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Harding Lawson Associates

A Report Prepared for

C. E. Wylie Construction Company
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San Diego, California 92111

SOIL AND GROUND-WATER INVESTIGATION
INTERMEDIATE MAINTENANCE FACILITY
PROJECT P-207
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

HLA Job. No. 19541,001.04

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I INTRODUCTION

This report presents the results of the soil and ground-water investigation performed by Harding Lawson Associates (HLA) for C.E. Wylie Construction Company (C.E. Wylie) at the proposed Intermediate Maintenance Facility (IMF) at the Alameda Naval Air Station in Alameda, California. The objective of this investigation was to evaluate the presence of hazardous materials in the soil and ground water at the site. Our services were performed under contract number N62474-89-C-6676 for FY88 MCON Project P-207 between C.E. Wylie and the United States Navy. The scope of our services, originally presented in our proposal dated October 13, 1989, is summarized as follows:

1. Prepare a Job Safety Plan.
2. Review existing reports for information pertaining to potential sources of contamination surrounding the site.
3. Drill and sample 15 soil borings.
4. Convert one boring to a ground-water monitoring well.
5. Analyze 11 soil samples and one ground-water sample for volatile organic compounds, extractable semi-volatile organic compounds, total petroleum hydrocarbons (TPH), Title 22 metal concentrations (total and soluble), oil and grease, and pH. The analyses were performed on a 5-day turnaround basis.
6. Analyze five soil samples for TPH and benzene, toluene, xylenes, and ethyl benzene (BTXE) on a two week turnaround basis.
7. Prepare a report documenting our findings.

II BACKGROUND

In September 1989, petroleum hydrocarbons were detected in the soil during construction activities at the site. During the installation of piles for the buildings foundation, petroleum odors were also noticed in the soil beneath the eastern portion of the IMF. In addition, soil exhibiting green staining, later found to contain petroleum hydrocarbons, was encountered during the removal of an underground drain line along 10th Street. C.E. Wylie Construction on behalf of the U.S. Navy requested that HLA perform a limited investigation to identify the extent of petroleum hydrocarbons in the soil along 10th Street near the northern boundary of the site.

On September 19, 1989, HLA drilled and sampled three soil borings. HLA's field geologist observed pieces of black organic material throughout the fill material in the former storm drain trench in addition to petroleum hydrocarbons. Selected soil samples from each boring were analyzed for total petroleum hydrocarbons using EPA Test Method 8015 (TPH) and volatile organic compounds using EPA Test Method 8240. A sample of the black organic material was analyzed for extractable semi-volatile organics using EPA Test Method 8270. Soil samples were found to contain TPH (jet fuel) concentrations up to 8600 parts per million (ppm) and concentrations of 2-butanone, a common industrial solvent, up to 10 ppm. Polynuclear aromatic compound concentrations were detected in the black organic material.

The results of our September 1989 investigation were presented in a letter dated September 27, 1989. Based on the results of our preliminary investigation, on behalf of the U.S. Navy, C.E. Wylie requested further investigation of the site to determine the extent of contamination.

Prior to performing the field investigation, HLA reviewed the Sampling Plan, Volume I of the Remedial Investigation/Feasibility Study Work Plan prepared by Canonie Environmental Services (Canonie). The following areas have been identified by

Canonie as being potential sources of suspected hazardous waste contamination within 0.5 miles of the IMF site:

Location	Waste Generated
• Area 97	Aviation Gasoline
• Buildings 162 and 547	Automobile Fuel
• Building 360	Plating chemicals, caustics, solvents, acids, sodium hydroxide
• Building 410	Oils, paints, paint strippers, chromium, phenols, and methylene chloride
• Buildings 400 and 530	Paint strippers, solvents, oils
• Building 14	Mercury
• Oil Refinery	Refinery waste
• Cans C-2 Area	Solvents, paints, organic compounds, PCBs, acids, and bases
• Yard D-13	Acids, poisons, oxidizers, flammables, and combustibles

III FIELD INVESTIGATION

A. Drilling and Soil Sampling Procedures

On October 30 and 31, 1989, HLA drilled and sampled 15 additional soil borings and installed one ground-water monitoring well. We placed 12 of the borings and the monitoring well at locations that were selected during our meeting of October 11, 1989, which was attended by representatives of HLA, C.E. Wylie Construction Company, the Department of Health Services (DHS) and the U.S. Navy. The locations of the three additional borings, drilled to further define the extent of contamination, were selected on the basis of observations made during drilling of the initial 12 borings.

The borings were drilled with a truck-mounted drill rig equipped with 8-inch-outside-diameter hollow stem augers. The augers were steam cleaned prior to use and between borings to prevent cross-contamination between borings.

Soil samples were collected during drilling with a 3-inch-outside diameter split-spoon Sprague & Henwood (S&H) sampler lined with stainless steel tubes. The sampler was cleaned prior to sampling with a steam cleaner, trisodium phosphate solution, or hexane, depending in the severity of the contamination on the sampler from the previous sampling interval. The borings were terminated at depths ranging form 4.5 feet below ground surface to 16.5 feet below ground surface.

The soil from each boring was logged by an HLA geologist. Plates 3 through 11 present the logs of the borings. The soil has been described in accordance with the ASTM soil classification system shown on Plate 12. The soil samples were screened in the field for organic vapors and radioactivity using a Foxboro organic vapor analyzer (OVA), and a Ludlum radiation survey meter, respectively. The OVA readings were taken using a "head space" method. Soil was placed in a plastic "ziploc" bag and after approximately five minutes, the OVA probe was inserted into the "head space" of the

bag. The OVA readings indicate the relative concentration of organic vapors in the soil. The OVA readings are shown on the boring logs.

Radioactivity readings were taken by placing the radioactivity detector adjacent to each soil sample. No radioactivity was detected in the soil samples.

The soil samples that were retained to potentially undergo chemical testing were retained in stainless-steel tubes. The ends of the tubes were covered with Teflon and plastic caps, then sealed with electrical tape to prevent the volatilization of volatile organic compounds. The tubes were stored in an ice cooler until delivery under chain-of-custody protocol to Curtis Tompkins, Ltd. in Berkeley, California.

B. Monitoring Well Installation

One ground-water monitoring well was installed in Boring B-14 at the location shown on Plate 2. The well construction diagram is shown on Plate 13.

The well, MW-1, constructed of 2-inch-diameter polyvinyl chloride (PVC) Schedule 40 casing, was installed to a depth of approximately 14 feet. The casing, with 0.020-inch perforations, was installed from a depth of 3.5 to 13.5 feet. A 6-inch bottom cap was placed below the perforated casing. Nonperforated casing was installed from depth of 3.5 feet to just above the ground surface. Lonestar No. 3 sand was placed in the annular space between the well casing and borehole wall from the bottom of the boring to a depth of 2.5 feet. A 1-foot-thick bentonite seal was placed above the sand pack. The remainder of the annular space was filled with cement grout from a depth of 1-1/2 feet to just below the top of the well casing to prevent surface water from infiltrating the ground water through the annular space. The top of the well casing was equipped with a locking water-tight cap and covered with steel casing.

C. Ground-Water Sampling

On November 3, 1989, Monitoring Well MW-1 was purged and sampled. Prior to purging, a clear lucite bailer was lowered into the well to check for floating petroleum product. At least seven well casing volumes were removed with a stainless-steel bailer from the well prior to sampling. HLA measured the temperature, pH, and electrical conductivity of the purged water. The well was completely dewatered three times and allowed to recover to 80 percent of its initial water level prior to sampling.

Ground-water samples were collected from Monitoring Well MW-1 using a clean stainless-steel bailer. The ground-water samples were decanted from the bailer into laboratory-prepared bottles. The bottles then immediately sealed, labeled, and placed in ice coolers until delivery under chain-of-custody protocol for analyses to Curtis Tompkins, Ltd. in Berkeley, California.

IV CHEMICAL ANALYSIS

HLA submitted 11 soil samples that were collected on October 31, 1989 and November 1, 1989 and one ground-water sample to be analyzed for EPA priority pollutants, including volatile organic compounds using EPA Test Method 8240, extractable semi-volatile organics using EPA Test Method 8270, and Title 22 metals (total and soluble*) concentrations using the EPA Test Methods indicated on the laboratory reports contained in Appendix B. The 11 soil samples were also analyzed for total petroleum hydrocarbons (TPH) using EPA Test Method 8015, oil and grease (O&G) using Standard Method 503E, and pH. Five additional soil samples were analyzed for TPH, BTXE, and O&G.

The locations of 11 samples analyzed for EPA priority pollutants, TPH and O&G, were selected to provide spatial coverage throughout the footprints of the proposed buildings. The samples analyzed for TPH, BTXE, and O&G were chosen for analysis because these constituents were suspected of being present in soil at many locations through out the site.

A sample collected from Boring B-18 at a depth of 6.5 feet appeared to be similar in composition to the sample of black organic tar-like material collected from Boring B-7 at a depth of 4.5 feet that was submitted for chemical analysis. Because the similarity of the materials, the sample from Boring B-18 was not analyzed. However, we assume the chemical analysis from the sample from Boring B-7 at 4.5 feet is representative of the black organic tar-like material.

The results of the chemical analyses performed on the soil samples and ground-water sample are summarized in Tables 1 through 6 in Appendix A. The laboratory reports for the samples are presented in Appendix B.

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* Testing for soluble metals not applicable for water sample.

V FINDINGS

A. Summary of Chemical Analysis Results

The results of the chemical analyses indicate that the soil and ground water have been impacted by EPA priority pollutants, TPH, and O&G. The constituents most commonly detected in the soil and ground-water samples were TPH and O&G. EPA priority pollutants including lead, arsenic, BTXE, 2-butanone (methyl ethyl ketone [MEK]), and 2-methylnapthalene were detected in soil samples. EPA priority pollutants, including benzene, phenol, phenanthrene, and fluorene were detected in the ground-water sample from Monitoring Well MW-1.

B. Soil Chemical Analysis Results

A layer of black tar-like material was encountered in Borings B-7 and B-18. This material may have been a waste product from the former oil refinery that was located opposite Avenue L according to the report prepared by Canonie which was examined by HLA. A sample of this material (Boring B-7 at 4.5 feet) contained 16,000 ppm TPH as gasoline, 76,000 TPH as diesel, 120,000 ppm O&G, 220 ppm 2-methylnapthalene, 13,000 ppm total lead, and 140 ppm soluble lead. We believe that the black tar-like material may be one primary source of O&G in the soil throughout the eastern half of the site. Polynuclear aromatic hydrocarbons were detected in a sample of this black tar-like material that was collected from the backfill material of the former storm drain trench along 10th Street during the previous HLA investigation.

Soil containing elevated TPH and O&G concentrations was encountered in Boring B-14, which was converted to ground-water Monitoring Well MW-1. A soil sample from that boring from a depth of 4 feet contained 33,000 ppm of O&G and 490 ppm TPH as diesel. A soil sample from Boring B-14 collected at a depth of 15 feet contained 860 ppm TPH as diesel and 3300 ppm O&G. The source of the hydrocarbons in Boring

B-14 was not defined during our investigation. However, the hydrocarbons may have been released from the oil separator near the Jet Engine Testing Facility (Building 397).

TPH was detected in the majority of the samples that also contained measurable concentrations of O&G. In many instances, the chromatographic signature of the TPH concentration detected in soil did not match those of the laboratory standards for gasoline, diesel fuel, and jet fuel. The laboratory quantification was based on the amount of hydrocarbons measured between C_8 to C_{12} for gasoline, C_{10} to C_{16} for jet fuel, and C_{12} to C_{26} for diesel. The molecular weight range of diesel (C_{12} to C_{26}) overlaps the molecular weight range of O&G detected by Standard Method 503E. Therefore, the measured concentrations of TPH as diesel may have resulted from the presence of O&G concentrations not associated with diesel fuel but rather with hydrocarbons having a similar range of molecular weight.

The soil samples that were analyzed for Title 22 metals did not contain concentrations that exceeded the Total Threshold Limit Concentration (TTLC) as defined in Section 66699, Title 22 of the California Administrative Code, with the exception of the soil samples collected from Boring B-7 at a depth of 4.5 feet, which contained lead at 13,000 ppm. This value exceeds the TTLC for lead, which is 1000 ppm.

A Waste Extraction Test (WET) was performed on the 11 soil samples analyzed for metals. The soluble lead concentrations in soil samples collected from Borings B-7 and B-8 at a depth of 4.5 feet were above 5 ppm, which is the Soluble Threshold Limit Concentration (STLC) for lead defined in Title 22. No other metals from the analyzed soil samples exceeded the respective STLC values.

The soil sample collected from Boring B-3 at a depth of 8.5 feet contained 2-butanone (MEK) at 10 ppm. MEK is an industrial solvent found in paint removers and cleaning solutions.

C. Ground-Water Conditions

Ground water was encountered at depths ranging from 3.5 feet in Boring B-6 to 6 feet in Borings B-9 and B-10. We believe that the ground-water level and flow direction varies as a result of tidal fluctuation. A sheen of oily material was observed in the water purged from Monitoring Well MW-1 during the ground-water sampling activities.

D. Ground-Water Chemical Analysis Results

The ground-water sample obtained from Monitoring Well MW-1 on November 3, 1989 contained the following compounds at the concentrations given in parentheses: gasoline (11 ppm), O&G (60 ppm), benzene (0.440 ppm), phenol (0.037 ppm), fluorene (0.0023 ppm), phenanthrene (0.0038 ppm), barium (0.40 ppm) lead (0.05 ppm), nickel (0.02 ppm) and vanadium (0.01 ppm).

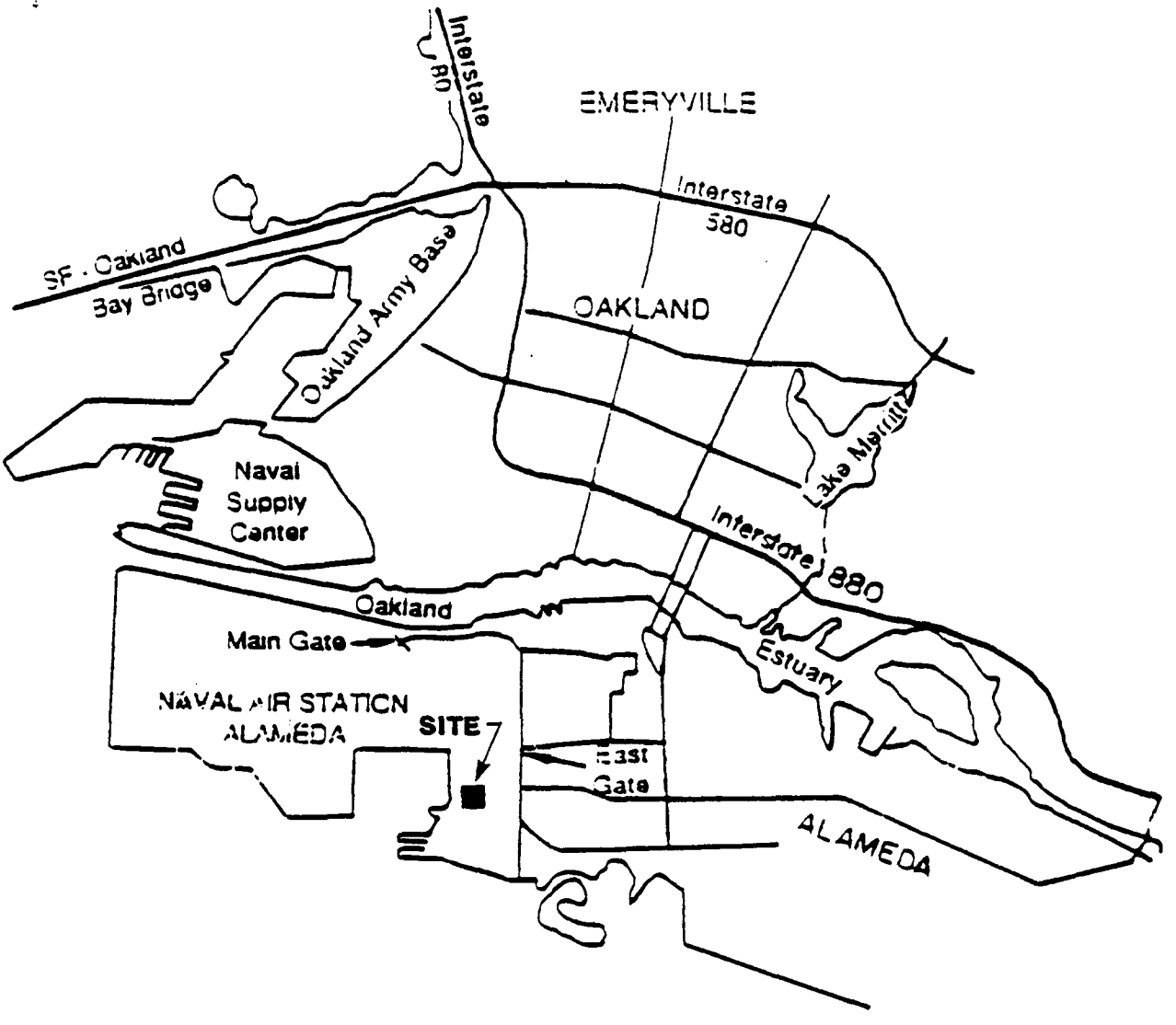
The EPA has established maximum contaminant levels (MCL) in drinking water for compounds that have been detected in the ground-water sample. The measured concentration of barium does not exceed the MCL (1 ppm). The measured concentration of lead is equal to the MCL (0.05 ppm); and the measured concentration of benzene exceeds the state and federal MCLs of 0.001 ppm and 0.005 ppm, respectively.

VI CONCLUSIONS

Contamination was detected in soil samples from 15 of the 18 borings that were drilled at the site. Contaminants were not detected in soil samples from Borings B-2, B-9, and B-10. Soil beneath portions of the eastern two-thirds of the site have been impacted by TPH, O&G, and other hydrocarbon compounds. HLA concludes that the IMF project site has been impacted by the release(s) of contaminates most likely from sources located outside of the proposed development area. Potential source areas for the hydrocarbons include the black organic tar-like material that may have been a waste product from a nearby former oil refinery, a possible release from the oil separator near Building 397, or from contaminants that migrated beneath the subject site through permeable bedding material around utility lines.

The concentrations of benzene in the ground-water sample collected from Monitoring Well MW-1 exceeds the MCL for benzene. In addition, the concentration of lead equals the MCL for lead. MCLs have not been established for other compounds that were detected in the sample such as phenol, fluorene, and 4-chlorophenyl. The extent of these compounds in ground water beneath the site is unknown.

VII ILLUSTRATIONS



Reference: Canonie Environmental

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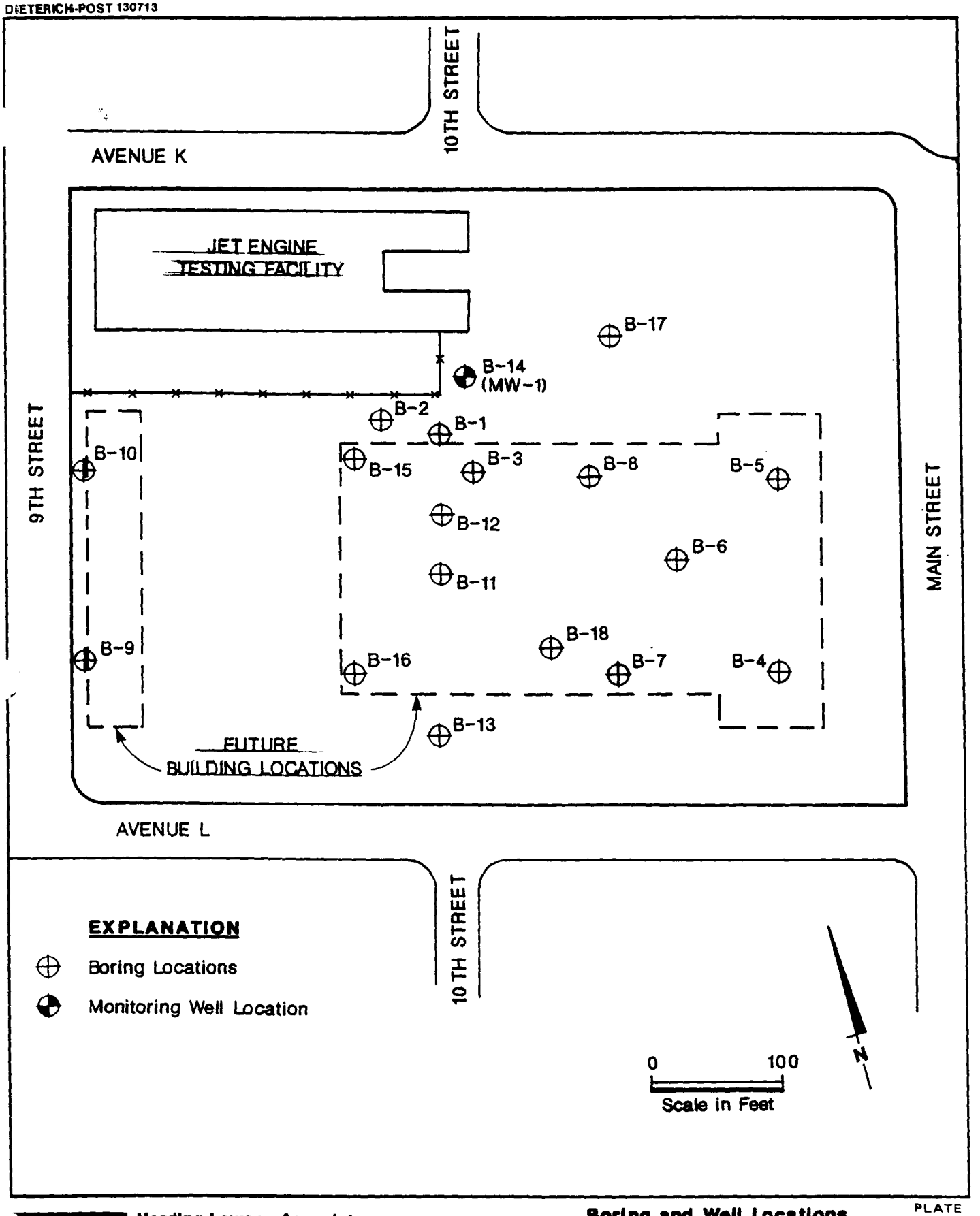
Site Location
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE 1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GM-L	19541,001.04		10/89	

DIETERICH-POST 130713



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Environmental Services

Boring and Well Locations
Intermediate Maintenance Facility
Alameda Naval Air Station
Alameda, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GM-L	19541,001.04		10/89	

Boring No. B- 1
Equipment 8" dia. HSA
Elevation 111 ft Date 9/19/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		BROWN SILTY SAND WITH GRAVEL (SP-SM) soil becomes blue-green large concrete fragments encountered strong hydrocarbon odor
		Strg	300			
				5		becomes saturated
		Strg	1000			free hydrocarbon product in sample
				10		Boring was terminated at 9.0 feet. Ground water was encountered at 6.0 feet.
				15		

Boring No. B- 2
Equipment 8" dia. HSA
Elevation 114 ft Date 9/19/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		CLAYEY SAND WITH GRAVEL (SC) medium dense, moist, concrete fragments present
				5		large block of concrete encountered GRAY SANDY FAT CLAY (CH) loose, wet, organic odor
		Mild	10	10		
						Boring was terminated at 10.5 feet. Ground water was encountered at 8.5 feet.
				15		

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Logs of Borings
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE 3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
B44N5-G5	19541,001.04		12/89	

Boring No. B- 3
Equipment 8" dia. HSA
Elevation 116 ft Date 9/19/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		GRAY GREEN SILTY SAND WITH GRAVEL (SP-SM) strong hydrocarbon odor
				5		
						GRAY BLACK SANDY FAT CLAY (CH) loose, wet
		Strg	1000			
				10		Boring was terminated at 9.5 feet. Ground water was encountered at 9.0 feet.
				15		

Boring No. B- 4
Equipment 8" dia. HSA
Elevation 114 ft Date 10/31/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		LIGHT BROWN SILTY SAND (SM) loose, dry BROWN SAND (SP) loose, moist slight organic odor
						becomes saturated
				5		dark blackish coloration at 5.7 feet
		Slgt	150			
						Boring was terminated at 6.0 feet. Ground water was encountered at 4.5 feet.
				10		
				15		

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Logs of Borings
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE 4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
B4415-G5	19541,001.04		12/89	

Boring No. B- 5
Equipment 8" dia. HSA
Elevation 114 ft Date 10/31/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		LIGHT BROWN SILTY SAND (SM) loose, dry BROWN SAND (SP) loose, moist
		No	10	5		color change to dark greenish brown slight odor, becomes saturated
		Slgt	400			
						Boring was terminated at 6.0 feet. Ground water was encountered at 4.5 feet.
				10		
				15		

Boring No. B- 6
Equipment 8" dia. HSA
Elevation 116 ft Date 10/31/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		LIGHT BROWN SILTY SAND (SM) loose, dry, shell fragments BROWN SAND (SP) loose, moist becomes saturated
		No	1	5		becomes black strong odor at 5.4 feet
		Strg	1000			
						Boring was terminated at 6.0 feet. Ground water was encountered at 3.5 feet.
				10		
				15		

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Logs of Borings
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE **5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
B4415-G5	19541,001.04		12/89	

Boring No. B- 7

Equipment 8" dia. HSA

Elevation 115 ft Date 10/31/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		BROWN SILTY SAND (SM) loose, dry shell and asphalt fragments BROWN SAND (SP) loose, moist, asphalt pieces BLACK ORGANIC TAR-LIKE MATERIAL WITH SAND AND WOOD FRAGMENTS
		Strg	100	5		strong hydrocarbon odor
				10		Boring was terminated at 6.5 feet. Ground water was encountered at approximately 4.0 feet.
				15		

Boring No. B- 8

Equipment 8" dia. HSA

Elevation 115 ft Date 10/31/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		LIGHT BROWN SAND (SP) loose, dry
						becomes moist at 3.5 feet
		Mild	500	5		becomes saturated becomes dark grayish brown slight to mild odor
		Mild	350			
				10		Boring was terminated at 6.5 feet. Ground water was encountered at 4.5 feet.
				15		

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Logs of Borings
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE 6

DRAWING	JOB NUMBER	APPROVED	DATE	REVISED DATE
B4415-G5	19541,001.04		12/89	

Boring No. B- 9
Equipment 8" dia. HSA
Elevation 115 ft Date 10/31/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		LIGHT BROWN SAND (SP) loose, dry BROWN SAND (SP) loose, dry
		No	1			becomes moist
				5		becomes saturated
		No	2			
						Boring was terminated at 6.5 feet. Ground water was encountered at approximately 6 feet.
				10		
				15		

Boring No. B-10
Equipment 8" dia. HSA
Elevation 115 ft Date 10/31/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		LIGHT BROWN SAND (SP) loose, dry
		No	1	5		
		No	1			becomes saturated
						Boring was terminated at 6.5 feet. Ground water was encountered at 6.0 feet.
				10		
				15		

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Logs of Borings
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE **7**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
B4415-G5	19541,001.04		12/89	

DIETERICH-POST 130713

Boring No. B-11

Equipment 8" dia. HSA

Elevation 111 ft Date 11/1/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		BROWN SAND (SP) loose, dry becomes moist at 1 foot becomes saturated
		No	0			becomes brownish-gray
				5		Boring was terminated at 4.5 feet. Ground water was encountered at 2.5 feet.
				10		
				15		

Boring No. B-12

Equipment 8" dia. HSA

Elevation 111 ft Date 11/1/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		DARK BROWN SILTY SAND (SM) loose, dry
		No	10			GRAY SAND (SP) medium dense, moist, shell fragments
		No	8			
		No	45	5		becomes saturated
						Boring was terminated at 6.0 feet. Ground water was encountered at 5.5 feet.
				10		
				15		

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Logs of Borings
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE **8**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
B4415-G5	19541,001.04		12/89	

Boring No. B-13
Equipment 8" dia. HSA
Elevation 111 ft Date 11/1/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		BROWN SILTY SAND (SM) loose, dry shell fragments, concrete pieces BROWN GRAY SAND (SP) medium dense, moist
		No	2			
		No	10			
				5		Boring was terminated at 5.0 feet. Ground water was encountered at 3.5 feet.
				10		
				15		

Boring No. B-14
Equipment 8" dia. HSA
Elevation 114 ft Date 11/1/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		LIGHT BROWN SILTY SAND (SM) loose, dry concrete and asphaltic fragments GRAY SAND (SP) moist VERY DARK BROWN TO BLACKISH SILTY SAND (SM) loose, saturated with oil strong oily odor
		Strg	1000	5		
		Strg	1000	10		
		Strg	1000	15		

Boring was terminated at 16.5 feet.
Ground water was encountered at

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Logs of Borings
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE 9

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
B4415-G5	19541,001.04		12/89	

Boring No. B-15

Equipment 8" dia. HSA

Elevation 115 ft Date 11/1/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	Description
				0		DARK BROWN SILTY SAND (SM) loose, dry fragments of concrete and asphalt
				5		BROWN SAND WITH GRAVEL (SP) loose, moist fragments of brick, concrete, and asphalt
		No	4			YELLOWISH BROWN GRAVEL WITH SAND (GW)
		No	4			loose, saturated
				10		Boring was terminated at 7.5 feet. Ground water was encountered at 5.9 feet.
				15		

Boring No. B-16

Equipment 8" dia. HSA

Elevation 115 ft Date 11/1/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	Description
				0		BROWN SILTY SAND (SM) loose, dry concrete, brick, and asphaltic fragments
						LIGHT BROWN SAND (SP) loose, dry
				5		
		No	1			
		No	0			Boring was terminated at 7.0 feet. Ground water was encountered at 5.6 feet.
				10		
				15		

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Logs of Borings
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE **10**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
B4415-G5	19541,001.04		12/89	

Boring No. B-17
Equipment 8" dia. HSA
Elevation 115 ft Date 11/1/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		LIGHT BROWN SILTY SAND (SM) loose, dry
						LIGHT BROWN SAND (SP) loose, moist
		No	9			
				5		VERY DARK GRAY TO BLACK SILTY SAND (SM) loose, saturated
		No	400			
						color change to yellowish brown at 8 feet
		No	4			
				10		Boring was terminated at 10.5 feet. Ground water was encountered at 4.0 feet.
				15		

Boring No. B-18
Equipment 8" dia. HSA
Elevation 115 ft Date 11/1/89

Laboratory Tests	Blows/ft	Odor	OVA (ppm)	Depth ft	Sample	
				0		LIGHT BROWN SILTY SAND (SM) loose, dry
						GRAY BROWN SAND (SP) loose, moist
		No	2			
				5		BLACK ORGANIC TAR-LIKE MATERIAL strong odor
		Strg	100			
		Strg	150			
						BROWN SILTY SAND (SM) loose, saturated
				10		
		No	35			
						Boring was terminated at 11.5 feet. Ground water was encountered at approximately 5 feet.
				15		

Harding Lawson Associates
Engineering and Environmental Services

Logs of Borings
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE 11

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
B4415-G5	19541,001.04		12/89	

MAJOR DIVISIONS				TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN No 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC	CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS WITH OR WITHOUT GRAVEL
			SC	CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL	ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

SOIL CLASSIFICATION - ASTM D2487-85

Perm — Permeability
Consol — Consolidation
LL — Liquid Limit (%)
PI — Plastic Index (%)
G_s — Specific Gravity
MA — Particle Size Analysis
■ — "Undisturbed" Sample
▨ — Bulk or Classification Sample

	Shear Strength (psf)	Confining Pressure		
TxUU (FM) or (S)	3200	(2600)	—	Unconsolidated Undrained Triaxial Shear (field moisture or saturated)
TxCU (P)	3200	(2600)	—	Consolidated Undrained Triaxial Shear (with or without pore pressure measurement)
TxCD	3200	(2600)	—	Consolidated Drained Triaxial Shear
SSCU (P)	3200	(2600)	—	Simple Shear Consolidated Undrained (with or without pore pressure measurement)
SSCD	3200	(2600)	—	Simple Shear Consolidated Drained
DSCD	2700	(2000)	—	Consolidated Drained Direct Shear
UC	470		—	Unconfined Compression
LVS	700		—	Laboratory Vane Shear

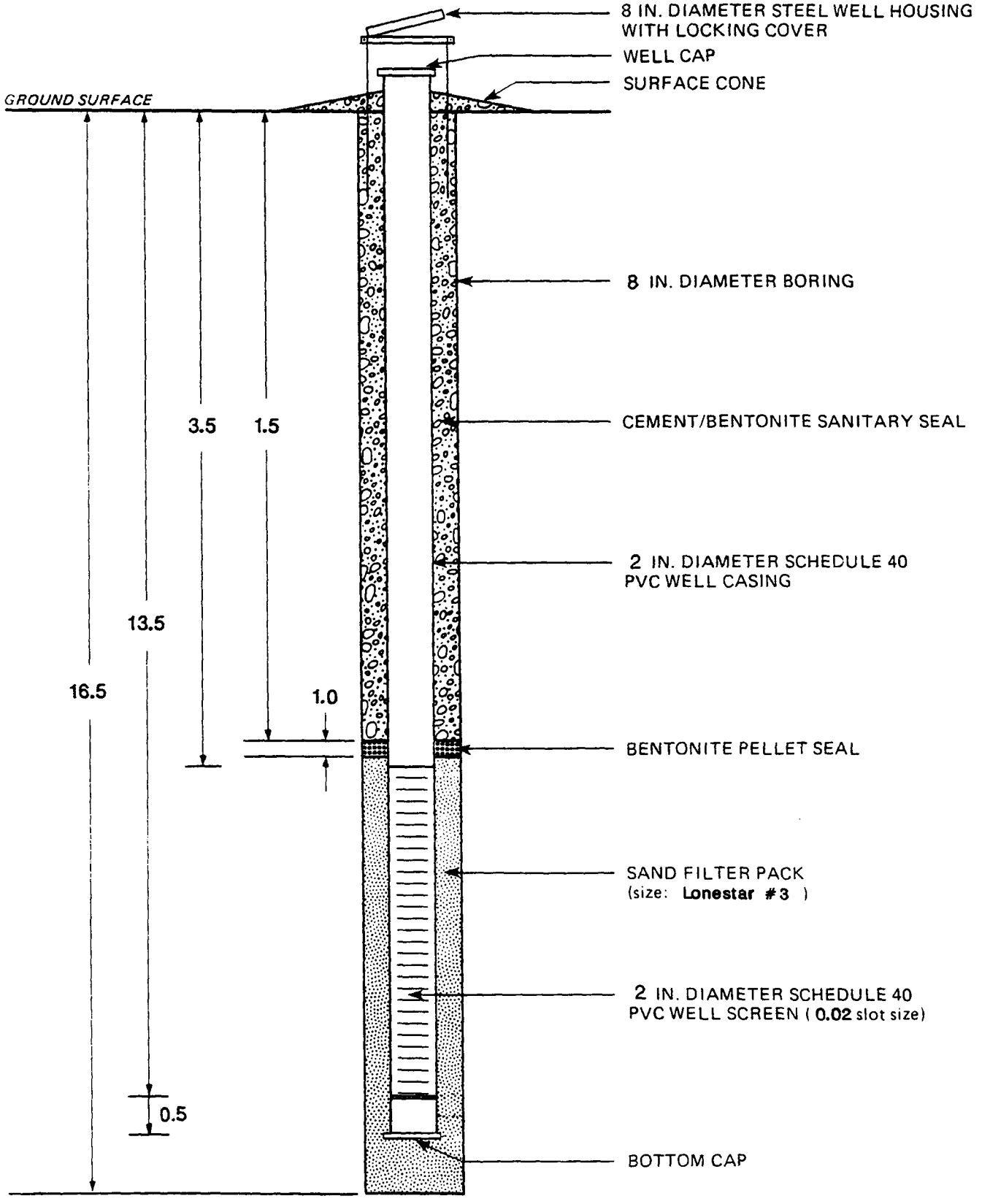
KEY TO TEST DATA

Harding Lawson Associates
Engineers and Geoscientists

Soil Classification Chart and Key to Test Data
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE **12**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
GM-L	19541,001.04		12/89		



NOT TO SCALE

Harding Lawson Associates
Engineers Geologists & Geophysicists

Monitering Well Completion Detail (MW-1)
Intermediate Maintenance Facility
Alameda Naval Air Station, California

PLATE **13**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
TY	19541,001.04		12/89		

FORM GW1

Appendix A

SUMMARY OF CHEMICAL ANALYSIS RESULTS

Table 1. Results of Chemical Analysis of Soil Samples
Total Petroleum Hydrocarbons and Oil and Grease
Concentrations in parts per million (ppm)

Harding Lawson Associates

Sample Identification	Total Petroleum Hydrocarbons: Gasoline	Jet Fuel	Diesel	Oil and Grease
B-1-4	ND(10)	130	ND(10)	NA
B-1-7	ND(1,000)	8,600	ND(1,000)	NA
B-2-9.5	ND(10)	ND(10)	ND(10)	NA
B-3-8.5	ND(10)	880	ND(10)	NA
B-4-5.5	ND(10)	300**	ND(10)	930
B-5-5	ND(10)	ND(10)	ND(10)	ND(50)
B-6-5.5	ND(10)	5,100**	ND(10)	720
B-7-4.5	16,000*	ND(1,000)	76,000***	120,000
B-8-4.5	ND(10)	ND(10)	ND(10)	ND(50)
B-9-5.5	ND(10)	ND(10)	ND(10)	ND(50)
B-10-4.5	ND(10)	ND(10)	ND(10)	ND(50)
B-11-3.5	ND(10)	ND(10)	ND(10)	780
B-12-5	ND(10)	ND(10)	55***	730
B-13-3	ND(10)	ND(10)	65***	6,200
B-14-4	ND(10)	ND(10)	490	33,000
B-14-15	860*	ND(100)	860***	3,300
B-15-5.5	ND(10)	ND(10)	51	930
B-16-5	ND(10)	ND(10)	ND(10)	810
B-17-5.5	ND(10)	ND(10)	ND(10)	1,100

ND = Concentrations not Detected (Detection limits given in paratheses.)
NA = Not Analyzed
* Chromatographic signature does not match hydrocarbon standard. Quantitation based on area sum in the C8-C12 range.
** Chromatographic signature does not match hydrocarbon standard. Quantitation based on area sum in the C10-C16 range.
*** Chromatographic signature does not match hydrocarbon standard. Quantitation based on area sum in the C12-C26 range.

Table 2. Results of Chemical Analyses of Soil Samples
Benzene, Toluene, Ethyl Benzene, and Xylenes
EPA Test Methods 8020 or 8240
Concentrations in parts per million (ppm)

Sample Identification	Benzene	Toluene	Ethyl Benzene	Xylenes
B-1-4	NA	NA	NA	NA
B-1-7	13	ND	52	16
B-2-10	NA	NA	NA	NA
B-3-8.5	ND	ND	ND	ND
B-4-5.5	ND	ND	0.0026	0.0036
B-5-5	ND	ND	ND	ND
B-6-5.5	ND	ND	ND	ND
B-7-4.5	7.0	39	7.8	22
B-8-4.5	ND	ND	ND	ND
B-9-5.5	ND	ND	ND	ND
B-10-4.5	ND	ND	ND	ND
B-11-3.5	ND	ND	ND	ND
B-12-5	ND	ND	ND	ND
B-13-3	ND	ND	ND	ND
B-14-4	ND	ND	ND	ND
B-14-15	ND	ND	9.3	ND
B-15-5.5	ND	ND	ND	ND
B-16-5	ND	ND	ND	ND
B-17-5.5	ND	ND	ND	ND

NA = Not analyzed

ND = Concentrations not detected (Detection limits vary from 0.005 to 2.5 ppm.)

Table 3. Results of Chemical Analyses of Soil Samples
Volatile Organics, Base/Neutral and Extractable Organics
EPA Test Methods 8240 and 8270
Concentrations in parts per million (ppm)

Sample Identification	Compounds Detected	Concentrations (ppm)
B-1-4	Not Analyzed	
B-1-7	Benzene	13
	Toluene	16
	Xylenes	52
B-2-10	Not Analyzed	
B-3-8.5	None Detected	
B-4-5.5	Xylenes	0.0036
	Ethyl benzene	0.0026
B-5-5	None Detected	
B-6-5.5	None Detected	
B-7-4.5	Benzene	7
	Toluene	39
	Xylenes	7.8
	Ethyl Benzene	22
	2-Methylnaphthalene	220
B-8-4.5	None Detected	
B-9-5.5	None Detected	
B-10-4.5	None Detected	
B-11-3.5	None Detected	
B-13-3	None Detected	
B-15-5.5	None Detected	
B-16-5	None Detected	

Table 4. Results of Chemical Analysis of Soil Samples
Total Metals
Concentrations in parts per million (ppm)

Metals	Sample Identification											Detection Limit	TTLC
	B-4-5.5	B-5-5	B-6-5.5	B-7-4.5	B-8-4.5	B-9-5.5	B-10-4.5	B-11-3.5	B-13-3	B-15-5.5	B-16-5		
Antimony	ND	ND	ND	2.2	ND	ND	ND	ND	ND	ND	ND	2.5	500
Arsenic	ND	ND	ND	81	ND	ND	ND	ND	ND	ND	ND	2.5	500
Barium	16	58	35	70	67	10	9.6	16	17	61	9.7	0.5	10,000
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	75
Cadmium	0.53	0.7	0.62	0.30	0.79	ND	0.55	ND	0.83	1.0	0.50	0.5	100
Chromium (total)	11	16	16	33	18	14	14	13	21	7.8	13	0.5	500*
Cobalt	1.4	3.4	3.1	4.8	3.5	2.5	2.8	2.0	2.8	4.9	3.0	0.5	8,000
Copper	4.5	8.2	5.8	70	21	3.5	3.2	4.6	5.7	15	3.7	0.5	2,500
Lead	9.3	ND	ND	13,000	140	ND	ND	ND	9.1	3.0	ND	2.5	1,000
Mercury	0.51	0.11	ND	0.78	0.31	ND	ND	ND	ND	ND	0.86	0.1	20
Molybdenum	ND	ND	ND	0.32	ND	ND	ND	ND	ND	ND	ND	0.5	3,500
Nickel	7.4	15	11	39	12	14	15	12	16	7.9	16	0.5	2,000
Selenium	ND	ND	ND	16	ND	ND	ND	ND	ND	ND	ND	2.5	100
Silver	ND	ND	ND	0.93	ND	ND	ND	ND	ND	ND	ND	1.0	500
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.5	700
Vanadium	11	11	9.9	13	13	7.4	6.0	6.8	7.9	10	5.8	0.5	2,400
Zinc	16	17	10	20	72	9.4	8.9	9.8	23	200	10	0.5	5,000

ND = Concentrations not detected.
* Value given for Chromium (VI)

Table 5. Results of Chemical Analysis of Soil Samples
Soluble Metals
Waste Extraction Test (WET)
Concentrations in parts per million (ppm)

Metal	Sample Identification											Detection Limit	STLC
	B-4-5.5	B-5-5	B-6-5.5	B-7-4.5	B-8-4.5	B-9-5.5	B-10-4.5	B-11-3.5	B-13-3	B-15-5.5	B-16-5		
Antimony	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05	15
Arsenic	ND	ND	0.06	ND	ND	ND	ND	ND	ND	0.06	ND	0.05	5
Barium	1.4	3.8	2.1	0.79	4.8	0.68	0.67	1.2	1.6	1.9	0.73	0.01	100
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	0.75
Cadmium	0.1	0.03	0.02	0.3	0.03	ND	ND	ND	0.07	0.02	ND	0.01	1
Chromium (total)	0.18	0.24	0.54	2.8	0.30	0.03	0.02	0.09	0.44	0.29	0.02	0.01	5*
Cobalt	0.03	0.17	0.03	0.13	0.19	0.03	0.03	0.04	0.05	0.08	0.04	0.01	80
Copper	0.04	0.04	0.02	0.03	0.19	0.05	0.03	0.10	0.07	0.32	0.03	0.01	25
Lead	0.36	0.10	ND	140	8.2	0.21	ND	0.17	0.97	0.10	ND	0.05	5
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	0.2
Molybdenum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	150
Nickel	0.1	0.25	0.10	1.8	0.26	0.05	0.06	0.12	0.22	0.26	0.07	0.01	20
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05	1
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02	5
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05	7
Vanadium	0.37	0.46	0.77	0.32	0.54	0.06	0.08	0.13	0.09	0.54	0.08	0.01	24
Zinc	ND	ND	ND	1.9	4.0	ND	ND	0.13	0.59	0.37	0.05	0.01	250

ND = Concentrations not detected.
* Value given for Chromium (VI)

Table 6. Results of Chemical Analysis of Ground-Water Sample Concentrations in parts per million (ppm)

Compound	Concentration (ppm)
Gasoline	11
Jet Fuel	ND
Diesel	ND
Oil and Grease	60
Barium	0.40
Lead	0.05
Nickel	0.02
Vanadium	0.01
Other Metals	ND
Benzene	0.440
Other Volatile Organics	ND
Phenol	0.037
Phenanthrene	0.0038
Fluorene	0.0023
Other Base/Neutral and Extractables	ND

ND = Concentrations not detected

Appendix B

LABORATORY REPORTS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

RECEIVED
NOV 20 1989
HARDING LAWSON ASSOCIATES

DATE RECEIVED: 11/03/89
DATE REPORTED: 11/15/89

LAB NUMBER: 18623

CLIENT: HARDING LAWSON ASSOCIATES

REPORT ON: 1 WATER SAMPLE

JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

RESULTS: SEE ATTACHED

M. E. Printen
QA/QC Officer

for CBG
Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18623-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: MW-1

DATE RECEIVED: 11/03/89
DATE ANALYZED: 11/06/89
DATE REPORTED: 11/15/89

Title 26 Metals in Aqueous Solutions

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	ND	0.05	EPA 7060
Barium	0.40	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	ND	0.01	EPA 6010
Chromium (total)	ND	0.01	EPA 6010
Cobalt	ND	0.01	EPA 6010
Copper	ND	0.02	EPA 6010
Lead	0.05	0.05	EPA 7420
Mercury	ND	0.001	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	0.02	0.01	EPA 6010
Selenium	ND	0.05	EPA 6010
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 7841
Vanadium	0.01	0.01	EPA 6010
Zinc	ND	0.01	EPA 6010

ND = Not Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	6	96	Mercury	<1	94
Arsenic	25	108	Molybdenum	<1	87
Barium	<1	106	Nickel	6	93
Beryllium	1	104	Selenium	<1	93
Cadmium	<1	90	Silver	<1	106
Chromium	16	97	Thallium	19	110
Cobalt	4	91	Vanadium	<1	100
Copper	1	105	Zinc	<1	91
Lead	7	84			

Curtis & Tompkins, Ltd.

ABORATORY NUMBER: 18623-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: MW-1

DATE RECEIVED: 11/03/89
DATE ANALYZED: 11/10/89
DATE REPORTED: 11/15/89

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	100
bromomethane	ND	100
vinyl chloride	ND	100
chloroethane	ND	100
methylene chloride	ND	50
trichlorofluoromethane	ND	50
1,1-dichloroethene	ND	50
1,1-dichloroethane	ND	50
trans-1,2-dichloroethene	ND	50
chloroform	ND	50
1,2-dichloroethane	ND	50
1,1,1-trichloroethane	ND	50
carbon tetrachloride	ND	50
bromodichloromethane	ND	50
1,2-dichloropropane	ND	50
is-1,3-dichloropropene	ND	50
richloroethylene	ND	50
dibromochloromethane	ND	50
1,1,2-trichloroethane	ND	50
benzene	440	50
trans-1,3-dichloropropene	ND	50
2-chloroethylvinyl ether	ND	100
bromoform	ND	50
1,1,2,2-tetrachloroethane	ND	50
tetrachloroethylene	ND	50
toluene	ND	50
chlorobenzene	ND	50
ethyl benzene	ND	50

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	100
carbon disulfide	ND	50
2-butanone	ND	100
vinyl acetate	ND	100
2-hexanone	ND	100
4-methyl-2-pentanone	ND	100
styrene	ND	50
total xylenes	ND	50

A/QC SUMMARY: SURROGATE RECOVERIES

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

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18623-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
CLIENT ID: MW-1

DATE RECEIVED: 11/03/89
DATE EXTRACTED: 11/08/89
DATE ANALYZED: 11/10/89
DATE REPORTED: 11/15/89

EPA 625: Base/Neutral and Acid Extractables in Water
Extraction Method: EPA 3510 Liquid/Liquid

ACID COMPOUNDS	RESULT ug/L	LOD ug/L
Phenol	37	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	10
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
-Nitrosodimethylamine	ND	5
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-Nitroso-di-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	ND	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethylphthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Diethylphthalate	ND	5
4-Chlorophenyl-phenylether	ND	5
Fluorene	TRACE(2.3)	5
N-Nitrosodiphenylamine	ND	5

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18623-1
CLIENT ID: MW-1

EPA 625

BASE/NEUTRAL COMPOUNDS	RESULT ug/L	LOD ug/L
Azobenzene	ND	5
4-Bromophenyl-phenylether	ND	5
Hexachlorobenzene	ND	5
Phenanthrene	TRACE(3.8)	5
Anthracene	ND	5
Di-n-butylphthalate	ND	5
Fluoranthene	ND	5
Benzidine	ND	5
Pyrene	ND	5
Butylbenzylphthalate	ND	5
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octylphthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	10
Dibenzo (a,h) anthracene	ND	10
Benzo (g,h,i) perylene	ND	10

HSL COMPOUNDS		
Aniline	ND	5
Benzoic Acid	ND	25
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5
4-Chloroaniline	ND	5
2-Methylnaphthalene	ND	5
2-Nitroaniline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY: SURROGATE RECOVERIES

Compound	%Recovery	Compound	%Recovery
2-Fluorophenol	23	Nitrobenzene-d5	54
Phenol-d5	18	2-Fluorobiphenyl	36
2,4,6-tribromophenol	58	Terphenyl	39

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18623
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 11/03/89
DATE ANALYZED: 11/08/89
DATE REPORTED: 11/15/89

Extractable Petroleum Hydrocarbons in Aqueous Solutions
EPA 8015 (Modified)
Extraction Method: EPA 3510

LAB ID	CLIENT ID	GASOLINE (mg/L)	JET FUEL (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
18623-1	MW-1	11*	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not Detected; Limit of detection in parentheses.

= Fingerprint Pattern does not match Hydrocarbon Standards.
Quantitation based on area sum within C8 to C12 boiling range.

QA/QC SUMMARY

RPD, %	31
Spike: % Recovery	97

Curtis & Tompkins, Ltd.

LAB NUMBER: 18623
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT # : 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 11/03/89
DATE ANALYZED: 11/10/89
DATE REPORTED: 11/15/89

ANALYSIS: OIL AND GREASE
METHOD: SMWW 503E

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
18623-1	MW-1	60	mg/L	20

QA/QC SUMMARY

RPD, %	5
RECOVERY, %	82

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 10/31/89
DATE REPORTED: 11/07/89

LAB NUMBER: 18591

CLIENT: HARDING LAWSON ASSOCIATES

REPORT ON: 7 SOIL SAMPLES

JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

RESULTS: SEE ATTACHED

M. E. Printess
QA/QC Officer

Jon Way for CBG
Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/06/89
DATE REPORTED: 11/06/89

Extractable Petroleum Hydrocarbons in Soils & Wastes
EPA 8015 (Modified)
Extraction Method: EPA 3550

LAB ID	CLIENT ID	GASOLINE (mg/Kg)	JET FUEL (mg/Kg)	DIESEL (mg/Kg)	OTHER (mg/Kg)
18591-1	B-4-5.5	ND(10)	300**	ND(10)	ND(10)
18591-3	B-5-5	ND(10)	ND(10)	ND(10)	ND(10)
18591-4	B-6-5.5	ND(10)	5,100**	ND(10)	ND(10)
18591-5	B-7-4.5	16,000*	ND(1000)	76,000***	ND(1000)
18591-6	B-8-4.5	ND(10)	ND(10)	ND(10)	ND(10)
18591-7	B-9-5.5	ND(10)	ND(10)	ND(10)	ND(10)
18591-8	B-10-4.5	ND(10)	ND(10)	ND(10)	ND(10)

ND = Not Detected; Limit of detection in parentheses.

*FINGERPRINT PATTERN DOES NOT MATCH HYDRDOCARBON STANDARD. QUANTITATION BASED ON AREA SUM IN THE C8-C12 BOILING RANGE.

**FINGERPRINT PATTERN DOES NOT MATCH HYDRDOCARBON STANDARD. QUANTITATION BASED ON AREA SUM IN THE C10-C16 BOILING RANGE.

***FINGERPRINT PATTERN DOES NOT MATCH HYDRDOCARBON STANDARD. QUANTITATION BASED ON AREA SUM IN THE C12-C26 BOILING RANGE.

QA/QC SUMMARY

Duplicate: Relative % Difference	7
Spike: % Recovery	112

Curtis & Tompkins, Ltd.

AB NUMBER: 18591
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT # : 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

ANALYSIS: OIL AND GREASE
METHOD: SMWW 503E

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
18591-1	B-4-5.5	930	mg/Kg	50
18591-3	B-5-5	ND	mg/Kg	50
18591-4	B-6-5.5	720	mg/Kg	50
18591-5	B-7-4.5	120,000	mg/Kg	50
18591-6	B-8-4.5	ND	mg/Kg	50
18591-7	B-9-5.5	ND	mg/Kg	50
18591-8	B-10-4.5	ND	mg/Kg	50

ND = Not Detected

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	84

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

ANALYSIS: pH
METHOD REFERENCE: EPA 9045

LAB ID	SAMPLE ID	pH
18591-1	B-4-5.5	8.7
18591-3	B-5-5	8.2
18591-4	B-6-5.5	8.7
18591-5	B-7-4.5	1.6
18591-6	B-8-4.5	7.0
18591-7	B-9-5.5	8.3
18591-8	B-10-4.5	7.9

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-1
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-4-5.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	ND	2.5	EPA 6010
Arsenic	ND	2.5	EPA 6010
Barium	16	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	0.53	0.5	EPA 6010
Chromium (total)	11	0.5	EPA 6010
Cobalt	1.4	0.5	EPA 6010
Copper	4.5	0.5	EPA 6010
Lead	9.3	2.5	EPA 7420
Mercury	0.51	0.1	EPA 7471
Molybdenum	ND	0.5	EPA 6010
Nickel	7.4	0.5	EPA 6010
Selenium	ND	2.5	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	11	0.5	EPA 6010
Zinc	16	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	92	Mercury	8	100
Arsenic	1	101	Molybdenum	1	87
Barium	<1	92	Nickel	3	97
Beryllium	<1	94	Selenium	6	102
Cadmium	4	89	Silver	1	96
Chromium	2	99	Thallium	5	84
Cobalt	<1	95	Vanadium	1	95
Copper	1	96	Zinc	1	97
Lead	4	89			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-3
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-5-5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	ND	2.5	EPA 6010
Arsenic	ND	2.5	EPA 6010
Barium	58	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	0.7	0.5	EPA 6010
Chromium (total)	16	0.5	EPA 6010
Cobalt	3.4	0.5	EPA 6010
Copper	8.2	0.5	EPA 6010
Lead	ND	2.5	EPA 7420
Mercury	0.11	0.1	EPA 7471
Molybdenum	ND	0.5	EPA 6010
Nickel	15	0.5	EPA 6010
Selenium	ND	2.5	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	11	0.5	EPA 6010
Zinc	17	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	92	Mercury	8	100
Arsenic	1	101	Molybdenum	1	87
Barium	<1	92	Nickel	3	97
Beryllium	<1	94	Selenium	6	102
Cadmium	4	89	Silver	1	96
Chromium	2	99	Thallium	5	84
Cobalt	<1	95	Vanadium	1	95
Copper	1	96	Zinc	1	97
Lead	4	89			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-4
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-6-5.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	ND	2.5	EPA 6010
Arsenic	ND	2.5	EPA 6010
Barium	35	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	0.62	0.5	EPA 6010
Chromium (total)	16	0.5	EPA 6010
Cobalt	3.1	0.5	EPA 6010
Copper	5.8	0.5	EPA 6010
Lead	ND	2.5	EPA 7420
Mercury	ND	0.1	EPA 7471
Molybdenum	ND	0.5	EPA 6010
Nickel	11	0.5	EPA 6010
Selenium	ND	2.5	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	9.9	0.5	EPA 6010
Zinc	10	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	92	Mercury	8	100
Arsenic	1	101	Molybdenum	1	87
Barium	<1	92	Nickel	3	97
Beryllium	<1	94	Selenium	6	102
Cadmium	4	89	Silver	1	96
Chromium	2	99	Thallium	5	84
Cobalt	<1	95	Vanadium	1	95
Copper	1	96	Zinc	1	97
Lead	4	89			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-5
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-7-4.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	2.2	2.5	EPA 6010
Arsenic	81	2.5	EPA 7060
Barium	70	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	0.30	0.5	EPA 6010
Chromium (total)	33	0.5	EPA 6010
Cobalt	4.8	0.5	EPA 6010
Copper	70	0.5	EPA 6010
Lead	13,000	2.5	EPA 7420
Mercury	0.78	0.1	EPA 7471
Molybdenum	0.32	0.5	EPA 6010
Nickel	39	0.5	EPA 6010
Selenium	16	2.5	EPA 7740
Silver	0.93	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	13	0.5	EPA 6010
Zinc	20	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	92	Mercury	8	100
Arsenic	1	101	Molybdenum	1	87
Barium	<1	92	Nickel	3	97
Beryllium	<1	94	Selenium	6	102
Cadmium	4	89	Silver	1	96
Chromium	2	99	Thallium	5	84
Cobalt	<1	95	Vanadium	1	95
Copper	1	96	Zinc	1	97
Lead	4	89			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-6
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-8-4.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	ND	2.5	EPA 6010
Arsenic	ND	2.5	EPA 6010
Barium	67	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	0.79	0.5	EPA 6010
Chromium (total)	18	0.5	EPA 6010
Cobalt	3.5	0.5	EPA 6010
Copper	21	0.5	EPA 6010
Lead	140	2.5	EPA 7420
Mercury	0.31	0.1	EPA 7471
Molybdenum	ND	0.5	EPA 6010
Nickel	12	0.5	EPA 6010
Selenium	ND	2.5	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	13	0.5	EPA 6010
Zinc	72	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	92	Mercury	8	100
Arsenic	1	101	Molybdenum	1	87
Barium	<1	92	Nickel	3	97
Beryllium	<1	94	Selenium	6	102
Cadmium	4	89	Silver	1	96
Chromium	2	99	Thallium	5	84
Cobalt	<1	95	Vanadium	1	95
Copper	1	96	Zinc	1	97
Lead	4	89			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-7
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-9-5.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	ND	2.5	EPA 6010
Arsenic	ND	2.5	EPA 6010
Barium	10	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	ND	0.5	EPA 6010
Chromium (total)	14	0.5	EPA 6010
Cobalt	2.5	0.5	EPA 6010
Copper	3.5	0.5	EPA 6010
Lead	ND	2.5	EPA 7420
Mercury	ND	0.1	EPA 7471
lybdenum	ND	0.5	EPA 6010
Nickel	14	0.5	EPA 6010
Selenium	ND	2.5	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	7.4	0.5	EPA 6010
Zinc	9.4	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	92	Mercury	8	100
Arsenic	1	101	Molybdenum	1	87
Barium	<1	92	Nickel	3	97
Beryllium	<1	94	Selenium	6	102
Cadmium	4	89	Silver	1	96
Chromium	2	99	Thallium	5	84
Cobalt	<1	95	Vanadium	1	95
Copper	1	96	Zinc	1	97
Lead	4	89			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-8
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-10-4.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	ND	2.5	EPA 6010
Arsenic	ND	2.5	EPA 6010
Barium	9.6	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	0.55	0.5	EPA 6010
Chromium (total)	14	0.5	EPA 6010
Cobalt	2.8	0.5	EPA 6010
Copper	3.2	0.5	EPA 6010
Lead	ND	2.5	EPA 7420
Mercury	ND	0.1	EPA 7471
Molybdenum	ND	0.5	EPA 6010
Nickel	15	0.5	EPA 6010
Selenium	ND	2.5	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	6.0	0.5	EPA 6010
Zinc	8.9	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	92	Mercury	8	100
Arsenic	1	101	Molybdenum	1	87
Barium	<1	92	Nickel	3	97
Beryllium	<1	94	Selenium	6	102
Cadmium	4	89	Silver	1	96
Chromium	2	99	Thallium	5	84
Cobalt	<1	95	Vanadium	1	95
Copper	1	96	Zinc	1	97
Lead	4	89			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-1
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #:19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-4-5.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/06/89
DATE REPORTED: 11/07/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	ND	0.05	EPA 7060
Barium	1.4	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	0.01	0.01	EPA 6010
Chromium (total)	0.18	0.01	EPA 6010
Cobalt	0.03	0.01	EPA 6010
Copper	0.04	0.01	EPA 6010
Lead	0.36	0.05	EPA 7420
Mercury	ND	0.01	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	0.1	0.01	EPA 6010
Selenium	ND	0.05	EPA 6010
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 7841
Vanadium	0.37	0.01	EPA 6010
Zinc	ND	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	6	96	Mercury	<1	90
Arsenic	25	108	Molybdenum	<1	87
Barium	<1	106	Nickel	6	93
Beryllium	1	104	Selenium	<1	93
Cadmium	<1	90	Silver	<1	106
Chromium	16	97	Thallium	19	110
Cobalt	4	91	Vanadium	<1	100
Copper	1	105	Zinc	<1	91
Lead	7	84			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-3
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #:19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-5-5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/06/89
DATE REPORTED: 11/07/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	ND	0.05	EPA 7060
Barium	3.8	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	0.03	0.01	EPA 6010
Chromium (total)	0.24	0.01	EPA 6010
Cobalt	0.17	0.01	EPA 6010
Copper	0.04	0.01	EPA 6010
Lead	0.10	0.05	EPA 7420
Mercury	ND	0.01	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	0.25	0.01	EPA 6010
Selenium	ND	0.05	EPA 7740
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 6010
Vanadium	0.46	0.01	EPA 6010
Zinc	ND	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	6	96	Mercury	<1	90
Arsenic	25	108	Molybdenum	<1	87
Barium	<1	106	Nickel	6	93
Beryllium	1	104	Selenium	<1	93
Cadmium	<1	90	Silver	<1	106
Chromium	16	97	Thallium	19	110
Cobalt	4	91	Vanadium	<1	100
Copper	1	105	Zinc	<1	91
Lead	7	84			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-4
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #:19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-6-5.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/06/89
DATE REPORTED: 11/07/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	0.06	0.05	EPA 7060
Barium	2.1	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	0.02	0.01	EPA 6010
Chromium (total)	0.54	0.01	EPA 6010
Cobalt	0.03	0.01	EPA 6010
Copper	0.02	0.01	EPA 6010
Lead	ND	0.05	EPA 7420
Mercury	ND	0.01	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	0.10	0.01	EPA 6010
Selenium	ND	0.05	EPA 7740
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 7841
Vanadium	0.77	0.01	EPA 6010
Zinc	ND	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	6	96	Mercury	<1	90
Arsenic	25	108	Molybdenum	<1	87
Barium	<1	106	Nickel	6	93
Beryllium	1	104	Selenium	<1	93
Cadmium	<1	90	Silver	<1	106
Chromium	16	97	Thallium	19	110
Cobalt	4	91	Vanadium	<1	100
Copper	1	105	Zinc	<1	91
Lead	7	84			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-5
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #:19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-7-4.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/06/89
DATE REPORTED: 11/07/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	ND	0.05	EPA 7060
Barium	0.79	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	0.03	0.01	EPA 6010
Chromium (total)	2.8	0.01	EPA 6010
Cobalt	0.13	0.01	EPA 6010
Copper	0.03	0.01	EPA 6010
Lead	140	0.05	EPA 7420
Mercury	ND	0.01	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	1.8	0.01	EPA 6010
Selenium	ND	0.05	EPA 6010
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 7841
Vanadium	0.32	0.01	EPA 6010
Zinc	1.9	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	6	96	Mercury	<1	90
Arsenic	25	108	Molybdenum	<1	87
Barium	<1	106	Nickel	6	93
Beryllium	1	104	Selenium	<1	93
Cadmium	<1	90	Silver	<1	106
Chromium	16	97	Thallium	19	110
Cobalt	4	91	Vanadium	<1	100
Copper	1	105	Zinc	<1	91
Lead	7	84			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-6
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #:19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-8-4.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/06/89
DATE REPORTED: 11/07/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	ND	0.05	EPA 7060
Barium	4.8	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	0.03	0.01	EPA 6010
Chromium (total)	0.30	0.01	EPA 6010
Cobalt	0.19	0.01	EPA 6010
Copper	0.19	0.01	EPA 6010
Lead	8.2	0.05	EPA 7420
Mercury	ND	0.01	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	0.26	0.01	EPA 6010
Selenium	ND	0.05	EPA 6010
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 7841
Vanadium	0.54	0.01	EPA 6010
Zinc	4.0	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	6	96	Mercury	<1	90
Arsenic	25	108	Molybdenum	<1	87
Barium	<1	106	Nickel	6	93
Beryllium	1	104	Selenium	<1	93
Cadmium	<1	90	Silver	<1	106
Chromium	16	97	Thallium	19	110
Cobalt	4	91	Vanadium	<1	100
Copper	1	105	Zinc	<1	91
Lead	7	84			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-7
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #:19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-9-5.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/06/89
DATE REPORTED: 11/07/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	ND	0.05	EPA 7060
Barium	0.68	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	ND	0.01	EPA 6010
Chromium (total)	0.03	0.01	EPA 6010
Cobalt	0.03	0.01	EPA 6010
Copper	0.05	0.01	EPA 6010
Lead	0.21	0.05	EPA 7420
Mercury	ND	0.01	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	0.05	0.01	EPA 6010
Selenium	ND	0.05	EPA 7740
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 7841
Vanadium	0.06	0.01	EPA 6010
Zinc	ND	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	6	96	Mercury	<1	90
Arsenic	25	108	Molybdenum	<1	87
Barium	<1	106	Nickel	6	93
Beryllium	1	104	Selenium	<1	93
Cadmium	<1	90	Silver	<1	106
Chromium	16	97	Thallium	19	110
Cobalt	4	91	Vanadium	<1	100
Copper	1	105	Zinc	<1	91
Lead	7	84			

Curtis & Tompkins, Ltd

BORATORY NUMBER: 18591-8
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #:19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-10-4.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/06/89
DATE REPORTED: 11/07/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	ND	0.05	EPA 6010
Barium	0.67	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	ND	0.01	EPA 6010
Chromium (total)	0.02	0.01	EPA 6010
Cobalt	0.03	0.01	EPA 6010
Copper	0.03	0.01	EPA 6010
Lead	ND	0.05	EPA 7420
Mercury	ND	0.01	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	0.06	0.01	EPA 6010
Selenium	ND	0.05	EPA 6010
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 6010
Vanadium	0.08	0.01	EPA 6010
Zinc	ND	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	6	96	Mercury	<1	90
Arsenic	25	108	Molybdenum	<1	87
Barium	<1	106	Nickel	6	93
Beryllium	1	104	Selenium	<1	93
Cadmium	<1	90	Silver	<1	106
Chromium	16	97	Thallium	19	110
Cobalt	4	91	Vanadium	<1	100
Copper	1	105	Zinc	<1	91
Lead	7	84			

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-4-5.5

DATE RECEIVED: 10/31/89
DATE EXTRACTED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3550 Sonication

ACID COMPOUNDS	RESULT ug/kg	LOD ug/kg
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	660
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1650
4-Nitrophenol	ND	1650
4,6-Dinitro-2-methylphenol	ND	1650
Pentachlorophenol	ND	1650
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	330
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-1
SAMPLE ID: B-4-5.5

BASE/NEUTRAL COMPOUNDS	RESULT ug/kg	LOD ug/kg
Azobenzene	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	660
Dibenzo (a,h) anthracene	ND	660
nzo (g,h,i) perylene	ND	660

HSL COMPOUNDS		
Aniline	ND	330
Benzoic Acid	ND	1650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1650
3-Nitroaniline	ND	1650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1650

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY:

2-Fluorophenol	77	Nitrobenzene-d5	53
Phenol-d5	81	2-Fluorobiphenyl	79
2,4,6-Tribromophenol	66	Terphenyl-d14	58

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-3
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-5-5

DATE RECEIVED: 10/31/89
DATE EXTRACTED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3550 Sonication

ACID COMPOUNDS	RESULT ug/kg	LOD ug/kg
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	660
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1650
4-Nitrophenol	ND	1650
4,6-Dinitro-2-methylphenol	ND	1650
Pentachlorophenol	ND	1650
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	330
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-3
SAMPLE ID: B-5-5

BASE/NEUTRAL COMPOUNDS	RESULT ug/kg	LOD ug/kg
Azobenzene	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	660
Dibenzo (a,h) anthracene	ND	660
Benzo (g,h,i) perylene	ND	660

HSL COMPOUNDS		
Aniline	ND	330
Benzoic Acid	ND	1650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1650
3-Nitroaniline	ND	1650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1650

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY:

2-Fluorophenol	89	Nitrobenzene-d5	62
Phenol-d5	97	2-Fluorobiphenyl	92
2,4,6-Tribromophenol	93	Terphenyl-d14	80

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-4
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-6-5.5

DATE RECEIVED: 10/31/89
DATE EXTRACTED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3550 Sonication

ACID COMPOUNDS	RESULT ug/kg	LOD ug/kg
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	660
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1650
4-Nitrophenol	ND	1650
4,6-Dinitro-2-methylphenol	ND	1650
Pentachlorophenol	ND	1650
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	330
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-4
SAMPLE ID: B-6-5.5

BASE/NEUTRAL COMPOUNDS	RESULT ug/kg	LOD ug/kg
Azobenzene	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	660
Dibenzo (a,h) anthracene	ND	660
nzo (g,h,i) perylene	ND	660

HSL COMPOUNDS		
Aniline	ND	330
Benzoic Acid	ND	1650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1650
3-Nitroaniline	ND	1650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1650

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY:

2-Fluorophenol	90	Nitrobenzene-d5	75
Phenol-d5	105	2-Fluorobiphenyl	110
2,4,6-Tribromophenol	100	Terphenyl-d14	90

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-5
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-7-4.5

DATE RECEIVED: 10/31/89
DATE EXTRACTED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3580 Waste Dilution

ACID COMPOUNDS	RESULT mg/kg	LOD mg/kg
Phenol	ND	100
2-Chlorophenol	ND	100
2-Nitrophenol	ND	500
2,4-Dimethylphenol	ND	100
2,4-Dichlorophenol	ND	100
4-Chloro-3-methylphenol	ND	100
2,4,6-Trichlorophenol	ND	100
2,4-Dinitrophenol	ND	500
4-Nitrophenol	ND	500
4,6-Dinitro-2-methylphenol	ND	500
Pentachlorophenol	ND	500
BASE/NEUTRAL COMPOUNDS		
Nitrosodimethylamine	ND	100
Bis(2-chloroethyl)ether	ND	100
1,3-Dichlorobenzene	ND	100
1,4-Dichlorobenzene	ND	100
1,2-Dichlorobenzene	ND	100
Bis(2-chloroisopropyl)ether	ND	100
N-Nitroso-di-n-propylamine	ND	100
Hexachloroethane	ND	100
Nitrobenzene	ND	100
Isophorone	ND	100
Bis(2-chloroethoxy)methane	ND	100
1,2,4-Trichlorobenzene	ND	100
Naphthalene	ND	100
Hexachlorobutadiene	ND	100
Hexachlorocyclopentadiene	ND	100
2-Chloronaphthalene	ND	100
Dimethylphthalate	ND	100
Acenaphthylene	ND	100
2,6-Dinitrotoluene	ND	100
Acenaphthene	ND	100
2,4-Dinitrotoluene	ND	100
Diethylphthalate	ND	100
4-Chlorophenyl-phenylether	ND	100
Fluorene	ND	100
N-Nitrosodiphenylamine	ND	100

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-5
SAMPLE ID: B-7-4.5

BASE/NEUTRAL COMPOUNDS	RESULT mg/kg	LOD mg/kg
Azobenzene	ND	100
4-Bromophenyl-phenylether	ND	100
Hexachlorobenzene	ND	100
Phenanthrene	ND	100
Anthracene	ND	100
Di-n-butylphthalate	ND	100
Fluoranthene	ND	100
Benzidine	ND	100
Pyrene	ND	100
Butylbenzylphthalate	ND	100
3,3'-Dichlorobenzidine	ND	500
Benzo (a) anthracene	ND	100
Chrysene	ND	100
Bis (2-ethylhexyl)phthalate	ND	100
Di-n-octylphthalate	ND	100
Benzo (b) fluoranthene	ND	100
Benzo (k) fluoranthene	ND	100
Benzo (a) pyrene	ND	100
Indeno (1,2,3-cd) pyrene	ND	100
Dibenzo (a,h) anthracene	ND	100
Benzo (g,h,i) perylene	ND	100

HSL COMPOUNDS		
Aniline	ND	100
Benzoic Acid	ND	500
2-Methylphenol	ND	100
4-Methylphenol	ND	100
2,4,5-Trichlorophenol	ND	500
Benzyl Alcohol	ND	100
4-Chloroaniline	ND	100
2-Methylnaphthalene	220	100
2-Nitroaniline	ND	500
3-Nitroaniline	ND	500
Dibenzofuran	ND	100
4-Nitroaniline	ND	500

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY:

2-Fluorophenol	NA	Nitrobenzene-d5	NA
Phenol-d5	NA	2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA	Terphenyl-d14	NA

NA = None Available due to method of analysis

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-6
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-8-4.5

DATE RECEIVED: 10/31/89
DATE EXTRACTED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3550 Sonication

ACID COMPOUNDS	RESULT ug/kg	LOD ug/kg
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	660
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1650
4-Nitrophenol	ND	1650
4,6-Dinitro-2-methylphenol	ND	1650
Pentachlorophenol	ND	1650
BASE/NEUTRAL COMPOUNDS		
Nitrosodimethylamine	ND	330
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-6
MPLE ID: B-8-4.5

BASE/NEUTRAL COMPOUNDS	RESULT ug/kg	LOD ug/kg
Azobenzene	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	660
Dibenzo (a,h) anthracene	ND	660
Benzo (g,h,i) perylene	ND	660

HSL COMPOUNDS		
Aniline	ND	330
Benzoic Acid	ND	1650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1650
3-Nitroaniline	ND	1650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1650

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY:

2-Fluorophenol	85	Nitrobenzene-d5	56
Phenol-d5	92	2-Fluorobiphenyl	88
2,4,6-Tribromophenol	81	Terphenyl-d14	72

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-7
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-9-5.5

DATE RECEIVED: 10/31/89
DATE EXTRACTED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3550 Sonication

ACID COMPOUNDS	RESULT ug/kg	LOD ug/kg
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	660
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1650
4-Nitrophenol	ND	1650
4,6-Dinitro-2-methylphenol	ND	1650
Pentachlorophenol	ND	1650
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	330
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-7
MPLE ID: B-9-5.5

BASE/NEUTRAL COMPOUNDS	RESULT ug/kg	LOD ug/kg
Azobenzene	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	660
Dibenzo (a,h) anthracene	ND	660
Benzo (g,h,i) perylene	ND	660

HSL COMPOUNDS		
Aniline	ND	330
Benzoic Acid	ND	1650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1650
3-Nitroaniline	ND	1650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1650

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY:

2-Fluorophenol	91	Nitrobenzene-d5	62
Phenol-d5	92	2-Fluorobiphenyl	90
2,4,6-Tribromophenol	86	Terphenyl-d14	76

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-8
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-10-4.5

DATE RECEIVED: 10/31/89
DATE EXTRACTED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3550 Sonication

ACID COMPOUNDS	RESULT ug/kg	LOD ug/kg
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	660
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1650
4-Nitrophenol	ND	1650
4,6-Dinitro-2-methylphenol	ND	1650
Pentachlorophenol	ND	1650
BASE/NEUTRAL COMPOUNDS		
Nitrosodimethylamine	ND	330
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-8
SAMPLE ID: B-10-4.5

BASE/NEUTRAL COMPOUNDS	RESULT ug/kg	LOD ug/kg
Azobenzene	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	660
Dibenzo (a,h) anthracene	ND	660
Benzo (g,h,i) perylene	ND	660

HSL COMPOUNDS		
Aniline	ND	330
Benzoic Acid	ND	1650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1650
3-Nitroaniline	ND	1650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1650

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY:

2-Fluorophenol	91	Nitrobenzene-d5	62
Phenol-d5	90	2-Fluorobiphenyl	87
2,4,6-Tribromophenol	82	Terphenyl-d14	70

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-4-5.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	1000
bromomethane	ND	1000
vinyl chloride	ND	1000
chloroethane	ND	1000
methylene chloride	ND	500
trichlorofluoromethane	ND	500
1,1-dichloroethene	ND	500
1,1-dichloroethane	ND	500
trans-1,2-dichloroethene	ND	500
chloroform	ND	500
1,2-dichloroethane	ND	500
1,1,1-trichloroethane	ND	500
carbon tetrachloride	ND	500
bromodichloromethane	ND	500
1,2-dichloropropane	ND	500
cis-1,3-dichloropropene	ND	500
trichloroethylene	ND	500
dibromochloromethane	ND	500
1,1,2-trichloroethane	ND	500
benzene	ND	500
trans-1,3-dichloropropene	ND	500
2-chloroethylvinyl ether	ND	1000
bromoform	ND	500
1,1,2,2-tetrachloroethane	ND	500
tetrachloroethylene	ND	500
toluene	ND	500
chlorobenzene	ND	500
ethyl benzene	ND	500

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	1000
carbon disulfide	ND	500
2-butanone	ND	1000
vinyl acetate	ND	1000
2-hexanone	ND	1000
4-methyl-2-pentanone	ND	1000
styrene	ND	500
total xylenes	ND	500

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Dichloroethane-d4	100
Toluene-d8	97
Bromofluorobenzene	109

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-3
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-5-5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
trans-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethylene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	TRACE(2.6)	5

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	10
carbon disulfide	ND	5
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5
total xylenes	TRACE(3.6)	5

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Dichloroethane-d4	105
Toluene-d8	116
Bromofluorobenzene	83

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18591-4
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-6-5.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	500
bromomethane	ND	500
vinyl chloride	ND	500
chloroethane	ND	500
methylene chloride	ND	250
trichlorofluoromethane	ND	250
1,1-dichloroethene	ND	250
1,1-dichloroethane	ND	250
trans-1,2-dichloroethene	ND	250
chloroform	ND	250
1,2-dichloroethane	ND	250
1,1,1-trichloroethane	ND	250
carbon tetrachloride	ND	250
bromodichloromethane	ND	250
1,2-dichloropropane	ND	250
cis-1,3-dichloropropene	ND	250
trichloroethylene	ND	250
dibromochloromethane	ND	250
1,1,2-trichloroethane	ND	250
benzene	ND	250
trans-1,3-dichloropropene	ND	250
2-chloroethylvinyl ether	ND	500
bromoform	ND	250
1,1,2,2-tetrachloroethane	ND	250
tetrachloroethylene	ND	250
toluene	ND	250
chlorobenzene	ND	250
ethyl benzene	ND	250

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	500
carbon disulfide	ND	250
2-butanone	ND	500
vinyl acetate	ND	500
2-hexanone	ND	500
4-methyl-2-pentanone	ND	500
styrene	ND	250
total xylenes	ND	250

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Dichloroethane-d4	101
Toluene-d8	99
Bromofluorobenzene	79

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-5
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-7-4.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	5000
bromomethane	ND	5000
vinyl chloride	ND	5000
chloroethane	ND	5000
methylene chloride	ND	2500
trichlorofluoromethane	ND	2500
1,1-dichloroethene	ND	2500
1,1-dichloroethane	ND	2500
trans-1,2-dichloroethene	ND	2500
chloroform	ND	2500
1,2-dichloroethane	ND	2500
1,1,1-trichloroethane	ND	2500
carbon tetrachloride	ND	2500
bromodichloromethane	ND	2500
1,2-dichloropropane	ND	2500
cis-1,3-dichloropropene	ND	2500
trichloroethylene	ND	2500
dibromochloromethane	ND	2500
1,1,2-trichloroethane	ND	2500
benzene	7,000	2500
trans-1,3-dichloropropene	ND	2500
2-chloroethylvinyl ether	ND	5000
bromoform	ND	2500
1,1,2,2-tetrachloroethane	ND	2500
tetrachloroethylene	ND	2500
toluene	39,000	2500
chlorobenzene	ND	2500
ethyl benzene	7,800	2500

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	5000
carbon disulfide	ND	2500
2-butanone	ND	5000
vinyl acetate	ND	5000
2-hexanone	ND	5000
4-methyl-2-pentanone	ND	5000
styrene	ND	2500
total xylenes	22,000	2500

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Dichloroethane-d4	97
Toluene-d8	97
Bromofluorobenzene	117

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-6
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-8-4.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
trans-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethylene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

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

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Dichloroethane-d4	95
Toluene-d8	113
Bromofluorobenzene	87

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-7
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-9-5.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
trans-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethylene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

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

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Dichloroethane-d4	95
Toluene-d8	106
Bromofluorobenzene	98

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18591-8
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION
SAMPLE ID: B-10-4.5

DATE RECEIVED: 10/31/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/07/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
trans-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethylene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

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

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	100
Toluene-d8	102
Bromofluorobenzene	97

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 11/01/89
DATE REPORTED: 11/14/89

NOV 17 1989
HARDING LAWSON ASSOCIATES

LAB NUMBER: 18607

CLIENT: HARDING LAWSON ASSOCIATES

REPORT ON: 5 SOIL SAMPLES

JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

RESULTS: SEE ATTACHED

M. E. Printera
QA/QC Officer

for CBG
Laboratory Director

Curtis & Tompkins, Ltd.

L J NUMBER: 18607
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT # : 19541,001.04

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/14/89

ANALYSIS: OIL AND GREASE
METHOD: SMWW 503E

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
18607-1	B-12-5	730	mg/Kg	50
18607-2	B-14-4	33,000	mg/Kg	50
18607-4	B-14-15	3,300	mg/Kg	50
18607-5	B-15-5.5	930	mg/Kg	50
18607-6	B-17-5.5	1,100	mg/Kg	50

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	86

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18607
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/10/89
DATE REPORTED: 11/14/89

Extractable Petroleum Hydrocarbons in Soils & Wastes
EPA 8015 (Modified)
Extraction Method: EPA 3550

LAB ID	CLIENT ID	GASOLINE (mg/Kg)	JET FUEL (mg/Kg)	DIESEL (mg/Kg)	OTHER (mg/Kg)
18607-1	B-12-5	ND(10)	ND(10)	55**	ND(10)
18607-2	B-14-4	ND(100)	ND(100)	490	ND(100)
18607-4	B-14-15	860*	ND(100)	860**	ND(100)
18607-5	B-15-5.5	ND(10)	ND(10)	51	ND(10)
18607-6	B-17-5.5	ND(10)	ND(10)	ND(10)	ND(10)

*Fingerprint pattern does not match Hydrocarbon standards. Quantitation based on area sum within C8-C12 boiling range.

**Fingerprint pattern does not match Hydrocarbon standards. Quantitation based on area sum within C12-C26 boiling range.

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

Duplicate: Relative % Difference	5
Spike: % Recovery	99

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18607
CLIENT: HARDING LAWSON ASSOCIATES
JOB NUMBER: 19541,001.04
JOB LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/14/89

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/kg)	TOLUENE (ug/kg)	TOTAL XYLENES (ug/kg)	ETHYL BENZENE (ug/kg)
18607-1	B-12-5	ND(5)	ND(5)	ND(5)	ND(5)
18607-4	B-14-15	ND(250)	ND(250)	9,300	ND(250)
18607-5	B-15-5.5	ND(5)	ND(5)	ND(5)	ND(5)
18607-6	B-17-5.5	ND(5)	ND(5)	ND(5)	ND(5)

ND = None Detected; Limit of Detection in Parentheses.

QA/QC SUMMARY

%RPD	7
%RECOVERY	85

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HARDING LAWSON ASSOCIATES

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18607
CLIENT: HARDING LAWSON ASSOCIATES
JOB NUMBER: 19541,001.04
JOB LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/14/89
DATE REPORTED: 11/15/89

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/kg)	TOLUENE (ug/kg)	TOTAL XYLENES (ug/kg)	ETHYL BENZENE (ug/kg)
18607-2	B-14-4	ND(10)	ND(10)	ND(10)	ND(10)

ND = None Detected; Limit of Detection in Parentheses.

QA/QC SUMMARY

%RPD	2
%RECOVERY	83

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DATE RECEIVED: 11/01/89
DATE REPORTED: 11/09/89

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HARDING LAWSON ASSOCIATES

LAB NUMBER: 18620

CLIENT: HARDING LAWSON ASSOCIATES

REPORT ON: 1 SOIL SAMPLE

JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

RESULTS: SEE ATTACHED

QA/QC Officer

Laboratory Director

Curtis & Tompkins, Ltd

BORATORY NUMBER: 18620
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 11/01/89
DATE REQUESTED: 11/03/89
DATE ANALYZED: 11/08/89
DATE REPORTED: 11/09/89

ANALYSIS: pH
METHOD REFERENCE: EPA 9045

LAB ID	SAMPLE ID	RESULT
18620-1	B-15-5.5	10.7

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18620-1
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
SAMPLE ID: B-15-5.5

DATE RECEIVED: 11/01/89
DATE REQUESTED: 11/03/89
DATE ANALYZED: 11/06/89
DATE REPORTED: 11/09/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	ND	2.5	EPA 6010
Arsenic	ND	2.5	EPA 6010
Barium	61	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	1.0	0.5	EPA 6010
Chromium (total)	7.8	0.5	EPA 6010
Cobalt	4.9	0.5	EPA 6010
Copper	15	0.5	EPA 6010
Lead	3.0	2.5	EPA 7420
Mercury	ND	0.1	EPA 7471
Molybdenum	ND	0.5	EPA 6010
Nickel	7.9	0.5	EPA 6010
Selenium	ND	2.5	EPA 7740
Silver	ND	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	10	1.0	EPA 6010
Zinc	200	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	90	Mercury	<1	95
Arsenic	1	103	Molybdenum	1	88
Barium	<1	96	Nickel	1	100
Beryllium	<1	97	Selenium	2	91
Cadmium	4	87	Silver	2	89
Chromium	1	99	Thallium	7	93
Cobalt	2	98	Vanadium	<1	96
Copper	<1	102	Zinc	<1	95
Lead	1	101			

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18620-1
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
SAMPLE ID: B-15-5.5

DATE RECEIVED: 11/01/89
DATE REQUESTED: 11/03/89
DATE ANALYZED: 11/09/89
DATE REPORTED: 11/09/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.10	EPA 7041
Arsenic	0.06	0.05	EPA 7060
Barium	1.9	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	0.02	0.01	EPA 6010
Chromium (total)	0.29	0.01	EPA 6010
Cobalt	0.08	0.01	EPA 6010
Copper	0.32	0.01	EPA 6010
Lead	0.10	0.05	EPA 7420
Mercury	ND	0.10	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	0.26	0.01	EPA 6010
Selenium	ND	0.05	EPA 7040
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 7841
Vanadium	0.54	0.02	EPA 6010
Zinc	0.37	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	<1	91	Mercury	14	86
Arsenic	3	92	Molybdenum	2	87
Barium	2	95	Nickel	<1	94
Beryllium	2	95	Selenium	3	104
Cadmium	6	88	Silver	2	92
Chromium	2	98	Thallium	14	93
Cobalt	2	95	Vanadium	2	94
Copper	2	98	Zinc	1	95
Lead	<1	97			

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18620-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
SAMPLE ID: B-15-5.5

DATE RECEIVED: 11/01/89
DATE REQUESTED: 11/03/89
DATE ANALYZED: 11/04/89
DATE REPORTED: 11/09/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
trans-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
1,2-dichloropropane	ND	5
cis-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethylene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

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

QA/QC SUMMARY: SURROGATE RECOVERIES

2-Dichloroethane-d4	86%
Toluene-d8	116%
Bromofluorobenzene	76%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18620-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
SAMPLE ID: B-15-5.5

DATE RECEIVED: 11/01/89
DATE REQUESTED: 11/03/89
DATE EXTRACTED: 11/08/89
DATE ANALYZED: 11/09/89
DATE REPORTED: 11/09/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3550 Sonication

ACID COMPOUNDS	RESULT ug/kg	LOD ug/kg
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	660
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1650
4-Nitrophenol	ND	1650
4,6-Dinitro-2-methylphenol	ND	1650
Pentachlorophenol	ND	1650
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	330
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18620-1
SAMPLE ID: B-15-5.5

EPA 8270

BASE/NEUTRAL COMPOUNDS	RESULT ug/kg	LOD ug/kg
Azobenzene	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	660
Dibenzo (a,h) anthracene	ND	660
Benzo (g,h,i) perylene	ND	660

HSL COMPOUNDS		
Aniline	ND	330
Benzoic Acid	ND	1650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1650
3-Nitroaniline	ND	1650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1650

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY:

2-Fluorophenol	95%	Nitrobenzene-d5	60%
Phenol-d5	90%	2-Fluorobiphenyl	110%
2,4,6-Tribromophenol	45%	Terphenyl-d14	50%

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HARDING LAWSON ASSOCIATES

DATE RECEIVED: 11/01/89
DATE REPORTED: 11/09/89

LAB NUMBER: 18606

CLIENT: HARDING LAWSON ASSOCIATES

REPORT ON: 3 SOIL SAMPLES

JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

RESULTS: SEE ATTACHED

QA/QC Officer

Laboratory Director

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18606
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/09/89

ANALYSIS: pH
METHOD REFERENCE: EPA 9045

LAB ID	SAMPLE ID	RESULT
18606-1	B-11-3.5	9.2
18606-2	B-13-3	8.8
18606-3	B-16-5	8.0

Curtis & Tompkins, Ltd.

LB NUMBER: 18606
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT # : 19541,001.04

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/09/89
DATE REPORTED: 11/09/89

ANALYSIS: OIL AND GREASE
METHOD: SMWW 503E

LAB ID	SAMPLE ID	RESULT	UNITS	DETECTION LIMIT
18606-1	B-11-3.5	780	mg/Kg	50
18606-2	B-13-3	6,200	mg/Kg	50
18606-3	B-16-5	810	mg/Kg	50

QA/QC SUMMARY

RPD, %	7
RECOVERY, %	92

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18606
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
LOCATION: ALAMEDA NAVAL AIR STATION

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/08/89
DATE REPORTED: 11/09/89

Extractable Petroleum Hydrocarbons in Soils & Wastes
EPA 8015 (Modified)
Extraction Method: EPA 3550

LAB ID	CLIENT ID	GASOLINE (mg/Kg)	KEROSENE (mg/Kg)	DIESEL (mg/Kg)	OTHER (mg/Kg)
18606-1	B-11-3.5	ND(10)	ND(10)	ND(10)	ND(10)
18606-2	B-13-3	ND(10)	ND(10)	65*	ND(10)
18606-3	B-16-5	ND(10)	ND(10)	ND(10)	ND(10)

*Fingerprint pattern does not match Hydrocarbon standards. Quantitation based on area sum within C12-C26 boiling range.

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

Duplicate: Relative % Difference	2
Spike: % Recovery	138

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18606-1
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
SAMPLE ID: B-11-3.5

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/09/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	ND	2.5	EPA 6010
Arsenic	ND	2.5	EPA 6010
Barium	16	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	ND	0.5	EPA 6010
Chromium (total)	13	0.5	EPA 6010
Cobalt	2.0	0.5	EPA 6010
Copper	4.6	0.5	EPA 6010
Lead	ND	2.5	EPA 7420
Mercury	ND	0.1	EPA 7471
Molybdenum	ND	0.5	EPA 6010
Nickel	12	0.5	EPA 6010
Selenium	ND	2.5	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	6.8	1.0	EPA 6010
Zinc	9.8	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	92	Mercury	<1	100
Arsenic	1	101	Molybdenum	1	87
Barium	<1	92	Nickel	3	97
Beryllium	<1	94	Selenium	1	102
Cadmium	4	93	Silver	1	96
Chromium	2	99	Thallium	7	85
Cobalt	<1	95	Vanadium	1	95
Copper	1	96	Zinc	1	97
Lead	1	99			

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18606-2
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
SAMPLE ID: B-13-3

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/09/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	ND	2.5	EPA 6010
Arsenic	ND	2.5	EPA 6010
Barium	17	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	0.83	0.5	EPA 6010
Chromium (total)	21	0.5	EPA 6010
Cobalt	2.8	0.5	EPA 6010
Copper	5.7	0.5	EPA 6010
Lead	9.1	2.5	EPA 7420
Mercury	ND	0.1	EPA 7471
Molybdenum	ND	0.5	EPA 6010
Nickel	16	0.5	EPA 6010
Selenium	ND	2.5	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	7.9	1.0	EPA 6010
Zinc	23	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	92	Mercury	<1	100
Arsenic	1	101	Molybdenum	1	87
Barium	<1	92	Nickel	3	97
Beryllium	<1	94	Selenium	1	102
Cadmium	4	93	Silver	1	96
Chromium	2	99	Thallium	7	85
Cobalt	<1	95	Vanadium	1	95
Copper	1	96	Zinc	1	97
Lead	1	99			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18606-3
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
SAMPLE ID: B-16-5

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/09/89

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	DETECTION LIMIT mg/Kg	METHOD
Antimony	ND	2.5	EPA 6010
Arsenic	ND	2.5	EPA 6010
Barium	9.7	0.5	EPA 6010
Beryllium	ND	0.5	EPA 6010
Cadmium	0.50	0.5	EPA 6010
Chromium (total)	13	0.5	EPA 6010
Cobalt	3.0	0.5	EPA 6010
Copper	3.7	0.5	EPA 6010
Lead	ND	2.5	EPA 7420
Mercury	0.86	0.1	EPA 7471
lybdenum	ND	0.5	EPA 6010
ckel	16	0.5	EPA 6010
Selenium	ND	2.5	EPA 7740
Silver	ND	1.0	EPA 6010
Thallium	ND	2.5	EPA 6010
Vanadium	5.8	1.0	EPA 6010
Zinc	10	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%RECOVERY		%RPD	%RECOVERY
Antimony	<1	92	Mercury	<1	100
Arsenic	1	101	Molybdenum	1	87
Barium	<1	92	Nickel	3	97
Beryllium	<1	94	Selenium	1	102
Cadmium	4	93	Silver	1	96
Chromium	2	99	Thallium	7	85
Cobalt	<1	95	Vanadium	1	95
Copper	1	96	Zinc	1	97
Lead	1	99			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18606-1
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
SAMPLE ID: B-11-3.5

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/07/89
DATE REPORTED: 11/09/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	ND	0.05	EPA 6010
Barium	1.2	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	ND	0.01	EPA 6010
Chromium (total)	0.09	0.01	EPA 6010
Cobalt	0.04	0.01	EPA 6010
Copper	0.10	0.01	EPA 6010
Lead	0.17	0.05	EPA 7420
Mercury	ND	0.01	EPA 7470
lybdenum	ND	0.01	EPA 6010
ckel	0.12	0.01	EPA 6010
Selenium	ND	0.05	EPA 6010
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 7841
Vanadium	0.13	0.02	EPA 6010
Zinc	0.13	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	1	99	Mercury	9	94
Arsenic	2	92	Molybdenum	1	94
Barium	1	103	Nickel	2	107
Beryllium	<1	104	Selenium	2	93
Cadmium	<1	94	Silver	4	98
Chromium	1	108	Thallium	<1	101
Cobalt	1	104	Vanadium	1	103
Copper	1	107	Zinc	1	103
Lead	<1	100			

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18606-2
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
SAMPLE ID: B-13-3

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/07/89
DATE REPORTED: 11/09/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	ND	0.05	EPA 6010
Barium	1.6	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	0.07	0.01	EPA 6010
Chromium (total)	0.44	0.01	EPA 6010
Cobalt	0.05	0.01	EPA 6010
Copper	0.07	0.01	EPA 6010
Lead	0.97	0.05	EPA 7420
Mercury	ND	0.01	EPA 7470
Molybdenum	ND	0.01	EPA 6010
Nickel	0.22	0.01	EPA 6010
Selenium	ND	0.05	EPA 6010
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 7841
Vanadium	0.09	0.02	EPA 6010
Zinc	0.59	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	1	99	Mercury	9	94
Arsenic	2	92	Molybdenum	1	94
Barium	1	103	Nickel	2	107
Beryllium	<1	104	Selenium	2	93
Cadmium	<1	94	Silver	4	98
Chromium	1	108	Thallium	<1	101
Cobalt	1	104	Vanadium	1	103
Copper	1	107	Zinc	1	103
Lead	<1	100			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18606-3
CLIENT: HARDING LAWSON ASSOCIATES
PROJECT #: 19541,001.04
SAMPLE ID: B-16-5

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/07/89
DATE REPORTED: 11/09/89

Title 22 Metals in Soils & Wastes
Extraction by Waste Extraction Test: CCR Title 26 Section 22-66700

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.05	EPA 6010
Arsenic	ND	0.05	EPA 6010
Barium	0.73	0.01	EPA 6010
Beryllium	ND	0.01	EPA 6010
Cadmium	ND	0.01	EPA 6010
Chromium (total)	0.02	0.01	EPA 6010
Cobalt	0.04	0.01	EPA 6010
Copper	0.03	0.01	EPA 6010
Lead	ND	0.05	EPA 7420
Mercury	ND	0.01	EPA 7470
lybdenum	ND	0.01	EPA 6010
Nickel	0.07	0.01	EPA 6010
Selenium	ND	0.05	EPA 7740
Silver	ND	0.02	EPA 6010
Thallium	ND	0.05	EPA 7841
Vanadium	0.08	0.02	EPA 6010
Zinc	0.05	0.01	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	1	99	Mercury	9	94
Arsenic	2	92	Molybdenum	1	94
Barium	1	103	Nickel	2	107
Beryllium	<1	104	Selenium	2	93
Cadmium	<1	94	Silver	4	98
Chromium	1	108	Thallium	<1	101
Cobalt	1	104	Vanadium	1	103
Copper	1	107	Zinc	1	103
Lead	<1	100			

Curtis & Tompkins, Ltd

BORATORY NUMBER: 18606-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
SAMPLE ID: B-11-3.5

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/02/89
DATE REPORTED: 11/09/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
trans-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
2-dichloropropane	ND	5
s-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethylene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

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

/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	99%
Toluene-d8	105%
Bromofluorobenzene	100%

Curtis & Tompkins, Ltd

BORATORY NUMBER: 18606-2
LIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
SAMPLE ID: B-13-3

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/02/89
DATE REPORTED: 11/09/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
trans-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
' 2-dichloropropane	ND	5
s-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethylene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

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

/QC SUMMARY: SURROGATE RECOVERIES

,2-Dichloroethane-d4	101%
Toluene-d8	106%
Bromofluorobenzene	74%

Curtis & Tompkins, Ltd.

BORATORY NUMBER: 18606-3
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
SAMPLE ID: B-16-5

DATE RECEIVED: 11/01/89
DATE ANALYZED: 11/02/89
DATE REPORTED: 11/09/89

EPA METHOD 8240: VOLATILE ORGANICS IN SOILS & WASTES

COMPOUND	Result ug/kg	Detection Limit ug/kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5
trichlorofluoromethane	ND	5
1,1-dichloroethene	ND	5
1,1-dichloroethane	ND	5
trans-1,2-dichloroethene	ND	5
chloroform	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
carbon tetrachloride	ND	5
bromodichloromethane	ND	5
2-dichloropropane	ND	5
s-1,3-dichloropropene	ND	5
trichloroethylene	ND	5
dibromochloromethane	ND	5
1,1,2-trichloroethane	ND	5
benzene	ND	5
trans-1,3-dichloropropene	ND	5
2-chloroethylvinyl ether	ND	10
bromoform	ND	5
1,1,2,2-tetrachloroethane	ND	5
tetrachloroethylene	ND	5
toluene	ND	5
chlorobenzene	ND	5
ethyl benzene	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

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

/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	100%
Toluene-d8	103%
Bromofluorobenzene	98%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18606-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
SAMPLE ID: B-11-3.5

DATE RECEIVED: 11/01/89
DATE EXTRACTED: 11/07/89
DATE ANALYZED: 11/08/89
DATE REPORTED: 11/09/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3550 Sonication

ACID COMPOUNDS	RESULT ug/kg	LOD ug/kg
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	660
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1650
4-Nitrophenol	ND	1650
4,6-Dinitro-2-methylphenol	ND	1650
Pentachlorophenol	ND	1650
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	330
Bis(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 18606-1
SAMPLE ID: B-11-3.5

BASE/NEUTRAL COMPOUNDS	RESULT ug/kg	LOD ug/kg
Azobenzene	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	660
Dibenzo (a,h) anthracene	ND	660
Benzo (g,h,i) perylene	ND	660

HSL COMPOUNDS		
Aniline	ND	330
Benzoic Acid	ND	1650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1650
3-Nitroaniline	ND	1650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1650

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY:

2-Fluorophenol	94%	Nitrobenzene-d5	90%
Phenol-d5	130%	2-Fluorobiphenyl	94%
2,4,6-Tribromophenol	67%	Terphenyl-d14	62%

Curtis & Tompkins, Ltd

BORATORY NUMBER: 18606-2
..IENT: HARDING LAWSON ASSOCIATES
JOB #: 19541,001.04
SAMPLE ID: B-13-3

DATE RECEIVED: 11/01/89
DATE EXTRACTED: 11/07/89
DATE ANALYZED: 11/08/89
DATE REPORTED: 11/09/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3580 Waste Dilution

ACID COMPOUNDS	RESULT mg/kg	LOD mg/kg
Phenol	ND	1
2-Chlorophenol	ND	1
2-Nitrophenol	ND	5
2,4-Dimethylphenol	ND	1
2,4-Dichlorophenol	ND	1
4-Chloro-3-methylphenol	ND	1
2,4,6-Trichlorophenol	ND	1
2,4-Dinitrophenol	ND	5
4-Nitrophenol	ND	5
4,6-Dinitro-2-methylphenol	ND	5
Pentachlorophenol	ND	5
BASE/NEUTRAL COMPOUNDS		
Nitrosodimethylamine	ND	1
Bis(2-chloroethyl)ether	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1
Bis(2-chloroisopropyl)ether	ND	1
N-Nitroso-di-n-propylamine	ND	1
Hexachloroethane	ND	1
Nitrobenzene	ND	1
Isophorone	ND	1
Bis(2-chloroethoxy)methane	ND	1
1,2,4-Trichlorobenzene	ND	1
Naphthalene	ND	1
Hexachlorobutadiene	ND	1
Hexachlorocyclopentadiene	ND	1
2-Chloronaphthalene	ND	1
Dimethylphthalate	ND	1
Acenaphthylene	ND	1
2,6-Dinitrotoluene	ND	1
Acenaphthene	ND	1
2,4-Dinitrotoluene	ND	1
Diethylphthalate	ND	1
4-Chlorophenyl-phenylether	ND	1
Fluorene	ND	1
N-Nitrosodiphenylamine	ND	1

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18606-2
SAMPLE ID: B-13-3

EPA 8270

BASE/NEUTRAL COMPOUNDS	RESULT mg/kg	LOD mg/kg
Azobenzene	ND	1
4-Bromophenyl-phenylether	ND	1
Hexachlorobenzene	ND	1
Phenanthrene	ND	1
Anthracene	ND	1
Di-n-butylphthalate	ND	1
Fluoranthene	ND	1
Benzidine	ND	1
Pyrene	ND	1
Butylbenzylphthalate	ND	1
3,3'-Dichlorobenzidine	ND	5
Benzo (a) anthracene	ND	1
Chrysene	ND	1
Bis (2-ethylhexyl)phthalate	ND	1
Di-n-octylphthalate	ND	1
Benzo (b) fluoranthene	ND	1
Benzo (k) fluoranthene	ND	1
Benzo (a) pyrene	ND	1
Indeno (1,2,3-cd) pyrene	ND	1
Dibenzo (a,h) anthracene	ND	1
Benzo (g,h,i) perylene	ND	1

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

ND = None Detected, Limit of Detection (LOD) appears in right column

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18606-3
IENT: HARDING LAWSON ASSOCIATES
JB #: 19541,001.04
SAMPLE ID: B-16-5

DATE RECEIVED: 11/01/89
DATE EXTRACTED: 11/07/89
DATE ANALYZED: 11/08/89
DATE REPORTED: 11/09/89

EPA 8270: Base/Neutral and Acid Extractables in Soils & Wastes
Extraction Method: EPA 3550 Sonication

ACID COMPOUNDS	RESULT ug/kg	LOD ug/kg
Phenol	ND	330
2-Chlorophenol	ND	330
2-Nitrophenol	ND	1650
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
4-Chloro-3-methylphenol	ND	660
2,4,6-Trichlorophenol	ND	330
2,4-Dinitrophenol	ND	1650
4-Nitrophenol	ND	1650
4,6-Dinitro-2-methylphenol	ND	1650
Pentachlorophenol	ND	1650
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	330
s(2-chloroethyl)ether	ND	330
1,3-Dichlorobenzene	ND	330
1,4-Dichlorobenzene	ND	330
1,2-Dichlorobenzene	ND	330
Bis(2-chloroisopropyl)ether	ND	330
N-Nitroso-di-n-propylamine	ND	330
Hexachloroethane	ND	330
Nitrobenzene	ND	330
Isophorone	ND	330
Bis(2-chloroethoxy)methane	ND	330
1,2,4-Trichlorobenzene	ND	330
Naphthalene	ND	330
Hexachlorobutadiene	ND	330
Hexachlorocyclopentadiene	ND	330
2-Chloronaphthalene	ND	330
Dimethylphthalate	ND	330
Acenaphthylene	ND	330
2,6-Dinitrotoluene	ND	330
Acenaphthene	ND	330
2,4-Dinitrotoluene	ND	330
Diethylphthalate	ND	330
4-Chlorophenyl-phenylether	ND	330
Fluorene	ND	330
N-Nitrosodiphenylamine	ND	330

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 18606-3
SAMPLE ID: B-16-5

BASE/NEUTRAL COMPOUNDS	RESULT ug/kg	LOD ug/kg
Azobenzene	ND	330
4-Bromophenyl-phenylether	ND	330
Hexachlorobenzene	ND	330
Phenanthrene	ND	330
Anthracene	ND	330
Di-n-butylphthalate	ND	330
Fluoranthene	ND	330
Benzidine	ND	330
Pyrene	ND	330
Butylbenzylphthalate	ND	330
3,3'-Dichlorobenzidine	ND	1650
Benzo (a) anthracene	ND	330
Chrysene	ND	330
Bis (2-ethylhexyl)phthalate	ND	330
Di-n-octylphthalate	ND	330
Benzo (b) fluoranthene	ND	330
Benzo (k) fluoranthene	ND	330
Benzo (a) pyrene	ND	330
Indeno (1,2,3-cd) pyrene	ND	660
Dibenzo (a,h) anthracene	ND	660
Benzo (g,h,i) perylene	ND	660
HSL COMPOUNDS		
Aniline	ND	330
Benzoic Acid	ND	1650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
2,4,5-Trichlorophenol	ND	1650
Benzyl Alcohol	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1650
3-Nitroaniline	ND	1650
Dibenzofuran	ND	330
4-Nitroaniline	ND	1650

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY:

2-Fluorophenol	98%	Nitrobenzene-d5	95%
Phenol-d5	137%	2-Fluorobiphenyl	96%
2,4,6-Tribromophenol	65%	Terphenyl-d14	63%

DISTRIBUTION

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San Diego, California 92111
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JO/msj/A4765-R18

QUALITY CONTROL REVIEWER

Robert G. Breynaert
Hydrogeologist