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Soil
Complete

EMCON
Northwest, Inc.

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February 12, 1992
Project W16-01.02

Mr. Joe Hickey
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue Southwest
Bellevue, Washington 98008-5452

Re: Broadview Service Station - Site Investigation and Cleanup

Dear Mr. Hickey:

Please find enclosed EMCON Northwest, Inc.'s final report documenting site investigation and site remediation at the Broadview Service Station. The site is located at 12258 Greenwood Avenue North, Seattle, and is owned by Mr. Bill Daniels.

If you have any questions, please call.

Sincerely,

EMCON Northwest, Inc.

Peter Rowland
Project Manager

Enclosure

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#1929

Final Report

Soil Sampling and Remediation Services

Former Broadview Service Site

Seattle, Washington

Prepared for

Mr. Willard Daniels
12039 Greenwood Avenue North
Seattle, Washington

February 11, 1992

Prepared by

Sweet-Edwards/EMCON, Inc.
18912 North Creek Parkway, Suite 210
Bothell, Washington 98011

Project W16-01.02

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1 INTRODUCTION

This report documents the underground storage tank (UST) removal, soil excavation, and soil remediation activities completed at the former gasoline and service station called Broadview Service (site), in North Seattle, Washington.

1.1 Site Description

The site is located at 12258 Greenwood Avenue North, at the southeast intersection of Greenwood Avenue North and North 125th Street. (Figure 1-1). The site has dimensions of approximately 226 feet north to south, and 123 feet east to west and occupies an area of approximately 28,000 square feet. The site is adjacent to private residential property located to the south and the Broadview Community Church located to the east.

Between approximately 1923 and February 1990 the site was privately owned and operated as an automobile filling and service station. Since 1932 the site has been owned and operated by Mr. W. Daniels of Seattle, Washington.

While in operation, the property consisted of a service station with three automobile service bays, a workshop, and cashiers office. The building area formerly occupied approximately 4,000 square feet near the center of the site. The area north and southwest of the service building is asphalt covered. The service station building was formerly underlain by a concrete slab. In the center of the service building a brick lined pit approximately 10 x 4 feet, and 6 feet deep, was used during automobile servicing. Two hydraulic lifting hoists were also located in the service building.

Site operations conducted in the past have included the use of nine steel USTs for storage of petroleum products. The USTs formerly in use at the site include the following:

- Five 4,000-gallon gasoline

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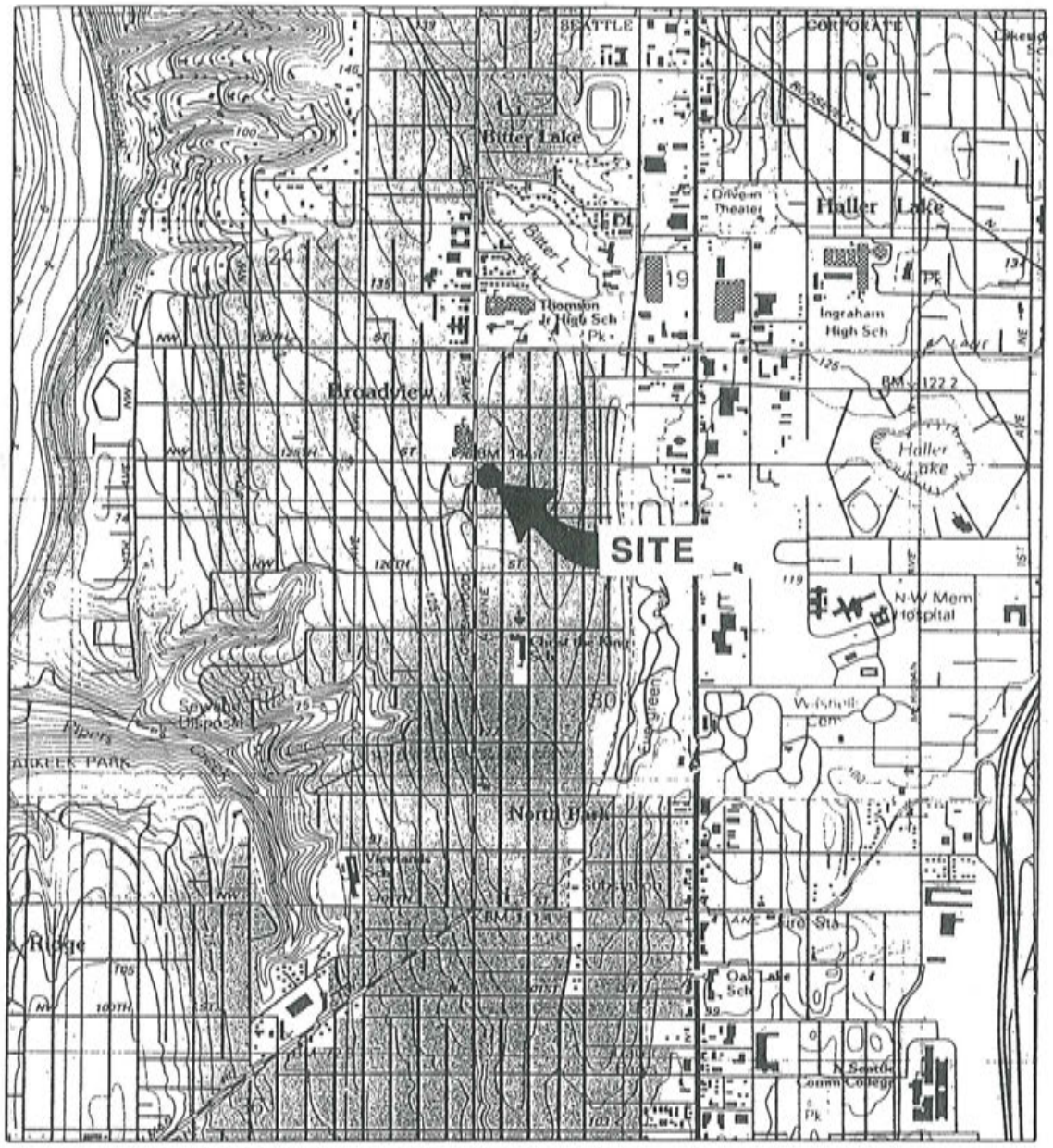

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Figure 1-1
BROADVIEW SERVICE STATION
SEATTLE, WASHINGTON
VICINITY MAP

- One 550-gallon waste oil
- One 550-gallon fuel oil
- One 550-gallon gasoline (previously abandoned in place and removed during this investigation)

The former USTs were located end to end along the front of the property between the service station and Greenwood Avenue North. Figure 1-2 shows the former location of the tanks and the service station buildings and offices. Tanks were numbered 1 through 9 as indicated on the site map.

1.2 Project Background

In late February 1990, Glacier Environmental Services, Inc. (GES) was contracted by Mr. Daniels to remove the USTs and related pump equipment from the site.

We understand that in March 1990 GES removed seven of the nine USTs and that five of the seven (tanks 1 through 4 and 7) had holes in the tank bottoms or sidewalls. Petroleum-like odors were detected by GES personnel in soils removed from around the tanks and soils were segregated according to odor into three soil stockpiles: 1) "clean" soil; 2) soils suspected of containing gasoline-related petroleum hydrocarbons; and 3) soils suspected of containing waste-oil related petroleum hydrocarbons.

We understand that the Washington State Department of Ecology (Ecology) was notified by GES in early March 1990 of the suspected release of petroleum products at the site.

During initial tank excavation activities, water seepage into the excavation was observed by GES at a depth of approximately five feet below ground surface (bgs) and in association with buried utilities and product distribution lines. The seepage zone at five feet was reported to coincide with the upper surface of dense sandy silt (native glacial till) beneath a zone of imported fill. It was reported by GES that seepage into the UST excavation reduced significantly after two days and had stopped within one week of the initial excavation.

GES reportedly pumped approximately 16,000 gallons of water from the excavation to a 20,000-gallon storage tank for temporary containment pending laboratory analysis for total petroleum hydrocarbons (TPH) and

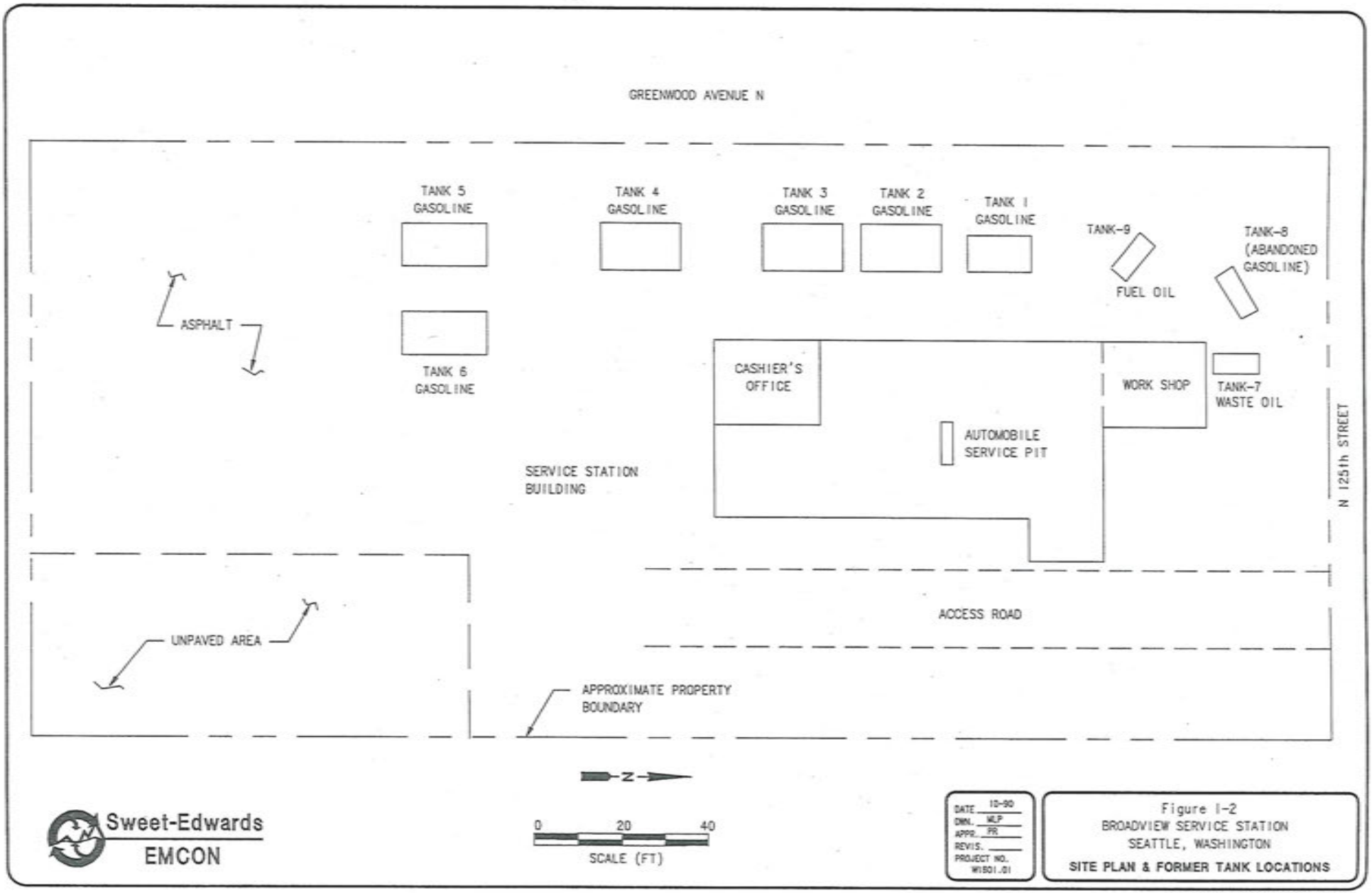
GREENWOOD AVENUE N
TANK 5 GASOLINE
TANK 4 GASOLINE
TANK 3 GASOLINE
TANK 2 GASOLINE
TANK 1 GASOLINE
TANK-9
FUEL OIL
TANK-8 (ABANDONED GASOLINE)
ASPHALT
TANK 6 GASOLINE
CASHIER'S OFFICE
WORK SHOP
TANK-7 WASTE OIL
AUTOMOBILE SERVICE PIT
SERVICE STATION BUILDING
N 125th STREET
ACCESS ROAD
UNPAVED AREA
APPROXIMATE PROPERTY BOUNDARY
N
0
20
40
SCALE (FT)
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Figure 1-2
BROADVIEW SERVICE STATION
SEATTLE, WASHINGTON
SITE PLAN & FORMER TANK LOCATIONS
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benzene, toluene, ethylbenzene, and xylenes (BTEX) and obtaining the appropriate water disposal permit from Metro.

We understand that laboratory analysis of the water detected BTEX compounds in the water above regulated concentrations. The water was aerated in the storage tank to reduce BTEX concentrations below Metro water was disposal standards and the water discharged into the Seattle sewer system upon receipt of the appropriate disposal permit.

1.3 Purpose and Scope-of-Work

In March 1990, SE/E was requested by GES to provide environmental consulting services to Mr. Daniels concerning the suspected presence of petroleum hydrocarbons in soil adjacent to the former USTs.

SE/E's project goals focused on characterizing petroleum hydrocarbons present in the soil in the former tank areas and shop building; excavating the soil with elevated petroleum hydrocarbon concentrations, and remediating petroleum-related hydrocarbons in the soil to comply with Ecology's Method A soil cleanup standards specified in the Model Toxics Control Act (MTCA)[1].

The tasks performed by SE/E during site characterization and soil cleanup were completed in two phases. Phase I was completed between March 1990 and June 1991 and included initial tank removal activities, soil excavation and segregation, and soil treatment utilizing vapor extraction. Phase II was completed between June and November 1991 and included re-excavation of all soils from the former tank excavation, further laboratory analysis and additional soil treatment by bioremediation. In June 1991, Mr Daniels transferred responsibility for remediation services at the site to The Remediation Company Inc, (TRC). SE/E assumed management of the site cleanup and TRC worked under the direction of SE/E.

The tasks performed by SE/E during this site characterization and soil cleanup included the following:

PHASE I

- Prepared a Site Health and Safety Plan

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[1] Chapter 173-340 WAC, Model Toxics Control Act, February 28, 1991.

- Monitored organic vapors in the working environment for health and safety purposes.
- Field screened soils during soil excavation with a Photoionization Detector (PID) to qualitatively determine the extent of soil excavation.
- Collected verification soil samples from the base and sides of the UST excavation.
- Collected verification soil samples from the service station sump area following removal of sump sidewalls and base.
- Submitted soil samples to an analytical laboratory for appropriate analysis.
- Evaluated soil quality data.
- Coordinated stockpiling of soils on site according to the nature of soil contamination.
- Designed for GES an on-site soil venting system to remediate soil containing gasoline-related hydrocarbons.
- Provided assistance to GES with monitoring of the soil venting system, and made recommendations concerning its operation.
- Assisted GES with bioremediation of soil containing waste oil- and fuel oil-related hydrocarbons.
- Collected representative soil samples from the soils being treated and submitted samples to an analytical laboratory.

PHASE II

- Directed TRC during soil excavation and soil treatment
- Coordinated the re-excavation of all soils from the former tank excavation
- Coordinated stockpiling of soils into approximate 100 yard stockpiles

- Collected soil samples from each stockpile and submitted samples to an analytical laboratory for TPH analysis
- Coordinated the treatment of selected soil stockpiles
- Collected soil treatment verification samples from the soils following treatment
- Coordinated the return of all treated soils to the former tank excavation
- Prepared this report documenting methods, results and conclusions of the site investigation and soil remediation.

2 GEOLOGY

Observations made during tank removal operations and soil excavation activities indicated that the underlying geology at the site consists of a variable thickness of imported fill material overlying dense glacial till.

The fill consists of up to ten feet of brown, fine to coarse sand and gravel beneath and around the former USTs, and approximately three to five feet of similar fill materials beneath the main service station area. Miscellaneous demolition debris, bricks, concrete and wood were also located beneath the service station building.

The glacial till consists of dense, blue-gray silty sand and sandy silt to a depth of at least 26 feet bgs. The upper surface of the glacial till appears to dip at a shallow angle southwest beneath Greenwood Avenue North and follows the natural topography of the area.

2.1 Ground Water Occurrence

Ground water was not encountered beneath the site during any soil excavation activities. The maximum depth of investigation at the site was approximately 26 feet bgs.

Based on driller's boring logs on file with Ecology, six wells are located within one mile of the site, and indicate that ground water occurs at a depth of at least 82 feet bgs in the area. Appendix A contains copies of the boring logs on file with Ecology. Figure 2-1 shows the approximate location of the wells.

A private well survey has not been completed in the area and it is possible that additional wells exist in the vicinity of the site. City supplied water, however, has been available for domestic use for several years and ground water use in the area is suspected to be minimal.

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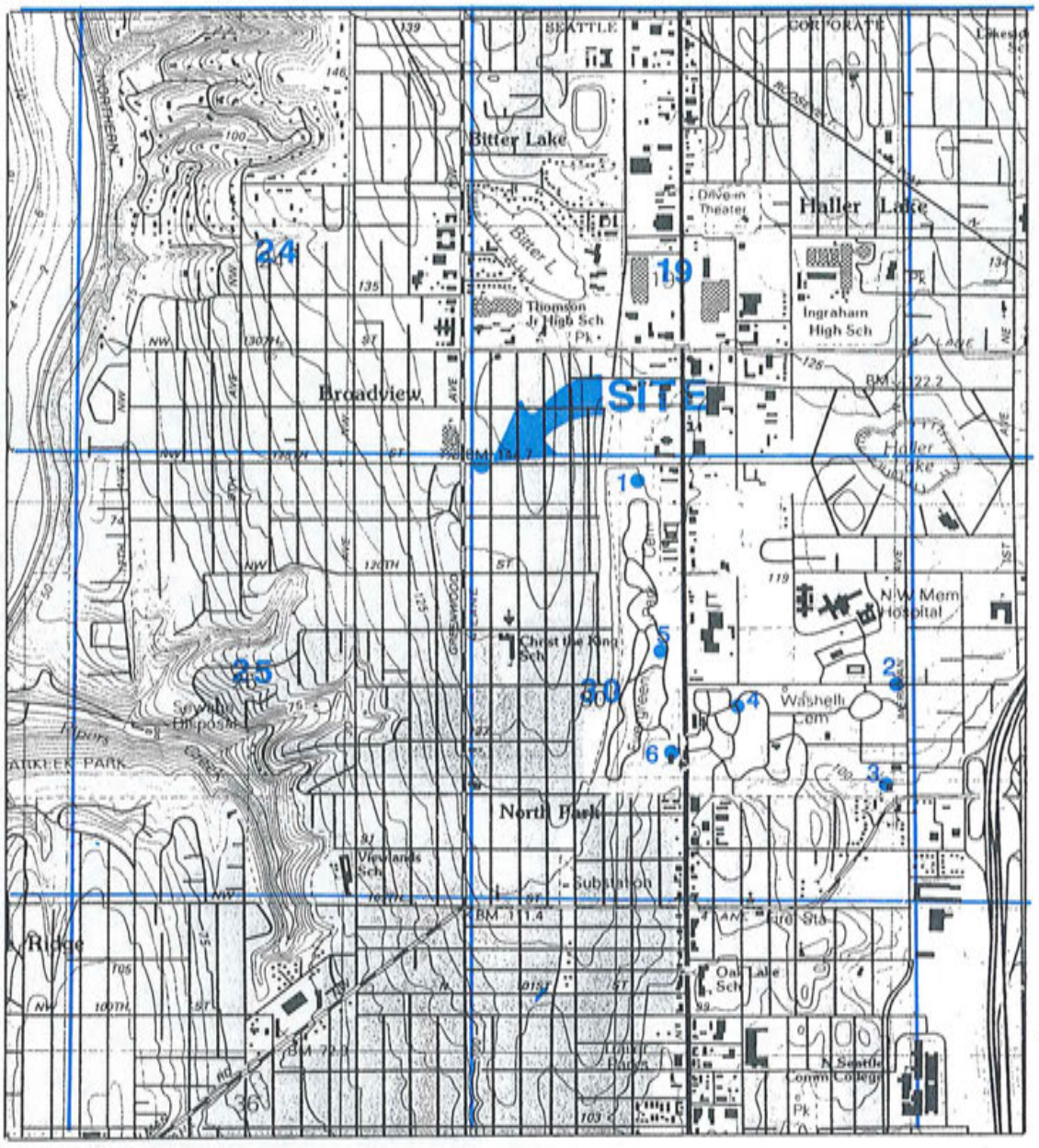

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Figure 2-1
BROADVIEW SERVICE STATION
SEATTLE, WASHINGTON
WELL LOG SURVEY

2.1.1 Water Seepage

In addition to the shallow water seepage zone described earlier, seepage into the excavation was also observed during winter months at a depth of approximately 13 feet bgs on the western wall of the tank excavation. The seepage area was small and appeared to occur from a sand lens approximately 5-inches thick and 50-feet long. Seepage appeared to be seasonal.

In addition, a catch basin is located approximately 15-feet from the excavation sidewall and may be influencing seepage into the excavation during storm events.

3 TANK REMOVAL

This section describes the tank removal activities observed by SE/E at the site and relates to the removal of Tanks 8 and 9 (Figure 1-2). Tanks 1 through 7 were removed prior to SE/E's involvement with the Broadview Service project.

On March 26, 1990, Tank 8 (550-gallon gasoline tank) was discovered between the former waste oil tank (Tank 7) and the fuel oil tank (Tank 9) (Figure 1-2). No product was present in the tank which was filled with 1/4 inch-diameter pea gravel. Several holes were observed in the tank sidewalls. The tank was removed with a track mounted excavator and appropriately disposed of by GES. The tank was not inspected by the Seattle Fire Department prior to removal as it was already abandoned in-place.

On March 30, 1990, Tank 9 (550-gallon Fuel Oil Tank) was made inert with dry ice and inspected by the Seattle Fire Department prior to removal. A track mounted excavator was used by GES to remove the tank from the excavation. Inspection of the tank revealed a 1-inch-diameter hole approximately one foot from the top of the tank. The tank was disposed of by GES.

Following tank removals, the tank excavations were inspected for evidence of tank leakage. No free petroleum product was found beneath or adjacent to Tank 8 or 9 at the time of removal. However, petroleum odors were detected in backfill material surrounding the tanks, and in native soil beneath and adjacent to the tanks.

4 SITE REMEDIATION

This section describes the field activities performed to remove, characterize, and segregate soils containing petroleum hydrocarbons at concentrations that exceed the MTCA Method A soil cleanup standards for UST sites. Characterization of the petroleum hydrocarbons present in the soil was performed to facilitate appropriate soil treatment methods.

4.1 Soil Excavation

Soil excavation was performed in two phases. Phase I took place between March 26, 1990, and August 10, 1990, and was performed by GES. Phase II took place between July 1 and July 3, 1991, and was performed by TRC. SE/E coordinated soil excavation activities during both phases of soil excavation.

Both GES and TRC used a track-mounted excavator and a rubber-tired backhoe for the purpose of excavating soils.

4.1.1 Excavation Criteria

Soil excavation focused on removing soil along the sidewalls and base of the UST excavation. Criteria used to determine the extent of soil removal included soil discoloration, hydrocarbon-like odors, and volatile organic vapor monitoring with a PID.

Soil Vapor Monitoring. Soil vapor head space monitoring is used as a field technique for determining relative levels of soil contamination. It does not, however, distinguish between petroleum compounds or perform with the accuracy or precision of laboratory analysis.

A PID reading of 50 parts per million (ppm) or above was used as a soil vapor concentration indicating the presence of petroleum hydrocarbons at potentially regulated concentrations. Consequently, soil excavation continued until soil vapor concentrations were below 50 ppm, or if physical

restraints prevented further excavation. The soil vapor monitoring method is described in Appendix B, Section B-1.

4.2 Limits of Excavation

4.2.1 Phase I

Between March 26 and April 16, 1990, excavation of contaminated soil proceeded beneath and adjacent to the former USTs. The depth of excavation ranged from 12 feet bgs beneath Tanks 5 and 6, 15 feet bgs beneath Tanks 7 and 8, and approximately 18 feet bgs beneath Tanks 1, 2, 3, 4, and 9.

A review of laboratory testing results and PID concentrations in soil samples collected from the northern end of the excavation in mid-April 1990, indicated that petroleum hydrocarbon concentrations in soils adjacent to Tanks 1, 7, 8, and 9, extended east beneath the service station. Mr. Daniels authorized continued excavation of soils beneath the service station following demolition of the building and removal of the concrete slab and automobile service pit. Prior to demolition of the building, GES contracted with Coastal Tank Cleaning, Inc., to remove and dispose of an oily sludge from the base of the service pit.

Excavation of soil from beneath the former service station commenced on July 26, 1990, following the demolition of the service station building. Soil excavation continued south and east of Tank 7 and extended beneath the automobile service pit formerly located in the center of the service station building (Figure 1-2). The excavation reached a maximum depth of 26 feet bgs approximately 20 feet east of Tank 1.

A total of approximately 2,400 cubic yards of soil was removed from the excavation. The excavation extended from the northern property boundary approximately 150 feet south, and between 20 feet and 40 feet east of Greenwood Avenue. Figure 4-1 illustrates the limit of soil excavation and former location of the service station building.

4.2.2 Phase II

Between July 1 and July 3, 1991, additional soil excavation was completed on the western sidewall, and in the base of the former tank excavation adjacent to tanks 1, 2, 3, 8 and 9. The purpose of additional excavation was to remove soils in areas where Phase I sampling indicated impacted soils still remained. Figure 4-1 shows the limit of excavation after

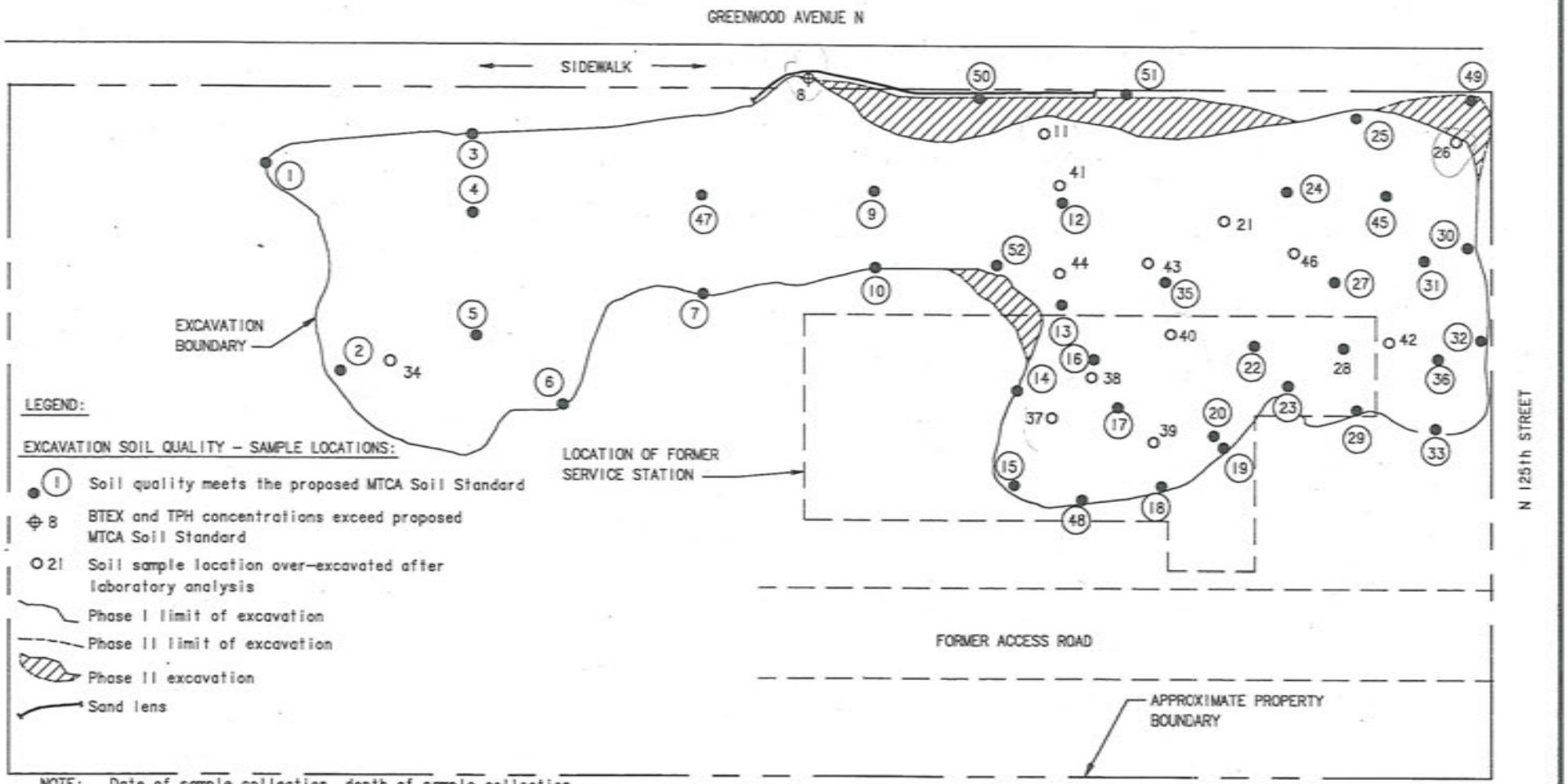

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Figure 4-1
BROADVIEW SERVICE STATION
SEATTLE, WASHINGTON
EXCAVATION PLAN & SOIL SAMPLE LOCATIONS

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completion of Phase II activities. Approximately 50 cubic yards of additional soil was excavated during Phase II.

4.3 Soil Sampling

Verification soil samples were collected from the excavation base and sidewalls, and were submitted for laboratory analysis to verify that petroleum hydrocarbon concentrations met the MTCA Method A soil cleanup standards for UST sites. Soil Sampling methods and equipment decontamination procedures are described in Appendix B, Section B-2.

4.3.1 Sample Locations

Phase I. A total of 48 soil samples were collected during Phase I excavations as shown on Figure 4-1. Sample locations were selected at the base and sides of the former UST excavation when PID values, soil staining, and soil odors indicated the limit of petroleum hydrocarbon impact had been reached.

Additional soil was excavated if TPH or BTEX concentrations in a sample were in excess of the MTCA Method A soil cleanup standards. Another soil sample was collected to verify concentrations at the new limit of excavation. Figure 4-1 also shows the soil sample locations at which additional soil excavation followed sampling.

Phase II. An additional four soil samples were collected during the Phase II excavation activities. Soil sample locations are shown on Figure 4-1 and were selected in areas where Phase I sampling indicated impacted soil still remained. In particular, locations were selected on the western sidewall and in the base of the excavation approximately 10-feet east of tank 2.

4.4 Laboratory Analysis

All excavation soil samples collected during Phase I and Phase II were submitted to Sound Analytical Services, Inc., (SAS), Tacoma, Washington, for analysis. The analysis method selected for each sample was based upon the suspected petroleum hydrocarbon compound present as indicated by the PID concentrations, and as indicated by the sample location relative to the former USTs. The following sub-section describes the laboratory analyses selected for soil suspected of containing (1) gasoline and fuel oil (2) waste oil, and (3) soils excavated from adjacent to the automobile service pit.

4.4.1 Gasoline and Fuel Oil Soils.

Samples collected from adjacent to the gasoline and fuel oil tanks were analyzed for Total Petroleum Fuel Hydrocarbons (TPFH) using EPA Method 8015 (Modified), or TPH-IR by EPA Method 418.1. BTEX analysis was performed using EPA Method 8020.

4.4.2 Waste Oil Tank Soils

An initial soil sample (sample SP-7) was collected from stockpiled soils, excavated from beneath the waste oil tank and suspected of containing traces of waste oil. The sample was analyzed for the following compounds:

- TPH-IR (EPA Method 418.1)
- Organochlorine Pesticides and PCBs (EPA Method 8080)
- Halogenated Volatiles (EPA Method 8010)
- EP Toxicity Metals (EPA SW-846)

Due to the non-detection of pesticides, PCBs, regulated concentrations of halogenated volatile organics and metals in the initial soil sample, subsequent samples collected in the vicinity of the waste oil tank were analyzed for TPH-IR and/or TPFH and BTEX compounds only.

4.4.3 Automobile Service Pit Soils

An initial soil sample (sample 37) collected from beneath the automobile service pit was analyzed for TPFH, BTEX, and selected halogenated volatile organic compounds, as specified in the MTCA Method A soil cleanup standards (methylene chloride, 1,1,1-trichloroethane, trichlorethene, and tetrachloroethene).

Due to the non-detection of halogenated volatile organic compounds in the initial sample, subsequent samples collected adjacent to the automobile service pit were analyzed for TPH-IR and/or TPFH, and BTEX compounds only.

4.5 Soil Stockpiling - Phase I

Soil removed from the excavation was segregated and temporarily stockpiled on-site according to the suspected principal petroleum hydrocarbon. Segregation of impacted soil was required to facilitate selection of an appropriate soil treatment method.

Three soil segregation categories were selected: (1) Unimpacted soil, (2) soil suspected of containing gasoline, and (3) fuel oil and soil suspected of containing waste oil. Segregation in the field was performed using the PID and soil odor. All soil stockpiles were placed on plastic sheeting and covered to minimize potential rainfall infiltration and runoff.

4.5.1 Stockpile Soil Sampling

To characterize the petroleum hydrocarbon compounds present in the stockpiles, SE/E collected representative soil samples from each stockpile.

Nine soil stockpiles were sampled on March 27, March 30, and April 10, 1990. A single soil sample was collected from each stockpile (sample numbers SP-1 through SP-9).

Three additional soil stockpiles were sampled on July 26, 1990. Three soil samples were collected from each stockpile and were composited into three samples by the laboratory. (Sample numbers SPG-1, -2, -3; SPD-1, -2, -3; SPWO-1, -2, -3). Stockpiled soil sampling methods are described in Appendix B, Section B-3.

4.5.2 Stockpiled Soil Analysis

Stockpile soil samples were submitted to SAS in chilled coolers under chain-of-custody. All samples were analyzed for BTEX. Samples SP-1, SP-3, and SP-5 through SP-7 were analyzed for TPH-IR. Samples SP-8, SP-9, and SPG -1, -2, -3; SPD -1, -2, -3 and SPWO -1, -2, -3 were analyzed for TPFH.

5 SOIL TESTING RESULTS AND INTERPRETATION

This section presents the analytical testing results of soil samples collected from the base and sides of the UST excavation, and from the soil stockpiles. Soil sample testing results were used to determine the extent of soil over-excavation required to remove impacted soils from the excavation. Stockpile sample results were used to segregate soils for appropriate soil treatment.

5.1 Excavation Base and Sidewall Samples

Soil testing results for samples collected from the excavation base and sidewalls are summarized in Table 5-1; laboratory data is included in Appendix C. Soil sample locations are presented on Figure 4-1.

Table 5-2 is a summary of the MTCA Method A soil cleanup standards for petroleum hydrocarbon compounds. A review of the results indicates that of the 52 soil samples analyzed (48 in Phase I and 4 in Phase II), 37 recorded no TPH or BTEX compounds above the MTCA Method A soil cleanup standards. No halogenated volatile organic compounds were detected in a soil sample collected beneath the car service bay.

Comparison of the soil testing results with the standards indicate that soil samples exceeded the TPH concentration at 15 locations, and that one or more BTEX compounds exceeded the standards at two locations.

At 16 of the 17 soil sample locations with elevated TPH and/or BTEX concentrations, additional soil was excavated and a further sample collected to verify soil quality. At all 16 locations the subsequent soil sample was below the MTCA Method A soil cleanup standards.

BTEX and TPH concentrations in one soil sample (Sample 8) collected on the western side of the excavation exceeded the MTCA Method A soil cleanup standard. Additional soil could not be excavated due to the proximity of Greenwood Avenue and City of Seattle property. The zone of soil contamination located on the western sidewall of the excavation was restricted to soils in a thin sand lens within the dense silty glacial till. The

Table 5-1

Soil Quality Results — Excavation Base and Sidewalls

Sample Number	Depth of Sample (feet bgs)	Date of Sample Collection	Field Sample Number	EPA 418.1	EPA Method 8015 Modified	EPA Method 8020			
				TPH-IR[1] (mg/kg) ppm	TPFH[2] (mg/kg) ppm	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
Phase I									
1	12	3/27/90	5VSC-1	194	NT	0.05	0.18	0.18	2.09
2	10	4/16/90	5VS-2	U	NT	U	U	U	U
3	12	3/26/90	5VW-1	U	NT	U	U	U	2.06
4	11	3/19/90	5VB-1	U	NT	U	U	U	U
5	11	3/19/90	6VB-1	29.9	NT	U	U	U	U
6	11	3/26/90	6VE-1	U	NT	U	U	U	U
7	12	3/30/90	4VE-1	NT	NT	NT	NT	NT	NT
8	13	3/19/90	4VW-1	NT	1,830 (Gas)	9.38	211	83.1	364
9	16	3/19/90	3VB-1	11.7	U	U	U	U	U
10	15	3/26/90	3VE-1	9	NT	U	U	U	U
11	13	3/26/90	2VWA-1	976	NT	U	U	U	U
12	12	3/26/90	2VBC-1	30.1	NT	U	U	U	U
13	21	8/10/90	9VE-1S	U	U	U	U	U	U
14	16	8/10/90	9VE-1M	9.8	U	U	U	U	U
15	18	8/10/90	9VE-1O	U	U	U	U	U	U
16	25	8/9/90	9VE-1K	NT	46.7 (Diesel & Gas)	U	U	0.14	0.84

Notes:

Mg/Kg is equivalent to parts per million (ppm) in soil.

(1) TPH-IR means total petroleum hydrocarbons-infrared spectrophotometry

(2) TPFH means semi-volatile total petroleum hydrocarbons. Fuel type based on elution ranges of selected hydrocarbons.

U Not detected at or above the method reporting limit.

NT Not tested by the laboratory.

Table 5-1

Soil Quality Results — Excavation Base and Sidewalls (Continued)

Sample Number	Depth of Sample (feet bgs)	Date of Sample Collection	Field Sample Number	EPA 418.1	EPA Method 8015 Modified	EPA Method 8020			
				TPH-IR[1] (mg/kg) ppm	TPFH[2] (mg/kg) ppm	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
17	20	8/10/90	9VE-1P	U	U	U	U	U	U
18	18	8/10/90	9VE-1N	NT	U	U	U	U	U
19	16	8/9/90	9VE-1I	NT	U (Diesel)	U	U	U	U
20	19	8/9/90	9VE-1J	NT	19.3 (Diesel)	U	U	U	U
21	15	3/19/90	1VB-1	164	33 (Diesel)	U	U	U	U
22	16	7/26/90	9VE-1B	NT	U	U	U	U	U
23	11	7/25/90	9VSE-1	NT	U	U	U	U	U
24	14	4/10/90	9VB-2	94.4	62 (Diesel)	NT	NT	NT	NT
25	10	4/10/90	8VW-2	9.8	NT	U	U	U	U
26	10	4/10/90	9VW-2	2,239	NT	U	U	U	0.14
27	9	7/25/90	9VE-1	NT	17 (Diesel)	U	0.09	U	U
28	15	7/25/90	9VB-7	NT	U	U	U	U	U
29	11	4/9/90	9VE-1A	NT	U	U	U	U	0.13

Notes:

Mg/Kg is equivalent to parts per million (ppm) in soil.

(1) TPH-IR means total petroleum hydrocarbons-infrared spectrophotometry

(2) TPFH means semi-volatile total petroleum hydrocarbons. Fuel type based on elution ranges of selected hydrocarbons.

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Table 5-1

Soil Quality Results — Excavation Base and Sidewalls (Continued)

Sample Number	Depth of Sample (feet bgs)	Date of Sample Collection	Field Sample Number	EPA 418.1	EPA Method 8015 Modified	EPA Method 8020			
				TPH-IR[1] (mg/kg) ppm	TPFH[2] (mg/kg) ppm	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
30	9	4/10/90	8VN-1	17.6	24 (Diesel)	U	0.12	U	0.69
31	10	3/27/90	8VB-1	48.3	U	U	0.16	U	U
32	12	3/27/90	WON-1	18.8	NT	U	U	U	U
33	13	3/27/90	WOE-1	8.6	NT	U	U	U	166
34	10	3/30/90	6VEB-1	421	NT	18.8	82.4	33.7	166
35	25	8/9/90	9VE-1L	NT	U	U	U	U	U
36	11	4/10/90	7VB-1	5.3	NT	NT	NT	NT	NT
37	9	7/26/90	SUMP-1	NT	413 (Aged Gas/Diesel and Heavy Oil)	U	U	U	0.19
38	10	7/26/90	9VE-1E	NT	398 (Aged Gas/Diesel and Heavy Oil)	U	U	0.55	1.45
39	17	7/26/90	9VE-1F	NT	323 (Aged Gas and Diesel)	U	U	0.3	0.8
40	19	7/26/90	9VE-1G	NT	938 (Aged Gas and Diesel)	U	U	0.69	2.95

Notes:

Mg/Kg is equivalent to parts per million (ppm) in soil.

(1) TPH-IR means total petroleum hydrocarbons-infrared spectrophotometry

(2) TPFH means semi-volatile total petroleum hydrocarbons. Fuel type based on elution ranges of selected hydrocarbons.

U Not detected at or above the method reporting limit.

NT Not tested by the laboratory.

Table 5-1

Soil Quality Results — Excavation Base and Sidewalls (Continued)

Sample Number	Depth of Sample (feet bgs)	Date of Sample Collection	Field Sample Number	EPA 418.1	EPA Method 8015 Modified	EPA Method 8020			
				TPH-IR[1] (mg/kg) ppm	TPFH[2] (mg/kg) ppm	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
41	16	3/26/90	2VBA-1	247	212 (Gas)	0.09	4.03	3.04	19.8
42	12	3/27/90	WOS-1	1,108	NT	U	U	U	U
43	13	3/27/90	2VE-1	571	NT	U	17.5	9.3	55.9
44	18	3/26/90	2VEC-1	277	NT	U	U	U	U
45	13	4/10/90	8VB-2	U	NT	U	U	U	U
46	11	4/10/90	9VE-2	2,080	NT	NT	NT	NT	NT
47	11	3/26/90	4VBA-1	5.9	NT	U	U	U	U
48	16	7/26/90	9VE-1H	NT	U	U	U	U	U
Phase II									
49	13	7/1/91	7.1.91-1	NT	U	NT	NT	NT	NT
50	15	7/3/91	7.3.91-1	NT	U	NT	NT	NT	NT
51	13	7/3/91	7.3.91-2	NT	19 (diesel)	NT	NT	NT	NT
52	13	7/3/91	7.3.91-4	NT	U	NT	NT	NT	NT

Notes:

Mg/Kg is equivalent to parts per million (ppm) in soil.

(1) TPH-IR means total petroleum hydrocarbons-infrared spectrophotometry

(2) TPFH means semi-volatile total petroleum hydrocarbons. Fuel type based on elution ranges of selected hydrocarbons.

U Not detected at or above the method reporting limit.

NT Not tested by the laboratory.

Table 5-2

Washington State Department of Ecology
MTCA Method A Soil Cleanup Standards for Petroleum Hydrocarbons at UST Sites

Cleanup Standard	Benzene[1] (mg/kg)	Toluene[1] (mg/kg)	Ethylbenzene[1] (mg/kg)	Total Xylenes[1] (mg/kg)	TPH as[2]		
					Gasoline (mg/kg)	Diesel (mg/kg)	Other (mg/kg)
Soil							
MTCA[3]	0.5	40	20	20	100	200	200

Note: mg/kg (ppm)
(1) EPA Methods 5030/8020.
(2) TPH means Total Petroleum Hydrocarbons as gasoline, diesel, or other hydrocarbons, EPA Methods 3550/8015 Modified); or EPA Method 418.1.
(3) Model Toxics Control Act, "Table 2, Method A Compliance Cleanup Levels– Soil," July 18, 1990, WSR 90-15-066.

Table 5-3

Stockpiled Soil Analysis

Sample Number	Date of Sample Collection	EPA Method 418.1	EPA Method 8015 Modified	EPA Method 8020			
		TPH-IR[1] (mg/kg)	TPFH[2] (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
SP-1	3/27	567	NT	2.97	54.7	31.6	270
SP-3	3/27	57.0	NT	U	0.10	0.23	2.08
SP-5	3/27	225	NT	0.73	11.2	10.2	61.4
SP-6	3/27	1,048	NT	0.70	77.0	33.0	170
SP-7	3/30	56,045	NT	NT	NT	NT	NT
SP-8	4/10	NT	677 (Diesel)	U	U	0.2	0.9
SP-9	4/10	NT	738 (Diesel)	U	U	0.14	0.33
SPG-1,-2,-3	7/26	NT	33 (Gas and Diesel)	U	0.15	0.24	0.98
SPD-1,-2,-3	7/26	NT	97 (Gas and Diesel)	U	0.15	0.33	1.29
SPWO-1,-2,-3	7/26	NT	665 (AgedGas/Diesel Heavy Oil)	U	U	0.18	1.04

Sample Number	Date of Sample Collection	EPA Method 8080	EPA Method 8010	
		Pesticides and PCBs	Halogenated Volatiles (mg/kg)	
SP-7	3/30	All analytes - U	1,1,1-trichloroethane Tetrachloroethylene Other Analytes	0.16 0.11 U

Notes:

Mg/Kg is equivalent to parts per million (ppm) in soil.

(1) TPH-IR means total petroleum hydrocarbons-infrared spectrophotometry

(2) TPFH means semi-volatile total petroleum hydrocarbons. Fuel type based on elution ranges of selected hydrocarbons.

U Not detected at or above the method reporting limit.

NT Not tested by the laboratory.

sand lens was approximately 3- to 5-inches thick, and 50-feet in length and tapered at each end before pinching out. The approximate location of the sand lens is shown on Figure 4-1.

To determine the extent of contamination near Sample 8, single soil sample (7.3.91-1) was collected approximately 2-inches below the sand lens from the glacial till. Both TPH and BTEX concentrations were non-detect at the laboratory reporting limit. We, therefore, conclude that soil contamination at this location is restricted to the sand lens material. The westerly extent of the sand lens was not investigated as excavation was terminated at Greenwood Avenue, which forms the western property boundary of the site.

5.2 Soil Stockpile Samples - Phase I

Ten stockpile soil samples were analyzed by SAS to characterize the nature and concentration of petroleum hydrocarbon compounds present in the soils. Results are summarized in Table 5-3; laboratory data is included in Appendix C.

A review of the results and comparison with the MTCA Method A soil cleanup standards (Table 5-2) indicates that 7 of the 10 samples exceeded standards for TPH and 3 of the 10 samples exceeded concentrations for one or more BTEX compounds. Sample SP-7 collected from stockpiled soils formerly surrounding the waste oil tank (Tank 7), detected no pesticides or PCBs and low non-regulated concentrations of 1,1,1-trichloroethane and tetrachloroethene.

6 SOIL TREATMENT - PHASE I

Soil treatment at the site has been completed in two phases. Phase I was performed by GES between August 23, 1990 and June 1991. Phase II was completed by TRC between June 1991 and November 1, 1991. This section describes Phase I activities, Section 7 describes Phase II.

Laboratory analysis of impacted soil collected from the site identified three general types of petroleum hydrocarbons in the soil: 1) gasoline-range, 2) fuel oil-range, and 3) waste oil (bearing oil-range). Based on stockpile soil analysis, approximately 2,000 cubic yards of soil were impacted by gasoline compounds and 400 cubic yards by fuel oil and waste oil compounds.

To treat the soil to MTCA soil cleanup standards, SE/E designed two on-site soil treatment systems: 1) a soil vapor extraction system for soil containing gasoline compounds, and 2) a soil bioremediation (landfarming) system for soil containing fuel oil and waste oil compounds. The soil remediation systems were designed for GES who constructed, operated, and maintained the systems. SE/E provided periodic vapor emissions monitoring to assist GES.

6.1 Soil Venting System

Approximately 2,000 cubic yards of soil containing gasoline compounds was excavated from the site. Due to the limited area available for soil treatment on the surface, SE/E recommended that the soil be returned to the UST excavation and treated with a vapor extraction system (VES) installed in the impacted soil.

6.1.1 Construction Method

The VES was constructed by placing an initial 1-foot layer of 1-inch-diameter drain rock in the base of the excavation. Vertical vents were placed on approximate 15-foot centers in the excavation on the drain rock and the gasoline impacted soil placed around the vents to the surface. Bentonite

hydrated with water was used to seal the vents at the surface and minimize the potential for air channeling around the vents during system operation.

The vertical vents were constructed of 4-inch-diameter schedule 40 PVC with a 5- or 10-foot section of factory slotted PVC on the bottom of each vent. Vents 1 through 14, 16, 17, and 19 had a 5-foot length of screen. Vents 15 and 18 had 10-feet of screen. Figure 6-1 shows the soil venting system design.

The soil vents were attached in series at the surface to a condensate trap and two Rotron DR404 (1 horsepower) blowers. Each soil vent had an individual ball-valve and air-port to allow isolation of treatment areas and provide access for air into the system. Vapors were released to the atmosphere from a 20-foot-tall air emission stack with a portal for emission monitoring. Soil treatment by the VES commenced on August 23, 1990.

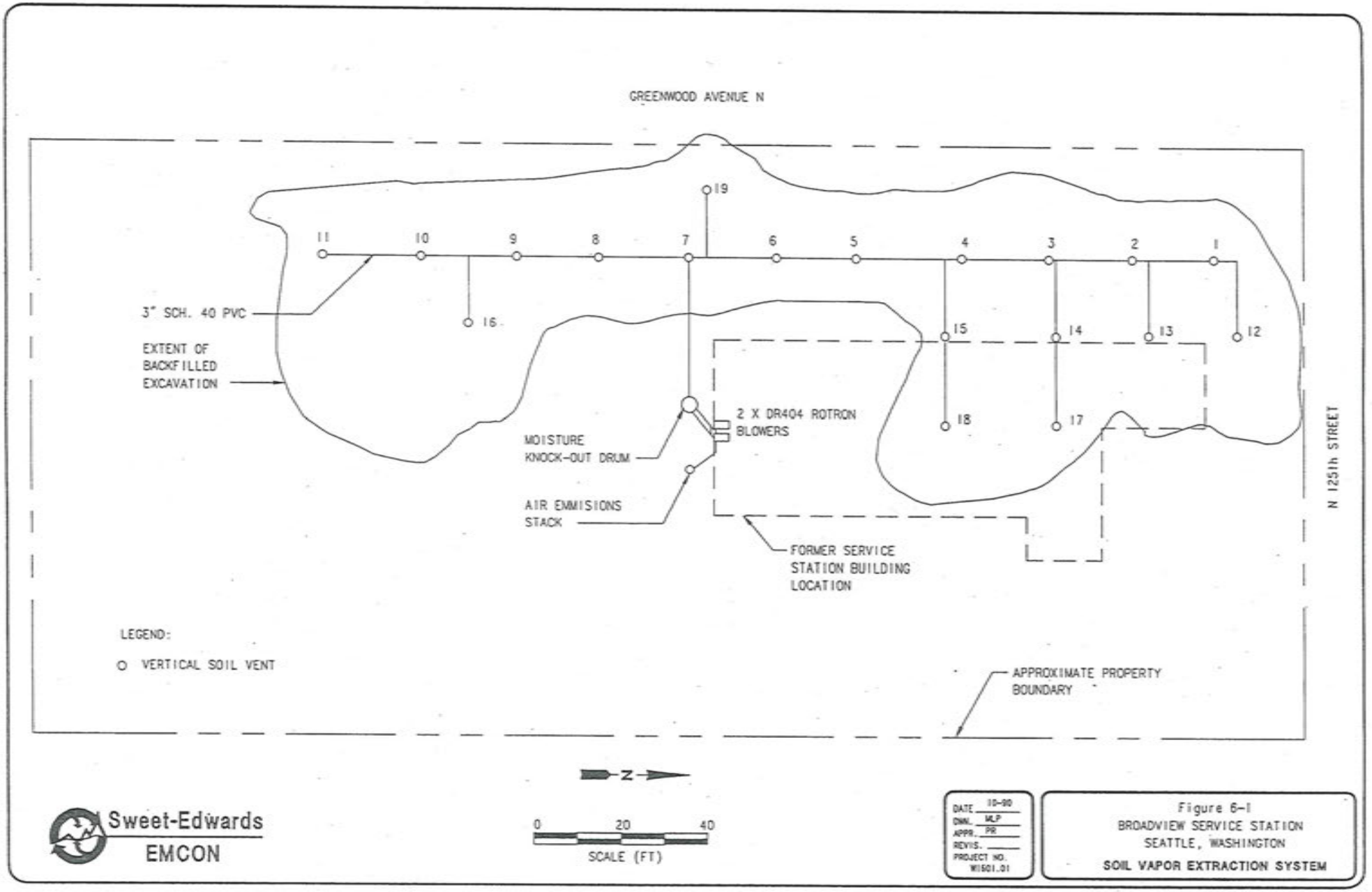
6.1.2 System Operation

Air-Emissions Permit. Prior to system start-up, GES applied for and was issued an operating permit from the Puget Sound Air Pollution Control Agency (PSAPCA), which limited air emissions to 15 pounds of VOCs per day. The permit is in the possession of GES.

Effluent Vapor Sampling. An initial vapor emissions sample was collected on August 23, 1990, (day one of soil treatment) from a portal in the air emissions stack. The sample was submitted to Columbia Analytical Services (CAS) of Longview, Washington for BTEX and TPFH analysis.

Vapor Monitoring. Concentrations of hydrocarbon vapors were periodically monitored with a PID through the portal in the emissions stack. Emissions were greatest upon initial start-up of the system and declined asymptotically over time as air passed through the system and the soils were cleaned up.

Vapor Concentrations. BTEX and volatile hydrocarbon concentrations from the vapor emission sample collected August 23, 1990, are summarized on Table 6-1 (Laboratory testing results are included in Appendix D). To limit the total volatile hydrocarbons emissions to less than 15 pounds per day, SE/E maintained the air emissions below 500 ppm volatile hydrocarbons (as measured with a PID) by adding air to the system via a portal in the condensate trap.


GREENWOOD AVENUE N
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3" SCH. 40 PVC
EXTENT OF BACKFILLED EXCAVATION
2 X DR404 ROTRON BLOWERS
MOISTURE KNOCK-OUT DRUM
AIR EMMISIONS STACK
FORMER SERVICE STATION BUILDING LOCATION
N 125th STREET
LEGEND:
VERTICAL SOIL VENT
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Figure 6-1
BROADVIEW SERVICE STATION
SEATTLE, WASHINGTON
SOIL VAPOR EXTRACTION SYSTEM
CADD FILE: W1SC.DWGS\BROAD-3\1-18-91

Table 6-1

Vapor Quality Data

Sample Number	Date of Collection	EPA Method 8020				EPA Method 8015
		Benzene (μL/L)	Toluene (μL/L)	Ethylbenzene (μL/L)	Xylenes (μL/L)	Volatile Hydrocarbons (μL/L)
D-G1	8/23/90	7.6	22.0	7.0	28.3	1,820 (gasoline)
Note: μL/L = parts per million (ppm)						

Water Level Monitoring. Due to the low permeability of the native glacial till soils at the site, water derived from seepage and rainfall infiltration accumulated within soils in the excavation. This reduced efficiency of the VES and required periodic pumping to maintain the system.

Water level monitoring on a monthly basis commenced in July 1990, at which time a small amount of water was recorded in the base of the excavation. SE/E recommended that GES obtain approval from Metro to discharge water to the Seattle sewer system. To facilitate approval of the discharge permit, SE/E collected a water sample (Sample EW-1) from air-vent 4 on July 25, 1990 (Figure 6-1). At the request of Metro the sample was analyzed for TPH, BTEX, and selected total metals (lead, copper, and zinc). Results are presented in Table 5-1; laboratory data is included in Appendix E. Concentrations of BTEX, TPH, and metals were all within the Metro acceptance levels and GES obtained authorization from Metro to dispose of discharge water to the Seattle Sewer system.

On November 21, 1990, SE/E measured approximately 10 feet of water in the excavation, and the vapor extraction system was turned off. On December 14, SE/E collected an additional water sample from the excavation and at the direction of Metro submitted the sample for pH, BTEX, and TPH analysis. Results of the analyses are presented in Table 6-2; laboratory data is included in Appendix E. Concentrations of TPH, benzene, toluene, and ethylbenzene were at or below the MRL. Xylenes were recorded at a concentration of 1.3 mg/L.

On December 31, 1990, SE/E obtained Metro's permission to dispose of water into the Seattle Sewer system. The Metro water disposal permit is included in Appendix F.

On January 4, 1991, GES installed water pumps in air-vents -5 and -14, and began pumping up to 5 gpm from the excavation to the Seattle Sewer system. Approximately 40,800 gallons of water was pumped from the excavation and disposed of in the Seattle Sewer system

6.2 Soil Landfarming

In addition to the gasoline impacted soil, approximately 400 cubic yards of fuel oil and/or waste oil impacted soil were removed from the UST excavation. SE/E recommended that GES treat the soil on site by thin spreading the soil, applying fertilizer to promote bacterial activity, and tilling the soil on a regular basis.

Table 6-2

Excavation Water Quality

Sample Number	Date of Sampling	EPA Method 418.1	EPA Method 8020							
		TPH-IR (mg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Xylenes (µg/l)	Lead (mg/l)	Copper (mg/l)	Zinc (mg/l)	Ph
EW-1	7/25/90	U	4.0	U	24.0	55.0	0.1	0.1	0.2	NA
WD-1290-1	12/14/90	U	U	U	U	1.3	NA	NA	NA	6.74

NOTES: NA = Not analyzed
U = Less than or equal of method reporting limit
mg/l = parts per million (ppm)
µg/l = parts per billion (ppb)

Due to the small area available for soil treatment, the fuel oil/waste oil impacted soils were treated in two batches. Treatment of Batch 1 began on August 23, 1990. Treatment of Batch 2 began on November 14, 1990.

6.2.1 Method

GES began treatment of the fuel oil/waste oil impacted soil on August 23, 1990. Treatment involved thin spreading (approximately 8-inch-thick lifts) the soil over the available site area, adding fertilizer and tilling the soil on a regular two-week interval. Straw bails were placed around the soil being treated to minimize erosion and off-site transport of soil. The area on site used to treat the fuel/waste oil impacted soil is shown on Figure 6-2.

Batch 2 treated soils were covered with plastic during the winter months to reduce rainfall infiltration.

6.3 Treatment Verification - Phase I

To verify that soil remediation by the VES and by landfarming had reduced petroleum hydrocarbon concentrations below the MTCA Method A soil cleanup standards, SE/E completed soil sampling and laboratory analysis of the treated soils.

6.3.1 Landfarmed Soil Sampling - Batch 1

On October 25, 1990, SE/E collected nine soil samples from three quadrants of the treatment area, and on January 15, 1991, three soil samples from one quadrant of the treatment area. Figure 6-2 shows the location of soil samples collected from the treated soil. The sampling method is similar to the stockpiled soil sampling method described in Appendix B, Section B-3.

Laboratory Analysis. The nine soil samples collected on October 25, 1990, were composited by SAS into three samples according to quadrant and analyzed for TPH-IR. The three samples collected on January 15, 1991, were submitted to Columbia Analytical Services (CAS) for compositing into one sample and was also analyzed for TPH-IR. The January sample was collected from quadrant C of the treatment area.

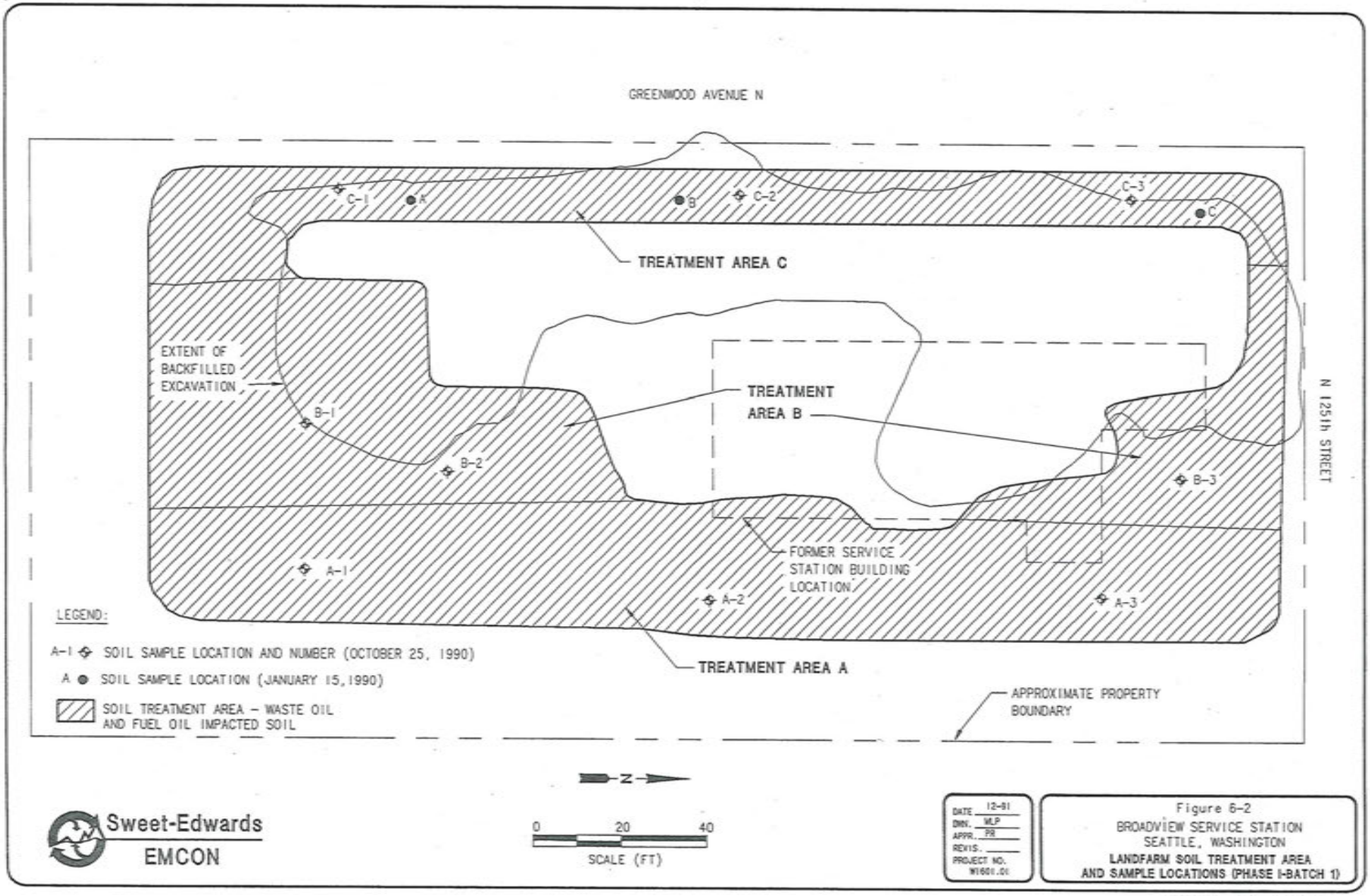

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Figure 6-2
BROADVIEW SERVICE STATION
SEATTLE, WASHINGTON
LANDFARM SOIL TREATMENT AREA AND SAMPLE LOCATIONS (PHASE I-BATCH 1)

MISC.DWGS BROAD-5 1-2-92

Soil Analysis Results. Laboratory analysis results of soil samples treated by landfarming are presented in Table 6-3 and in Appendix G.

Composite soil samples 1 and 2 collected on October 25, 1990, had TPH concentrations of 194 and 180 ppm, respectively, and were both below the 200 ppm standard for soils containing fuel oil and waste oil. Based on the soil sampling results, soil from quadrant areas A and B were returned to an open area of the original excavation. Composite soil sample 3 (quadrant area C) had a TPH concentration of 251 ppm and the soil underwent further treatment with the Batch 2 soil.

Composite soil sample 1 collected on January 15, 1991, also from quadrant area C had a TPH concentration of 1600 ppm. The soil was left on-site and underwent further treatment by tilling, fertilizer application and aeration during treatment of the Batch 2 soils.

6.3.2 Landfarmed Soil Sampling - Batch 2

On May 29 1991, SE/E collected three samples from each of five areas of the Batch 2 treated soils. The samples were submitted to SAS for laboratory analysis of TPH-IR. The sampling technique followed the same method as described in Appendix B-2. Chain-of-custody documentation is included in Appendix H.

Laboratory Analysis. SAS composited the three samples from each area and analyzed each for TPH-IR using EPA Method 418.1.

Soil Analysis Results. Laboratory results are presented on Table 6-4 and in Appendix H. TPH-IR concentrations for the five samples ranged between 270 and 420 mg/Kg and were all above the 200 mg/Kg concentration set as the MTCA Method A soil cleanup standard for soils impacted by oil-related compounds.

The soil was left on-site and underwent further treatment during Phase II activities (see Section 7).

6.3.3 VES Treated Soil

On January 18, 1991, SE/E collected 14 soil samples from nine test pits excavated in the VES treated soils. The test pits were excavated to the bottom of the treated soil fill material and samples collected from 1/3 and 2/3 of the total depth of the test pit. Figure 6-3 shows the approximate location of the test pits and sample locations. The soil sampling method is similar to that described in Appendix B, Section B-2.

Table 6-3

Treated Soil Quality (Phase I - Batch 1)

Date of Sample Collection	Sample Number	Composite Sample Number	TPH-IR (mg/kg)
10/25/90	DLF-1090-A1		
10/25/90	DLF-1090-A2	1	194
10/25/90	DLF-1090-A3		
10/25/90	DLF-1090-B1		
10/25/90	DLF-1090-B2	2	180
10/25/90	DLF-1090-B3		
10/25/90	DLF-1090-C1		
10/25/90	DLF-1090-C2	3	251
10/25/90	DLF-1090-C3		
01/15/91	DE-1-91-A	1	1680
01/15/91	DE-1-91-B		
01/15/91	DE-1-91-C		

Note:

TPH-IR analysis using EPA Method 418.1
Mg/kg = parts per million (ppm)
Samples collected in October were analyzed by SAS
Samples collected in January were analyzed by CAS

Refer to Figure 6-2 for sample locations.

Table 6-4

Soil Quality Data - Treated Soils
Phase I - Batch 2

Sample Number	TPH-IR
D-591-D1	330
D-591-E1	420
D-591-F1	380
D-591-G1	270
D-591-H1	350

NOTES: Results reported in mg/kg (ppm)
All samples collected 5/29/91
TPH-IR Analysis using EPA Method 418.1.

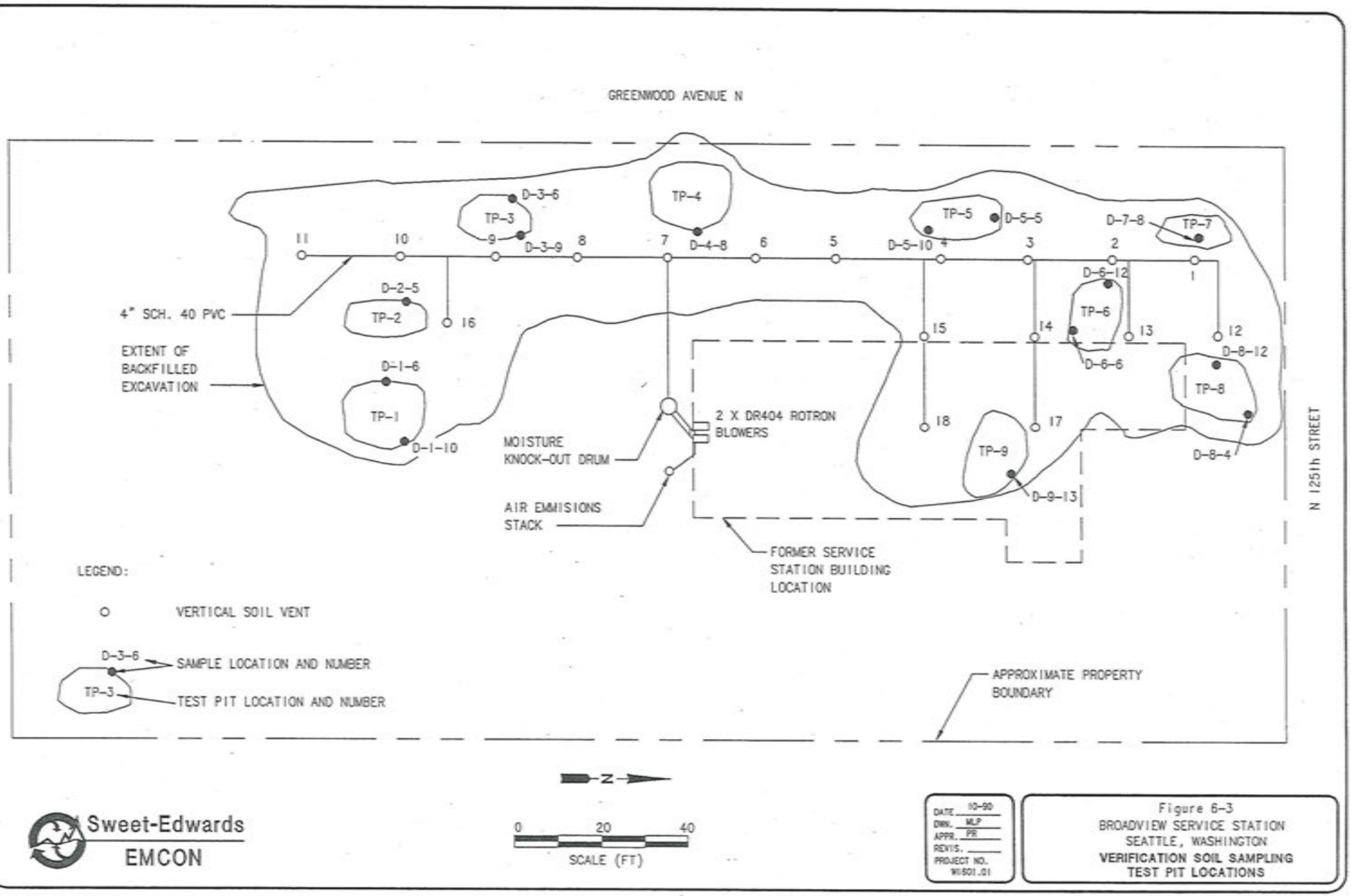

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Figure 6-3
BROADVIEW SERVICE STATION
SEATTLE, WASHINGTON
VERIFICATION SOIL SAMPLING
TEST PIT LOCATIONS

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Soils sampled from test pits within the VES excavation had minor to no odor and appeared to be "clean" based on visual observation. PID screening of soil samples from the test pits had volatile organic vapor concentrations ranging between zero and 12.8 ppm.

Laboratory Analysis. The 14 soil samples were submitted to CAS for compositing and analysis. Two soil samples collected from test pits -1, -3, -5, -6, and -8 were composited into one sample per test pit. Single samples were collected from test pits -2, -4, -7, and -9, and were analyzed as discrete samples. Composite and discrete soil samples were analyzed for TPFH, TPH, and BTEX compounds.

Soil Analysis Results. Laboratory analysis results of soil samples collected from the test pits are presented in Table 6-5 and in Appendix I. PID concentrations recorded at the time of sampling are also presented in Table 6-5.

Review of the results indicate that no BTEX compounds were detected in any sample. However, in five of the nine samples, TPFH and TPH-IR concentrations between 270 and 1,100 mg/Kg were detected. Furthermore, TPFH analysis indicated that diesel and heavy oil were the principal contaminants with no gasoline being detected.

Based on the non-detection of BTEX compounds it was concluded that treatment of gasoline contaminated soils by the VES was successful. However, the elevated TPH concentrations indicated that diesel and heavy oil remained in soils in the former tank excavation.

Table 6-5

Treated Soil Quality (VES System)

Sample Number	PID Measurements (field)	TPFH		TPH-IR	BTEX Compounds			
		Diesel	Oil		Benzene	Toluene	Ethylbenzene	Xylene
D-1-6, 1-10 Comp.	0 and 0	ND	ND	NT	ND	ND	ND	ND
D-2-5	0	ND	730	209	ND	ND	ND	ND
D-3-6, 3-9 Comp.	1.8 and 0	ND	330	361	ND	ND	ND	ND
D-4-8	1.2	270	250	565	ND	ND	ND	ND
D-5-5, 5-10 Comp.	12.8 and 7.2	170	ND	NT	ND	ND	ND	ND
D-6-6, 6-12 Comp.	1.8 and 6.6	ND	ND	NT	ND	ND	ND	ND
D-7-8	0	ND	ND	NT	ND	ND	ND	ND
D-8-4, 8-12 Comp.	0 and 0	ND	1,100	488	ND	ND	ND	ND
D-9-13	0.6	ND	300	366	ND	ND	ND	ND

NOTE:

All concentrations are reported in mg/kg (ppm).

PID Field Screening of soil vapors.

TPFH TPFH means semi-volatile total petroleum hydrocarbons. Fuel type based on elution ranges of selected hydrocarbons.

TPH-IR Analysis using EPA Method 418.1.

BTEX Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8020.

NT Not tested.

ND Concentration less than the Method Reporting limit (MRL).

7 SOIL TREATMENT - PHASE II

degradation products ?

Based on the detection of diesel and oil related compounds in the VES soil samples collected on January 18, 1991, soils in the excavation were re-excavated and placed in approximate 100-cubic yard stockpiles. The soil stockpiles were then sampled and analyzed for TPH-IR by EPA Method 418.1. As diesel and oil were the principal petroleum contaminants, soil samples with a TPH concentration below the 200 mg/Kg MTCA Method A cleanup standard were segregated as "clean", and stockpiles that exceeded the standard were segregated for additional treatment.

7.1 Soil Excavation

Due to the space restrictions on site, re-excavation of soil and soil stockpiling was completed in two stages. The initial re-excavation stage was completed on June 10, and 11, 1991. The second re-excavation stage was completed between July 1, and July 3, 1991.

In total, approximately 2,000 cubic yards of soil was re-excavated from the former tank excavation and placed in 20 stockpiles of approximately 100 cubic yards. In addition, approximately 100 cubic yards of soil from the Phase I, Batch 2 landfarming area were stockpiled as "dirty", requiring further treatment.

7.2 Stockpile Soil Sampling - Phase II

Verification soil samples were collected from nine stockpiles on June 11, 1991, and from a further 11 stockpiles on July 5, 1991. Sampling methods are described in Appendix B, Section B-2.

7.2.1 Laboratory Analysis

Three soil samples were collected from each stockpile and were submitted to SAS for TPH-IR analysis using EPA Method 418.1. Samples from each individual stockpile were composited by the laboratory prior to analysis.

7.2.2 Soil Analysis Results

Laboratory results of the stockpiled soil are presented in Table 7-1 and in Appendix J. Review of the data indicated that 13 of the 20 stockpiles had TPH-IR concentrations below 200 mg/Kg. These soils were "clean" based on the MTCA Method A soil cleanup standards, and were returned to the excavation. The seven stockpiles with TPH-IR concentrations exceeding the standard were segregated as requiring additional treatment by landfarming.

7.3 Soil Treatment

Soils requiring treatment by landfarming were treated on-site in two batches due to the space limitations of the site. Batch 1 was treated between July 15, 1991 and September 3, 1991, and Batch 2 between September 5, 1991 and November 1, 1991.

Soil treatment consisted of tilling the soil with a rake/tiller, and a plough to a depth of approximately 1-foot bgs, applying approximately 800 pounds of chemical fertilizer (per batch), and adding water during the dry periods. Tilling was performed at least two times per week. Soils were left uncovered.

7.3.1 Treatment Verification

Treatment verification samples were collected monthly from the soil treatment pad following commencement of treatment. Samples were collected and analyzed at the ratio of one sample per 100 cubic yards of soil.

Batch 1. Composite samples were collected from Batch 1 soils on August 9, and on September 3, 1991. The treatment pad was divided into four quadrants and four samples were collected from each quadrant. Each set of samples were composited in the field in a clean stainless steel bowl before being transferred to appropriate laboratory supplied containers. Sampling procedures and decontamination methods are described in Appendix B-2 and B-3.

Samples were submitted to SAS under chain-of-custody for TPH-IR analysis using EPA Method 418.1.

Table 7-1

Soil Quality Data - Stockpile Soil (Phase II)

Sample Number	Date	TPH-IR
SC-2	June 11, 1991	110
SC-3	June 11, 1991	180
SC-4	June 11, 1991	150
SC-5	June 11, 1991	140
SC-6	June 11, 1991	280
SC-7	June 11, 1991	330
SC-8	June 11, 1991	360
SC-9	June 11, 1991	130
SC-10	June 11, 1991	110
SC-11	July 5, 1991	66
SC-12	July 5, 1991	110
SC-13	July 5, 1991	65
SC-14	July 5, 1991	470
SC-15	July 5, 1991	130
SC-16	July 5, 1991	160
SC-17	July 5, 1991	730
SC-18	July 5, 1991	160
SC-19	July 5, 1991	180
SC-20	July 5, 1991	390
SC-21	July 5, 1991	400

NOTES: Results reported in mg/kg (ppm)
TPH-IR analysis using EPA Method 418.1

Laboratory Results. Results of the two Batch 1 sampling events are presented in Table 7-2, and in Appendix K.

A comparison of the October 1, 1991 sampling results with the MTCA Method A cleanup standards indicate that three samples remained above the 200 mg/Kg standard. Consequently, the soil underwent further treatment before additional samples were collected on September 3, 1991. The fourth sample had a TPH concentration of 140 mg/Kg and the soil represented by the sample underwent no further treatment.

Comparison of the September sampling results with the MTCA Method A soil cleanup standards indicate all three samples had TPH concentrations below 200 mg/Kg and were "clean".

Batch 1 soils were returned to an open area of the former tank excavation and the Batch 2 soils were spread on the site for treatment.

Batch 2. Composite samples were collected from Batch 2 soils on October 1, and on November 1, 1991. The treatment pad was divided into four quadrants and four samples were collected from each quadrant using the same method as described for Batch 1.

Samples were submitted to SAS under chain-of-custody for TPH-IR Analysis using EPA Method 418.1.

Laboratory Results. Results of the two Batch 2 sampling events are presented in Table 7-3, and in Appendix L.

A comparison of the October 1, 1991 sampling results with the MTCA Method A cleanup standards indicate that all four quadrants of the treatment area remained above the 200 mg/Kg standard. Consequently, the soil underwent further treatment before additional samples were collected on November 1, 1991. Comparison of the November sampling event results with the cleanup standard indicate all the Batch 2 soils were below the 200 mg/Kg soil cleanup standard.

Batch 2 soils were returned to an open area of the former tank excavation, and the site returned to final grade.

Table 7-2

Soil Quality Data - Treated Soil
(Phase II - Batch 1)

Sample Number	Date	TPH-IR
DV-8/91-1	8/9/91	270
DV-8/91-2	8/9/91	210
DV-8/91-3	8/9/91	140
DV-8/91-4	8/9/91	210
DV-9/3-1	9/3/91	100
DV-9/3-2	9/3/91	170
DV-9/3-3	9/3/91	110

NOTES: Results reported in mg/kg (ppm)
TPH-IR analysis using EPA Method 418.1

Table 7-3

Soil Quality Data - Treated Soil
(Phase II - Batch 2)

Sample Number	Date	TPH-IR
DV-10-1-1	10/1/91	410
DV-10-1-2	10/1/91	430
DV-10-1-3	10/1/91	310
DV-10-1-4	10/1/91	240
DV-11-91-1	11/1/91	46
DV-11-91-2	11/1/91	50
DV-11-91-3	11/1/91	43
DV-11-91-4	11/1/91	55

NOTES: Results reported in mg/kg (ppm)
TPH-IR analysis using EPA Method 418.1

8 FINDINGS AND CONCLUSIONS

Based on analytical data and observations made during investigations at the site, we conclude the following:

Geology

- Fill material, comprised of brown sand and gravel with wood and demolition debris occurred from the surface to between 3 and 5-feet bgs in the areas explored.
- Up to 10 feet of fill material occurred in areas around the former USTs.
- A dense blue to gray, sandy silt (Glacial Till) occurs beneath the fill material, and to a depth of at least 26 feet bgs.
- A thin sand lens (approximately 5-inches thick and 50-feet long) occurs on the western sidewall of the former tank excavation, at a depth of approximately 12-feet bgs.

Hydrogeology

- Native soils were damp at the base of the excavation. No ground water was observed.
- Water seepage into the excavation was observed at the surface of the glacial till in March 1990 during initial excavation activities, and is probably a seasonal occurrence.
- Water seepage into the excavation was also observed at a depth of 12 feet bgs on the western sidewall of the tank excavation from the sand lens described earlier. Seepage ceased from the sand lens shortly after excavation, and was dry during the summer of 1991.

- Some seepage may also be associated with a storm water catch basin located east of Greenwood Avenue and approximately 15 feet from the excavation sidewall, adjacent to an observed seepage location.

Petroleum Hydrocarbons in Soil

- Petroleum hydrocarbon compounds were detected at concentrations above the MTCA Method A cleanup standards in soils beneath the former Broadview Service Station. Petroleum hydrocarbon compounds originated from gasoline, fuel oil, and waste oil related petroleum products.

- Concentrations of TPH and BTEX compounds were used as an indication of petroleum hydrocarbon contamination of the soil, and were later used to verify site cleanup.

- PCBs, metals, pesticides, or halogenated volatile organics were not identified in the soil.

- Approximately 2,000 cubic yards of soil had elevated TPH and/or BTEX concentrations as a result of gasoline related petroleum hydrocarbons.

- Approximately 800 cubic yards of soil had elevated TPH concentrations as a result of fuel oil, or waste oil related petroleum hydrocarbons.

- Laboratory analysis of verification soil samples collected from the base and sidewall extremities of the tank excavation, indicate TPH and BTEX concentrations in the base, and on the north, south, and east sidewalls are below the MTCA Method A soil cleanup levels.

- Laboratory analysis of one soil sample (Sample 8) collected from the west sidewall of the excavation indicate that TPH and BTEX concentrations exceed the MTCA Method A soil cleanup levels at the site boundary, and at one location. The sample was collected from the sand lens described earlier, when minor seepage from the sand lens was occurring. The sand lens was not specifically sampled at any other location on the western sidewall of the excavation.

- Analysis of a sample (7.3.91-1) collected 2-inches below the sand lens indicates that contamination has not migrated into native glacial till soils below the sand lens. Other soil samples collected from the western sidewall of the excavation verify that soil contamination has not extended off-site in the native, dense glacial till material.

Soil Remediation

- A total of approximately 2,450 cubic yards of soil was excavated and treated to MTCA Method A soil cleanup standards. This total is made up of 2,400 cubic yards excavated during Phase I and 50 cubic yards during Phase II.

- Of the 2,450 cubic yards, approximately 2,000 cubic yards of gasoline contaminated soils was originally treated on-site using a VES.

- Approximately 1,100 cubic yards of fuel oil and waste oil contaminated soils were treated on-site using landfarming techniques. The 1,100 cubic yards is comprised of 400 cubic yards excavated during Phase I, and 700 cubic yards re-excavated and re-treated by landfarming during Phase II. (Phase II treatment required re-excavation and re-treatment of Phase I treated soils.)

- All contaminated soils excavated from the site were treated to levels below those specified in the Washington State MTCA Method A soil cleanup standards.

Appendix A

DRILLER'S BORING LOGS

Well 1

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG

No. Appl. 549
Cert. 197-A

Date Nov. 18, 1947

Record by C. D. Marks & Sons

Source Driller's Record

Location: State of WASHINGTON

County King

Area

Map

NE ¼ NW ¼ sec. 30 T. 26 N., R. 4 E. W.

DIAGRAM OF SECTION

Drilling Co. C. D. Marks & Sons

Address Snohomish, Wash.

Method of Drilling Date Nov. 31 1947

Owner Evergreen Cemetery Co.

Address 11111 Aurora Ave., Seattle

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Hard Pan	90	90
	Yellow sand (water bearing)	70	160
	Blue Clay	5	165
	Blue Glacier sand (water bearing)	20	185
	Blue seamy clay	3	188
	185' to 300' Blue clay (no water)		
	Pump Test:		
	Dim: 188' x 10"		
	SWL: 82'		
	DD: 140'		
	Perforations:		
	Cook Screen, WW 10" screen		
	10" #14 slot - 20' #20 slot		
	from 155 to 188'		

Turn up

Sheet ____ of ____ sheets

Well 2

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG

No. Appl. #1038
Cert. #716-A

Date December 15, 1950

Record by C.D. Marks & Son

Source Driller Record

Location: State of WASHINGTON

County King

Area

Map

NE ¼ SE ¼ sec. 30 T. 26 N., R. 4 E. W.

DIAGRAM OF SECTION

Drilling Co. C. D. Marks & Son

Address Rt. 3, Snohomish, Wash.

Method of Drilling Date 19

Owner Evergreen Cemetery Co. of Seattle

Address 11,111 Aurora Ave., Seattle

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Surface to hardpan	37	37
	Fine sand water bearing	72	109
	Clay - no water	129	238
	PUMP TEST:		
	Dim. 8" x 238'		
	SWL: 37'		
	D.D.: 160'		
	Yield: 190 g.p.m.		
	CASING: 12" diam. from surface to 37		
	10" diam. " " to 109'		
	7" diam. " 100 to 238'		
	Perforations: 10" casing perforated		
	1/8" perforations 36 per foot.		

Turn up

Sheet of sheets

Well 3.

26/6-30R

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. .....

(1) OWNER: Name Charlene Milani Address 11840 194th Ave NE, Redmond 98053

(2) LOCATION OF WELL: County King NW 1/2, NE 1/4 SE 1/4 SE 1/4 Sec. 30 T. 26 N., R. 6 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 155 ft. Depth of completed well 155 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from 0 ft. to 155 ft.
Threaded [ ] ..." Diam. from ... ft. to ... ft.
Welded [X] ..." Diam. from ... ft. to ... ft.

Perforations: Yes [ ] No [X]
Type of perforator used .....
SIZE of perforations ... in. by ... in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

Screens: Yes [ ] No [X]
Manufacturer's Name .....
Type ... Model No ...
Diam. ... Slot size ... from ... ft. to ... ft.
Diam. ... Slot size ... from ... ft. to ... ft.

Gravel packed: Yes [ ] No [X] Size of gravel: .....
Gravel placed from ... ft. to ... ft.

Surface seal: Yes [X] No [ ] To what depth? 18 ft.
Material used in seal puddling clay
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? ... Depth of strata ...
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ... H.P. ...

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 76 ft. below top of well Date 5-5-87
Artesian pressure ... lbs. per square inch Date ...
Artesian water is controlled by ... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [ ] If yes, by whom? .....
Yield: 15 gal./min. with 40 ft. drawdown after 2 1/2 hrs.
" " " Air Jet "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ... gal./min. with ... ft. drawdown after ... hrs.
Artesian flow ... g.p.m. Date ...
Temperature of water ... Was a chemical analysis made? Yes [ ] No [ ]

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Surface	0	2
Brown sand & gravel-clay	2	8
Tan sand & gravel-clay	8	15
Gray clay	15	21
Gray clay gravel-damp	21	25
Gray hard pan gravel	25	65
Gray gravel & sand-clay	65	85
Gray clay gravel	85	96
Gray clay sand & gravel	96	102
Gray sand clay	102	107
Gray gravel clay	107	114
Gray clay - gravel	114	130
Gray clay	130	145
Gray clay - gravel	145	150
Gray water sand & gravel	150	155
Gray sand & gravel	155	—

MAY 1 6 1987

Work started 4-28 19 87 Completed 5-5 19 87

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Johnson Drilling Co., Inc.
(Person, firm, or corporation) (Type or print)

Address 19415 108th Ave SE Renton 98055

[Signed] Brad Johnson
(Well Driller)

License No. 0233 Date 5-5 19 87

(USE ADDITIONAL SHEETS IF NECESSARY)

Well 4

26/04-30K

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Evergreen-Washelli, Inc Address 11,111 Aurora Ave., No. Seattle 98133

(2) LOCATION OF WELL: County King — NW ¼ SE ¼ Sec. 30 T. 26 N., R. 4 W.M.

Bearing and distance from section or subdivision corner N-1/2

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 126 ft. Depth of completed well 126 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 126 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type Stainless Steel Model No.
Diam. 6" Slot size #12 from 109 ft. to 126 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☐ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 22 ft.
Material used in seal Bentonite & Cement
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" (See Attached) " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 15 gal./min. with 6" ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Brn. Sand Clay Binder	0	9
Brn. Sand & Gravel - clay Binder	9	31
Grayish Hard Till Brn	31	58
~~Large gravel, Gray Sand & Clay~~		~~58~~
Gravel, Water, Brn. Sand Brn w/clay Tight	58	64
Brn. Sand, gravel, Soft clay	64	73
" " " dirty w/clay	73	78
Cleaner Sand & gravel	78	102
Wood, Soft Sand, getting Coarser & Sm. Gravel	102	120
Grayer Sand, Finer, Less gravel	120	125'6"
Blue gray clay	125'6"	126'

MAY 18 1987

Work started 1-30 19 87 Completed 2-18 19 87

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Burt Well Drilling, Inc.
(Person, firm, or corporation) (Type or print)

Address 19282 N.E. Lincoln Rd. Poulsbo, Wa. 98370

[Signed] George A. Burt
(Well Driller)

License No. 0648 Date 2-26-87, 19 87

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

Well 4

WATER WELL REPORT

STATE OF WASHINGTON

26/04-30K

Application No. .....

Permit No. .....

(1) OWNER: Name Evergreen-Washelli, INC Address 11,111 Aurora Ave, N. Seattle 98133

(2) LOCATION OF WELL: County King NW ¼ SE ¼ Sec. 30 T. 26 N., R. 4 W.M.

Bearing and distance from section or subdivision corner North Half,

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....

New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 12 inches.
Drilled 143 ft. Depth of completed well ~~143~~ 123 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 12" Diam. from 0 ft. to 135 ft.
Threaded ☐ ." Diam. from ft. to ft.
Welded ☐ ." Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name WESCO
Type Stainless Model No.
Diam. 12" Slot size #20 from 123 ft. to 93 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☐ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 22 ft.
Material used in seal Cement
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 28 ft. below top of well Date 4-10-82
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Brown Sand w/clay	0	9
Brn Sand & gravel w/less clay	9	20
gray clay, Sand & Gravel	20	30
Sand-gravel w/clay	30	73
" " Less clay w/water	73	91
Sand, gravel, water	91	111
gray Sand, gravel, water	111	123
gray green clay	123	125
gray clay	125	143

RECEIVED
MAY 10 1982

Work started 3-4 19 82 Completed 4-10 19 82

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME (Person, firm, or corporation) (Type or print)

Address Burt Well Drilling, Inc. 19782 N.E. Lincoln Rd. Poulsbo, Wa.

[Signed] George A. Burt (Well Driller)

License No. 0048 Date 4-15 19 82

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

Well 5

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG No. Appli. 4153

Date Dec. 7-9, 19 55

Record by Layne-Pacific Inc.

Source driller's record

Diagram of Section

Location: State of WASHINGTON

County King

Area

Map

SE¼SE.¼ NW.¼ sec. 30 T. 26 N., R. 4 E. W.M.

Drilling Co. Layne-Pacific Inc.

Address 15524 Bothell Way, Seattle 55

Method of Drilling drilled Date Dec. 9, 19 55

Owner Layne-Pacific Inc.

Address 15524 Bothell Way, Seattle 55

Land surface, datum ..... ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Sandy clay & gravel	58	58
	Sand & gravel (very small amt. water)	12	70
	Fine sand (very small amount of water)	18	88
	Sandy clay & gravel	5	93
	Coarse sand & gravel	2	95
	Sandy clay	2	97
	Coarse sand & large gravel	7	104
	Gray clay	2	106
	Sandy clay & gravel	4	110
	Fine heaving sand	5	115
	Fine sand	1	116
	Very sandy clay	23	139
	Very sandy blue clay	4	143
	Blue clay	7	150

Turn up

Sheet ..... of ..... sheets

WELL LOG.—Continued No. 26 14 30F

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Depth forward		
	Blue clay & sandy blue clay	7	150
		12	162
	Sand & gravel & cemented gravel layers	9	171
	Sand & gravel & cemented gravel (no cemented gravel below 173')	12	183
	Fine sand	2	185
	Pump Test:		
	Diam. 12"x 183'		
	SWL: 53 ft.		
	DD: 49 ft.		
	Yield: 340 g.p.m.		
	CASING:		
	18" diam. from 0 to 42 ft.		
	12" " " 0 to 165 ft.		
	10" " " 155 to 165 ft.		
	Gravel-walled 155 to 185		
	3/8" circular plate welded to bottom of 10" screen (20' depth)		
	Perforations:		
	20 ft. of 10" Layne Shutter, Silicon-bronze 165 to 185 ft.		

S. F. No. 7[illegible]—12-54—3M. 40108.

Well 6

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

No. Appli.#5040

WELL LOG

Date 9-28, 1959

Record by well driller

Source driller's record

Location: State of WASHINGTON

County King

Area Plat X, Evergreen

Map Cemetery

¼ ¼ sec. 30 T. 26 N., R. 4 E. W.

Diagram of Section

Drilling Co. Layne Pacific

Address Seattle

Method of Drilling ..... Date 6-25, 1959

Owner Everegreen Cemetery Co.

Address Seattle

Land surface, datum ..... ft. above below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Sand & gravel	6	6
	Hardpan	8	14
	Sand & gravel	23	37
	Dirty sand & gravel (some water)	15	52
	Tight sand & gravel	5	57
	Sand with some gravel (water)	8	65
	Sand with thin layers of clay	4	69
	Yellow clay	11	80
	Sand & gravel	8	88
	Clay with thin clay layers	13	101
	Sand	13	114
	Blue cemented gravel	9	123
	Blue sand & gravel-tight	6	129
	Cemented sand & gravel	3	132
	Coarse sand & gravel	7	139

Turn up (over)

Sheet ..... of ..... sheets

2/42E30D

WELL LOG.—Continued No. 26/4 30L

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Well 6 Depth forward	——	139
	Tight sand	2	141
	Sand & gravel (clay balls & wood below 154')	27	168
	Blue clay	1	169
	PUMP TEST:		
	Dim. 166'7"x12"x8"		
	SWL: 24 ft.		
	DD: 25'6"		
	Yield: 530 g.p.m.		
	Type & size of pump: vertical turbine test pump		
	Type & size of engine: gas		
	CASING:		
	16" diam. O.D. ¼" steel plate from 0 to 12 ft.		
	12" diam. std. steel welded from +1 to 132 ft. (shoe)		
	8" diam. std. steel from 122 to 134 ft.		
	8" " " " 154 to 166'7" welded plate plug		
	PERFORATIONS:		
	Layne stainless steel shutter screen from 134 to 154 ft.		
	(#6 gauge, #6 opening).		

S. F. No. 7[illegible]—12-54—3M. [illegible]08.

Appendix B

FIELD INVESTIGATION PROCEDURES

B-1 Soil Vapor Monitoring

Field tests consisted of measuring volatile organic vapors with a portable photoionization detector (PID) in the sample jar headspace for each recovered soil sample. The soil samples for field screening were placed in a clean jar and aluminum foil placed over the mouth of the jar. The jar was then allowed to stand for approximately one-quarter hour. The aluminum foil was punctured with the PID probe and the resultant maximum reading in the headspace above the soil recorded.

The purpose of the field tests was to determine the relative magnitude of volatile organic vapors, if any, in the explorations. This screening equipment was also used for health and safety to monitor air quality in the breathing zone during drilling operations. A Photovac MP-100 Microtip, calibrated daily to 100 ppm isobutylene, was used to obtain the measurements.

B-2 Soil Sampling

Soil samples were collected from the excavation sidewalls and base using the excavator bucket or a stainless steel spoon attached to a sampling rod. Samples were placed directly into laboratory prepared glass containers with stainless steel sampling equipment and placed in a chilled cooler for storage and shipment to the analytical laboratory.

Sample containers were labeled in the field with a sample number, sample depth, date and samplers initials. Chain-of-custody documentation was used to accompany sample shipment to the laboratory.

Sampling equipment was decontaminated between each sample location to minimize the possibility of sample cross-contamination. The decontamination process included an initial non-phosphatic soap solution wash, a methanol solution rinse, and a final deionized water rinse.

B-3 Stockpiled Soil Sampling

Method. Representative soil samples were collected from the stockpiles using a shovel and stainless steel spoons. The shovel was used to dig into the stockpile approximately one foot below the surface, and the spoons used to pack the soil into a laboratory prepared glass container. Sample containers were labelled, stored, and transported to the laboratory according to the protocol described in Section 4.3.2.

Sampling equipment was decontaminated in a similar manner to that described in Appendix Section B-2.

B-4 Vapor Sampling Method

A gas sample was collected from the air-emissions stack using a "vacu-sampler" air canister. An initial gas sample was collected on August 23, 1990, by attaching a "Vacu-Sampler" to tubing inserted in the air emissions stack. The valve on the "Vacu-Sampler" was depressed which allowed the effluent vapors to be pulled into the container. Immediately following collection of the vapor sample, hydrocarbon vapor concentrations (recorded with a PID), ambient air temperature, and temperature of the exhaust vapors were recorded. The container was then submitted for laboratory analysis.

Appendix C

SOIL ANALYSIS DATA - EXCAVATION AND STOCKPILES (PHASE I)

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

Report To: Sweet Edwards Date: April 19, 1990

Report On: Analysis of Soil Lab No.: 10864

IDENTIFICATION:
Samples Received on 04-17-90
Project: W160101 Daniels
Client ID: RUSH 5VS-2

ACTION COPY

ANALYSIS:

Benzene, ppm	< 0.05
Toluene, ppm	< 0.05
Ethyl Benzene, ppm	< 0.05
Xylenes, ppm	< 0.05

BTEX by EPA SW-846 Modified Method 8020

Total Petroleum Hydrocarbons, ppm ..... < 5.0
by EPA Method 418.1

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 10864
Date: April 19, 1990
Client: Sweet Edwards

Client ID: 5VS-2
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Total Petroleum Hydrocarbons	< 5.0	< 5.0	----	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet-Edwards Date: April 16, 1990

Report On: Analysis of Soil Lab No.: 10813

IDENTIFICATION:
Samples Received on 04-12-90
Project: W-160101 Daniels, Original Date Samples Received 04-11-90

ANALYSIS:

Lab Sample No.	Client ID	Total Petroleum Hydrocarbons, ppm by EPA Method 418.1
RUSH 1	9-VB-2	94.4
RUSH 2	8-VB-2	< 5.0
3	8-VN-1	17.6
4	8-VW-2	9.8
5	9-VE-2	2,080
6	7-VB-1	5.3
7	9-VW-2	2,239

Lab Sample No.	Client ID	Total Petroleum Fuel Hydrocarbons, ppm, by EPA SW-846 Modified Method 8015
RUSH 1	9-VB-2	62 as Diesel
RUSH 2	8-VN-1	24 as Diesel
3	9-VE-1	17 as Diesel

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Sweet Edwards
Project: W-160101

Lab No. 10813
April 6, 1990

Lab Sample No.	RUSH 2	3	4	8
Client Identification	8-VB-2	8-VN-1	8-VW-2	9-VE-1
Matrix/Units	Soil mg/kg	Soil mg/kg	Soil mg/kg	Soil mg/kg
Benzene	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	< 0.05	0.12	< 0.05	0.09
Ethyl Benzene	< 0.05	< 0.05	< 0.05	< 0.05
Xylenes	< 0.05	0.13	< 0.05	0.14
BTEX by EPA SW-846 Method 8020				

SOUND ANALYTICAL SERVICES

C. Larry Zuraw

C. LARRY ZURAW

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 10813
Date: April 16, 1990
Client: Sweet-Edwards

Client ID: 8-VN-1
Matrix: Soil
Units: mg/kg

Compound	Sample(S)	Duplicate(D)	RPD*	
Benzene	< 0.05	< 0.05	---	
Toluene	0.12	0.12	---	
Ethyl Benzene	< 0.05	< 0.05	---	
Xylenes	0.13	0.15	14.3	
Total Petroleum Fuel Hydrocarbons	17	13	26.7	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

W16-01.01

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet Edwards Date: April 16, 1990

Report On: Analysis of Soil Lab No.: 10792

IDENTIFICATION:
Samples Received on 04-11-90
Project: W-160101 Daniels

ANALYSIS:

Lab Sample No.	RUSH 1	RUSH 2
Client ID	SP-8	SP-9
Matrix/Units	Soil mg/kg	Soil mg/kg
Benzene Toluene Ethyl Benzene Xylene BTEX by EPA SW-846 Method 8020	< 0.05 < 0.05 0.20 0.90	< 0.05 < 0.05 0.14 0.33
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015 TPH as	677 Diesel	738 Diesel

SOUND ANALYTICAL SERVICES

C. Larry Zuraw

C. LARRY ZURAW

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SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 10792
Date: April 16, 1990
Client: Sweet-Edwards

Client ID: SP-9
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Benzene	< 0.05	< 0.05	---	
Toluene	< 0.05	< 0.05	---	
Ethyl Benzene	0.14	0.14	---	
Xylenes	0.33	0.25	27.6	
Total Petroleum Fuel Hydrocarbons	738	623	16.9	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

H. Small

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

Report To: Sweet Edwards

Date: April 5, 1990

Report On: Analysis of Soil

Lab No.: 10604
Page 1 of 4

IDENTIFICATION:
Samples Received on 4-2-90
Project: J-W1601-01 Daniels

ANALYSIS:

Lab Sample No.	RUSH 1	RUSH 2	RUSH 3	RUSH 4
Client Identification	6VEB-1	2VBC-1	2VEC-1	4VE-1
Matrix/Units	Soil ppm	Soil ppm	Soil ppm	Soil ppm
Benzene	18.8	< 0.05	< 0.05	NT
Toluene	82.4	< 0.05	< 0.05	NT
Ethyl Benzene	33.7	< 0.05	< 0.05	NT
Xylenes	166	< 0.05	< 0.05	NT
BTEX by EPA SW-846 Method 8020				
Total Petroleum Hydrocarbons by EPA Method 418.1	421	30.1	277	< 5.0

NT = Not Tested

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Lab Sample No. 5 Client ID: SP-7

Total Petroleum Hydrocarbons, ppm by EPA Method 418.1 56,045

ORGANOCHLORINE PESTICIDES AND PCB - Method 8080

Compound	Conc., mg/kg	Detection Limit
Aldrin	ND	0.01
a-BHC	ND	0.01
b-BHC	ND	0.01
g-BHC	ND	0.01
y-BHC (Lindane)	ND	0.01
Chlordane (technical)	ND	0.1
4,4'-DDD	ND	0.01
4,4'-DDE	ND	0.01
4,4'-DDT	ND	0.01
Dieldrin	ND	0.01
Endosulfan I	ND	0.01
Endosulfan II	ND	0.01
Endosulfan sulfate	ND	0.01
Endrin	ND	0.01
Endrin aldehyde	ND	0.01
Heptachlor	ND	0.01
Heptachlor epoxide	ND	0.01
Methoxychlor	ND	0.02
Toxaphene	ND	0.1
PCB - Type	ND	
PCB	ND	0.1

ND = Not Detectable.

PESTICIDE SURROGATE RECOVERY
Dibutylchlorendate, % 79

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Lab Sample No. 5 Client ID: SP-7

Halogenated Volatiles Per EPA SW-846 Method 8010.

Contaminant	Concentration (mg/kg) (ppm)
Methylene chloride	< 0.05
1,1-dichloroethylene	< 0.05
1,1-dichloroethane	< 0.05
1,2-transdichloroethylene	< 0.05
1,2-dichloroethane	< 0.05
1,1,1-trichloroethane	0.16
Carbon Tetrachloride	< 0.05
1,2-dichloropropane	< 0.05
Trans-1,3-dichloropropene	< 0.05
Trichloroethylene	< 0.05
Cis-1,3-dichloropropene	< 0.05
1,1,2-trichloroethane	< 0.05
Tetrachloroethylene	0.11
1,1,2,2-tetrachloroethane	< 0.05
Chlorobenzene	< 0.05
1,2 Dichlorobenzene	< 0.05
1,3 Dichlorobenzene	< 0.05
1,4 Dichlorobenzene	< 0.05

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Sweet Edwards
Page 4 of 4
Lab No. 10604
April 5, 1990

Lab Sample No. 5 Client ID: SP-7

Sample was analyzed for EP toxicity in accordance with "Test Methods for Evaluating Solid Waste", EPA SW-846, 3rd Edition, Sept. 1986.

Contaminant	Concentration (mg/l)	Max Conc., (mg/l)
Arsenic	< 0.1	5.0
Barium	0.4	100.0
Cadmium	< 0.1	1.0
Chromium	< 0.1	5.0
Lead	< 0.1	5.0
Mercury	< 0.05	0.2
Selenium	< 0.1	1.0
Silver	< 0.1	5.0

SOUND ANALYTICAL SERVICES

STAN P. PALMQUIST

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 10604
Date: April 5, 1990
Client: Sweet-Edwards

Client ID: 4VE-1
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Total Petroleum Hydrocarbons	< 5.0	< 5.0	---	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

RECEIVED APR 11 1990

DATE 3/30/90 PAGE 1 OF 1

PROJECT J-W1601-01 DANIELS
CLIENT INFO. CONTACT H. Small &/or P. Rowland.
ADDRESS at Sweet-Edwards.
TELEPHONE#
SAMPLERS NAME Peter Rowland PHONE# 485-5000
SAMPLERS SIGNATURE Peter Rowland

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	TPH 418.1	BTEX	Lead Method	EDB per 8010	8010		NUMBER OF CONTAINERS
1. 6VEB-1	3/30	12.00		Soil														✓	✓					2
2. 9VB-1	3/30	10.10		"													Hold							2
3. 2VBC-1	3/30	9:15		"														✓	✓					2
4. 2VEC-1	3/30	9:20		"														✓	✓					2
5. 4VE-1	3/30	8:30		"														✓	✓					2
6. SP-7	3/30	8:50		"														✓						6
7.																		✓		✓	✓	✓		
8.																								

ANALYSIS REQUESTED — GENERAL CHEMISTRY (Specify) — OTHER (Specify)

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature Peter Rowland	Signature Rodney Turner	Signature		
Printed Name PETER D. ROWLAND	Printed Name National Courier	Printed Name	Shipping I.D. No.	Total No. of Containers
Firm Sweet-E/E	Firm 1010 2 April 90	Firm	VIA	Chain of Custody Seals
Date/Time 4/2/90 8.00 AM	Date/Time	Date/Time	Project	Received in good condition
				LAB NO. 9004
Received By Rodney Turner	**Received By** Ivy Bolm	**Received By**	**SPECIAL INSTRUCTIONS/COMMENTS**	
Signature Rodney Turner	Signature Ivy Bolm	Signature	Will call with Analyses	
Printed Name National Courier	Printed Name Sound Analytical	Printed Name	Rush #1 — #5	
Firm 0810 2 April 90	Firm 4/2/90 10:10 AM	Firm	SP-7 no Rush	
Date/Time	Date/Time	Date/Time		

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

Report To: Sweet-Edwards

Date: March 31, 1990

Report On: Analysis of Soil

Lab No.: 10555

IDENTIFICATION:

Samples Received on 3-28-90

Project: W1601.01 Daniels Property

ANALYSIS:

Lab Sample No.	RUSH 1	RUSH 2	RUSH 3	RUSH 4
Client Identification	4VW-1	5VSC-1	8VB-1	WOE-1
Matrix/Units	Soil ppm	Soil ppm	Soil ppm	Soil ppm
Benzene	9.38	0.05	< 0.05	NT
Toluene	211	0.18	0.16	NT
Ethyl Benzene	83.1	0.18	< 0.05	NT
Xylenes	364	2.09	0.69	NT
BTEX by EPA SW-846 Method 8020				
Total Petroleum Hydrocarbons by EPA Method 418.1	NT	194	48.3	8.6
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015	1,830	NT	< 10	NT
TPH as	Gasoline			

NT = Not Tested.

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Sweet-Edwards
Page 2 of 3
Lab No. 10555
March 31, 1990

Lab Sample No.	RUSH 5	RUSH 6	RUSH 7	RUSH 8
Client Identification	WON-1	WOS-1	SP-1	SP-3
Matrix/Units	Soil ppm	Soil ppm	Soil ppm	Soil ppm
Benzene	NT	NT	2.97	< 0.05
Toluene	NT	NT	54.7	0.10
Ethyl Benzene	NT	NT	31.6	0.23
Xylenes	NT	NT	270	2.08
BTEX by EPA SW-846 Method 8020				
Total Petroleum Hydrocarbons by EPA Method 418.1	18.8	1,108	567	57.0

NT = Not Tested.

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Sweet-Edwards
Page 3 of 3
Lab No. 10555
March 31, 1990

Lab Sample No.	RUSH 9	RUSH 10	RUSH 11	RUSH 12
Client Identification	SP-5	SP-6	5VW-1	2VE-1
Matrix/Units	Soil ppm	Soil ppm	Soil ppm	Soil ppm
Benzene	0.73	0.70	< 0.05	< 0.05
Toluene	11.2	77.0	< 0.05	17.5
Ethyl Benzene	10.2	33.0	< 0.05	9.3
Xylenes	61.4	170	2.06	55.9
BTEX by EPA SW-846 Method 8020				
Total Petroleum Hydrocarbons by EPA Method 418.1	225	1,048	16.0	571

NT = Not Tested.

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 10555
Date: March 31, 1990
Client: Sweet-Edwards

Client ID: 8VB-1
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Total Petroleum Hydrocarbons	48.3	41.5	15.1	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet-Edwards Date: August 3, 1990

Report On: Analysis of Soil Lab No.: 12485

IDENTIFICATION:
Samples Received on 07-30-90
Project: W1601.01 Daniels

ACTION COPY

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AUG 7 1990

ANALYSIS:

Lab Sample No.	RUSH 1	RUSH 2	RUSH 3
Client Identification	Comp. SPG-1,2, & 3	Comp. SPD-1,2, & 3	Comp. SPWO-1,2, & 3
Matrix/Units	Soil ppm	Soil ppm	Soil ppm
Benzene	< 0.05	< 0.05	< 0.05
Toluene	0.15	0.15	< 0.05
Ethyl Benzene	0.24	0.33	0.18
Xylenes	0.98	1.29	1.04
BTEX by EPA SW-846 Method 8020			
Total Petroleum Fuel Hydrocarbons, by EPA SW-846 Modified Method 8015	33	97	665
TPH as	Gas & Diesel	Gas & Diesel	Aged Gas/ Diesel & Heavy Oil
Halogenated Volatiles Per EPA SW-846 Method 8010.			
Methylene chloride	NT	NT	< 0.05
1,1,1-trichloroethane	NT	NT	< 0.05
Trichloroethylene	NT	NT	< 0.05
Tetrachloroethylene	NT	NT	< 0.05

NT - Not Tested.

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 12485
Date: August 3, 1990
Client: Sweet-Edwards

Client ID: Comp. SPD-1, 2, & 3
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Benzene	< 0.05	< 0.05	----	
Toluene	0.15	0.18	18.2	
Ethyl Benzene	0.33	0.32	3.0	
Xylenes	1.29	1.50	15.0	

Lab No: 12485
Date: August 3, 1990
Client: Sweet-Edwards

Client ID: Comp. SPWO-1, 2, & 3
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Total Petroleum Fuel Hydrocarbons	665	569	15.6	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

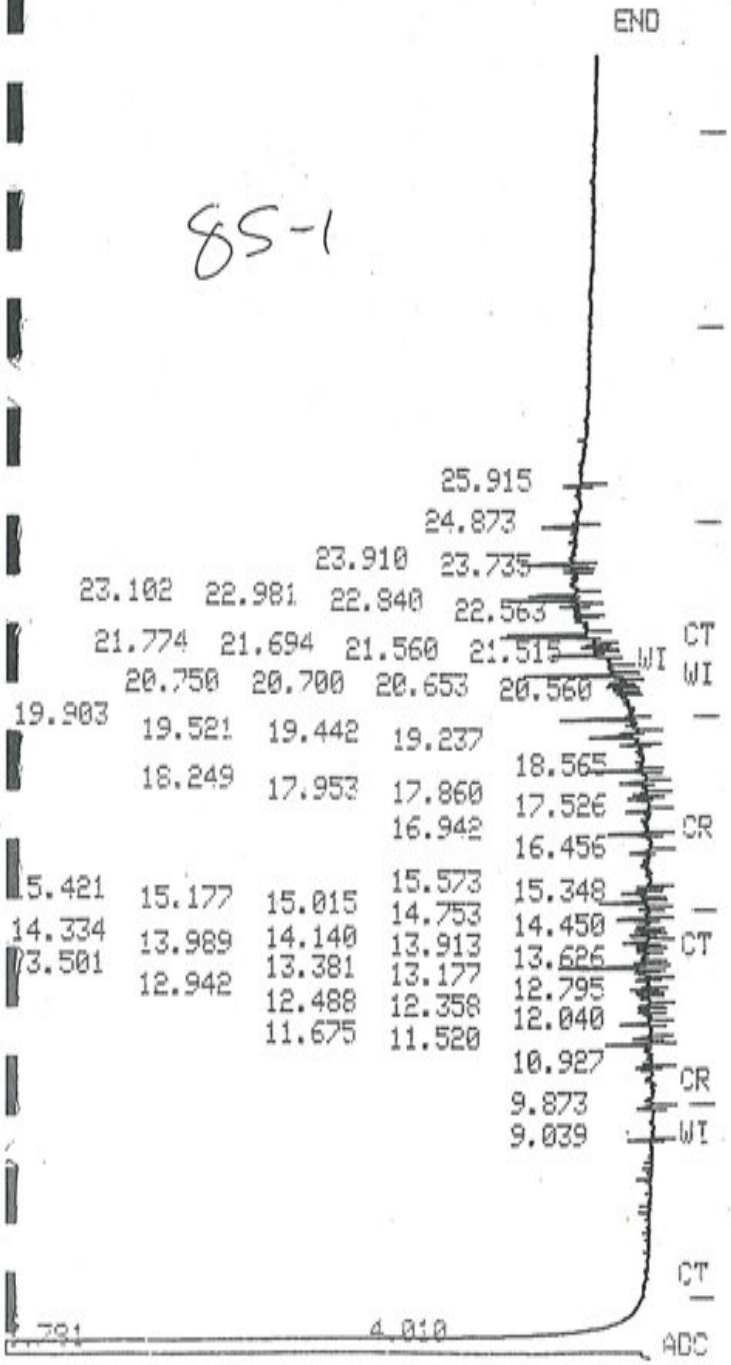
VARIAN HI-TEMP GAS CHROMATOGRAPH
METHOD 1 RUN 2472
TIME 09:07 29 JUL 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	54.6595	199276
TOTALS:			54.6595	199276

DETECTED PEAKS: 64 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 392.3 OFFSET: -63

RACK 16 VIAL 15 INJ 1

ERROR LOG:
ADC OVERRANGE



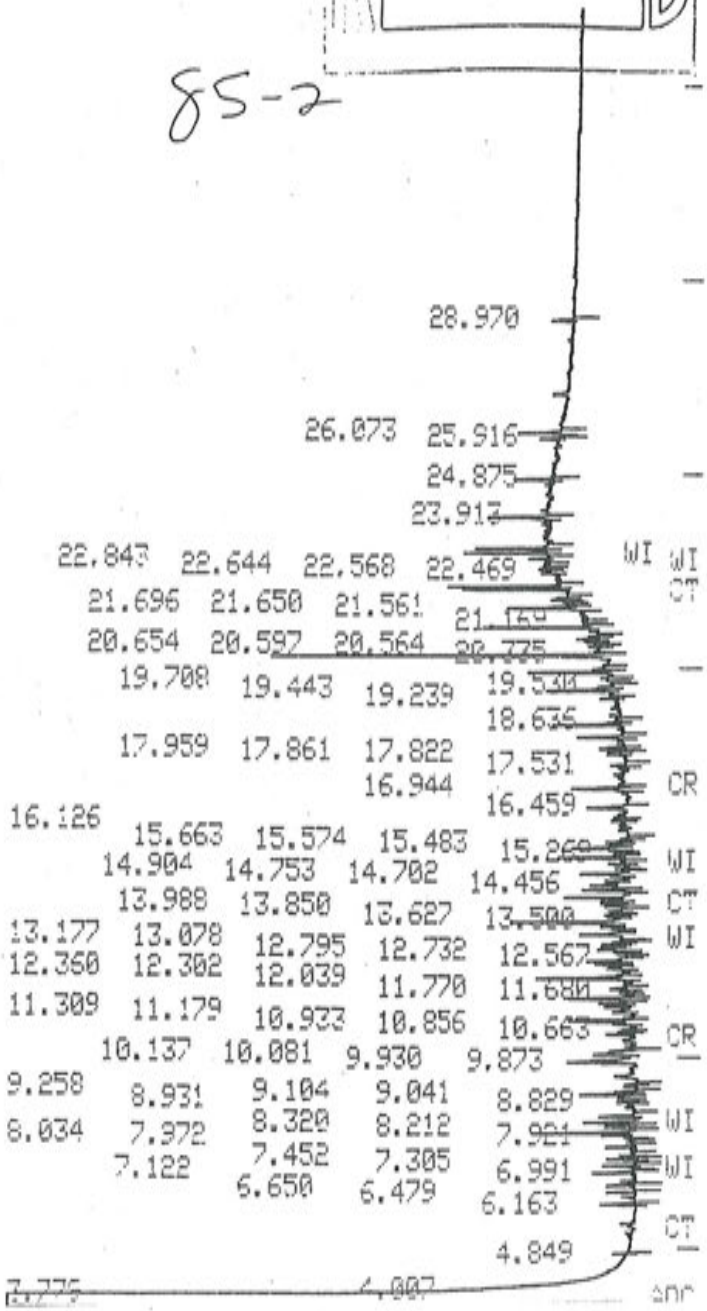
GAS CHROMATOGRAPH
METHOD 1 RUN 2473
TIME 09:55 29 JUL 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	154.7280	564103
TOTALS:			154.7280	564103

DETECTED PEAKS: 121 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 392.3 OFFSET: -57

RACK 16 VIAL 1 INJ 1

ERROR LOG:
ADC OVERRANGE
ANNOTATION OMITTED

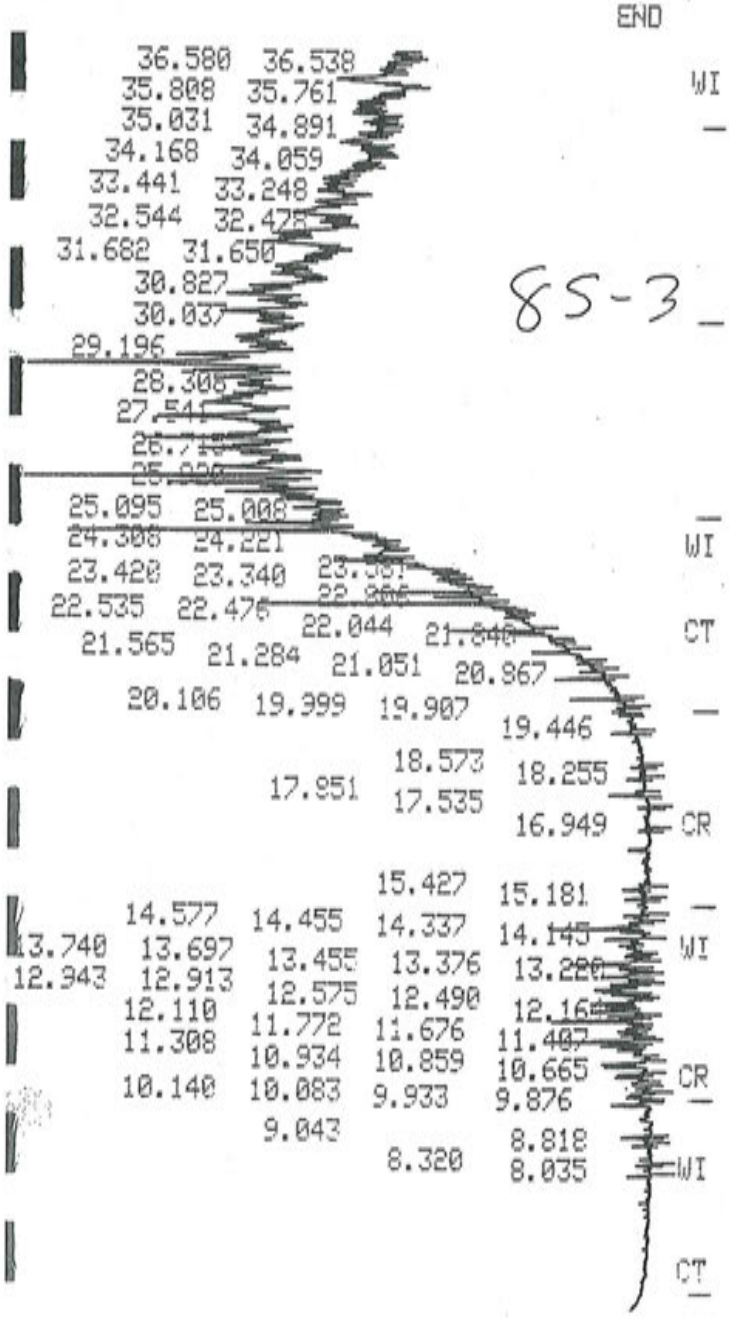


12	35.688	3.1772	11583
13	35.761	0.5977	2179
14	35.808	1.5160	5527
15	35.871	2.8133	10256
16	36.300	10.6989	39005
17	36.384	1.2966	4727
18	36.538	3.2072	11692
19	36.580	1.1158	4068
20	36.718	1.9742	7197
21	36.765	0.7456	2718
22	36.899	0.5940	2165
TOTALS:		1276.1386	4652516

DETECTED PEAKS: 243 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 392.3 OFFSET: -71

RACK 16 VIAL 2 INJ 1

ERROR LOG:
ADC OVERRANGE
ANNOTATION OMITTED



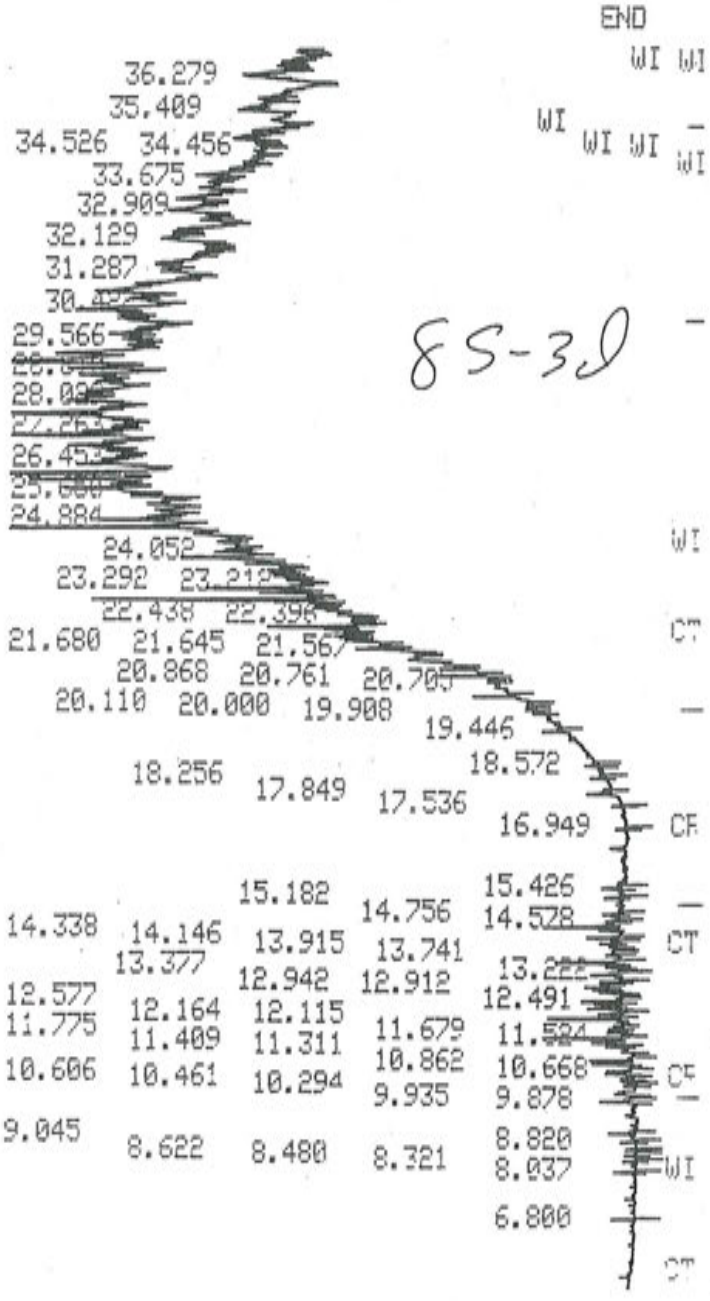
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	1051.8545	3834826
2		35.409	0.7079	2581
3		35.703	0.4395	1602
4		36.073	0.1428	520
5		36.096	0.0557	203
6		36.279	0.8514	3104
7		36.315	0.3983	1452
TOTALS:			1054.4504	3844290

DETECTED PEAKS: 270 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 392.3 OFFSET: -76

RACK 16 VIAL 3 INJ 1

ERROR LOG:
ADC OVERRANGE
ANNOTATION OMITTED



Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000
Portland, OR (503) 624-7200

Chain of Custody / Laboratory Analysis Request

DATE 7/30/90 PAGE 1 OF 1

PROJECT DANIELS #W16001
CLIENT INFO.
CONTACT
ADDRESS
TELEPHONE#
SAMPLERS NAME ROWLAND PHONE# 485-5000
SAMPLERS SIGNATURE Peter Rowland

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE
1. SPG-1,2,3	7/26			Soil
2. SPD-1,2,3	7/26			"
3. SPWO-1,2,3	7/26			"
4.				
5.				
6.				
7.				
8.				

ANALYSIS REQUESTED

BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	GENERAL CHEMISTRY (Specify) 8015 (MOD)	GENERAL CHEMISTRY (Specify) 8020	OTHER (Specify)			NUMBER OF CONTAINERS
→ COMPOSIT SAMPLES 1, 2 AND 3													✓	✓					3
→ COMPOSIT SAMPLES, 1, 2 AND 3													✓	✓					3
→ COMPOST SAMPLES, 1, 2 AND 3													✓						

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature Peter Rowland	Signature John Fleming	Signature		
Printed Name PETER ROWLAND	Printed Name John Fleming	Printed Name	Shipping I.D. No.	Total No. of Containers
Firm SBE	Firm National courier	Firm	VIA	Chain of Custody Seals
Date/Time 7/30 11:00	Date/Time 7/30 1225	Date/Time	Project	Received in good condition
Received By John Fleming NCS 188	Received By SGiang	Received By		LAB NO.
Signature John Fleming	Signature SGiang	Signature	SPECIAL INSTRUCTIONS/COMMENTS	
Printed Name John Fleming	Printed Name SAS	Printed Name	Will call you with other analyses	
Firm National Courier	Firm 7-30-90 0:25	Firm		
Date/Time 7/30/90 10:40	Date/Time	Date/Time		

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

Report To: Sweet-Edwards Date: March 28, 1990

Report On: Analysis of Soil Lab No.: 10528

IDENTIFICATION:
Samples Received on 3-27-90
Project: W1601.01 Daniels Property

ANALYSIS:

Lab Sample No.	RUSH 1	RUSH 2	RUSH 3	RUSH 4
Client Identification	2VBA-1	2VWA-1	4VBA-1	6VE-1
Matrix/Units	Soil ppm	Soil ppm	Soil ppm	Soil ppm
Benzene	0.09	< 0.05	< 0.05	< 0.05
Toluene	4.03	0.24	< 0.05	< 0.05
Ethyl Benzene	3.04	1.43	< 0.05	< 0.05
Xylenes	19.8	4.35	< 0.05	< 0.05
BTEX by EPA SW-846 Method 8020				
Total Petroleum Hydrocarbons by EPA Method 418.1	247	976	5.9	29.9
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015	212	NT	NT	NT
TPH as	Gasoline	NT	NT	NT

NT = Not Tested.

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 10528
Date: March 28, 1990
Client: Sweet-Edwards

Client ID: 2VBA-1
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Total Petroleum Hydrocarbons	247	217	12.9	
Total Petroleum Fuel Hydrocarbons	212	202	4.8	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

Report To: Sweet-Edwards

Date: March 21, 1990

Report On: Analysis of Soil

Lab No.: 10423

IDENTIFICATION:

Samples Received on 3-20-90
Project: Daniel Property

ANALYSIS:

Lab Sample No.	RUSH 1	RUSH 2
Client Identification	1VB-1	3VB-1
Matrix/Units	Soil ppm	Soil ppm
Benzene	< 0.05	< 0.05
Toluene	< 0.05	< 0.05
Ethyl Benzene	< 0.05	< 0.05
Xylenes	< 0.05	< 0.05
BTEX by EPA SW-846 Method 8020		
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015	33	<10
TPH AS	diesel	
Total Petroleum Hydrocarbons by EPA Method 418.1	164	11.7

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

Sweet-Edwards
Page 2 of 2
Lab No. 10423
March 21, 1990

Lab Sample No.	RUSH 3	RUSH 4	RUSH 5
Client Identification	3VE-1	5VB-1	6VB-1
Matrix/Units	Soil ppm	Soil ppm	Soil ppm
Benzene	< 0.05	< 0.05	< 0.05
Toluene	< 0.05	< 0.05	< 0.05
Ethyl Benzene	< 0.05	< 0.05	< 0.05
Xylenes	< 0.05	< 0.05	< 0.05
BTEX by EPA SW-846 Method 8020			
Total Petroleum Hydrocarbons by EPA Method 418.1	9.0	< 5.0	< 5.0

SOUND ANALYTICAL SERVICES

STAN P. PALMQUIST

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 10423
Date: March 21, 1990
Client: Sweet-Edwards

Client ID: 1VB-1
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Benzene	< 0.05	< 0.05	---	
Toluene	< 0.05	< 0.05	---	
Ethyl Benzene	< 0.05	< 0.05	---	
Xylenes	< 0.05	< 0.05	---	
Total Petroleum Fuel Hydrocarbons	33	30	9.5	
Total Petroleum Hydrocarbons	164	137	17.9	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

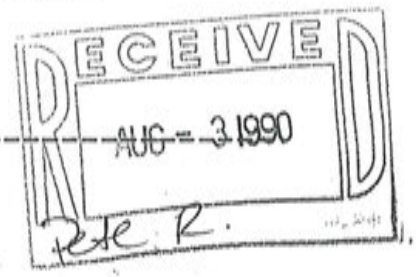
SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

Report To: Sweet-Edwards Date: July 31, 1990

Report On: Analysis of Water & Soil Lab No.: 12486

IDENTIFICATION:
Samples Received on 07-30-90
Project: W1601.01 Daniels



ANALYSIS:

Lab Sample No.	RUSH 1	RUSH 2	RUSH 3	RUSH 4
Client Identification	EW-1	9VSE-1	9VE-1A	9VB-7
Matrix/Units	Water ppm	Soil ppm	Soil ppm	Soil ppm
Benzene	0.004	< 0.05	< 0.05	< 0.05
Toluene	< 0.001	< 0.05	< 0.05	< 0.05
Ethyl Benzene	0.024	< 0.05	< 0.05	< 0.05
Xylenes	0.055	< 0.05	< 0.05	< 0.05
BTEX by EPA SW-846 Method 8020				
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015	< 10	< 10	< 10	< 10
Total Metals:				
Lead	0.1	NT	NT	NT
Copper	0.1	NT	NT	NT
Zinc	0.2	NT	NT	NT

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 12486
Date: July 31, 1990
Client: Sweet-Edwards

Client ID: EW-1
Matrix: Water
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Total Petroleum Fuel Hydrocarbons	< 10	< 10	---	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

Chain of Custody / Laboratory Analysis Request

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

DATE 7/26/90 PAGE 1 OF 1

PROJECT DANIELS # W1601.01
CLIENT INFO. CONTACT Peter Rowland
ADDRESS
TELEPHONE# 485-5000
SAMPLERS NAME P. Rowland PHONE# 485-5000
SAMPLERS SIGNATURE Peter Rowland

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE
1. EW-1	7/25	2:00		Water
2. 9VSE-1	7/25			Soil
3. 9VE-1A	7/25			Soil
4. 9VB-7	7/25			Soil
5. ~~9VW-1A~~	~~7/25~~			Soil
6.				
7.				
8.				

ANALYSIS REQUESTED

GENERAL CHEMISTRY (Specify)

OTHER (Specify)

BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	BTEX 8020	TPFH 8015	Metals (see Note)				NUMBER OF CONTAINERS
													✓	✓	✓				4
													✓	✓					1
													✓	✓					1
													✓	✓					1
													Please Hold						1
																			7

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature Peter Rowland	Signature John Fleming	Signature		
Printed Name PETER ROWLAND	Printed Name John Fleming	Printed Name	Shipping I.D. No.	Total No. of Containers
Firm Sweet/Edwards/EMCON	Firm Nat'l Courier	Firm	VIA	Chain of Custody Seals
Date/Time 7/30/90 ~~1100~~ 11:00	Date/Time 7/30/1225	Date/Time	Project	Received in good condition
				LAB NO.

Received By	Received By	Received By	SPECIAL INSTRUCTIONS/COMMENTS
Signature John Fleming	Signature Qiang	Signature	Metals:
Printed Name John Fleming	Printed Name ~~SAS~~	Printed Name	
Firm Nat'l Courier	Firm 7-30-90 12:25	Firm	RUSH on All Samples Please.
Date/Time 7/30/90 1044	Date/Time	Date/Time	

ACTION COPY

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

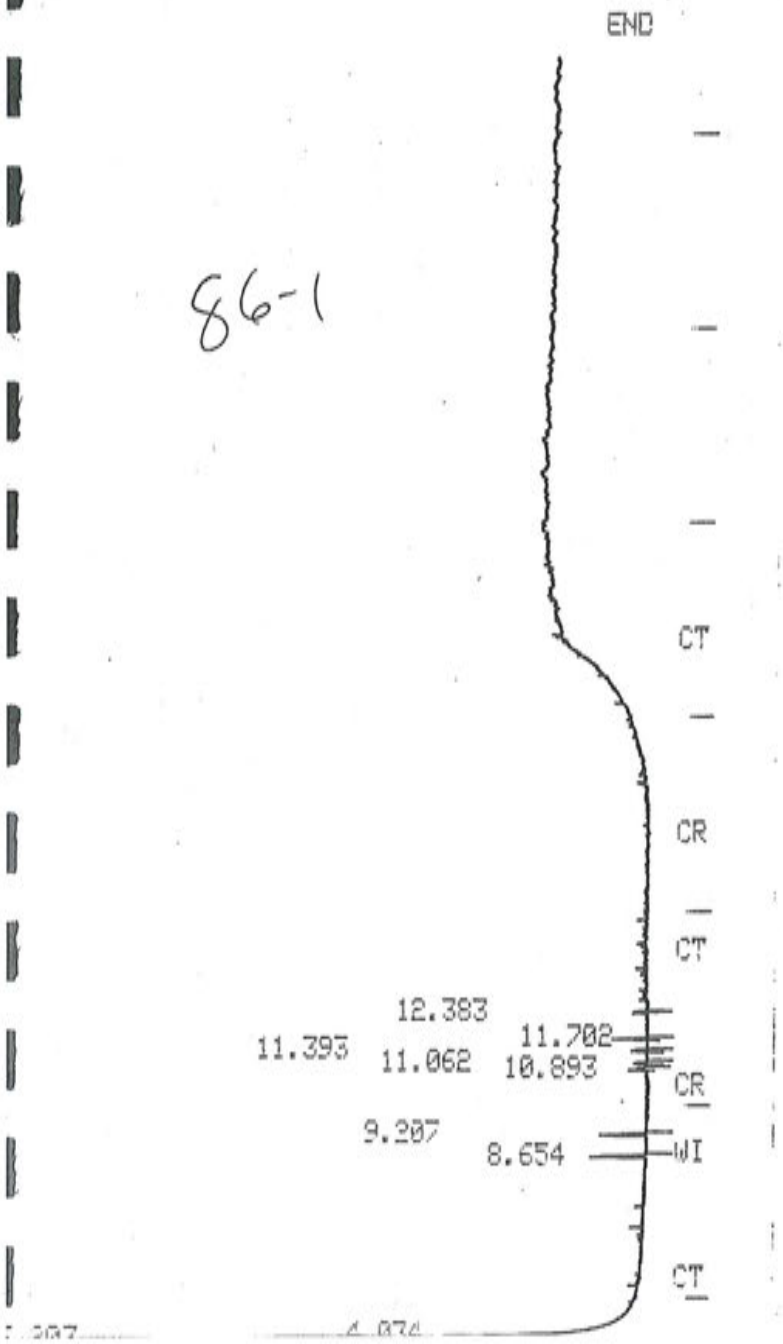
VARIAN HI-TEMP GAS CHROMATOGRAPH
METHOD 1 RUN 2491
TIME 23:49 29 JUL 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	6.6304	24173
TOTALS:			6.6304	24173

DETECTED PEAKS: 8 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 439.6 OFFSET: -64

RACK 16 VIAL 1 INJ 1

ERROR LOG:
ADC OVERRANGE



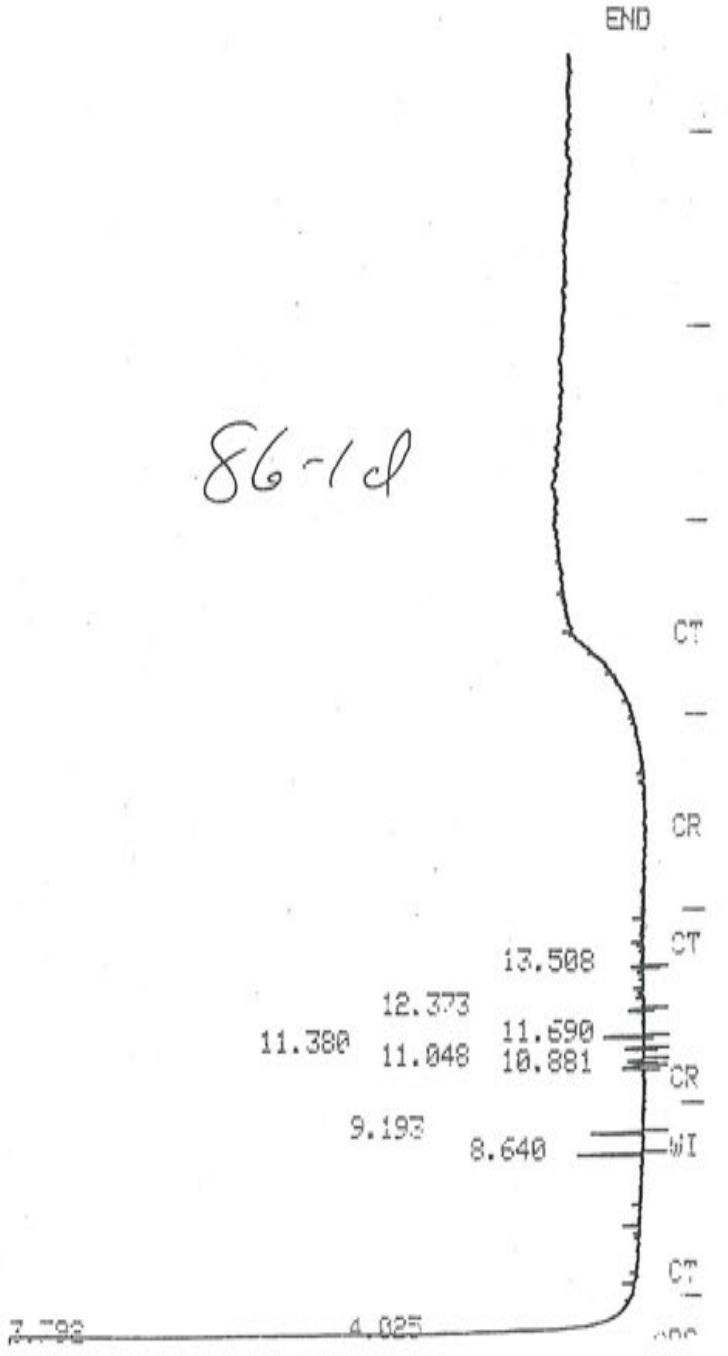
VARIAN HI-TEMP GAS CHROMATOGRAPH
METHOD 1 RUN 2492
TIME 00:35 30 JUL 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	7.9294	28908
TOTALS:			7.9294	28908

DETECTED PEAKS: 9 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 439.6 OFFSET: -71

RACK 16 VIAL 2 INJ 1

ERROR LOG:
ADC OVERRANGE



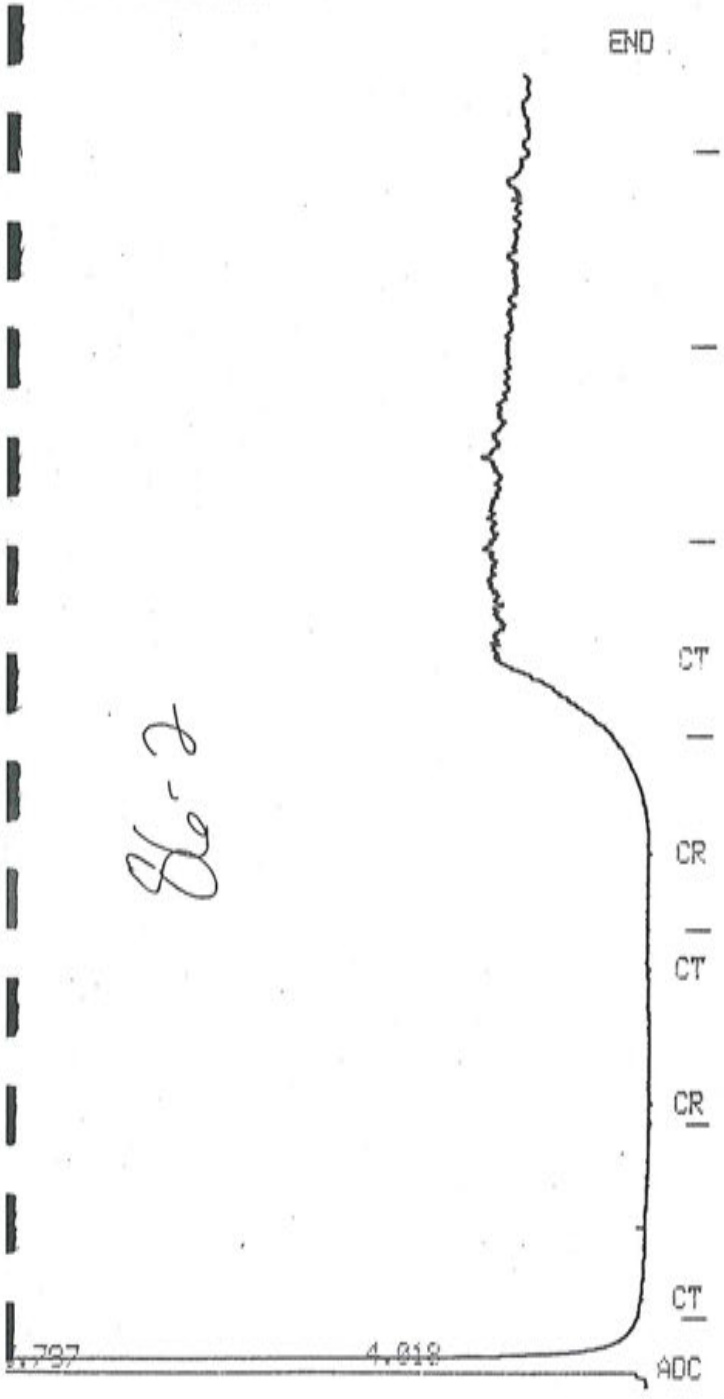
VARIAN HI-TEMP GAS CHROMATOGRAPH
METHOD 1 RUN 2479
TIME 14:35 29 JUL 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	0.2232	813
TOTALS:			0.2232	813

DETECTED PEAKS: 1 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 392.3 OFFSET: -71

RACK 16 VIAL 7 INJ 1

ERROR LOG:
ADC OVERRANGE



46-2

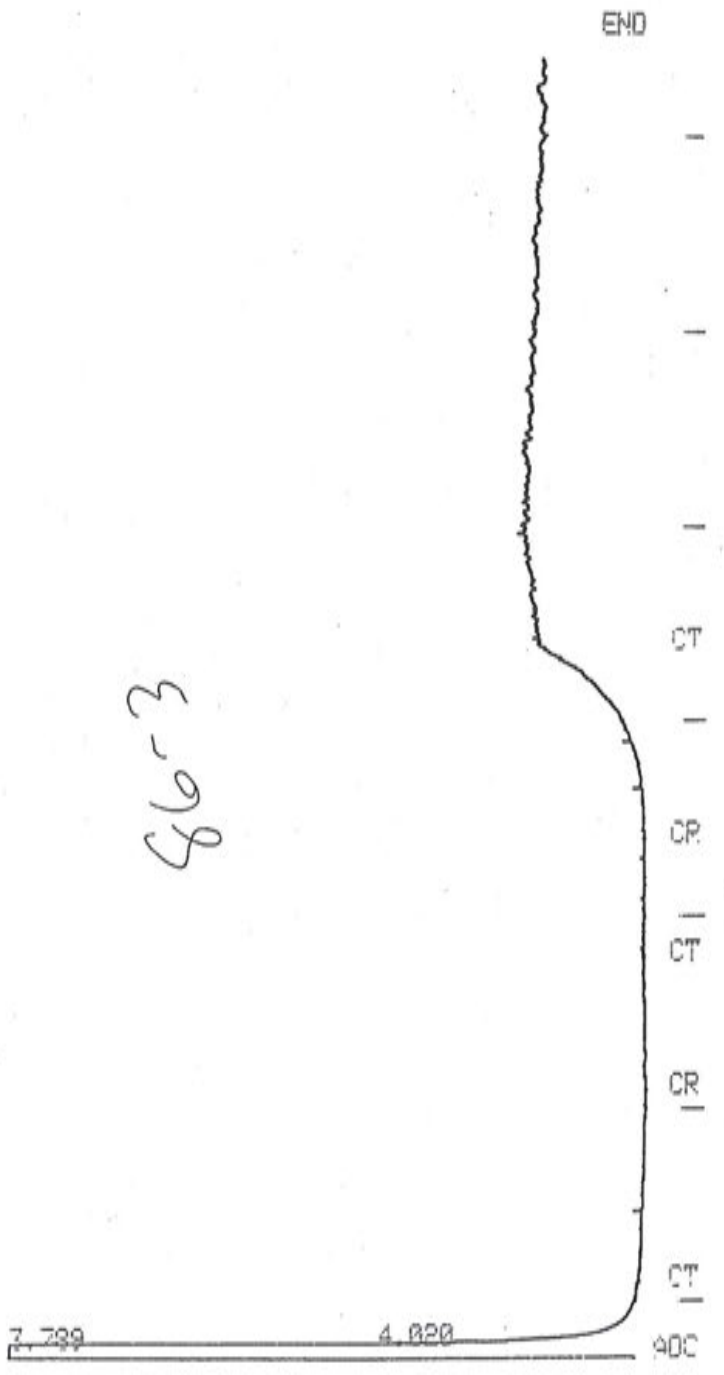
VARIAN HI-TEMP GAS CHROMATOGRAPH
METHOD 1 RUN 2480
TIME 15:21 29 JUL 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	0.2283	832
TOTALS:			0.2283	832

DETECTED PEAKS: 1 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 392.3 OFFSET: -81

RACK 16 VIAL 8 INJ 1

ERROR LOG:
ADC OVERRANGE



46-3

VARIAN HI-TEMP GAS CHROMATOGRAPH
METHOD 1 RUN 2481
TIME 16:07 29 JUL 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

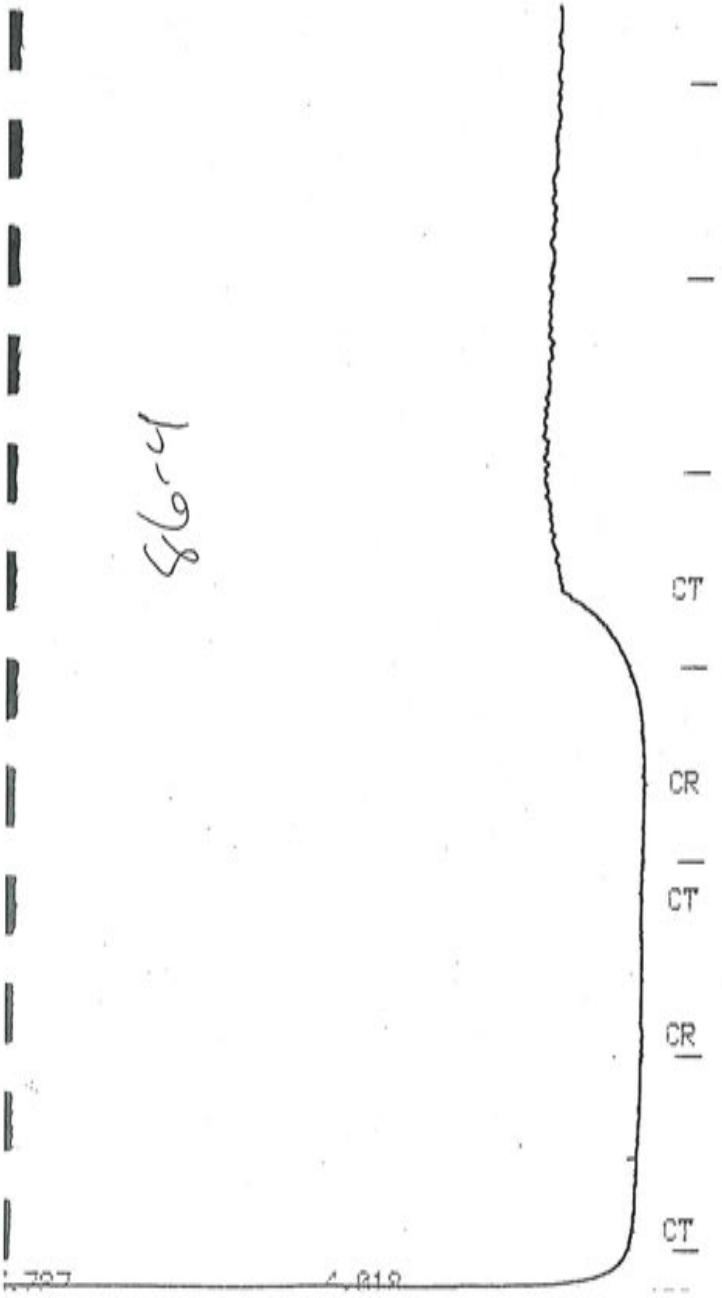
PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	0.2218	808
TOTALS:			0.2218	808

DETECTED PEAKS: 1 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 392.3 OFFSET: -76

RACK 16 VIAL 9 INJ 1

ERROR LOG:
ADC OVERRANGE

END



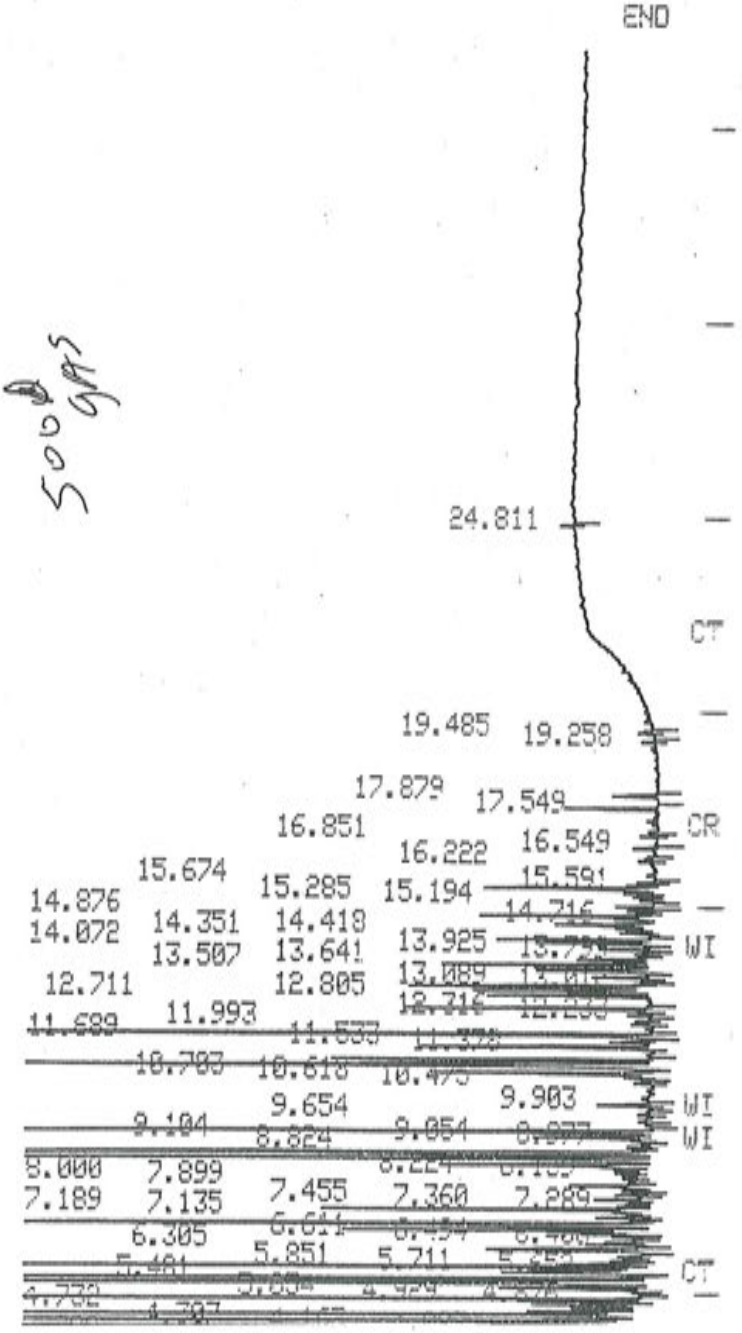
PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		2.728	3.2265	11763
2		2.814	0.9136	3331
3		2.844	20.6420	75256
4		2.888	0.4309	1570
5		2.956	1.1014	4015
6		3.223	35.9458	131050
7		3.334	0.5335	1945
8		3.399	33.6055	122518
9		19.550	796.1057	2902423
TOTALS:			892.5053	3253874

DETECTED PEAKS: 139 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 392.3 OFFSET: -74

RACK 16 VIAL 10 INJ 1

ERROR LOG:
ADC OVERRANGE
ANNOTATION OMITTED

END



SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

Report To: Sweet-Edwards

Date: August 13, 1990

ACTION COPY

Report On: Analysis of Soil

Lab No.: 12706

RECEIVED
AUG 14 1990
Pete R.

IDENTIFICATION:
Samples Received on 08-09-90
Project: Daniels

ANALYSIS:

Lab Sample No.	1	2	3	4
Client Identification	9VE-1I	9VE-1J	9VE-1K	9VE-1L
Matrix/Units	Soil ppm	Soil ppm	Soil ppm	Soil ppm
Benzene	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	< 0.05	< 0.05	< 0.05	< 0.05
Ethyl Benzene	< 0.05	< 0.05	0.14	< 0.05
Xylenes	< 0.05	< 0.05	0.84	< 0.05
BTEX by EPA SW-846 Method 8020				
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015	< 10	19.3	46.7	< 10
TPH as	Diesel	Diesel	Diesel & Gas	

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 12706
Date: August 13, 1990
Client: Sweet-Edwards

Client ID: 9VE-11
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Benzene	< 0.05	< 0.05	----	
Toluene	< 0.05	< 0.05	----	
Ethyl Benzene	< 0.05	< 0.05	----	
Xylenes	< 0.05	< 0.05	----	
Total Petroleum Fuel Hydrocarbons	< 10	< 10	----	

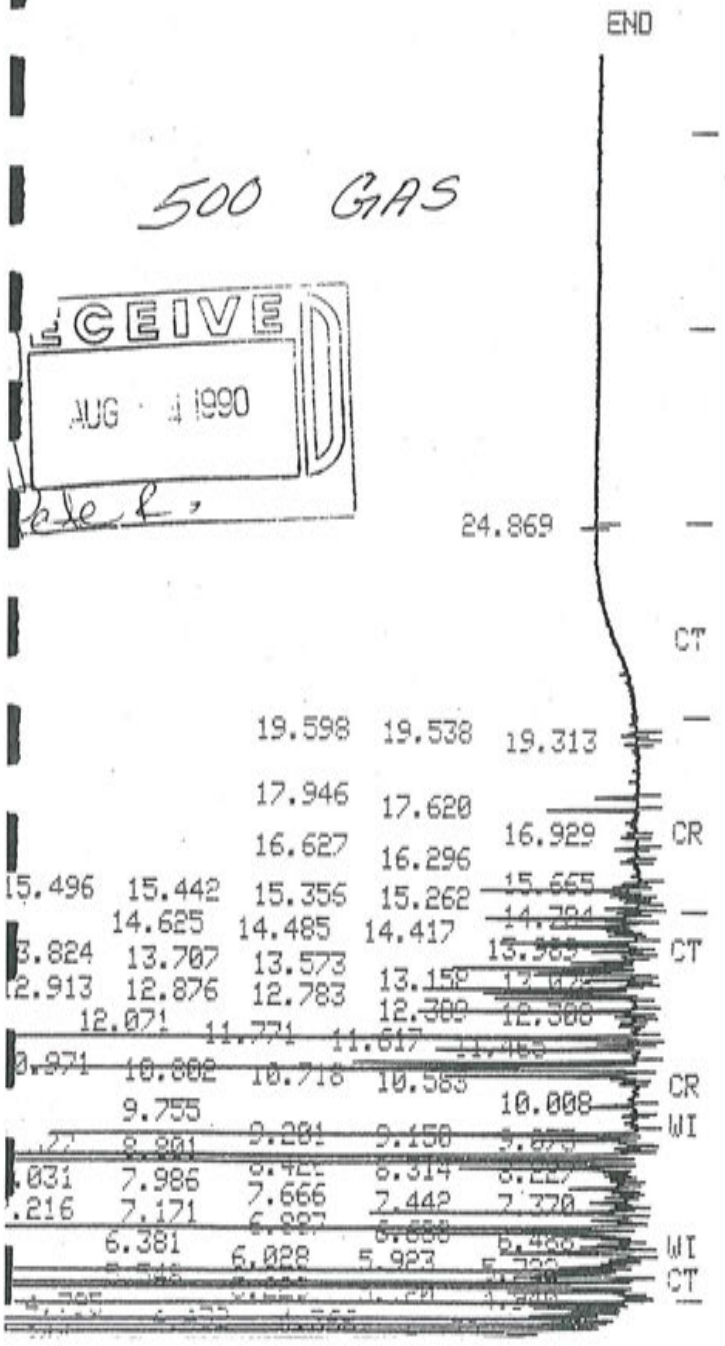
*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		2.781	2.3216	8464
2		2.869	0.7572	2760
3		2.899	17.4208	63512
4		2.944	0.3822	1393
5		3.012	0.9339	3405
6		3.282	31.2917	114082
7		3.393	0.5835	2127
8		3.461	29.5544	107749
9		19.550	671.6543	2448701
	TOTALS:		754.9000	2752196

DETECTED PEAKS: 142 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 378.8 OFFSET: -43

RACK 16 VIAL 10 INJ 1

ERROR LOG:
ADC OVERRANGE



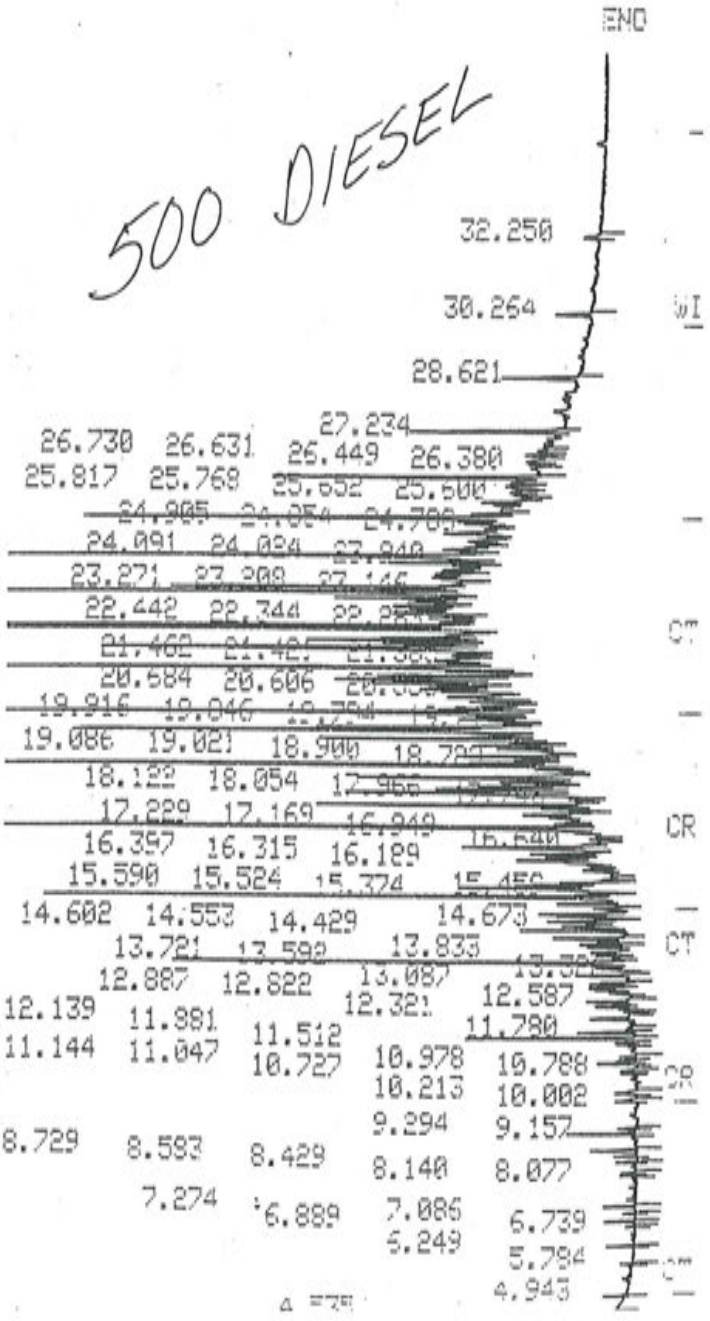
VARIAN HI-TEMP GAS CHROMATOGRAPH
METHOD 1 RUN 2704
TIME 13:14 09 AUG 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		2.817	0.1480	539
2		3.295	2.9117	10615
3		19.550	957.1376	3489509
	TOTALS:		960.1974	3500655

DETECTED PEAKS: 218 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 378.8 OFFSET: -53

RACK 16 VIAL 7 INJ 1

ERROR LOG:
ADC OVERRANGE



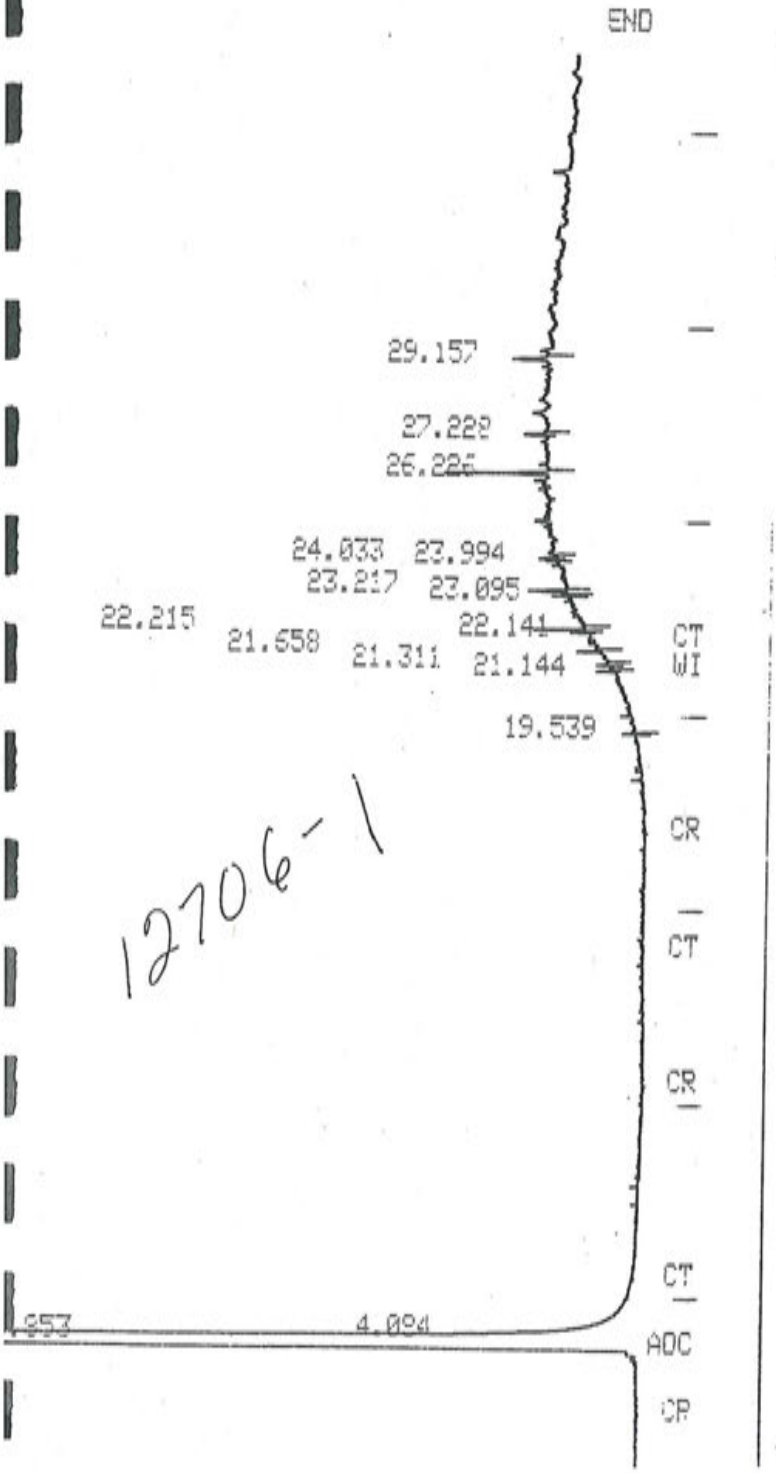
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	13.1863	48074
TOTALS:			13.1863	48074

DETECTED PEAKS: 14 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 378.8 OFFSET: -60

RACK 16 VIAL 6 INJ 1

ERROR LOG:
ADC OVERRANGE



12706-1

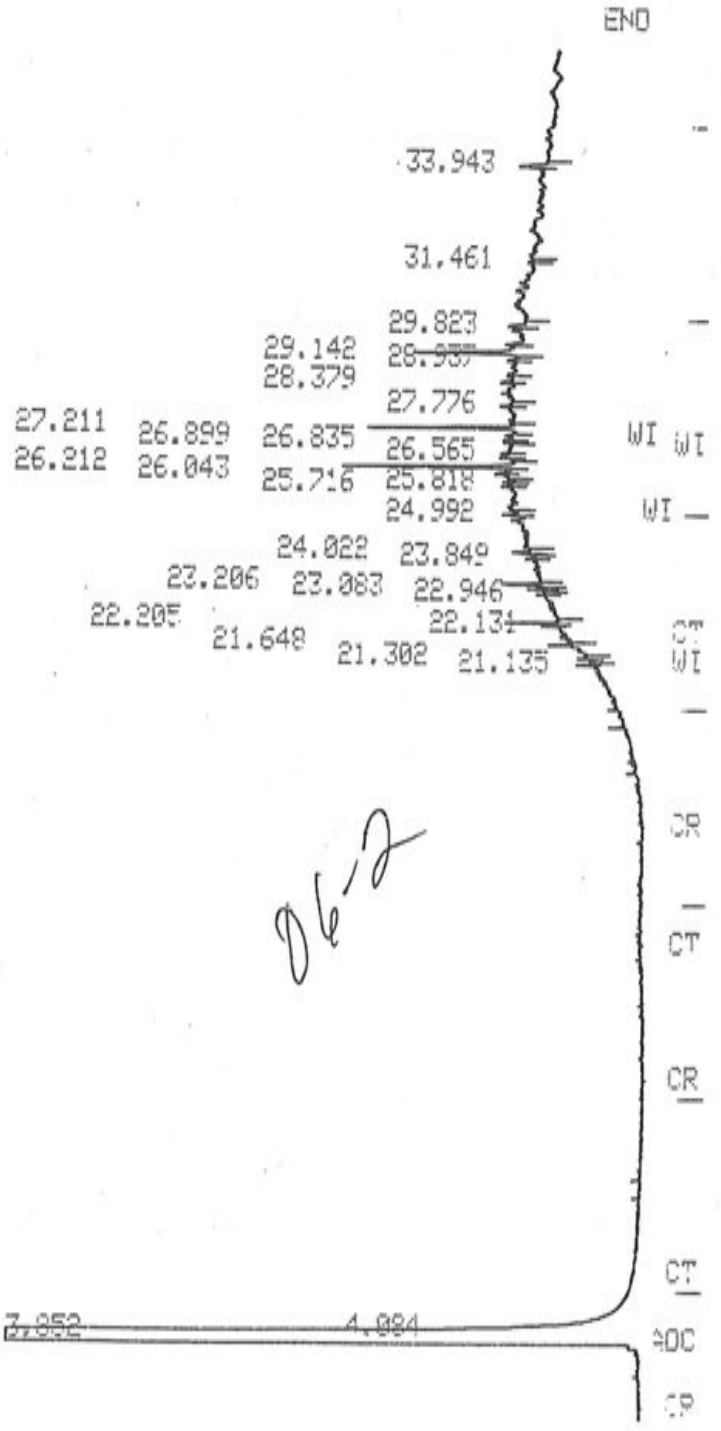
TIME 21:46 09 AUG 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	36.7659	134040
TOTALS:			36.7659	134040

DETECTED PEAKS: 28 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 378.8 OFFSET: -69

RACK 16 VIAL 7 INJ 1

ERROR LOG:
ADC OVERRANGE



06-2

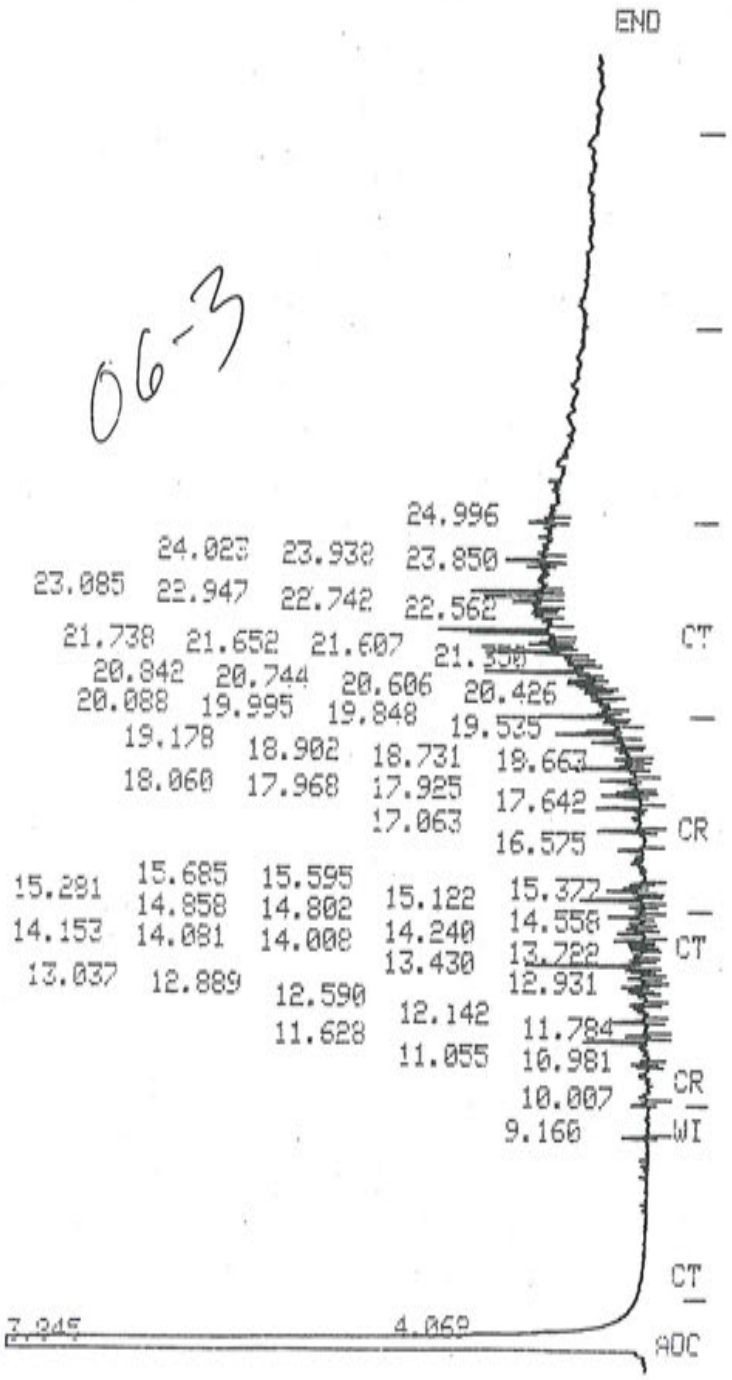
VARIAN HI-TEMP GAS CHROMATOGRAPH
METHOD 1 RUN 2716
TIME 22:33 09 AUG 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	76.9413	280511
TOTALS:			76.9413	280511

DETECTED PEAKS: 81 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 378.8 OFFSET: -73

RACK 16 VIAL 8 INJ 1

ERROR LOG:
ADC OVERRANGE



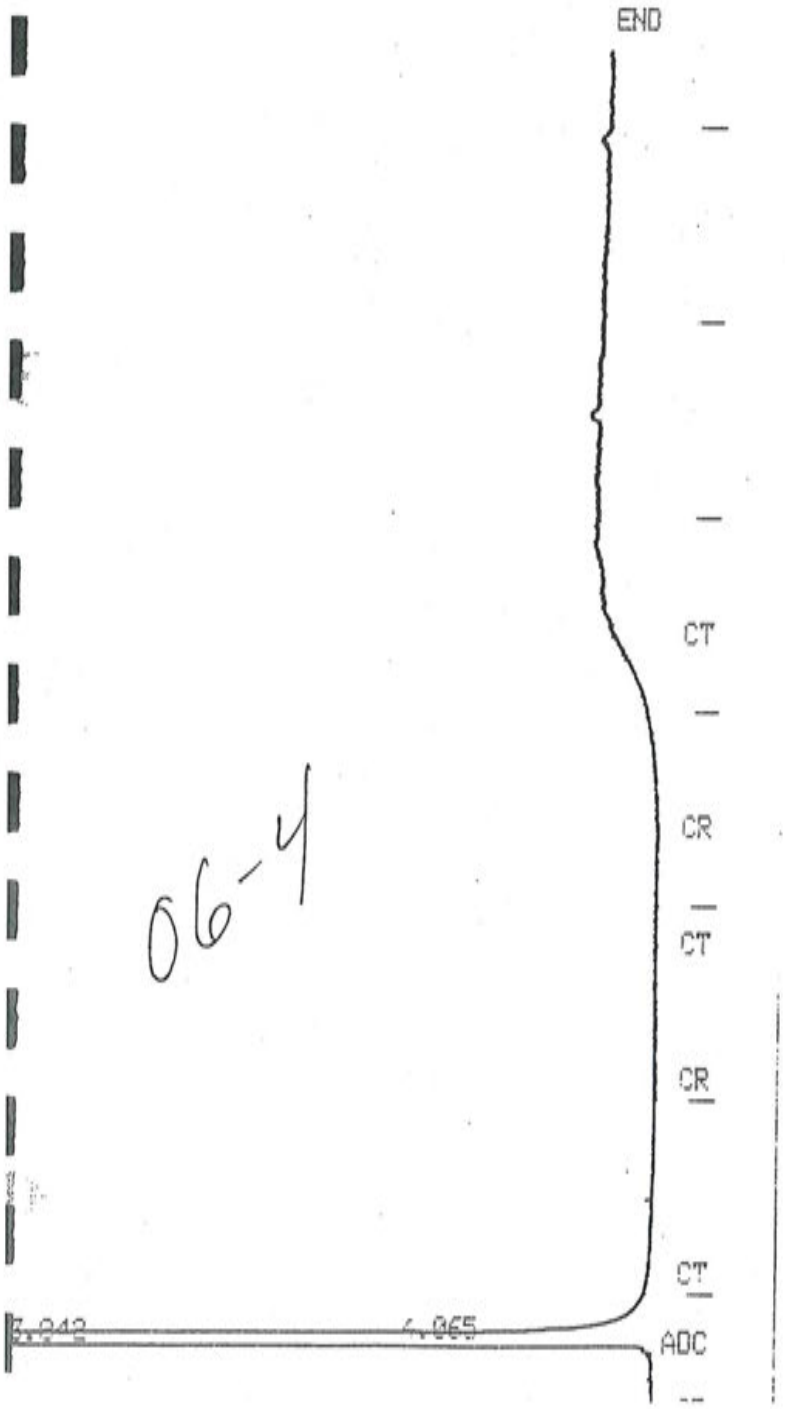
METHOD 1 RUN 2717
TIME 23:22 09 AUG 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	0.1624	592
TOTALS:			0.1624	592

DETECTED PEAKS: 1 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 378.8 OFFSET: -65

RACK 16 VIAL 9 INJ 1

ERROR LOG:
ADC OVERRANGE



06-4

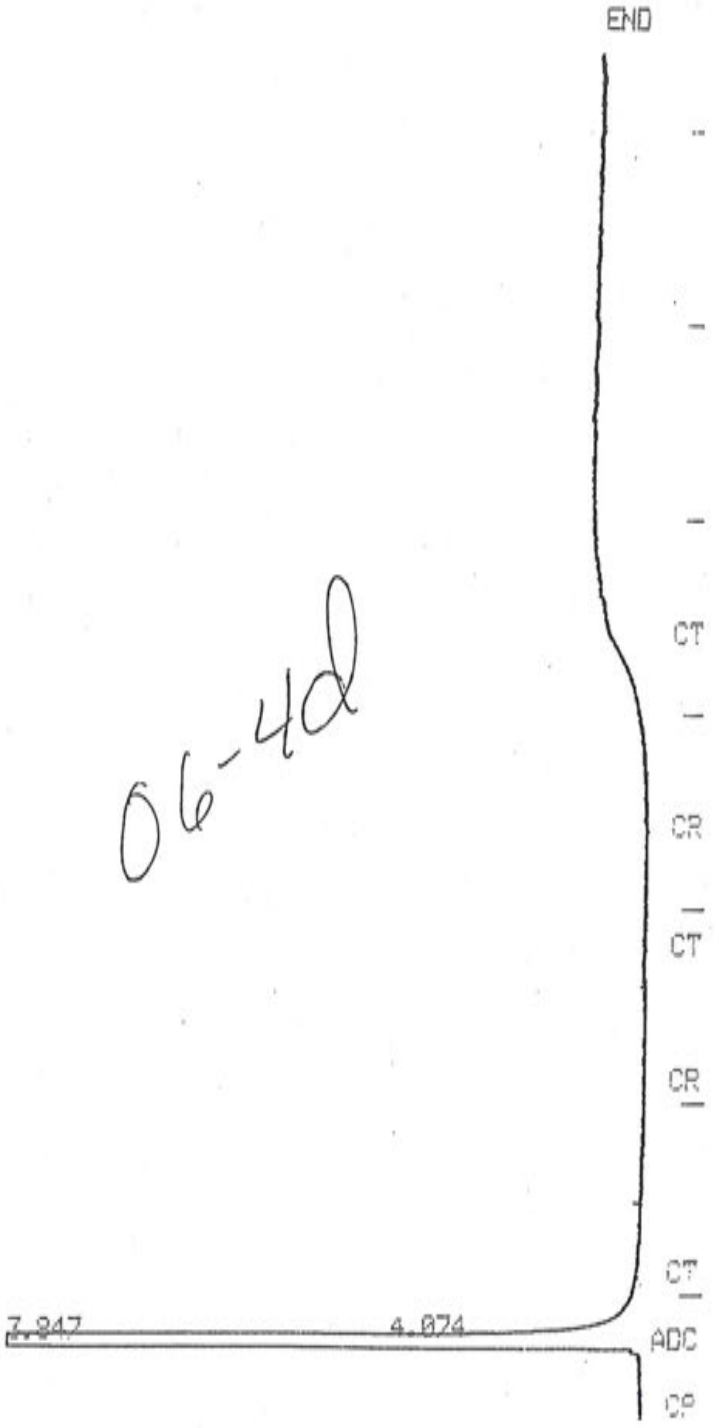
TIME 00:10 10 AUG 90
SAMPLE: DIESEL-8015
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT MG-L	AREA COUNTS
1		19.550	0.1786	651
TOTALS:			0.1786	651

DETECTED PEAKS: 1 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 2.7429000 DIVISOR: 1.0000000
NOISE: 378.8 OFFSET: -60

RACK 16 VIAL 10 INJ 1

ERROR LOG:
ADC OVERRANGE



06-4d

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000
Portland, OR (503) 624-7200

Chain of Custody / Laboratory Analysis Request

PROJECT DANIELS # _____ DATE 8/9/90

CLIENT INFO. CONTACT PETER ROWLAND

ADDRESS SEIE BOTHELL

TELEPHONE# 485-5000

SAMPLERS NAME JOHN GOENTHER TELEPHONE# 485-5000

SAMPLERS SIGNATURE _____

ANALYSIS REQUESTED — GENERAL CHEMISTRY (Specify)

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	TPH 8015	BTEX 8021					NUMBER OF
1. 9VE-1I	8/9/90	0930		SOIL														1	1					1
2. 9VE-1J	"	1000		"														1	1					1
3. 9VE-1K	"	1030		"														1	1					1
4. 9VE-1L	"	1130		"														1	1					1
5.																								
6.																								
7.																								
8.																								

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature	Signature	Signature		
Printed Name JOHN GOENTHER	Printed Name	Printed Name	Shipping I.D. No.	Total No. of Containers
Firm SEIE	Firm	Firm	VIA	Chain of Custody Seals
Date/Time 8/9/90 1530	Date/Time	Date/Time	Project	Received in good condition
Received By ~~GRE~~ COURIER	Received By	Received By		LAB NO.
Signature	Signature	Signature	SPECIAL INSTRUCTIONS/COMMENTS	
Printed Name IVY BOLM	Printed Name	Printed Name		
Firm SOUND ANALYTICAL	Firm	Firm		
Date/Time 8/9/90 5:25 pm	Date/Time	Date/Time		

RECEIVED
AUG 14 1990

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet-Edwards Date: August 23, 1990

Report On: Analysis of Soil Lab No.: 12818

IDENTIFICATION:
Samples Received on 08-15-90
Project: W160101 Daniels Property

ANALYSIS:

Lab Sample No.	1	2	3	4	5
Client ID	9VE-1M	9VE-1N	9VE-1O	9VE-1P	9VE-1S
Matrix/Units	Soil ppm	Soil ppm	Soil ppm	Soil ppm	Soil ppm
Benzene	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethyl Benzene	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Xylenes	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
BTEX by EPA SW-846 Method 8020					
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015	< 10	< 10	< 10	< 10	< 10
Total Petroleum Hydrocarbons, by EPA Method 418.1	9.8	NT	NT	< 5.0	< 5.0

NT - Not Tested

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 12818
Date: August 23, 1990
Client: Sweet-Edwards

Client ID: 9VE-1S
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Benzene	< 0.05	< 0.05	----	
Toluene	< 0.05	< 0.05	----	
Ethyl Benzene	< 0.05	< 0.05	----	
Xylenes	< 0.05	< 0.05	----	
Total Petroleum Fuel Hydrocarbons	< 10	< 10	----	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 8/15/90 PAGE 1 OF 1

PROJECT DANIELS PROPERTY # 91-6-101
CLIENT INFO.
CONTACT
ADDRESS
TELEPHONE#
SAMPLERS NAME P. JR SWEANEY PHONE# 485 5000
SAMPLERS SIGNATURE Peter Rowland

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE
1. VE-1M	8/10			SOIL
2. VE-1N	"			"
3. VE-1O	"			"
4. VE-1P	"			"
5. VE-1S	"			"
6.				
7.				
8.				

ANALYSIS REQUESTED

BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	GENERAL CHEMISTRY (Specify) pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	OTHER (Specify) BTEX (8020)	TPH (8015 M)				NUMBER OF CONTAINERS
													✓	✓				1
													✓	✓				1
													✓	✓				1
													✓	✓				1
													✓	✓				1
																		5

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature PETER ROWLAND	Signature Rodney 748.	Signature	Shipping I.D. No.	Total No. of Containers
Printed Name SAME.	Printed Name NCS	Printed Name	VIA	Chain of Custody Seals
Firm 8/15/90 2:00pm	Firm 15 Aug 90 1970.	Firm	Project	Received in good condition
Date/Time	Date/Time	Date/Time		LAB NO.
Received By Rodney Turner	**Received By** Guy Bolm	**Received By**	**SPECIAL INSTRUCTIONS/COMMENTS**	
Signature Rodney 748	Signature IVY Bolm	Signature		
Printed Name	Printed Name Sound Analytical	Printed Name		
Firm National Courier	Firm 8/15/90 5:30pm	Firm		
Date/Time	Date/Time	Date/Time		

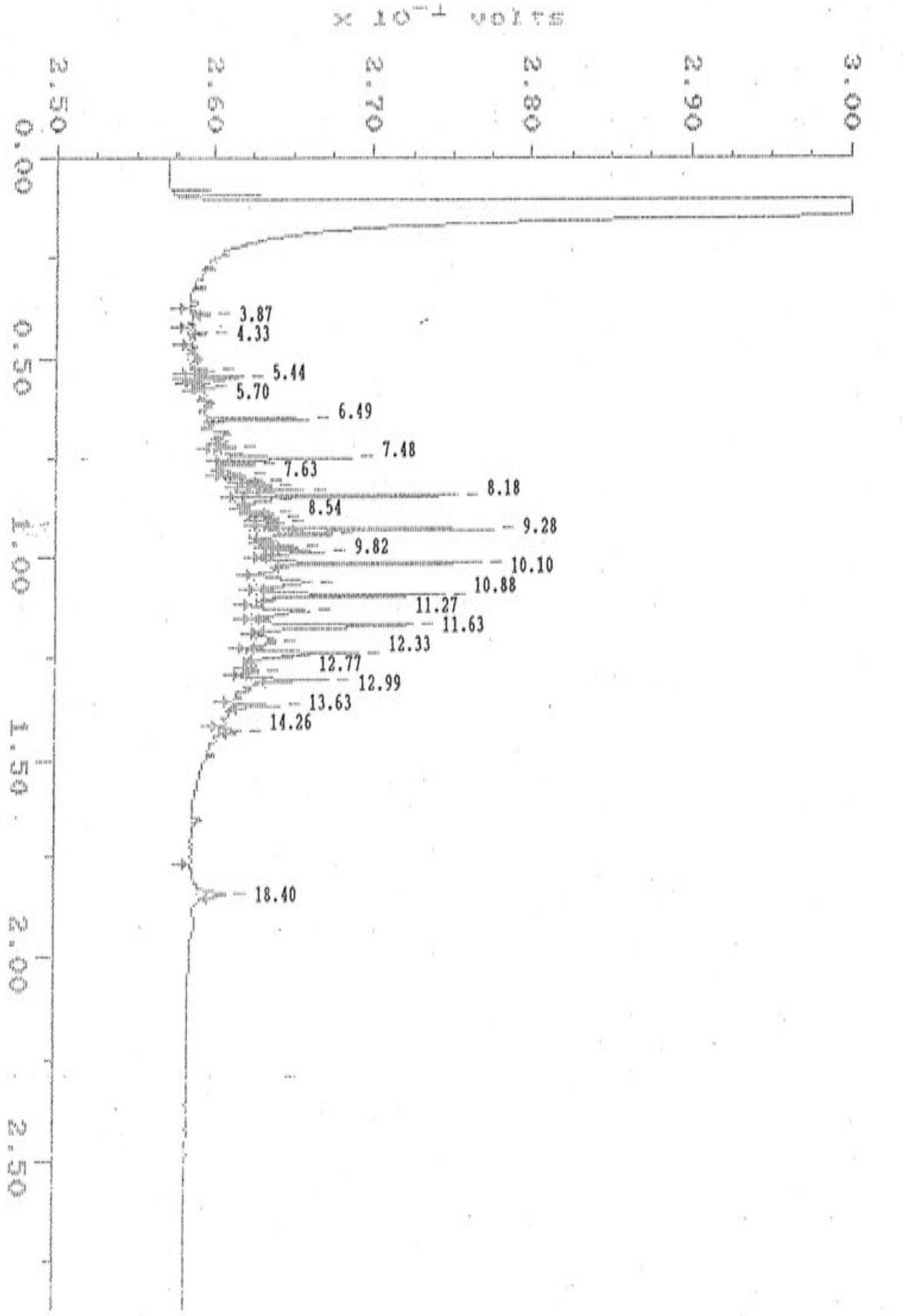
DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

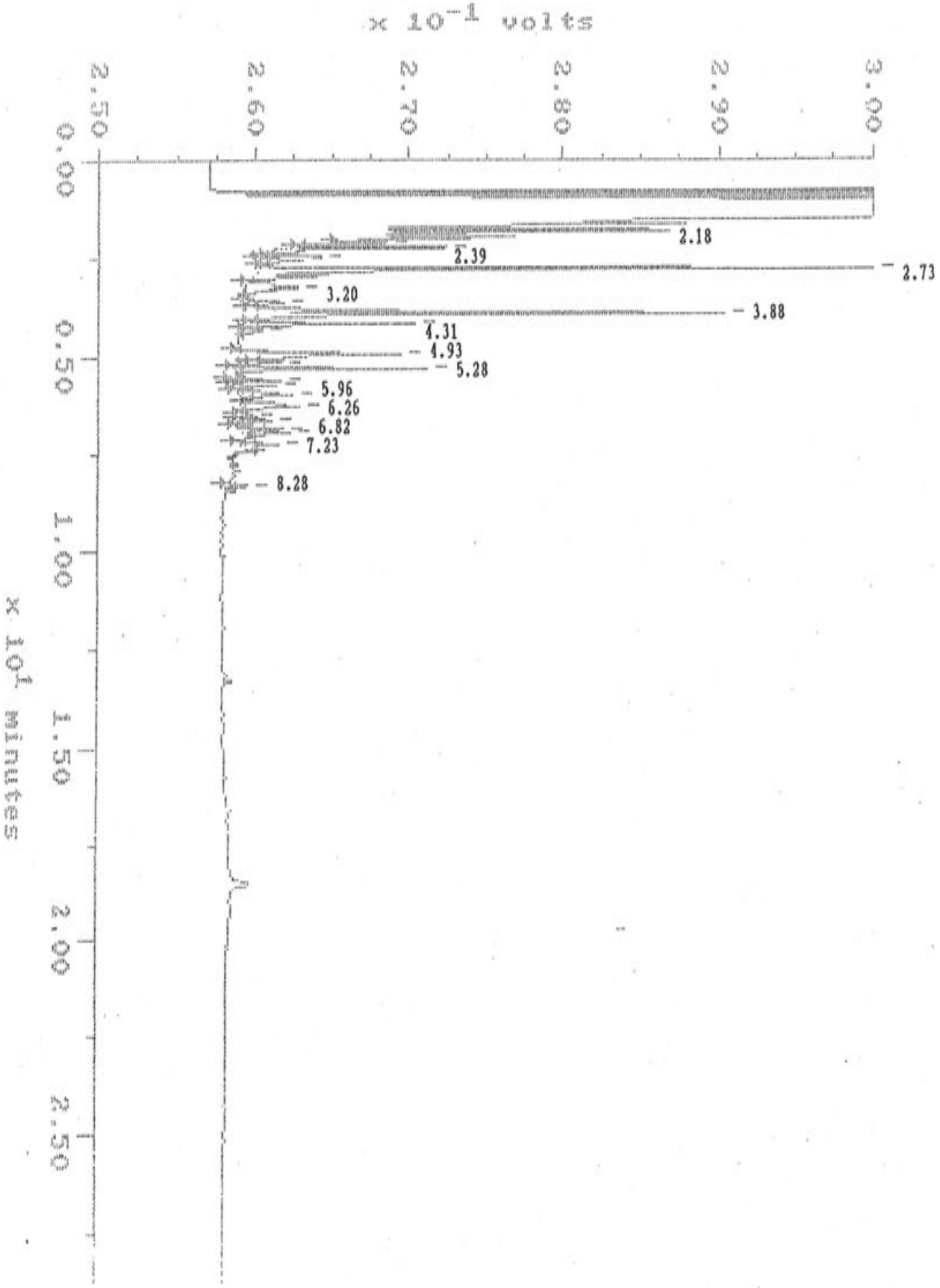
Sample: 500DIESEL
Acquired: 21-AUG-90 8:31

Channel: detector 1
Method: C:\MAX\DATA2\8015

Filename: 500DIE
Operator:



Sample: 500GAS
Acquired: 21-AUG-90 9:07
Channel: detector 1
Method: C:\MAX\DATA2\8015
Filename: 500GS2
Operator:

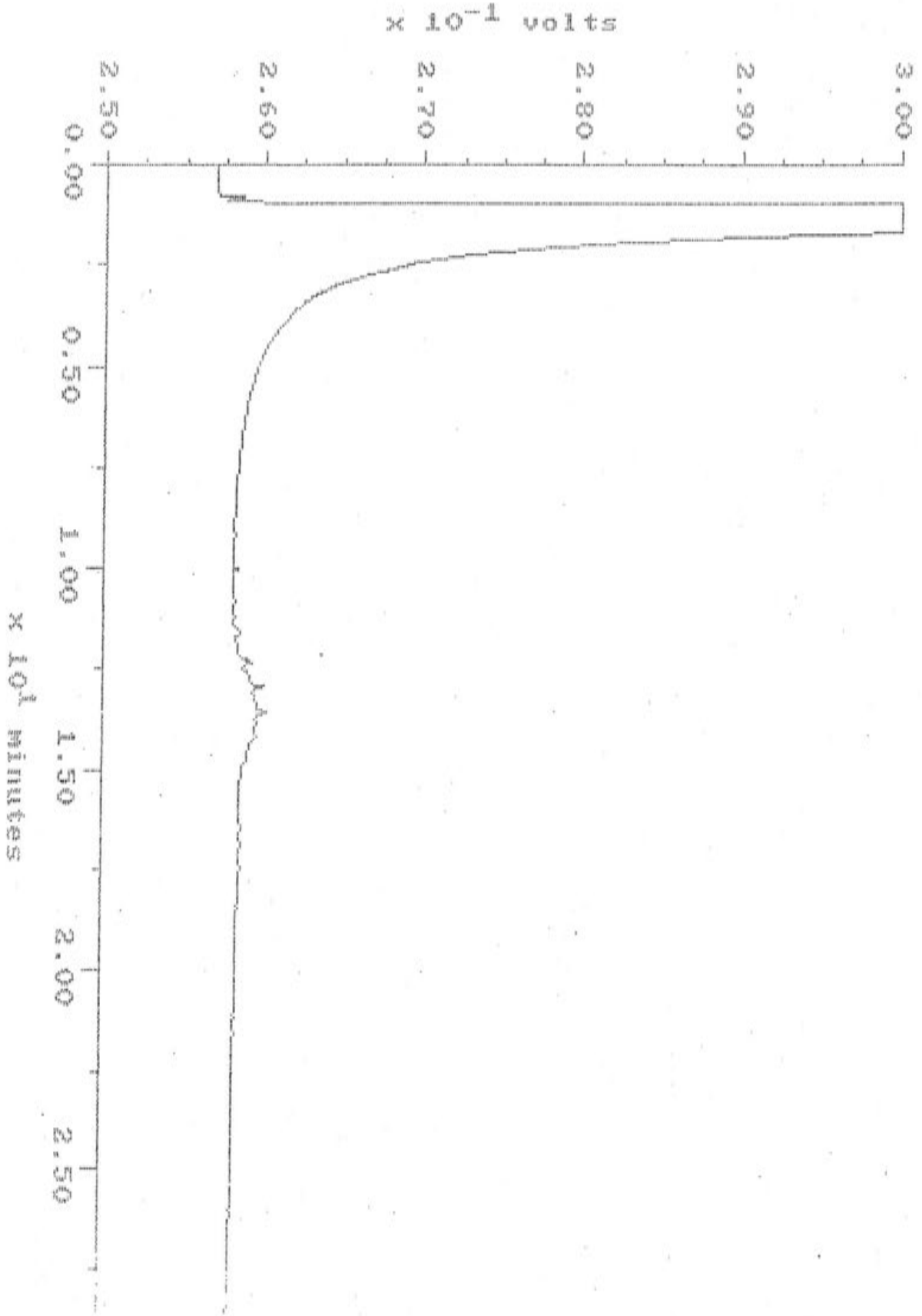


Sample: 12818-1
Acquired: 22-AUG-90 14:55
Dilution: 1 : 10.000
Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.733
Filename: 12818-1
Operator:

Sample: 12818-1
Acquired: 22-AUG-90 14:55
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.733

Filename: 12818-1
Operator:



Sample: 12818-2
Acquired: 22-AUG-90 15:31
Dilution: 1 : 10.000

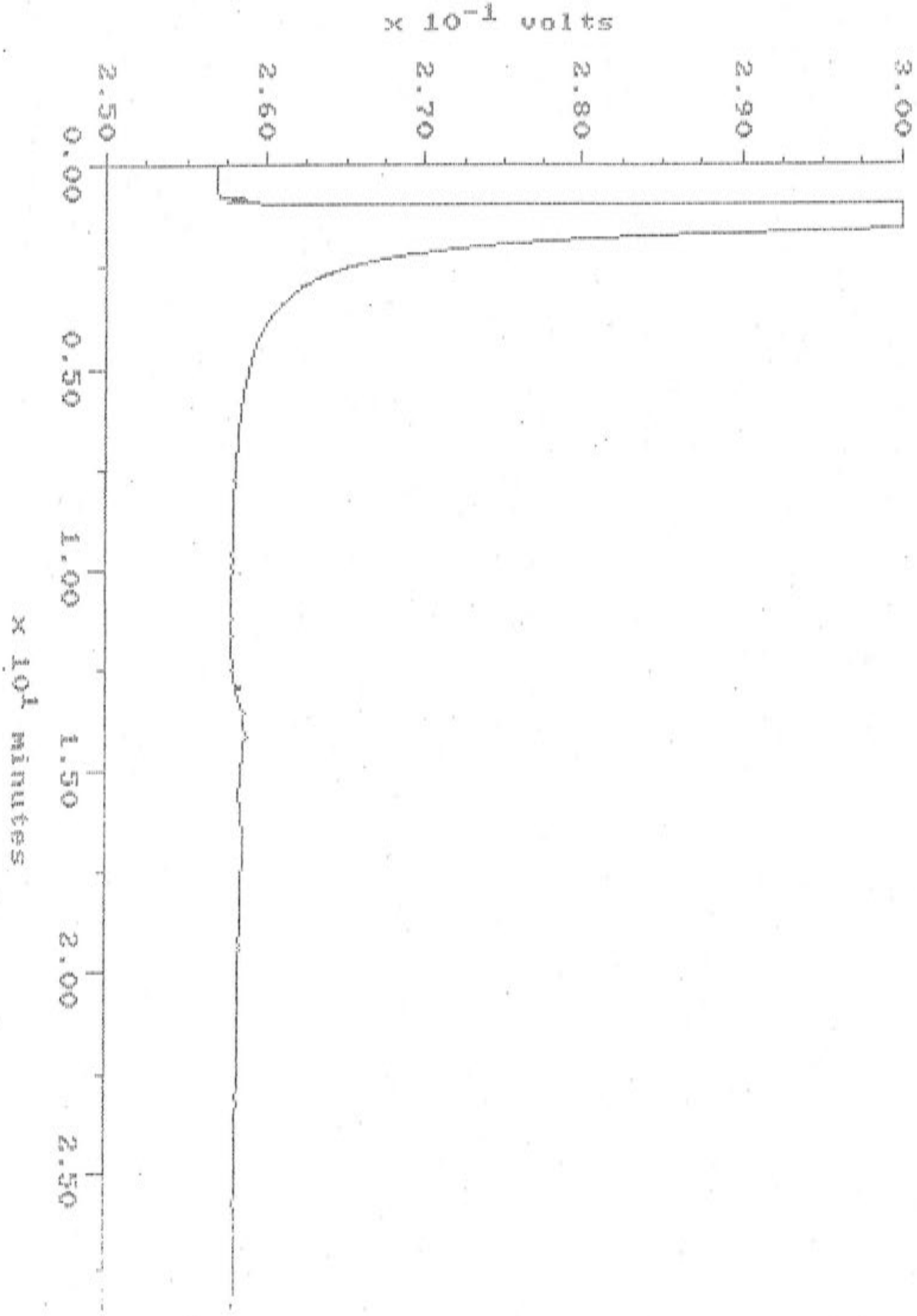
Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.681

Filename: 12818-2
Operator:

Sample: 12818-2
Acquired: 22-AUG-90 15:31
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.681

Filename: 12818-2
Operator:



Sample: 12818-3
Acquired: 22-AUG-90 16:07
Dilution: 1 : 10.000

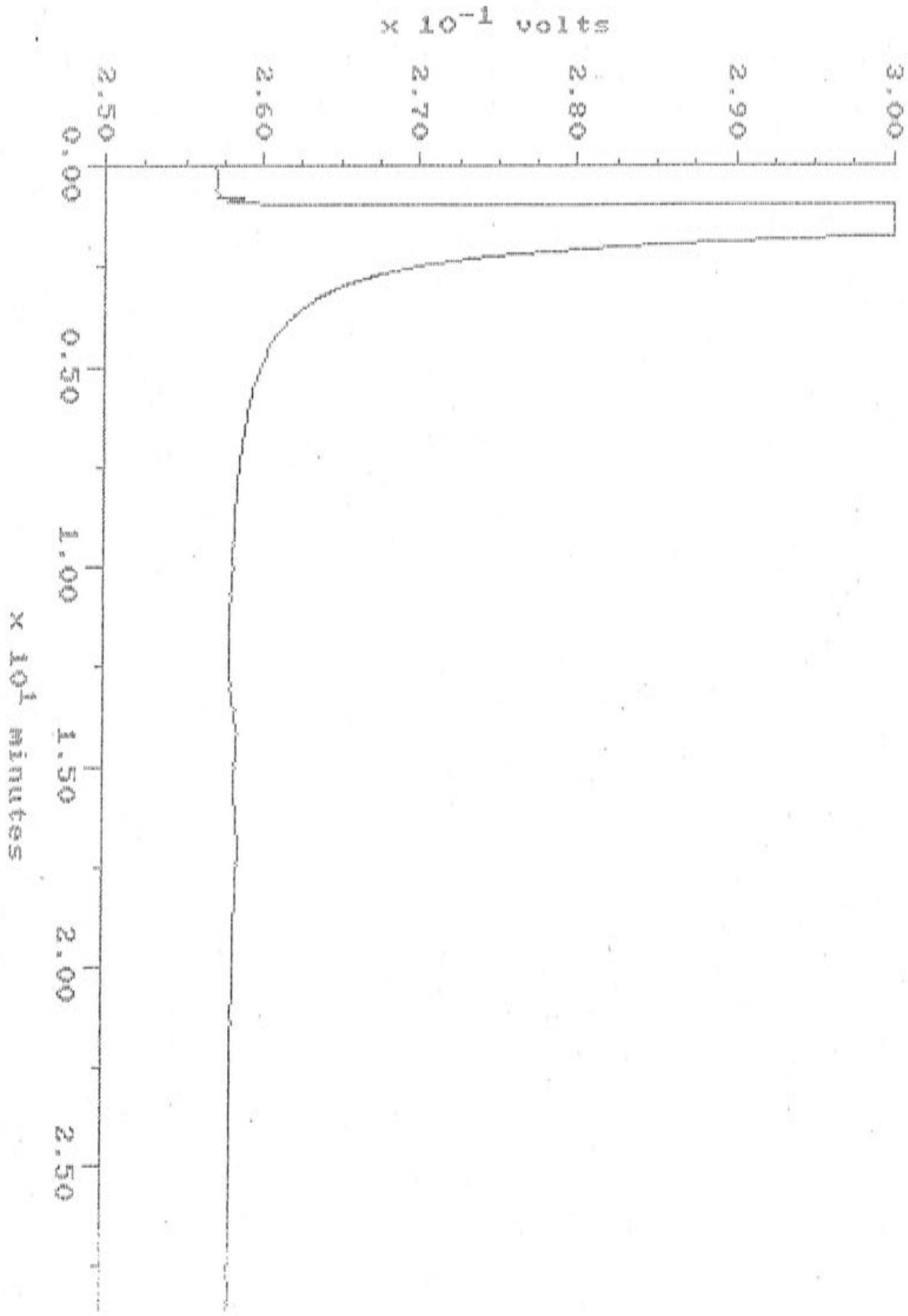
Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.160

Filename: 12818-3
Operator:

Sample: 12818-3
Acquired: 22-AUG-90 16:07
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.160

Filename: 12818-3
Operator:



Sample: 12818-4
Acquired: 22-AUG-90 16:43
Dilution: 1 : 10.000

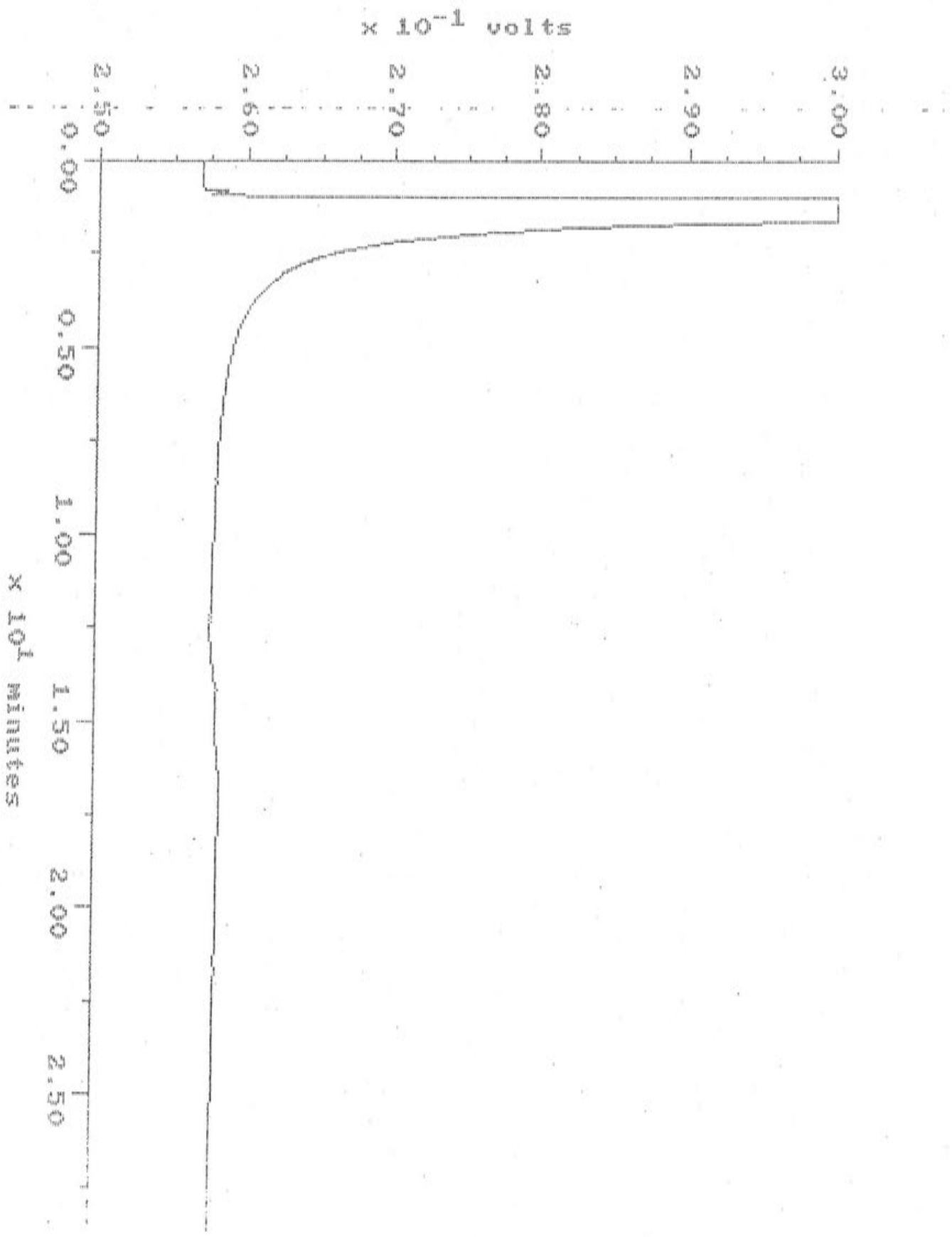
Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.281

Filename: 12818-4
Operator:

Sample: 12818-4
Acquired: 22-AUG-90 16:43
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.281

Filename: 12818-4
Operator:



Sample: 12818-5
Acquired: 22-AUG-90 17:19
Dilution: 1 : 10.000

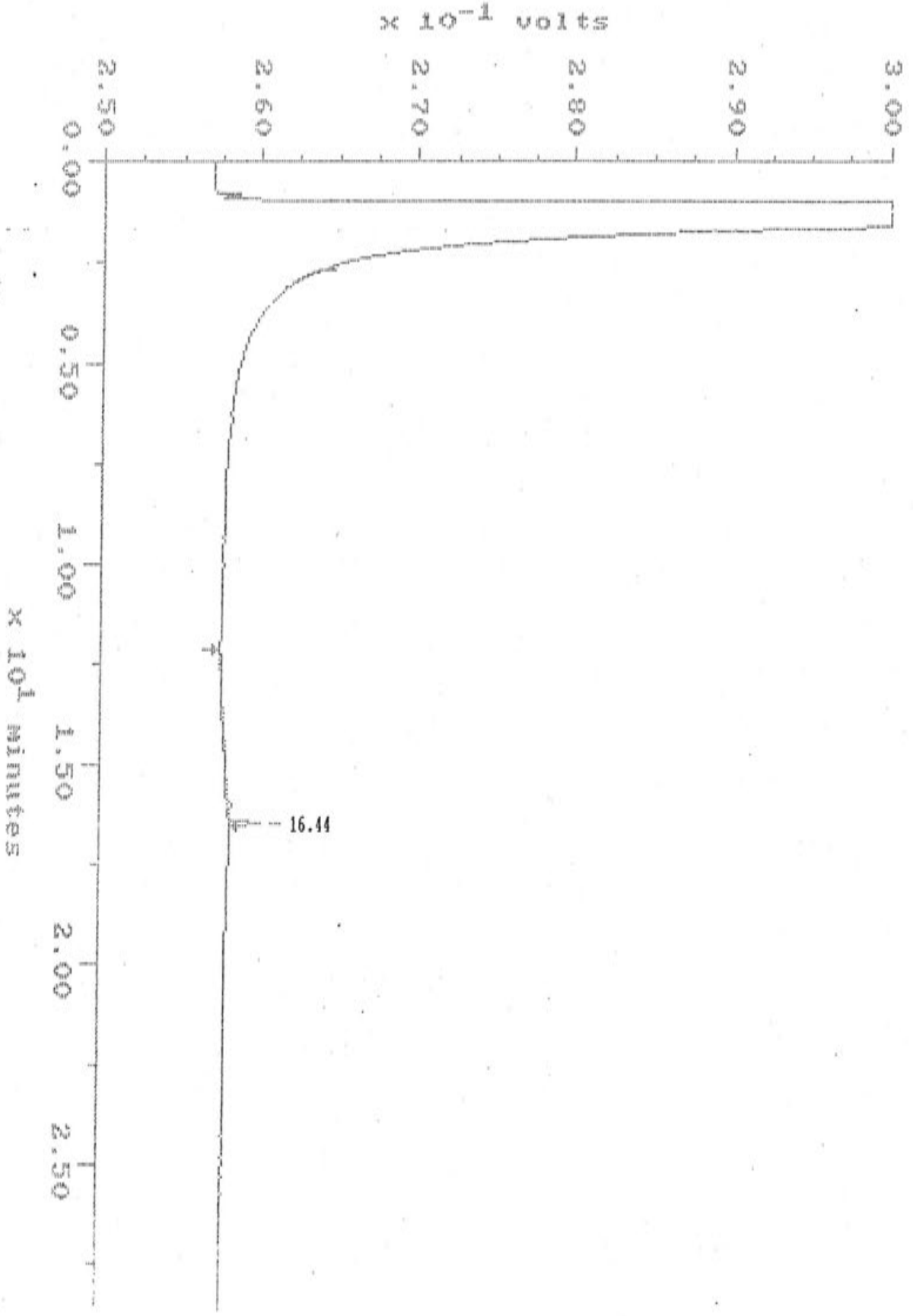
Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.582

Filename: 12818-5
Operator:

Sample: 12818-5
Acquired: 22-AUG-90 17:19
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.582

Filename: 12818-5
Operator:



Sample: 12818-5D
Acquired: 22-AUG-90 17:55
Dilution: 1 : 10.000

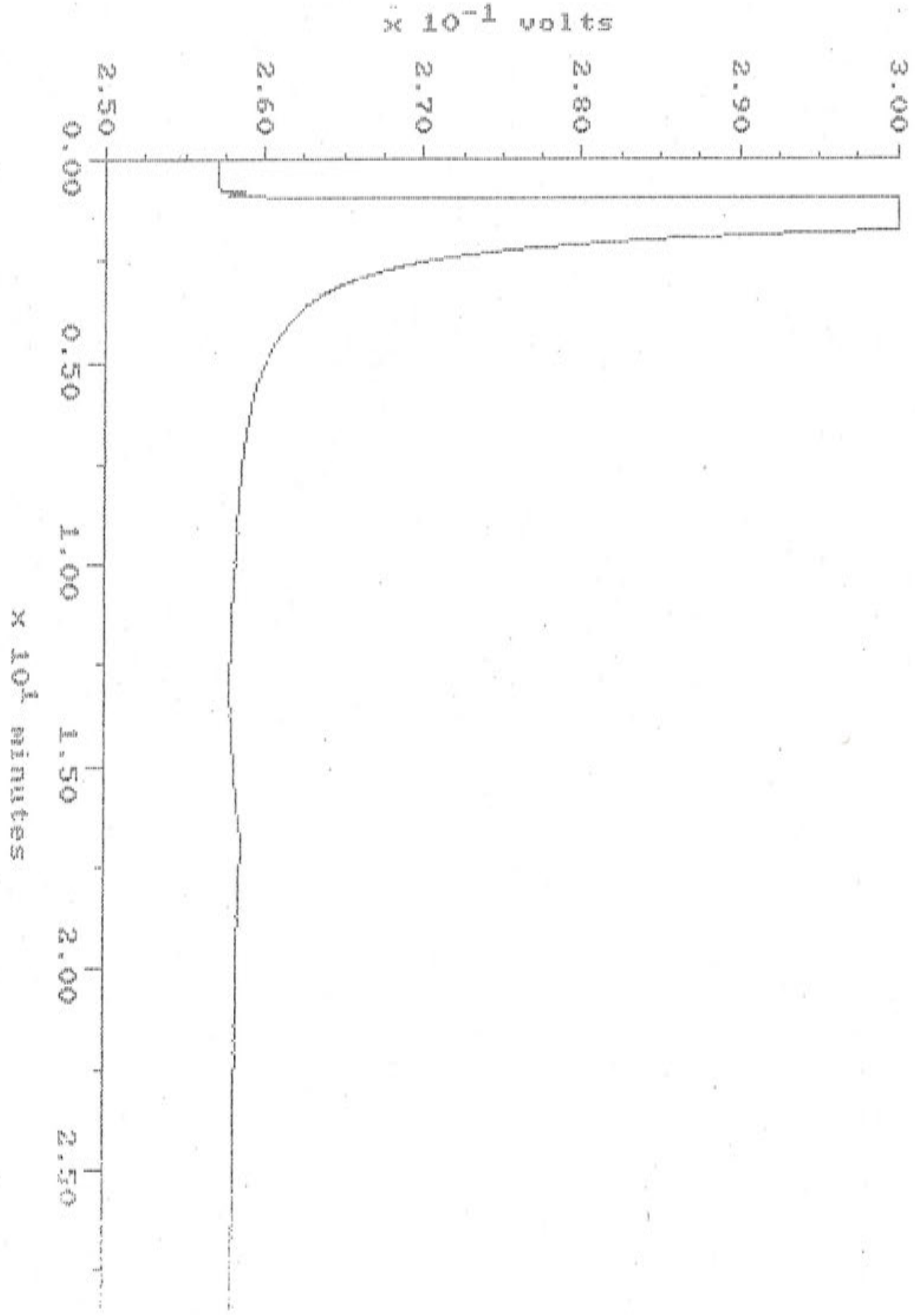
Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.035

Filename: 12828-5D
Operator:

Sample: 12818-5D
Acquired: 22-AUG-90 17:55
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015
Amount: 9.035

Filename: 12828-5D
Operator:



Appendix D

VAPOR EXTRACTION SYSTEM DESIGN

Columbia Analytical Services, Inc.

September 10, 1990

RECEIVED
SEP 12 1990
COPY

Peter Rowland
Sweet - Edwards/EMCON
18912 N. Creek Pkwy
Suite 210
Bothell, WA 98011

RE: Daniels W16-01.01

Dear Peter:

Enclosed are the revised report pages for the air sample submitted to our lab on August 23, 1990. For your reference, our service request number for this work is B903036.

Please call if you have any questions.

Respectfully submitted:

Mike Higgins

Michael Higgins
COLUMBIA ANALYTICAL SERVICES, INC.

mbm/MH

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

CLIENT: Sweet - Edwards/EMCON
SUBMITTED BY: Peter Rowland
PROJECT: Daniels W16-01.01
SAMPLE DESCRIPTION: Air

DATE RECEIVED: 08/23/90
DATE ANALYZED: 08/23/90
WORK ORDER #: B903036

BTEX/Volatile Hydrocarbons Analyses
EPA Methods 8015/8020
μL/L (ppm)
Fuel Hydrocarbon Range, C_5-C_{12}

Sample Name:		D-G1
Lab Code:		B3036-1
	MRL	
Benzene	3	7.6
Toluene	3	22.0
Ethyl Benzene	3	7.0
Total Xylenes	3	28.3
Volatile Hydrocarbons	10	1,820

NOTE: Volatile hydrocarbons quantitated using gasoline.

MRL means Method Reporting Limit
ND means None Detected at or above the MRL

Approved by Dave Eshelman / Date 9/10/90

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

CLIENT: Sweet - Edwards/EMCON
SUBMITTED BY: Peter Rowland
PROJECT: Daniels W16-01.01
SAMPLE DESCRIPTION: Air

DATE RECEIVED: 08/23/90
DATE ANALYZED: 08/23/90
WORK ORDER #: B903036

BTEX/Volatile Hydrocarbons Analyses
EPA Methods 8015/8020
µL/L (ppm)
Fuel Hydrocarbon Range, C_5-C_{12}

Sample Name:		Method Blank
Lab Code:		B3036-MB
	MRL	
Benzene	3	ND
Toluene	3	ND
Ethyl Benzene	3	ND
Total Xylenes	3	ND
Volatile Hydrocarbons	10	ND

NOTE: Volatile hydrocarbons quantitated using gasoline.

MRL means Method Reporting Limit
ND means None Detected at or above the MRL

Approved by Dave Spelman Date 9/10/90

Appendix E

WATER ANALYSIS DATA

672-7135

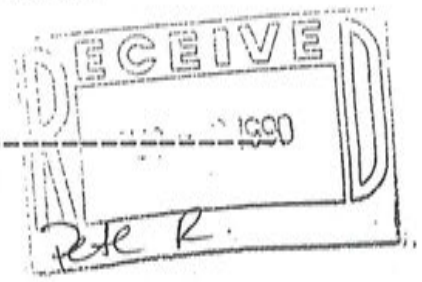
SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet-Edwards Date: July 31, 1990

Report On: Analysis of Water & Soil Lab No.: 12486

IDENTIFICATION:
Samples Received on 07-30-90
Project: W1601.01 Daniels



ANALYSIS:

Lab Sample No.	RUSH 1	RUSH 2	RUSH 3	RUSH 4
Client Identification	EW-1	9VSE-1	9VE-1A	9VB-7
Matrix/Units	Water ppm	Soil ppm	Soil ppm	Soil ppm
Benzene	0.004	< 0.05	< 0.05	< 0.05
Toluene	< 0.001	< 0.05	< 0.05	< 0.05
Ethyl Benzene	0.024	< 0.05	< 0.05	< 0.05
Xylenes	0.055	< 0.05	< 0.05	< 0.05
BTEX by EPA SW-846 Method 8020				
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015	< 10	< 10	< 10	< 10
Total Metals:				
Lead	0.1	NT	NT	NT
Copper	0.1	NT	NT	NT
Zinc	0.2	NT	NT	NT

SOUND ANALYTICAL SERVICES

C. Larry Zuraw

C. LARRY ZURAW

COPY

Columbia Analytical Services inc.

RECEIVED
DEC 3 1 1990

December 28, 1990

Jeff Kirtland
Sweet - Edwards/EMCON
18912 N. Creek Pkwy - Suite 210
Bothell, WA 98011

Re: **Daniels/Project #W1601.01**

Dear Jeff:

Enclosed are the results of the water sample submitted to our lab on December 14, 1990. For your reference, our service request number for this work is B904841.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

Colin Elliott dlw

Colin B. Elliott
Senior Project Chemist

CBE/lip

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

CLIENT: Sweet - Edwards/EMCON
SUBMITTED BY: Jeff Kirtland
PROJECT: Daniels/#W1601.01
SAMPLE DESCRIPTION: Water

DATE RECEIVED: 12/14/90
WORK ORDER #: B904841

pH
EPA Method 150.1

Sample Name	Lab Code	Result
WD-1290-1	K4841-1	6.74

Approved by Dave Erlenmeyer Date 12/28/90

00001

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

CLIENT: Sweet - Edwards/EMCON
SUBMITTED BY: Jeff Kirtland
PROJECT: Daniels/#W1601.01
SAMPLE DESCRIPTION: Water

DATE RECEIVED: 12/14/90
DATE EXTRACTED: 12/18/90
DATE ANALYZED: 12/21/90
WORK ORDER #: B904841

TRPH-IR
EPA Method 418.1
mg/L

Sample Name	Lab Code	MRL	Result
WD-1290-1	K4841-1	0.5	ND
Method Blank	K4841-MB	0.5	ND

MRL means Method Reporting Limit
ND means None Detected at or above the MRL

Approved by Dave Eichman/ Date 12/28/90

00002

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

CLIENT: Sweet - Edwards/EMCON
SUBMITTED BY: Jeff Kirtland
PROJECT: Daniels/#W1601.01
SAMPLE DESCRIPTION: Water

DATE RECEIVED: 12/14/90
DATE ANALYZED: 12/18/90
WORK ORDER #: B904841

BTEX Analyses
EPA Methods 5030/8020
µg/L (ppb)

Sample Name:		WD-1290-1	Method Blank
Lab Code:		B4841-1	B4841-MB
	MRL		
Benzene	0.5	ND	ND
Toluene	1	ND	ND
Ethylbenzene	1	ND	ND
Total Xylenes	1	1.3	ND

MRL means Method Reporting Limit
ND means None Detected at or above the MRL

Approved by Dave Edelman Date 12/28/90

00003

COLUMBIA ANALYTICAL SERVICES, INC.

CLIENT: Sweet - Edwards/EMCON
SUBMITTED BY: Jeff Kirtland
PROJECT: Daniels/#W1601.01
SAMPLE DESCRIPTION: Water

DATE RECEIVED: 12/14/90
DATE ANALYZED: 12/18/90
WORK ORDER #: B904841

QA/QC Report
Surrogate Recovery Summary
EPA Method 8020

Sample Name	Lab Code	Percent Recovery
WD-1290-1	B4841-1	93.2
Method Blank	B4841-MB	93.2
CAS Acceptance Criteria		60-120

Approved by Dave Erlenmeyer Date 12/28/90

~1847

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 12/14/90 PAGE 1 OF 1

PROJECT Daniels # W1601.01
CLIENT INFO. CONTACT Peter Rowland
ADDRESS SE/E Bothell
TELEPHONE# 485-5000
SAMPLERS NAME Jeff Kirkland PHONE# 485-5000
SAMPLERS SIGNATURE Jeff Kirkland

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	8020 BTEX	418.1 TPH	pH				NUMBER OF CONTAINERS
1. WD-1290-1	12/14/90	725		water														X	X	X				3
2.																								
3.																								
4.																								
5.																								
6.																								
7.																								
8.																								

Relinquished By Sweet Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature Jeff Kirkland	Signature John L. Zable	Signature	Hand Delivered	
Printed Name Jeff Kirkland	Printed Name CAS	Printed Name	Shipping I.D. No.	Total No. of Containers
Firm SE/E	Firm 1214 0830	Firm	VIA	Chain of Custody Seals
Date/Time 12/14/90 0815	Date/Time	Date/Time	Project	Received in good condition
				LAB NO.
Received By John L. Zable	Received By Ruth Allison	Received By	SPECIAL INSTRUCTIONS/COMMENTS	
Signature John L. Zable	Signature Ruth Allison	Signature		
Printed Name CTS	Printed Name CAS	Printed Name		
Firm 121490 0830	Firm 12/15/90 1000	Firm		
Date/Time	Date/Time	Date/Time		

C11

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Appendix F

METRO WATER DISPOSAL PERMIT

METRO
Municipality of Metropolitan Seattle

Exchange Building • 821 Second Ave. • Seattle, WA 98104-1598

December 31, 1990

Peter Roland
Sweet Edwards/EMCON, Inc.
18912 North Creek Parkway, Suite 210
Bothell, WA 98011

Dear Mr. Roland:

The purpose of this letter is to approve your request to discharge groundwater to Metro during underground fuel tank removal at the Broadview Service Station, 12258 Greenwood Avenue North, Seattle, Washington.

Since testing indicates this discharge meets Metro limits for Total Petroleum Hydrocarbons, benzene, toluene and ethyl benzene, no additional analytical monitoring is required provided you and your subcontractors meet the following conditions:

1. Contact Kris Effertz (684-0968), City of Seattle, to site the discharge, ensure the sewer line has capacity for the projected flow, and arrange for sewer billing.

2. Avoid discharging large volumes > 25,000 gpd. You have indicated your maximum pump rate would be 10 gpm (14,400 gpd) for two to three months.

3. Follow common sense criteria:

   a) There shall be no pronounced odor of solvent or gasoline.
   b) There shall be no pronounced oil sheen or unusual color.
   c) There shall be no pronounced hydrogen sulfide (rotten egg) odor.
   d) There shall be no visibly pronounced turbidity, the discharge must remain translucent.

Metro will expect operators on site to pay close attention to these common sense criteria whenever discharge to the sewer is occurring. If any of the common sense criteria are exceeded, you must stop discharging and notify the Metro Industrial Waste Section at 684-2325.

When the discharge has been completed please send me written confirmation and include the dates and volumes discharged. I appreciate your cooperation. If you have any questions, I may be reached at 684-2327.

Sincerely,

Christie J. True
Senior Industrial Waste Investigator
Comprehensive Planning Division

CJT:mwr
Enclosure

cc: Kris Effertz, City of Seattle

cjt25\lprsee

Appendix G

SOIL ANALYSIS DATA - TREATED SOILS PHASE I, (BATCH 1)

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922- 5047

Report To: Sweet Edwards

Date: November 1, 1990

Report On: Analysis of Soil

Lab No.: 14178

IDENTIFICATION:
Samples Received on 10-30-90
Project: W1601.01

ANALYSIS:

Lab Sample No.	Client ID	Total Petroleum Hydrocarbons, ppm by EPA Method 418.1
1	Composite samples were made at Sound Analytical of samples DLF-1090-A1, DLF-1090-A2, and DLF-1090-A3. The sample was analyzed.	194
2	Composite samples were made at Sound Analytical of samples DLF-1090-B1, DLF-1090-B2, and DLF-1090-B3. The sample was analyzed.	180
3	Composite samples were made at Sound Analytical of samples DLF-1090-C1, DLF-1090-C2, and DLF-1090-C3. The sample was analyzed.	251

SOUND ANALYTICAL SERVICES

(For) STAN P. PALMQUIST

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 14179

Client ID: Composite Samples were made at SAS of samples DLF-1090-C1, DLF-1090-C2, and DLF-1090-C3. The sample was analyzed.

Date: November 1, 1990
Client: Sweet Edwards
Matrix: Soil
Units: ppm

Compound	Sample(S)	Duplicate(D)	RPD*	
Total Petroleum Hydrocarbons	251	243	3.2	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 10/24/90 PAGE 1 OF 2

PROJECT Dawnville # W1601.01
CLIENT INFO.
CONTACT Peter Rowland
ADDRESS SE/E Bothell
TELEPHONE# 485-5000
SAMPLERS NAME D. Kirkland PHONE# 485-5000
SAMPLERS SIGNATURE D. Kirkland

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE
1. DLF-1090-A1	10/25/90			soil
2. DLF-1090-A2				
3. DLF-1090-A3				
4. DLF-1090-B1				
5. DLF-1090-B2				
6. DLF-1090-B3				
7. DLF-1090-C1				
8. DLF-1090-C2				

ANALYSIS REQUESTED

BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	GENERAL CHEMISTRY (Specify) pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	EPA-418.1	OTHER (Specify)					NUMBER OF CONTAINERS
																			1
															X				1
																			1
																			1
															X				1
																			1
																			1
															X				1

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature D. Kirkland	Signature	Signature	Grey Towers	
Printed Name D. Kirkland	Printed Name	Printed Name	Shipping I.D./ No.	Total No. of Containers
Firm SE/E	Firm	Firm	VIA	Chain of Custody Seals
Date/Time 10/25/90	Date/Time	Date/Time	Project	Received in good condition
				LAB NO.

Received By	Received By	Received By	SPECIAL INSTRUCTIONS/COMMENTS
Signature	Signature	Signature	Composite A samples Composite B samples Composite C samples. Please retain sample composite for possible later 8015m analysis.
Printed Name	Printed Name	Printed Name	
Firm 10/26/90 7:00	Firm	Firm	
Date/Time	Date/Time	Date/Time	

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Chain of Custody / Laboratory Analysis Request

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

DATE 10/24/90 PAGE 2 OF 2

PROJECT Damit # W1601.01
CLIENT INFO. CONTACT Peter Rowland
ADDRESS SE/E Bothell
TELEPHONE# 485-8000
SAMPLERS NAME [signature] PHONE# 485-5000
SAMPLERS SIGNATURE [signature]

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE
1. DLF-1090-C3	10/25			soil
2.				
3.				
4.				
5.				
6.				
7.				
8.				

ANALYSIS REQUESTED

BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	GENERAL CHEMISTRY (Specify) pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	EPA 418.1	OTHER (Specify) Jeeppak #1				NUMBER OF CONTAINERS
																		1

Relinquished By Sweet, Edwards & Assoc.
Signature [signature]
Printed Name Jeff Kirkland
Firm SE/E
Date/Time 10/25/90

Relinquished By
Signature
Printed Name
Firm
Date/Time

Relinquished By
Signature
Printed Name
Firm
Date/Time

PROJECT INFORMATION
Shipping I.D. No. Gray Mountain
VIA
Project

SAMPLE RECEIPT
Total No. of Containers
Chain of Custody Seals
Received in good condition
LAB NO.

Received By [signature]
Signature [signature]
Printed Name SAB
Firm
Date/Time 10/30/90 7:00 AM

Received By
Signature
Printed Name
Firm
Date/Time

Received By
Signature
Printed Name
Firm
Date/Time

SPECIAL INSTRUCTIONS/COMMENTS
See Page 1

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Appendix H

SOIL ANALYSIS DATA — TREATED SOILS PHASE I, (BATCH 2)

COPY

Columbia Analytical Services Inc.

January 23, 1991

Pete Rowland
Sweet - Edwards/EMCON
18912 N. Creek Pkwy - Suite 210
Bothell, WA 98011

Re: **Danials/Project #W16-01.01**

Dear Pete:

Enclosed are the results of the soil samples submitted to our lab on January 15, 1991. For your reference, our service request number for this work is B910241.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

Colin B. Elliott
Senior Project Chemist

CBE/lip

17 South 40th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 206/577-7222 • Fax 206/636-1068

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

CLIENT: Sweet - Edwards/EMCON
SUBMITTED BY: Pete Rowland
PROJECT: Danials/#W16-01.01
SAMPLE DESCRIPTION: Soil

DATE RECEIVED: 01/15/91
DATE EXTRACTED: 01/16/91
DATE ANALYZED: 01/16/91
WORK ORDER #: B910241

TRPH-IR
16th Standard Methods 503 D / EPA Method 418.1
mg/Kg (ppm)
Dry Weight Basis

Sample Name	Lab Code	MRL	Result
DL-1-91-A,B,C Comp.	B0241-1	25	1,680
Method Blank	B0241-MB	25	ND

MRL means Method Reporting Limit
ND means None Detected at or above the MRL

Approved by Glenn Elliott Date 1/24/91

317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 206/577-7222 • Fax 206/636-1068

Columbia Analytical Services, Inc.

1317 South 13th Avenue • Kelso, WA 98626 • 206/577-7222, Fax 206/636-1068

Chain of Custody/ Laboratory Analysis Request

DATE 1-15-91 PAGE 1 OF 1

PROJECT DANIALS #W160101

SEND REPORT TO P. ROWLAND

ADDRESS

TELEPHONE#

SAMPLERS NAME P. Rowland PHONE# 425-5000

SAMPLERS SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX
1. DL-1-91-A	1-15-91			SOIL
2. DL-1-91-B	1-15-91			SOIL
3. DL-1-91-C	1-15-91			SOIL
4.				
5.				
6.				
7.				
8.				

ORGANIC ANALYSIS																	INORGANIC ANALYSIS					OTHER			NUMBER OF CONTAINERS
Base/Neu/Acid Organics GC/MS 625/8270	Volatile Organics GC/MS 624/8240	Halogenated Volatiles 601/8010	Aromatic Volatiles 602/8020 BTEX	Gas/BTEX MOD 8015/8020	Pesticides/PCBs 608/8080	Total Petroleum Hydrocarbons - Mod 8015	Total Petroleum Hydrocarbons - 418.1	Total Organic Halides (TOX) 9020	Total Organic Carbon (TOC) 415/9060	EPTOX Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag	Metals (total or dissolved) List Below	Cyanide	Ph, Cond, Cl, SO_4, PO_4, F, Br NO_3, NO_3, (Circle)	NH_3-N, COD, Total-P, TKN (Circle)	Coliform (Circle) Total, Fecal	418.1 TPH							
		COMPOSITE														✓								1
																✓								1
																✓								1
																								3

Relinquished By P. Rowland	Relinquished By	Invoice Information: P.O.#	Project Information Site Contact:
Signature P. ROWLAND	Signature	Bill to:	Site Address:
Printed Name SB/B	Printed Name		
Firm 1-15-91 3:05	Firm		
Date/Time	Date/Time		
Received By	Received By:	Special Instruction/Comments: 24HR TAT. by 3PM 1/16	Sample Receipt: Shipped Via: / Seals Intact: / Condition: / Lab No. / SR Number:
Signature M. HENRY	Signature		
Printed Name CAS	Printed Name		
Firm SAME	Firm		
Date/Time	Date/Time		

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

SOUND ANALYTICAL SERVICES

4813 PACIFIC HIGHWAY EAST
TACOMA, WA 98424

FACSIMILE COVER SHEET
FAX NO. (206) 922 - 5047

DATE: 6-7-91

TIME: 11:05

CONTENTS: TOTAL OF 2 PAGES INCLUDING THIS COVER SHEET.

TO: PETE ROWLAND

FROM: SPAN PALMQUIST

IF YOU HAVE ANY PROBLEMS WITH THIS TRANSMITTAL PLEASE CALL (206) 922 - 2310.

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet-Edwards, Inc. Date: May 30, 1991

Report On: Analysis of Soil Lab No.: 17873

IDENTIFICATION:
Samples Received on 05-30-91
Project: W1601.01 Daniels

ANALYSIS:

Lab Sample No.	Client ID	Total Petroleum Hydrocarbons, mg/kg by EPA Method 418.1
1	D-591-D1 Composite	330
2	D-591-E1 Composite	420
3	D-591-F1 Composite	380
4	D-591-G1 Composite	270
5	D-591-H1 Composite	350

SOUND ANALYTICAL SERVICES

(For) STAN P. PALMQUIST

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 5/29/91 PAGE 1 OF 2

PROJECT Daniels #W1601.01
CLIENT INFO. CONTACT Peter Rowland
ADDRESS SE/E Bothell
TELEPHONE# 485-5000
SAMPLERS NAME Jeff Kirkland PHONE# 485-5000
SAMPLERS SIGNATURE JK

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	NUMBER OF CONTAINERS
1. D591-D1a	5/29	815		Soil	1
2. D591-D1b		820			1
3. D591-D1c		825			1
4. D591-E1a		830			1
5. D591-E1b		835			1
6. D591-E1c		840			1
7. D591-F1a		850			1
8. D591-F1b	↓	855		↓	1

ANALYSIS REQUESTED

GENERAL CHEMISTRY (Specify)

OTHER (Specify)

- BASE/NEU/ACID ORGAN. GC/MS/625/8270
- VOLATILE ORGANICS GC/MS/624/8240
- HALOGENATED VOLATILE ORGANICS 601/8010
- PHENOLICS 604/8040
- POLYNUCLEAR AROMATIC 610/8310
- TOTAL ORGANIC CARBON (TOC) 415/9060
- TOTAL ORGANIC HALIDE (TOX) 9020
- EP TOX/TCLP METALS (Circle One)
- METALS (TOTAL) (See Special Inst.)
- TCLP ORGANICS
- pH, COND ALK
- NO_3/NO_2, Cl SO_4
- Ca, Mg, Na, K
- 8/18.1

Composite: Report as D-591-D1

Composite: Report as D-591-E1

Composite D-591-F1a, F1b, F1c Report as D-591-F1

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION
Signature: Jeff Kirkland	Signature: Anne Udaloy	Signature	Shipping I.D. No.
Printed Name: SE/E	Printed Name: SE/E	Printed Name	VIA
Firm: 5/29/91 1000	Firm: 5/30/91 8:45	Firm	Project
Date/Time	Date/Time	Date/Time	

Received By: Anne Udaloy	Received By: Siang	Received By	SAMPLE RECEIPT
Signature: Anne Udaloy	Signature: Siang	Signature	Total No. of Containers
Printed Name: SE/E	Printed Name: SA	Printed Name	Chain of Custody Seals
Firm: 5/29/91 10:00	Firm: 5/30/91 8:45 AM	Firm	Received in good condition
Date/Time	Date/Time	Date/Time	LAB NO.

SPECIAL INSTRUCTIONS/COMMENTS
Composite samples as noted above

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000
Portland, OR (503) 624-7200

Chain of Custody / Laboratory Analysis Request

DATE 5/29/91 PAGE 2 OF 2

PROJECT Daniels # W1601.01
CLIENT INFO. CONTACT Peter Rowland
ADDRESS
TELEPHONE#
SAMPLERS NAME Jeff Kirtland PHONE# 485-5000
SAMPLERS SIGNATURE JJ Kirtland

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	ANALYSIS REQUESTED	NUMBER OF CONTAINERS
1. D-591-F1c	5/29/91	900		Soil	composite w/ D591-F1a, F1b, F1c	1
2. D-591-G1a	"	800		"		1
3. D-591-G1b		802			composite: Reyntos D591-G1	1
4. D-591-G1c		805				1
5. D-591-H1a		745				1
6. D-591-H1b		750			Comp. D-591-H1's	1
7. D-591-H1c		755				1
8.						

ANALYSIS REQUESTED: BASE/NEU/ACID ORGAN. GC/MS/625/8270; VOLATILE ORGANICS GC/MS/624/8240; HALOGENATED VOLATILE ORGANICS 601/8010; PHENOLICS 604/8040; POLYNUCLEAR AROMATIC 610/8310; TOTAL ORGANIC CARBON (TOC) 415/9060; TOTAL ORGANIC HALIDE (TOX) 9020; EP TOX/TCLP METALS (Circle One); METALS (TOTAL) (See Special Inst.); TCLP ORGANICS; GENERAL CHEMISTRY (Specify): pH, COND ALK; NO_3/NO_2, Cl SO_4; Ca, Mg, Na, K; 2/12, 1; OTHER (Specify)

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature JJ Kirtland	Signature Anne Udaloy	Signature		
Printed Name Jeff Kirtland	Printed Name ANNE UDALOY	Printed Name	Shipping I.D. No.	Total No. of Containers
Firm SE/E	Firm SE/E	Firm	VIA	Chain of Custody Seals
Date/Time 5/29/91 1000	Date/Time 5/30/91 8:45	Date/Time	Project	Received in good condition
				LAB NO.
Received By Anne Udaloy	Received By Siang	Received By	SPECIAL INSTRUCTIONS/COMMENTS	
Signature ANNE UDALOY	Signature Siang	Signature		
Printed Name SE/E	Printed Name SAS	Printed Name		
Firm 5/29/91 10:00	Firm 5/30/91 8:45 AM	Firm		
Date/Time	Date/Time	Date/Time		

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Appendix I

SOIL ANALYSIS DATA - TREATED SOILS (VES SYSTEM)

Columbia Analytical Services inc.

February 12, 1991

Peter Rowland
Sweet - Edwards/EMCON
18912 N. Creek Pkwy - Suite 210
Bothell, WA 98011

Re: **Daniels/Project #W1601.01**

Dear Peter:

Enclosed are the results of the soil samples submitted to our lab on January 22, 1991. Preliminary results were transmitted via facsimile on February 6, 1991. For your reference, our service request number for this work is K910328.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

Robert Scuderi
Senior Project Chemist

RS/lip

1317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 206/577-7222 • Fax 206/636-1068

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Sweet - Edwards/EMCON
Submitted By: Peter Rowland
Project: Daniels/#W1601.01
Sample Matrix: Soil

Date Received: 01/22/91
Date Extracted: 01/24/91
Date Analyzed: 01/31-02/07/91
Work Order #: K910328

Hydrocarbon Scan
EPA Methods 3550/Modified 8015
mg/Kg (ppm)
Dry Weight Basis

Sample Name	Lab Code	MRL	Diesel	Jet Fuel	Gasoline	Kerosene	Mineral Spirits	Oil*
D-1-6,1-10 Comp	K0328-3	50	ND	ND	ND	ND	ND	ND
D-2-5	K0328-4	50	ND	ND	ND	ND	ND	730
D-3-6, 3-9 Comp	K0328-7	50	ND	ND	ND	ND	ND	330
D-4-8	K0328-8	50	270	ND	ND	ND	ND	250
D-5-5, 5-10 Comp	K0328-11	50	170	ND	ND	ND	ND	ND
D-6-6, 6-12 Comp	K0328-14	50	ND	ND	ND	ND	ND	ND
D-7-8	K0328-15	50	ND	ND	ND	ND	ND	ND
D-8-4, 8-12 Comp	K0328-18	50	ND	ND	ND	ND	ND	1,100
D-9-13	K0328-19	50	ND	ND	ND	ND	ND	300
Method Blank	K0328-MB	50	ND	ND	ND	ND	ND	ND

MRL Method Reporting Limit
***** Quantitated using hydraulic oil as a standard. The MRL for oil is five times the MRL shown above. The oil results were performed on February 7, 1991 after the samples were cleaned up with silica gel to remove polar organics which may interfer with the nonpolar petroleum products.
ND None Detected at or above the method reporting limit

Approved by R. Sundberg Date 2/12/91

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Extracted:**	01/28/91
Project:	Daniels/#W1601.01	**Work Order #:**	K910328
Sample Matrix:	Soil		

BTEX
EPA Methods 5030/8020
mg/Kg (ppm)
Dry Weight Basis

Sample Name:		D-1-6, 1-10 Comp	D-2-5	D-3-6, 3-9 Comp
Lab Code:		K0328-3	K0328-4	K0328-7
Date Analyzed:		01/28/91	01/28/91	01/28/91
Analytes	**MRL**			
Benzene	0.05	ND	ND	ND
Toluene	0.1	ND	ND	ND
Ethylbenzene	0.1	ND	ND	ND
Total Xylenes	0.1	ND	ND	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by B. Sweden Date 2/12/91

1317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 206/577-7222 • Fax 206/636-1068

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Extracted:**	01/28/91
Project:	Daniels/#W1601.01	**Work Order #:**	K910328
Sample Matrix:	Soil		

BTEX
EPA Methods 5030/8020
mg/Kg (ppm)
Dry Weight Basis

Sample Name:		D-4-8	D-5-5, 5-10 Comp	D-6-6, 6-12 Comp
Lab Code:		K0328-8	K0328-11	K0328-14
Date Analyzed:		01/28/91	01/28/91	01/28/91
Analytes	**MRL**			
Benzene	0.05	ND	ND	ND
Toluene	0.1	ND	ND	ND
Ethylbenzene	0.1	ND	ND	ND
Total Xylenes	0.1	ND	ND	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by B. Sadler Date 2/12/91

1317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 206/577-7222 • Fax 206/636-1068

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Extracted:**	01/28/91
Project:	Daniels/#W1601.01	**Work Order #:**	K910328
Sample Matrix:	Soil		

BTEX
EPA Methods 5030/8020
mg/Kg (ppm)
Dry Weight Basis

Sample Name:		D-7-8	D-8-4, 8-12 Comp	D-9-13
Lab Code:		K0328-15	K0328-18	K0328-19
Date Analyzed:		01/28/91	01/28/91	01/28/91
Analytes	**MRL**			
Benzene	0.05	ND	ND	ND
Toluene	0.1	ND	ND	ND
Ethylbenzene	0.1	ND	ND	ND
Total Xylenes	0.1	ND	ND	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by B. Sudan Date 2/12/91

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Extracted:**	01/28/91
Project:	Daniels/#W1601.01	**Work Order #:**	K910328
Sample Matrix:	Soil		

BTEX
EPA Methods 5030/8020
mg/Kg (ppm)
Dry Weight Basis

Sample Name:		Method Blank
Lab Code:		K0328-MB
Date Analyzed:		01/28/91
Analytes	**MRL**	
Benzene	0.05	ND
Toluene	0.1	ND
Ethylbenzene	0.1	ND
Total Xylenes	0.1	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by B. Sutton Date 2/12/91

1317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 206/577-7222 • Fax 206/636-1068

APPENDIX A

LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Extracted:**	01/24/91
Project:	Daniels/#W1601.01	**Date Analyzed:**	01/31/91
Sample Matrix:	Soil	**Work Order #:**	K910328

QA/QC Report
Surrogate Recovery Summary
Hydrocarbon Scan
EPA Methods 3550/Modified 8015

Sample Name	Lab Code	Percent Recovery *p*-Terphenyl
D-1-6,1-10 Comp	K0328-3	102
D-1-6,1-10 Comp	K0328-3MS	*61.6
D-1-6, 1-10 Comp	K0328-3DMS	*58.1
D-2-5	K0328-4	114
D-3-6, 3-9 Comp	K0328-7	92.7
D-4-8	K0328-8	103
D-5-5, 5-10 Comp	K0328-11	*51
D-6-6, 6-12 Comp	K0328-14	110
D-7-8	K0328-15	**121
D-8-4, 8-12 Comp	K0328-18	98
D-9-13	K0328-19	92
Method Blank	K0328-MB	103
	CAS Acceptance Criteria	65-115

* Outside acceptance limits because of matrix interferences. The gas chromatogram showed target components that interfered with the analyses. The sample was not reanalyzed.

** Outside acceptance limits. Since no target analytes were detected in the sample, the elevated percent recovery does not adversely impact the data.

Approved by B.S. Date 2/12/91

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Extracted:**	01/24/91
Project:	Daniels/#W1601.01	**Date Analyzed:**	01/31/91
Sample Matrix:	Soil	**Work Order #:**	K910328

QA/QC Report
Matrix Spike/Duplicate Matrix Spike Summary
Hydrocarbon Scan
EPA Methods 3550/Modified 8015
mg/Kg (ppm)
Dry Weight Basis

Sample Name: D-1-6, 1-10 Comp

Lab Code	Analyte	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
K0328-3MS	Diesel	10	774	ND	784	101	45-110
K0328-3DMS	Diesel	10	1,130	ND	1,000	88.5	45-110

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by B. Sanders Date 2/12/91

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Extracted:**	01/28/91
Project:	Daniels/#W1601.01	**Date Analyzed:**	01/28/91
Sample Matrix:	Soil	**Work Order #:**	K910328

QA/QC Report
Surrogate Recovery Summary
BTEX
EPA Methods 5030/8020

Sample Name	Lab Code	Percent Recovery 4-Bromofluorobenzene
D-1-6, 1-10 Comp	K0328-3	84.2
D-2-5	K0328-4	71.9
D-3-6 3-9 Comp	K0328-7	71.8
D-4-8	K0328-8	78.6
D-5-5, 5-10 Comp	K0328-11	92.2
D-6-6, 6-12 Comp	K0328-14	82.2
D-7-8	K0328-15	59.2
D-8-4, 8-12 Comp	K0328-18	63.6
D-9-13	K0328-19	98.8
Method Blank	K0328-MB	87.5
	CAS Acceptance Criteria	50-130

Approved by R. Sanders Date 2/12/91

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Extracted:**	01/28/91
Project:	Daniels/#W1601.01	**Date Analyzed:**	02/01/91
Sample Matrix:	Soil	**Work Order #:**	K910328

QA/QC Report
Surrogate Recovery Summary
BTEX
EPA Methods 5030/8020

Sample Name	Lab Code	Percent Recovery 4-Bromofluorobenzene
D-2-5	K0328-4MS	95.0
D-2-5	K0328-4DMS	85.9
	CAS Acceptance Criteria	50-130

Approved by _____ Date 2/12/91

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Extracted:**	01/28/91
Project:	Daniels/#W1601.01	**Date Analyzed:**	02/01/91
Sample Matrix:	Soil	**Work Order #:**	K910328

QA/QC Report
Matrix Spike/Duplicate Matrix Spike Summary
BTEX
EPA Methods 5030/8020
mg/Kg (ppm)
Dry Weight Basis

Sample Name: D-2-5
Lab Code: K0328-4MS/DMS

Analytes	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
Benzene	1.11	1.14	ND	0.95	1.18	85.6	104	39-150
Toluene	1.11	1.14	ND	1.51	1.53	136	134	46-148
Ethylbenzene	1.11	1.14	ND	1.64	1.60	148	140	32-160

ND None Detected at or above the method reporting limit

Approved by B.Sadler Date 2/12/91

APPENDIX B

CHAIN OF CUSTODY INFORMATION

1C0328

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 1-21-91 PAGE 1 OF 2

PROJECT W160101 #
CLIENT INFO. CONTACT Bill Daniels.
ADDRESS
TELEPHONE#
SAMPLERS NAME Pete Rowland PHONE# 485-5000
SAMPLERS SIGNATURE Pete Rowland

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE
1. D-1-6	1-18-91			SOIL
2. D-1-10				
3. D-2-5				
4. D-3-6				
5. D-3-9				
6. D-4-8				
7. D-5-5				
8. D-5-10				

ANALYSIS REQUESTED

BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	GENERAL CHEMISTRY (Specify) pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	OTHER (Specify) BTEX 8020	TPH 8015M GAS				NUMBER OF CONTAINERS
	COMPOSIT												X	X				1
													X	X				1
													X	X				1
	COMPOSIT												X	X				1
													X	X				1
													X	X				1
	COMPOSIT												X	X				1
													X	X				1

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature: Pete Rowland	Signature: John C. Zahle	Signature		8
Printed Name: SEE	Printed Name: CAS	Printed Name	Shipping I.D. No.	Total No. of Containers
Firm: 1-21-91 8:30 AM	Firm: 0900 012191	Firm	VIA	Chain of Custody Seals
Date/Time	Date/Time	Date/Time	Project	Received in good condition
Received By: M Higgins	Received By: Ruth Allison	Received By		LAB NO.
Signature: M Higgins	Signature: Ruth Allison	Signature	SPECIAL INSTRUCTIONS/COMMENTS	
Printed Name: CAS/BOTHELL	Printed Name: CAS	Printed Name		
Firm: SAME	Firm: 1/22/91 0830	Firm		
Date/Time	Date/Time	Date/Time		

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retain by originator.

E/E 400-05

KO328

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 1-21-91 PAGE 2 OF 2

PROJECT W160101 #
CLIENT INFO. CONTACT Bill Daniels.
ADDRESS
TELEPHONE#
SAMPLERS NAME PHONE# 485-5000
SAMPLERS SIGNATURE Peter Rowland

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE
1. D-6-6	1-18-91			SOIL
2. D-6-12				
3. D-7-8				
4. D-8-4				
5. D-8-12				
6. D-9-13				
7.				
8.				

ANALYSIS REQUESTED

BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	GENERAL CHEMISTRY (Specify) pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	OTHER (Specify) TPH 8015 M+HGMS	BTEX 8020					NUMBER OF CONTAINERS
Composite													X	X					1
													X	X					1
													X	X					1
Composite													X	X					1
													X	X					1
													X	X					1
																			6 + 8 = 14 TOTAL

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature	Signature John L Zabe	Signature	Shipping I.D. No.	Total No. of Containers
Printed Name SE/E	Printed Name CAS	Printed Name	VIA	Chain of Custody Seals
Firm 1-21-91 - 8:30 AM	Firm 012191 0900	Firm	Project	Received in good condition
Date/Time	Date/Time	Date/Time		LAB NO.
Received By	Received By Ruth Allison	Received By	SPECIAL INSTRUCTIONS/COMMENTS	
Signature M. HIGGINS	Signature Ruth Allison	Signature		
Printed Name CAS/BOTHELL	Printed Name CAS	Printed Name		
Firm SAME -	Firm 1/22/91 0830	Firm		
Date/Time	Date/Time	Date/Time		

DISTRIBUTION: WHITE - return to originator YELLOW - lab PINK - retained by originator.

EIF 400-05

Columbia Analytical Services Inc.

RECEIVED
FEB 2 8 1991

February 26, 1991

COPY

Peter Rowland
Sweet - Edwards/EMCON
18912 N. Creek Pkwy
Suite 210
Bothell, WA 98011

Re: **Bill Daniels/Project #W1601.01**

Dear Peter:

Enclosed are the results of the soil samples requested for analysis on February 14, 1991, from previous service request number K910328 received on January 22, 1991. For your reference, our service request number for this work is K910793.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

Robert Scuderi
Senior Project Chemist

RS/das

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Requested:**	02/14/91
Project:	Bill Daniels/#W1601.01	**Date Extracted:**	02/15/91
Sample Matrix:	Soil	**Date Analyzed:**	02/20/91
		Work Order #:	K910793

Total Recoverable Petroleum Hydrocarbons
SM Method 5520E/EPA Method 418.1
mg/Kg (ppm)
Dry Weight Basis

Sample Name	Lab Code	MRL	Result
D-2-5	K0328-4	25	209
D-3-6, 3-9 Comp	K0328-7	25	361
D-4-8	K0328-8	25	565
D-8-4, 8-12 Comp	K0328-18	25	488
D-9-13	K0328-19	25	366
Method Blank	K0793-MB	25	ND

SM *Standard Methods for the Examination of Water and Wastewater*, 17th Edition, 1989
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by B. Scott Date 2/26/91

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APPENDIX A

LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Requested:**	02/14/91
Project:	Bill Daniels/#W1601.01	**Date Extracted:**	02/15/91
Sample Matrix:	Soil	**Date Analyzed:**	02/20/91
		Work Order #:	K910793

QA/QC Report
Duplicate Summary
Total Recoverable Petroleum Hydrocarbons
SM Method 5520E/EPA Method 418.1
mg/Kg (ppm)
Dry Weight Basis

Sample Name	Lab Code	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
D-2-5	K0328-4	25	209	191	200	9

SM *Standard Methods for the Examination of Water and Wastewater*, 17th Edition, 1989
MRL Method Reporting Limit

Approved by R. Scudi Date 2/26/91

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COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Sweet - Edwards/EMCON	**Date Received:**	01/22/91
Submitted By:	Peter Rowland	**Date Requested:**	02/14/91
Project:	Bill Daniels/#W1601.01	**Date Extracted:**	02/15/91
Sample Matrix:	Soil	**Date Analyzed:**	02/20/91
		Work Order #:	K910793

QA/QC Report
Matrix Spike Summary
Total Recoverable Petroleum Hydrocarbons
SM Method 5520E/EPA Method 418.1
mg/Kg (ppm)
Dry Weight Basis

Sample Name	Lab Code	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery
D-9-13	K0328-19MS	25	978	366	1,240	89

SM *Standard Methods for the Examination of Water and Wastewater*, 17th Edition, 1989
MRL Method Reporting Limit

Approved by B. Sundberg Date 2/26/91

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Appendix J

SOIL ANALYSIS DATA - STOCKPILES (PHASE II)

41601

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet-Edwards Date: July 11, 1991

Report On: Analysis of Soil Lab No.: 185455

IDENTIFICATION:
Samples Received on 07-08-91
Project: W160102 Daniels

ANALYSIS:

Lab Sample No.	Client ID	Total Petroleum Hydrocarbons, mg/kg by EPA Method 418.1
1	*SC-11 A,B,C	66
2	*SC-12 A,B,C	110
3	*SC-13 A,B,C	65
4	*SC-14 A,B,C	470
5	*SC-15 A,B,C	130
6	*SC-16 A,B,C	160
7	*SC-17 A,B,C	730
8	*SC-18 A,B,C	160
9	*SC-19 A,B,C	180
10	*SC-20 A,B,C	390
11	*SC-21 A,B,C	400

Note - Results reported on an as received basis.

*A composite sample was made at Sound Analytical; the composite was analyzed.

Continued . . .

SOUND ANALYTICAL SERVICES, INC.

Sweet-Edwards
Project: W160102

July 11, 1991

Lab Sample No.	Client ID	*Total Petroleum Fuel Hydrocarbons, mg/kg
12	7-1-91-1	< 10.0
13	7-3-91-2	19 Diesel
14	7-3-91-1	< 10.0
15	7-3-91-4	< 10.0

*TPH by EPA SW-846 Modified Method 8015

Note - Results reported on an as received basis.

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 18545 (1)
Date: July 11, 1991
Client: Sweet-Edwards

Client ID: *SC-11 A,B,C
Matrix: Soil
Units: mg/kg

Compound	Sample(S)	Duplicate(D)	RPD*
Total Petroleum Hydrocarbons	66	60	9.5

Lab No: 18545 (11)
Date: July 11, 1991
Client: Sweet-Edwards

Client ID: *SC-21 A,B,C
Matrix: Soil
Units: mg/kg

Compound	Sample(S)	Duplicate(D)	RPD*
Total Petroleum Hydrocarbons	400	400	---

Lab No: 18545 (12)
Date: July 11, 1991
Client: Sweet-Edwards

Client ID: 7-1-91-1
Matrix: Soil
Units: mg/kg

Compound	Sample(S)	Duplicate(D)	RPD*
Total Petroleum Fuel Hydrocarbons	< 10.0	< 10.0	---
%Surrogate Recovery			
1-Chlorooctane	80	94	
Perylene	73	82	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

ANALYTICAL NARRATIVE

TPH CHECKLIST

Client: Sweet-Edwards

Lab No.: 18545

Project Name: W160102

Prepared by: Dawn Werner

Delivered by: UPS

Analyzed by: Dean Strom

Lab Number	12	13	14	15	
Client ID	7-1-91-1	7-1-91-2	7-3-91-1	7-3-91-4	
Date Sampled	7-2-91	7-3-91	7-3-91	7-3-91	
Date Received	7-8-91	7-8-91	7-8-91	7-8-91	
Date Extracted	7-9-91	7-9-91	7-9-91	7-9-91	
Date Analyzed	7-10-91	7-10-91	7-10-91	7-10-91	
Dilution Factor					
Sample Matrix	Soil	Soil	Soil	Soil	
Matrix Spike %R					
Matrix Spike Duplicate % RPD					
Surrogate Recovery 8015 Modified 1-Chlorooctane Perylene	 80 73	 81 78	 85 69	 91 82	
Condition of samples on receipt: Samples received cold and in good condition. Chain of custody was in order.					
Notes and Discussion:					

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 7/5/91 PAGE 1 OF 2

PROJECT DANIELS # W160102
CLIENT INFO. CONTACT P. ROWLAND
ADDRESS ABOVE
TELEPHONE# ABOVE
SAMPLERS NAME P. ROWLAND PHONE#
SAMPLERS SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	418.1 TPH						NUMBER OF CONTAINERS
1. SC-11, A,B,C	7/5			Soil			Composit					A	B	&	C			✓						3
2. SC-12, ABC	"			"					"				"					✓						3
3. SC-13, -A,-B,-C	"			"					"				"					✓						3
4. SC-14, A, B, C	"			"					"				"					✓						3
5. SC-15 A, B, C	"			"					"				"					✓						3
6. SC-16 A,B,C	"			"					"				"					✓						3
7. SC-17 A,B,C	"			"					"				"					✓						3
8. SC-18 A,B,C	"			"					"				"					✓						3

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature PETER ROWLAND	Signature	Signature		24
Printed Name S/E/E	Printed Name	Printed Name	Shipping I.D. No.	Total No. of Containers
Firm 7/5/91 3:00pm	Firm	Firm	VIA	Chain of Custody Seals
Date/Time	Date/Time	Date/Time	Project	Received in good condition
				LAB NO.
Received By Mary Curtiss	Received By	Received By	SPECIAL INSTRUCTIONS/COMMENTS	
Signature Mary Curtiss	Signature	Signature		
Printed Name SAS	Printed Name	Printed Name		
Firm 7-8-91 3:30pm	Firm	Firm		
Date/Time	Date/Time	Date/Time		

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 7/5/91 PAGE 2 OF 2

PROJECT DANIELS # W160102
CLIENT INFO. CONTACT P. ROWLAND
ADDRESS ABOVE
TELEPHONE#
SAMPLERS NAME P. ROWLAND PHONE#
SAMPLERS SIGNATURE PR

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	GENERAL CHEMISTRY (Specify) 418.1 TPH	8015 M TPH	OTHER (Specify)	NUMBER OF CONTAINERS
1. SC-19, A, B, C	7/5			Soil		COMPOSIT					A, B & C							✓			3
2. SC-20, A, B, C	7/5			"		COMPOSIT					A, B & C							✓			3
3. SC-21, ABC	7/5			"		COMPOSIT					A, B, & C							✓			3
4. 7-1-91-1	7/2			"														~~TPH~~	✓		1
5. 7-3-91-2	7/3			"															✓		1
6. 7-3-91-1	7/3			"															✓		1
7. 7-3-91-4	7/3			"															✓		1
8.																					13 + 24

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature	Signature	Signature	Shipping I.D. No.	Total No. of Containers
Printed Name SE/E	Printed Name	Printed Name	VIA	Chain of Custody Seals TOTAL 37
Firm 7/5/91 3:00pm	Firm	Firm	Project	Received in good condition
Date/Time	Date/Time	Date/Time		LAB NO.
Received By Mary Curtiss	**Received By**	**Received By**	**SPECIAL INSTRUCTIONS/COMMENTS**	
Signature Mary Curtiss	Signature	Signature	SAMPLES 4, 5, 6 & 7 CAN BE ~~INVOICED~~ 2→ (see Stan)	
Printed Name SAS	Printed Name	Printed Name	ALL 418.1 ANALYSES NOT TO BE ~~INVOICED~~ AS PER STAN.	
Firm 7-8-91 3:30pm	Firm	Firm		
Date/Time	Date/Time	Date/Time		

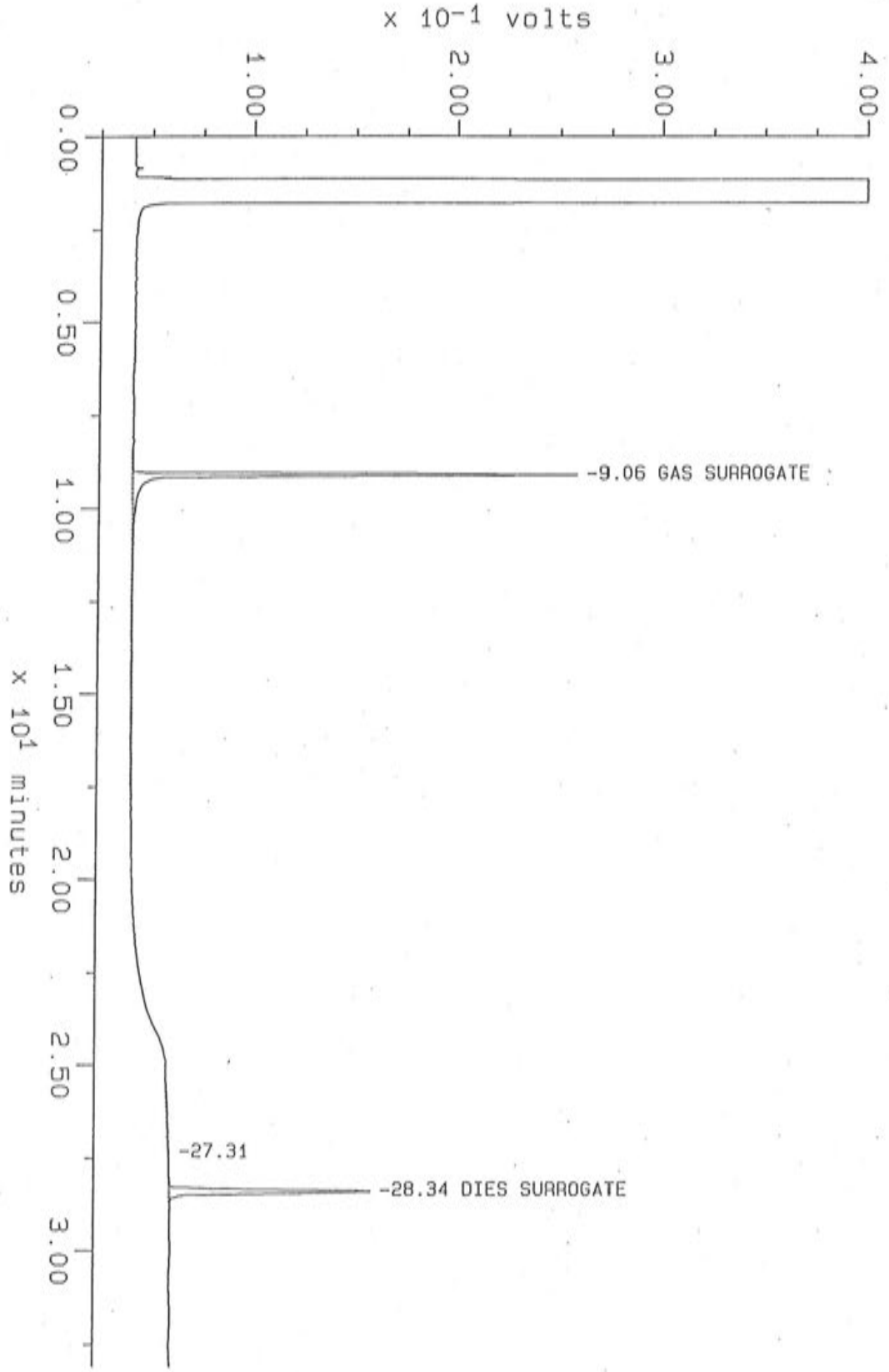
DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Sample: 18545-12
Acquired: 10-JUL-91 9:15
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015HP1
Amount: 2.028

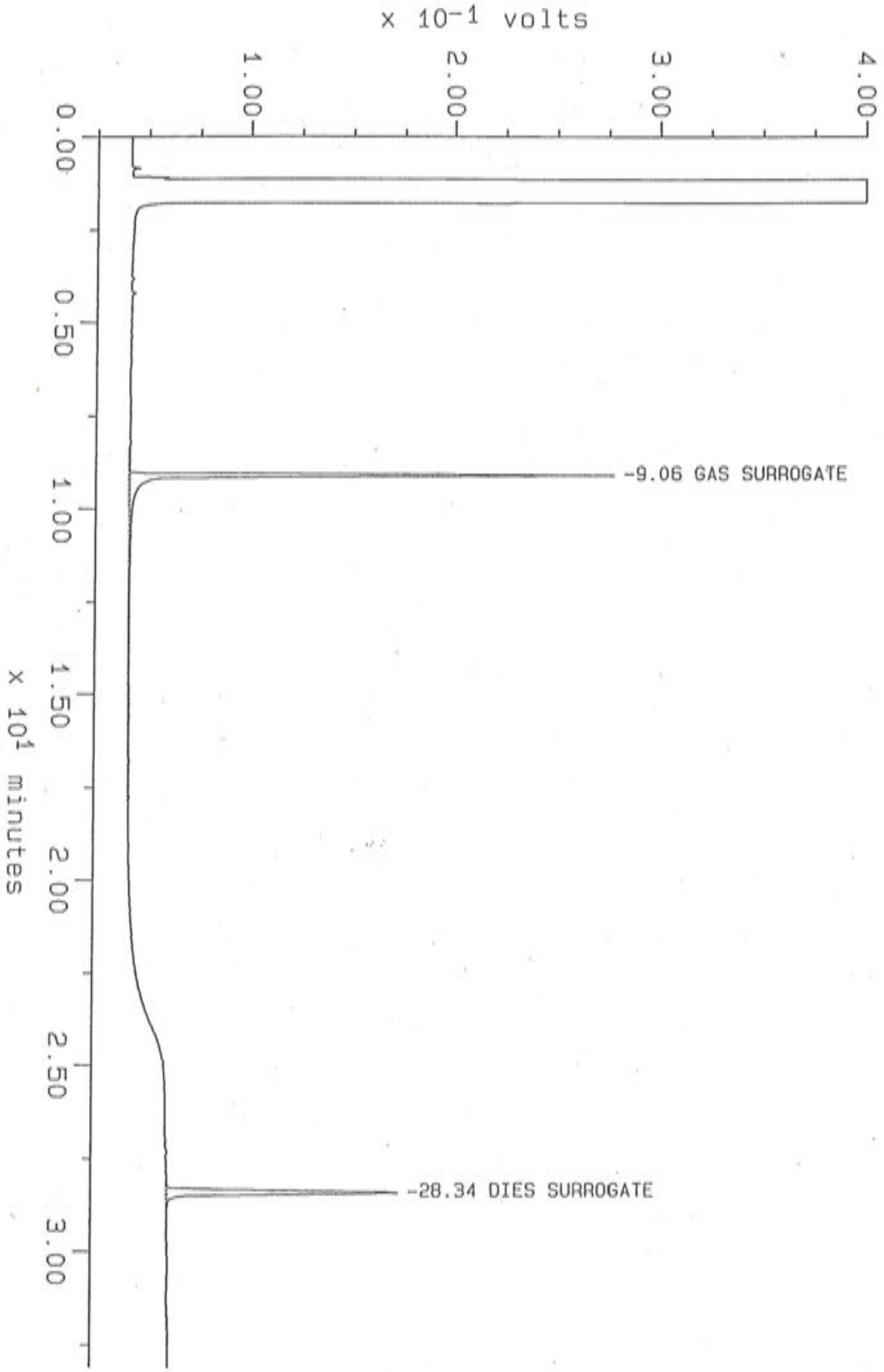
Filename: 18545-12
Operator: DAS



Sample: 18545-12D
Acquired: 10-JUL-91 9:59
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015HP1
Amount: 2.256

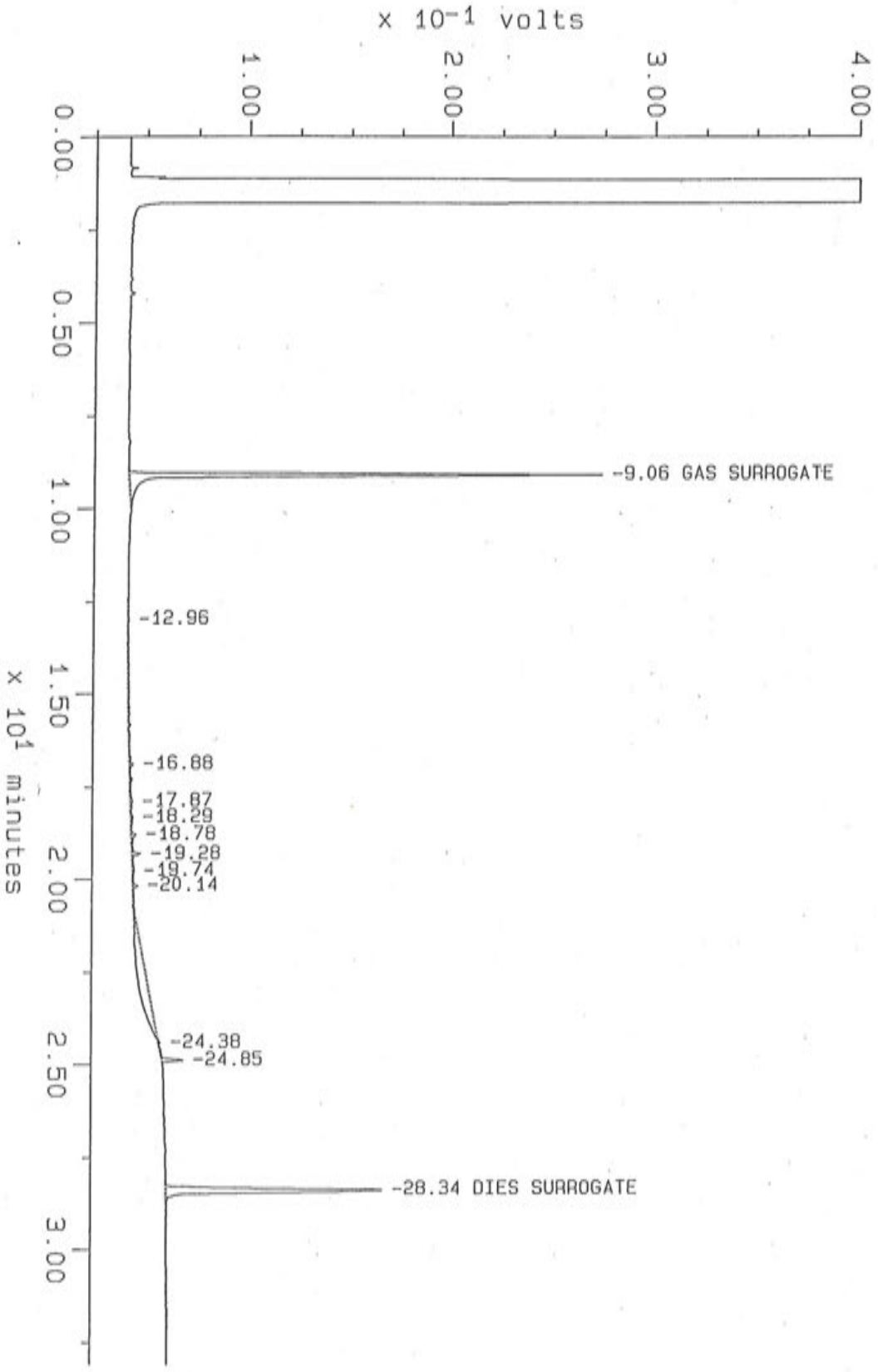
Filename: 545-12D
Operator: DAS



Sample: 18545-13
Acquired: 10-JUL-91 10:42
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015HP1
Amount: 2.408

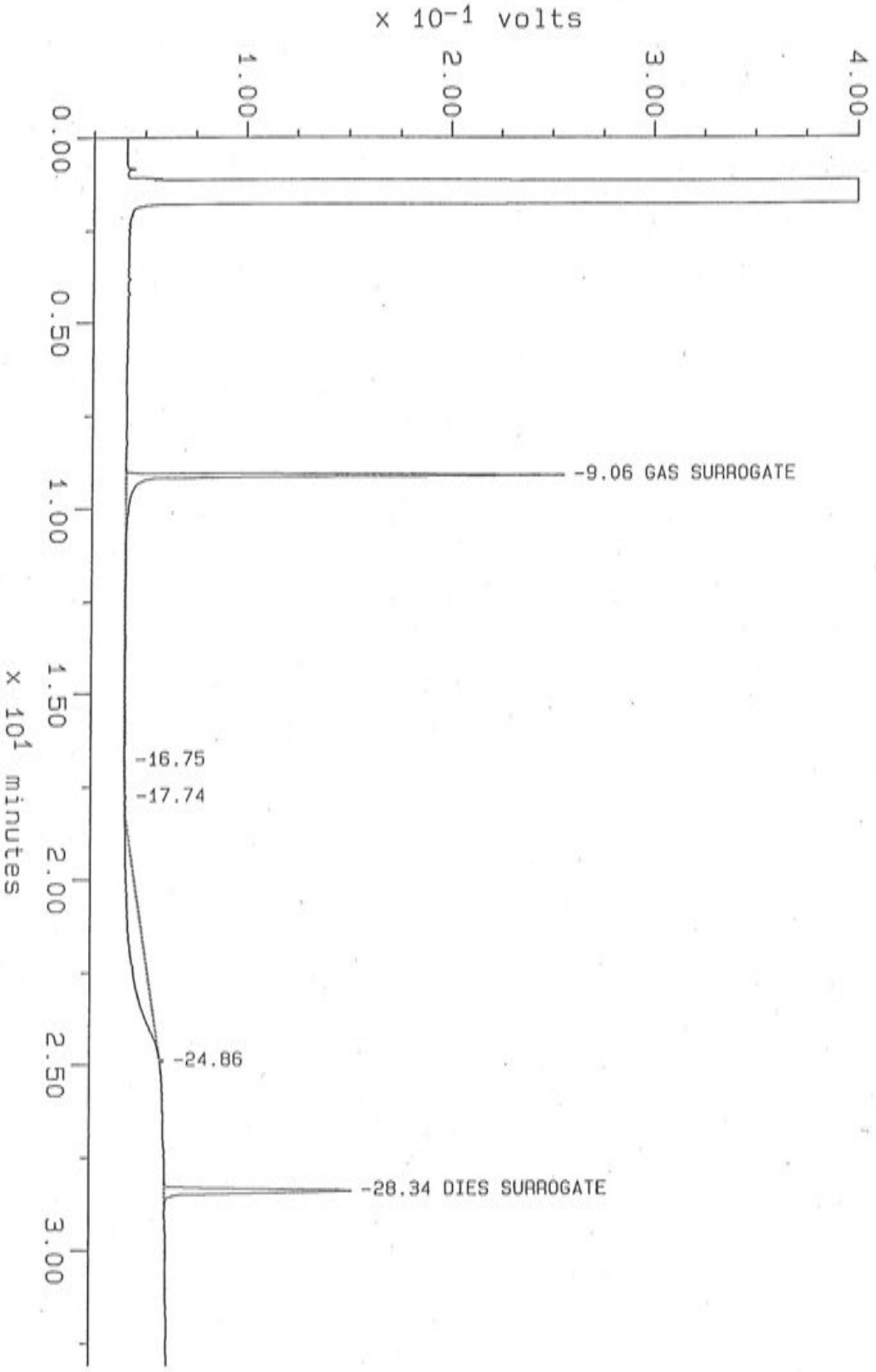
Filename: 18545-13
Operator: DAS



Sample: 18545-14
Acquired: 10-JUL-91 12:08
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015HP1
Amount: 2.147

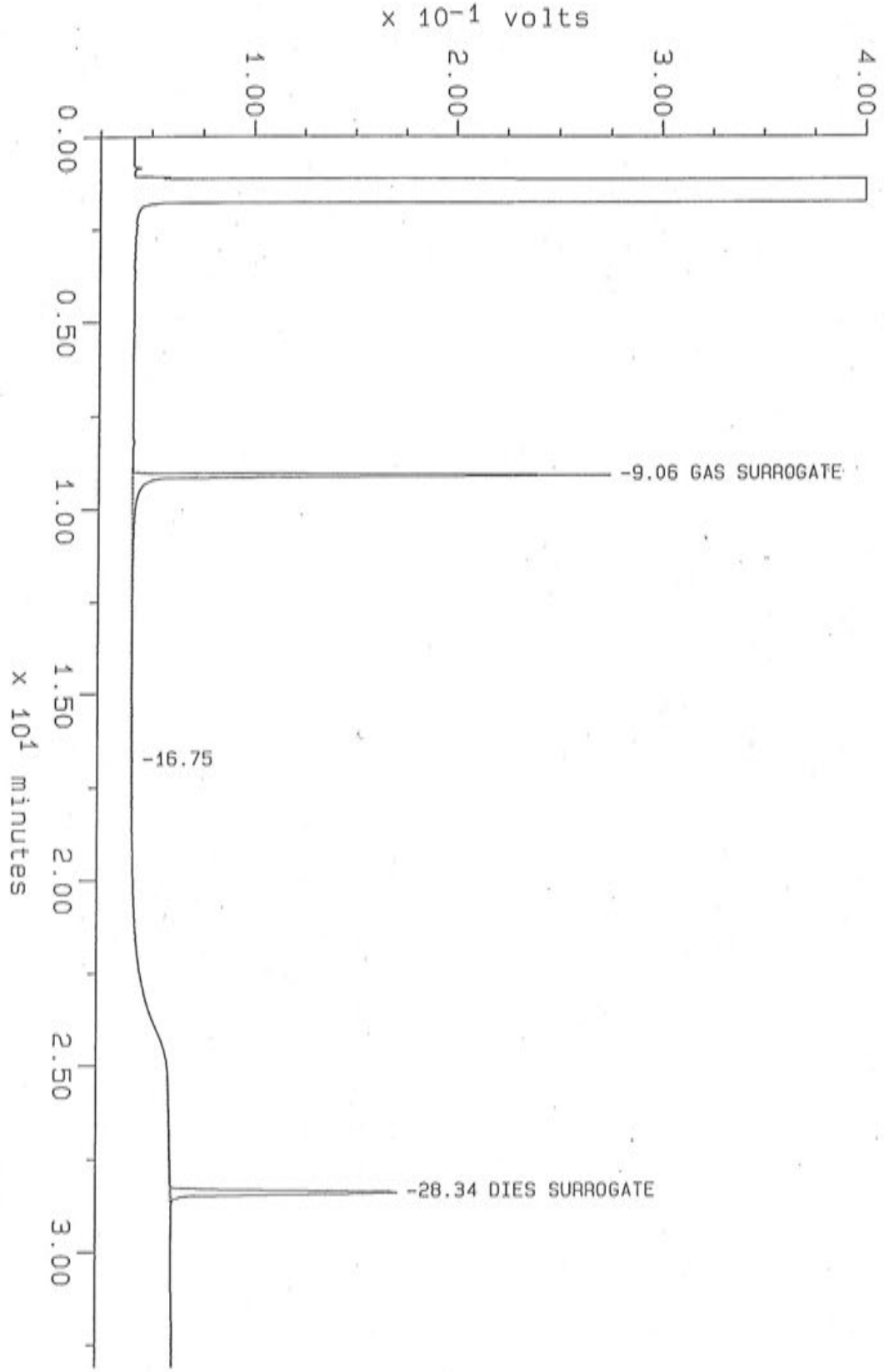
Filename: 18545-14
Operator: DAS

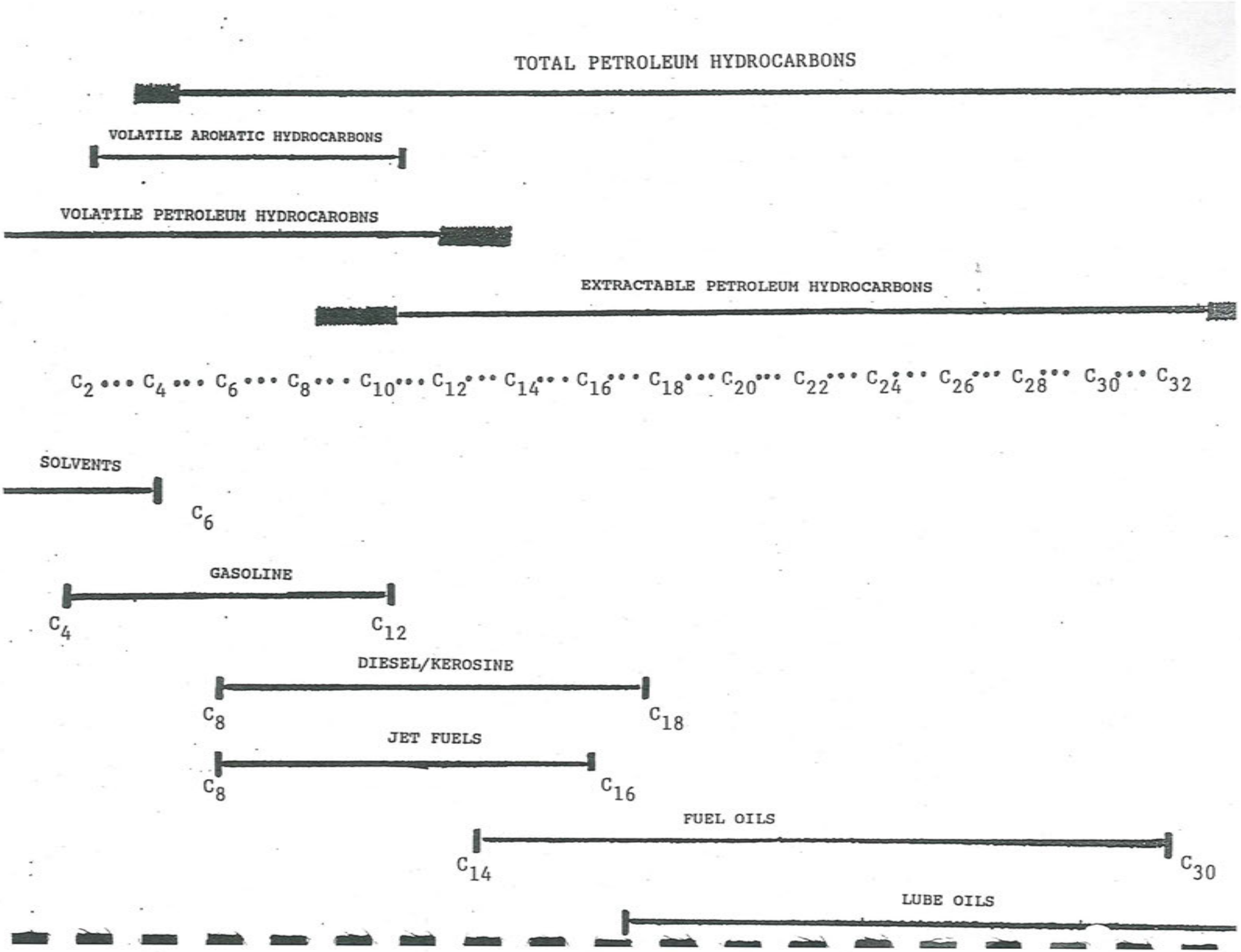


Sample: 18545-15
Acquired: 10-JUL-91 12:52
Dilution: 1 : 10.000

Channel: detector 1
Method: C:\MAX\DATA2\8015HP1
Amount: 2.286

Filename: 18545-15
Operator: DAS

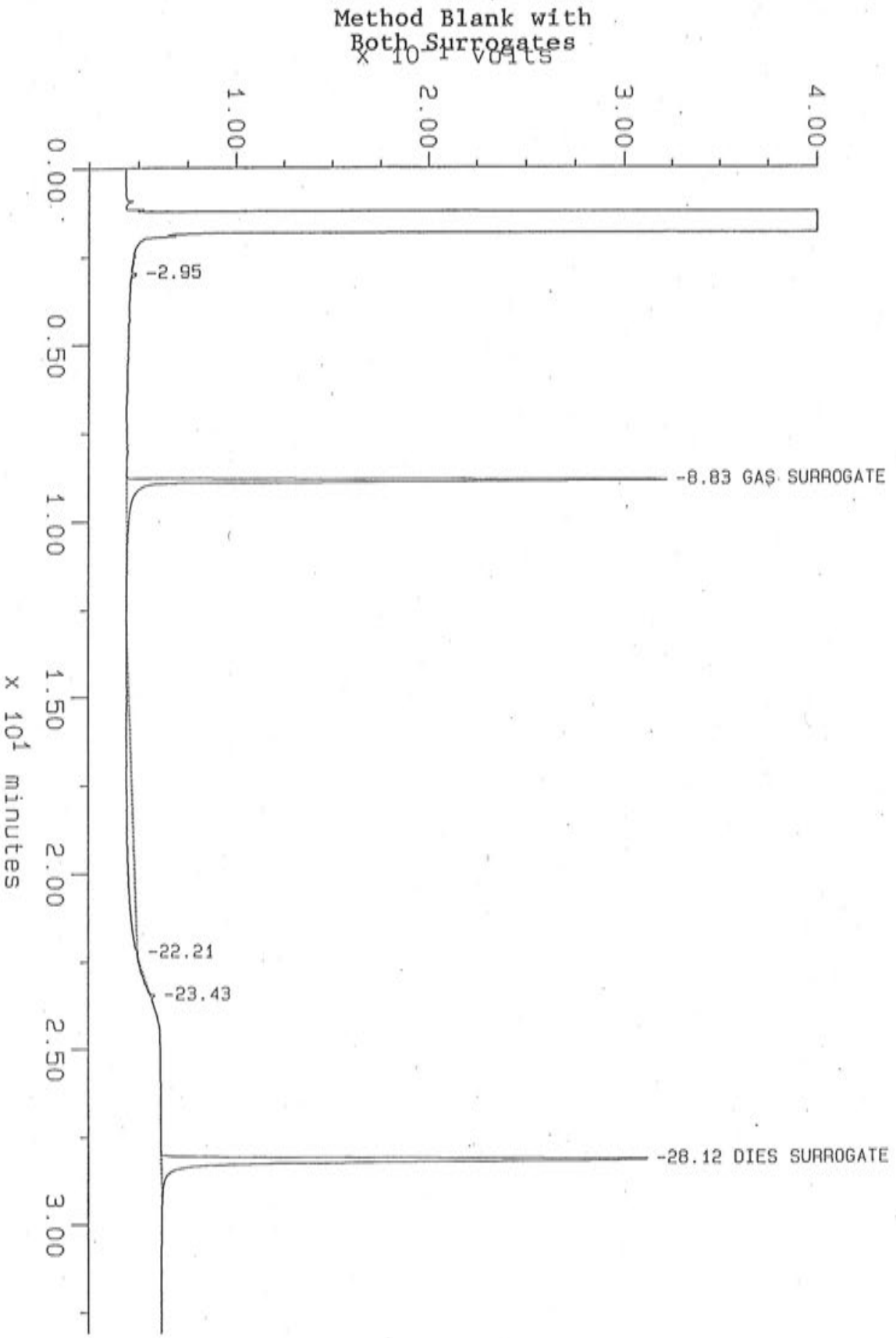



TOTAL PETROLEUM HYDROCARBONS
VOLATILE AROMATIC HYDROCARBONS
VOLATILE PETROLEUM HYDROCAROBNS
EXTRACTABLE PETROLEUM HYDROCARBONS
C2 C4 C6 C8 C10 C12 C14 C16 C18 C20 C22 C24 C26 C28 C30 C32
SOLVENTS
C6
GASOLINE
C4
C12
DIESEL/KEROSINE
C8
C18
JET FUELS
C8
C16
FUEL OILS
C14
C30
LUBE OILS

Sample: BLANK
Acquired: 30-MAY-91 16:30

Channel: detector 1
Method: C:\MAX\DATA1\8015D

Filename: BLANK2S1
Operator: DAS

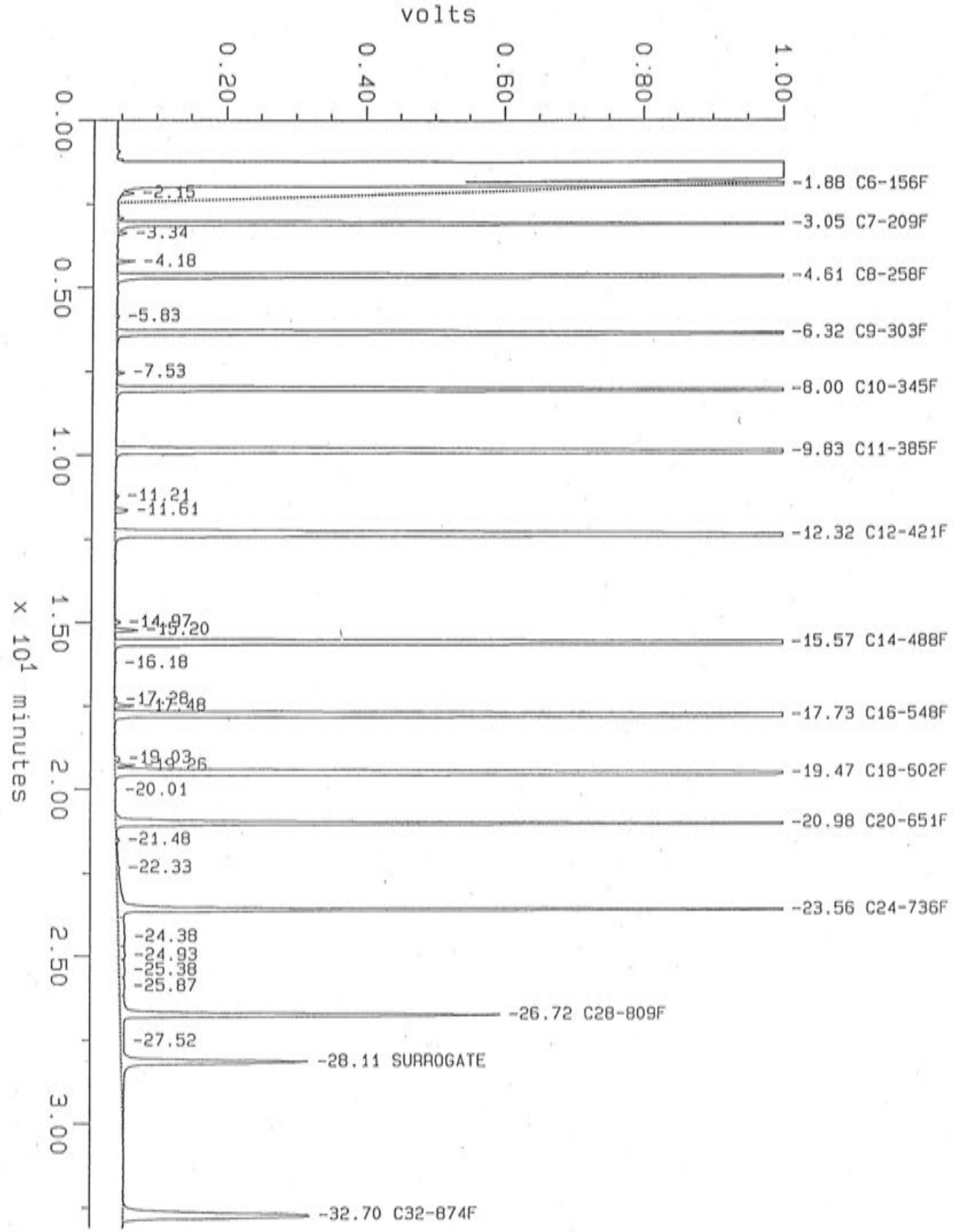


Sample: CALIBSTD
Acquired: 20-MAY-91 14:11

Channel: detector 1
Method: C:\MAX\DATA1\CALIBSTD

Filename: CALIBSTD
Operator: DAS

Standard Alkane Mixture (C6 to C32)

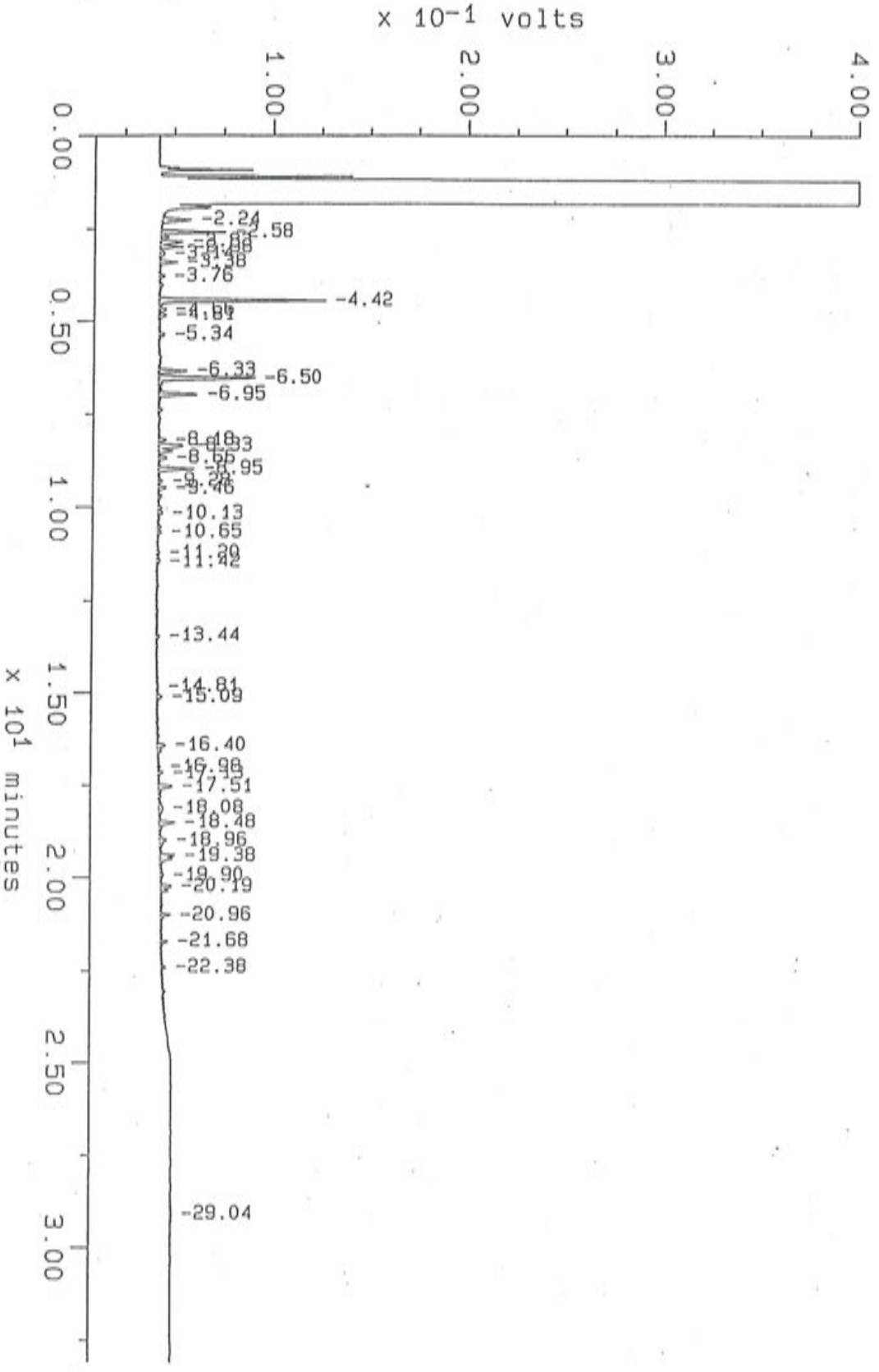


Sample: 50G/D
Acquired: 13-MAY-91 10:18

Channel: detector 1
Method: C:\MAX\DATA1\B0158U

Filename: 50GD6
Operator: DAS

Calibration Standard
50 ppm Gasoline and Diesel

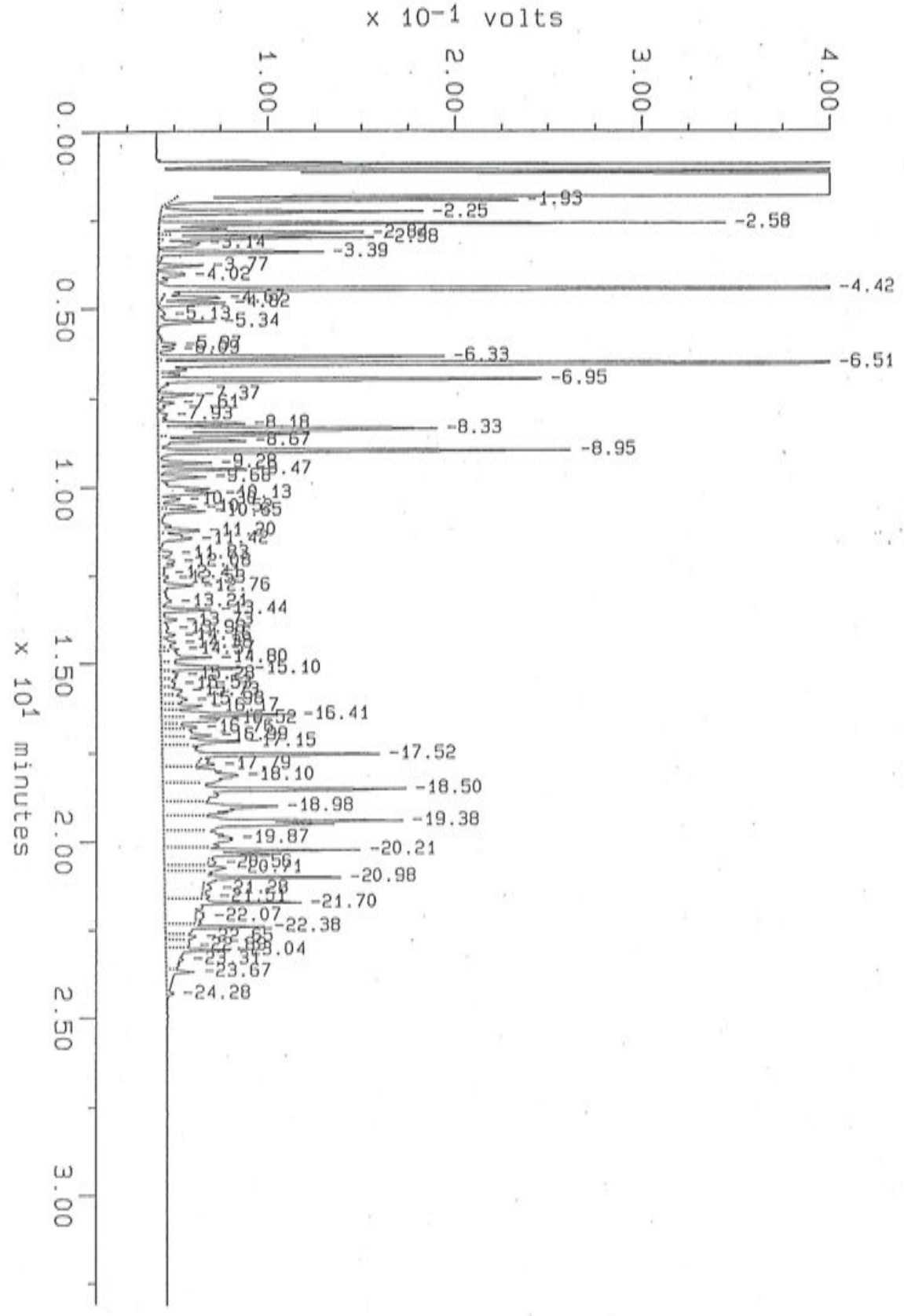


Sample: 500G/D
Acquired: 08-MAY-91 20:13

Channel: detector 1
Method: C:\MAX\DATA1\8015HP1

Filename: 500GD5
Operator: DAS

Calibration Standard
500 ppm Gasoline and Diesel

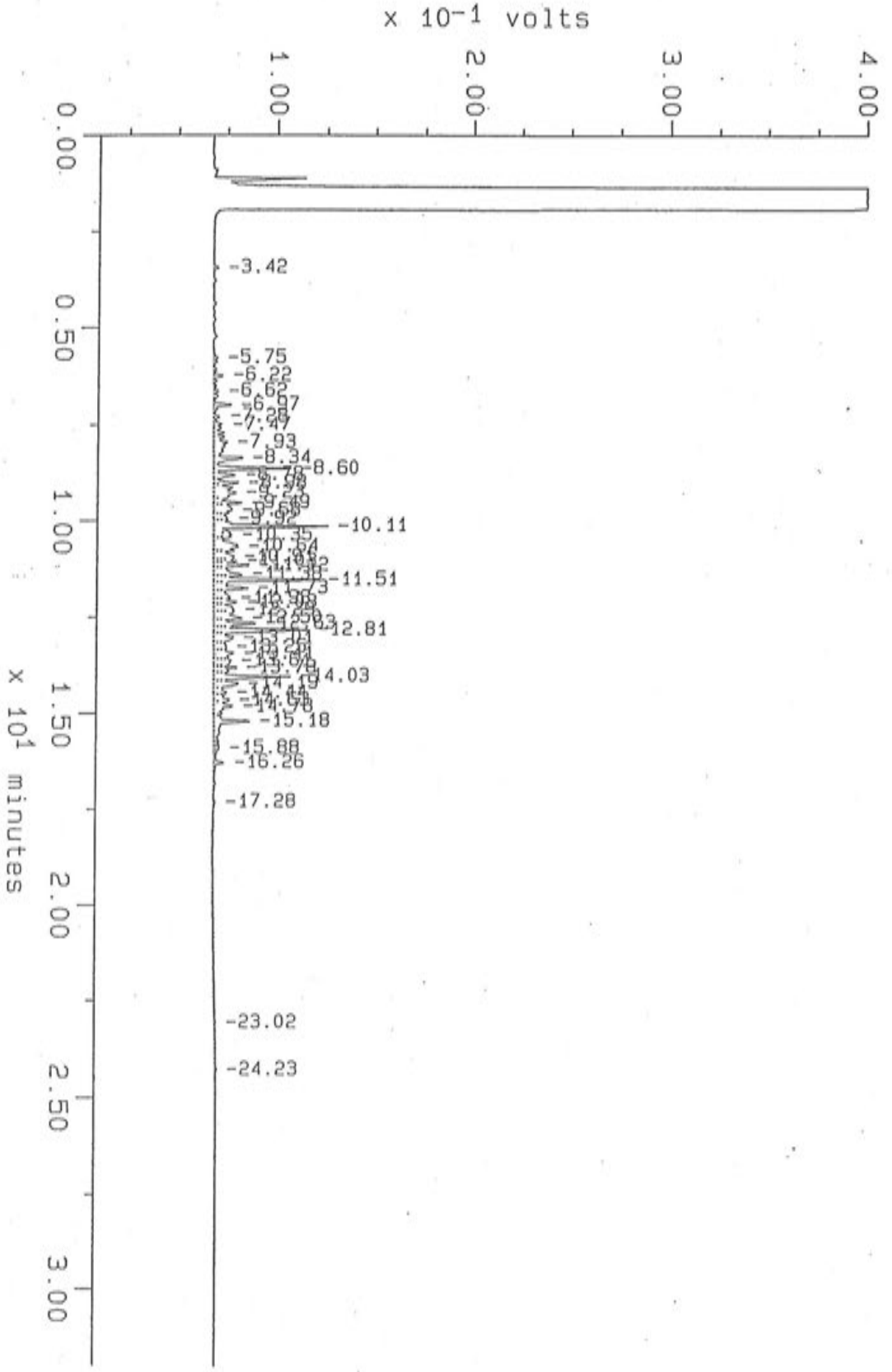


Sample: 200PPM KEROSENE
Acquired: 27-APR-91 0:13

Channel: detector 1
Method: C:\MAX\DATA1\8015HPBU

Filename: 200JET
Operator: DAS

200 ppm Kerosene

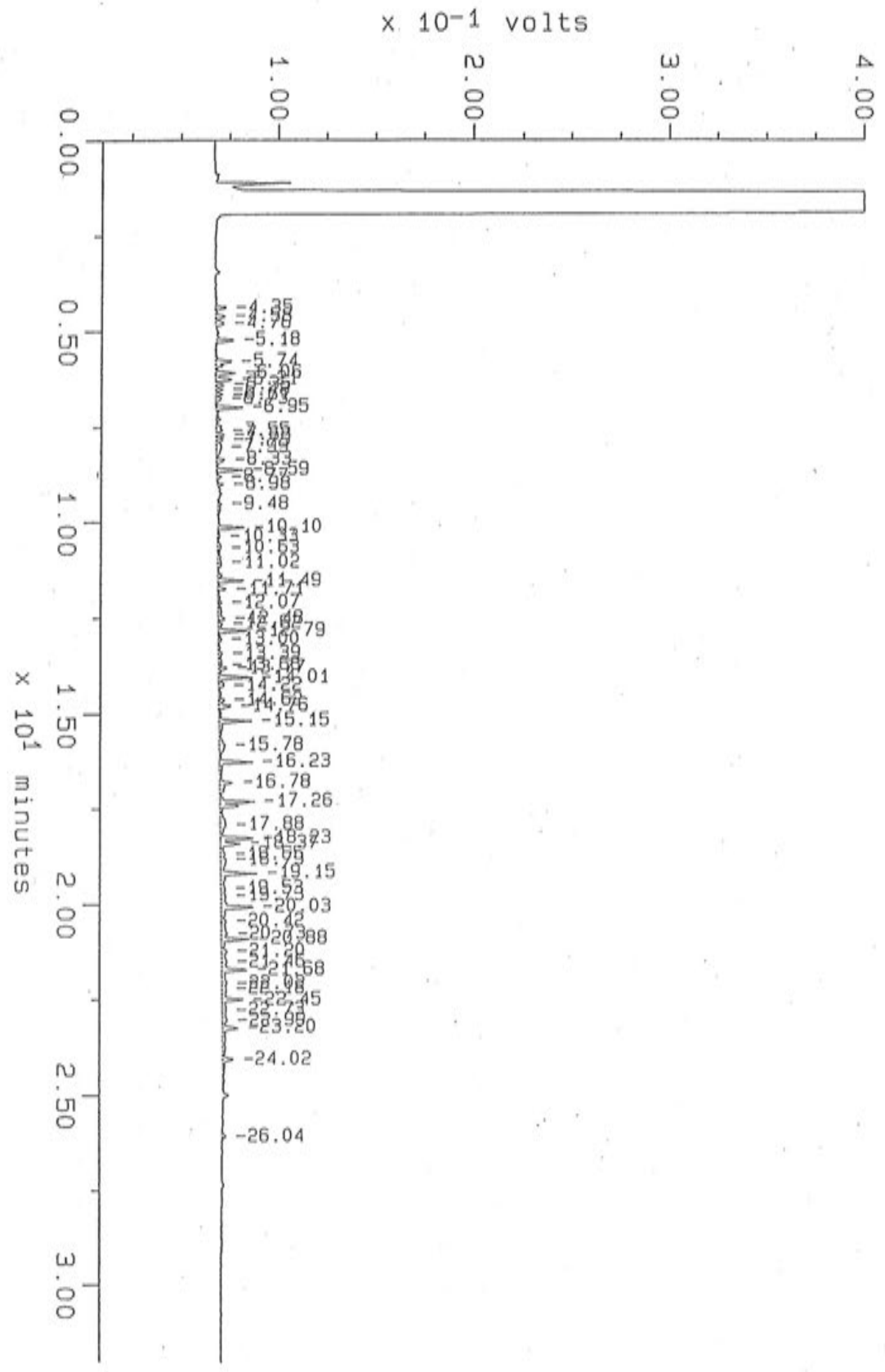


Sample: 200PPM GAS OIL
Acquired: 26-APR-91 23:30

Channel: detector 1
Method: C:\MAX\DATA1\8015HPBU

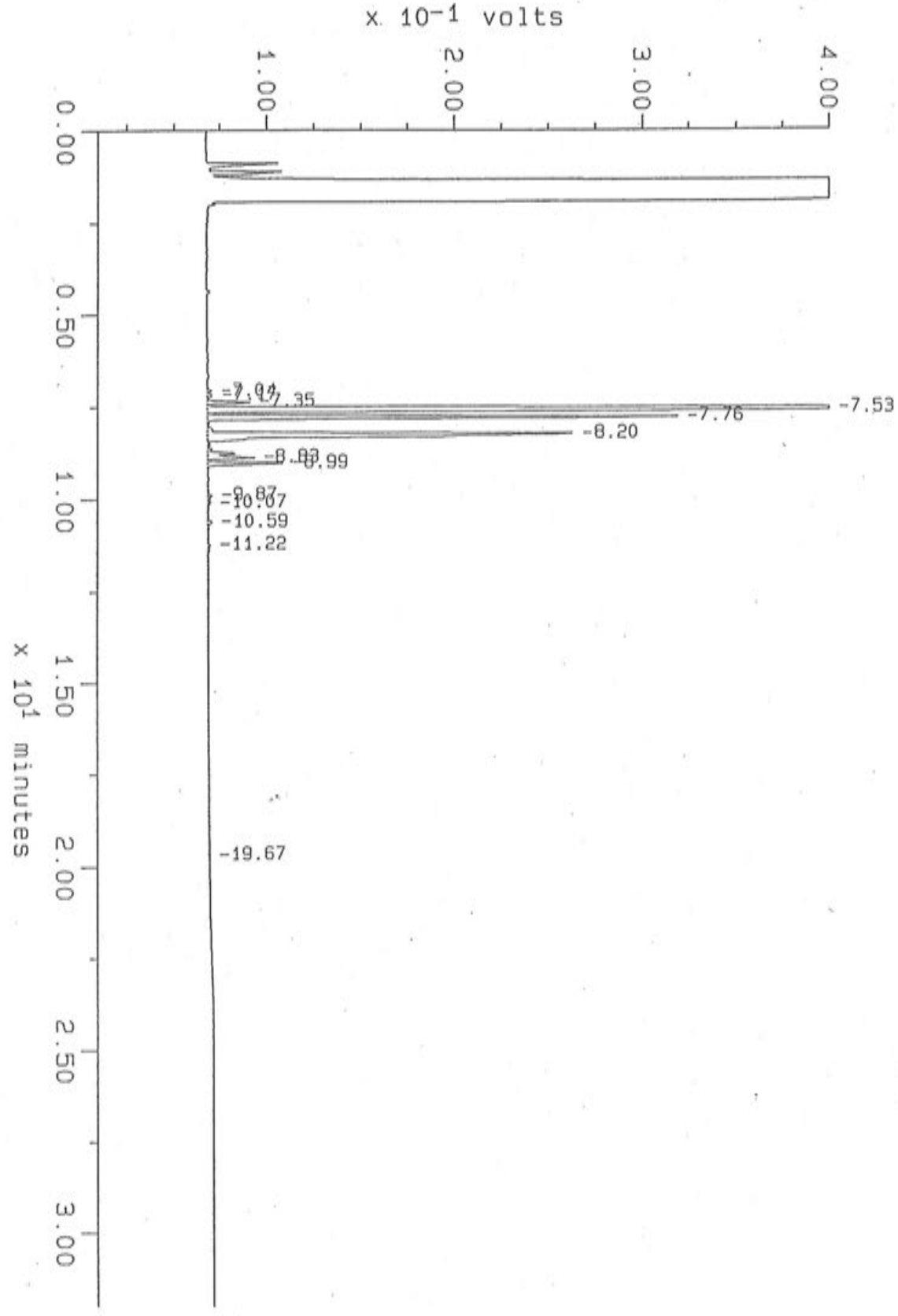
Filename: 200GSOIL
Operator: DAS

200 ppm Gas Oil



Sample: 200PPM TURPEN. Channel: detector 1 Filename: 200TURP
Acquired: 27-APR-91 0:56 Method: C:\MAX\DATA1\8015HPBU Operator: DAS

200 ppm Turpentine

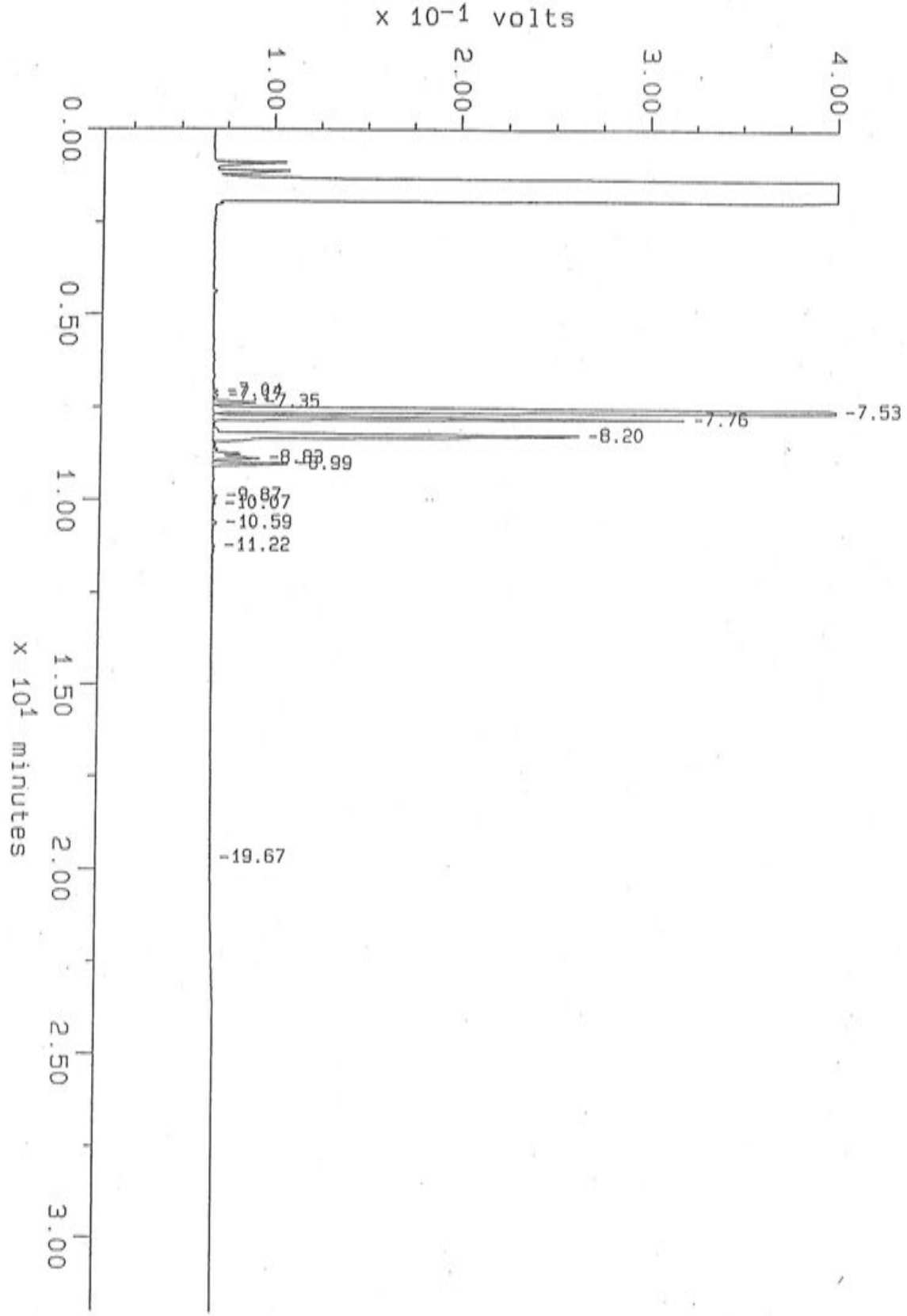


Sample: 200PPM TURPEN.
Acquired: 27-APR-91 0:56

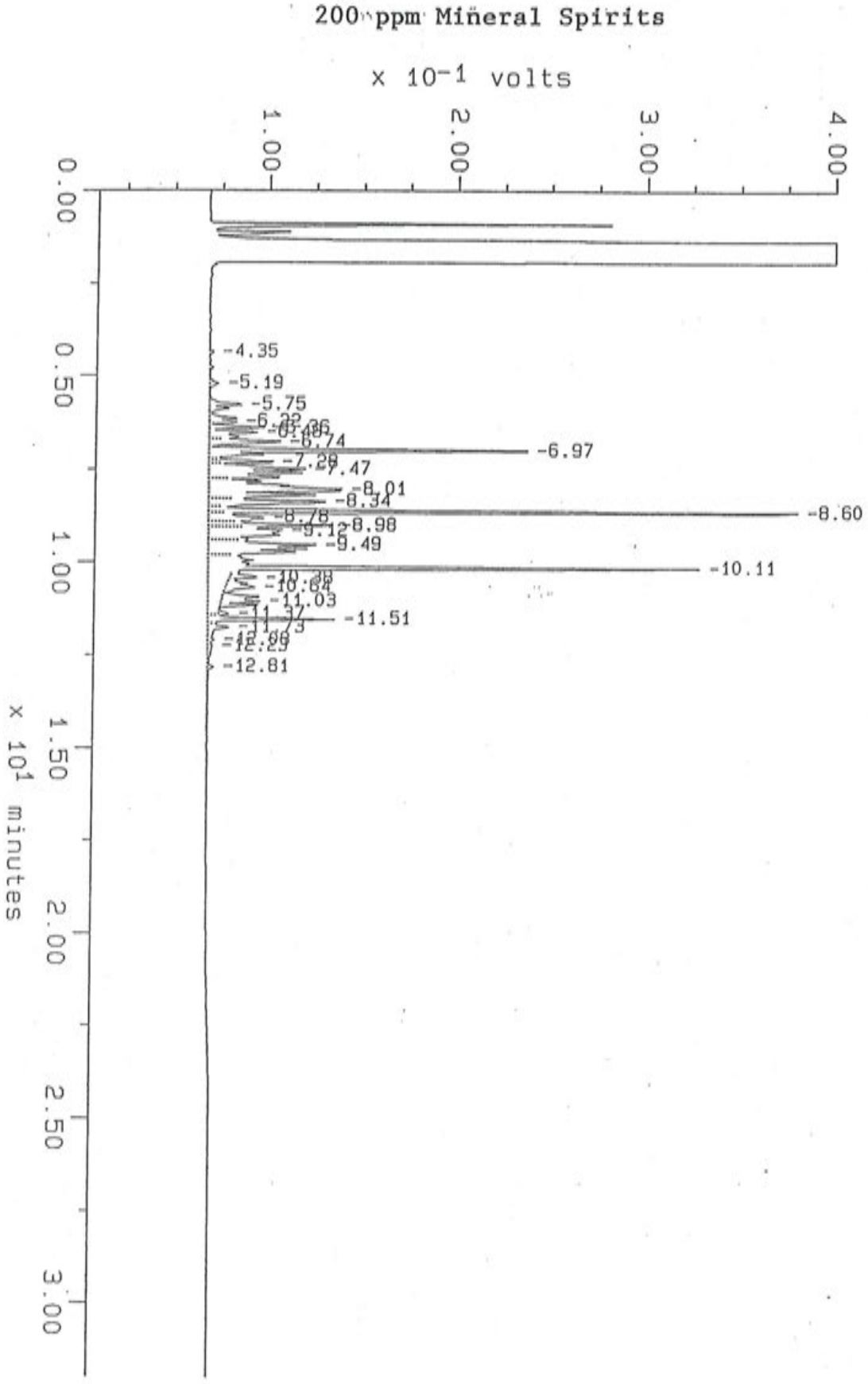
Channel: detector 1
Method: C:\MAX\DATA1\8015HPBU

Filename: 200TURP
Operator: DAS

200 ppm Turpentine



Sample: 200PPM MIN SPIR Channel: detector 1 Filename: 200MS
Acquired: 27-APR-91 1:38 Method: C:\MAX\DATA1\8015HPBU Operator: DAS



SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet-Edwards

Date: June 13, 1991

Report On: Analysis of Soil

Lab No.: 18121

IDENTIFICATION:
Samples Received on 06-13-91
Project: W160102 Daniels

ANALYSIS:

Lab Sample No.	Client ID	Total Petroleum Hydrocarbons, mg/kg by EPA Method 418.1
1	Composite SC-2	110
2	Composite SC-3	180
3	Composite SC-4	150
4	Composite SC-5	140
5	Composite SC-6	280
6	Composite SC-7	330
7	Composite SC-8	360
8	Composite SC-9	130
9	Composite SC-10	110

Note - Results reported on an as received basis.

SOUND ANALYTICAL SERVICES

STAN P. PALMQUIST

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 18121 (1)
Date: June 13, 1991
Client: Sweet-Edwards

Client ID: Comp SC-2
Matrix: Soil
Units: mg/kg

Compound	Sample(S)	Duplicate(D)	RPD*
Total Petroleum Hydrocarbons	110	110	---

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 6/11/91 PAGE 1 OF 4

PROJECT DANIELS #W160102
CLIENT INFO. CONTACT Peter Rowland.
ADDRESS
TELEPHONE# 485-5000
SAMPLERS NAME PJR PHONE#
SAMPLERS SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	418.1						NUMBER OF CONTAINERS
1. SC-2A	6/11	5.30		SOIL			COMPOSIT						SC-2					✓						1
2. SC-2B	"	"		"																				1
3. SC-2C	"	"		"																				1
4. SC-3A	"	"		"			COMPOSIT						SC-3					✓						1
5. SC-3B	"	"		"																				1
6. SC-3C	"	"		"																				1
7. SC-4A	"	"		"			COMPOSIT						SC-4					✓						1
8. SC-4B	"	"		"																				1

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By
Signature See Sheet 4	Signature	Signature
Printed Name	Printed Name	Printed Name
Firm	Firm	Firm
Date/Time	Date/Time	Date/Time
Received By Siang	**Received By**	**Received By**
Signature Siang	Signature	Signature
Printed Name SAS	Printed Name	Printed Name
Firm 6/13/91 8:17	Firm	Firm
Date/Time	Date/Time	Date/Time

PROJECT INFORMATION
Shipping I.D. No.
VIA
Project

SAMPLE RECEIPT
Total No. of Containers
Chain of Custody Seals
Received in good condition
LAB NO.

SPECIAL INSTRUCTIONS/COMMENTS
Rush Analysis if Possible - Consult w/ Stan - I will call on Thursday
Peter

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 6/11/91 PAGE 2 OF 4

PROJECT Daniels #W160102
CLIENT INFO. CONTACT Ken Rowland
ADDRESS
TELEPHONE#
SAMPLERS NAME PSR PHONE#
SAMPLERS SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	4/18.1	GENERAL CHEMISTRY (Specify)		OTHER (Specify)			NUMBER OF CONTAINERS
1. SC-4C	6/11	5:30		Soil																				1
2. SC-5A	"	"		"																				1
3. SC-5B				"									Composit					1	SC-5					1
4. SC-5C				"																				1
5. SC-6A				"																				1
6. SC-6B				"									Composit					1	SC-6					1
7. SC-6C				"																				1
8. SC-7A				"																				1

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By
Signature See Sheet 4	Signature	Signature
Printed Name	Printed Name	Printed Name
Firm	Firm	Firm
Date/Time	Date/Time	Date/Time
Received By SGiang	Received By	Received By
Signature SGiang	Signature	Signature
Printed Name SG	Printed Name	Printed Name
Firm	Firm	Firm
Date/Time 6/13/91 8:27	Date/Time	Date/Time

PROJECT INFORMATION
Shipping I.D. No.
VIA
Project

SAMPLE RECEIPT
Total No. of Containers
Chain of Custody Seals
Received in good condition
LAB NO.

SPECIAL INSTRUCTIONS/COMMENTS

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 6/11/91 PAGE 3 OF 4

PROJECT DANIELS #W160102
CLIENT INFO. CONTACT John Rowland
ADDRESS
TELEPHONE#
SAMPLERS NAME RBR PHONE#
SAMPLERS SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE
1. SC-7B	6/11	5:30		Soil
2. SC-7C	"	"		"
3. SC-8A				
4. SC-8B				
5. SC-8C				
6. SC-9A				
7. SC-9B				
8. SC-9C				

ANALYSIS REQUESTED

BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	GENERAL CHEMISTRY (Specify) pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	418.1	OTHER (Specify)	NUMBER OF CONTAINERS
								Composit					1	SC-7	1
															1
															1
								Composit					1	SC-8	1
															1
															1
								Composit					1	SC-9	1
															1

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By
Signature See Sheet 4	Signature	Signature
Printed Name	Printed Name	Printed Name
Firm	Firm	Firm
Date/Time	Date/Time	Date/Time
Received By Qiang	Received By	Received By
Signature Qiang	Signature	Signature
Printed Name STL	Printed Name	Printed Name
Firm 6/13/91 8:27	Firm	Firm
Date/Time	Date/Time	Date/Time

PROJECT INFORMATION	SAMPLE RECEIPT
Shipping I.D. No.	Total No. of Containers
VIA	Chain of Custody Seals
Project	Received in good condition
	LAB NO.

SPECIAL INSTRUCTIONS/COMMENTS

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 6/11/91 PAGE 4 OF 4

PROJECT DANIELS #W160102
CLIENT INFO.
CONTACT
ADDRESS
TELEPHONE#
SAMPLERS NAME Rowland PHONE#
SAMPLERS SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE
1. SC-10A	6/11	5:50		Soil
2. SC-10B	"			"
3. SC-10C	"			"
4.				
5.				
6.				
7.				
8.				

ANALYSIS REQUESTED

BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	GENERAL CHEMISTRY (Specify) pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K			OTHER (Specify)			NUMBER OF CONTAINERS
														418.1				
															1	SC-10		1
																		1
																		27

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature Pete Rowland	Signature	Signature		Total No. of Containers
Printed Name SE/E.	Printed Name	Printed Name	Shipping I.D. No.	Chain of Custody Seals
Firm 6/12/91	Firm	Firm	VIA	Received in good condition
Date/Time 12:15	Date/Time	Date/Time	Project	LAB NO.
Received By SGiang	**Received By**	**Received By**	**SPECIAL INSTRUCTIONS/COMMENTS**	
Signature SGiang	Signature	Signature		
Printed Name SAB	Printed Name	Printed Name		
Firm 6-13-91 8:27	Firm	Firm		
Date/Time	Date/Time	Date/Time		

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

Appendix K

SOIL ANALYSIS DATA - TREATED SOIL PHASE II (BATCH 1)

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet-Edwards Date: September 5, 1991

Report On: Analysis of Soil Lab No.: 19703

IDENTIFICATION:
Sample received on 09-04-91
Project: W160102 Daniels

ORIGINAL IS IN PROJECT FILING

ANALYSIS:

Lab Sample No.	Client ID	Total Petroleum Hydrocarbons, mg/kg by EPA Method 418.1
RUSH 1	DV-9-3-1	100
RUSH 2	DV-9-3-2	170
RUSH 3	DV-9-3-3	110

Note - Results reported on a dry weight basis.

SOUND ANALYTICAL SERVICES

FOR MARTY FRENCH

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047

QUALITY CONTROL REPORT

Client: Sweet-Edwards
Project: W160102 Daniels
Client ID: DV-9-3-2
Lab No: 19703 (2)
Matrix: Soil
Units: mg/kg
Date: September 5, 1991

DUPLICATES

Parameter	Sample(S)	Duplicate(D)	RPD
Total Petroleum Hydrocarbons	170	170	0.0

RPD = Relative Percent Difference
= [(S - D) / ((S + D) / 2] x 100

METHOD BLANK

Parameter	Blank Value
Total Petroleum Hydrocarbons	< 1.0

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 9/3/91 PAGE 1 OF 1

PROJECT W160102 #
CLIENT INFO. CONTACT DANIELS
ADDRESS
TELEPHONE#
SAMPLERS NAME P. Rowland PHONE# 485-5000
SAMPLERS SIGNATURE PR

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	GENERAL CHEMISTRY (Specify) TPH 418.1	OTHER (Specify)	NUMBER OF CONTAINERS
1. DV-9-3-1	9/3/91			Soil														X		1
2. DV-9-3-2	"			"														X		1
3. DV-9-3-3	"			"														X		1
4.																				
5.																				
6.																				
7.																				
8.																				3

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By
Signature P. Rowland	Signature	Signature
Printed Name P. ROWLAND	Printed Name	Printed Name
Firm SE/E	Firm	Firm
Date/Time 9/3/91 3:50pm	Date/Time	Date/Time
Received By S Giang	**Received By**	**Received By**
Signature S Giang	Signature	Signature
Printed Name SAS	Printed Name	Printed Name
Firm 9/4/91 1:40pm	Firm	Firm
Date/Time	Date/Time	Date/Time

PROJECT INFORMATION
Overnight UPS.
Shipping I.D. No.
VIA
Project

SAMPLE RECEIPT
Total No. of Containers
Chain of Custody Seals
Received in good condition
LAB NO.

SPECIAL INSTRUCTIONS/COMMENTS
Please call me at 485-5000 w/ results.
See Stan Palmquist about the invoice — my records show this is sample number 21 through 23

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet Edwards

Date: August 15, 1991

Report On: Analysis of Soil

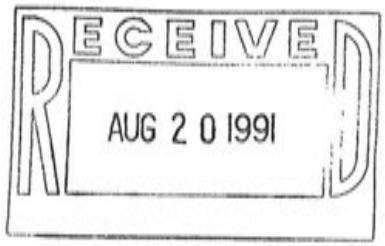
Lab No.: 19227

IDENTIFICATION:
Samples Received on 08-12-91
Project: W160102

ANALYSIS:

Lab Sample No.	Client ID	Total Petroleum Hydrocarbons, mg/kg by EPA Method 418.1
1	DV-8/91-1	270
2	DV-8/91-2	210
3	DV-8/91-3	140
4	DV-8/91-4	210

Results are reported on a dry weight basis.



SOUND ANALYTICAL SERVICES

MARTY FRENCH

Appendix L

SOIL ANALYSIS DATA - TREATED SOIL PHASE II (BATCH 2)

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet Edwards Date: November 5, 1991

Report On: Analysis of Soil Lab No.: 21027

IDENTIFICATION:
Sample received on 11-04-91
Project: W160102 Bill Daniels

ANALYSIS:

Lab Sample No.	Client ID	Total Petroleum Hydrocarbons, mg/kg by EPA Method 418.1
1	DV-11-91-1	46
2	DV-11-91-2	50
3	DV-11-91-3	43
4	DV-11-91-4	55

Results are reported on a dry weight basis.

SOUND ANALYTICAL SERVICES

STAN P. PALMQUIST

Sweet-Edwards / EMCON, Inc.
Kelso, WA (206) 423-3580
Bothell, WA (206) 485-5000

Chain of Custody / Laboratory Analysis Request

DATE 11/1/91 PAGE 1 OF 1

PROJECT W160102 Bill Daniels -
CLIENT INFO. CONTACT Peter Rowland
ADDRESS
TELEPHONE# 485-5000
SAMPLERS NAME P. Rowland PHONE#
SAMPLERS SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	TYPE	BASE/NEU/ACID ORGAN. GC/MS/625/8270	VOLATILE ORGANICS GC/MS/624/8240	HALOGENATED VOLATILE ORGANICS 601/8010	PHENOLICS 604/8040	POLYNUCLEAR AROMATIC 610/8310	TOTAL ORGANIC CARBON (TOC) 415/9060	TOTAL ORGANIC HALIDE (TOX) 9020	EP TOX/TCLP METALS (Circle One)	METALS (TOTAL) (See Special Inst.)	TCLP ORGANICS	pH, COND ALK	NO_3/NO_2, Cl SO_4	Ca, Mg, Na, K	TPH 418.1					NUMBER OF CONTAINERS
1. DV-1191-1	11/1/91	1:00		Soil														✓					1
2. DV-11-91-2	"	"		Soil														✓					1
3. DV-11-91-3	"	"		Soil														✓					1
4. DV-11-91-4	"	"		Soil														✓					1
5.																							4
6.																							
7.																							
8.																							

NOV - 8 1991

Relinquished By Sweet, Edwards & Assoc.	Relinquished By	Relinquished By	PROJECT INFORMATION	SAMPLE RECEIPT
Signature Peter Rowland	Signature	Signature		
Printed Name P. ROWLAND	Printed Name	Printed Name	Shipping I.D. No.	Total No. of Containers
Firm SE/E	Firm	Firm	VIA	Chain of Custody Seals
Date/Time 11/1/91 / 2:00	Date/Time	Date/Time	Project	Received in good condition
				LAB NO.
Received By Mary Curtiss	**Received By**	**Received By**	**SPECIAL INSTRUCTIONS/COMMENTS**	
Signature Mary Curtiss	Signature	Signature	Please see Stan Palmquist about the invoicing. Please call me when you have an answer. Many thanks Pete.	
Printed Name SAS	Printed Name	Printed Name		
Firm 11-4-91 9:30am	Firm	Firm		
Date/Time	Date/Time	Date/Time		

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator.

S-E/E 400-05

SOUND ANALYTICAL SERVICES

4813 PACIFIC HIGHWAY EAST
TACOMA, WA 98424

FACSIMILE COVER SHEET
FAX NO. (206) 922 - 5047

DATE: 10-15

TIME: _____

CONTENTS: TOTAL OF 2 PAGES INCLUDING THIS COVER SHEET.

TO: Sweet - Edwards — Peter Rowland

FROM: Laura

IF YOU HAVE ANY PROBLEMS WITH THIS TRANSMITTAL PLEASE CALL (206) 922 - 2310.

Lab NO 20344

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Sweet - Edwards

Date: October 11, 1991

Report On: Analysis of Soil

Lab No.: 20344

IDENTIFICATION:
Samples Received on 10-02-91
Project: W800102

ANALYSIS:

Lab Sample No.	Client ID	Total Petroleum Hydrocarbons, mg/kg by EPA Method 418.1
1	DV-10-1-1	410
2	DV-10-1-2	430
3	DV-10-1-3	310
4	DV-10-1-4	240

Results are reported on a dry weight basis.

SOUND ANALYTICAL SERVICES

STAN P. PALMQUIST