A: Hahn

PREPARED FOR

HAHN MOTOR COMPANY

Robert Colombo
Environmental Geologist

Steven P. Hughes
Senior Hydrogeologist

PRELIMINARY INTEGRITY ASSESSMENT OF TWO UNDERGROUND STORAGE TANKS (UST)s AND THREE INDUSTRIAL WASTE WATER SUMPS

1201 South First Street and 307 East Arlington Street
Yakima, Washington

E-4406-1

OCTOBER 25, 1989

Earth Consultants, Inc.
1805 - 136th Place Northeast
Suite 101
Bellevue, Washington 98005
(206) 643-3780

222 East 26th Street, Suite 103
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(206) 272-6608

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

December 26, 1989 E-4406-1

Department of Ecology
Central Regional Office
801 Summit View, Suite 1
Yakima, Washington 98902

Attention: Mr. David George

Subject: **Identification of Soil Contamination**
Hann Motor Company
1201 South First Street
Yakima, Washington

Dear Mr. George:

Earth Consultants, Incorporated (ECI) conducted a limited preliminary assessment of subsurface soil conditions on the referenced property. Mr. Steven Hughes of ECI discussed the findings of the study with you, by telephone, on November 6, 1989.

We are following up our verbal report on November 6, 1989 with a printed copy of our study. If you need additional information regarding the site please call.

Sincerely,

EARTH CONSULTANTS, INC.

Steven P. Hughes
Senior Hydrogeologist

SPH/sar

Enclosure: ECI Report E-4406-1

1805 - 136th Place N.E., Suite 101, Bellevue, Washington 98005
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Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

October 25, 1989 E-4406-1

Hahn Motor Company
P.O. Box 382
1201 South First Street
Yakima, Washington 90907

Attention: Mrs. Donna Rieti, General Manager

Subject: **Preliminary Integrity Assessment of Two Underground Storage Tanks (UST)s and Three Industrial Waste Water Sumps 1201 South First Street and 307 East Arlington Street Yakima, Washington**

Reference: Earth Consultants, Inc. Proposal, dated May 16, 1989

Dear Mrs. Rieti:

The Environmental Services Division of Earth Consultants, Inc. (ECI) is pleased to submit herewith our report entitled "Preliminary Integrity Assessment of Two Underground Storage Tanks and Three Industrial Waste Water Sumps, 1201 South First Street and 307 East Arlington Street, Yakima, Washington." This report presents a summary of our field exploration and laboratory analyses, along with preliminary conclusions.

We appreciate the opportunity to provide environmental consulting services to the project. If you have any questions or if we may be of further service, please contact us.

Respectfully,

EARTH CONSULTANTS, INC.

for Robert Colombo jr

Robert Colombo
Project Environmental Geologist

Steven P. Hughes
Senior Hydrogeologist

RC/SPH/sar

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PRELIMINARY INTEGRITY ASSESSMENT OF TWO UNDERGROUND STORAGE TANKS (UST)s AND THREE INDUSTRIAL WASTE WATER SUMPS 1201 SOUTH FIRST STREET AND 307 EAST ARLINGTON STREET YAKIMA, WASHINGTON

EXECUTIVE SUMMARY

The Hahn Motor Company is located at 1201 South First Street and 307 East Arlington Street in Yakima, Washington. The company maintains a retail automotive sales business and automotive and truck repair facility at the site. Automotive repair is conducted at the main facility (1201 South First Street) and truck repair is conducted at the Fifth Wheel Shop (307 East Arlington Street).

In May of 1989, the Hahn Motor Company contracted Earth Consultants, Inc. (ECI) to conduct a study of the potential for subsurface soil and groundwater contamination. The specific site areas included two underground waste oil tanks (UST)s, two floor sumps inside the main facility, and a exterior floor sump, reportedly a "dry well." The USTs and interior sumps are located at the main facility while the dry well is located at the Fifth Wheel Shop (see Plate 2).

The methods of site assessment included drilling three soil borings and hand augering two holes. Borings were located adjacent to the two USTs and the dry well. The auger holes were located adjacent to the two interior sumps at the main facility. Soil and groundwater samples were collected. Selected samples were submitted for laboratory analyses which included: total petroleum hydrocarbons (TPH), metals (EP-Toxicity basis), and volatile organic compounds (VOC)s.

Interpretation of the results of laboratory sample analysis indicate that petroleum hydrocarbon contamination, exceeding the Washington Department of Ecology (WDOE) recommended cleanup goals (RCG), was detected in soils from boring B-3 and the interior sump at the main facility. Low levels of volatile organic compounds (VOC)s were also detected in soil and groundwater.

Based on the results of laboratory sample analysis, we expect that soil and groundwater may require remediation of the petroleum hydrocarbon contamination which exceeds the WDOE RCG.

We recommend the WDOE be requested to review this report to assess the need for further study and/or remediation of the VOCs detected.

SITE HISTORY

The Hahn Motor Company is located at 1201 South First Street, in Yakima, Washington. The company conducts retail automotive sales, along with automotive maintenance and repair on-site.

Located in the maintenance area of the facility are two underground storage tanks (UST)s. Used oil, generated from the automobile repair, is stored in the USTs. The used oil is utilized as fuel for a boiler located in the basement of the facility.

UST number T-1 (4,000 gallon capacity) was installed in 1948. UST number T-2 was installed in 1968. The capacity of UST T-2 is unknown. It is not known if the USTs have factory-installed corrosion protection. probably not

Located inside the main facility are two waste water floor sumps. They are used to capture surface run-off in the automobile repair area. Reportedly, the sumps drain into the city sewer system.

The Fifth Wheel Shop, an associated maintenance facility for heavy truck repair, is located at 307 East Arlington Street. As shown on Plate 2, this portion of Hahn Motor Company is located to the north of the main facility, across Arlington Avenue. A "dry well" waste water sump is located at this facility. The exterior sump is reportedly used to capture runoff in the truck repair area.

METHODS OF STUDY

Three borings and two hand auger holes (see Plate 2) were made to (a) visually evaluate subsurface conditions at select locations, and (b) obtain soil and groundwater samples for laboratory analysis.

A truck-mounted B-80 air rotary drilling unit was used to accomplish the drilling. Our field sampling program generally followed EPA guidelines and the general guidelines for sampling described in our original proposal dated May 16, 1989, and as outlined below.

Soil Sampling

Borings

During drilling, the drill bit and drill rods were advanced to the desired sampling depth. An outer casing, used to maintain an open borehole, was then advanced to the sampling depth. Following retraction of the drill bit and drill rods from the casing, a split spoon sampler with connecting rods was lowered into the casing to the sampling depth.

The inner rod/sampler assembly was driven at the designated sampling interval using a 140 pound hammer. The sampler was then withdrawn and opened for observation. Samples were transferred from the sampler directly to sterilized glass jars with teflon lids furnished by the project laboratory.

Following removal of the sample, the split spoon sampler was subjected to a three-phase cleaning before reassembly to avoid contamination between samples. The sampler and the hand auger were washed and scrubbed by brush in a solution of Alconox soap and water. This was followed by a rinse with a solution of 5% nitric acid and a final thorough rinse with triple distilled or deionized water. The sampler was then reassembled for the next run. Augers and peripheral equipment were steam cleaned and scrubbed between borings.

Hand Auger Holes

Following concrete coring of the floor slab adjacent to the sumps at the main facility, a hand auger and a set of decontaminated stainless steel spoons was used to collect soil samples. One soil sample was collected from each auger hole. Each sample consisted of a composite over the length of each auger hole. Following collection of each sample, the hand auger and spoons were cleaned as described in the previous section.

Sample Logging and Storage

During drilling, a field log for the boring was made by the project hydrogeologist. In an effort to preserve sample integrity, samples were stored in ice-filled coolers at the site and taken to the lab in this condition. Each jar was clearly labeled as to boring number, sample number, date, time, sample depth, and project hydrogeologist. EPA established protocols for sample management, including maintenance of chain of custody documents, were observed at each stage of the project.

Following documentation of receipt of samples establishing chain of custody, the project analytical laboratory analyzed one soil and one groundwater sample for potential petroleum-derived hydrocarbons (C-4 to C-22) using infrared spectrophotometry (IR), EP-TOX, metals, volatile organics and purgeable volatiles.

Groundwater Sampling

Groundwater samples were collected from each of the borings. Prior to sampling, a minimum of three casing volumes of water was withdrawn from the interior of the casing. Purging was accomplished using a positive displacement pump. For this project no monitoring wells were installed.

Following purging, a dedicated decontaminated teflon bailer was used to extract groundwater samples from the interior of the casing. The water samples were poured into preconditioned,

labeled glassware furnished by the project laboratory. These samples were stored and managed in accordance with the sample management protocols described earlier.

Laboratory Analysis

Petroleum Hydrocarbons -- EPA Method 418.1

check this

Analysis for petroleum hydrocarbons was by EPA Method 418.1. This method helps to differentiate between naturally occurring hydrocarbons from decaying vegetable and animal matter and petroleum-derived hydrocarbons.

EP-TOX Metals -- EPA Method SW-846

The EP (Extraction Procedure) Toxicity test is assumed to simulate the leaching a waste will undergo if disposed of in an improperly designed sanitary landfill. The extract obtained from the extract procedure (EP) is analyzed to determine if any of the thresholds established for the eight elements (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) have been exceeded.

Volatile Organics -- EPA Method 8240

This is a purge-and-trap gas chromatography/mass spectrometer (GC/MS) method applicable to the detection of 34 purgeable volatile organic compounds (VOC)s in soils.

Purgeable Organics -- EPA Method 624

This is a purge-and-trap gas chromatography/mass spectrometer (GC/MS) method applicable to the detection of 36 purgeable volatile organic compounds (VOC)s in water samples.

Method Detection Limit (MDL)

The Method (or laboratory) Detection Limit (MDL) for each parameter analyzed is listed in the various tables of the laboratory results in this report. The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero. Laboratory Quality Assurance/Quality Control (QA/QC) is maintained through various performance characterizations of QA/QC spikes and check standards.

RESULTS OF STUDY

Surface

The Boring Location Plan, Plate 2, illustrates the location of the three borings and two hand auger holes drilled on the Hahn Motor Company property. Also shown on Plate 2 is the location of the USTs, interior waste sumps, and exterior waste water sump (dry well).

The ground surface of the site is relatively level. Except for the surface area around the UST filler caps, open areas adjacent to the main facility are paved with asphalt concrete. The areas around the UST filler caps is paved with concrete.

Open areas in the vicinity of the Fifth Wheel shop (located north of the main facility) are level and paved with concrete. This includes the area adjacent to the waste water sump. The remainder of the site is occupied by the Fifth Wheel shop.

Local Hydrogeology

The site is located in the Yakima River Valley, which is in the Columbia Plateau Province. Shallow sub-surface lithology in the valley consists of alluvial deposits characterized by sands and gravel. Underlying the alluvium are basalt flows of the Columbia River Basalt Group.

An unconfined shallow aquifer is present in the vicinity of the subject site. Based on local topography, the expected direction of groundwater flow is southeast. However, the actual direction of groundwater flow may be influenced by unknown local subsurface conditions and local unknown hydrogeologic factors.

Subsurface

Assessment of subsurface conditions was accomplished by visual observations of soil conditions encountered during drilling and augering, and interpretation of the results of laboratory analysis. Unconsolidated gravels, probably corresponding to Yakima River Alluvium, were encountered during drilling.

Groundwater

Shallow groundwater was encountered in borings B-1, B-2, and B-3. The estimated depth at which groundwater was encountered during drilling was approximately 14 feet below the ground surface.

Analytical Results

Regulatory Considerations

The Washington Department of Ecology (WDOE) has established cleanup goals for a variety of chemical compounds in soil and groundwater. According to WDOE's "Policies and Procedures for Underground Storage Tank Removal," (August 1, 1988, draft-copy), the Recommended Cleanup Goals (RCG)s for soil include: TPH 200 parts per million (ppm), benzene 660 parts per billion (ppb), toluene 143 ppm, and ethylbenzene 14 ppm. The RCGs for groundwater include: TPH 15 ppm, benzene 66 ppb, Toluene 14.3 ppm, Ethylbenzene 1.4 ppm.

Total Petroleum Hydrocarbons (TPH)

A total of 12 samples were analyzed for TPH - nine soil samples and three groundwater samples. The results of laboratory analysis are presented in Tables 1 and 2.

As shown in Table 1, concentrations of TPH were detected in all soil samples. However, only four samples contained concentrations of TPH above the WDOE RCG. These samples included: the composite of Sump #1 with 236 ppm TPH; B-3 at 3 feet with 1,780 ppm TPH; B-3 at 9 feet with 1,130 ppm TPH; and B-3 at 15 feet with 618 ppm TPH.

As shown in Table 2, concentrations of TPH detected in the groundwater samples collected from borings B-1 and B-3 were below the 5 ppm MDL (method detection limit). However, the TPH concentration detected in the groundwater sample collected from boring B-2 was 5 ppm. This concentration is below the WDOE RCG of 15 ppm.

EP-Toxicity for Metals

Three soil samples were analyzed for metals on an EP-Toxicity basis. The metals analyzed for included arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, copper, nickel, and zinc. The results of laboratory analysis are presented in Table 3.

As shown in Table 3, except for barium all other metal concentrations were below the MDL (detection limits indicated by "<" in Table 3).

The concentrations of barium detected included B-3 at 9 feet (0.3 ppm), and B-2 at 15 feet (0.5 ppm). Currently, there are no state of federal guidelines for barium concentrations in soil.

Volatile Organic Compounds (VOC)s - Soil

Three soil samples were analyzed for volatile organic compounds (VOC)s. Soil samples analyzed included the hand auger samples collected from Sump #1 and Sump #2, and boring

B-3 at 9 feet. The results of laboratory analysis are presented in Tables 4, 5, and 6. As shown in Tables 4, 5, and 6, concentrations of VOCs detected included the following:

Boring B-3 at 9 feet	Toluene 1.1 ppb
Sump #1	1,1,1-Trichloroethane 5.2 ppb; Tetrachloroethene 0.7 ppb
Sump #2	Acetone 7.5 ppb; 1,2-Dichlorethene (total) 1.7 ppb; 1,1,1,-Trichloroethane 1.1 ppb; Trichloroethene 2.9 ppb; Tetrachloroethene 7.3 ppb; Toluene 25 ppb; Ethylbenzene 2.2 ppb; and Total Xylenes 8.8 ppb.

All other VOCs in the samples were either not present in the samples or below the MDL.

Volatile Organic Compounds (VOC)s - Groundwater

The groundwater sample collected from boring B-3 was analyzed for VOCs. The results of laboratory analysis are presented in Table 7.

As shown in Table 7, concentrations of two VOCs were detected in the groundwater sample. These included Acetone (22 ppb) and Tetrachloroethene (5 ppb).

According to the EPA, there has been a recent regional study (release pending) of tetrachloroethene contamination in the shallow aquifer present in the Yakima area (telephone conversation with EPA, October, 1989). The tetrachloroethene concentration of 5 ppb encountered in the groundwater sample collected from boring B-3 may reflect this regional contamination.

CONCLUSIONS

Total Petroleum Hydrocarbons (TPH)

Concentrations of TPH detected in the soil sample adjacent to Sump #1, and soil samples from boring B-3, exceed the WDOE RCG.

Given the relatively low TPH concentration detected in the soil sample from Sump #1 (236 ppm TPH), we expect that the extent of contamination is probably limited to the immediate sump area.

The concentration of TPH contamination detected in boring B-3 significantly exceeds the WDOE RCG. The contamination appears to extend from near the ground surface to a depth of 15 feet.

The TPH concentration in the groundwater sample from boring B- 3 did not exceed the WDOE RCG. However, given that shallow groundwater was encountered at roughly 14 feet, we expect that some groundwater contamination will be detected during remediation which exceeds the RCG.

Volatile Organic Compounds (VOC)s

The VOCs detected in soil and groundwater may be associated with the use of solvents in the maintenance areas of the site. However, based of verbal information from the EPA, the tetrachloroethlene detected may be indicative of a low level of regional groundwater contamination.

The acetone and tetrachloroethylene detected in groundwater may require additional characterization of the potential extent and average concentration in groundwater. However, only a few recommended maximum contaminant levels have been established for VOCs in groundwater. Therefore, we expect that a WDOE determination, based on site specific information, of the need for further characterization of the VOCs detected in groundwater may be required.

Site Remediation

Given the concentrations of TPH detected, we expect that the WDOE will require site remediation, based on TPH recommended cleanup goals.

RECOMMENDATIONS

1. In accordance with RCW 90.48.360, the WDOE should be contacted regarding the findings of this study in order to satisfy petroleum spill reporting requirements. We suggest that a complete copy of all reports be forwarded to the WDOE for review and comment.

2. Assuming the WDOE recommends cleanup action, the areal and vertical extent of petroleum hydrocarbon contamination identified in this study should be addressed.

3. Cleanup in the vicinity of Sump #1, may include the removal of contaminated soil and confirmation soil sampling. Following cleanup of contaminated soil, the sump should be secured in a manner which does not allow future leakage. During this work we recommend that the general condition of Sump #2 be assessed to assure that future potential problems are minimized.

4. Contaminated soil should be remediated in the vicinity of Boring B-3. A common method used on sites similar to this involves the excavation of the contaminated soil and either (a) the on-site soil remediation, or (b) off-site disposal of the contaminated soil

in an approved landfill. Following soil excavation, confirmation soil and groundwater (if encountered) samples should be collected. Given that the contaminant is a waste-oil, recommended laboratory sample analysis may include total petroleum hydrocarbons, metals, solvents, and PCBs.

5. Prior to additional characterization of the VOCs detected in groundwater, the issue should be reviewed by the WDOE.

6. The "dry well" located at the Fifth Wheel Shop should not be used as a surface water catch basin or disposal well.

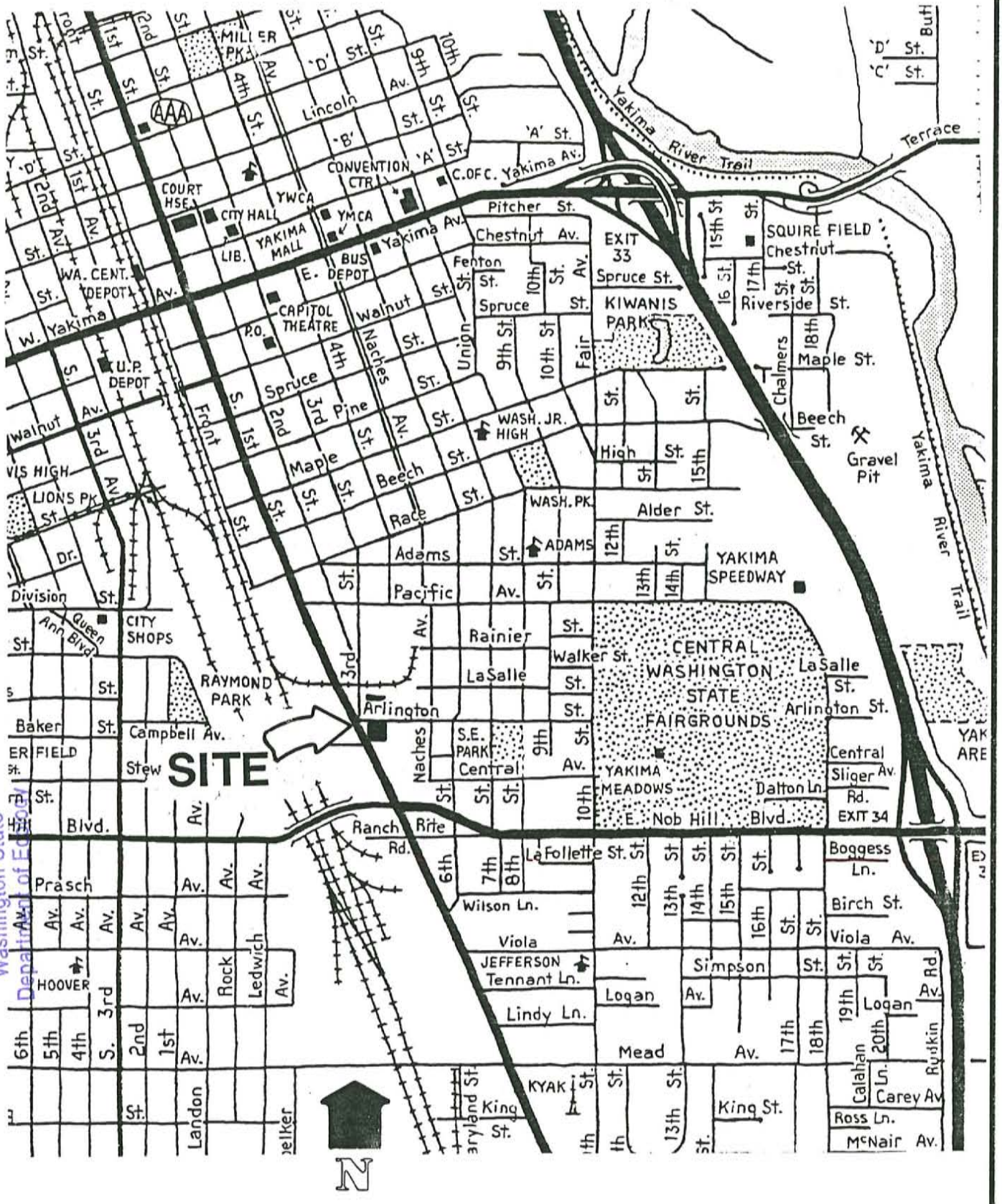
STANDARD LIMITATIONS

The findings and conclusions documented in this report have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our proposal dated May 16, 1989. All conclusions and recommendations and professional opinion based on our interpretation of information currently available to us. No warranty, expressed or implied, is made. This report is for the exclusive use of Hahn Motors and their representatives.

Conditions between borings may vary. A potential always remains for the presence of unknown, or unidentified, or unexpected, or unforeseen subsurface contamination. Further evidence against such potential site contamination would require additional subsurface exploration and testing.

If new information is discovered or developed in future site work (which may include excavations, borings, or other studies), ECI should be requested to reevaluate the conclusions of this report, and to provide amendments as required.

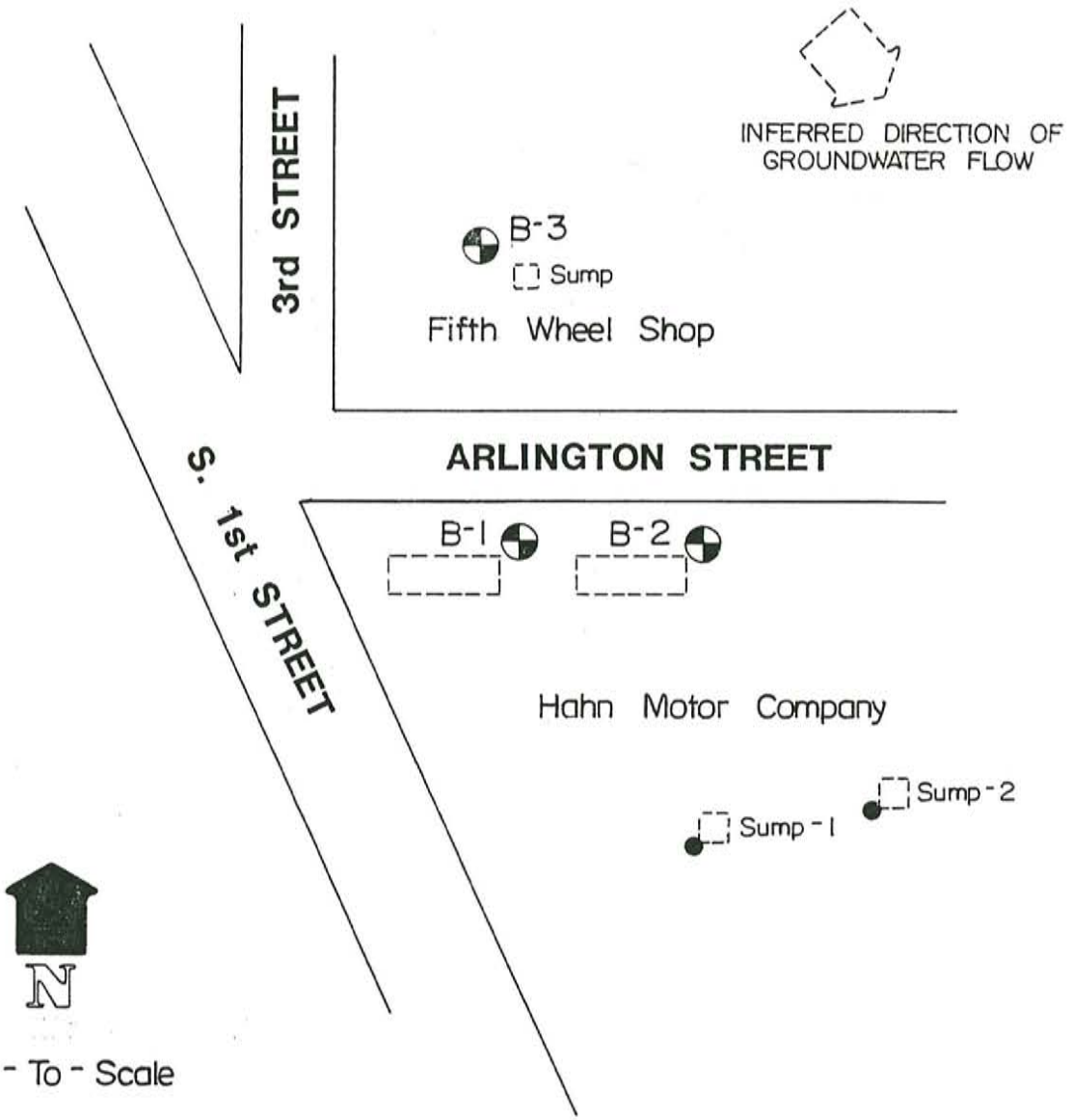
We appreciate the opportunity to be of service to you on this project. If you have any questions regarding our scope, methods, findings, conclusions, or recommendations, please contact us.



Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

Vicinity Map
Hahn Motor Company
Yakima, Washington

Proj. No. 4406-1	Drwn. GLS	Date Oct. '89	Checked TS	Date 10/10/89	Plate 1



Not - To - Scale

LEGEND

- B-1 Approximate Location of ECI Boring, Proj. No. E-4406-1, July 1989
- Approximate Location of ECI Hand Auger Boring

Reference :
Site Sketch
By Earth Consultants Inc.
Undated

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

Boring Location Plan
Hahn Motor Company
Yakima, Washington

Proj. No. 4406-1	Drwn. GLS	Date Oct. '89	Checked TS	Date 10/10/89	Plate 2

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTION
Coarse Grained Soils	Gravel And Gravelly Soils	Clean Gravels (little or no fines)		GW gw	Well-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
				GP gp	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
	More Than 50% Coarse Fraction Retained On No. 4 Sieve	Gravels With Fines (appreciable amount of fines)		GM gm	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC gc	Clayey Gravels, Gravel-Sand-Clay Mixtures
More Than 50% Material Larger Than No. 200 Sieve Size	Sand And Sandy Soils	Clean Sand (little or no fines)		SW sw	Well-Graded Sands, Gravelly Sands, Little Or No Fines
				SP sp	Poorly-Graded Sands, Gravelly Sands, Little Or No Fines
	More Than 50% Coarse Fraction Passing No. 4 Sieve	Sands With Fines (appreciable amount of fines)		SM sm	Silty Sands, Sand-Silt Mixtures
				SC sc	Clayey Sands, Sand-Clay Mixtures
Fine Grained Soils	Silts And Clays	Liquid Limit Less Than 50		ML ml	Inorganic Silts & Very Fine Sands, Rock Flour, Silty-Clayey Fine Sands; Clayey Silts w/ Slight Plasticity
				CL cl	Inorganic Clays Of Low To Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean
				OL ol	Organic Silts And Organic Silty Clays Of Low Plasticity
More Than 50% Material Smaller Than No. 200 Sieve Size	Silts And Clays	Liquid Limit Greater Than 50		MH mh	Inorganic Silts, Micaceous Or Diatomaceous Fine Sand Or Silty Soils
				CH ch	Inorganic Clays Of High Plasticity, Fat Clays
				OH oh	Organic Clays Of Medium To High Plasticity, Organic Silts
Highly Organic Soils				PT pt	Peat, Humus, Swamp Soils With High Organic Contents

Topsoil		Humus And Duff Layer
Fill		Highly Variable Constituents

The Discussion In The Text Of This Report Is Necessary For A Proper Understanding Of The Nature Of The Material Presented In The Attached Logs

Notes :

Dual symbols are used to indicate borderline soil classification. Upper case letter symbols designate sample classifications based upon laboratory testing; lower case letter symbols designate classifications not verified by laboratory testing.

I 2"O.D. SPLIT SPOON SAMPLER
II 2.4" I.D. RING SAMPLER OR SHELBY TUBE SAMPLER
P SAMPLER PUSHED
✳ SAMPLE NOT RECOVERED
▽ WATER LEVEL (DATE)
WATER OBSERVATION WELL

C TORVANE READING, tsf
qu PENETROMETER READING, tsf
W MOISTURE, percent of dry weight
pcf DRY DENSITY, pounds per cubic ft.
LL LIQUID LIMIT, percent
PI PLASTIC INDEX

Earth Consultants Inc.
Geotechnical Engineering and Geology

LEGEND

Proj. No. 4406-1 | Date Aug'89 | Plate 3

BORING NO. 1

Logged By RC

Date 7-17-89 Elev. _____

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	gp	GRAVEL	5 10				

Boring terminated at 15 feet below existing grade.
Groundwater encountered at 14 feet during drilling.
Backfill per WAC

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

BORING LOG

HAHN MOTOR COMPANY
YAKIMA, WASHINGTON

Proj. No. 4406-1	Drwn. GLS	Aug'89	Checked RC	Date 7-31-89	Plate 4

BORING NO. 2

Logged By RC

Date 7-17-89 Elev. _____

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	gp	GRAVEL	5 10				

Boring terminated at 15 feet below existing grade.
Groundwater encountered at 14 feet during drilling.
Backfill per WAC

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

BORING LOG
HAHN MOTOR COMPANY
YAKIMA, WASHINGTON

Proj. No. 4406-1	Drwn. GLS	Aug'89	Checked RC	Date 7-31-89	Plate 5

BORING NO. 3

Logged By RC

Date 7-18-89

Elev. _____

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	GP	GRAVEL	5 10				

Boring terminated at 15 feet below existing grade.
Groundwater encountered at 14 feet during drilling.
Backfill per WAC

Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

BORING LOG
HAHN MOTOR COMPANY
YAKIMA, WASHINGTON

Proj. No. 4406-1	Drwn. GLS	Aug'89	Checked RC	Date 7-31-89	Plate 6

TABLE 1
RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS, SOIL BY IR (EPA METHOD 418.1)
Results Reported as ug/g (ppm)

Sample #	Total Petroleum Hydrocarbons (ppm)
Sump #1, WB soil	236
Sump #2, BATT soil	36.2
B-1, 8.0' soil	16.9
B-1, 15.0' soil	17.2
B-2, 10.0' soil	16.7
B-2, 15.0' soil	162
B-3, 3.0' soil	1780
B-3, 9.0', soil	1130
B-3, 15.0', soil	618
WDOE SCGs	**200**
Quality Assurance	
B-2, 15.0' (Duplicate, Soil)	133

WDOE SCGs = Washington State Department of Ecology (WDOE) Soil Cleanup Goals (See text).

WB = Wash Bay

BATT = Battery Storage Area

As reported by the project laboratory, August 3, 1989.

TABLE 2
RESULTS OF ANALYSES OF ENVIRONMENTAL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS, GROUNDWATER BY IR (EPA METHOD 418.1)
Results Reported as ug/g (ppm)

Sample #	Total Petroleum Hydrocarbons (ppm)
B-1, WS-1 Groundwater	<5.0
B-2, WS-2 Groundwater	5.0
B-3, WS-1 Groundwater	<5.0
Quality Assurance	
B-2, 15.0' (Duplicate, Soil)	133.
WDOE GCGs	**15.0**

WDOE GCGs = Washington State Department of Ecology (WDOE) Groundwater Cleanup Goals (See text).

As reported by the project laboratory, August 3, 1989.

TABLE 3
RESULTS OF ANALYSIS OF ENVIRONMENTAL SAMPLES FOR EP-TOX METALS IN ACCORDANCE WITH "TEST METHODS FOR EVALUATING SOLID WASTE" EPA SW-846, 3RD EDITION
Results Reported as ppm (mg/L)

Sample #	B-3, 9.0'	B-1, 15.0'	B-2, 15.0'	ALLOWABLE LIMITS***
Analyte				
Arsenic	<0.1	<0.1	<0.1	5.0
Barium	0.3	<0.1	0.5	100.0
Cadmium	<0.1	<0.1	<0.1	1.0
Chromium	<0.1	<0.1	<0.1	5.0
Lead	<0.1	<0.1	<0.1	5.0
Mercury	<0.05	<0.05	<0.05	0.2
Selenium	<0.1	<0.1	<0.1	1.0
Silver	<0.1	<0.1	<0.1	5.0
Copper	<0.1	<0.1	<0.1	*
Nickel	<0.1	<0.1	<0.1	*
Zinc	<0.1	<0.1	<0.1	*

*** = Dangerous Waste Maximum Concentrations in Extract, WAC 173-303-090, Dangerous waste characteristics, WDOE, Dangerous Waste Regulations, Chapter 173-303, Amended January 1989.

* = No reported value as per Chapter 173-303-090, WAC.

As reported by the project laboratory, August 3, 1989.

TABLE 4
ORGANIC VOLATILES BY EPA METHOD 624/8240
All results reported in ug/kg (ppb)

CAS Number	Sample Identification (ug/Kg) Compound	Sample Number: B-3,9.0'
74-87-3	Chloromethane	3.8U
74-83-9	Bromomethane	3.1U
75-01-4	Vinyl Chloride	2.0U
75-00-3	Chloroethane	3.3U
75-09-2	**Methylene Chloride**	**3.0JB**
67-64-1	**Acetone**	**6.6J**
75-15-0	Carbon Disulfide	1.2U
75-35-4	1,1-Dichloroethene	0.7U
75-34-3	1,1-Dichloroethane	0.6U
75-34-3	1,2-Dichlorethene (total)	0.8U
67-66-3	Chloroform	1.1U
107-06-2	1,2-Dichloroethane	0.5U
78-93-3	2-Butanone	6.2U
71-55-6	1,1,1-Trichloroethane	0.6U
56-23-5	Carbon Tetrachloride	0.9U
108-05-4	Vinyl Acetate	3.1U
75-27-4	Bromodichloromethane	0.3U
78-87-5	1,2-Dichloropropane	0.7U
10061-01-5	cis-1,3-Dichloropropene	1.8U
79-01-6	Trichloroethene	0.6U
124-48-1	Dibromochloromethane	0.7U
79-00-5	1,1,2-Trichloroethane	0.7U
71-43-2	Benzene	1.0U
10061-02-6	Trans-1,3-Dichloropropene	1.9U
110-75-8	2-Chloroethylvinylether	2.7U
75-25-2	Bromoform	2.5U
108-10-1	4-Methyl-2-Pentanone	3.5U
591-78-6	2-Hexanone	3.2U
127-18-4	Tetrachloroethene	0.5U
79-34-5	1,1,2,2-Tetrachloroethane	2.7U
108-88-3	**Toluene**	**1.1**
108-90-7	Chlorobenzene	0.9U
100-41-4	Ethylbenzene	0.8U
100-42-5	Styrene	1.1U
1330-20-7	Total Xylenes	1.8U

Surrogate Recoveries

d8-Toluene	99.3%
Bromofluorobenzene	96.1%
d4-1,2-Dichloroethane	97.9%

As reported by the project laboratory, August 3, 1989.

TABLE 5
ORGANIC VOLATILES BY EPA METHOD 624/8240
All results reported in ug/kg (ppb)

CAS Number	Sample Identification (ug/Kg) Compound	Sample Number: Sump #1, WB
74-87-3	Chloromethane	3.8U
74-83-9	Bromomethane	3.1U
75-01-4	Vinyl Chloride	2.0U
75-00-3	Chloroethane	3.3U
75-09-2	**Methylene Chloride**	**4.4B**
67-64-1	**Acetone**	**3.9J**
75-15-0	Carbon Disulfide	1.2U
75-35-4	1,1-Dichloroethene	0.7U
75-34-3	1,1-Dichloroethane	0.6U
75-34-3	1,2-Dichlorethene (total)	0.8U
67-66-3	Chloroform	1.1U
107-06-2	1,2-Dichloroethane	0.5U
78-93-3	2-Butanone	6.2U
71-55-6	**1,1,1-Trichloroethane**	**5.2**
56-23-5	Carbon Tetrachloride	0.9U
108-05-4	Vinyl Acetate	3.1U
75-27-4	Bromodichloromethane	0.3U
78-87-5	1,2-Dichloropropane	0.7U
10061-01-5	cis-1,3-Dichloropropene	1.8U
79-01-6	Trichloroethene	0.6U
124-48-1	Dibromochloromethane	0.7U
79-00-5	1,1,2-Trichloroethane	0.7U
71-43-2	Benzene	1.0U
10061-02-6	Trans-1,3-Dichloropropene	1.9U
110-75-8	2-Chloroethylvinylether	2.7U
75-25-2	Bromoform	2.5U
108-10-1	4-Methyl-2-Pentanone	3.5U
591-78-6	2-Hexanone	3.2U
127-18-4	**Tetrachloroethene**	**0.7**
79-34-5	1,1,2,2-Tetrachloroethane	2.7U
108-88-3	**Toluene**	**0.5M**
108-90-7	Chlorobenzene	0.9U
100-41-4	Ethylbenzene	0.8U
100-42-5	Styrene	1.1U
1330-20-7	Total Xylenes	1.8U

Surrogate Recoveries

d8-Toluene	101.%
Bromofluorobenzene	91.0%
d4-1,2-Dichloroethane	99.0%

As reported by the project laboratory, August 3, 1989.

TABLE 6
ORGANIC VOLATILES BY EPA METHOD 624/8240
All results reported in ug/kg (ppb)

CAS Number	Sample Identification (ug/Kg) Compound	Sample No.: Sump #2, Batt.
74-87-3	Chloromethane	4.1U
74-83-9	Bromomethane	3.4U
75-01-4	Vinyl Chloride	2.2U
75-00-3	Chloroethane	3.6U
75-09-2	**Methylene Chloride**	**6.4B**
67-64-1	**Acetone**	**7.5**
75-15-0	Carbon Disulfide	1.3U
75-35-4	1,1-Dichloroethene	0.8U
75-34-3	1,1-Dichloroethane	0.7U
75-34-3	**1,2-Dichlorethene (total)**	**1.7**
67-66-3	Chloroform	1.2U
107-06-2	1,2-Dichloroethane	0.5U
78-93-3	2-Butanone	6.7U
71-55-6	**1,1,1-Trichloroethane**	**1.1**
56-23-5	Carbon Tetrachloride	1.0U
108-05-4	Vinyl Acetate	3.4U
75-27-4	Bromodichloromethane	0.3U
78-87-5	1,2-Dichloropropane	0.8U
10061-01-5	cis-1,3-Dichloropropene	2.0U
79-01-6	**Trichloroethene**	**2.9**
124-48-1	Dibromochloromethane	0.8U
79-00-5	1,1,2-Trichloroethane	0.8U
71-43-2	Benzene	1.1U
10061-02-6	Trans-1,3-Dichloropropene	2.1U
110-75-8	2-Chloroethylvinylether	2.9U
75-25-2	Bromoform	2.7U
108-10-1	4-Methyl-2-Pentanone	3.8U
591-78-6	2-Hexanone	3.5U
127-18-4	**Tetrachloroethene**	**7.3**
79-34-5	1,1,2,2-Tetrachloroethane	2.9U
108-88-3	**Toluene**	**25.0**
108-90-7	Chlorobenzene	1.0U
100-41-4	**Ethylbenzene**	**2.2**
100-42-5	Styrene	1.2U
1330-20-7	**Total Xylenes**	**8.8**

Surrogate Recoveries

d8-Toluene	98.7%
Bromofluorobenzene	95.8%
d4-1,2-Dichloroethane	99.9%

As reported by the project laboratory, August 3, 1989.

TABLE 7
ORGANIC VOLATILES BY EPA METHOD 624/524
All results reported in ug/kg (ppb)

water sample

CAS Number	Sample Identification (ug/Kg) Compound	Sample Number: B-3, WS-1
74-87-3	Chloromethane	2.9U
74-83-9	Bromomethane	0.9U
75-01-4	Vinyl Chloride	1.1U
75-00-3	Chloroethane	0.9U
75-09-2	**Methylene Chloride**	**6.8B** no
67-64-1	**Acetone**	**22.0**
75-15-0	Carbon Disulfide	2.0U
75-35-4	1,1-Dichloroethene	1.3U
75-34-3	1,1-Dichloroethane	1.1U
156-60-5	Trans-1,2-Dichloroethene	1.1U
156-59-2	Cis-1,2-Dichlorethene	1.2U
67-66-3	**Chloroform**	**0.4J**
107-06-2	1,2-Dichloroethane	0.6U
78-93-3	2-Butanone	1.0U
71-55-6	**1,1,1-Trichloroethane**	**0.2M**
56-23-5	Carbon Tetrachloride	0.5U
108-05-4	Vinyl Acetate	1.7U
75-27-4	Bromodichloromethane	0.2U
78-87-5	1,2-Dichloropropane	0.6U
10061-02-6	Trans-1,3-Dichloropropene	0.5U
79-01-6	Trichloroethene	0.8U
124-48-1	Dibromochloromethane	0.9U
79-00-5	1,1,2-Trichloroethane	0.3U
71-43-2	Benzene	0.4U
10061-01-5	cis-1,3-Dichloropropene	0.6U
110-75-8	2-Chloroethylvinylether	1.5U
75-25-2	Bromoform	0.3U
108-10-1	4-Methyl-2-Pentanone	1.8U
591-78-6	2-Hexanone	1.3U
127-18-4	**Tetrachloroethene**	**5.0**
79-34-5	1,1,2,2-Tetrachloroethane	0.6U
108-88-3	**Toluene**	**0.5M**
108-90-7	Chlorobenzene	0.6U
100-41-4	Ethylbenzene	1.0U
100-42-5	Styrene	0.5U
1330-20-7	Total Xylenes	1.5U

Surrogate Recoveries

d8-Toluene. 109.0%	
Bromofluorobenzene	99.2%
d4-1,2-Dichloroethane	95.5%

As reported by the project laboratory, August 3, 1989

TABLE 8

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
J	Indicates an estimated value when result is less than specified detection limit.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.

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