.0004	0.010
75	7.59	0.0002	0.005
84	8.34	0.0001	0.003
90	8.85	0.0001	0.002
95	9.58	0.0001	0.001

Measure	Trask	Inman	Folk-Ward
Median, phi	6.04	6.04	6.04
Median, in.	0.0006	0.0006	0.0006
Median, mm	0.015	0.015	0.015
Mean, phi	5.41	6.16	6.12
Mean, in.	0.0009	0.0006	0.0006
Mean, mm	0.023	0.014	0.014
Sorting	0.352	2.178	2.086
Skewness	0.971	0.053	0.063
Kurtosis	0.213	0.514	0.897
Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)		

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	0.01
Fine Sand	200	12.93
Silt	>0.005 mm	62.69
Clay	<0.005 mm	24.17
	Total	100

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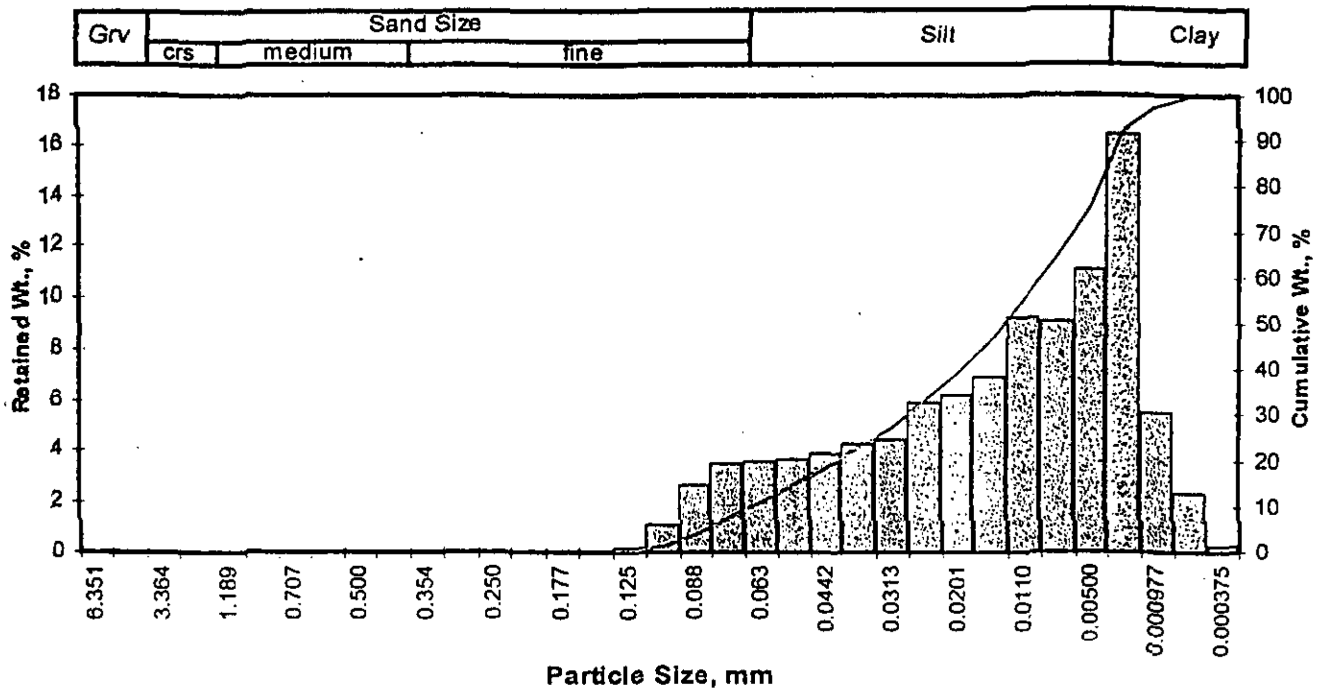
PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	Applied P & Ch Laboratory	**PTS File No:**	31298
Project:	N/A	**Sample ID:**	LT4
Project No:	N/A	**Depth, ft:**	N/A



Opening		Phi of	U.S.	Sample Weight,	Increment Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.00	0.00	0.00
0.0278	0.707	0.50	25	0.00	0.00	0.00
0.0234	0.595	0.75	30	0.00	0.00	0.00
0.0197	0.500	1.00	35	0.00	0.00	0.00
0.0166	0.420	1.25	40	0.00	0.00	0.00
0.0139	0.354	1.50	45	0.00	0.00	0.00
0.0117	0.297	1.75	50	0.00	0.00	0.00
0.0098	0.250	2.00	60	0.00	0.00	0.00
0.0083	0.210	2.25	70	0.00	0.00	0.00
0.0070	0.177	2.50	80	0.00	0.00	0.00
0.0059	0.149	2.75	100	0.00	0.00	0.00
0.0049	0.125	3.00	120	0.15	0.15	0.15
0.0041	0.105	3.25	140	1.10	1.10	1.25
0.0035	0.088	3.50	170	2.61	2.61	3.86
0.0029	0.074	3.75	200	3.50	3.50	7.36
0.0025	0.063	4.00	230	3.58	3.58	10.94
0.0021	0.053	4.25	270	3.61	3.61	14.55
0.00174	0.0442	4.50	325	3.91	3.91	18.46
0.00146	0.0372	4.75	400	4.24	4.24	22.70
0.00123	0.0313	5.00	450	4.43	4.43	27.13
0.000986	0.0250	5.32	500	5.92	5.92	33.05
0.000790	0.0201	5.64	635	6.17	6.17	39.22
0.000615	0.0156	6.00		6.88	6.88	46.10
0.000435	0.0110	6.50		9.22	9.22	55.33
0.000308	0.00781	7.00		9.07	9.07	64.40
0.000197	0.00500	7.65		11.09	11.09	75.49
0.000077	0.00195	9.00		16.43	16.43	91.92
0.000038	0.000977	10.00		5.51	5.51	97.43
0.000019	0.000488	11.00		2.34	2.34	99.77
0.000015	0.000375	11.38		0.23	0.23	100.00
TOTALS				100.00	100.00	100.00

Cumulative Weight Percent greater than			
Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	3.58	0.0033	0.084
10	3.93	0.0026	0.065
16	4.34	0.0019	0.049
25	4.88	0.0013	0.034
40	5.68	0.0008	0.019
50	6.21	0.0005	0.013
60	6.76	0.0004	0.009
75	7.62	0.0002	0.005
84	8.35	0.0001	0.003
90	8.84	0.0001	0.002
95	9.56	0.0001	0.001

Measure	Trask	Inman	Folk-Ward
Median, phi	6.21	6.21	6.21
Median, in.	0.0005	0.0005	0.0005
Median, mm	0.013	0.013	0.013
Mean, phi	5.68	6.34	6.30
Mean, in.	0.0008	0.0005	0.0005
Mean, mm	0.020	0.012	0.013
Sorting	0.387	2.002	1.907
Skewness	0.975	0.067	0.093
Kurtosis	0.228	0.493	0.895

Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	0.00
Fine Sand	200	7.36
Silt	>0.005 mm	68.13
Clay	<0.005 mm	24.51
	Total	100

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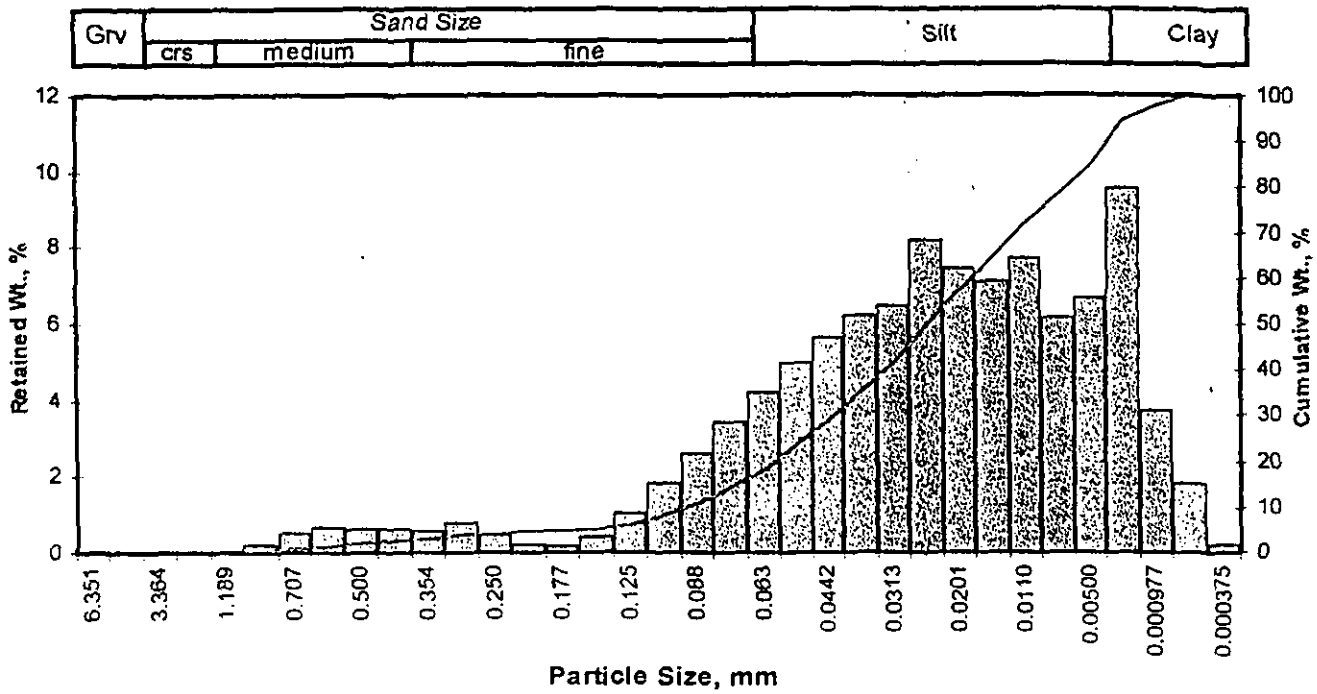
PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	Applied P & Ch Laboratory	**PTS File No:**	31298
Project:	N/A	**Sample ID:**	LT5
Project No:	N/A	**Depth, ft:**	N/A



Opening		Phi of	U.S.	Sample Weight,	Increment Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.20	0.20	0.20
0.0278	0.707	0.50	25	0.53	0.53	0.73
0.0234	0.595	0.75	30	0.66	0.66	1.39
0.0197	0.500	1.00	35	0.64	0.64	2.03
0.0166	0.420	1.25	40	0.64	0.64	2.67
0.0139	0.354	1.50	45	0.56	0.56	3.23
0.0117	0.297	1.75	50	0.76	0.76	3.99
0.0098	0.250	2.00	60	0.46	0.46	4.45
0.0083	0.210	2.25	70	0.20	0.20	4.65
0.0070	0.177	2.50	80	0.13	0.13	4.78
0.0059	0.149	2.75	100	0.41	0.41	5.19
0.0049	0.125	3.00	120	1.03	1.03	6.22
0.0041	0.105	3.25	140	1.80	1.80	8.02
0.0035	0.088	3.50	170	2.60	2.60	10.62
0.0029	0.074	3.75	200	3.42	3.42	14.04
0.0025	0.063	4.00	230	4.20	4.20	18.24
0.0021	0.053	4.25	270	4.95	4.95	23.19
0.00174	0.0442	4.50	325	5.65	5.65	28.84
0.00146	0.0372	4.75	400	6.20	6.20	35.04
0.00123	0.0313	5.00	450	6.46	6.46	41.50
0.000986	0.0250	5.32	500	8.19	8.19	49.69
0.000790	0.0201	5.64	635	7.45	7.45	57.14
0.000615	0.0156	6.00		7.10	7.10	64.24
0.000435	0.0110	6.50		7.69	7.69	71.93
0.000308	0.00781	7.00		6.18	6.18	78.11
0.000197	0.00500	7.65		6.65	6.65	84.76
0.000077	0.00195	9.00		9.55	9.55	94.31
0.000038	0.000977	10.00		3.71	3.71	98.02
0.000019	0.000488	11.00		1.80	1.80	99.82
0.000015	0.000375	11.38		0.18	0.18	100.00
TOTALS				100.00	100.00	100.00

Cumulative Weight Percent greater than			
Weight	Phi	Particle Size	
percent	Value	Inches	Millimeters
5	2.63	0.0063	0.161
10	3.44	0.0036	0.092
16	3.87	0.0027	0.069
25	4.33	0.0020	0.050
40	4.94	0.0013	0.033
50	5.33	0.0010	0.025
60	5.79	0.0007	0.018
75	6.75	0.0004	0.009
84	7.57	0.0002	0.005
90	8.39	0.0001	0.003
95	9.19	0.0001	0.002

Measure	Trask	Inman	Folk-Ward
Median, phi	5.33	5.33	5.33
Median, in.	0.0010	0.0010	0.0010
Median, mm	0.025	0.025	0.025
Mean, phi	5.08	5.72	5.59
Mean, in.	0.0012	0.0007	0.0008
Mean, mm	0.030	0.019	0.021
Sorting	0.433	1.852	1.919
Skewness	0.867	0.208	0.192
Kurtosis	0.227	0.769	1.111

Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	2.67
Fine Sand	200	11.38
Silt	>0.005 mm	70.72
Clay	<0.005 mm	15.24
	Total	100

TLI Project: 54146
Client Sample: LT1

Method 8290 PCDD/PCDF Analysis (b)
Analysis File: S012805

Client Project:	n/a			ICal:	SF52081
Sample Matrix:	SOIL	Date Received:	05/31/2001	Spike File:	SPMIT343
TLI ID:	292-98-1	Date Extracted:	06/06/2001	1st CCal:	S012793
		Date Analyzed:	06/08/2001	End CCal:	S012807
Sample Size:	45.150 g	Dilution Factor:	n/a	% Moisture:	77.0
Dry Weight:	10.385 g	Blank File:	S012795	% Lipid:	n/a
GC Column:	DB-5	Analyst:	DFS	% Solids:	23.0

Analytes	Conc. (pg/g)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	1.1			0.82	27:37	B__
1,2,3,7,8-PeCDD	2.3			1.41	31:46	J__
1,2,3,4,7,8-HxCDD	3.9			1.28	34:53	J__
1,2,3,6,7,8-HxCDD	9.7			1.26	34:59	__
1,2,3,7,8,9-HxCDD	8.9			1.15	35:18	__
1,2,3,4,6,7,8-HpCDD	178			1.05	38:21	__
1,2,3,4,6,7,8,9-OCDD	1270			0.83	42:10	__
2,3,7,8-TCDF	3.2			0.77	26:57	B__
1,2,3,7,8-PeCDF	ND	0.3				__
2,3,4,7,8-PeCDF	2.2			1.48	31:27	J__
1,2,3,4,7,8-HxCDF	3.9			1.32	34:11	J__
1,2,3,6,7,8-HxCDF	3.5			1.14	34:16	J__
2,3,4,6,7,8-HxCDF	3.5			1.23	34:47	J__
1,2,3,7,8,9-HxCDF	ND	0.4				__
1,2,3,4,6,7,8-HpCDF	29.6			1.08	37:17	__
1,2,3,4,7,8,9-HpCDF	ND	1.0				__
1,2,3,4,6,7,8,9-OCDF	59.2			0.82	42:23	__

Totals	Conc. (pg/g)	Number	DL	EMPC	Flags
Total TCDD	1.8	2		2.3	__
Total PeCDD	4.9	3		8.0	__
Total HxCDD	67.4	5		71.3	__
Total HpCDD	424	2			__
Total TCDF	28.7	9		54.5	X__
Total PeCDF	41.6	7		60.4	X__
Total HxCDF	58.0	7		70.4	X__
Total HpCDF	66.3	2		71.4	__

MIT3_PSR v1.00, LARS 6.25.01

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TLI Project: 54146
Client Sample: LT4

Method 8290 PCDD/PCDF Analysis (b)
Analysis File: S0128[illegible]

Client Project:	n/a			ICal:	SF52081
Sample Matrix:	SOIL	Date Received:	05/31/2001	Spike File:	SPMIT343
TLI ID:	292-98-2	Date Extracted:	06/06/2001	1st CCal:	S012793
		.Date Analyzed:	06/09/2001	End CCal:	S012807
Sample Size:	30.820 g	Dilution Factor:	n/a	% Moisture:	66.7
Dry Weight:	10.263 g	Blank File:	S012795	% Lipid:	n/a
GC Column:	DB-5	Analyst:	DFS	% Solids:	33.3

Analytes	Conc. (pg/g)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.3				
1,2,3,7,8-PeCDD	1.6			1.63	31:50	J
1,2,3,4,7,8-HxCDD	2.2			1.11	34:54	J
1,2,3,6,7,8-HxCDD	6.5			1.19	35:00	
1,2,3,7,8,9-HxCDD	4.6			1.43	35:20	J
1,2,3,4,6,7,8-HpCDD	91.1			1.03	38:22	
1,2,3,4,6,7,8,9-OCDD	616			0.83	42:10	
2,3,7,8-TCDF	EMPC		1.9			B
1,2,3,7,8-PeCDF	ND	0.4				
2,3,4,7,8-PeCDF	1.2			1.59	31:29	J
1,2,3,4,7,8-HxCDF	2.8			1.20	34:13	J
1,2,3,6,7,8-HxCDF	EMPC		1.9			J
2,3,4,6,7,8-HxCDF	1.9			1.18	34:48	J
1,2,3,7,8,9-HxCDF	ND	0.5				
1,2,3,4,6,7,8-HpCDF	18.3			1.07	37:17	
1,2,3,4,7,8,9-HpCDF	ND	1.3				
1,2,3,4,6,7,8,9-OCDF	EMPC		29.8			

Totals	Conc. (pg/g)	Number	DL	EMPC	Flags
Total TCDD	3.2	3			
Total PeCDD	1.6	1		7.2	
Total HxCDD	40.6	5		43.8	
Total HpCDD	213	2			
Total TCDF	15.8	7		43.1	X
Total PeCDF	31.4	5		47.0	X
Total HxCDF	36.9	6		49.0	X
Total HpCDF	41.6	2		46.6	X

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