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DEQ Files on ANR Freight Terminal Site
February 1991–July 1996

USEPA SF
1336410

SCHN00171771

ERM-Northwest, inc.

2821 Northup Way • Bellevue, Washington 98004 • (206) 827-9440 • FAX (206) 827-2408

RECEIVED
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NORTHWEST REGION

February 25, 1991

Bruce Henderson
NW Regional Office
Department of Environmental Quality
811 6th Avenue
Portland, OR 97204

Subject: **Matrix Report**
File #26-91-063
ANR Freight Systems, 3333 NW 35th Avenue

Dear Mr. Henderson;

ANR Freight Systems is seeking a letter of No Further Action in order to complete a property transaction. Please expedite your analysis.

Water samples collected by Petroleum Services Unlimited, on February 1, 1991, revealed 105 ppm TPH as diesel from observation Well #1 and 0.475 ppm diesel from observation Well #2. Benzene was not detected. Details of the sample collection procedures are not known. The analytical reports are attached.

Three observation wells were constructed in 1988 by Northwest Pump and Equipment adjacent to a 1,000 gallon gasoline tank and a 20,000 gallon diesel tank. Construction details discovered during a February 11 site visit by ERM-Northwest are presented below. A tank-site sketch, Figure 1, shows the numbering scheme for these wells.

Mr. Ken Boeve, the terminal manager, has stated that a diesel fuel spill of approximately 20 gallons had occurred in the vicinity of well #1 sometime during the past several years.

Tank Testing

On February 14, 1991 Tanknology Corporation Inc. performed a tank and line test on the 20,000 gallon diesel tanking system. Both the tank and lines were found to be tight. A copy of Tanknology's report is attached.

Field Reconnaissance

On February 11, 1991 ERM-NW representative Mr. Fred Becker traveled to Portland to evaluate the Petroleum Services findings. The purpose of this site visit was to pump water from observation well #1 to reduce the TPH concentration and collect a water sample for chemical analysis.

Observations

Inspection of the observation wells on February 11th revealed that:

- the wells are constructed with 4 inch diameter slotted PVC pipe from bottom to the top, the top 4 inches of slotted pipe protrudes above the gravel pack which surrounds each well casing;
- the gravel pack is a well graded material;
- there is no surface seal constructed for any of the wells;
- each well is capped with a plastic expansion cap which is not pad-locked; and,
- each well is completed below ground surface and is protected by a flush mounted steel monument cover which is secured by two bolts.

For each observation well, the following measurements were made:

Well #	Total Depth	Depth to Water	Water in Well (Ft.)	Gallons in Well
#1	10.3 feet	9.25 feet	1.05	0.68
#2	1.60	1.45	0.15	0.09
#3	10.5 feet	9.6 feet	0.9	0.59

As there was not enough water in Well #1 to allow pumping to occur, a PVC bailer was used to evacuate water from the well. It was only possible to evacuate ≤ one pint of liquid per bailer "drop". Over a period of four hours, a total of approximately 7 gallons (10 casing volumes) of water was removed from the well.

A sample of the gravel pack and water from Well # 1 was collected February 11, 1991 for analysis for Total Petroleum Hydrocarbons (TPH) using EPA Test Method 418.1. The samples were submitted to Alden Analytical

The ERM Group

Laboratory in Seattle, Washington for analysis. The analytical results yielded 5.2 mg/l TPH for the water sample and 190 mg/kg for the gravel pack sample.

The water sample was collected using a stainless steel bailer. The water sample was placed into 2-1 liter glass bottles. These bottles were immediately placed into a cooler packed with ice until delivery to the analytical laboratory. The gravel sample was collected as a composite sample from several spots just below the surface of the gravel around the well casing. The sample portions were obtained by scraping away the surface gravel with hands covered by clean chemically resistant gloves. The gravel sample was placed into a 4 ounce glass jar. This sample was kept in a cooler with ice until delivery to the analytical laboratory. Samples were hand delivered to the laboratory. Copies of the analytical reports and chain of custody forms are attached.

Site Conditions

Topographical Characteristics

- A review of the 1977 USGS Portland Quadrangle Topographic map, indicates that the site itself is relatively flat with a surface elevation of approximately 30 feet above mean sea level (msl).

The following information about the vicinity geology and ground water was obtained from personnel contacted at DEQ.

Site Geology

- The site is underlain by hydraulic fill of fine to medium sand and silts overlying interlayered silty sands, sandy silts, with thin beds of silt and clay, and occasional sand lenses. The area historically contained lakes, ponds and sloughs which were filled to create the land area on which the site is located.

Ground Water Use

- Ground water in the area has been encountered at approximately eight to ten feet below ground surface. Due to the history of the area, ground water flow has local characteristics, and pools in areas that were once pond and lake bottoms. Ground water flow in the area of the subject site is to the southeast. The area is heavily industrialized and contamination of the ground water has occurred. According to

DEQ personnel, ground water quality in the area is such that it is not considered potable.

Hydrogeological Conditions

- Surface water runoff for the subject site is engineered to drain into man-made storm drain receptors, situated throughout drainage lows along the property. This storm drain channel feeds into a larger system along Northwest 35th Avenue. As indicated on Figure 2, the site receives surface water and fluid runoff from adjacent properties located along the north and west property boundaries. These properties are situated on slightly higher surface grades, which, from the property line, slope onto the site. The location of the slopes are also indicated on Figure 2.

Summary of findings

The concentration of TPH in a water sample collected on February 11, 1991 from Well #1 was 5 ppm, an order of magnitude less than 105 ppm reported February 7, 1991. A sample of the gravel pack collected from the surface yielded 190 ppm TPH, this is less than the action level of 500 ppm for soil cleanup required by DEQ for a level 2 matrix site.

Benzene was not detected in the water sample collected February 1, 1991 from Well #1.

Corrective Action

In order to prevent another spill from entering an observation well, ERM-Northwest recommends that the monitoring wells be abandoned as soon as possible by backfilling the well casing with neat cement, completing the cement backfill at ground surface.

If there are any questions, please contact the undersigned at our Bellevue office.

Sincerely,
ERM-Northwest, Inc.

Fred H. Becker

Fred H. Becker, P.G.
Project Manager

The ERM Group

MATRIX SCORE SHEET

1. Depth to Groundwater < 25 feet 25 - 50 feet 51 - 100 feet > 100 feet	 (10) (7) (4) (1)	10
2. Mean Annual Precipitation >40 inches 20 - 40 inches <20 inches	 (10) (5) (1)	10
3. Native Soil Type Coarse sands, gravels Silts, fine sands Clays	 (10) (5) (1)	5
4. Sensitivity of Uppermost Aquifer Sole Source Current Potable Future Potable Non-potable	 (10) (7) (4) (1)	1
5. Potential Receptors Many, near Medium Few, far	 (10) (5) (1)	5
TOTAL SCORE	=	31

Matrix Score	Cleanup Level in ppm TPH	
	Gasoline	Diesel
Level 1: > 40 pts.	40	100
Level 2: 25 - 40 pts.	80	500
Level 3: < 25 pts.	130	1000

SCHN00171776

Matrix Checklist

✓ 1. The release of petroleum has been reported to the Department of Environmental Quality (220).

✓ 2. The Matrix score sheet attached to this checklist has been completed for this site, unless the site is being cleaned up to the most stringent cleanup level (320).

✓ 3. If the cleanup level used for this site is one of the three diesel cleanup levels, a hydrocarbon identification (HCID) test has been performed which proves that the soil contamination is not from gasoline (335(3)).

✓ 4. A sketch has been made of this site (345(1)). This sketch clearly shows:

✓ a. The location of all buildings and other key features, both man-made and natural;

✓ b. The names of adjacent streets and properties;

NA c. The location of all excavations including those that were for the removal of tanks and associated piping as well as those that were strictly for the removal of contaminated soils;

✓ d. The location of all product storage tanks, lines and dispensers, including those that were decommissioned as well as those that remain on the site; and

✓ e. The locations from which all soil and water samples were collected .

N/A 5. If any contaminated soil in excess of matrix limits has been left on site, the reason for leaving this soil has been explained and the requirements of 355(4) have been met.

N/A 6. If water was present in the tank pit, the Department was notified, the water was pumped from the pit, and the requirements of 340(4) have been met.

✓ 7. All soil and/or water samples have been collected, coded, stored and shipped as specified in the rules, and proper chain-of-custody forms have been filled out (345).

✓ 8. All final confirmatory soil samples have been analyzed using the methods required by the Department (350).

N/A 9. If a tank was decommissioned in place, the Department gave prior approval for a site-specific sampling plan (340(5)).

✓ 10. A report has been prepared which contains all of the information required by the rules (360).

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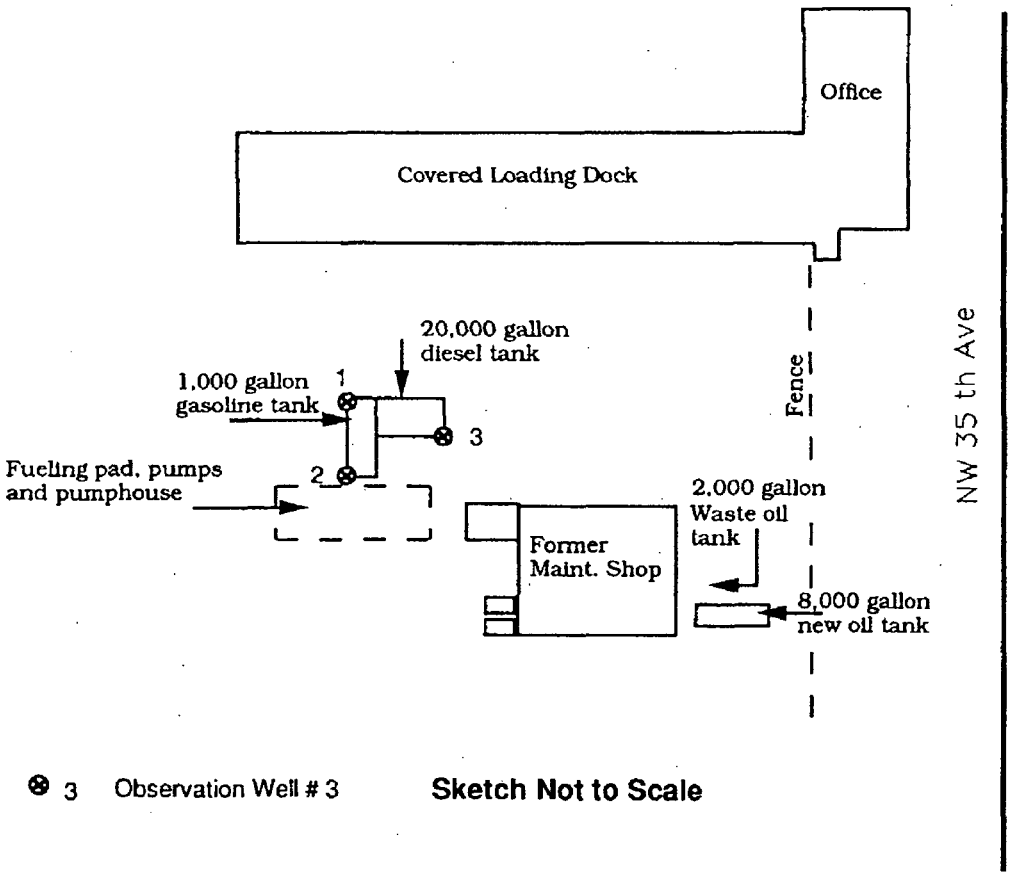
Figure 1

Observation Well Locations
ANR Freight Systems
Portland, Oregon



⊗ 3 Observation Well # 3 **Sketch Not to Scale**

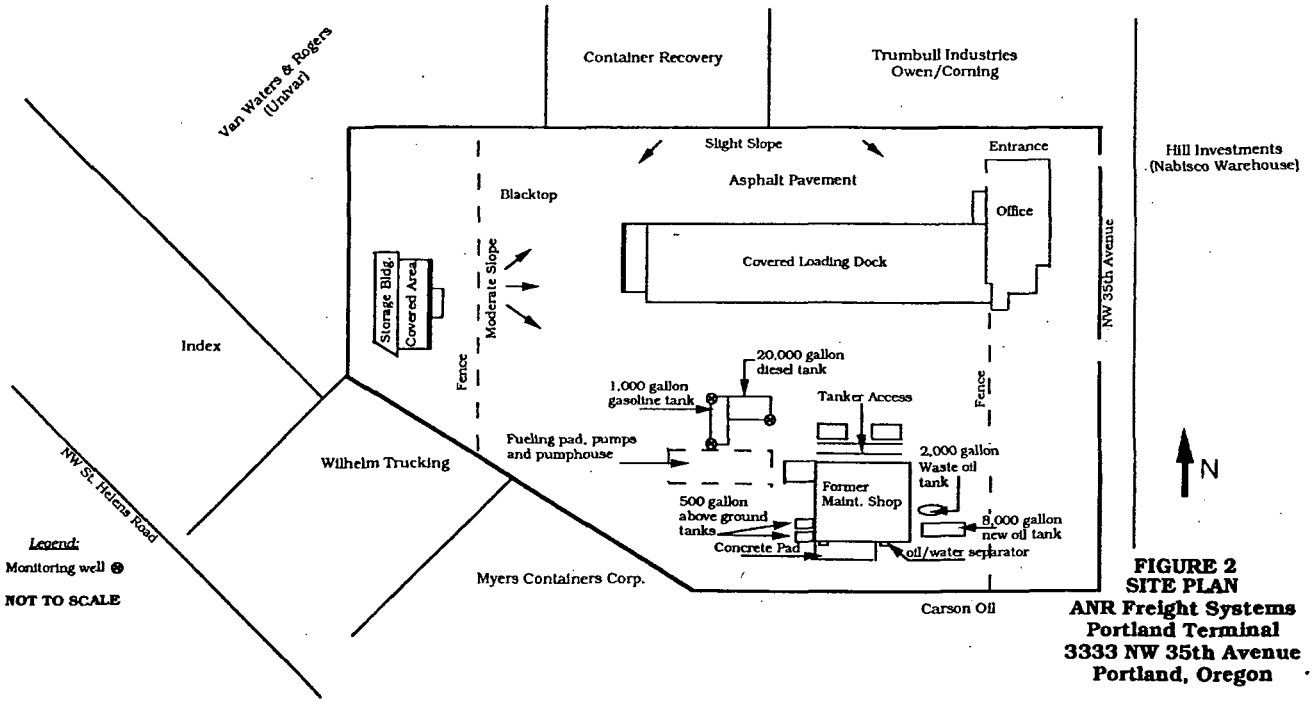


FIGURE 2
SITE PLAN
ANR Freight Systems
Portland Terminal
3333 NW 35th Avenue
Portland, Oregon

SCHN00171779

Coastal
The Energy People

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
AUG 24 1992
NORTHWEST REGION

August 21, 1992

Ms. Sheila A. Monroe
Oregon DEQ Northwest Region
1500 SW First Avenue, Suite 750
Portland, Oregon 97201

RE: **FINAL CLEANUP ASSESSMENT REPORT - ANR FREIGHT SYSTEM, INC. TERMINAL, 3333 NW THIRTY-FIFTH AVENUE, PORTLAND, OREGON - DEQ FACILITY NO. 5039, FILE NO. 26-91-063**
CRC PROJECT NO. 1825

Dear Ms. Monroe:

Attached is a copy of the Final Cleanup Assessment Report for the removal of four underground storage tanks at the ANR Freight System, Inc. Terminal at the referenced address in Multnomah County, Oregon. This report has been prepared in accordance with the requirements of OAR 340-122-360(1). The contractor for tank removal was Petroleum Equipment Maintenance Company (PEMCO) of Portland, Oregon, License No. 10534. The contractor was responsible for cleaning and disposing of the tanks, sampling of soil and groundwater and excavation of any contaminated soil.

The tank removal commenced on May 27, 1992 and was completed on July 30, 1992. The project was supervised by Coastal Remediation Company for ANR Freight System, Inc. A copy of the UST decommission form was submitted to DEQ by PEMCO.

Very truly yours,

John Dumeyer, P.E.
Senior Project Manager

cc: C. Miller
K. Detweiler
File 1825

Coastal Remediation Company
A SUBSIDIARY OF THE COASTAL CORPORATION
P O BOX 1871 • ROANOKE VA 24008-1871 • 703 983-0282 • 1-800-776-5733

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	TANK REMOVAL	1
3.0	CONTAMINATED SOIL	2
4.0	TANK AND SLUDGE DISPOSAL	2
5.0	ATTACHMENTS	2
6.0	CONCLUSIONS	2

LIST OF APPENDICES

APPENDIX A - SITE MAPS

APPENDIX B - SOIL MATRIX CHECKLIST

APPENDIX C - SOIL SAMPLING REPORTS

APPENDIX D - DISPOSAL RECEIPTS

APPENDIX E - LABORATORY RESULTS

1.0 INTRODUCTION

The ANR Freight System, Inc. (ANRFS) Portland, Oregon terminal is located in northwest Portland on Northwest 35th Street in Section 29, T.1.N., R.1.E. The terminal has a total area of 9.3 acres and has been operated as a truck maintenance facility since 1963. Four underground storage tanks (USTs) were located on-site:

1 - 20,000 gallon diesel tank,
1 - 1,000 gallon gasoline tank,
1 - 8,000 gallon motor oil tank, and
1 - 2,000 gallon used oil tank.

These USTs were installed in two areas adjacent to the truck maintenance shop as shown on Site Map 1. The two fuel tanks were located northwest of the shop and the two oil tanks were located southeast of the shop.

In January, 1991, ANRFS reported a diesel fuel spill of 20 gallons next to one of the fuel tank monitoring wells. This well was subsequently purged and abandoned in June, 1991. In 1992, ANRFS decided to remove all four USTs at the site.

2.0 TANK REMOVAL

ANRFS retained Coastal Remediation Company to oversee the removal of the four USTs. Petroleum Equipment Maintenance Company (PEMCO) was selected to perform the removal work. PEMCO is a DEQ licensed service contractor (No. 10534). The work was supervised by Brian Crockett, a PEMCO employee and DEQ licensed decommissioning supervisor (No. 10391).

PEMCO notified DEQ about the removal on March 20, 1992, obtained all permits and commenced work on May 27, 1992. The tanks were pumped out, inerted and thoroughly cleaned in place prior to removal. The two fuel tanks were removed and inspected. There were no visual signs of leakage from the fuel tanks or piping. The fill material around the tanks was poorly graded, medium grained brown sand. Groundwater was encountered at 11.5 feet below the ground surface. There was no odor or evidence of stained soil and no sheen on or odor from the groundwater.

Nine soil samples and one groundwater sample were obtained from the fuel tank pit by a PEMCO geologist. The samples were analyzed by AMTEST Laboratory in Beaverton, Oregon. The sample locations are shown on Site Map 1. Six soil samples were analyzed by the Hydrocarbon ID (HCID) test. Five samples were analyzed for BTEX by EPA Method 8020. The groundwater sample was analyzed for BTEX by EPA Method 602. The soil samples were all below detection limits. The water sample only contained 0.6 ug/l of toluene. No other BTEX compounds were detected in the groundwater sample. These results were reported to Beth Brady at DEQ and verbal permission was received to backfill this pit.

The two oil tanks were pumped out, inerted and thoroughly cleaned in place. These tanks were removed on May 28, 1992. There were no holes in these tanks or signs of leakage. There was a small amount of stained soil around the fill pipes at the west end of the 8,000 gallon tank and

SCHN00171782

the east end of the 2,000 gallon tank. Groundwater was encountered at 11 feet below ground surface in this pit. Four soil samples and one groundwater sample were collected. The four soil samples were analyzed for HCID and the groundwater sample was analyzed for BTEX by EPA Method 602. No BTEX compounds were detected in the water. Only two soil samples were positive for HCID. The sample at the east end of the waste oil tank had 550 mg/kg of TPH and the sample at the west end of the motor oil tank had 30,590 mg/kg of total petroleum hydrocarbons (TPH). These results were reported to Sheila Monroe of DEQ. Additional excavation was undertaken on June 12, 1992 and four additional soil samples were collected and analyzed for TPH. Three samples were below detection levels and the sample at the west end of the motor oil tank had 48 mg/kg of TPH. Four soil samples were collected from the sides of the oil tank pit and analyzed for BTEX compounds by EPA Method 8020. All BTEX consituents for the four samples were below detection level.

3.0 CONTAMINATED SOIL

Approximately 80 cubic yards of contaminated soil were excavated from the oil tank pit. Soil samples were collected from the stockpile and analyzed for TPH (812 and 905 ug/kg). The samples for disposal were also analyzed for cadmium, chromium, lead, PCBs and volatile compounds by the methods listed on the laboratory data sheets. All of the compound results were below detection levels. One hundred eight and one-half (108.5) tons of soil were transported to the Hillsboro Landfill on July 30, 1992 for final disposal. The landfill receipts are attached in the Appendix.

4.0 TANK AND SLUDGE DISPOSAL

The four tanks were cleaned and transported from the site to Oregon Pacific Steel for disposal. The scrap receipts are attached. Six drums of sludge from the tanks were transported from the site for incineration by Sunwest Energy Corporation. The receipt is attached.

5.0 ATTACHMENTS

Also included in the Appendix are the sampling summary by PEMCO, laboratory results from AMTEST, chain-of-custody forms, the Soil Matrix Checklist and Score Sheet.

6.0 CONCLUSIONS

The four USTs at the ANRFS Terminal were properly removed and disposed of the contaminated materials in accordance with OAR 340-122-305. Eighty (80) cubic yards of contaminated soil were excavated and the remaining soil concentration was 48 mg/kg of TPH. This is less than the Level 2 requirement of 500 mg/kg. The pits have been backfilled and repaved. Based upon the analytical results, the site cleanup has been performed in accordance with OAR 340-122-305 and no further action is required.

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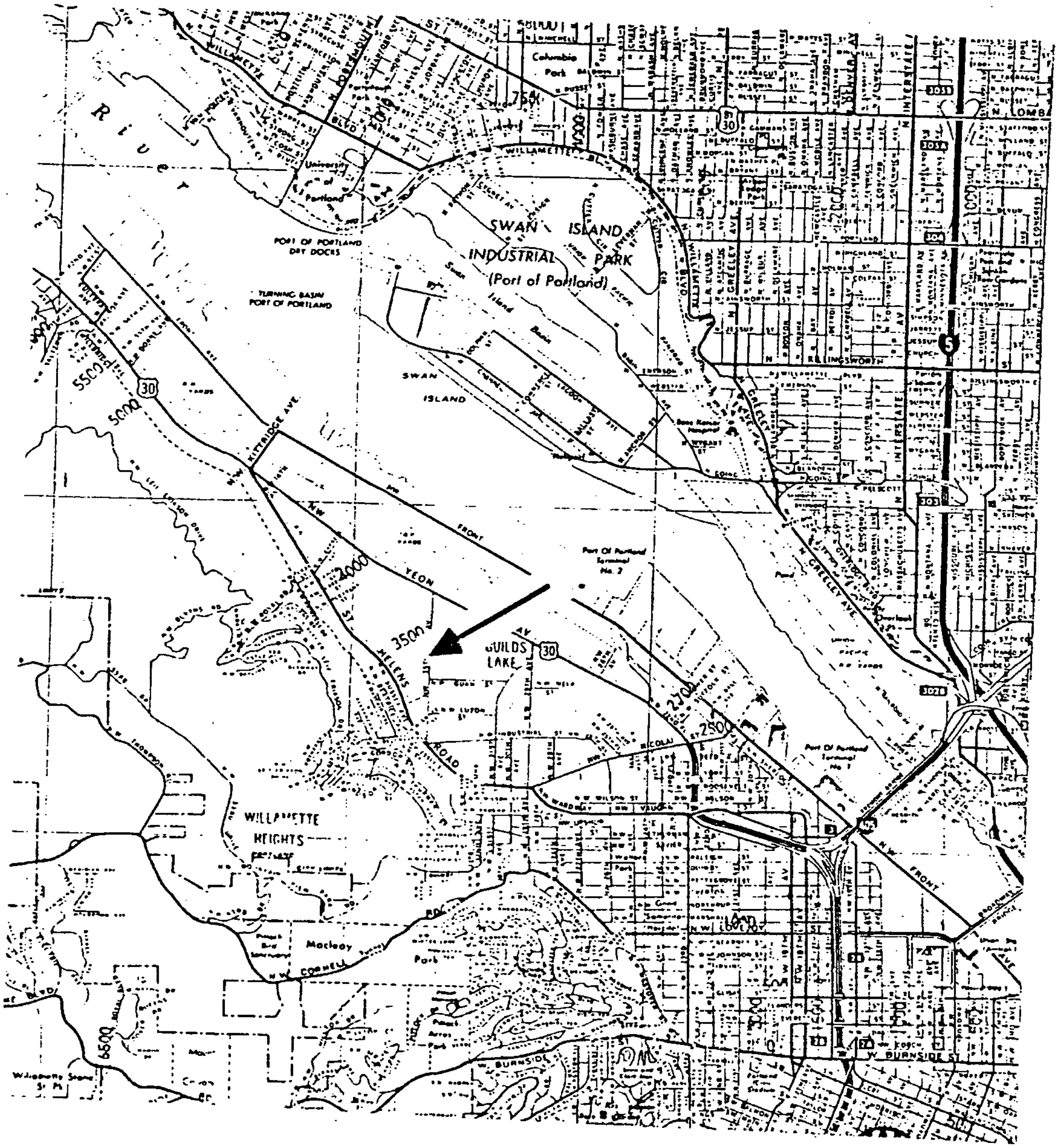
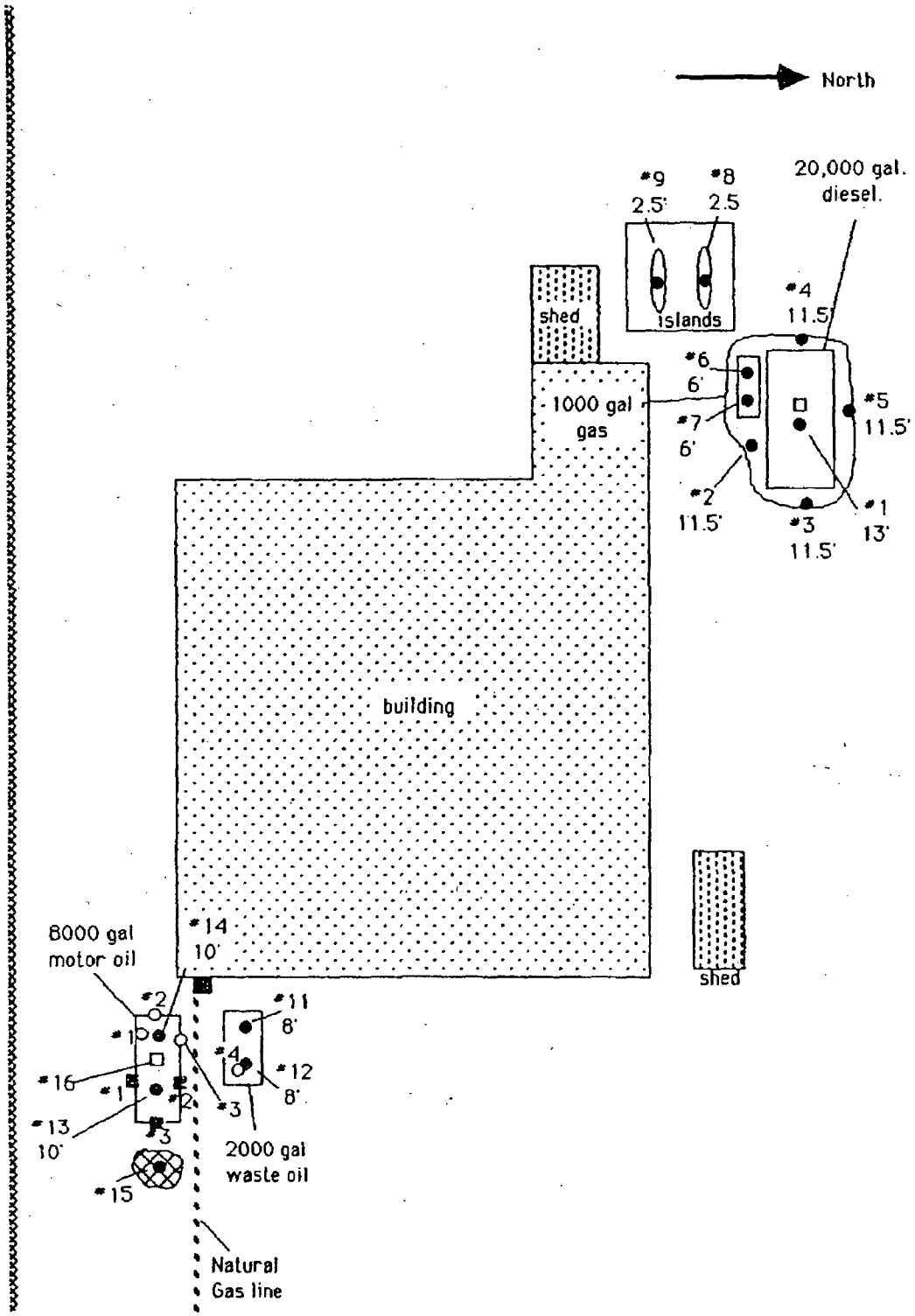
APPENDIX A

SITE MAPS



Location Map



ANR Freight 3333 NW 35th ortland, OR Site Map 1	*KEY* ● Soil samples collected 5/28/92 □ Water samples collected 5/28/92 ○ Soil samples collected 6/12/92 ■ Soil samples collected 7/10/92 (all from 11ft.)	*PEMCO* **Job** #3552 **Date:** 7/30/92 Gail K. Wayper

SCHN00171786

APPENDIX B

SOIL MATRIX CHECKLIST

MATRIX CHECKLIST

X 1. The release of petroleum has been reported to the Department of Environmental Quality (220).

X 2. The Matrix Score Sheet has been completed for this site, unless the site is cleaned up to the most stringent cleanup level (320).

X 3. The required hydrocarbon identification test (TPH-HCID) has been performed (335(3)), and, if detectable levels were found, the appropriate analytical method or methods have been used to measure the levels of contamination (350).

X 4. A sketch has been made of this site (345(1)) which clearly shows:

- X a. The location of all buildings and other key features, both man-made and natural;
- X b. The names of adjacent streets and properties;
- X c. The location of all excavations including those that were for the removal of tanks and associated piping as well as those that were strictly for the removal of contaminated soils;
- X d. The location of all product storage tanks, lines and dispensers, including those that were decommissioned as well as those that remain on the site; and
- X e. All soil and water sample locations.

N/A 5. If any contaminated soil in excess of matrix limits has been left on site, the reason for leaving this soil has been explained and the requirements of 355(4) have been met.

X 6. If water was present in the tank pit, the Department was notified, the water was pumped from the pit, and the requirements of 340(4) have been met.

X 7. All soil and/or water samples have been collected, coded, stored and shipped as specified in the rules, and proper chain-of-custody forms have been filled out (345).

X 8. If a release from a waste oil tank was discovered, at least one sample has been analyzed by the methods specified in 350(5).

N/A 9. If a tank was decommissioned in place, the Department gave prior approval for a site-specific sampling plan (340(5)).

X 10. A report has been prepared which includes a detailed description of everything that was observed and performed at the site, contains all of the information required by the rules (360), and presents findings and recommendations which are consistent with Departmental regulations.

SCHN00171788

MATRIX SCORE SHEET

1. Depth to Groundwater < 25 feet 25 - 50 feet 51 - 100 feet > 100 feet	 (10) (7) (4) (1)	10
2. Mean Annual Precipitation >45 inches 20 - 45 inches <20 inches	 (10) (5) (1)	10
3. Native Soil Type Coarse sands, gravels Silts, fine sands Clays	 (10) (5) (1)	5
4. Sensitivity of Uppermost Aquifer Sole Source Current Potable Future Potable Non-potable	 (10) (7) (4) (1)	4
5. Potential Receptors Many, near Medium Few, far	 (10) (5) (1)	5
TOTAL SCORE	=	34

Matrix Score	Cleanup Level in ppm TPH	
	Gasoline	Diesel
Level 1: > 40 pts.	40	100
Level 2: 25 - 40 pts.	80	500
Level 3: < 25 pts.	130	1000

SCHN00171789

APPENDIX C

SOIL SAMPLING REPORTS

PEMCO

437 N. Columbia Blvd.
P.O. Box 11569
Portland, Oregon 97211
Office (503) 283-2151
FAX (503) 283-6388

July 31, 1992

Coastal Remediation
310 First St.
Roanoke, VA 24011

Attn: Mr. John Dumeyer

Re: ANR Freight System
3333 NW 35th
Portland, OR 97210

Dear Mr. Dumeyer:

This report presents the procedures and results of soil sampling documented by PEMCO at the above referenced facility. PEMCO's scope of work included removal of (1) 20,000 gallon diesel, (1) 1000 gallon gas, (1) 2000 gallon waste oil and (1) 8000 gallon motor oil tank and collecting soil samples for required analyses.

Procedures

On 5/28/92, PEMCO removed four (4) tanks (listed above) and collected two soil samples from beneath each tank (refer to Site Map 1). Additional samples were also collected from the sidewalls of the diesel and gas tank excavation, and beneath two islands. Because water was encountered at the 11.5 foot depth, water samples from each excavation were collected and analyzed for BTEX. Results of soil analyses are shown in Table 1 and results of water analyses are in Table 2. The site was reported to Sheila Monroe of the DEQ.

Table 1. Soil Sample Results

Sample No.	Location	Depth(ft.)	TPH-HCID*	TPH (418.1M)*	BTEX (ppm)*
1	bot. diesel/gas exc.	13	all ND		all ND
2	s. side, diesel/gas	11.5			all ND
3	e. side, diesel/gas	11.5			all ND
4	w. side, diesel/gas	11.5			all ND
5	n. side, diesel/gas	11.5			all ND
6	w. end, gas	6	all ND		
7	e. end, gas	6	all ND		
8	beneath n. island	2.5	all ND		

Table 1, cont.

Sample No.	Location	Depth(ft.)	TPH-HCID*	TPH (418.1M)*	BTEX (ppm)*
9	beneath s. island	2.5	all ND		
11	w. end, w/o	8	all ND		
12	e. end, w/o	8	diesel, other det.	550	
13	e. end, motor oil	10	all ND		
14	w. end, motor oil	10	other det.	30,590	
%15	stockpile, w/o		other det.	905,812^	

* result given if tested
^ duplicate sample
% full scan results: TCLP(3) all ND, PCB's all ND, volatiles all ND.

Table 2. Water Sample Results

Sample No.	Location	Depth(ft.)	B (ppb)	T(ppb)	E(ppb)	X(ppb)
10	Diesel/gas excav.	11.5	ND	0.6	ND	ND
16	Motor oil excav.	11.5	ND	ND	ND	ND

Sample results showed the diesel/gas excavation soil samples were non-detected. There was further excavation on the motor oil and waste oil excavation on 6/12/92. Four soil samples were collected and tested for TPH(418.1M). The results are shown in Table 3.

Table 3. Confirmation Soil Sample Results

Sample No.	Location	Depth(ft.)	TPH(418.1M)
1&3 composite	sw&n. bot, motor oil	12	ND
2	w. sidew. motor oil	11	48
4	e. bot, waste oil	11	ND

Soil samples collected from the four sidewalls of the motor oil excavation were analyzed for BTEX. These results were all ND.

Complete analytical results and chain of custody documentation can be found in Appendix A.

Samples were collected using disposable vinyl gloves. The samples were packed for minimal headspace in clean, EPA-approved glass containers and placed on ice for transport to the lab; accompanied by chain of custody documentation.

A total of 710 gallons of tank bottom residual from the four (4) tanks were disposed of at Sunwest Energy Corp. Tank and sludge disposal receipts are attached.

SCHN00171792

Subsurface Conditions
Soils encountered at the site consisted of brown, poorly graded sand interbedded with grey silty sand to the total depth explored of 12 feet. Water was encountered at a depth of 11.5 feet.

Please do not hesitate to call if you have any questions.

Sincerely,

PEMCO

Bill Knutson

Bill Knutson, P.E.
Environmental Specialist

SCHN00171793

P..

ENVIRONMENTAL CLEANUP SITE INFORMATION
SITE SUMMARY REPORT

July 22, 1996 03:17 pm

SITE ID: 1820 SITE NAME: FTL Inc. CERCLIS NO:

ALIASES: ANR Freight Terminal
Coastal Corp.

ADDRESS: 3333 NW 35th Ave Portland 97210

COUNTY: MULTNOMAH REGION: NWR

INVG STATUS: SUS NPL SITE: N ORPHAN SITE: N STUDY AREA: N

PROPERTY: TWNSHP/RANGE/SECT: 1N,1E,29 TAX LOTS: 17

LATITUDE: 45 deg.32'48" LONGITUDE: 122 deg.43'12" SITE SIZE: 9.3 ac.

FACILITIES:

NAME: ANR Freight System
COMMENTS: Truck terminal for dry-goods transfer
YEARS OF OPERATION: 1963 to 1991
SIC CODES: OPERATING STATUS: Inactive

NAME: FTL Inc.
COMMENTS: Truck terminal for dry-goods transfer
YEARS OF OPERATION: 1991 to present
SIC CODES: OPERATING STATUS: Active

HAZARDOUS SUBSTANCES/WASTE TYPES:

Chlorinated solvents, petroleum-based solvents, hydrocarbons.

MANNER AND TIME OF RELEASE:

Unknown.

CONTAMINATION INFORMATION:

Coastal Corp. (Houston, TX), the property owner, met with DEQ 1/23/96 to find out whether DEQ could make the determination that Coastal was not responsible for groundwater contamination that it has discovered on the site. Coastal believed that the contamination, consisting of chlorinated and petroleum-based VOCs, originated from undetermined off-site sources. The site has two other, unrelated, contamination issues: releases from USTs that were removed in 1992 (NFA apparently issued by DEQ's LUST Program), and oil in groundwater along the northern property boundary, for which Owens-Corning has apparently assumed responsibility.

SCHN00171794

HAZARDOUS SUBSTANCES

SUBSTANCE	RELEASE AREAS	COMMENTS
BENZENE ( )		Date released: unk. Quantity Released: unk.
DICHLOROETHANE,1,1- ( )		Date released: unk. Quantity Released: unk.
DICHLOROETHYLENE,1,1- ( )		Date released: unk. Quantity Released: unk.
DICHLOROETHYLENE,1,2-CIS- ( )		Date released: unk. Quantity Released: unk.
ETHYLBENZENE ( )		Date released: unk. Quantity Released: unk.
METHYLENE CHLORIDE ( )		Date released: unk. Quantity Released: unk.
TETRACHLOROETHYLENE ( )		Date released: unk. Quantity Released: unk.
TOLUENE ( )		Date released: unk. Quantity Released: unk.
TRICHLOROETHANE,1,1,1- ( )		Date released: unk. Quantity Released: unk.
TRICHLOROETHYLENE ( )		Date released: unk. Quantity Released: unk.
TRIMETHYLBENZENE,1,2,4- ( )		Date released: unk. Quantity Released: unk.
VINYL CHLORIDE ( )		Date released: unk. Quantity Released: unk.
XYLENEs ( )		Date released: unk. Quantity Released: unk.

SUBSTANCE CONTAMINATION

SITE ID: 1820 FTL Inc. SITE SUMMARY REPORT

SUBSTANCE	MEDIA CONTAMINATED	CONCENTRATION LEVEL	EVIDENCE	OBSERV. DATE
BENZENE	Groundwater	21.6 ppb	Laboratory Data	20-NOV-95
DICHLOROETHANE,1,1-	Groundwater	383 ppb	Laboratory Data	20-NOV-95
DICHLOROETHYLENE,1,1-	Groundwater	47.7 ppb	Laboratory Data	20-NOV-95
DICHLOROETHYLENE,1,2-CIS-	Groundwater	1,375 ppb	Laboratory Data	20-NOV-95
ETHYLBENZENE	Groundwater	551 ppb	Laboratory Data	20-NOV-95
METHYLENE CHLORIDE	Groundwater	98.6 ppb	Laboratory Data	20-NOV-95
TETRACHLOROETHYLENE	Groundwater	4.1 ppb	Laboratory Data	20-NOV-95
TOLUENE	Groundwater	1,070 ppb	Laboratory Data	20-NOV-95
TRICHLOROETHANE,1,1,1-	Groundwater	43.1 ppb	Laboratory Data	20-NOV-95
TRICHLOROETHYLENE	Groundwater	39.3 ppb	Laboratory Data	20-NOV-95
TRIMETHYLBENZENE,1,2,4-	Groundwater	25.7 ppb	Laboratory Data	20-NOV-95
VINYL CHLORIDE	Groundwater	979 ppb	Laboratory Data	20-NOV-95
XYLENEs	Groundwater	1,599 ppb	Laboratory Data	20-NOV-95

MEDIA CONTAMINATION COMMENTS:

Groundwater.

STATUS OF INVESTIGATIVE OR REMEDIAL ACTION:

As a result of the 1/23/96 meeting, Coastal may decide to enter the Voluntary Cleanup Program. Further site evaluation will depend on this decision.

INVESTIGATIVE, REMEDIAL, AND ADMINISTRATIVE ACTIONS

ACTION	START DATE	COMPL. DATE	RESP. STAFF	AGENCY CODE	REGION	LEAD PROGRAM
Site added to database	24-JAN-96	01-JAN-01		DEQ		

SCHN00171796

SITE ID: 1820 FTL Inc. SITE SUMMARY REPORT

COMMENTS:

VCS Waiting List 03-APR-96 DEQ NW VCS

PARTY INFORMATION

SITE CONTACT:

ASSOCIATED PARTIES NAME AND ADDRESS	AFFILIATION	AFFILIATION STATUS	INFORMATION AS OF DATE
Terence J. Woolfe Corporate Director, Real Estate Coastal Corp. Nine Greenway Plaza Houston, TX 77046-0995 (713) 877-6102((713) 877-3505) COMMENTS: Property owner.	Owner		24-JAN-96

DATA SOURCES: Letter report dated 1/22/96 from DRT Environmental Consultants (Fort Collins, CO).

LAST UPDATED BY: jmd DATE: 31-MAY-96

(site_report.rpt)

SCHN00171797

DEQ Files on Trumbull Asphalt Plant Site
1988–January 1993

SCHN00171798

REPORT ON DECOMMISSIONING FUMELINE PROJECT AT TRUMBULL ASPHALT PORTLAND, OREGON

Prepared for:
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Advanced Environmental Specialist
Owens/Corning Fiberglass

Prepared by:
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Crosby & Overton, Inc.
Portland, Oregon

SCHN00171799

TABLE OF CONTENTS

			PAGE
1.0		INTRODUCTION	2
	1.1	Overview	2
	1.2	Scope of Work	2
2.0		REGIONAL HYDROLOGY	2
3.0		FIELD WORK	3
	3.1	Fume Line Decommissioning	3
	3.2	Soil Borings	3
	3.3	Well Installation	3
4.0		LABORATORY ANALYSIS	4
5.0		FINDINGS	4
	5.1	Subsurface Conditions - Soils	4
	5.2	Subsurface Conditions - Groundwater	4
6.0		LABORATORY RESULTS	4
	6.1	Soils	4
	6.2	Groundwater	5
7.0		DISCUSSION	5
8.0		RECOMMENDATIONS	5

REFERENCES CITED

MAPS
- Map of Soil Boring Locations
- Map of Fume Line Plume Boundary

ANALYTICAL DATA
- Soil Boring Samples
- Monitoring Well Samples

FIELD PHOTOGRAPHS

26-88-054

UNDERGROUND FUME LINE DECOMMISSIONING AND

SITE INVESTIGATION

FOR

OWENS-CORNING FIBERGLAS CORP.

PORTLAND, OREGON

1.0 INTRODUCTION

1.1 Overview

On July 20, 1988 Owens-Corning Fiberglas Corp. (OCF) contracted Crosby & Overton, Inc., to decommission an underground fume line at their Trumbull Asphalt Division plant at NW 35'th Street and NW Yeon Avenue in Portland, Oregon.

The facility is in a heavy industrial area near the Willamette River in the northwest portion of Portland. The property is immediately surrounded by truck terminals to the south and west, by NW 35'th street to the east, and by NW Yeon Avenue to the north. There are numerous oil refineries and chemical plants in the area.

1.2 Scope of Work

The buried fume line is approximently three foot square by sixty-seven feet long. The line is located under eighteen inches of soil, three feet north of the boiler house, and runs under an incinerator concrete pad and the maintenance shop. Due to the location of buildings and equipment, an in-place closure was chosen that encompassed exposing the fume line, cleaning the line, disposal of material remaining in the line, and filling the line with sand to eliminate any void spaces.

Initial sampling had indicated the presence of contamination in the soils near the fume line. During the decommissioning operation, additional soil borings were taken to determine the extent of contamination. In addition, two of the soil borings were converted to monitoring wells to assess the ground water quality in the nearest aquifer.

2.0 REGIONAL HYDROLOGY

The upper layer soil type in the area is all sand fill. At one time the area was part of the Willamette River flood zone until it was filled in to create a commercial/industrial area in the early 1900's. With several refineries in the area it was common practice up until the 1960's to clean oil tankers and flush the rinse onto the ground Total Petroleum Hydrocarbon (TPH) background

soil levels in this area are typically high.

Ground water in this area typically flows toward the Willamette River which is to the north of the plant. The ground water levels vary extensively from season to season and can range from two or three feet in the winter to fifteen feet in the summer. As with the soils, ground water TPH levels in this area are generally high.

3.0 FIELD WORK

On August 22, 1988, Crosby & Overton, Inc., initiated the project to decommission the fume line. The Oregon Department of Environmental Quality (DEQ) had been contacted to insure that the line was not considered an underground tank. The DEQ agreed that the line was process equipment and not an UST. Upon excavation of portions of the fume line it was apparent that the line had been leaking and significant contamination had occurred.

Representatives of OCF and the DEQ were notified of the conditions. After a conference with Frank Berg, Asphalt Operations Manager with OCF's Trumbull Asphalt division and David Crowle, Environmental Specialist with OCF, it was determined that prior to any remedial efforts, other than fume line cleaning and decommissioning, an assessment of the contamination be made.

3.1 Fume Line Decommissioning

Operations to clean the fume line continued on August 23, 1988 and sludge from the line was removed with a vacuum truck and transported to Merit-Oil for recycling. Decommissioning of the fume line was completed on September 15, 1988. Prior to completion a meeting was held at the site with Loren Garner of the DEQ's NW Regional Office. Mr Garner agreed with the plan to fill the line with sand based on the location of the fume line under buildings and equipment. The line was packed with sand and covered. On September 20, 1988, Charlie Gray of the DEQ approved disposal of ten cubic yards of soil that had been excavated at the east end of the fume line. The soil was taken to the Riedel disposal facility.

3.2 Soil Borings

Soil borings were taken the week of August 22'nd. Borings were obtained utilizing a hand auger. Boring locations were determined systematically out from the fume line and along one property line to determine the extent of hydrocarbon contamination in the soil (see map). A composite sample from each drilling was taken at five foot intervals and analyzed for Benzene-Toluene-Xylene (BTX) and TPH values using EPA method 3810 at an independent laboratory (see lab results). A total of thirteen soil boring samples were taken as well as a control sample from the sludge inside the fume line. Eight borings were concentrated along the south property line due to visual and odor observations of hydrocarbons present.

3.3 Well Installation

Two boring locations were converted to monitoring wells, to the north and south of the fume line. Each well is approximently 20 feet from the line and

the south well is along the property line, inside of the south wall of the boiler house. Wells are constructed of two inch PVC riser and screen and have steel casings with locking lids (see photos). After adequate purging, samples were obtained from each well.

4.0 LABORATORY ANALYSIS

All samples collected were analyzed by Northwest Testing Laboratories. Soil and water samples were analyzed utilizing EPA methods for some or all of the following constituents:

- PCB's
- Total Petroleum Hydrocarbons
- Benzene, Toluene, Xylene

Analytical results are attached.

5.0 FINDINGS

5.1 Subsurface Conditions - Soil

Field observations of the soil samples by both Crosby & Overton and OCF personnel indicated that samples from two different areas, along the south property line and north of the fume line, were different. Samples and boring cuttings along the property line had a distinct diesel fuel odor. The control sample from the fume line and a sample of blowing distillate oil (BD oil), a by-product recovered from the asphalt process (related to the fume line material only without the sludge or water content), both had an equally distinct asphalt odor.

5.2 Subsurface Conditions - Ground Water

Samples were taken from monitoring wells one and two. It was obvious from samples from both wells that there was floating product on the aquifer. As above, field observations indicated the samples were different both visually and from an odor standpoint. Well number two (property line) samples had a distinct diesel odor. Well number one samples had a typical asphaltic odor.

6.0 LABORATORY RESULTS

6.1 Soils

Soil samples one through four and thirteen had TPH levels in the 100 - 5000 ppm range. These samples were taken on the north (plant) side of the fume line in the expected direction of groundwater flow. The remaining samples are in the 20,000 to 50,000 ppm TPH range (one sample was even higher at 162,000 ppm). These higher concentrations occurred in samples along the south property line from east to the furthest west point on the property line.

Northwest Testing Laboratories was asked to include a comparison of the hydrocarbons found in the soil samples to common hydrocarbon products. Comments at the bottom of the analysis sheets indicate that volatile portions

of the samples along the property line were similar to diesel fuel.

6.2 Ground Water

The laboratory was asked to finger print the samples in comparison to samples of OCF fume line waste and BD oil. The resultant chromatographs (see lab results) show well number one samples matching fume line and BD oil samples quite closely with the 4-phenanthrene peak used as an identifier in each sample. Two samples from monitoring well number two at the property line did not match the other samples.

7.0 DISCUSSION

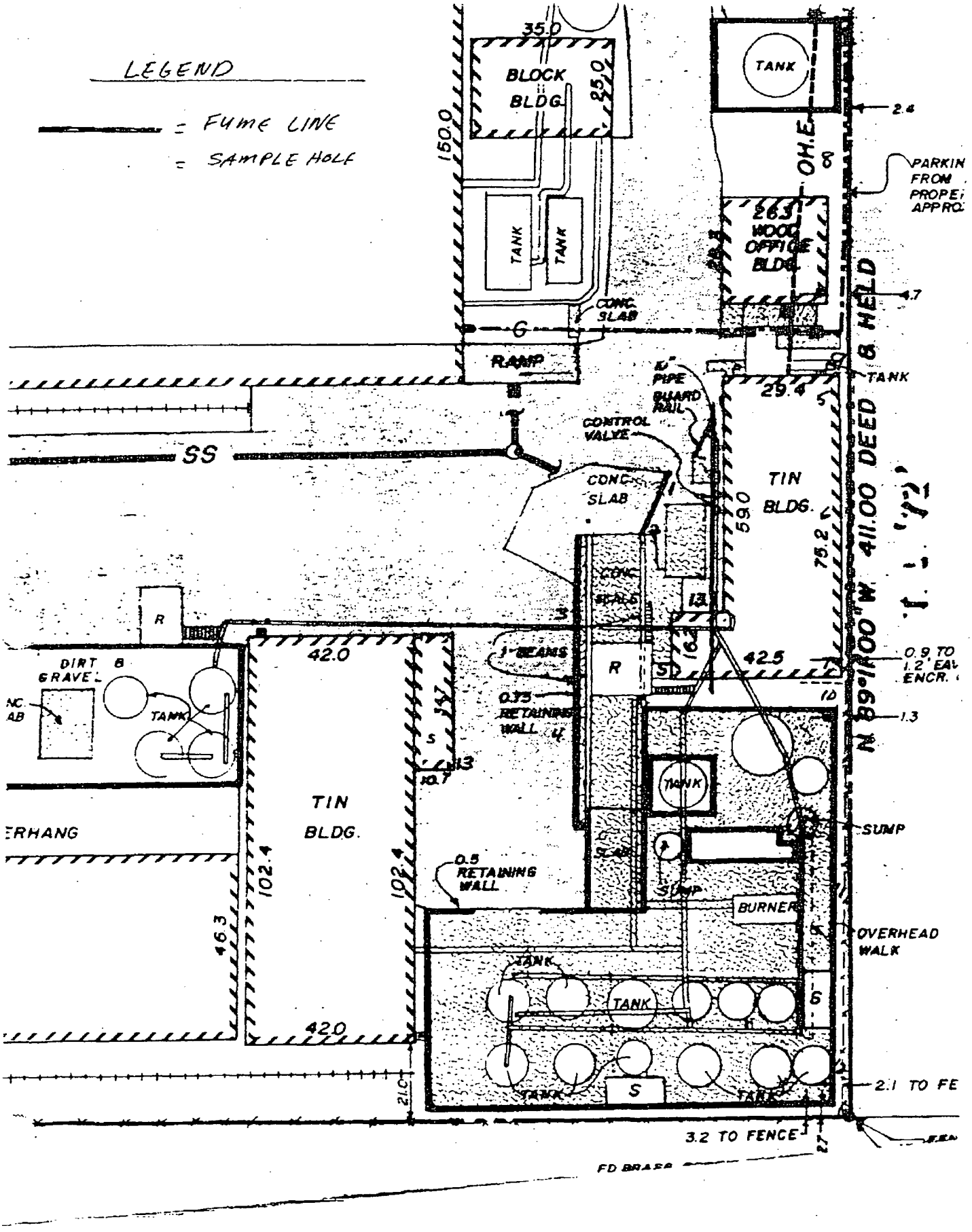
In determining the extent of possible contamination from the underground fume line, it was found that very high levels of hydrocarbons exist in the soils along the facilities' south property line. Ground water samples demonstrated floating product on the water table in the near vicinity of the fume line, within twenty - thirty feet north and south of the fume line. Soil and water samples along the property line did not appear to be contaminated with materials from on the OCF Trumbull Asphalt Division site. Field observations of soil and water samples from the property line were observed to have a diesel fuel odor. Soil and water samples from a limited area on the north (plant) side of the fume line were observed to be similar to the material contained in the fume line.

To determine if the contamination along the property line was a part of the plume resulting from the leaking fume line, base neutral gas chromatograph finger prints were made comparing the sludge from the fume line to samples in the two monitoring wells. The finger prints demonstrate that the hydrocarbon contamination along the property line to the south of the fume line is from a different source than the leaking fume line. The expected ground water flow direction is northwest which also points to the contamination to the south of the fume line as being from a different source and flowing onto the OCF property.

Contamination to the northwest (north side) of the fume line was matched up closely to the control sample from the fume line. This contamination appears to be much more limited in concentration and area and is believed to be contained on site (see map with approximate plume location). Soil and water samples were used to determine fume line plume boundaries, the plume appears to end approximately sixty yards to the northwest of the source.

8.0 RECOMMENDATIONS

Soil and ground water remediation should focus on the area of known contamination from the leaking fume line. Clean-up options are limited in this area due to the activity, buildings, and equipment on the site. It would not be economically reasonable to excavate soils in the area of contamination, nor is it necessary with other technically demonstrated methods available. Crosby & Overton, Inc., recommends using a skimmer pump to remove free product from the ground water in conjunction with a bioremediation technique for the remaining groundwater and soils contamination.



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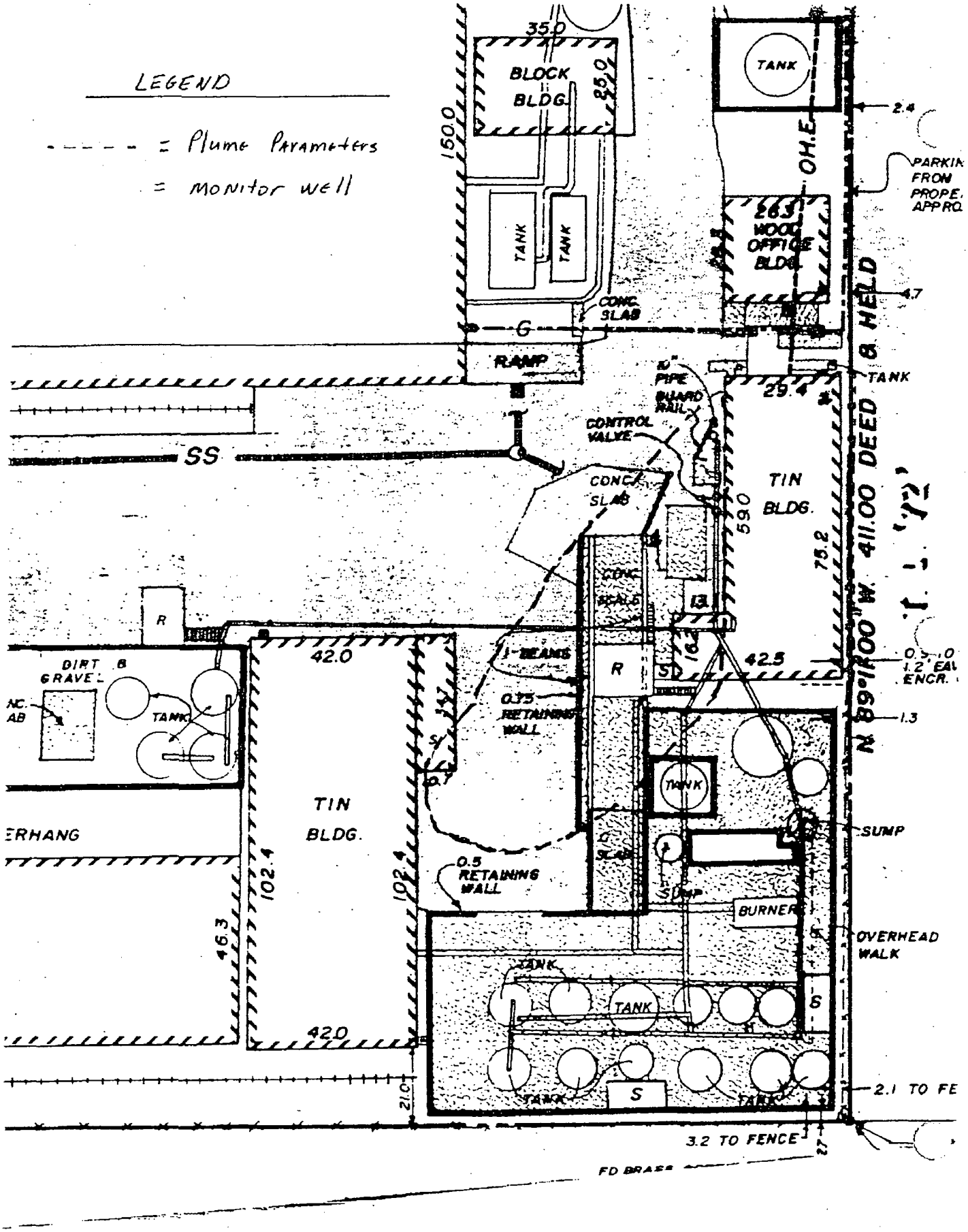

SCHN00171806

GROUNDWATER CONTAMINATION

REMEDIAL INVESTIGATION

TRUMBULL ASPHALT COMPANY
PORTLAND, OREGON

August 28, 1989

Prepared For:

Owens-Corning Fiberglas Corporation
Fiberglas Tower
Toledo, Ohio 43659

Prepared By:

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Portland, Oregon 97230
(503) 252-8316

SRH PN: 2-2033

GROUNDWATER CONTAMINATION

REMEDIAL INVESTIGATION

TRUMBULL ASPHALT COMPANY
PORTLAND, OREGON

SRH

SCHN00171808

TABLE OF CONTENTS

1.0 INTERPRETATIONS AND LIMITATIONS 1
- 1.1 Interpretations 1
- 1.2 Limitations 2

2.0 BACKGROUND AND PROJECT SCOPE 2
- 2.1 Background 2
- 2.2 Project Scope 3

3.0 SITE DESCRIPTION 4
- 3.1 Site Location 4
- 3.2 Review of Site Area Contaminant Release Records Check 4

4.0 SOIL GAS SURVEY 5
- 4.1 Introduction 5
- 4.2 Methodology 6
- 4.3 Results 6

5.0 SUBSURFACE INVESTIGATION 7
- 5.1 Introduction 7
- 5.2 Drilling Procedures 8
- 5.3 Monitoring Well Construction 8
- 5.4 Soil Sampling Procedure 8
- 5.5 Water Gauging Procedures 9
- 5.6 Water Sampling Procedures 10

6.0 SUBSURFACE CONDITIONS 10
- 6.1 Geology 10
- 6.2 Hydrogeology 11
  - 6.2.1 Direction and Velocity of Movement 11
  - 6.2.2 Aquifer Characteristics 12

7.0 PRODUCT RECOVERY 12
- 7.1 Recovery Procedure 13
- 7.2 Recovery Results 13

8.0 CONTAMINATION 13
- 8.1 Contaminant Analyses 13
  - 8.1.1 General 13
  - 8.1.2 Analytical Results 14
- 8.2 Contamination Source 16

9.0 CONCLUSION AND RECOMMENDATIONS 17
- 9.1 Conclusion 17
- 9.2 Recommendations 18

APPENDICES

Appendix A - Soil Gas Chromatography Output

Appendix B - Drilling Logs

Appendix C - Laboratory Analytical Data, Chain-of-Custody Documentation, and Chromatograms

1.0 INTERPRETATIONS AND LIMITATIONS

1.1 Interpretations

From review and analysis of the data collected for this study, we have drawn the following interpretations:

1) The drilling and sampling of nine test borings, the installation and sampling of six permanent monitoring wells, and the performance of a soil gas survey for this study all indicate that hydrocarbon contamination exists at the site, but at lower levels of severity than reported in a preliminary study by Crosby and Overton.

2) Concentrations of Total Petroleum Hydrocarbons (TPH) were found to range from 2 parts per million (ppm) to 9350 ppm from soil analyses and 0.20 ppm to 14.8 ppm for water analyses. In addition, the thickness of floating product was found to be 1/8 inch thick in monitoring well MW-3.

3) The results of the soil gas survey indicate moderately high levels of contamination. During the performance of the survey, a second soil gas anomaly of high chromatographic intensity was found to the north of the primary investigation.

4) The actual source of the contamination has not been identified. However, it is strongly suggested by (1) the past history of the site; (2) the distribution of the contamination plume, as currently known from the results of the drilling and the soil gas survey; and (3) the direction of groundwater movement that the source of the contamination is at least, in part, from on-site releases and is most likely from more than one source. The anomaly seen near the wooden office building is probably from the leaking fume line. The anomaly seen under the operating facilities near the southwest corner of the site is probably due to spills over years of operation of the asphalt plant. The source of the anomaly seen near the covered loading dock is unknown due to lack of subsurface data in the area of the anomaly.

5) Shallow groundwater flow under the site is to the east and south, probably under influence of the local recharge area to the west of the site in the West Hills. The actual movement vector may vary during the year, under influence of recharge amounts and possibly the stage of the Willamette River, but it appears to typically be in a generally easterly direction.

6) The subsurface materials beneath the site are relatively consistent from bore hole to bore hole, and were found to be the same as those found during previous work. There is a layer of man-made fill underlain by a layer of old topsoil and an unknown thickness of native sands.

SCHN00171811

1.2 Limitations

The observations and interpretations presented in this report are based on the assumption that the conditions do not vary from those found during the course of the investigation, at the individual sampled areas. If any variations are encountered during any further investigations for this project, SRH should be notified so that supplemental interpretations can be made. The observations and interpretations of this report are intended only for the individual sampling sites described and the sampling conditions described, and must not be extended to adjacent areas.

SRH is not responsible for the accuracy of results of investigations carried out by others, or interpretations drawn by others on the site. References are made within this report to work performed by others only to facilitate background and guidance for the scope of work and for the reported SRH work.

The findings of this report are valid for the dates and under the conditions of the observations and testing. However, changes in the conditions of the subject property, neighboring properties, or changes in applicable standards can occur with the passage of time, whether they result from natural processes, legislation, or the broadening of knowledge. Accordingly, the observations and findings presented in this report may be invalidated by changes outside of our control.

2.0 BACKGROUND AND PROJECT SCOPE

2.1 Background

In July 1988, Owens-Corning Fiberglas Corporation contracted with Crosby and Overton, Incorporated, of Portland, Oregon to decommission a fume line at Owens-Corning's Trumbull Asphalt Division plant in Northwest Portland. This followed detection of what was thought to be leakage from the buried fume line, which runs east-west, through the center of the site.

During the decommissioning of the fume line, Crosby and Overton also excavated and sampled thirteen hand auger borings to determine the subsurface conditions, and the extent of any possible contamination. Two of these borings, located at the north and south end of the fume line, were converted to permanent monitoring wells by installing 2-inch PVC riser pipes. At that time, Crosby and Overton also obtained 5-foot interval samples from each of the soil borings and composited all of the samples into one sample per boring. The thirteen samples were then taken to a local laboratory and analyzed for benzene, toluene, and xylene (BTX), and Total Petroleum Hydrocarbons (TPH).

IAnalyses of the soil samples taken south of the fume line showed petroleum product in the soil, with a maximum value of 3,600 ppm of TPH reported. Analyses of the soil samples near the facility's southern property line yielded TPH values up to 162,000 ppm. BTX values were reported as being less than detection limits for all soil samples.

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In addition to the laboratory analyses described above, Crosby and Overton personnel reported that water samples from their monitoring wells had visual and olfactory indications in the field of floating product up to 12 inches thick on the uppermost groundwater surface.

Crosby and Overton performed an additional fingerprint gas chromatography analysis of the sludge from the fume line and compared it to similar analyses of samples taken from the monitoring wells. It was their conclusion, coupled with what they felt was a northwesterly flow of the groundwater, that the product found in the soil was from a different source than the leaking fume line, and perhaps from a source off of the Trumbull property.

2.2 Project Scope

SRH Environmental Management was retained by Owens-Corning in March of 1989 to perform a site investigation and to recover free product from the groundwater surface. The scope of work was divided into seven tasks, as follows:

- Task 1: Review all of the data generated to date, including local area monitoring well and UST historical records;
- Task 2: Perform a soil gas survey of the suspected area of free product;
- Task 3: Drill three soil borings and construct three monitoring wells as a Phase 1;
- Task 4: Construct an additional three monitoring wells, as a Phase 2, if necessary;
- Task 5: Perform an initial recovery of the free product reported by Crosby and Overton, using the constructed monitoring wells;
- Task 6: Perform laboratory analyses of the recovered soil and water samples; and
- Task 7: Prepare a final report of interpretations and recommendations for further investigations or remediation.

This reports presents the data collected during this study, together with our interpretations and recommendations for further action.

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3.0 SITE DESCRIPTION

3.1 Site Location

The Trumbull Asphalt plant site is located in the Guild's Lake industrial district of Northwest Portland, south of NW Yeon Street on 35th Avenue. The offices for the Trumbull plant are located at 3750 NW Yeon, around the corner from the plant.

The asphalt manufacturing plant site and associated storage buildings cover a total area of approximately 84,000 square feet. The site is bordered by industrial properties on all sides. Northwest Yeon Avenue is located to the north, to the west is a spur line of the Burlington Northern Railroad Yard, the east is bordered by NW 35th Avenue, and the south by a trucking facility. The southwestern bank of the Willamette River is about 1/3 of a mile northeast of the site. Figure 1 shows the site vicinity map.

The site has been filled in the past to bring it level with NW 35th Avenue, and the total relief over the site is less than five feet. Most of the site is covered with buildings, manufacturing facilities, or asphaltic pavement. Inspection of topographic maps for the area indicates the average elevation is about 30 feet above Mean Sea Level.

3.2 Review of Site Area Contaminant Release Records Check

SRH Environmental Management conducted a records check of state and local environmental regulatory agencies of areas near the Trumbull Asphalt plant to determine if past contaminant spills or releases have occurred.

Agency records checks were conducted at the following agencies:

* Oregon Department of Environmental Quality, Environmental Cleanup Division. Review of ECD, CERCLIS, and NPL lists for properties with records of any unauthorized releases. The DEQ UST list was also reviewed.

* The Portland Building. Review of sewer contaminant violations.

* State Fire Marshal's Hazardous Materials Response List. Review of hazardous materials releases in the area.

The review of files from the respective agencies indicated that numerous releases into the subsurface soil zone have occurred in the general area of Northwest Portland where the Trumbull Asphalt facility is located. However, none of the reported releases are within one-half mile of the facility. Furthermore, a records check of the three facilities immediately adjacent to the Trumbull Asphalt facility in the east, west, and south areas revealed no reported releases of contaminants.

The industrial area of Northwest Portland, within which the Trumbull Asphalt facility is located, encompasses an area approximately 3 miles long and 3/4 mile wide. This area

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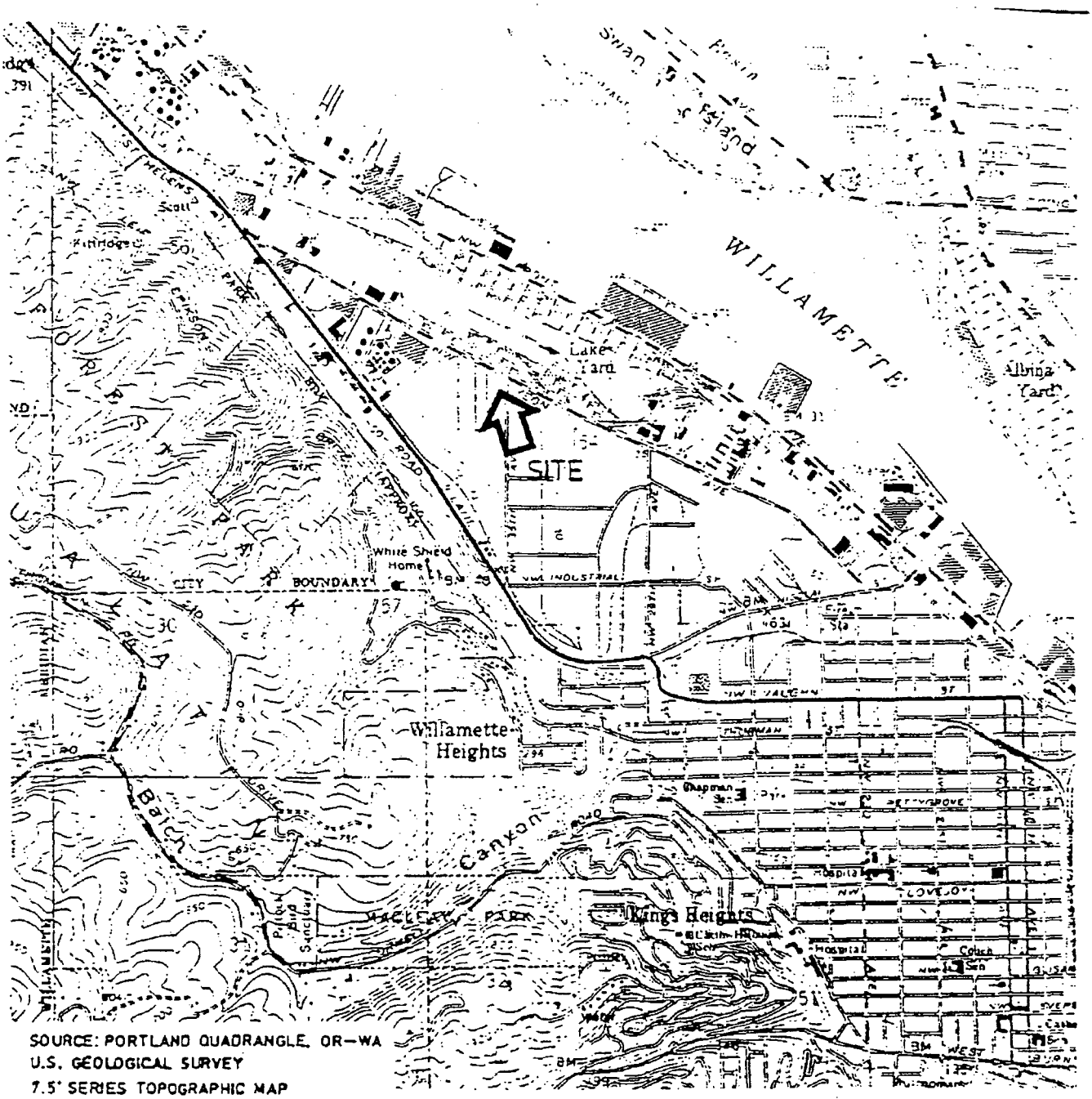

SOURCE: PORTLAND QUADRANGLE, OR—WA
U.S. GEOLOGICAL SURVEY
7.5' SERIES TOPOGRAPHIC MAP

SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE LOCATION

Figure 1.

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
Interstate Route — U. S. Route — State Route

SRH ENVIRONMENTAL MANAGEMENT		
SCALE	CHECKED BY	DRAWN BY
DATE JULY 1989		JH
SIZE	TRUMBULL ASPHALT VICINITY MAP	DRAWING NO.

SCHN00171815

is readily identified as having widespread elevated background levels of industrial contaminants in the subsurface soils.

At the present time, no historical background contaminant subsurface data is available to determine contaminant levels surrounding the Trumbull Asphalt Plant.

4.0 SOIL GAS SURVEY

4.1 Introduction

On April 25 and 27, 1989, before test borings were drilled and monitoring wells installed, a 45-point soil gas survey was made to determine the most beneficial locations for the borings and wells and to outline the suspected petroleum product anomalies in the soil.

Personnel from SRH conducted the soil gas survey using a Photovac model 10S55 portable gas chromatograph fitted with a highly sensitive photoionization detector. The soil gas survey provides a rapid and cost effective areal delineation of subsurface contamination and is used to determine if the subsurface is free from contamination or, if contamination is present, to objectively determine appropriate test boring and monitoring well locations. This reduces the required number of borings, and additional information is gained which provides insight into the appropriate remedial strategies, which are specific for each project site.

In order to effectively address a variety of site characteristics and requirements, SRH Environmental Management has developed a three-level approach to soil gas characterization. The first level, which is the "point source" soil gas survey, encompasses areas immediately around identified potential point source areas. These include areas such as tank pads, product lines, pump islands, turbines, vent lines, etc. This survey does not cover the site perimeter areas or remaining areas located between potential point source areas.

The second level, the "limited scale plume definition" survey, encompasses the point source areas and further defines the extent of the contaminant plume with an additional limited number of sample points. The additional sampling points are placed at a short distance from the identified point sources.

The third level, the "full scale perimeter plume definition" survey, encompasses additional areas including the perimeter of the site and areas throughout the site with detailed plume mapping.

A full scale perimeter plume definition survey was completed at the Trumbull Asphalt facility.

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4.2 Methodology

Following the site inspection and visual survey, the soil gas sample locations were gridded off on a 20- to 30-foot grid, using site plot plans provided by the client. Three gas probes were made off the site, just to the east of the property boundary near a tank pad.

A rotary-hammer drill and manually operated impact driver were used to prebore 1/2-inch-diameter-by-30-inch-deep probe holes at each of the premarked sample points. A specially constructed 1/4-inch-diameter stainless steel gas sample probe was then driven to a depth of 36 inches at each point and connected, via a Teflon transfer line, to an air sampling control unit. The air sampling unit was programmed to purge the probe, and draw a preset soil vapor sample from the vadose zone. A standardized volume of sample vapor was then drawn with a gas-tight syringe and injected into the chromatograph. The sample chromatograph analytical program, column type, and chromatographic conditions were selected, based on the suspected type and amount of volatile components in the contaminant.

The column separated the volatile organic components sampled from the vadose zone, with the concentration of volatiles measured by the photoionization detector. The result was a chromatographic "fingerprint" of the types and relative concentrations of volatiles present in the soil gas sample.

Air blanks were taken before and after each soil gas sample to eliminate background interferences from volatiles in the ambient air, or traces of residual contamination from previous sampling within the sampling system.

Inspection of the chromatogram allowed the SRH chromatograph analyst to determine: (1) if the soil vapor contained volatile organics; (2) if the volatiles were refined fuels (gasoline, diesel fuel, etc.), crude oils, or specific solvents (benzene, acetone, trichloroethylene); (3) if the hydrocarbons were weathered; (4) if natural biodegradation was occurring; or (5) whether the volatiles were moving with groundwater flow.

As a result of these analyses, areas can generally be described as clean or lightly, moderately, or highly contaminated. Point sources can be located, with the direction of contaminant spread inferred, and groundwater involvement deduced. The soil gas survey, however, does not provide the same level of quantification obtained from direct sampling and analyses of soil and groundwater samples, nor does it define the vertical extent of contamination.

4.3 Results

Copies of the gas chromatography output are presented in Appendix A in the form of chromatographic peaks indicating the soil gas hydrocarbon components and their relative concentrations. An areal map is presented as Figure 2 which shows the locations of each of the soil gas sampling points. Figure 3 indicates the GC response as a volt value

Figure 2. Soil Gas Sampling Points Locations

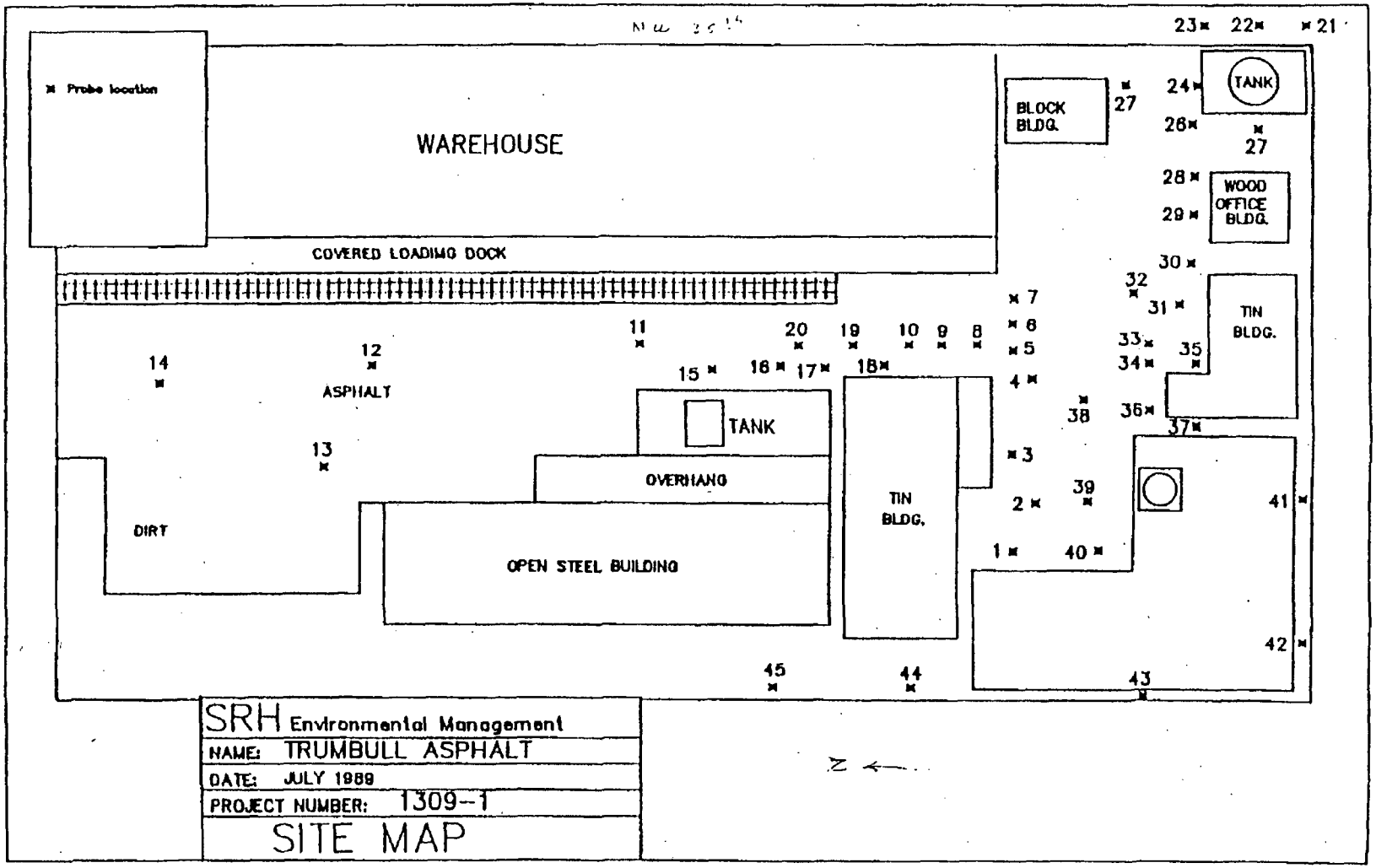

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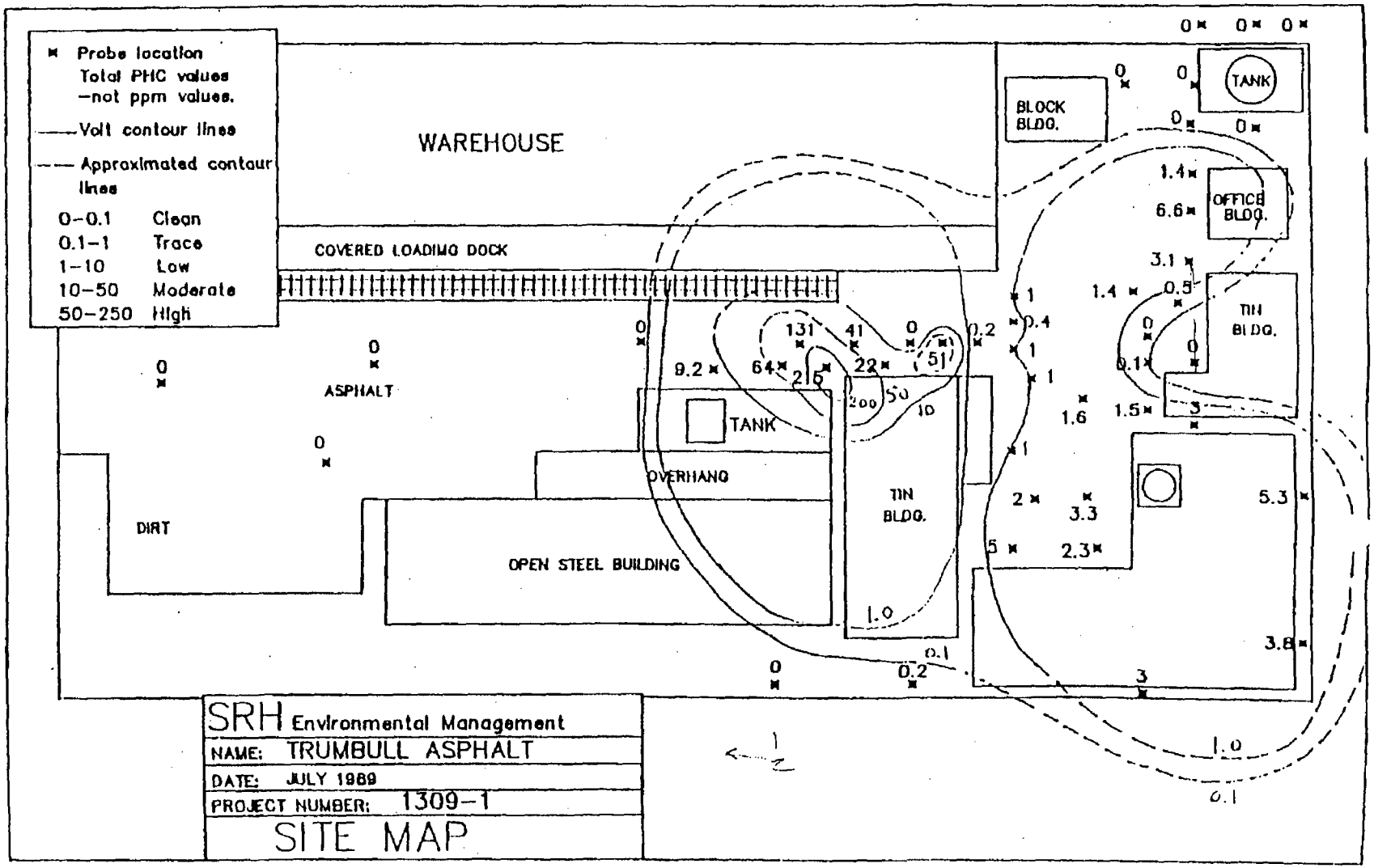
Figure 3. Soil Gas Contour Map



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recorded at each point. The values were then contoured with lines of equal concentration, which outlines areas with potential subsurface contaminants.

The most prominent feature found during analysis of the Trumbull soil gas map is the presence of a large hydrocarbon anomaly which extends from across the southern property boundary to the north, about one-half of the distance through the site. The area appears to be slightly to moderately contaminated with volatile organic compounds with readings ranging in intensity from low to moderate.

The anomaly extends over a large area, with what appears as possibly two point sources. The first possible point source is in the area of the abandoned fume line, just north and west of the mail office building. This area shows a broad area of moderate concentrations of contaminant without a specific point source identified. The highest value recorded in this anomaly is 6.6 electron volts, recorded at a point just outside the door of the wooden office building.

The second point source is more defined, near the southwest corner of the covered loading dock. This point source shows an anomaly with a maximum recorded concentration of 215 electron volts. This value is fairly significant and typically represents higher levels of contamination.

These two anomalies coalesce into a broad area of anomalous readings that seem to underlie most of the actual asphalt plant operational facilities. The anomaly appears to diminish to the north and east, toward the storage and shipping facilities.

Our subsurface evaluation, reported in Section 5 indicates that the local uppermost groundwater is moving in a generally east to southeast direction. However, the shape of the plume from the point source near the loading dock is elongated in a south and southwestern direction, with perhaps a portion moving toward the east, under the warehouse, where no soil gas points could be obtained. The shape of the plume near the fume line is rather oblate, with no clear movement direction inferred.

The large moderate grade anomaly seen under the asphalt production facilities may be due to normal everyday operations of the plant over the years of operation, with no single large spills or accidents occurring.

5.0 SUBSURFACE INVESTIGATION

5.1 Introduction

Six monitoring wells were installed at the site for this project in two phases on two separate days. Two of the wells, MW-3 and MW-5 were completed with 4-inch I.D. casing. The remaining four wells were completed with 2-inch I.D. casing. In addition to the six monitoring wells, three soils borings were made that were not completed as monitoring wells. All the wells and soil borings were installed and sampled under the

SCHN00171820

direct supervision of SRH geologists and environmental scientists. Logs of all nine wells are presented in Appendix B . The locations of the borings are presented in Figure 4.

5.2 Drilling Procedures

Wells MW-3 and MW-5 were drilled with 6-inch I.D., hollow stem augers. The other four monitoring wells and the three soil borings were drilled with 4-inch I.D., hollow stem augers. All of the borings were drilled using a Central Mining Equipment model 55 drilling machine provided by Geo-Tech Explorations of North Plains, Oregon.

All tools, monitoring equipment, augers, and the drill itself were thoroughly steam-cleaned prior to setting up on each boring location.

The borings were drilled by advancing the augers 5 feet and then conducting a Standard Penetration Test with a stainless steel, 2-inch O.D., split-spoon sampler, or taking a grab sample from the auger flights. The split-spoon sampler is advanced by repeated blows of a standard, 140-pound, pin-guided hammer dropping 30 inches. The number of blows to advance the sampler each 6-inch increment was recorded and the amount required to advance the sampler the final 12 inches is added and called the N-value of the soil. These data were recorded and are presented on the drilling logs in Appendix B.

5.3 Monitoring Well Construction

Under the supervision of SRH personnel, monitoring well materials were carefully steam-cleaned prior to installation in the well. The 2-inch and 4-inch I.D., flush-threaded, machine-slotted, PVC well screens were 10 feet long. The riser pipes, also composed of PVC, were similarly 2-inch and 4-inch I.D. and flush-threaded. No solvents or glues were used at any time during monitoring well construction.

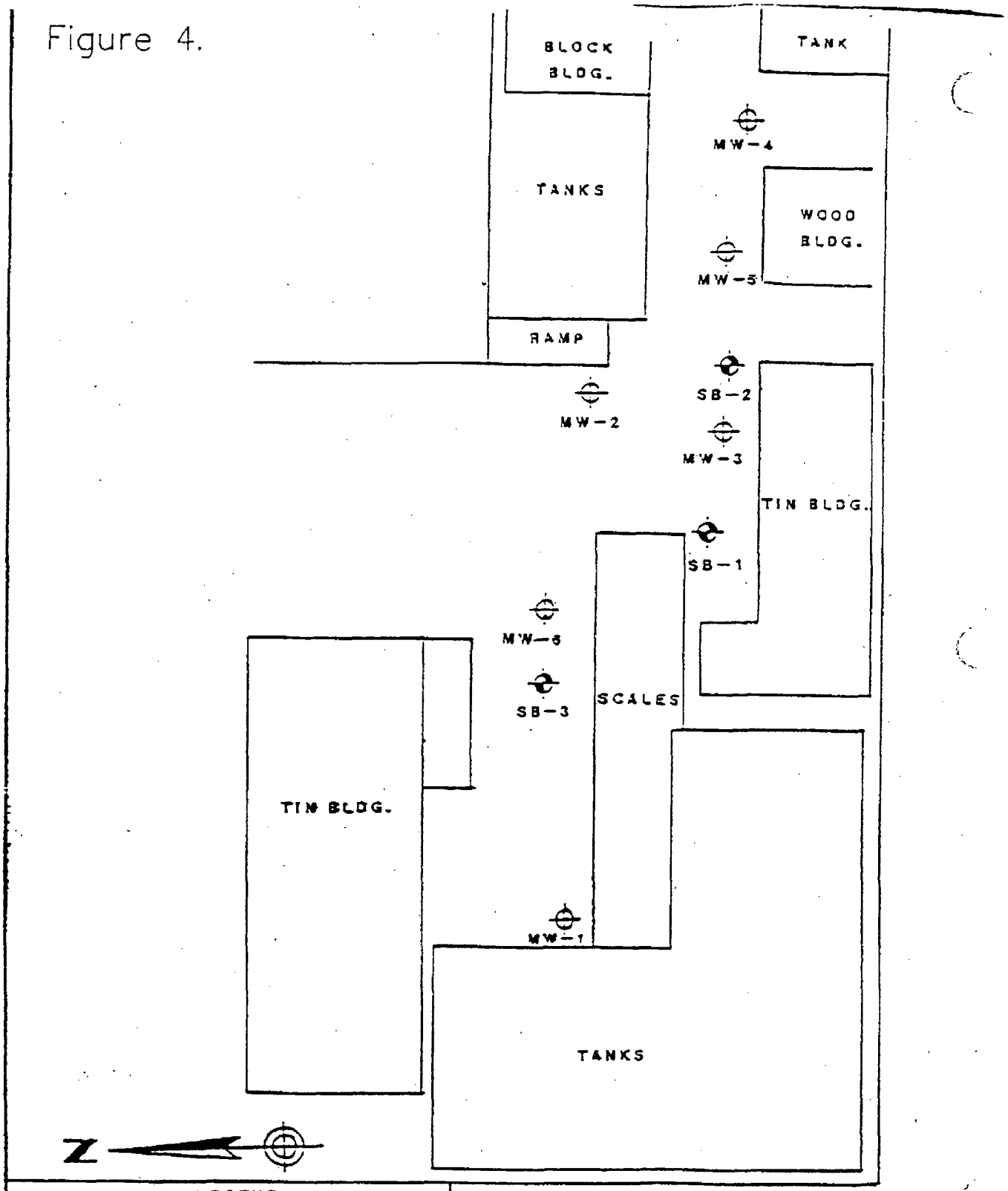
At the completion of the drilling of each well, the well screen was fitted with a bottom cap and lowered into the boring at the bottom of the riser pipe, to the depth specified by the supervising project manager. A plastic and neoprene sanitary seal was set into the top of the monitoring pipe and vented to allow equilibration of the water level with atmospheric pressure. A high grade select sand backfill was then placed from the bottom of the boring to a level of 2 feet above the top of the slotted well screen. A bentonite seal was then placed above the permeable backfill to within a few feet of the surface, and a seal of cement installed to the surface. Locking, flush-mounted steel caps were set in the cement seal to secure the wells against vandalism and potential cross contamination. Well completion specifications are included in the well logs attached as Appendix B. Figure 5 shows a typical construction diagram for monitoring wells.

5.4 Soil Sampling Procedure

Soil samples were logged according to geologic and Unified Soil classification and visual and olfactory indications of contamination by an SRH staff Geologist or Environmental Scientist and placed in plastic Ziploc bags with clear identification. One sample from each boring was split, with one portion placed in a plastic Ziploc bag, and the other portion into

SCHN00171821

Figure 4.



LEGEND

⊕ = MONITORING WELL LOCATION

⊕ = SOIL BORING LOCATION

SRH ENVIRONMENTAL MANAGEMENT		
SCALE 1" = 30'	CHECKED BY	DRAWN BY
DATE		
SIZE	TRUMBULL ASPHALT SOIL BORINGS AND MONITORING WELLS	DRAWING NO.

SCHN00171822

a wide-mouth, clear glass bottle. The samples placed in Ziploc bags were stored in the SRH office archives in Portland, Oregon for further examination and Quality Assurance during the preparation of this report.

The sampling of the soils was carried out using standard EPA and industry protocols following the proper chain-of-custody procedures. The soil samples were obtained from the split-spoon samplers and the auger flights using decontaminated stainless steel spoons. Each individual sample was loaded directly into a laboratory cleaned, 8-ounce, clear glass, wide-mouth jar fitted with a Teflon-lined screw cap lid. All of the jars were filled to maximum capacity to minimize headspace volatile losses. A clean pair of disposable surgical-type gloves was worn for the collection of each discrete sample. The samples were placed into a cooler with ice immediately following sample collection and promptly delivered to an off-site analytical laboratory together with sampling information and chain-of-custody documentation. Sampling implements were decontaminated prior to reuse by scrubbing off all visible particulates with a tap water/TSP/baking soda solution, tap water rinse, hexane rinse, acetone rinse, and three rinses with deionized water.

5.5 Water Gauging Procedures

On June 27, 1989, all six wells were measured for depth to groundwater. The results of those measurements are presented in Table 1 of this report.

Depth to water was measured using the "wetted tape" method, which allows for a high degree of accuracy in measuring shallow groundwater depth. The method was accomplished by lowering a decontaminated, Teflon-coated measuring tape into the well, with a weight attached to the end to keep the tape pulled straight. The tape was lowered to a specific whole-foot point on the tape, which was estimated to be long enough to allow the end with the weight to be immersed below the water level. The whole-foot point was then measured to an established measuring point at the top of the PVC riser pipe, and the tape carefully removed. The height of the wetted surface was located on the bottom of the tape and measured to the nearest 1/8th of an inch. This length of wetted tape was then subtracted from the whole-foot point to give the total depth to groundwater to the nearest 1/8th of an inch. This number was then recalculated to give the water depth to the nearest 0.01 foot. To facilitate Quality Assurance, the depths were measured twice using the same method.

Relative elevations of the groundwater were then determined to the nearest 0.01-foot to determine the direction of movement. The elevations were determined by surveying the relative elevations of the wellheads using a standard surveyor's autolevel and stadia rod, using standard techniques. The depths to the water level, as measured using the previously described method, were then subtracted from the well head elevations to determine the actual water elevations. The relative elevations are presented below in Table 1.

SCHN00171823

TABLE 1
GROUNDWATER ELEVATION DATA

WELL NUMBER	DEPTH TO WATER	WELLHEAD ELEV.	WATER ELEV.
MW-1	8.11	100.64	92.53
MW-2	7.19	99.68	92.49
MW-3	7.42	99.88	92.46
MW-4	7.85	100.23	92.38
MW-5	7.58	100.00	92.42
MW-6	7.42	99.92	92.50

* All elevations are measured relative to MW-5 which was arbitrarily picked as elevation 100.00 on June 27, 1989. All measurements are in feet.

5.6 Water Sampling Procedures

A 0.72 meter long, 4.0 cm O.D., 3.2 cm I.D. stainless steel bottom-filling bailer was used to sample the monitoring wells. Prior to insertion into each well, the bailer was thoroughly decontaminated by washing in a trisodium phosphate solution, and then successively rinsed in distilled water and hexane. The bailer was then allowed to air dry before insertion into the monitoring well casing.

The depth to groundwater and the depth of the monitoring well casing were measured, to allow calculation of the volume of water in the riser pipe and screen. Each well was then bailed sufficiently to evacuate the saturated volume of PVC monitoring casing a minimum of 3 times. A water sample was then collected by transferring the bailer sample into an amber glass, wide-mouth bottle, fitted with a Teflon-lined cap, supplied by a local analytical laboratory. Care was taken to not allow any head space at the top of each bottle. The sample taken for each well was carefully labeled and immediately placed on ice and transferred into the custody of the local laboratory, together with proper chain-of-custody documentation. The chain-of-custody documentation is included in Appendix C of this report.

6.0 SUBSURFACE CONDITIONS

6.1 Geology

The Trumbull Asphalt site is located on a filled area on top of fluvial deposits of the Willamette River flood plain. The area was once occupied by Guild's Lake, which was filled in about 60 years ago to create industrial land.

SCHN00171824

Environmental Scientists from SRH supervised the drilling and logging of all of the soil borings and monitoring wells. Soil samples were taken throughout the depth, and soil types were visually classified according to the Unified Soil Classification System. Well logs were prepared for each soil boring and are presented in Appendix B. The results are summarized below.

The subsurface units at the site were generally consistent and can be categorized into four basic units:

1) A 0.8-foot-thick layer of asphalt pavement and crushed rock subgrade. This layer was found at the surface in all of the borings.

2) A 3- to 6-foot-thick layer of dry to moist, mottled medium gray, pebbly, silty, fine to medium **SAND**. This layer is interpreted to represent a man-made fill, placed on the site in the past to bring it level to the local road. This unit also contained some crushed rock and bits of organic material.

3) A 0.5- to 1-foot-thick layer of moist to wet, mottled medium gray and brown, clayey, fine sandy **SILT**, with small organics pieces and numerous root holes. The silt showed extremely low plasticity in field plasticity index tests. This layer is interpreted to represent the old topsoil horizon on the site. This unit was encountered in all of the drill holes at a depth ranging from about 3 to 6 feet.

4) A layer of unknown thickness of moist to wet, mottled medium gray, slightly silty, fine to medium **SAND**. This unit was encountered in all of the drill holes immediately below the silt layer, at a depth of about 7 to 10 feet. This unit represents the overbank deposits of the ancestral Willamette River. All drill borings were completed in this unit.

A geologic cross-section was developed across the site from west to east. This shows the thickness and location of each of the above-described units, and shows a visual representation of each of the test borings. The cross-section is presented in Figure 6.

6.2 Hydrogeology

6.2.1 Direction and Velocity of Movement

At the time of measurement, June 27, 1989, the water table was observed to be at a depth of about 8 to 9 feet. Observations by the USGS and proprietary sources indicates this level fluxes in response to the local recharge from the nearby West Hills, and may reach near the ground surface during prolonged, wet winter months. However, no observations have been made on the Trumbull site during the winter for this project.

SCHN00171825

The depths to groundwater have been plotted on a site map and are presented in Figure 7. This plot shows that the local groundwater flow is to the east and perhaps slightly to the south. The general flow of the upper groundwater beneath the site is to the east, toward the Willamette River.

The total hydrologic relief over the site was about 0.2 feet on the day of measurement. This relief can be expected to change in response to the local recharge conditions. This relief over the site results in a local hydraulic gradient of about $1/10^3$. This means that for every 1,000 feet of horizontal measurement, the level of the groundwater can be expected to be about 1 foot lower.

If an assumption of the hydraulic conductivity of the medium sand aquifer is on the order of about 3 to 30 feet per day (as taken from published tables for sands of similar size and classification), and the porosity is on the order of 30% (also taken from published tables), the local velocity of the groundwater is on the order of 0.09 to 0.9 feet per day, which is relatively slow.

6.2.2 Aquifer Characteristics

From a hydrogeological point of view, the top sand fill and the bottom natural sandy layer are the two available aquifers for fluid movement, and both are fairly permeable in the horizontal and vertical axes. The naturally occurring sand at depth appears to be quite uniform and forms the native formation containing the local uppermost aquifer. This aquifer is classified as unconfined, which means that it has no pressure (as in an artesian aquifer) other than that imposed on it by gravity. Petroleum product, driven by gravity and rainwater, could easily move downward or laterally through either of these units.

Separating the upper fill and the lower sands are sandy silts which have a much lower permeability, but do not have a major role in affecting the horizontal flow of the vadose or saturated aquifer systems, forming neither a cap nor a barrier. The silts do, however, affect the infiltration of surface waters in a vertical sense, and will slow, or perhaps prohibit, the migration of the contaminants downward toward the local uppermost groundwater body.

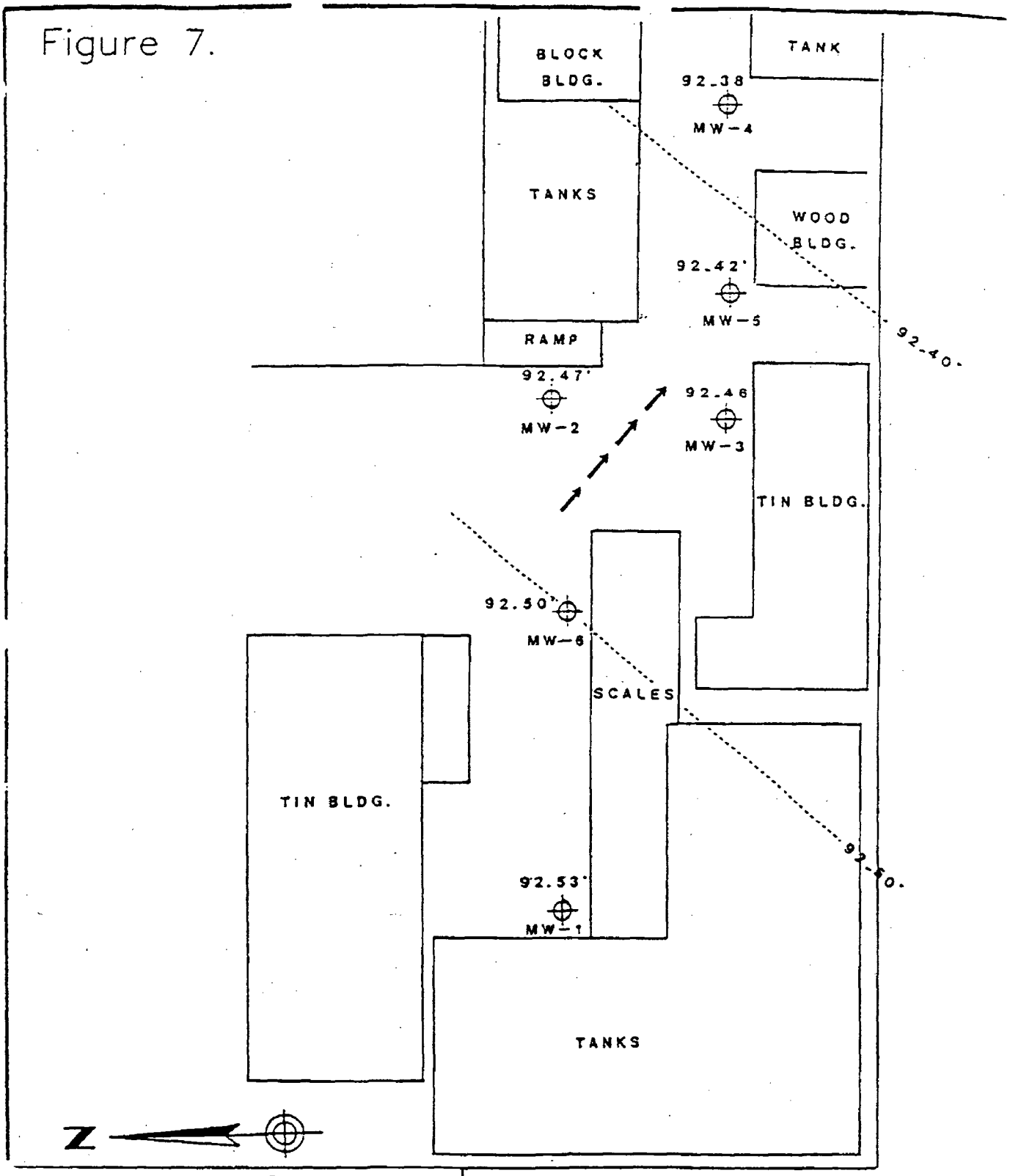
The upper fill material was not saturated, but inspection of the soil samples indicated that the lower portions of the overlying fill have a higher moisture content than the upper portions of the underlying native sand unit. This indicates that the silts are acting as at least a partial barrier to downward movement of water in some portions of the project site.

7.0 PRODUCT RECOVERY

The recovery of the free product from the groundwater was undertaken so as to partially remediate the groundwater contamination, in addition to providing further development for the monitoring wells.

SCHN00171826

Figure 7.



LEGEND

⊕ = MONITORING WELL LOCATION

↗ = DIRECTION OF GROUNDWATER MOVEMENT

MW = MONITORING WELL NUMBER

SRH ENVIRONMENTAL MANAGEMENT

SCALE 1"=30'	CHECKED BY	DRAWN BY
DATE		
SIZE	TRUMBULL ASPHALT	DRAWING NO.

SCHN00171827

7.1 Recovery Procedure

SRH Environmental Management pumped product and water from the monitoring wells located at Trumbull Asphalt on June 30, 1989. Pumping was accomplished using an SRH-owned portable, electrical, centrifugal pump at a rate of approximately 20 gallons per minute under the supervision of an SRH Engineer and an Environmental Scientist. Each well was pumped for a ten-minute period, yielding a total volume of about 200 gallons of water and product. The water and product pumped from each well was discharged to Trumbull's oil/water separator. The separator is located within the facility.

A length of new, decontaminated, 1-inch I.D., vinyl suction hose was designated for each monitoring well to avoid possible cross contamination. The suction hose was left in each well to be used again as needed.

7.2 Recovery Results

Visual and olfactory observations indicated low levels of free product in each well. There was a slight sheen apparent on the water surface in the oil water separator as the discharge water was being pumped into it. However, it was very thin and dissipated quickly.

8.0 CONTAMINATION

8.1 Contaminant Analyses

8.1.1 General

Soil and groundwater samples were collected from the site using the EPA approved methods as described in Section 5.0 of this report. Both the soil and the water were analyzed for the presence of Total Petroleum Hydrocarbons (TPH) using modified EPA Method 418.1. The results of these analyses are presented in Table 2, below.

In addition to the above laboratory analyses, field determination of pH, conductivity, and temperature were made during the sampling of three water samples (MW 4, 5, and 6) using approved EPA methodology. The methods used included the use of portable battery operated pH and conductivity electrode instruments, utilizing the proper calibration and temperature compensation techniques. The results of these analyses are presented in Table 3.

A number of soil and water samples were also analyzed in an attempt to determine the source of the hydrocarbons. In this case, the hydrocarbons were "fingerprinted" using EPA method 8015 to compare the results to similar analyses on potential contaminants generated from within the asphalt production facility. The results of these comparative analyses are presented in Table 4.

SCHN00171828

8.1.2 Analytical Results

During the drilling of the first three borings (MW-1, MW-2, MW-3), samples of the soils were collected from a depth of 7.5 feet (capillary zone) and analyzed for TPH. The results of these analyses are presented in Table 2. They yielded TPH contents of a low of 11 ppm for MW-2, 3500 ppm for MW-1, and a high of 9350 ppm for MW-3. In addition to the soil samples, waters were sampled for TPH content. These analyses yielded contaminant levels ranging from a low of 2.0 ppm for MW-2, 8.4 ppm for MW-1, and 14.8 ppm for MW-3.

TABLE 2
WATER AND SOIL TPH ANALYSES RESULTS

STATION NO.	MEDIA	SAMPLE NO.	TPH EPA 418-1
SB-1	SOIL	503-1	95
SB-2	"	503-2	580
SB-3	"	503-3	2
MW-1	"	503-4	3500
MW-2	"	503-5	11
MW-3	"	504-6	9350
MW-1	H2O	511-10	8.4
MW-2	"	511-11	2.0
MW-3	"	511-12	14.8
MW-4	SOIL	523-1	17.9
MW-5	"	523-2	8960
MW-6	"	523-3	29.5
MW-4	H2O	530-1	0.20
MW-5	"	530-2	12.4
MW-6	"	530-3	0.92

The relative comparative amounts of TPH were the same for both the waters and the soils, with MW-2 having the lowest amount, and MW-3 having the highest.

Six more borings were then drilled, with three completed as monitoring wells. They were also analyzed for TPH for soils at 7.5 feet (capillary zone) and groundwater. Soil analyses ranged from a low of 2 ppm for SB-3 up to 8960 ppm for MW-5. Water analyses yielded contents ranging from 0.20 ppm for MW-4 to 12.4 for MW-5. The relative comparative TPH contents form hole to hole were identical for both the waters and the soils. MW-4 showed the lowest values, and MW-5 showed the highest values both in soil and water TPH contents.

SCHN00171829

During the sampling of MW-4 through MW-6, field analyses were carried out of temperature, conductivity, and pH. The results are presented below in Table 3.

TABLE 3
MONITORING WELL SAMPLING FIELD ANALYTICAL DATA

WELL NO.	TEMP. °C	COND. uS/cm	pH	ODOR	OIL SHEEN Y/N
MW-4	17.5	375	6.0	NONE	NONE
MW-5	17.0	500	6.3	PETROL.	YES
MW-6	17.0	495	6.1	PETROL.	YES

In addition to the above described analyses, soil and water samples from the Trumbull site were "fingerprint" analyzed and compared to four prepared standards in order to identify the nature of the contamination. The results are presented in Table 4, below. The four standards were: (1) blowing distillate material collected from the fume line;(2) bunker C oil collected at Trumbull site near the south fence; (3) diesel #2 standard; and (4) oil sheen collected from MW-3.

TABLE 4
COMPARATIVE ANALYSES RESULTS

(values in ppm)

VALUES BELOW INDICATE RELATIVE PPM RESPONSES AS COMPARED TO FOUR KNOWN STANDARDS.

STATION No.	MEDIA	SAMPLE No.	TPH EPA 418.1	HC EPA 8015 7(B)	9(MW)	DIESEL #2	BUNKER C
SB-1	SOIL	503-1	95	ND	ND	NA	NA
SB-2	"	503-2	580	ND	1410	NA	NA
SB-3	"	503-3	2	46	ND	NA	NA
MW-1	"	503-4	3500	ND	2730	NA	NA
MW-2	"	503-5	11	30.8	ND	NA	NA
MW-3	"	504-6	9350	ND	9410	NA	NA
MW-1	WATER	511-10	8.4	ND	NA	17	ND
MW-2	"	511-11	2.0	ND	ND	1.4	ND
MW-3	"	511-12	14.8	ND	22.4	ND	ND

7(B) = blowing distillate from the fume line
9(MW) = oil collected from MW-3
ND - No comparative response

SCHN00171830

8.2 Contamination Source

In order to determine the source of the contamination found in the subsurface beneath the Trumbull Asphalt plant site, the TPH soil data were plotted on a map of the site and contoured as to areas of equal TPH content. Figure 8 presents this data. The contours seen on the map roughly outline the grosser areas of contamination. Figure 9 indicates the TPH values as analyzed from the groundwater samples.

Two TPH content anomalies are seen, with the water analytical results anomalies being almost identical to those seen from the soil analyses. The locations of the anomalies roughly coincide with those seen from the results of the soil gas survey, though the definition of the anomalies is less defined due to the lower number of sampled points. Drill borings were not placed near the large soil gas anomaly seen near the loading dock, as this was not within the Scope of Services for this investigation.

The first anomaly is located between the wooden office building and the tin building along the southern boundary of the site. This location coincides roughly with the location of the suspected leaking fume line. The amounts of TPH are all well above background and show an anomaly stretched in a generally east-west alignment. The actual shape of the anomaly is undefined due to the lack of sampling points spaced in both an equal east-west and north-south direction. If it is assumed that the abandoned fume line was the source of contamination, the shape and intensity of the anomaly is compatible with the direction of groundwater flow from the fume line.

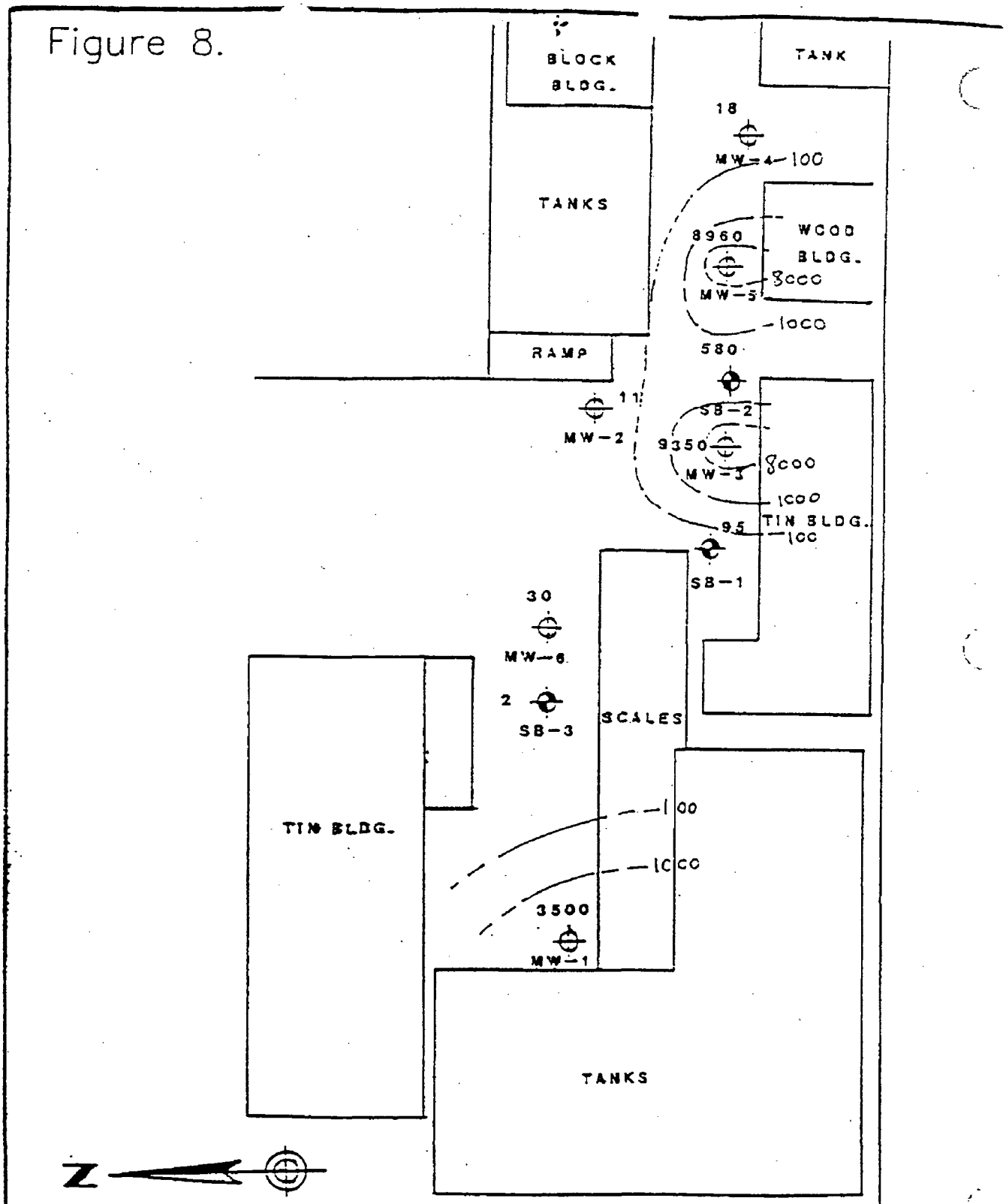
The second zone of contamination is seen near the operating facilities in the extreme southwest corner of the plant. This anomaly is seen in only one test boring (MW 1). However, it seems to confirm the low-grade ubiquitous TPH anomaly seen under the operating plant from the soil gas data. The amount of TPH from the water analyses, however, is quite low. As with the first anomaly, if it is assumed the low grade contamination observed is from the operation of the plant, the extension of the contaminant plume to the east of the building is compatible with known groundwater flow direction. The source of this soil contamination may be a result of surface soil contaminant spillage from previous years of plant operation.

As described above, a chromatographic fingerprint analysis was made to determine the source of contamination utilizing a comparison of chromatographic data. The data indicates that the fume line distillate sample was very similar to Diesel #2, in terms of retention time and relative peak magnitudes (see Appendix C for chromatogram). However, the Bunker C oil and the sample from MW-3 showed a quite different chromatogram with little similarity to the other sources.

The comparative analyses of representative chromatograms from a water sample from MW-3 to representative chromatograms from the above sources yielded the following interpretations:

SCHN00171831

Figure 8.



LEGEND

⊕ = MONITORING WELL LOCATION

⊕ = SOIL BORING LOCATION

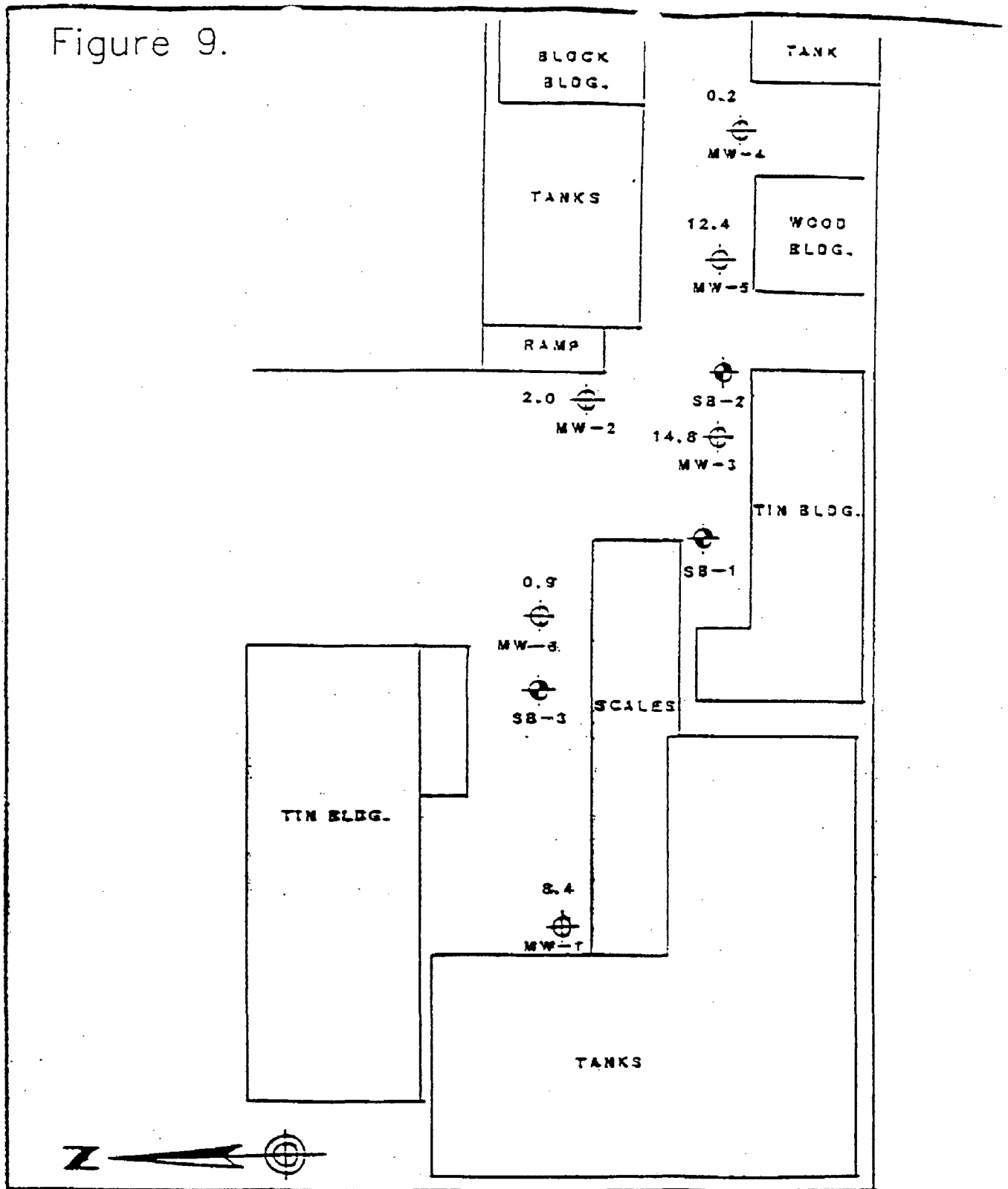
—— = SOIL TPH CONTOUR LINE

SRH ENVIRONMENTAL MANAGEMENT

SCALE 1" = 30'	CHECKED BY	DRAWN BY
DATE		
SIZE	TRUMBULL ASPHALT	DRAWING NO.

SCHN00171832

Figure 9.



LEGEND

⊕ = MONITORING WELL LOCATION

⊕ = SOIL BORING LOCATION

SRH ENVIRONMENTAL MANAGEMENT

SCALE 1" = 30'	CHECKED BY	DRAWN BY
DATE		
SIZE	TRUMBULL ASPHALT	DRAWING NO.

SCHN00171833

1) The MW-3 groundwater sample chromatographic profile indicates a similar pattern to a combination of Diesel #2 and distillate from fume line.

2) The groundwater sample from MW-3 has a different chromatographic profile from the Bunker C oil standard.

The data suggest that at least three soil samples (with highest TPH values) have the same hydrocarbon type identified in the sample from MW-3. On the other hand, the two soil samples with lower TPH values seem to be comparable to fume line oil. Table 4 indicates that two water samples are similar to diesel oil and one is similar to the contaminant from MW-3 (a combination of diesel and fume line oil).

The chromatographic resemblance between the samples and the combination blowing distillate and diesel comparative standards may be the result of the comingling of contaminants from different point source areas. Possible point sources include the fume line blowing distillate, the possible release of diesel (fuel oil #2) from fuel furnace feed lines at the plant, or possibly the on-site migration of contaminants from an off-site location. However, as the groundwater gradient is predominantly to the east and northeast, it seems likely that the origin of the contaminant(s) is from within the plant facility.

An oil sheen was observed prior to well development on MW-1 and MW-3. After six days, no floating oil product was observed in MW-1, but MW-3 still showed about 1/8 inch of product. From the second series of wells, MW-4 never showed floating product nor any odor. The two other wells (MW-5 and MW-6) observed at the time of well development showed minor amounts of floating product. At the time of free product recovery pumping, a slight amount of floating product was observed. The contaminated waters had a brownish color and a petroleum odor.

9.0 CONCLUSION AND RECOMMENDATIONS

9.1 Conclusion

The hydrogeological subsurface investigation at the Owens-Corning Trumbull Asphalt facility in Portland, Oregon indicates the presence of petroleum hydrocarbon contamination in the soils and groundwater.

The affected area is most heavily contaminated in areas to the north and east of a former subsurface fume line. Following the installation of six monitoring/recovery wells, a thin oil sheen was observed in the wells nearest the area near where the old fume line was located.

Groundwater gradient was measured from the static water elevations of the six monitoring wells and was determined to be in a southeasterly direction.

SCHN00171834

Both groundwater and soil analytical results indicate elevated total hydrocarbon contaminant readings; however, the sampled areas were free of the benzene, toluene, and xylene fractions.

A chromatographic fingerprint profile of the contaminated material was compared against three potential point source contaminants (blowing distillate, Bunker C, and diesel) found at the facility. The results indicate a resemblance between the groundwater contaminant and a combination of the diesel and blowing distillate standards, with the diesel indicating a closer chromatographic match. The analytical results suggest the presence of comingling plumes at the site.

The amount of contamination present at the site appears to be much less than that reported in the preliminary Crosby and Overton study.

9.2 Recommendations

SRH Environmental Management recommends that, based on the following hydrogeological observations made as a result of this investigation, the groundwater wells be monitored to determine if groundwater contaminant levels remain constant or lose or gain in concentration over time. The basis for the recommendation is made from the following observations:

1) Characteristics of the contaminated material. The laboratory analysis indicates the absence of BTX fractions. These fractions constitute the primary health hazard concern associated with petroleum hydrocarbon contaminants.

2) All apparent point source leaks associated with the production of contaminants at the plant appear to have been terminated. These include repairs to the new fume line and removal of the old fume line, and the repair of a leaking coupling in a furnace fuel supply line.

3) The contaminated soils have been capped with asphalt throughout the site, thus minimizing the potential for water mediated transport of the contaminated material from soils to the saturated zone.

4) The Trumbull Asphalt facility is situated in a large area which is zoned for industrial land use. The area as a whole has a widespread elevated background groundwater contamination.

5) Little or no free product exists at this time.

To determine if the contamination point sources have been terminated, SRH recommends that the existing six monitoring wells be monitored quarterly for the presence of petroleum hydrocarbons (total of four sampling periods).

SCHN00171835

Specifically, SRH would perform the following:

1) Measure the static well water level of each well to determine the gradient.

2) Determine if free-floating product is present.

3) Purge the wells of three well volumes of water.

4) Collect representative groundwater samples of each well in approved sampling bottles.

5) Submit the samples to an EPA approved laboratory to determine the presence of TPH using EPA method 418.1 and to determine the characteristics of the contaminants utilizing EPA method 8015 (modified). Utilization of EPA 8015 data results will assist in determining if any changes in contaminant composition occur and will, if increased levels of contaminants become apparent, greatly assist in determining the point source origin of possible future contamination.

6) Purge the wells of any free-floating product by pumping the wells and discharging the effluent waters to Trumbull's oil/water separator.

If necessary, based on the results of the quarterly sampling, SRH may recommend the installation of additional monitoring wells to reconcile data gaps in the investigation.

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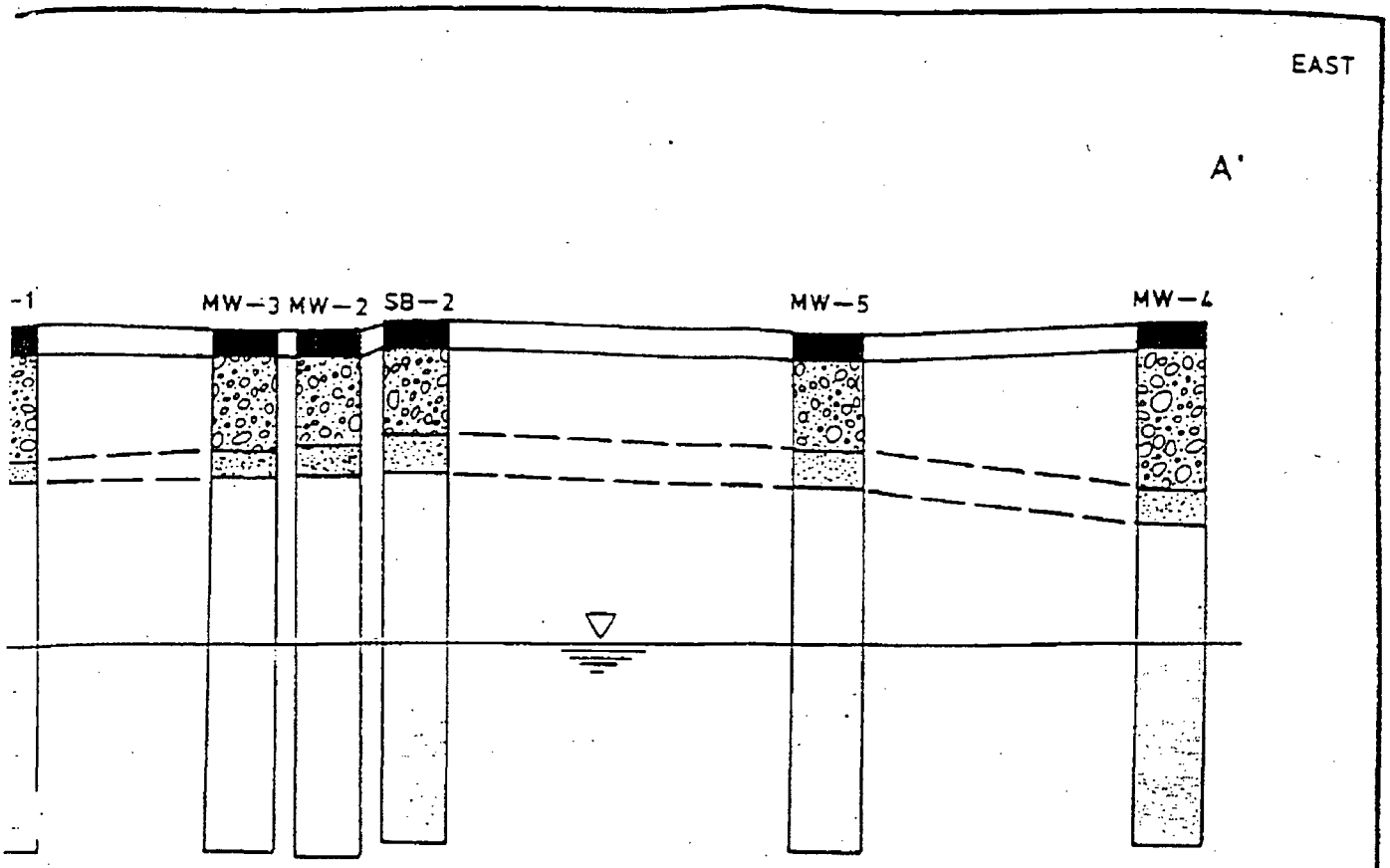

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APPROVED BY			6

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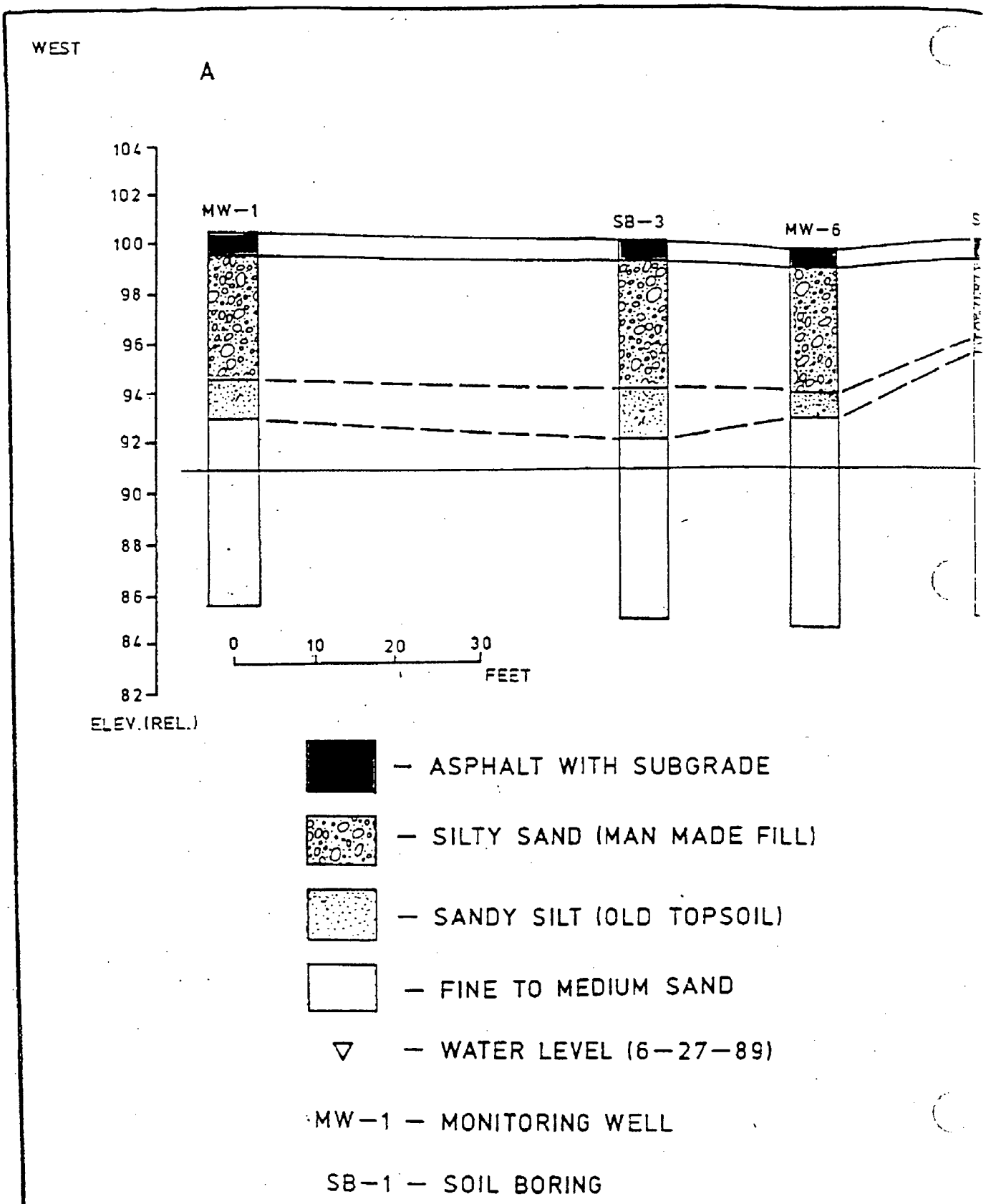
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A
104
102
100
98
96
94
92
90
88
86
84
82
ELEV.(REL.)
MW-1
SB-3
MW-6
0
10
20
30
FEET
— ASPHALT WITH SUBGRADE
— SILTY SAND (MAN MADE FILL)
— SANDY SILT (OLD TOPSOIL)
— FINE TO MEDIUM SAND
— WATER LEVEL (6-27-89)
MW-1 — MONITORING WELL
SB-1 — SOIL BORING

SUMMARY REPORT

FIRST QUARTER
GROUNDWATER MONITORING

TRUMBULL ASPHALT PLANT
PORTLAND, OREGON

SRH
GROUP

SCHN00171839

SUMMARY REPORT

FIRST QUARTER GROUNDWATER MONITORING

TRUMBULL ASPHALT PLANT
PORTLAND, OREGON

June 19, 1990

Prepared For:

Owens-Corning Fiberglas Corporation
Fiberglas Tower
Toledo, Ohio 43659

Prepared By:

SRH ENVIRONMENTAL MANAGEMENT
12245 NE Whitaker Way
Portland, Oregon 97230

SRH PN: 2-2033

SCHN00171840

INTRODUCTION

This report presents methodology and results for the First Quarter groundwater monitoring performed by SRH Environmental Management at the Owens-Corning Fiberglas Trumbull Asphalt facility in Portland, Oregon. The monitoring is a part of the recommendations made in the SRH report Groundwater Contamination Remedial Investigation, dated August 28, 1989. Groundwater samples were collected and temperature, pH, and conductivity were measured in the field. Samples were submitted to an off-site laboratory for additional analysis. The following is a synopsis report summarizing the results of the continuing investigation.

WATER MONITORING METHODOLOGY

There are currently six groundwater monitoring wells at the facility. The initial test at each well was to collect a partial bailerful of water and examine it for odor and for the presence of free product on the surface. The bailer was decontaminated prior to sampling prior to sampling of each well.

The depth to water was determined using the wetted tape method with a decontaminated steel tape. Once the depth to water was determined, the volume of standing water in the well was calculated, and then at least three well volumes of water were pumped out. A centrifugal pump was attached to the PVC tubing which was in every well except MW2. The purged water was deposited in the oil/water separator located at the site.

The water samples for laboratory analysis were collected in clean, 1 liter amber glass bottles with Teflon lids, preserved with approximately 5 milliliters of hydrochloric acid, and filled to zero head space to minimize volatilization of hydrocarbon. The samples were then stored in an ice chest at a maximum temperature of 4° Celsius until deposited at an off-site laboratory. All of the samples were delivered to the laboratory the same day they were collected. The samples were analyzed for Total Petroleum Hydrocarbons (TPH) using EPA Method 418.1. After these results were reported, the Department of Environmental Quality (DEQ) Hydrocarbon Scan (HCID - Modified EPA Method 8015) was performed on the sample from MW5.

An additional sample from each well was collected in a small cup for field analysis. pH was measured using a Nurnberg Scientific Portable pH meter. Conductivity and temperature were measured using a YSI Inc. Model 33 S-C-T meter.

The field and laboratory analytical results are presented in Table 1.

GROUNDWATER MONITORING RESULTS

The TPH values have decreased in four of the six wells. There is a slight increase in one well and a significant increase in the remaining well. All of the TPH results, except for

SCHN00171841

MW-5, are below the current cleanup guidance levels of 15 ppm for the neighboring state of Washington.

Minor amounts of free product were observed in two wells. A gas chromatographic distribution or "fingerprint" of groundwater from MW-5 resembles the "fingerprint" of Diesel #2.

The pH values range from 6.0 to 6.5, indicating slight acidity which is typical for waters in the area of the plant. There is little difference in pH values between the two periods.

Only three conductivities were previously reported. Conductivity has decreased somewhat in two wells and remained the same in one well.

CONCLUSIONS

The overall results indicate that mild groundwater contamination remains at the site. TPH decreases observed in four of the six wells may indicate that passive remediation is occurring at the site with the removal of the point sources of contamination. It is not clear at this time if amount of free product observed two of the wells is significant enough to justify a recovery process.

RECOMMENDATIONS

Quarterly monitoring and sampling should proceed as planned.

No additional recommendations are made at this time.

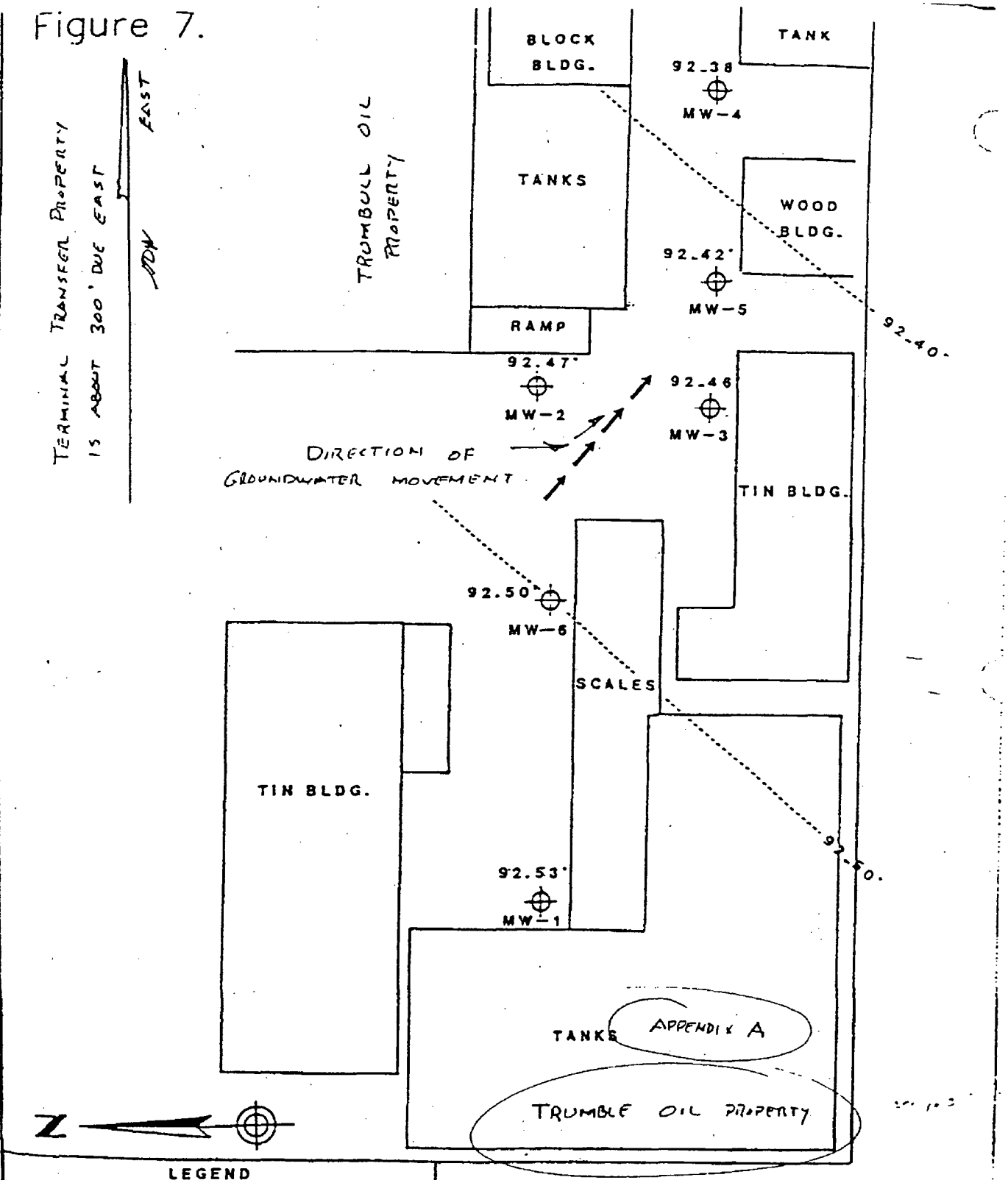
SCHN00171842

TABLE 1
GROUNDWATER MONITORING RESULTS

WELL #	TEMP	pH		TPH (ppm)		COND (uS/cm)		FREE PROD		SHEEN		ODOR	
		CURR	PREV	CURR	PREV	CURR	PREV	CURR	PREV	CURR	PREV	CURR	PREV
MW1	21	6.2	---	4.6	8.4	365	---	no	---	yes	---	no	---
MW2	22	6.5	---	0.7	2.0	395	---	1/16"	---	yes	---	no	---
MW3	22	6.4	---	8.0	14.8	462	---	no	---	slight	---	no	---
MW4	22	6.0	6.0	<0.2	0.2	290	375	no	no	no	---	no	no
MW5	22	6.0	6.3	180.0	12.4	500	500	1/8"	no	yes	yes	yes	yes
MW6	22	6.2	6.1	1.3	0.92	460	495	no	no	faint	yes	no	yes

SCHN00171843

Figure 7.



LEGEND

- ⊕ = MONITORING WELL LOCATION
- ↗ = DIRECTION OF GROUNDWATER MOVEMENT
- MW = MONITORING WELL NUMBER
- .50' = GROUNDWATER ELEVATION (RELATIVE)

SRH ENVIRONMENTAL MANAGEMENT

SCALE 1" = 30'	CHECKED BY	DRAWN BY
DATE		
SIZE	TRUMBULL ASPHALT GROUNDWATER ELEVATIONS AND MOVEMENT	DRAWING NO.

APPENDIX B

SCHN00171844

DEPT. OF ENVIRONMENTAL QUALITY
RECEIVED
JUL 06 1992
ENVIRONMENTAL CLEANUP DIVISION

PRELIMINARY ASSESSMENT

Trumbull Asphalt Plant
3605 NW 35th Avenue
Portland, Oregon

SEACOR Job No. F0059-001-01

Submitted by

SEACOR

for

Owens-Corning Fiberglas
Trumbull Asphalt Plant
3605 NW 35th Avenue
Portland, Oregon

June 22, 1992

Science & Engineering Analysis Corporation
10950 Southwest 5th Street, Suite 310
Beaverton, Oregon 97005
(503) 520-1433

Prepared by:

Ross R. Simmons, REA
Project Manager

Reviewed by:

Steven E. Locke, PE
Principal Chemical Engineer

TABLE OF CONTENTS

GENERAL SITE DATA 1

1.0 INTRODUCTION 2

2.0 BACKGROUND 3
2.1 Site Description 3
2.1.1 Asphalt Manufacturing Area 3
2.1.2 Commercial Products Warehouse 4
2.1.3 Roofing Production Line Building 4
2.2 Summary of Trumbull Asphalt Production Processes 4
2.3 Adjacent Properties 5
2.4 Ownership and Operational History 5
2.5 Regulatory History 6
2.5.1 NPDES Permits 6
2.5.2 Waste Water Discharge Permits 7
2.5.3 Air Discharge Permits 7
2.5.4 Radiation Permit 7
2.5.5 Hazardous Waste Generator Status 7
2.5.6 Chemical Inventory Reporting 8

3.0 WASTE CHARACTERISTICS 10
3.1 Source Areas 10
3.1.1 Asphalt Manufacturing Area Tank Farm 10
3.1.2 Other Storage Tanks 11
3.1.3 Maintenance Shops 11
3.1.4 Roofing Line - Asphalt Coater and Paint Applicator 12
3.1.5 Storm Sewer System and Oil/Water Separator 12
3.1.6 Air Blowing Fume Line 12
3.1.7 Boiler Fuel Lines and Storage Tank 15
3.2 Waste Characteristics Conclusions 16

4.0 GROUNDWATER PATHWAY 17
4.1 Hydrogeologic Setting 17
4.1.1 Regional Geology and Hydrogeology 17
4.1.2 Site Geology 18
4.1.3 Site Hydrogeology 18
4.1.4 Annual Net Precipitation 19
4.2 Groundwater Targets 19
4.3 Groundwater Conclusions 20

5.0 SURFACE WATER PATHWAY 21
5.1 Hydrologic Setting 21
5.1.1 Maximum 2-year, 24-hour Rainfall 21

5.1.2 Flood Plain 21
5.2 Surface Water Targets 21
5.2.1 Water Intakes Within 2 Miles 21
5.2.2 Recreation Uses of Surface Water 22
5.2.3 Sensitive Environments 22
5.3 Surface Water Conclusions 22

6.0 AIR PATHWAY 23

7.0 DIRECT CONTACT PATHWAY 24

8.0 SUMMARY AND CONCLUSIONS 25

SCHN00171847

LIST OF FIGURES

Figure 1 Site Location Map 3

Figure 2 Site Map 3

Figure 3 Fume Line Location 12

Figure 4 Soil Gas Sampling Locations and Relative Results in Volts 13

Figure 5 Soil Boring and Groundwater Monitoring Well Locations 14

Figure 6 Fuel Supply Line Location 15

LIST OF TABLES

Table 1. Trumbull Asphalt NPDES Permits 6
Table 2. Trumbull Asphalt Air Discharge Permits 7
Table 3. Chemicals Listed by Trumbull Asphalt for 1991
SARA Section 313 Chemical Inventory Reporting 9
Table 4. Asphalt Manufacturing Area Storage Tanks 10
Table 5. Roofing Production
Line Area Storage Tanks 11
Table 6. Summary of Soil Sample Analytical Results
for Total Petroleum Hydrocarbons 14
Table 7. Summary of Groundwater Sample Analytical Results
for Total Petroleum Hydrocarbons[a] 15
Table 8. Groundwater Wells in Vicinity
of Trumbull Asphalt Facility 19

SCHN00171848

LIST OF REFERENCES

Reference 1 Report on Decommissioning Fume Line. Crosby & Overton, Inc.

Reference 2 Groundwater Contamination Remedial Investigation, August 28, 1989, report by SRH Environmental Management

Reference 3 Quarterly Groundwater Monitoring Reports, Trumbull Asphalt, May 1990 through January 1992

Reference 4 Well Logs

GENERAL SITE DATA

Site Name and Address:	Trumbull Asphalt Division 3605 NW 35th Avenue Portland, Oregon
Current Owners:	Owens-Corning Fiberglas Corp. Fiberglas Tower Toledo, Ohio 43659
	Contact: Dave Crowle, Sr. Environmental Specialist (419) 248-8879
Current Operator:	Owens-Corning Fiberglas Corp. Fiberglas Tower Toledo, Ohio 43659
Site Contact:	Chris Ruckman, Plant Manager (503) 228-7668
Latitude:	45° 32' 50" North
Longitude:	122° 43' 20" West
Legal Description:	Township 1 North, Range 1 East, Section 20, SW ¼ of SW ¼
Directions to site:	From downtown Portland, take I-405 northbound, then US Highway 30 west (NW Yeon Avenue). Follow Yeon Avenue to site at intersection with NW 35th Avenue.

SCHN00171850

1.0 INTRODUCTION

This report presents the results of a Preliminary Assessment (PA) for the Trumbull Asphalt Plant site located in Portland, Oregon. On February 18, 1992, the DEQ notified Trumbull Asphalt of its intent to require a PA for this site. Owens-Corning Fiberglas Corp., owner of the facility, has elected to voluntarily complete the PA and submit its report to the DEQ. Owens-Corning Fiberglas retained Science & Engineering Analysis Corporation (SEACOR) to complete the PA.

A PA is required by Oregon state law where a significant threat to human health or the environment is suspected from a release of hazardous substances (as defined in Oregon Revised Statutes (ORS) Chapter 465.200). Authority for conducting PAs is provided in ORS 465.245 and Oregon Department of Environmental Quality (DEQ) regulations, Oregon Administrative Rule (OAR) 340-122-426. This PA was designed to investigate chemical and waste handling practices, and to evaluate potential exposure pathways (surface water, air, groundwater and direct contact) for hazardous chemicals that may have been released to the environment from operations at the Trumbull Asphalt facility.

PAs are intended generally to identify potential hazards at a site, identify sites that require immediate action, and to establish priorities for sites requiring in-depth investigations. The PA is not a full investigation or characterization of the site. The scope of the investigation includes review of available file information, interviews, a comprehensive target survey, and an on-site reconnaissance inspection.

SCHN00171851

2.0 BACKGROUND

2.1 Site Description

The Trumbull Asphalt Plant produces asphalt products for residential, industrial and commercial markets, including roofing products and specialty industrial asphalt products. The plant was reportedly built in the 1930s or earlier and has been in continuous operation since. The site covers approximately 9.4 acres and includes an asphalt manufacturing area, a roofing production line, and buildings devoted primarily to warehouse functions. Primary access is from NW 35th Avenue which borders the site on the east. A small parking area is located at the northeast corner of the site. A truck loading area is along the eastern perimeter of the site. Additional truck loading bays are located on the north side of the property along NW Yeon Avenue. A railroad spur line runs from north to south through the center of the site, while another railroad spur is present along the western perimeter of the site.

The plant operates 24 hours a day, and the site is always occupied. Fencing surrounds the site to minimize the risk of unauthorized entry.

A walk-through inspection of the site was completed by SEACOR on April 16, 1992. Frank Burg, Operations Manager of the Trumbull facility, accompanied SEACOR's inspectors and provided information about the materials and processes used on site.

The location of the subject site is shown on Figure 1. Figure 2 is a site map of the facility.

2.1.1 Asphalt Manufacturing Area

The Asphalt Manufacturing Area generally occupies the southern quarter of the site, and includes 21 above ground tanks used for storage of asphalt flux, processed asphalt, fuel oil, neutral oil, mineral spirits, and ferric chloride. There are also three converter tanks used for batch processing of asphalt materials. The major structure in this area is the Pouring Shed, where various heated asphalt mixtures are poured into cardboard cylinders for sales to industrial customers. A portion of a structure known as the Plastics Shed is currently used for storage. Several drums were stored in this area, including fuel oil conditioner, P_2O_5, phosphoric acid, paint stripper, and boiler treatment chemicals (sodium hydroxide and potassium hydroxide). The building reportedly used to occupy a larger area south and east of the Pouring Shed and was used for production of mastics and adhesives under a previous owner, Lloyd Fry Roofing. The eastern half of the Plastics Shed was dismantled approximately 11 years ago. An office building, boiler house, maintenance shop, quality control laboratory, and a pre-heater unit for heating the asphalt flux prior to processing are also located in the asphalt manufacturing and storage area. A rail car unloading area is located north of the Pouring Shed. The ground surface throughout the Asphalt Manufacturing Area is paved with asphalt or concrete, except along the western railroad spur, within the bermed areas around tanks 10, 11, 13, 15, 18 and 19, a small area on the west side of the maintenance shop, and a small area around the incinerator. Surface runoff from the Asphalt Manufacturing Area is routed to an oil/water separator prior to discharge to the municipal storm sewer system.

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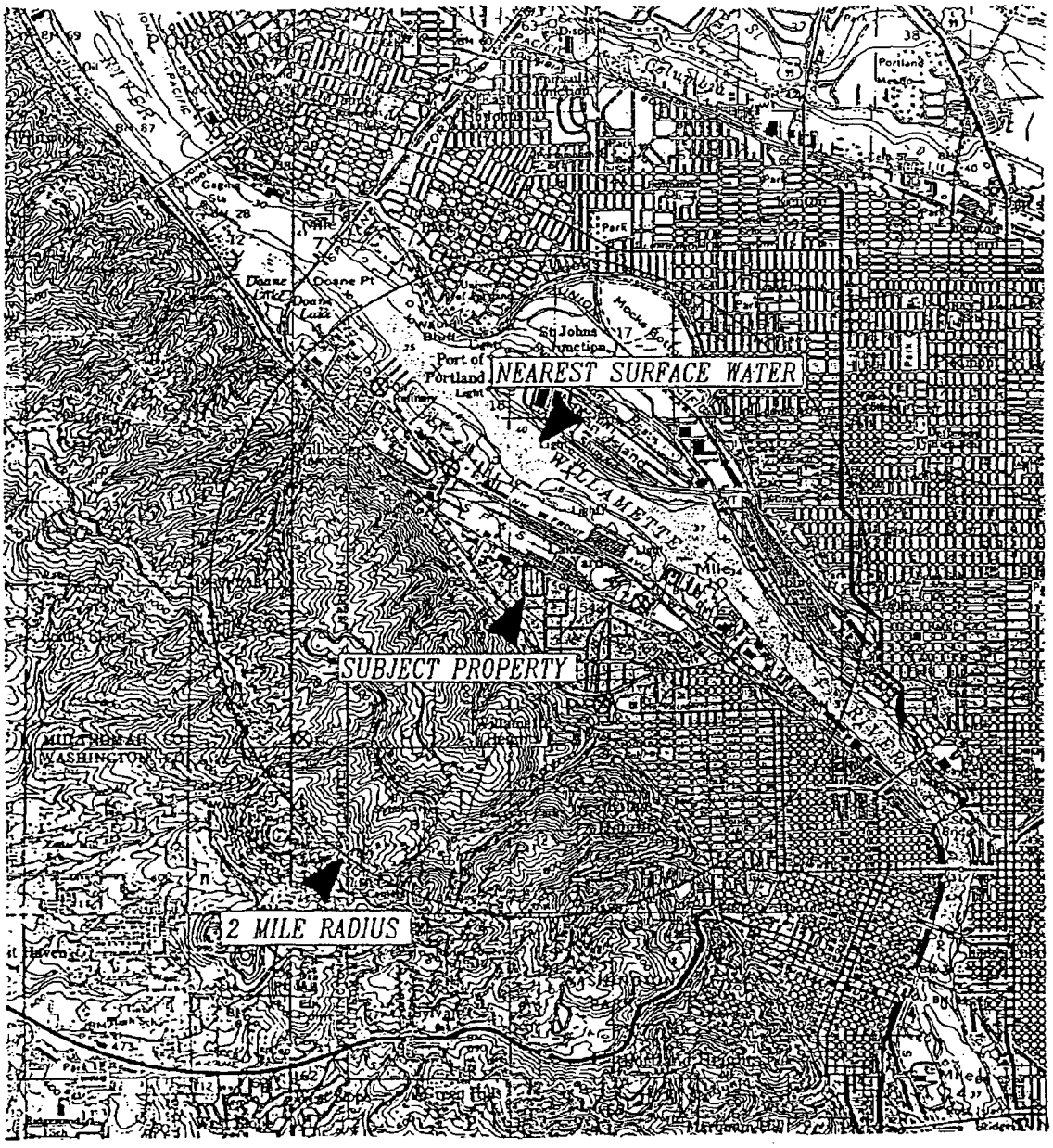

⊗ WATER WELL LOCATIONS WITHIN 2-MILE RADIUS

REFERENCE: USGS 15X15 MINUTE QUADRANGLE, PORTLAND, OREGON (1961)

SCALE 1:62500

1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

N

SEACOR 10950 S.W. 5th Street Suite 310 Beaverton, OR 97005	DRAWN BY: S. SPENCER APPROVED BY: DATE: 05/07/92 JOB NO.: F0059-001-01	FIGURE NO. 01 SITE LOCATION MAP TRUMBULL ASPHALT PLANT 3605 N.W. 35TH AVENUE PORTLAND, OREGON

LOC-1.DWG

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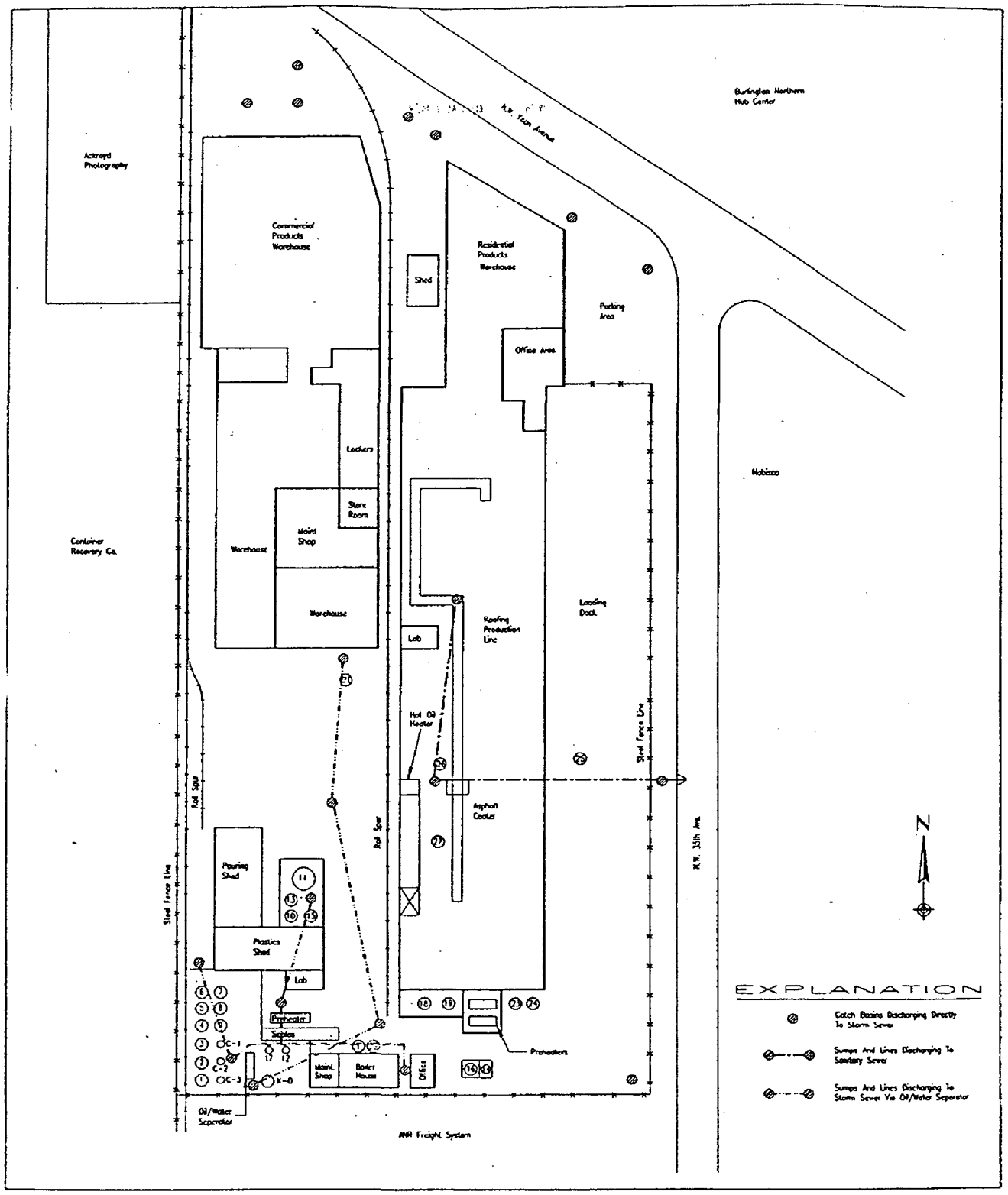

SEACOR 10950 S.W. 5th Street Suite 310 Beaverton, OR 97005	DRAWN BY: S. SPENCER APPROVED BY: DATE: 04/28/92 JOB NO.: F0059-001-01	FIGURE NO. 02 SITE MAP TRUMBULL ASPHALT FACILITY PORTLAND, OREGON

F0059C2.DWG

SCHN00171854

2.1.2 Commercial Products Warehouse

The northwest portion of the site is occupied by a large structure known as the Commercial Products Warehouse, currently used primarily for warehousing and finished product shipping. An equipment maintenance shop, maintenance storage room, and employee locker room are also located in this building. Hydraulic oil, motor oil and anti freeze are stored in drums in the maintenance shop. An unused cellar is present beneath the central part of this structure. Access to the cellar was not possible because it was flooded with water at the time of the inspection.

According to Plant Manager Chris Ruckman, this cellar contained equipment and storage for the Felt Mill operations formerly located in this building. He said the cellar has concrete floors and walls and is located beneath about half of the Commercial Products Warehouse building. Mr. Ruckman said that water seepage into the cellar has been occurring as long as he can remember. A sump pump was formerly utilized to remove the water. The pump was taken out when the Felt Mill equipment was decommissioned in 1989.

2.1.3 Roofing Production Line Building

A large rectangular structure housing the Roofing Production Line occupies the central portion of the site. The building includes raw material storage areas at its southern end, the production line in the middle, and the Residential Products Warehouse area in the northern end. An office area, quality control laboratory, and master control room are also present in the building. Materials stored in the buiilding include sand and roofing granules in portable 5,000-pound bins, lime in 100-pound bags, anti tak (coconut oil) in reusable 250-gallon totes, hot melt adhesive in 50-pound cartons, and small quantities of zinc oxide. Surface runoff from the northern portion of the site is collected by several catch basins which discharge directly to the municipal storm sewer system. Liquid discharges from the production line are discharged to the municipal sanitary sewer system.

2.2 Summary of Trumbull Asphalt Production Processes

Asphalt flux raw material is received by rail car and truck stored in heated above ground tanks in the southwest corner of the site (tanks 1-5). Natural gas fired boilers (with #2 fuel oil as a backup fuel) generate steam to maintain the storage tanks at temperatures of 300° to 350° Fahrenheit. The flux is then batch processed to produce the asphalt mixtures that are used in manufacture of the plant's finished products. The flux is passed through a pre-heater which raises the temperature of the material to between 450° and 500° Fahrenheit and transferred into three above ground converter units where the mixture is air blown to oxidize the mixture. Occasionally, depending on the quality of the available flux material, ferric chloride is also blended with the flux as a catalyst prior to air blowing. The blended and blown asphalt is then transferred to above ground storage tanks to await use in production of roofing and other products manufactured at the site. A water jacket containing non-contact water is used to cool the process equipment.

The heated air stream from the converter units passes through a knock-out tank where entrained liquid-phase petroleum is removed, then goes to an incinerator. The light end petroleum blow down from the knock-out tank (B-D Oil) flows to an above ground tank where it is stored prior to being sold for off-site use in the industrial fuel market. Water condensate from the air blowing process is directed to the incinerator for evaporation and incineration.

SCHN00171855

The air blown asphalt mixture is poured into cardboard cylinders in the Pouring Shed or transferred to the Roofing Production Line. Asphalt for roofing production is transferred from the storage tank to a natural gas fired pre-heater, then to a 2,000-gallon surge tank near the asphalt coater. On the Roofing Production Line, rolled fiberglass is passed through the asphalt coater where the heated asphalt mixture is applied along with granulated solids. For some product types, painted markings are also applied. Paint is mixed from zinc oxide, lime and water in a 100-gallon mixing tank. the mixture is then transferred to an adjacent 150-gallon paint use tank for application to the rolled roofing products. The rolled product is then sold by the roll, or cut and packaged. Small quantities of adhesive (hot melt) are used in the packaging process.

All asphalt process vessels and lines are located above ground. Prior to the mid 1980's, the heated air stream from the air blowing process followed an underground fume line for a short distance near the boiler house. The underground portion of this line was decommissioned in 1989. This is discussed further in Section 3.0. According to Mr. Burg, minor spills of asphalt occur on the paved surfaces of the asphalt manufacturing area and on the concrete floor around the asphalt coater in the roofing production area. Cleanup of these spills is accomplished through mechanical scraping. Mr. Burg stated that no solvent materials are used on the plant site other than petroleum naphtha in the maintenance areas.

2.3 Adjacent Properties

The subject site is located in the Guild's Lake Industrial Area, a neighborhood of heavy industrial activity stretching from the Portland Hills on the west to the Willamette River on the east and extending north several miles from Portland's central business district. No residential properties are located in the vicinity of the subject site.

The Trumbull Asphalt site is bordered by NW 35th Avenue on the east. Across the street to the east is a Nabisco warehouse facility. NW Yeon Avenue borders the Trumbull site on the north, with the Burlington Northern Railroad Hub Center freight yard across the street to the north. Ackroyd Photography and the Container Recovery facility (formerly Convoy Co.) adjoin the Trumbull site on the west. Bordering the property on the south is the ANR Freight Systems truck terminal.

The Nabisco site, the Burlington Northern Hub Center, and the Van Waters and Rogers chemical distribution facility about 500 feet west of the Trumbull site, are listed on the DEQ Environmental Cleanup Division's Site Assessment Data Base of sites with known or suspected releases of hazardous substances. Nearby sites with confirmed leaking underground storage tank releases include the Container Recovery site, the Nabisco site, the ANR terminal, Terminal Transfer Co. at 3601 NW Yeon, and Coca Cola Bottling Co. at 3599 NW Yeon.

2.4 Ownership and Operational History

Owens-Corning Fiberglas purchased the Trumbull Asphalt facility in April 1977 from Lloyd Fry Roofing Co. According to Trumbull representatives, Lloyd Fry has had at least a partial interest in the plant since its construction. In about 1940, Mr. Fry purchased a 100 per cent interest in the business from a Mr. Akins Miller Sr.

The general operations of the asphalt manufacturing area have been substantially unchanged for at least the past 20 years, according to Mr. Burg. Owens-Corning Fiberglas converted the roofing operations

SCHN00171856

to use of fiberglass after it acquired the facility. Previously, rags and other fiber materials had been received via truck and rail car. The fibers were mixed with water and mechanically agitated in large vessels. The resulting fibrous pulp was pressed into rolled felt which was used as the foundation for asphalt-coated roofing products. This activity occurred in an area known as the Felt Mill, in the building currently known as the Commercial Products Warehouse. The Felt Mill ceased operations in December 1982. The Felt Mill equipment was removed in 1989.

Various mastics and adhesives were also produced in the Plastics Shed. Representatives of Trumbull had no information about the manufacturing processes or materials used in this area. Production of mastics and adhesives is reported to have ended in early 1977.

2.5 Regulatory History

The Trumbull Asphalt facility has a number of permits issued by local and state agencies for site discharges of air, water and waste. According to Mr. Burg, no citations have been issued by the permitting agencies for violations of permit conditions.

2.5.1 NPDES Permits

The facility currently has three National Pollutant Discharge Elimination System (NPDES) permits for water discharges to the City of Portland municipal storm sewer system. The permits have been issued by the DEQ Water Quality Division and are summarized in Table 1.

Table 1. Trumbull Asphalt NPDES Permits

Discharge Name	Permit Number	Date of Issuance	Date of Expiration
Non-Contact Cooling Water	100J	3/31/92	12/31/95
Boiler Blow Down	500J	3/31/92	7/31/96
Oily Storm Water	1300J	3/31/92	7/31/93

The non-contact cooling water results from the water jacket system used for cooling the asphalt process equipment. The boiler blow down comes from the boilers on the southern perimeter of the site which are used to generate steam for heating asphalt piping and storage tanks. Sampling of the non-contact cooling and boiler blow down water is done monthly, with annual reports of results submitted to the DEQ. Both of these discharge streams are routed to the oil/water separator near the tank farm in the southwest corner of the site prior to off-site discharge. Surface runoff from the Asphalt Manufacturing Area and condensate from the air blowing knock-out tank are also directed to the oil/water separator. The locations of surface runoff collection sumps and on-site storm sewer lines are shown on Figure 2. The oily storm water discharge from the separator is sampled weekly for pH and oil and grease.

SCHN00171857

2.5.2 Waste Water Discharge Permits

The plant has a waste water discharge permit (number 400-092) issued March 31, 1991 by the City of Portland Bureau of Environmental Services for waste water generated from the Roofing Production Line. The locations of collection sumps and the waste water line are shown on Figure 2. Quarterly monitoring and reporting is performed. The current permit expires October 9, 1994. Prior to 1991, these discharges were routed directly into the municipal storm sewer system.

2.5.3 Air Discharge Permits

Permits issued by the DEQ Air Quality Division regulate air discharges from the air blowing vapor incinerator and the vapor collection and filter system for the Roofing Production Line. These permits are summarized in Table 2.

Table 2. Trumbull Asphalt Air Discharge Permits

Discharge Name	Permit Number	Date of Issuance	Date of Expiration
Asphalt Plant Discharge (Incinerator, Pre-Heater & Boiler)	26-1815	6/20/89	4/1/94
Roofing Line Discharge*	26-2044	2/18/87	4/1/97

* Minimum Source Permit - no monitoring required.

The discharge from the incinerator is monitored for particulates, opacity and density. The CECO filter system for the roofing production line condenses petroleum light end vapors from the asphalt coater area. The petroleum condensate is discharged to a 55-gallon drum, the contents of which are periodically transferred to the B-D oil tank.

2.5.4 Radiation Permit

Small amounts of cesium 137 and strontium 90 are used in the process weight scales. These are regulated under a permit issued by the Oregon State Health Department (number ORE-0457-1), expiring March 31, 1993.

2.5.5 Hazardous Waste Generator Status

Trumbull Asphalt is a regulated hazardous waste generator under registration number ORD987180940. According to Mr. Ruckman, Trumbull filed for generator status on August 1, 1991 to facilitate disposal of a single 55-gallon drum of used oil which had become contaminated with paint waste due to unauthorized disposal by an employee. The drum was transported for off-site disposal in September 1991. Mr. Ruckman stated that no hazardous waste is generated by the plant's normal operations.

SCHN00171858

2.5.6 Chemical Inventory Reporting

Table 3 lists the chemicals inventoried by Trumbull Asphalt for 1991 reporting under requirements of the Superfund Amendment and Reauthorization Act (SARA) Section 313.

According to Mr. Ruckman, other chemicals which have Material Safety Data Sheets and which are used or stored on site in quantities exceeding the SARA reportable quantities are:

Anti Tak	Instant Lok Hot Melt
Argon	Limestone
Asphalt	Mappalyene
B-D Oil	Oxygen
Boiler Treatment Chemicals	Propane
(solid and liquid)	Roofing Granules
Carbon Dioxide	Strontium 90
Cesium 137	Thermonal 59
#2 Fuel oil	Unimin Sand
Ferric Chloride	Used Oil
Fine Aggregates	Anti Freeze
Glass Mat	
Hydrated Lime	

SCHN00171859

Table 3. Chemicals Listed by Trumbull Asphalt for 1991
SARA Section 313 Chemical Inventory Reporting

Product Trade Name	Hazardous Ingredient	% Hazardous Ingredient	Comments
Acetylene	Acetone	40%	Small quantity (<780 lbs.)
Swepco #101 Moly Grease	Acetone	3%	No longer in use
Thermo 85 Fine Plaster	Aluminum Oxide Phosphoric Acid	83% 5%	Small quantity
Barium Chloride 503	Barium Chloride	10%	Small quantity
Roofing Granules (Green)	Chromium Oxide	0.9%	
1,1,1 Trichloroethane	Diethylene Dioxide 1,1,1 Trichloroethane 2-Butylene Oxide	2.5% 96.5% 0.5%	Exempt Laboratory Chemical
Airco Arc 308 AC-DC	Ferro-Chromium Manganese Nickel	15% 5% 5%	No longer used
Adhesive 1264-EMM	Formaldehyde	0.001%	Small quantity (<1250 lbs.)
Adhesive/Sealant	Hydroperoxide Saccharin	3% 5%	No longer used
Neutralizing Solution Code 567	Isopropyl Alcohol	70%	Small quantity
Indicator Solution Coded 535	Isopropyl Alcohol	75%	Small quantity
Zinc Oxide	Lead Zinc Oxide	1% 98%	Small quantity (<2750 lbs.)
Airco 375	Manganese Nickel	0.5% 85%	No longer used
Airco 6013	Manganese	1%	No longer used
Airco Pipe-Craft	Manganese	1%	No longer used
Airco 6011	Manganese	1%	No longer used
Shell Rotella Oil 30	Phosphorodithioic Acid	10%	
Dimonyl Engine Oil	Phosphorodithioic Acid	2%	
Long Distance Engine Oil (301-20)	Phosphorodithioic Acid	2%	
Mineral Spirits	Psendocumene	3.5%	Small quantity (<1400 lbs.)
Molybdate Reagent 726	Sulfuric Acid	10%	Small quantity
Sulfuric Acid Code 555	Sulfuric Acid	0.1%	Small quantity
ZEP Dry Moly	Xylene	90%	No longer used
Air Motor Oil	Zinc	0.05%	No longer used
Zinc Chloride	Zinc Chloride	100%	Exempt laboratory chemical
Rapid Tap	1,1,1 Trichloroethane	80%	Small quantity
ZEP Dry Moly	1,1,1-Trichloroethane Ethoxyethange	80%	No longer used

Source: Inter-Office Memo from Chris Ruckman, Plant Manager, April 6, 1992

SCHN00171860

3.0 WASTE CHARACTERISTICS

3.1 Source Areas

3.1.1 Asphalt Manufacturing Area Tank Farm

Twenty above ground storage tanks, three converter units used for asphalt processing, a air blowing knock-out tank and an incinerator are located in this portion of the plant. All of the tanks are surrounded by concrete berms designed to contain any spills from the tanks. The tanks are connected by a network of above ground piping used for transferring raw materials and processed asphalt to various portions of the plant.

The tanks, their contents, and their capacities are listed in Table 4. Except as noted, all tanks are constructed of steel. Locations of the tanks are shown on Figure 2.

Table 4. Asphalt Manufacturing Area Storage Tanks

Tank #	Contents	Capacity (in gallons)
1	Flux	20,644
2	Flux	25,989
3	Flux	20,947
4	Flux	29.223
5	Flux	26,471
6	Flux (neutral oil)	17,741
C-1	Converter Unit 1	12,500[a]
C-2	Converter Unit 2	12,500[a]
C-3	Converter Unit 3	12,500[a]
7	Asphalt	18,660
8	Asphalt	17,710
9	Asphalt	30,292
10	Asphalt	31,399
11	Flux	61,750
12	B-D Oil	10,364
13	Asphalt	32,086
14	Mineral Spirits	500
15	Asphalt	31,399
16	#2 Fuel Oil	25,995
17	Ferric Chloride	8,000
18	Asphalt	31,741
19	Asphalt	31,741
21	L.P. Gas	
22	Boiler Chemicals	4 @ 75 gals. each
23	Asphalt Saturant (inactive)	26,000
24	Asphalt Saturant (inactive)	22,000
K-O	Knock-Out Tank	900[b]
I	Incinerator	

[a] Normal processing capacity. Total capacity is 18,000 gallons.
[b] Normal processing capacity. Total capacity is approximately 3,800 gallons.

There have been no documented releases from any of these tanks.

SCHN00171861

3.1.2 Other Storage Tanks

Nine additional storage tanks are located in the Roofing Production Line area. All are above ground, and all but one are enclosed within the roofing line building. Five of the tanks store granulated solids which are applied to the rolled fiberglass roofing material. According to Mr. Burg, these tanks are either bermed or located in such a way that their contents can be contained in the event of a spill or tank failure. Product transfers between tanks and the roofing process line are via overhead piping. Product spills, if any, are cleaned up by scraping and shoveling with the material placed into containers for off-site disposal. Liquid discharges from the roofing line area are collected in sumps in the floor and discharged to the sanitary sewer.

The storage tanks in the Roofing Production Line area are listed in Table 5. Locations of the tanks are shown on Figure 2.

Table 5. Roofing Production
Line Area Storage Tanks

Tank #	Contents	Capacity (in gallons)
25	Limestone (Silo)	
26a	Paint Mixing Tank	100
26b	Paint Use Tank	150
27	Asphalt Surge Tank	2,000

No documented releases have occurred from any of these tanks.

3.1.3 Maintenance Shops

Maintenance shops for equipment and fork lift vehicles are located adjacent to the boiler house in the Asphalt Manufacturing Area and in the Commercial Products Warehouse. Three self-contained parts washer units are present which use stoddard solvent. The solvent is provided and the waste solvent removed by Safety Kleen. Hydraulic oil, motor oil, industrial oil and anti freeze are stored in 55-gallon drums and smaller containers in the Commercial Products Warehouse maintenance shop. One fire-proof cabinet stores small quantities (less than 5 gallons) of xylene and various paints. Waste oil and other waste lubricants are placed into 55-gallon drums which are periodically picked up by an off-site contractor for recycling. Pressurized cylinders of acetylene, argon, oxygen and carbon dioxide are also used and stored in the maintenance shops.

No documented releases of hazardous substances have occurred in the maintenance shops. Minor oil staining was observed on the floor surface in the Commercial Products Warehouse maintenance shop, as is typical in vehicle maintenance areas. No evidence was observed indicating that substantial spills had occurred, and no obvious pathways were observed for potential movement of contaminants to the subsurface environment.

SCHN00171862

3.1.4 Roofing Line - Asphalt Coater and Paint Applicator

This is the primary location within the Roofing Production Line area where a potential exists for hazardous substance releases. Hot liquid asphalt and granulated solids are applied to rolled fiberglass as it passes through the asphalt coater. For some products, painted markings are also applied to the rolled material, using a paint mixture with hydrated lime and zinc oxide. Minor spills of liquid asphalt onto the process area floor occur as a normal part of the process. According to Mr. Burg, cleanup is accomplished only through mechanical scraping, with spilled material placed into containers for off-site disposal. Mr. Burg stressed that no solvents or other chemicals are used for cleaning of floors or equipment in this area.

Water and other liquid discharges from the roofing line are collected in floor sumps and discharged to the municipal sanitary sewer system. This discharge is permitted by the City of Portland Bureau of Environmental Services, as discussed in Section 2.0. Prior to 1991, this discharge was released directly to the storm sewer system.

3.1.5 Storm Sewer System and Oil/Water Separator

Surface water runoff from the Asphalt Manufacturing Area is collected in sumps which direct flow to the oil/water separator. The locations of these sumps and the on-site storm sewer lines are shown on Figure 2. The nature of this portion of the plant results in minor releases of asphalt to the paved ground surface which migrate via surface runoff into this system. No known subsurface releases from the storm sewer lines have occurred. Discharge from the separator is permitted by the DEQ (see Section 2.0) with weekly monitoring of oil and grease levels in the discharge.

Surface water runoff from the remaining areas of the plant is collected in catch basins around the north and east perimeters of the site. Discharge from these catch basins goes directly to the municipal storm sewer system, as do approximately 14 roof drain lines.

3.1.6 Air Blowing Fume Line

The heated air stream from air blowing of asphalt is routed through above ground piping from the converter units to the knock-out tank adjacent to the oil/water separator, then to the incinerator located adjacent to the boiler house. The location of the fume line is shown on Figure 3. Prior to the early 1980's, a portion of the fume line between the knock-out tank and the incinerator was routed underground along the north side of the maintenance shop and boiler house (see Figure 3 for location.) Sometime prior to 1985, the underground portion was taken out of service and replaced with the current above ground configuration. In 1988, the underground line was decommissioned. Leaks from the underground fume line have been identified as a source of known petroleum contamination in shallow soils and the uppermost groundwater zone in this area. The contaminants appear to be petroleum hydrocarbons in the diesel and heavier oil boiling ranges. Contamination apparently resulted from continuing small quantity leaks from the fume line during its years of use. The total quantity of petroleum distillate released is not known.

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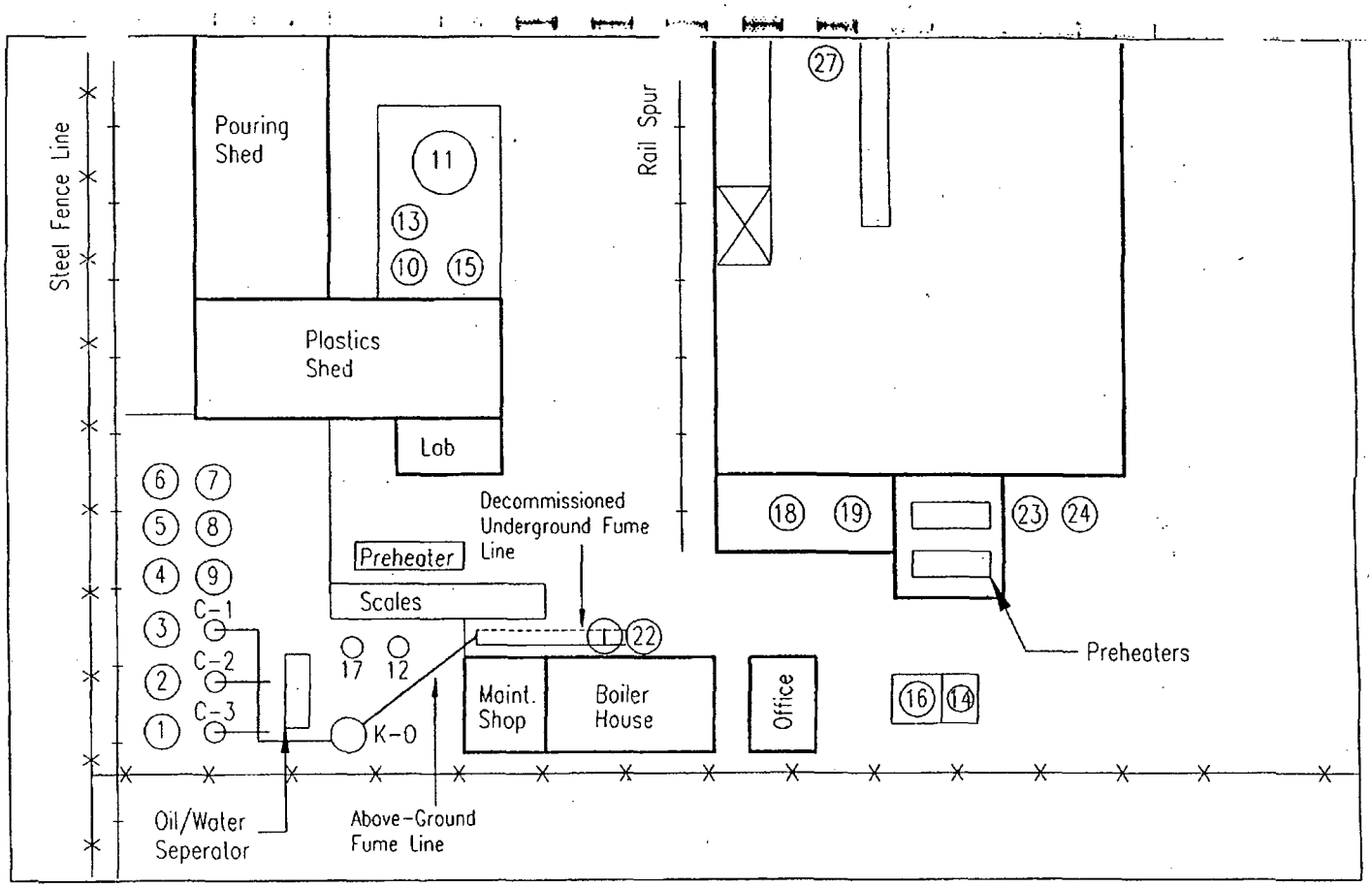

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APPROVED BY:	RPL
DATE:	05/22/92
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FIGURE NO. 3
FUME LINE LOCATION

TRUMBULL ASPHALT PLANT
3605 N.W. 35TH AVENUE
PORTLAND, OREGON

F005903.DWG

SCHN00171864

Investigations performed by Crosby and Overton and by SRH Environmental Management have generated data documenting impact to soil and groundwater in this area. Results of the previous investigations of the fume line area were detailed in a 1988 Crosby & Overton report titled "Report on Decommissioning Fume Line," and an August 28, 1989 report by SRH titled, "Groundwater Contamination Remedial Investigation, Trumbull Asphalt Co., Portland, Oregon." These data are summarized below. Copies of these reports are attached as Reference 1 and Reference 2.

In July, 1988, Owens-Corning Fiberglas contracted with Crosby and Overton, Inc. to decommission the fume line. Crosby and Overton also excavated and sampled thirteen hand auger borings to determine the subsurface soil conditions. Two of these borings, located at the ends of the underground fume line, were converted to observation wells by installing 2-inch PVC riser pipes. No screening intervals were used in these wells. At that time, Crosby and Overton also obtained 5-foot interval samples from each of the soil borings. The discreet samples from each boring were combined to form one composite sample per boring. The thirteen composite samples were then analyzed for benzene, toluene, ethylbenzene and xylene (BTEX) and for Total Petroleum Hydrocarbons (TPH).

Analyses of the soil samples taken near the underground fume line showed petroleum product in the soil, with a maximum value of 3,600 parts per million (ppm) of TPH reported. Analyses of the soil samples near the facility's southern property line yielded TPH values of up to 162,000 ppm. BTEX values were reported as being less than detection limits for all soil samples. Crosby and Overton personnel reported that visual observation of groundwater samples from their observation wells indicated up to 12 inches of free petroleum product captured in the unscreened wells.

On August 26, 1988, OCF reported the release to the DEQ Northwest Region office (LUST file number 26-88-0054).

In April 1989, SRH Environmental Management collected soil gas samples at 45 points around the asphalt manufacturing area to screen for evidence of subsurface volatile contamination in a broad area of the asphalt manufacturing plant. Sample locations and relative volatile vapor concentrations are shown on Figure 4. Samples were analyzed in the field using a portable gas chromatograph. The results reported by SRH indicated the potential of three source areas: near the tank farm in the southwest corner of the property, near the office building and boiler house along the south property line, and near the northeast corner of the Plastics Shed. Reported soil gas results suggested a small area near the Plastics Shed, where high concentrations of volatile vapors were present. A broader area of impact at low concentrations was evident in the two southern areas.

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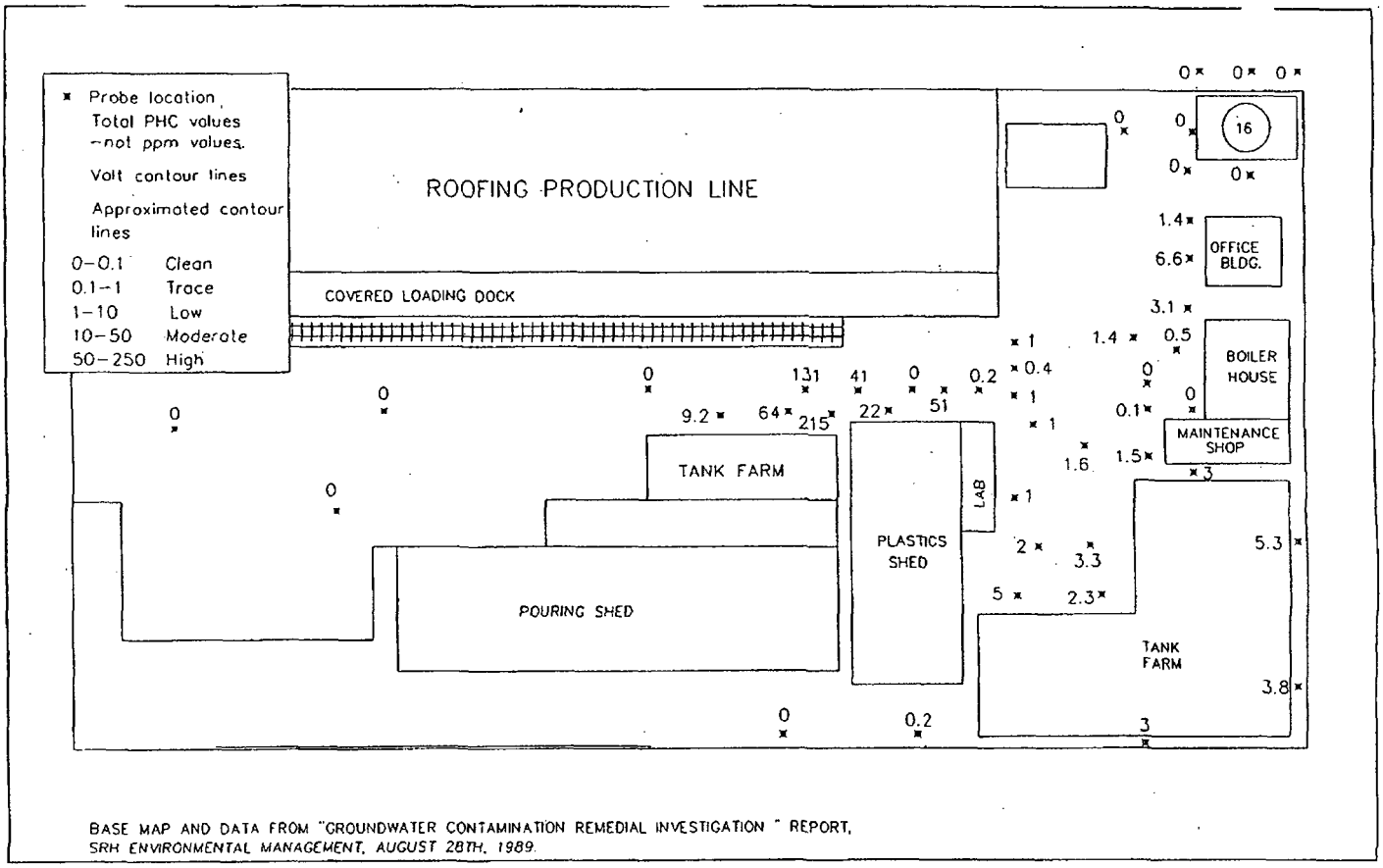

BASE MAP AND DATA FROM "GROUNDWATER CONTAMINATION REMEDIAL INVESTIGATION " REPORT, SRH ENVIRONMENTAL MANAGEMENT, AUGUST 28TH, 1989.

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FIGURE NO. 4
SOIL GAS SAMPLING LOCATIONS AND RELATIVE RESULTS IN VOLTS
TRUMBULL ASPHALT PLANT
3605 N.W. 35TH AVENUE
PORTLAND, OREGON

F005904.DWG

SCHN00171866

In May 1989, SRH installed nine soil borings in the vicinity of the fume line. Six were completed as groundwater monitoring wells. Locations of the borings and wells are shown on Figure 5. Soil samples were collected from each boring at a depth of approximately 7.5 feet below ground surface, just above the groundwater table. The samples were analyzed for TPH, with detected concentrations ranging from 2 to 9,350 milligrams per kilogram (mg/Kg). These confirmed the presence of two zones of contamination, with one near the tank farm and another near the boiler house. Results of the soil sample analyses are summarized in Table 6.

Table 6. Summary of Soil Sample Analytical Results for Total Petroleum Hydrocarbons

Sample Location	Sample Date	TPH[a]
MW-1	5/03/89	3,500
MW-2	5/03/89	11
MW-3	5/03/89	9,350
MW-4	5/23/89	17.9
MW-5	5/23/89	8,960
MW-6	5/23/89	29.5
SB-1	5/03/89	95
SB-2	5/03/89	580
SB-3	5/03/89	2

[a] Total Petroleum Hydrocarbons by EPA Method 418.1, modified for soils. Results in milligrams per kilogram (mg/Kg).

Groundwater samples were collected from the six monitoring wells in May 1989. Samples were analyzed for TPH with detected concentrations ranging from 0.2 to 14.8 milligrams per liter (mg/L). The highest concentrations in groundwater were also near the tank farm and near the boiler house. A sheen was observed on the groundwater surface in MW-1 and MW-3 prior to development of the wells. At the time of sampling, however, no free product was present in MW-1. The thickness of free product in MW-3 was measured as 1/8 inch.

The samples were also analyzed by GC/FID (modified EPA Method 8015) to produce fingerprints of the volatile and semi volatile hydrocarbon constituents present. Results were compared with chromatographic fingerprints for diesel, #2 heating oil, blown distillate residue collected from the fume line, and a sample of the free product sheen collected from the water surface in MW-3. The SRH report concluded that the petroleum detected in the soil and groundwater was most similar to the fume line distillate, or at some locations, to a combination of fume line distillate and #2 heating oil. This data suggests that possible sources of the contamination include leaks from the underground fume line, possible releases of #2 heating oil, or an off-site source of #2 heating oil.

On June 30, 1989, pumping of the wells was completed to remove free product from the water surface and to enhance development of the monitoring wells. Each well was pumped for approximately ten minutes. A total of about 200 gallons of liquid was removed from the six

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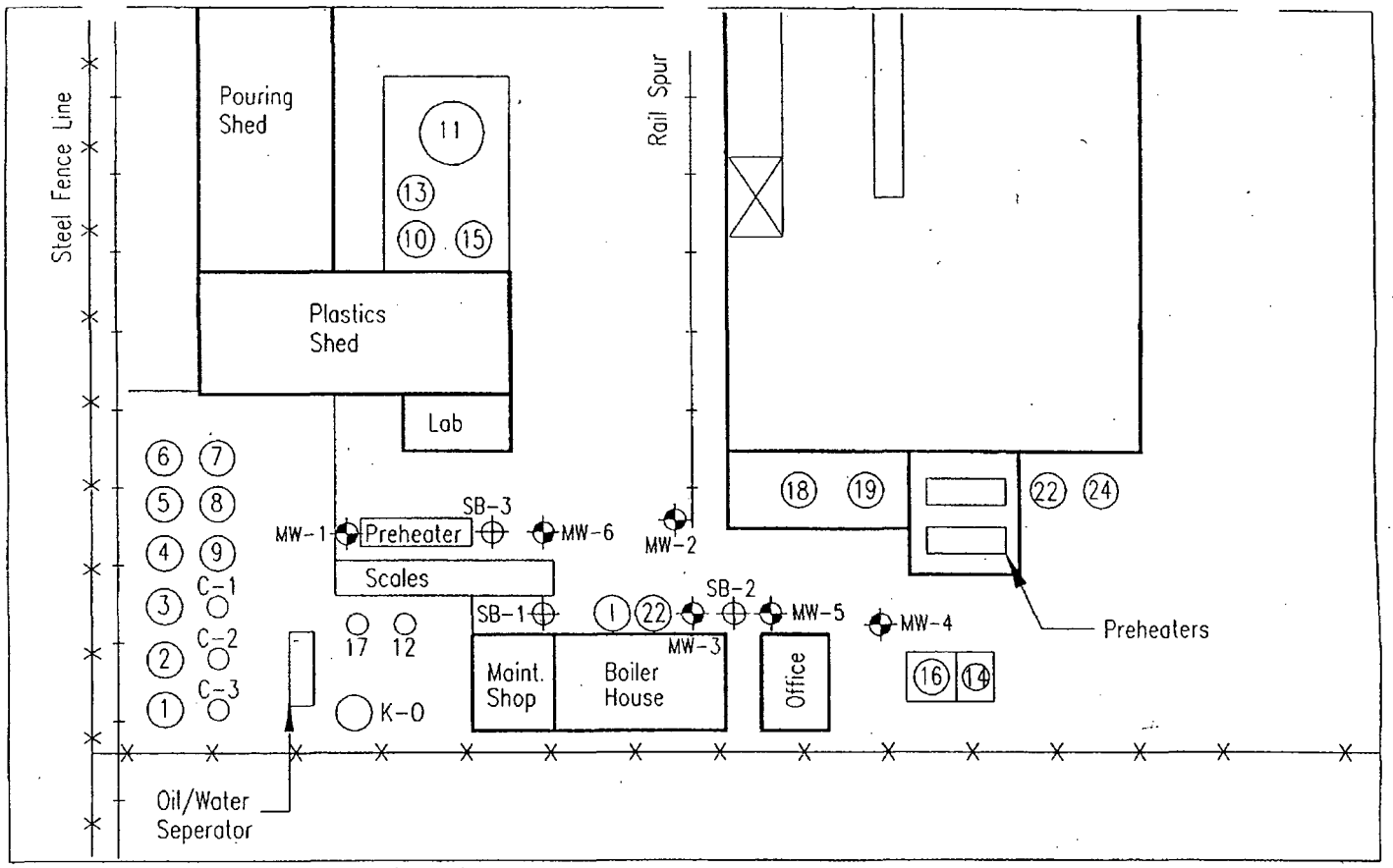

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EXPLANATION

MW-1 GROUNDWATER MONITORING WELL LOCATIONS AND NUMBERS

SB-1 SOIL BORING LOCATIONS AND NUMBERS

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JOB NO.:	F0059-001-01

FIGURE NO. 5

SOIL BORING AND GROUNDWATER MONITORING WELL LOCATIONS

TRUMBULL ASPHALT PLANT
3605 N.W. 35TH AVENUE
PORTLAND, OREGON

F005905.DWG

SCHN00171868

wells and placed into the on-site oil/water separator. Low levels of free product in the wells were evident, creating a slight sheen on the water surface when the pumped water was added to the separator. The sheen dissipated quickly.

Additional monitoring of the wells occurred in June 1990, January, April and July 1991, and January 1992. Copies of these monitoring reports are attached as Reference 3. Monitoring results have shown generally decreasing concentrations of TPH. The highest concentration has consistently been found in MW-5, with lower concentrations at MW-1 and MW-3. Concentrations in MW-2, MW-4 and MW-6 have ranged from less than the analytical detection limit to about 1 mg/L in the last five sampling events.

Results of the groundwater sample analyses for TPH are summarized in Table 7.

Table 7. Summary of Groundwater Sample Analytical Results for Total Petroleum Hydrocarbons*

Sample Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	Detection Limit
5/11/89 and 5/30/89	8.4	2.0	14.8	0.2	12.4	0.9	0.2
5/11/90	4.6	0.7	8.0	<0.2	180.0	1.3	0.2
1/11/91	2.0	<0.5	14.0	<0.5	NT	1.1	0.5
4/23/91	<0.5	<0.5	0.7	<0.5	40.0	<0.5	0.5
7/26/91	1.3	<0.5	3.5	0.6	160.0	1.0	0.5
1/10/92	<0.5	<0.5	0.8	<0.5	33.0	<0.5	0.5

* Analyses for Total Petroleum Hydrocarbons by EPA Method 418.1. All results in milligrams per liter (mg/L).

NT Not tested.

3.1.7 Boiler Fuel Lines and Storage Tank

As described above, analyses of soil and groundwater samples collected during the fume line release investigation indicated that hydrocarbons similar to #2 heating oil may have been present in the subsurface environment in the vicinity of the boiler house. Boilers used to produce steam for heating of pipes and asphalt storage tanks are fired by natural gas, with #2 heating oil used as a backup fuel source. The #2 heating oil is stored in an above ground tank east of the boiler house. The tank previously stored Bunker C and was converted to #2 heating oil in 1989. Product is transferred from the tank to the boiler in above ground lines. Locations of the above ground fuel supply lines are shown on Figure 6. No documented large-quantity spills of #2 heating oil have occurred from the tank or lines. According to Mr. Burg, portions of the lines have been replaced and upgraded in recent years. Results of the soil vapor, soil and groundwater sampling do not indicate the presence of subsurface contamination in the area around the tank.

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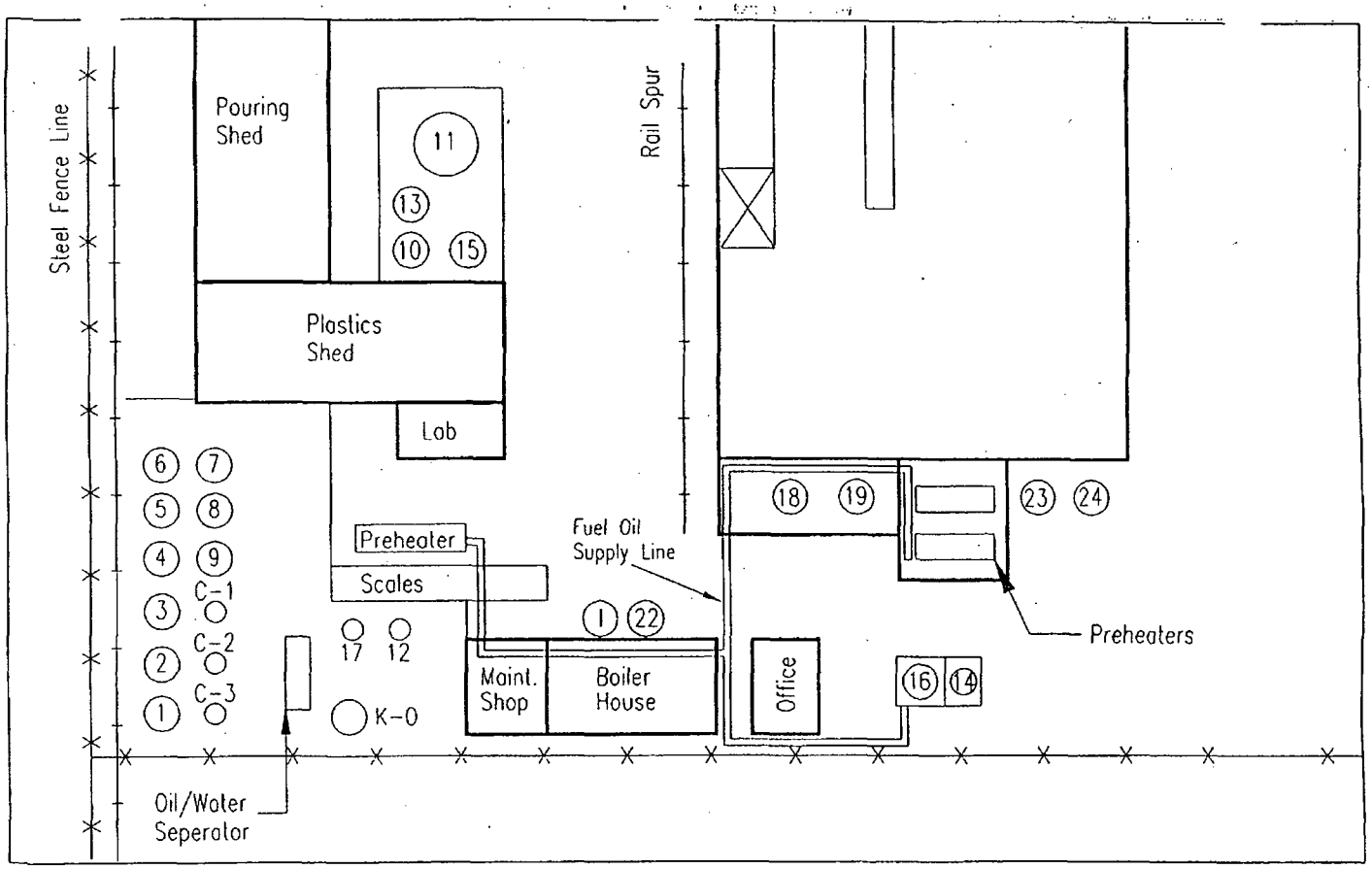

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FIGURE NO. 6

FUEL OIL SUPPLY LINE LOCATIONS
TRUMBULL ASPHALT PLANT
3605 N.W. 35TH AVENUE
PORTLAND, OREGON

F005906.DWG

SCHN00171870

3.2 Waste Characteristics Conclusions

Operations at the Trumbull Asphalt facility include the storage and use of significant quantities of petroleum, primarily asphalt. Storage of these materials in above ground tanks and transfers through above ground lines result in small releases of asphalt to the ground surface. However, since the majority of the surface area is paved, such releases are generally contained and routed away from the subsurface environment.

Surface runoff from the Asphalt Manufacturing Area is controlled by directing on-site storm water lines through an oil-water separator. Discharge from the separator is to the municipal storm sewer. Other liquid waste discharges from the site are also permitted and monitored. These include non-contact cooling water, boiler blow down, and roofing line waste water.

The primary source of concern for the site is petroleum hydrocarbon contamination which has impacted the groundwater pathway in the southern portions of the Asphalt Manufacturing Area. Releases of petroleum distillate from the former underground portion of the fume line have contributed to this contamination. Minor releases from the tank farm and process equipment over the years may have also contributed to the subsurface contamination. Release of #2 heating oil from the boiler fuel supply lines may also have occurred. Several LUST releases have been reported on neighboring properties which may also contribute to petroleum hydrocarbon presence in the uppermost groundwater in the area.

SCHN00171871

4.0 GROUNDWATER PATHWAY

4.1 Hydrogeologic Setting

4.1.1 Regional Geology and Hydrogeology

The Trumbull Asphalt facility is located in the western part of the northwest-trending Portland Basin, a relatively flat-bottomed structural depression with faulted southwestern and northeastern margins[1]. The Portland Basin is filled with sediments and lies between the Portland Hills on the west and the Cascade Range on the east, north and south. The eastern slope of the Portland Hills is approximately one-third mile southwest of the site. The subject property is located within the floodplain of the Willamette River, located approximately one-half mile to the north. The industrial neighborhood surrounding the site is known as the Guilds Lake area after a shallow lake which formerly occupied the area. The lake was filled to provide industrial land in the early part of this century.

Immediately underlying the Guilds Lake fill materials are recently deposited alluvium, generally less than 30 feet in thickness[1]. Below this alluvium are the Pleistocene-age Portland Terrace deposits. These fine-grained deposits of sand, gravel and silt were laid down by the outburst floods of glacial Lake Missoula, and cover much of the lower-lying portions of the Portland Basin. Below the Portland Terrace Deposits is the Troutdale Formation of early Pliocene age, representing river and flood plain sediments deposited under the ancestral Willamette and Columbia River systems. The Troutdale Formation is underlain by the early-Pliocene Sandy River Mudstone, and the Miocene-age Columbia River Basalt[2].

The Troutdale Formation and Columbia River Basalt are productive aquifers which are tapped for industrial purposes in the project area and are used for drinking water in other areas of the Portland Basin. Wells installed by the City of Portland draw groundwater from the Troutdale Formation at the eastern edge of the urbanized Portland area, approximately 12 miles east of the Trumbull Asphalt site. Unconsolidated gravel and coarse sand in the Troutdale Formation deposits, and the interflow zones and fractured basalt of the Columbia River Basalt are the primary water bearing zones. Vertical movement of water is limited by interbedded layers of clay and mudstone. Groundwater flow in these deep aquifers is generally toward the Willamette River in the vicinity of the project site.

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1 Madin, I.P., "Earthquake Hazard Geology Maps of the Portland Metropolitan Area, Oregon," Oregon Department of Geology and Mineral Industries, 1990.

2 Brown, S.G., "Problems Utilizing Groundwater in the West-Side Business District of Portland, Oregon," USGS Water Supply Paper 1619-0, 1963.

SCHN00171872

4.1.2 Site Geology

According to documents prepared by SRH from the drilling of soil borings and monitoring wells at the site, the subsurface units at the site were generally consistent and can be categorized into four basic units:

- A 0.8 foot thick layer of asphalt pavement and crushed rock subgrade. This layer was found at the surface in all of the borings.

- A 3 to 6 foot thick layer of dry to moist, mottled medium gray, pebbly, silty, fine to medium sand. This layer is interpreted to represent a man-made fill, placed on the site in the past to bring it level to the local road. This unit also contained some crushed rock and bits of organic material.

- A 0.5 to 1 foot thick layer of moist to wet, mottled medium gray and brown, clayey, fine sandy silt with small organics pieces, and numerous root holes. The silt showed extremely low plasticity in field plasticity index tests. This layer is interpreted to represent the old topsoil horizon on the site. This unit was encountered in all of the drill holes at a depth ranging from about 3 to 6 feet.

- A layer of unknown thickness of moist to wet, mottled medium gray, slightly silty, fine to medium sand. This unit was encountered in all of the drill holes immediately below the silt layer, at a depth of about 7 to 10 feet. This unit represents the overbank deposits of the ancestral Willamette River. All drill borings were completed in this unit.

4.1.3 Site Hydrogeology

Depth to the uppermost groundwater in the on-site wells has been measured and reported during each of the groundwater sampling events since May 1989. Groundwater depths have ranged from 7.34 to 8.33 feet below ground surface (bgs). Some seasonal fluctuation of the water table has been observed, with the greatest fluctuation at MW-3 (1.43 feet, ranging from 7.65 to 6.22 feet bgs). Total hydrologic relief across the site has generally been measured at between 0.2 and 0.6 feet, resulting in a local hydraulic gradient ranging from 0.1 to 0.3 percent in a south to southeast direction.

If hydraulic conductivity of the medium sand aquifer is assumed to be on the order of about 3 to 30 feet per day (as taken from published tables for sands of similar size and classification), and the porosity is on the order of 30% (also taken from published tables), the local velocity of the groundwater is on the order of 0.09 to 0.9 feet per day, which is relatively slow.

From a hydrogeological point of view, the top sand fill and the bottom natural sandy layer are the two available aquifers for fluid movement, and both are fairly permeable in the horizontal and vertical directions. The naturally-occurring sand at depth appears to be quite uniform and contains the local uppermost aquifer in an unconfined condition. Petroleum product, driven by gravity and infiltration of rainwater could easily move downward or laterally through either of these units.

SCHN00171873

4.1.4 Annual Net Precipitation

Annual net precipitation rate for the site was estimated using data from the Portland Weather Service Office, the nearest weather recording station. Available data indicates that the net annual precipitation (precipitation minus evapotranspiration) for the area is 21.09 inches. The net precipitation rate ranges from +6.04 inches in December to -5.28 inches in July. Total average annual rainfall at the Portland station is 42 inches.

4.2 Groundwater Targets

Oregon Water Resources Department (OWRD) files were researched for recorded water well logs in Township 1 North, Range 1 East, Sections 19, 20, 29 and 30. Additional sections adjoining the section where the Trumbull site is located (Section 20) were not researched since they are predominantly located across the Willamette River in areas that are not expected to be hydraulically linked to the shallow groundwater beneath the Trumbull site.

A total of 13 well logs were located in the areas researched. These are summarized in Table 8. Approximate locations of the wells are shown on Figure 1.

Table 8. Groundwater Wells in Vicinity of Trumbull Asphalt Facility

#	Owner	Location	Distance from Trumbull	Direction from Trumbull	Use	Depth
1	Van Waters and Rogers	3905 NW Yeon	500 feet	west	monitoring	23'
2	Van Waters and Rogers	3905 NW Yeon	500 feet	west	monitoring	23'
3	Van Waters and Rogers	3905 NW Yeon	500 feet	west	monitoring	27'
4	Van Waters and Rogers	3905 NW Yeon	500 feet	west	monitoring	19'
5	Northwest Natural Gas Co.	NW Front & Kittridge	0.8 miles	northwest	test	100'
6	Northwest Natural Gas Co.	NW Front & Kittridge	0.8 miles	northwest	test	100'
7	Northwest Natural Gas Co.	NW Front & Kittridge	0.8 miles	northwest	test	100'
8	Chevron USA	5501 NW Front	0.5 miles	north	industrial	310'
9	Hercules Powder Co.	3366 NW Yeon	0.8 miles	southeast	industrial	574'
10	Hercules Powder Co.	3366 NW Yeon	0.8 miles	southeast	industrial	679'
11	Dan Woodman	3138 NW Wilson	0.8 miles	south	domestic	240'
12	Kermit Medoff	6241 NW Cornell Rd.	1.5 miles	southwest	domestic	125'
13	Medoff & Eltzroth	6241 NW Cornell Rd.	1.5 miles	southwest	domestic	125'

SCHN00171874

The four nearby monitoring wells at Van Waters and Rogers are installed in the shallow water bearing zone ranging from 6 to 20 feet bgs. The other wells are completed in deeper aquifers. All of the wells in the vicinity of the Trumbull site are used to supply industrial water, or have been installed for testing or monitoring purposes. The only known domestic wells are located upgradient of the Trumbull facility on the eastern slopes of the Portland Hills. Domestic water supplies in the project site vicinity are from the City of Portland municipal water system which draws its supply from surface water in the Cascade Range 40 miles to the east, and from wells in the Troutdale Formation about 12 miles east of the site.

A cellar beneath the central portion of Trumbull's Commercial Products Warehouse was observed to be flooded with water during the site inspection. Based on the measured groundwater depths at the site of less than ten feet, the water observed in the basement is believed to be an expression of the shallow groundwater, although the source and discharge locations for this water are not known.

Groundwater in the uppermost aquifer likely discharges to the Willamette River located one-half mile to the north.

4.3 Groundwater Conclusions

Based on available data, the known or suspected contaminant sources at the Trumbull facility have impacted only the uppermost groundwater aquifer, at depths of less than 10 feet. The only apparent receptor for this pathway is the Willamette River. Significant quantities of petroleum in this aquifer might also migrate into the flooded cellar of the Trumbull Asphalt Commercial Products Warehouse. No visual or olfactory evidence that petroleum was present in the cellar water was observed at the time of the site inspection. However, in an extreme case, this could present a risk of vapor or direct-contact exposure to building occupants and should, therefore, be monitored periodically.

No domestic water supply wells are known to be located in the area at risk of impact from the known or potential sources at the Trumbull facility. No water supply wells of any type are known to utilize the uppermost aquifer within a two-mile radius of the Trumbull site, although monitoring wells in this aquifer are present.

SCHN00171875

5.0 SURFACE WATER PATHWAY

5.1 Hydrologic Setting

Based on USGS topographic maps, the only surface water bodies within a two-mile radius of the Trumbull facility are the Willamette River and two small streams which flow northeasterly from the Portland Hills toward the Willamette. These two unnamed creeks are visible as they flow down the eastern slope of the Portland Hills at locations one-half mile south and one-half mile west of the Trumbull site. The streams then flow in underground culverts through the Guild's Lake area before discharging to the Willamette River at locations to the north of the Trumbull site.

Surface topography in the vicinity of the Trumbull facility is generally flat. The net change in surface elevation between the site and the Willamette River, approximately one-half mile away, is approximately five feet. This results in a terrain slope over this distance of approximately 0.2 percent.

Surface water runoff on the Trumbull site is collected in catch basins and directed to the municipal storm sewer system. Storm sewer flow from the asphalt manufacturing area, where the majority of hazardous substance use and storage occurs at the Trumbull facility, is routed through an oil/water separator prior to off-site discharge. Weekly monitoring of this discharge is performed to reduce the risk of off-site petroleum discharge.

The ground surface throughout the area surrounding the Trumbull facility is predominantly covered by buildings or paved with asphalt and concrete. Thus, there is little direct infiltration of surface water into shallow soils. Fill materials near the surface include various silts, sands and gravel, underlain by a sand or sandy silt layer to depths of approximately ten feet. These materials appear to have a relatively high permeability, so that surface water which does contact surface soils is likely to infiltrate downward rather quickly.

5.1.1 Maximum 2-year, 24-hour Rainfall

According to National Weather Service data provided in the DEQ's Preliminary Assessment Guidance document, the maximum 2-year, 24-hour rainfall event in the area of the Trumbull site is approximately 2.5 inches of precipitation.

5.1.2 Flood Plain

According to FEMA flood insurance map 410183 0020 D, the Trumbull site is not within a 100-year or 500-year flood plain.

5.2 Surface Water Targets

5.2.1 Water Intakes Within 2 Miles

There are no known water intake locations within two miles downgradient from the Trumbull facility. Water supply throughout the area is provided by the City of Portland municipal water system.

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5.2.2 Recreation Uses of Surface Water

The Willamette River is used for recreational boating, fishing and swimming. The Willamette River is located approximately one-half mile north of the Trumbull site. There are no known recreational uses for the two unnamed creeks located upgradient from the Trumbull site.

5.2.3 Sensitive Environments

The Willamette River is a heavily used recreational fishing resource, including habitat for salmon, some species of which have been recommended for federal protection as threatened species. There are no other known habitat for threatened or endangered species within two miles downgradient from the site.

No national or state parks or monuments, national recreation areas, national or state wildlife refuges, national forests, wilderness areas, wild and scenic rivers, or other parks or recreation areas are located within two miles downgradient from the Trumbull site. The nearest park or recreation area is Forest Park, located in the Portland Hills approximately one-half mile southwest (upgradient) from the Trumbull site.

5.3 Surface Water Conclusions

Due to the presence of structures and pavement over most of the area on and around the Trumbull site, surface water runoff is controlled almost exclusively by the municipal storm sewer system. Contaminants released to the surface will generally migrate to the nearest storm water catch basin, into the storm sewer system, and eventually discharge to the Willamette River. The asphalt manufacturing area is the portion of the Trumbull site with the greatest likelihood of surface contaminant releases, due to the storage and use of petroleum products in this area. Releases in this area which reach the storm sewer system are routed through an oil-water separator prior to off-site discharge.

The Willamette River is the only surface water body or sensitive environment within two miles downgradient from the Trumbull site. The terrain slope from the site to the river is generally flat, with surface water flow directed to the storm sewer system. Thus, there is no apparent pathway for direct surface water migration from the Trumbull facility to the Willamette River.

SCHN00171877

6.0 AIR PATHWAY

The only identified source or potential source of contamination at the Trumbull site is the presence of petroleum in shallow subsurface soil and the uppermost groundwater. This contamination appears to have resulted from releases from a former underground fume line, possible accumulation from minor leakage over time from above ground fuel lines around the boiler plant, and leakage or spillage around above ground storage tanks. The subsurface contamination presents no apparent risk of air emissions impact. Any future leaks from the fuel lines would likely be of de minimis amounts presenting little air impact risk. Minor surface spills of asphalt occur during the plant's production process. The asphalt is stored and used in a liquid phase at temperatures from 200° to 500° Fahrenheit. When surface spills occur, the material cools quickly. Thus, there is little release of volatile vapors from such spills. All vapors released from the tank farm and associated process equipment are reportedly captured by a fume collection system which is routed to the incinerator. Thus, the only apparent air discharges are the permitted discharges discussed in Section 2.5.3.

The risk of impact to the air appears to be minimal from the identified sources at the Trumbull site. Therefore, no further discussion of the air pathway is included here.

SCHN00171878

7.0 DIRECT CONTACT PATHWAY

The only identified source or potential source of contamination at the Trumbull site is the presence of petroleum in shallow subsurface soil and the uppermost groundwater. This contamination appears to have resulted from releases from a former underground fume line, possible accumulation from minor leakage over time from above ground fuel lines around the boiler plant, and leakage or spillage around above ground storage tanks. The subsurface contamination presents no apparent risk of direct contact exposure.

Storage and use of petroleum and other hazardous substances on the site present some risk of direct contact exposure resulting from surface spills. However, concrete berms around all of the tanks are designed to contain any spills, minimizing the risk of direct contact exposure. The Trumbull facility operates and is occupied by personnel 24 hours per day. In addition, the entire site is fenced to prevent unauthorized access. Thus, there is a low risk of direct contact exposure for anyone except plant employees.

No residences, schools, parks, day care facilities, playgrounds or fairgrounds are located within 1,000 feet of the Trumbull site. All surrounding properties are industrial and commercial in nature. Therefore, the risk for inadvertent direct contact exposure to off-site individuals is minimal, and no further discussion of the direct contact pathway is included here.

SCHN00171879

8.0 SUMMARY AND CONCLUSIONS

The Trumbull Asphalt Plant produces asphalt products for residential, industrial and commercial markets. The plant was reportedly built in the 1930s or earlier, and has been in continuous operation since.

The primary area of hazardous materials use and storage is the Asphalt Manufacturing Area in the southern portion of the plant site. Asphalt flux is received by rail car and truck, and is stored in an above ground tank farm. The asphalt flux is air blown to produce asphalt mixtures that are subsequently applied to the various finished products made at the plant. Hazardous substances stored and used in the process include asphalt flux, mineral spirits, ferric chloride, and a variety of other materials.

The above ground storage tanks and above ground transfer lines are one of the primary potential sources of contamination at the site. However, there have been no documented releases from the tanks and lines. Concrete berms around the tanks are designed to contain any spills. Minor spillage of heated asphalt mixtures to the ground surface occurs occasionally. However, the majority of the surface area is paved, minimizing the risk of release to the subsurface environment. Asphalt spills are cleaned up by mechanical scraping, with the material placed into containers for off-site disposal. Surface runoff in the Asphalt Manufacturing Area is directed to an oil-water separator prior to discharge to the municipal storm sewer system.

Vehicle and equipment maintenance shops on the site use small quantities of petroleum products and utilize stoddard solvent for parts cleaning. The solvent is provided and waste solvent collected by an off-site contractor. Waste oil and other waste lubricants are stored in 55-gallon drums and picked up periodically for off-site recycling.

The primary source of concern at the site is petroleum hydrocarbon contamination which has impacted the groundwater pathway in the southern portions of the Asphalt Manufacturing Area. Releases of petroleum distillate from a former underground fume line appear to be the primary source of this contamination. Minor releases from the tank farm and process equipment over time may have also contributed to the subsurface contamination. Releases of #2 heating oil from boiler fuel supply lines may have also occurred.

Groundwater in the uppermost aquifer beneath the site, at depths of 7 to 8 feet bgs, has been impacted by the known petroleum contamination. No domestic water wells are located within two miles downgradient of the site. The only wells in the vicinity known to be screen in the uppermost aquifer are monitoring wells located about 500 feet to the west.

Due to the presence of structures and pavement over most of the area on and around the Trumbull site, surface water runoff is controlled almost exclusively by the municipal storm sewer system. Contaminants released to the surface generally migrate to the nearest storm water catch basin, into the storm sewer system, and eventually discharge to the Willamette River. The asphalt manufacturing area is the portion of the Trumbull site with the greatest likelihood of surface contaminant releases, due to the storage and use of petroleum products in this area. Releases in this area which reach the storm sewer system are routed through an oil-water separator prior to off-site discharge. The Willamette River is the only surface water body or sensitive environment within two miles downgradient from the Trumbull site.

No impact to air or direct contact pathways appears to be present.

SCHN00171880

Reference 1

REPORT ON DECOMMISSIONING FUME LINE

CROSBY & OVERTON, INC.

REPORT ON DECOMMISSIONING FUMELINE PROJECT AT TRUMBULL ASPHALT PORTLAND, OREGON

Prepared for:
David A. Crowle
Advanced Environmental Specialist
Owens/Corning Fiberglass

Prepared by:
Hubert H. Willer III
Hazardous Materials Specialist
Crosby & Overton, Inc.
Portland, Oregon

SCHN00171882

TABLE OF CONTENTS

		PAGE
1.0	INTRODUCTION	2
1.1	Overview	2
1.2	Scope of Work	2
2.0	REGIONAL HYDROLOGY	2
3.0	FIELD WORK	3
3.1	Fume Line Decommissioning	3
3.2	Soil Borings	3
3.3	Well Installation	3
4.0	LABORATORY ANALYSIS	4
5.0	FINDINGS	4
5.1	Subsurface Conditions - Soils	4
5.2	Subsurface Conditions - Groundwater	4
6.0	LABORATORY RESULTS	4
6.1	Soils	4
6.2	Groundwater	5
7.0	DISCUSSION	5
8.0	RECOMMENDATIONS	5

REFERENCES CITED

MAPS
- Map of Soil Boring Locations
- Map of Fume Line Plume Boundary

ANALYTICAL DATA
- Soil Boring Samples
- Monitoring Well Samples

FIELD PHOTOGRAPHS

UNDERGROUND FUME LINE DECOMMISSIONING AND

SITE INVESTIGATION

FOR

OWENS-CORNING FIBERGLAS CORP.

PORTLAND, OREGON

1.0 INTRODUCTION

1.1 Overview

On July 20, 1988 Owens-Corning Fiberglas Corp. (OCF) contracted Crosby & Overton, Inc., to decommission an underground fume line at their Trumbull Asphalt Division plant at NW 35'th Street and NW Yeon Avenue in Portland, Oregon.

The facility is in a heavy industrial area near the Willamette River in the northwest portion of Portland. The property is immediately surrounded by truck terminals to the south and west, by NW 35'th street to the east, and by NW Yeon Avenue to the north. There are numerous oil refineries and chemical plants in the area.

1.2 Scope of Work

The buried fume line is approximently three foot square by sixty-seven feet long. The line is located under eighteen inches of soil, three feet north of the boiler house, and runs under an incinerator concrete pad and the maintenance shop. Due to the location of buildings and equipment, an in-place closure was chosen that encompassed exposing the fume line, cleaning the line, disposal of material remaining in the line, and filling the line with sand to eliminate any void spaces.

Initial sampling had indicated the presence of contamination in the soils near the fume line. During the decommissioning operation, additional soil borings were taken to determine the extent of contamination. In addition, two of the soil borings were converted to monitoring wells to assess the ground water quality in the nearest aquifer.

2.0 REGIONAL HYDROLOGY

The upper layer soil type in the area is all sand fill. At one time the area was part of the Willamette River flood zone until it was filled in to create a commercial/industrial area in the early 1900's. With several refineries in the area it was common practice up until the 1960's to clean oil tankers and flush the rinse onto the ground Total Petroleum Hydrocarbon (TPH) background

the south well is along the property line, inside of the south wall of the boiler house. Wells are constructed of two inch PVC riser and screen and have steel casings with locking lids (see photos). After adequate purging, samples were obtained from each well.

4.0 LABORATORY ANALYSIS

All samples collected were analyzed by Northwest Testing Laboratories. Soil and water samples were analyzed utilizing EPA methods for some or all of the following constituents:

- PCB's
- Total Petroleum Hydrocarbons
- Benzene, Toluene, Xylene

Analytical results are attached.

5.0 FINDINGS

5.1 Subsurface Conditions - Soil

Field observations of the soil samples by both Crosby & Overton and OCF personnel indicated that samples from two different areas, along the south property line and north of the fume line, were different. Samples and boring cuttings along the property line had a distinct diesel fuel odor. The control sample from the fume line and a sample of blowing distillate oil (BD oil), a by-product recovered from the asphalt process (related to the fume line material only without the sludge or water content), both had an equally distinct asphalt odor.

5.2 Subsurface Conditions - Ground Water

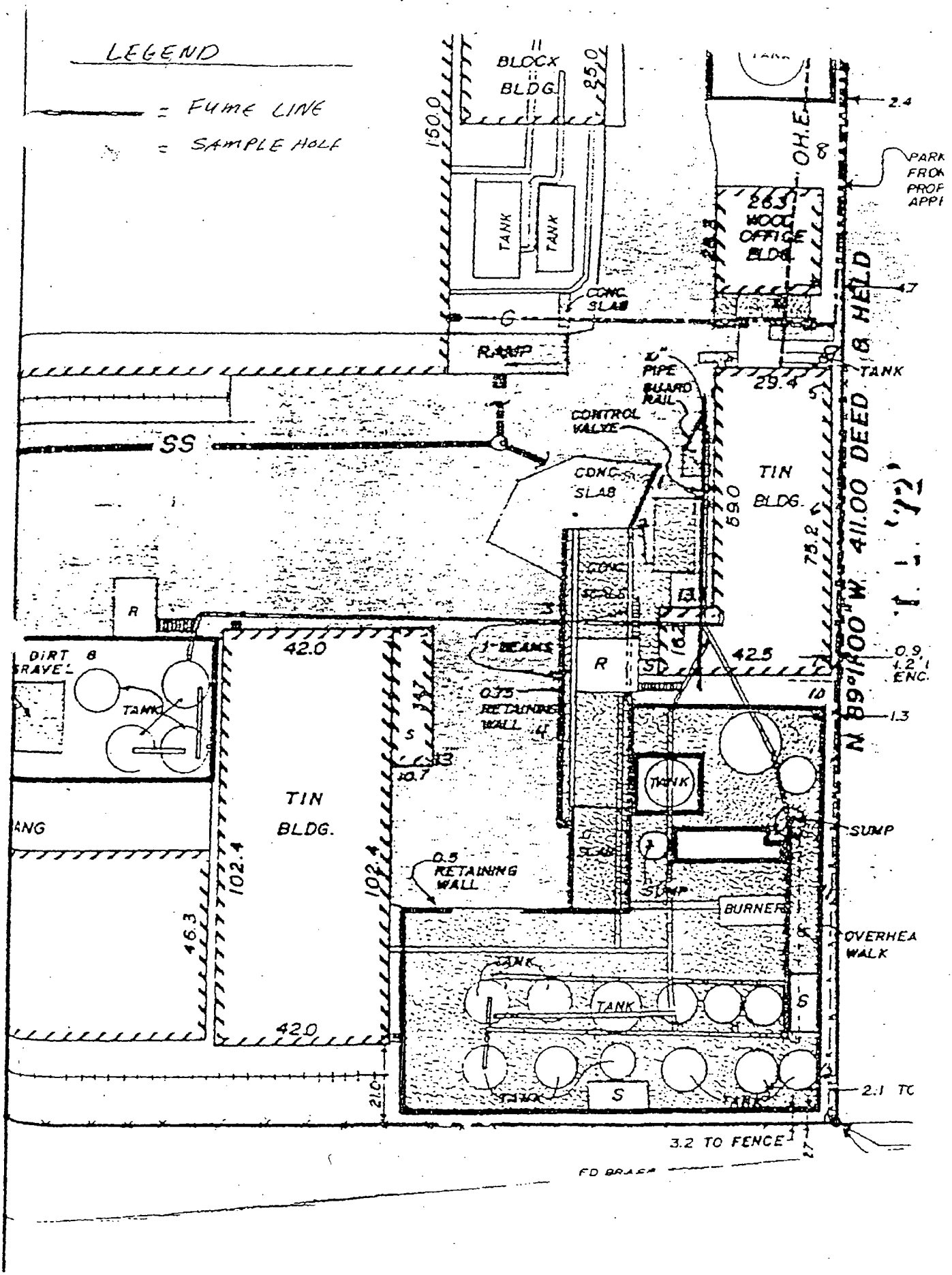
Samples were taken from monitoring wells one and two. It was obvious from samples from both wells that there was floating product on the aquifer. As above, field observations indicated the samples were different both visually and from an odor standpoint. Well number two (property line) samples had a distinct diesel odor. Well number one samples had a typical asphaltic odor.

6.0 LABORATORY RESULTS

6.1 Soils

Soil samples one through four and thirteen had TPH levels in the 100 - 5000 ppm range. These samples were taken on the north (plant) side of the fume line in the expected direction of groundwater flow. The remaining samples are in the 20,000 to 50,000 ppm TPH range (one sample was even higher at 162,000 ppm). These higher concentrations occurred in samples along the south property line from east to the furthest west point on the property line.

Northwest Testing Laboratories was asked to include a comparison of the hydrocarbons found in the soil samples to common hydrocarbon products. Comments at the bottom of the analysis sheets indicate that volatile portions



SCHN00171886

NORTHWEST TESTING LABORATORIES, INC.

JCTION INSPECTION
LS INSPECTION
ICAL ANALYSIS
ICAL TESTING

5405 N. Lagoon Avenue
P.O. Box 17126
Portland, Oregon 97217-0126
Phone: (503) 289-1778

NON-DESTRUCTIVE TESTING
WELDING CERTIFICATION
SOIL TESTING
ASSAYING

August 26, 1988

Crosby & Overton
5420 N. Lagoon Avenue
Portland, OR 97217

Attention: Mr. Hubert Willer

Subject: Analysis performed on eight (8) samples received on 8/24/88, per your P.O. Number 22942.

REPORT:

Item: Soil Samples
Job No: 8023K
Reference: Trumball
Procedure: EPA SW 846 Method 3810

Analysis::

	1	2	3	4
Benzene, ppm	<0.1	<0.1	<0.1	<0.1
Toluene, ppm	<0.1	<0.1	<0.1	<0.1
Xylene, ppm	<0.1	<0.1	<0.1	<0.1
Volatile Hydrocarbons, ppm...	<1	160	<1	33
Oil and Grease, ppm.....	186	3,480	185	582
Total Hydrocarbons, ppm.....	186	3,640	185	615

	5	6	7	Control
Benzene, ppm	<0.1	<0.1	<0.1	<0.5
Toluene, ppm	<0.1	<0.1	<0.1	<0.5
Xylene, ppm	<0.1	<0.1	<0.1	<0.5
Volatile Hydrocarbons, ppm...	71	210	310	360
Oil and Grease, ppm	30,300	28,300	38,200	175,000
Total Hydrocarbons, ppm.....	30,371	28,510	38,510	175,360

Note: The oil and grease is performed using gravimetric procedure.
Sample No. 2 - Volatiles are similar to kerosene
Sample No. 4 - Volatiles are similar to diesel fuel
Sample No. 5 - Volatiles are similar to diesel fuel
Sample No. 6 - Volatiles are similar to diesel fuel
Sample No. 7 - Volatiles are similar to diesel fuel
Sample Control - Volatiles are similar to diesel fuel

Respectfully,
NORTHWEST TESTING LABORATORIES, INC.

Howard B. Holmes

Howard B. Holmes
Assistant Supervisor, Chemistry

Report No: 317259

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NORTHWEST TESTING LABORATORIES

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ANALYSIS
ESTING

5405 N. Lagoon Avenue
P.O. Box 17126
Portland, Oregon 97217-0126
Phone: (503) 289-1778

NON-DESTRUCTIVE TESTING
WELDING CERTIFICATION
SOIL TESTING
ASSAYING

September 30, 1988

Crosby & Overton
5420 N. Lagoon Avenue
Portland, Oregon 97217

Attention Mr. Hubert Willer

Subject Analysis performed on five (5) samples received on 9/22/88, per your P.O. Number 22942.

REPORT:

Item: Control - Fume Line Sludge
Monitor Well #1
Monitor Well #2 (2 samples)
BD Fuel Oil

Reference: Trumbull - 8023K

Procedure: PCB Extraction
Base - Neutral Extraction

Analysis:

A base/neutral fingerprint was performed on each sample. Methylene Chloride was used as the solvent for the extraction. A Hewlett-Packard GC/MS with a capillary column was used to perform the analysis.

The control sample was compared to each of the other three (3) samples. The No. #1 Monitor sample and the BD-Fuel Oil sample were both similar to the control sample in composition and all had phenanthrene present in detectable quantities. The No. 2 monitor sample was very different in composition and did not contain phenanthrene in a detectable quantity. Copies of the GC/MS fingerprints are enclosed. Please note that the x-axis scale for the control is a little different numerically than the other three samples.

All five samples contain no PCB's (<1ppm).

Respectfully,
NORTHWEST TESTING LABORATORIES, INC.

Donald P. Marshall

Donald P. Marshall, Chemist

Howard B. Holmes

Howard B. Holmes
Assistant Supervisor, Chemistry

Report Number: 318237

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Data file: COM2.D
File type: GC / MS DATA FILE

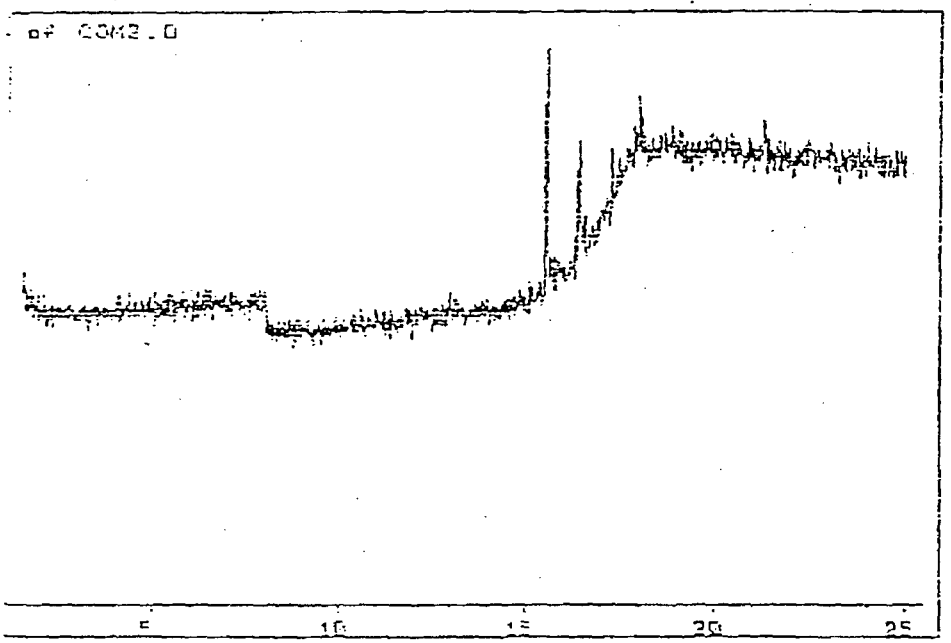
Name Info: CROSBY & OVERTON (TRUMBULL 8023K) #2 MONITOR
Misc Info: 1.5021 GM IN 25 ML EM = 2000 FLOW = 49.0
Operator : PM (2.0 UL MANUAL INJ SIM)

Date : 27 Sep 88 8:59 am
Instrment: MS_5970
Inlet : GC

Sequence index : 0
Als bottle num : 0
Replicate num : 0

LATE
TA H

T: null.
Z: null.
Stop
Tabulate
Y: null.
X: null.



SCHN00171889

Data file: COM1.D
File type: GC / MS DATA FILE

Name Info: CROSBY & OVERTON (TRUMBULL 8023K) #1 MONITOR
Misc Info: 1.2404 GM IN 25 ML EM = 2000 FLOW = 49.0
Operator : PM (2.0 UL MMANUAL INJ SIM)

Date : 27 Sep 88 8:29 am
Instrment: MS_5970
Inlet : GC

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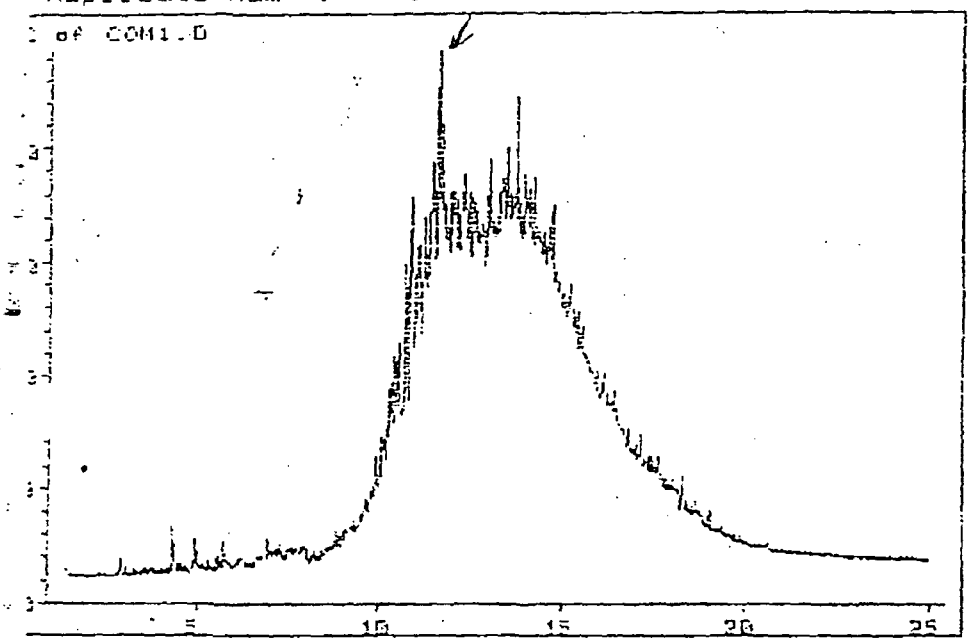
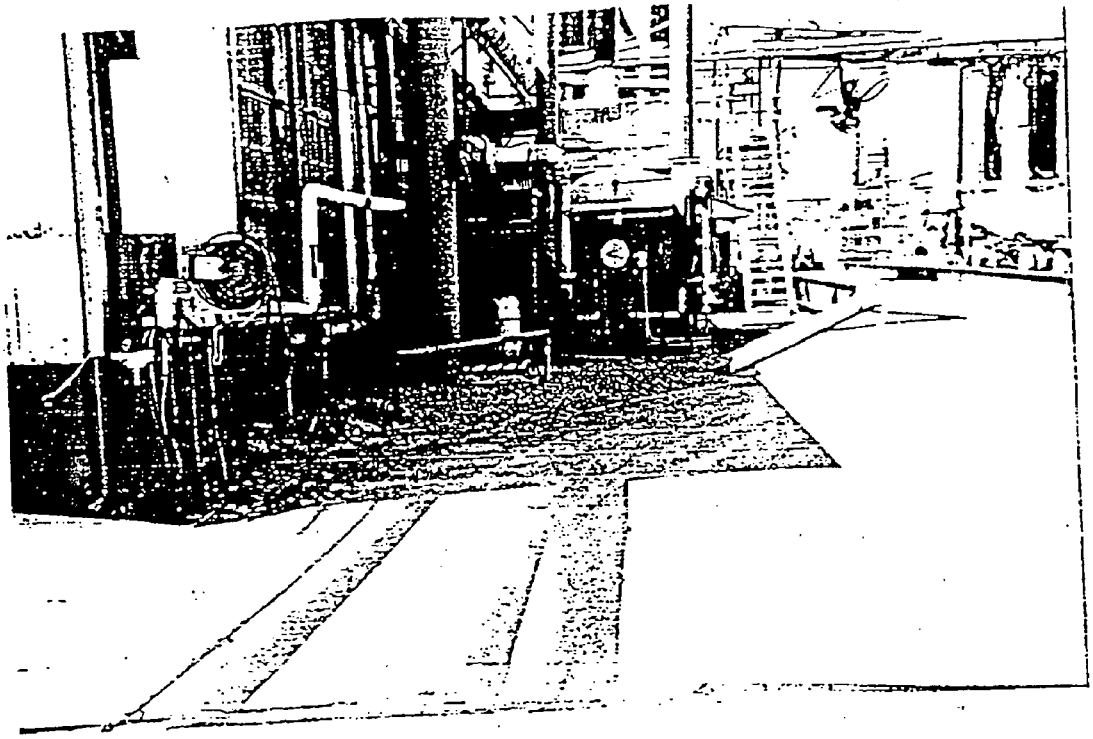
Replicate num : 0

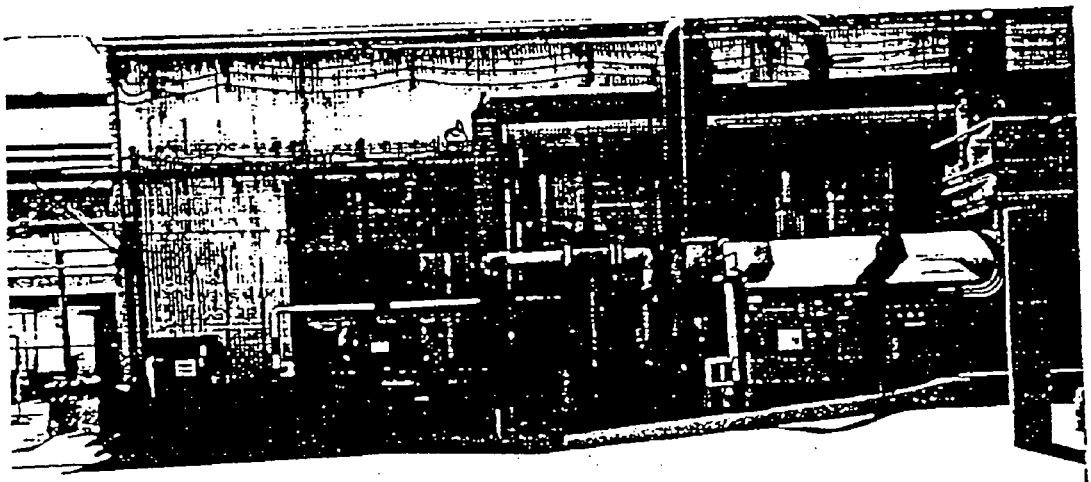


Phenanthrene

SCHN00171890



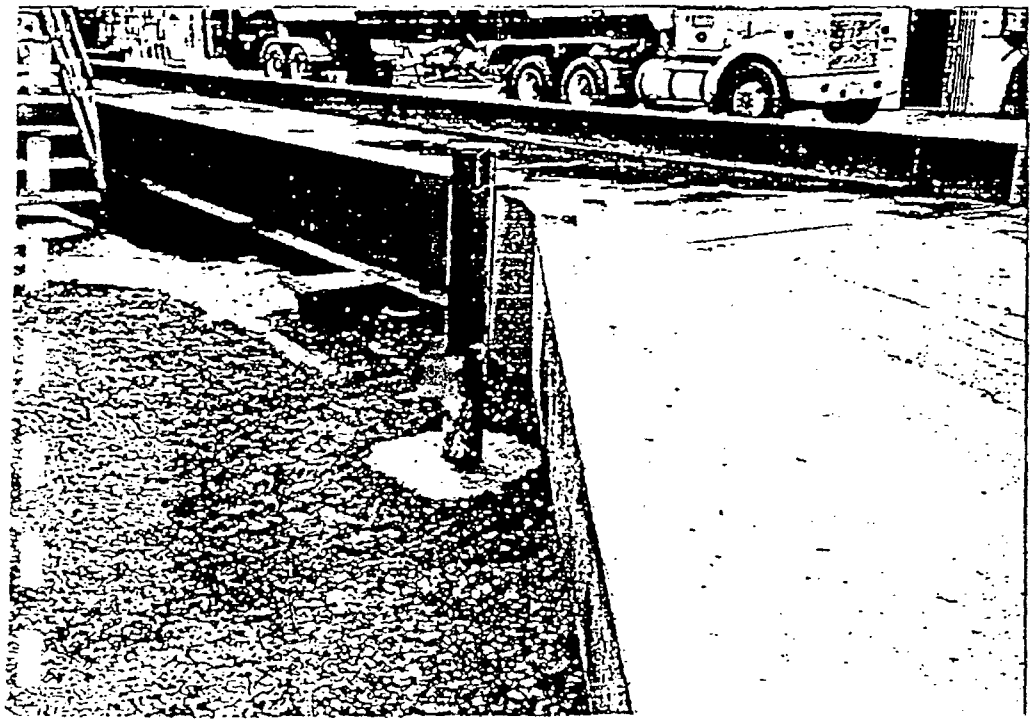
Decommissioning Site



MARINE CHEMIST - CERTIFICATION OF HOT WORK

VACTRUCK REMOVING SLUDGE FROM FUME LINE

SAND PACKING FINISHED



MONITOR WELL #1

Reference 2

GROUNDWATER CONTAMINATION REMEDIAL INVESTIGATION REPORT

SRH ENVIRONMENTAL MANAGEMENT

SCHN00171894

GROUNDWATER CONTAMINATION

REMEDIAL INVESTIGATION

TRUMBULL ASPHALT COMPANY
PORTLAND, OREGON

GROUNDWATER CONTAMINATION

REMEDIAL INVESTIGATION

TRUMBULL ASPHALT COMPANY
PORTLAND, OREGON

August 28, 1989

Prepared For:

Owens-Corning Fiberglas Corporation
Fiberglas Tower
Toledo, Ohio 43659

Prepared By:

SRH Environmental Management
12245 NE Whitaker Way
Portland, Oregon 97230
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SRH PN: 2-2033

SCHN00171896

TABLE OF CONTENTS

1.0 INTERPRETATIONS AND LIMITATIONS 1
- 1.1 Interpretations 1
- 1.2 Limitations 2

2.0 BACKGROUND AND PROJECT SCOPE 2
- 2.1 Background 2
- 2.2 Project Scope 3

3.0 SITE DESCRIPTION 4
- 3.1 Site Location 4
- 3.2 Review of Site Area Contaminant Release Records Check 4

4.0 SOIL GAS SURVEY 5
- 4.1 Introduction 5
- 4.2 Methodology 6
- 4.3 Results 6

5.0 SUBSURFACE INVESTIGATION 7
- 5.1 Introduction 7
- 5.2 Drilling Procedures 8
- 5.3 Monitoring Well Construction 8
- 5.4 Soil Sampling Procedure 8
- 5.5 Water Gauging Procedures 9
- 5.6 Water Sampling Procedures 10

6.0 SUBSURFACE CONDITIONS 10
- 6.1 Geology 10
- 6.2 Hydrogeology 11
  - 6.2.1 Direction and Velocity of Movement 11
  - 6.2.2 Aquifer Characteristics 12

7.0 PRODUCT RECOVERY 12
- 7.1 Recovery Procedure 13
- 7.2 Recovery Results 13

8.0 CONTAMINATION 13
- 8.1 Contaminant Analyses 13
  - 8.1.1 General 13
  - 8.1.2 Analytical Results 14
- 8.2 Contamination Source 16

9.0 CONCLUSION AND RECOMMENDATIONS 17
- 9.1 Conclusion 17
- 9.2 Recommendations 18

APPENDICES

Appendix A - Soil Gas Chromatography Output

Appendix B - Drilling Logs

Appendix C - Laboratory Analytical Data, Chain-of-Custody Documentation, and Chromatograms

1.0 INTERPRETATIONS AND LIMITATIONS

1.1 Interpretations

From review and analysis of the data collected for this study, we have drawn the following interpretations:

1) The drilling and sampling of nine test borings, the installation and sampling of six permanent monitoring wells, and the performance of a soil gas survey for this study all indicate that hydrocarbon contamination exists at the site, but at lower levels of severity than reported in a preliminary study by Crosby and Overton.

2) Concentrations of Total Petroleum Hydrocarbons (TPH) were found to range from 2 parts per million (ppm) to 9350 ppm from soil analyses and 0.20 ppm to 14.8 ppm for water analyses. In addition, the thickness of floating product was found to be 1/8 inch thick in monitoring well MW-3.

3) The results of the soil gas survey indicate moderately high levels of contamination. During the performance of the survey, a second soil gas anomaly of high chromatographic intensity was found to the north of the primary investigation.

4) The actual source of the contamination has not been identified. However, it is strongly suggested by (1) the past history of the site; (2) the distribution of the contamination plume, as currently known from the results of the drilling and the soil gas survey; and (3) the direction of groundwater movement that the source of the contamination is at least, in part, from on-site releases and is most likely from more than one source. The anomaly seen near the wooden office building is probably from the leaking fume line. The anomaly seen under the operating facilities near the southwest corner of the site is probably due to spills over years of operation of the asphalt plant. The source of the anomaly seen near the covered loading dock is unknown due to lack of subsurface data in the area of the anomaly.

5) Shallow groundwater flow under the site is to the east and south, probably under influence of the local recharge area to the west of the site in the West Hills. The actual movement vector may vary during the year, under influence of recharge amounts and possibly the stage of the Willamette River, but it appears to typically be in a generally easterly direction.

6) The subsurface materials beneath the site are relatively consistent from bore hole to bore hole, and were found to be the same as those found during previous work. There is a layer of man-made fill underlain by a layer of old topsoil and an unknown thickness of native sands.

SCHN00171899

In addition to the laboratory analyses described above, Crosby and Overton personnel reported that water samples from their monitoring wells had visual and olfactory indications in the field of floating product up to 12 inches thick on the uppermost groundwater surface.

Crosby and Overton performed an additional fingerprint gas chromatography analysis of the sludge from the fume line and compared it to similar analyses of samples taken from the monitoring wells. It was their conclusion, coupled with what they felt was a northwesterly flow of the groundwater, that the product found in the soil was from a different source than the leaking fume line, and perhaps from a source off of the Trumbull property.

2.2 Project Scope

SRH Environmental Management was retained by Owens-Corning in March of 1989 to perform a site investigation and to recover free product from the groundwater surface. The scope of work was divided into seven tasks, as follows:

- Task 1: Review all of the data generated to date, including local area monitoring well and UST historical records;
- Task 2: Perform a soil gas survey of the suspected area of free product;
- Task 3: Drill three soil borings and construct three monitoring wells as a Phase 1;
- Task 4: Construct an additional three monitoring wells, as a Phase 2, if necessary;
- Task 5: Perform an initial recovery of the free product reported by Crosby and Overton, using the constructed monitoring wells;
- Task 6: Perform laboratory analyses of the recovered soil and water samples; and
- Task 7: Prepare a final report of interpretations and recommendations for further investigations or remediation.

This reports presents the data collected during this study, together with our interpretations and recommendations for further action.

SCHN00171900

is readily identified as having widespread elevated background levels of industrial contaminants in the subsurface soils.

At the present time, no historical background contaminant subsurface data is available to determine contaminant levels surrounding the Trumbull Asphalt Plant.

4.0 SOIL GAS SURVEY

4.1 Introduction

On April 25 and 27, 1989, before test borings were drilled and monitoring wells installed, a 45-point soil gas survey was made to determine the most beneficial locations for the borings and wells and to outline the suspected petroleum product anomalies in the soil.

Personnel from SRH conducted the soil gas survey using a Photovac model 10S55 portable gas chromatograph fitted with a highly sensitive photoionization detector. The soil gas survey provides a rapid and cost effective areal delineation of subsurface contamination and is used to determine if the subsurface is free from contamination or, if contamination is present, to objectively determine appropriate test boring and monitoring-well locations. This reduces the required number of borings, and additional information is gained which provides insight into the appropriate remedial strategies, which are specific for each project site.

In order to effectively address a variety of site characteristics and requirements, SRH Environmental Management has developed a three-level approach to soil gas characterization. The first level, which is the "point source" soil gas survey, encompasses areas immediately around identified potential point source areas. These include areas such as tank pads, product lines, pump islands, turbines, vent lines, etc. This survey does not cover the site perimeter areas or remaining areas located between potential point source areas.

The second level, the "limited scale plume definition" survey, encompasses the point source areas and further defines the extent of the contaminant plume with an additional limited number of sample points. The additional sampling points are placed at a short distance from the identified point sources.

The third level, the "full scale perimeter plume definition" survey, encompasses additional areas including the perimeter of the site and areas throughout the site with detailed plume mapping.

A full scale perimeter plume definition survey was completed at the Trumbull Asphalt facility.

SCHN00171901

4.2 Methodology

Following the site inspection and visual survey, the soil gas sample locations were gridded off on a 20- to 30-foot grid, using site plot plans provided by the client. Three gas probes were made off the site, just to the east of the property boundary near a tank pad.

A rotary-hammer drill and manually operated impact driver were used to prebore 1/2-inch-diameter-by-30-inch-deep probe holes at each of the premarked sample points. A specially constructed 1/4-inch-diameter stainless steel gas sample probe was then driven to a depth of 36 inches at each point and connected, via a Teflon transfer line, to an air sampling control unit. The air sampling unit was programmed to purge the probe, and draw a preset soil vapor sample from the vadose zone. A standardized volume of sample vapor was then drawn with a gas-tight syringe and injected into the chromatograph. The sample chromatograph analytical program, column type, and chromatographic conditions were selected, based on the suspected type and amount of volatile components in the contaminant.

The column separated the volatile organic components sampled from the vadose zone, with the concentration of volatiles measured by the photoionization detector. The result was a chromatographic "fingerprint" of the types and relative concentrations of volatiles present in the soil gas sample.

Air blanks were taken before and after each soil gas sample to eliminate background interferences from volatiles in the ambient air, or traces of residual contamination from previous sampling within the sampling system.

Inspection of the chromatogram allowed the SRH chromatograph analyst to determine: (1) if the soil vapor contained volatile organics; (2) if the volatiles were refined fuels (gasoline, diesel fuel, etc.), crude oils, or specific solvents (benzene, acetone, trichloroethylene); (3) if the hydrocarbons were weathered; (4) if natural biodegradation was occurring; or (5) whether the volatiles were moving with groundwater flow.

As a result of these analyses, areas can generally be described as clean or lightly, moderately, or highly contaminated. Point sources can be located, with the direction of contaminant spread inferred, and groundwater involvement deduced. The soil gas survey, however, does not provide the same level of quantification obtained from direct sampling and analyses of soil and groundwater samples, nor does it define the vertical extent of contamination.

4.3 Results

Copies of the gas chromatography output are presented in Appendix A in the form of chromatographic peaks indicating the soil gas hydrocarbon components and their relative concentrations. An areal map is presented as Figure 2 which shows the locations of each of the soil gas sampling points. Figure 3 indicates the GC response as a volt value

SCHN00171902

recorded at each point. The values were then contoured with lines of equal concentration, which outlines areas with potential subsurface contaminants.

The most prominent feature found during analysis of the Trumbull soil gas map is the presence of a large hydrocarbon anomaly which extends from across the southern property boundary to the north, about one-half of the distance through the site. The area appears to be slightly to moderately contaminated with volatile organic compounds with readings ranging in intensity from low to moderate.

The anomaly extends over a large area, with what appears as possibly two point sources. The first possible point source is in the area of the abandoned fume line, just north and west of the mail office building. This area shows a broad area of moderate concentrations of contaminant without a specific point source identified. The highest value recorded in this anomaly is 6.6 electron volts, recorded at a point just outside the door of the wooden office building.

The second point source is more defined, near the southwest corner of the covered loading dock. This point source shows an anomaly with a maximum recorded concentration of 215 electron volts. This value is fairly significant and typically represents higher levels of contamination.

These two anomalies coalesce into a broad area of anomalous readings that seem to underlie most of the actual asphalt plant operational facilities. The anomaly appears to diminish to the north and east, toward the storage and shipping facilities.

Our subsurface evaluation, reported in Section 5 indicates that the local uppermost groundwater is moving in a generally east to southeast direction. However, the shape of the plume from the point source near the loading dock is elongated in a south and southwestern direction, with perhaps a portion moving toward the east, under the warehouse, where no soil gas points could be obtained. The shape of the plume near the fume line is rather oblate, with no clear movement direction inferred.

The large moderate grade anomaly seen under the asphalt production facilities may be due to normal everyday operations of the plant over the years of operation, with no single large spills or accidents occurring.

5.0 SUBSURFACE INVESTIGATION

5.1 Introduction

Six monitoring wells were installed at the site for this project in two phases on two separate days. Two of the wells, MW-3 and MW-5 were completed with 4-inch I.D. casing. The remaining four wells were completed with 2-inch I.D. casing. In addition to the six monitoring wells, three soils borings were made that were not completed as monitoring wells. All the wells and soil borings were installed and sampled under the

SCHN00171903

direct supervision of SRH geologists and environmental scientists. Logs of all nine wells are presented in Appendix B . The locations of the borings are presented in Figure 4.

5.2 Drilling Procedures

Wells MW-3 and MW-5 were drilled with 6-inch I.D., hollow stem augers. The other four monitoring wells and the three soil borings were drilled with 4-inch I.D., hollow stem augers. All of the borings were drilled using a Central Mining Equipment model 55 drilling machine provided by Geo-Tech Explorations of North Plains, Oregon.

All tools, monitoring equipment, augers, and the drill itself were thoroughly steam-cleaned prior to setting up on each boring location.

The borings were drilled by advancing the augers 5 feet and then conducting a Standard Penetration Test with a stainless steel, 2-inch O.D., split-spoon sampler, or taking a grab sample from the auger flights. The split-spoon sampler is advanced by repeated blows of a standard, 140-pound, pin-guided hammer dropping 30 inches. The number of blows to advance the sampler each 6-inch increment was recorded and the amount required to advance the sampler the final 12 inches is added and called the N-value of the soil. These data were recorded and are presented on the drilling logs in Appendix B.

5.3 Monitoring Well Construction

Under the supervision of SRH personnel, monitoring well materials were carefully steam-cleaned prior to installation in the well. The 2-inch and 4-inch I.D., flush-threaded, machine-slotted, PVC well screens were 10 feet long. The riser pipes, also composed of PVC, were similarly 2-inch and 4-inch I.D. and flush-threaded. No solvents or glues were used at any time during monitoring well construction.

At the completion of the drilling of each well, the well screen was fitted with a bottom cap and lowered into the boring at the bottom of the riser pipe, to the depth specified by the supervising project manager. A plastic and neoprene sanitary seal was set into the top of the monitoring pipe and vented to allow equilibration of the water level with atmospheric pressure. A high grade select sand backfill was then placed from the bottom of the boring to a level of 2 feet above the top of the slotted well screen. A bentonite seal was then placed above the permeable backfill to within a few feet of the surface, and a seal of cement installed to the surface. Locking, flush-mounted steel caps were set in the cement seal to secure the wells against vandalism and potential cross contamination. Well completion specifications are included in the well logs attached as Appendix B. Figure 5 shows a typical construction diagram for monitoring wells.

5.4 Soil Sampling Procedure

Soil samples were logged according to geologic and Unified Soil classification and visual and olfactory indications of contamination by an SRH staff Geologist or Environmental Scientist and placed in plastic Ziploc bags with clear identification. One sample from each boring was split, with one portion placed in a plastic Ziploc bag, and the other portion into

SCHN00171904

TYPICAL WELL CONSTRUCTION DIAGRAM

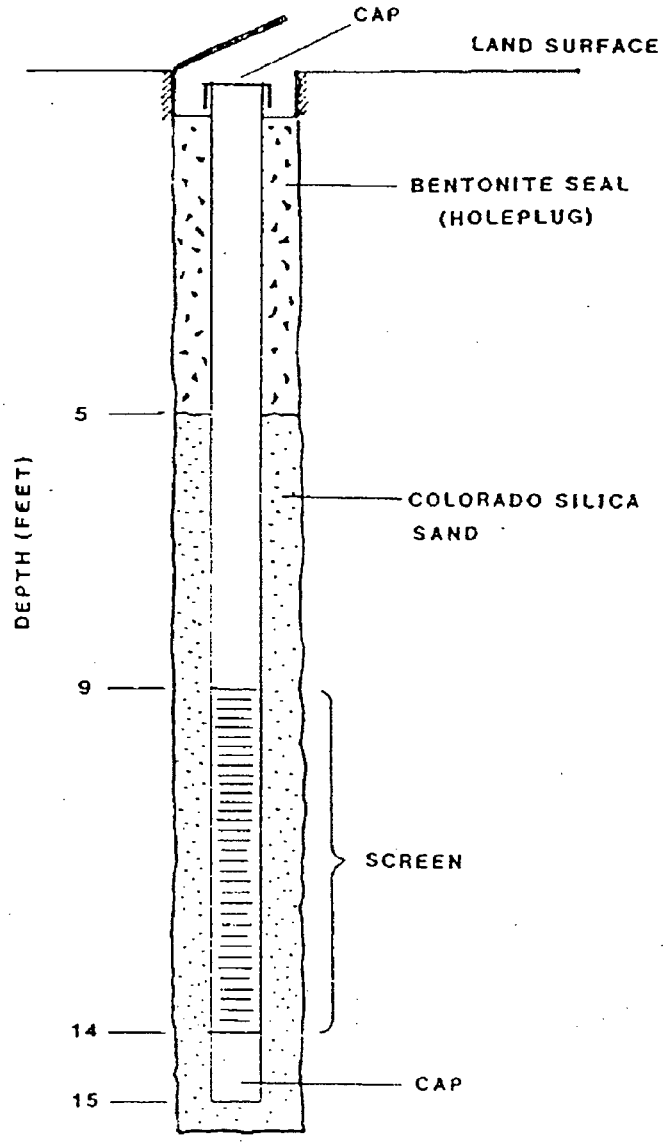


Figure 5.

TABLE 1
GROUNDWATER ELEVATION DATA

WELL NUMBER	DEPTH TO WATER	WELLHEAD ELEV.	WATER ELEV.
MW-1	8.11	100.64	92.53
MW-2	7.19	99.68	92.49
MW-3	7.42	99.88	92.46
MW-4	7.85	100.23	92.38
MW-5	7.58	100.00	92.42
MW-6	7.42	99.92	92.50

* All elevations are measured relative to MW-5 which was arbitrarily picked as elevation 100.00 on June 27, 1989. All measurements are in feet.

5.6 Water Sampling Procedures

A 0.72 meter long, 4.0 cm O.D., 3.2 cm I.D. stainless steel bottom-filling bailer was used to sample the monitoring wells. Prior to insertion into each well, the bailer was thoroughly decontaminated by washing in a trisodium phosphate solution, and then successively rinsed in distilled water and hexane. The bailer was then allowed to air dry before insertion into the monitoring well casing.

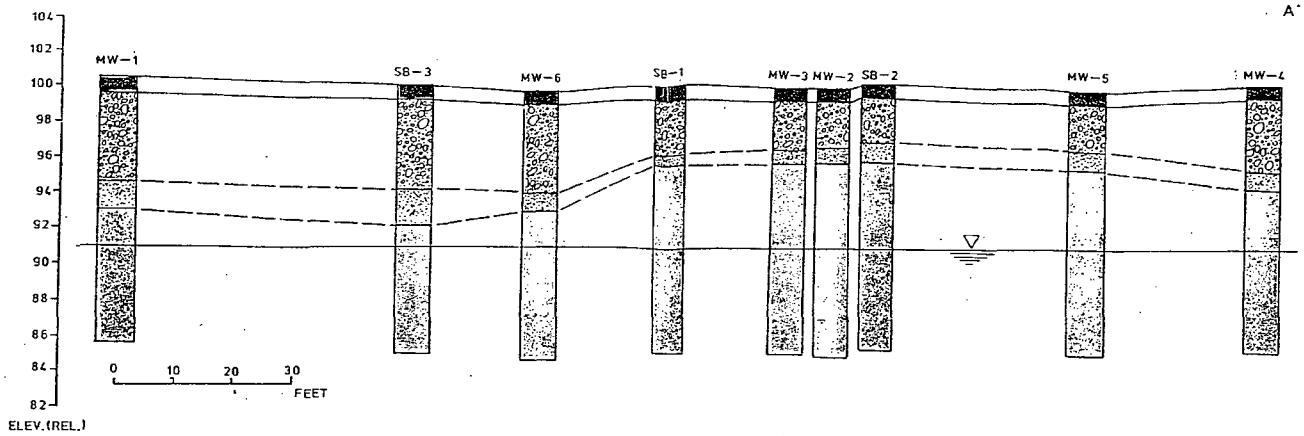
The depth to groundwater and the depth of the monitoring well casing were measured, to allow calculation of the volume of water in the riser pipe and screen. Each well was then bailed sufficiently to evacuate the saturated volume of PVC monitoring casing a minimum of 3 times. A water sample was then collected by transferring the bailer sample into an amber glass, wide-mouth bottle, fitted with a Teflon-lined cap, supplied by a local analytical laboratory. Care was taken to not allow any head space at the top of each bottle. The sample taken for each well was carefully labeled and immediately placed on ice and transferred into the custody of the local laboratory, together with proper chain-of-custody documentation. The chain-of-custody documentation is included in Appendix C of this report.

6.0 SUBSURFACE CONDITIONS

6.1 Geology

The Trumbull Asphalt site is located on a filled area on top of fluvial deposits of the Willamette River flood plain. The area was once occupied by Guild's Lake, which was filled in about 60 years ago to create industrial land.

SCHN00171906



— ASPHALT WITH SUBGRADE

— SILTY SAND (MAN MADE FILL)

— SANDY SILT (OLD TOPSOIL)

— FINE TO MEDIUM SAND

▽ — WATER LEVEL (6-27-89)

MW-1 — MONITORING WELL

SB-1 — SOIL BORING

DATE	8/4/89	SRH GROUP — SRH Environmental Management, 12245 N.E. Whitaker Way Portland, Or 97230	SCALE
PROJECT NO.	1331-1		
DRAWN BY	SMS	TRUMBULL ASPHALT GEOLOGIC CROSS SECTION	FIGURE
APPROVED BY			6

SCHN00171907

8.1.2 Analytical Results

During the drilling of the first three borings (MW-1, MW-2, MW-3), samples of the soils were collected from a depth of 7.5 feet (capillary zone) and analyzed for TPH. The results of these analyses are presented in Table 2. They yielded TPH contents of a low of 11 ppm for MW-2, 3500 ppm for MW-1, and a high of 9350 ppm for MW-3. In addition to the soil samples, waters were sampled for TPH content. These analyses yielded contaminant levels ranging from a low of 2.0 ppm for MW-2, 8.4 ppm for MW-1, and 14.8 ppm for MW-3.

TABLE 2
WATER AND SOIL TPH ANALYSES RESULTS

STATION NO.	MEDIA	SAMPLE NO.	TPH EPA 418-1
SB-1	SOIL	503-1	95
SB-2	"	503-2	580
SB-3	"	503-3	2
MW-1	"	503-4	3500
MW-2	"	503-5	11
MW-3	"	504-6	9350
MW-1	H2O	511-10	8.4
MW-2	"	511-11	2.0
MW-3	"	511-12	14.8
MW-4	SOIL	523-1	17.9
MW-5	"	523-2	8960
MW-6	"	523-3	29.5
MW-4	H2O	530-1	0.20
MW-5	"	530-2	12.4
MW-6	"	530-3	0.92

The relative comparative amounts of TPH were the same for both the waters and the soils, with MW-2 having the lowest amount, and MW-3 having the highest.

Six more borings were then drilled, with three completed as monitoring wells. They were also analyzed for TPH for soils at 7.5 feet (capillary zone) and groundwater. Soil analyses ranged from a low of 2 ppm for SB-3 up to 8960 ppm for MW-5. Water analyses yielded contents ranging from 0.20 ppm for MW-4 to 12.4 for MW-5. The relative comparative TPH contents form hole to hole were identical for both the waters and the soils. MW-4 showed the lowest values, and MW-5 showed the highest values both in soil and water TPH contents.

SCHN00171908

8.2 Contamination Source

In order to determine the source of the contamination found in the subsurface beneath the Trumbull Asphalt plant site, the TPH soil data were plotted on a map of the site and contoured as to areas of equal TPH content. Figure 8 presents this data. The contours seen on the map roughly outline the grosser areas of contamination. Figure 9 indicates the TPH values as analyzed from the groundwater samples.

Two TPH content anomalies are seen, with the water analytical results anomalies being almost identical to those seen from the soil analyses. The locations of the anomalies roughly coincide with those seen from the results of the soil gas survey, though the definition of the anomalies is less defined due to the lower number of sampled points. Drill borings were not placed near the large soil gas anomaly seen near the loading dock, as this was not within the Scope of Services for this investigation.

The first anomaly is located between the wooden office building and the tin building along the southern boundary of the site. This location coincides roughly with the location of the suspected leaking fume line. The amounts of TPH are all well above background and show an anomaly stretched in a generally east-west alignment. The actual shape of the anomaly is undefined due to the lack of sampling points spaced in both an equal east-west and north-south direction. If it is assumed that the abandoned fume line was the source of contamination, the shape and intensity of the anomaly is compatible with the direction of groundwater flow from the fume line.

The second zone of contamination is seen near the operating facilities in the extreme southwest corner of the plant. This anomaly is seen in only one test boring (MW 1). However, it seems to confirm the low-grade ubiquitous TPH anomaly seen under the operating plant from the soil gas data. The amount of TPH from the water analyses, however, is quite low. As with the first anomaly, if it is assumed the low grade contamination observed is from the operation of the plant, the extension of the contaminant plume to the east of the building is compatible with known groundwater flow direction. The source of this soil contamination may be a result of surface soil contaminant spillage from previous years of plant operation.

As described above, a chromatographic fingerprint analysis was made to determine the source of contamination utilizing a comparison of chromatographic data. The data indicates that the fume line distillate sample was very similar to Diesel #2, in terms of retention time and relative peak magnitudes (see Appendix C for chromatogram). However, the Bunker C oil and the sample from MW-3 showed a quite different chromatogram with little similarity to the other sources.

The comparative analyses of representative chromatograms from a water sample from MW-3 to representative chromatograms from the above sources yielded the following interpretations:

1) The MW-3 groundwater sample chromatographic profile indicates a similar pattern to a combination of Diesel #2 and distillate from fume line.

2) The groundwater sample from MW-3 has a different chromatographic profile from the Bunker C oil standard.

The data suggest that at least three soil samples (with highest TPH values) have the same hydrocarbon type identified in the sample from MW-3. On the other hand, the two soil samples with lower TPH values seem to be comparable to fume line oil. Table 4 indicates that two water samples are similar to diesel oil and one is similar to the contaminant from MW-3 (a combination of diesel and fume line oil).

The chromatographic resemblance between the samples and the combination blowing distillate and diesel comparative standards may be the result of the comingling of contaminants from different point source areas. Possible point sources include the fume line blowing distillate, the possible release of diesel (fuel oil #2) from fuel furnace feed lines at the plant, or possibly the on-site migration of contaminants from an off-site location. However, as the groundwater gradient is predominantly to the east and northeast, it seems likely that the origin of the contaminant(s) is from within the plant facility.

An oil sheen was observed prior to well development on MW-1 and MW-3. After six days, no floating oil product was observed in MW-1, but MW-3 still showed about 1/8 inch of product. From the second series of wells, MW-4 never showed floating product nor any odor. The two other wells (MW-5 and MW-6) observed at the time of well development showed minor amounts of floating product. At the time of free product recovery pumping, a slight amount of floating product was observed. The contaminated waters had a brownish color and a petroleum odor.

9.0 CONCLUSION AND RECOMMENDATIONS

9.1 Conclusion

The hydrogeological subsurface investigation at the Owens-Corning Trumbull Asphalt facility in Portland, Oregon indicates the presence of petroleum hydrocarbon contamination in the soils and groundwater.

The affected area is most heavily contaminated in areas to the north and east of a former subsurface fume line. Following the installation of six monitoring/recovery wells, a thin oil sheen was observed in the wells nearest the area near where the old fume line was located.

Groundwater gradient was measured from the static water elevations of the six monitoring wells and was determined to be in a southeasterly direction.

SCHN00171910

Both groundwater and soil analytical results indicate elevated total hydrocarbon contaminant readings; however, the sampled areas were free of the benzene, toluene, and xylene fractions.

A chromatographic fingerprint profile of the contaminated material was compared against three potential point source contaminants (blowing distillate, Bunker C, and diesel) found at the facility. The results indicate a resemblance between the groundwater contaminant and a combination of the diesel and blowing distillate standards, with the diesel indicating a closer chromatographic match. The analytical results suggest the presence of comingling plumes at the site.

The amount of contamination present at the site appears to be much less than that reported in the preliminary Crosby and Overton study.

9.2 Recommendations

SRH Environmental Management recommends that, based on the following hydrogeological observations made as a result of this investigation, the groundwater wells be monitored to determine if groundwater contaminant levels remain constant or lose or gain in concentration over time. The basis for the recommendation is made from the following observations:

1) Characteristics of the contaminated material. The laboratory analysis indicates the absence of BTX fractions. These fractions constitute the primary health hazard concern associated with petroleum hydrocarbon contaminants.

2) All apparent point source leaks associated with the production of contaminants at the plant appear to have been terminated. These include repairs to the new fume line and removal of the old fume line, and the repair of a leaking coupling in a furnace fuel supply line.

3) The contaminated soils have been capped with asphalt throughout the site, thus minimizing the potential for water mediated transport of the contaminated material from soils to the saturated zone.

4) The Trumbull Asphalt facility is situated in a large area which is zoned for industrial land use. The area as a whole has a widespread elevated background groundwater contamination.

5) Little or no free product exists at this time.

To determine if the contamination point sources have been terminated, SRH recommends that the existing six monitoring wells be monitored quarterly for the presence of petroleum hydrocarbons (total of four sampling periods).

APPENDIX A

SOIL GAS CHROMATOGRAPHY OUTPUT

Reference 3

QUARTERLY GROUNDWATER MONITORING REPORTS
TRUMBULL ASPHALT

MAY 1990 - JANUARY 1992

SUMMARY REPORT

FIRST QUARTER GROUNDWATER MONITORING

TRUMBULL ASPHALT PLANT
PORTLAND, OREGON

June 19, 1990

Prepared For:

Owens-Corning Fiberglas Corporation
Fiberglas Tower
Toledo, Ohio 43659

Prepared By:

SRH ENVIRONMENTAL MANAGEMENT
12245 NE Whitaker Way
Portland, Oregon 97230

SRH PN: 2-2033

SUMMARY REPORT

FIRST QUARTER
GROUNDWATER MONITORING

TRUMBULL ASPHALT PLANT
PORTLAND, OREGON

INTRODUCTION

This report presents methodology and results for the First Quarter groundwater monitoring performed by SRH Environmental Management at the Owens-Corning Fiberglas Trumbull Asphalt facility in Portland, Oregon. The monitoring is a part of the recommendations made in the SRH report Groundwater Contamination Remedial Investigation, dated August 28, 1989. Groundwater samples were collected and temperature, pH, and conductivity were measured in the field. Samples were submitted to an off-site laboratory for additional analysis. The following is a synopsis report summarizing the results of the continuing investigation.

WATER MONITORING METHODOLOGY

There are currently six groundwater monitoring wells at the facility. The initial test at each well was to collect a partial bailerful of water and examine it for odor and for the presence of free product on the surface. The bailer was decontaminated prior to sampling prior to sampling of each well.

The depth to water was determined using the wetted tape method with a decontaminated steel tape. Once the depth to water was determined, the volume of standing water in the well was calculated, and then at least three well volumes of water were pumped out. A centrifugal pump was attached to the PVC tubing which was in every well except MW2. The purged water was deposited in the oil/water separator located at the site.

The water samples for laboratory analysis were collected in clean, 1 liter amber glass bottles with Teflon lids, preserved with approximately 5 milliliters of hydrochloric acid, and filled to zero head space to minimize volatilization of hydrocarbon. The samples were then stored in an ice chest at a maximum temperature of 4° Celsius until deposited at an off-site laboratory. All of the samples were delivered to the laboratory the same day they were collected. The samples were analyzed for Total Petroleum Hydrocarbons (TPH) using EPA Method 418.1. After these results were reported, the Department of Environmental Quality (DEQ) Hydrocarbon Scan (HCID - Modified EPA Method 8015) was performed on the sample from MW5.

An additional sample from each well was collected in a small cup for field analysis. pH was measured using a Nurnberg Scientific Portable pH meter. Conductivity and temperature were measured using a YSI Inc. Model 33 S-C-T meter.

The field and laboratory analytical results are presented in Table 1.

GROUNDWATER MONITORING RESULTS

The TPH values have decreased in four of the six wells. There is a slight increase in one well and a significant increase in the remaining well. All of the TPH results, except for

SCHN00171916

TABLE 1
GROUNDWATER MONITORING RESULTS

WELL #	TEMP	pH		TPH (ppm)		COND (uS/cm)		FREE PROD.		SHEEN		ODOR	
		CURR	PREV	CURR	PREV	CURR	PREV	CURR	PREV	CURR	PREV	CURR	PREV
MW1	21	6.2	---	4.6	8.4	365	---	no	---	yes	---	no	---
MW2	22	6.5	---	0.7	2.0	395	---	1/16"	---	yes	---	no	---
MW3	22	6.4	---	8.0	14.8	462	---	no	---	slight	---	no	---
MW4	22	6.0	6.0	<0.2	0.2	290	375	no	no	no	---	no	no
MW5	22	6.0	6.3	180.0	12.4	500	500	1/8"	no	yes	yes	yes	yes
MW6	22	6.2	6.1	1.3	0.92	460	495	no	no	faint	yes	no	yes

SCHN00171917

SUMMARY REPORT

QUARTERLY GROUNDWATER MONITORING

Trumbull Asphalt Plant
Portland, Oregon

SUMMARY REPORT

QUARTERLY GROUNDWATER MONITORING

Trumbull Asphalt Plant
Portland, Oregon

February 15, 1991

Prepared For:

Owens-Corning Fiberglas Corporation
Fiberglas Tower
Toledo, Ohio 43659

Prepared By:

SRH Environmental Management
PO Box 301008
Portland, Oregon 97230

SRH PN: 2-2033

INTRODUCTION

SRH Environmental Management (SRH) was retained by Owens-Corning Fiberglas (OCF) to provide groundwater sampling and testing services of six existing monitoring wells at the Trumbull Asphalt facility located at 3605 NW 35th Avenue in Portland, Oregon.

SRH's work consisted of the following:

- Measurement for free-floating petroleum;
- Measurement of static water level elevation;
- Collection of representative groundwater samples;
- Submittal of groundwater samples to an independent, off-site laboratory for analysis; and
- Preparation of a brief report summarizing sample collection and presenting analytical results.

This report completes that scope of activities. A map showing the locations of the monitoring wells at the Trumbull facility is included as Figure 1.

BACKGROUND

The investigation of the Trumbull Asphalt property, as described herein, follows recommendations for groundwater monitoring made in a previous report prepared by SRH entitled, "Groundwater Contamination Remedial Investigation," dated August 28, 1989.

The groundwater monitoring program was to be completed on a quarterly basis (approximately every three months) over a period of one year. The results of the first quarterly sampling event was described in an SRH report dated June 19, 1990. Due to circumstances beyond SRH's control, the "second quarter" of monitoring, scheduled for Fall 1990 was not completed. The quarterly monitoring activity described herein should be considered the "third quarter" event.

WATER TABLE ELEVATION AND FREE PRODUCT MEASUREMENTS

The depth to water was determined using an electronic water level indicator (except in MW-5, where steel tape measurements were used). To examine for the presence of free-floating petroleum, a stainless steel gauging tape was lowered into each well; hydrocarbon-finding paste and water-finding paste were applied to opposite sides of the tape.

SCHN00171920

Owens-Corning Fiberglas
Trumbull Site
SRH PN: 2-2033

TABLE 1

GROUNDWATER ELEVATION DATA

JANUARY 1991

WELL NO.	WELLHEAD ELEV	DEPTH TO WATER	WATER ELEV
MW-1	100.64	8.33	92.31
MW-2	99.68	7.48	92.20
MW-3	99.88	6.22	93.66
MW-4	100.23	8.05	92.18
MW-5	100.00	---	NA
MW-6	99.92	8.25	91.67

Comments:

1. Elevations are relative to an assumed datum of 100 feet.
2. Due to the presence of free-floating product in MW-5, the static water elevation measurement in this well has an unacceptable error for this purpose.
3. All elevations in feet.

SUMMARY REPORT

QUARTERLY GROUNDWATER MONITORING

Trumbull Asphalt Plant
Portland, Oregon

June 7, 1991

Prepared For:

Owens-Corning Fiberglas Corporation
Fiberglas Tower
Toledo, Ohio 43659

Prepared By:

SRH Environmental Management
PO Box 301008
Portland, Oregon 97230

By:

Jeffrey T. Wallace
Project Manager

Steven E. Locke, PE
Manager, Engineering Services

SRH PN: 2-2033

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GROUNDWATER ELEVATION AND FREE PRODUCT MEASUREMENTS

The depth to water was determined using an electronic water level indicator (except in MW-5 where free-floating hydrocarbon liquid was anticipated). To examine for the presence of free-floating hydrocarbons, an electronic interface probe was used. Table 1 summarizes these measurements.

Changes in the conditions of the subject properties or deviations from the conditions as observed by SRH during the completion of the work described, or changes in applicable environmental regulations may affect the conclusions which may be drawn from these observations and data. Changes, whether they result from natural processes, legislative actions, or the broadening of knowledge, are expected to occur with passage of time.

SCHN00171924

SRH
ENVIRONMENTAL MANAGEMENT

TABLE 1

OWENS–CORNING FIBERGLAS
TRUMBULL ASPHALT PLANT
SRH PN: 2–2033

SUMMARY OF GROUNDWATER ANALYTICAL
AND FIELD DATA FROM MONITORING WELLS

		GROUNDWATER ELEVATION DATA			ANALYTICAL DATA	FIELD OBSERVATIONS
WELL NO.	SAMPLE DATE	WELLHEAD ELEV (a)	WATER DEPTH (b)	WATER ELEV (a)	TPH (c) mg/L	WELL CASING HEADSPACE VAPOR (d)
MW–1	4/23/91	100.64	7.73	92.91	ND	N/A
MW–2	4/23/91	99.68	6.87	92.81	ND	N/A
MW–3	4/23/91	99.88	7.10	92.78	0.7	N/A
MW–4	4/23/91	100.23	7.56	92.67	ND	N/A
MW–5	4/23/91	100.00	(e)	(e)	40	N/A
MW–6	4/23/91	99.92	7.08	92.84	ND	N/A

NOTES:

"ND" – None Detected at Method Detection Limit
"N/A" – Not applicable
"mg/L" – milligrams per liter

(a) Elevations relative to an assumed site datum of 100.00 feet
(b) Depth to water measured from the top of the casing
(c) Total Petroleum Hydrocarbons by EPA Method 418.1
(d) Well casing headspace vapor using a photoionization detector – concentration in Span Gas Equivalent Units
(e) Due to the presence of free–floating hydrocarbons, the static water elevation measurement had an unacceptable error.

SCHN00171925

Columbia Analytical Services inc.

RECEIVED MAY 5 1991

May 2, 1991

Jeff Wallace
SRH Environmental Management
P.O. Box 301008
Portland, OR 97230

Re: SRH PN ~~#2-3049 Project~~ 2-2033

Dear Jeff:

Enclosed are the results of the samples submitted to our lab on April 23, 1991. For your reference, our service request number for this work is K912155.

All analyses were performed in accordance with the laboratory's quality assurance program.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.

Cheryl Noone-Fisher

Cheryl Noone-Fisher
Project Chemist

CNF/mbm

Columbia Analytical Services inc.

2-2033

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

Chain of Custody/ Laboratory Analysis Request

DATE 4/23/91 PAGE 1 OF 1

PROJECT SRH PN # ~~2-3049~~

SEND REPORT TO Jeff Wallace

ADDRESS SRH Group PO Box 301008

TELEPHONE# 503 252-8316 Portland OR

SAMPLERS NAME WH / JH PHONE#

SAMPLERS SIGNATURE J. Heydarpour

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	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, SO4, PO4, F, Br NO3, NO2, (Circle)	NH3-N, COD, Total-P, TKN (Circle)	Coliform (Circle) Total, Fecal	TPH-HC ID			NUMBER OF CONTAINERS
1. MW1/0423/1	4/23			GW								X									X			1
2. MW2/0423/2												X									X			1
3. MW3/0423/3												X									X			1
4. MW4/0423/4												X									X			1
5. MW5/0423/5												X									X			1
6. MW6/0423/6												X									X			1
7.																								
8.																								

Relinquished By	Relinquished By	Invoice Information:	Project Information	Sample Receipt
Jalal Heydarpour	Mike Custer	P.O.#	Site Contact:	Shipped Via:
Signature J. Heydarpour	Signature Mike Custer	Bill to:		Seals Intact:
Printed Name	Printed Name CAS		Site Address:	Condition:
Firm SRH	Firm 4-23-91 18:00			
Date/Time 4/23/91 17:10	Date/Time			Lab No.
Received By: Mike Custer	Received By:	Special Instruction/Comments:		SR Number:
Signature Mike Custer	Signature Lance Jordin	Cancel TPH-HC ID per Jeff Wallace 4/24/91		
Printed Name CAS	Printed Name Lance Jordin			
Firm 4-23-91 17:15	Firm CAS			
Date/Time	Date/Time 4/23/91			

SCHN00171927

SUMMARY REPORT
QUARTERLY GROUNDWATER MONITORING

Trumbull Asphalt Plant
Portland, Oregon

August 23, 1991

SUMMARY REPORT

QUARTERLY GROUNDWATER MONITORING

Trumbull Asphalt Plant
Portland, Oregon

August 23, 1991

Prepared For:

Owens-Corning Fiberglas Corporation
Fiberglas Tower
Toledo, Ohio 43659

Prepared By:

SRH Environmental Management
PO Box 301008
Portland, Oregon 97230

By:

Jeffrey T. Wallace
Project Manager/Geologist

Steven E. Locke, P.E.
Manager, Engineering Services

SRH PN: 2-2033

INTRODUCTION

SRH Environmental Management (SRH) was retained by Owens-Corning Fiberglas Corporation (OCF) to provide groundwater sampling and testing services for six existing monitoring wells at the Trumbull Asphalt facility located at 3605 NW 35th Avenue in Portland, Oregon.

SRH's work consisted of the following:

- Measurement for free-floating petroleum.
- Measurement of static water level elevation.
- Collection of representative groundwater samples.
- Submittal of groundwater samples to an independent, off-site laboratory for analysis.
- Preparation of a brief report summarizing sample collection and presenting analytical results.

This report completes that scope of activities. A map showing the locations of the monitoring wells at the Trumbull facility is included as Figure 1.

BACKGROUND

The investigation of the Trumbull Asphalt property, as described herein, follows recommendations for groundwater monitoring made in a previous report prepared by SRH entitled, "Groundwater Contamination Remedial Investigation," dated August 28, 1989.

The groundwater monitoring at the Trumbull site has been completed on a quarterly basis (approximately every three months) for the past approximately one year. During the past year, all wells have shown hydrocarbons present above laboratory detection limits, except MW-2. Total petroleum hydrocarbon concentrations in the wells have generally been below 5 mg/L, except in MW-5, where free-phase (floating) hydrocarbons have been measured during each monitoring event.

In April 1991, a bail-down test was attempted of MW-5 to determine if a sufficient thickness of floating hydrocarbon liquid was present to warrant a free-product recovery system. Details of these activities were summarized in SRH correspondence dated April 19, 1991. Based on that work, it was concluded that the implementation of a permanent free-product recovery system was not appropriate; however, recommendations for regular examination of MW-5 for the presence of hydrocarbons (and product removal, if observed) were made.

LIMITATIONS

The observations, interpretations, and conclusions presented in this report are professional opinions based on the observations and data described herein.

Changes in the conditions of the subject properties or deviations from the conditions as observed by SRH during the completion of the work described, or changes in applicable environmental regulations may affect the conclusions which may be drawn from these observations and data. Changes, whether they result from natural processes, legislative actions, or the broadening of knowledge, are expected to occur with passage of time.

SCHN00171931

RECEIVED AUG - 8 1991

Report Date: August 6, 1991
Job#: GE-910726AC-6
PO#: 06-1859
Project#: ~~2-3049~~ 2-2033
Project: Trumbull Asphalt

Attention: Jeff Wallace
SRH Environmental Management
P.O. Box 301008
Portland, OR 97230

SAMPLE INFORMATION:
Date Samples Were Received By Laboratory: 07/26/91

Lab No.	Field Identification	Sample Matrix	Date	Time
1	2033-MW 1	Ground Water	07/26/91	12:15
2	2033-MW 2	Ground Water	07/26/91	11:15
3	2033-MW 3	Ground Water	07/26/91	13:40
4	2033-MW 4	Ground Water	07/26/91	10:50
5	2033-MW 5	Ground Water	07/26/91	14:20
6	2033-MW 6	Ground Water	07/26/91	12:00

ANALYTICAL RESULTS:

Analysis Performed: Total Petroleum Hydrocarbons in water, by EPA Method 418.1.

SAMPLE ID	SAMPLE RESULT
2033-MW 1	1.3
2033-MW 2	ND
2033-MW 3	3.5
2033-MW 4	0.6
2033-MW 5	160
2033-MW 6	1.0

Detection Limit: 0.6 mg/L

Results expressed as mg/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

Sincerely,

Rence Chauvin
Technical Director

RJC/lws

This report is for the sole and exclusive use of the above-named client. Samples are retained 15 days from the report date, or until holding time expires. Results pertain only to samples submitted.

COFFEY LABORATORIES, INC.
12420 N.E. Whitaker Way • Portland, OR • 97230 • (503) 254-1794 • FAX (503) 254-1452

SEACOR

January 27, 1992

Mr. Dave Crowle
Owens-Corning Fiberglas Corporation
Fiberglas Tower
Toledo, Ohio 43659

RE: Status Report on Additional Groundwater Monitoring
Trumbull Asphalt, Portland, Oregon
SEACOR PN: F0010-002-01

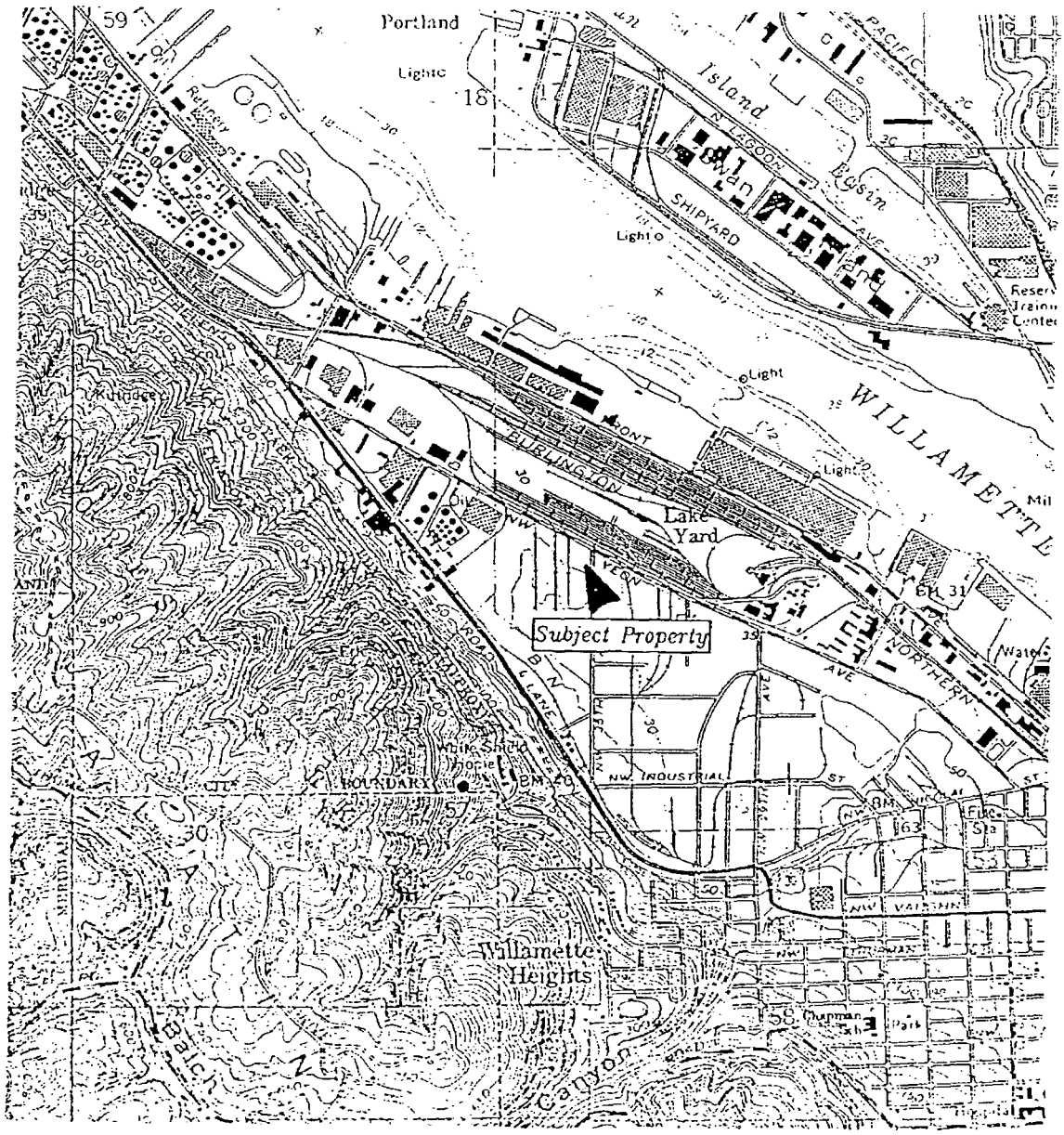
Mr. Crowle:

This letter report presents results of groundwater depth measurements and laboratory analyses of groundwater samples that Science & Engineering Analysis Corporation (SEACOR) collected from monitoring wells at the above-referenced site. The site is located at 3605 NW 35th Avenue in Portland, Oregon. The approximate location of the site is shown on the Site Location Map (Figure 1). The groundwater samples were collected and analyzed as part of an ongoing quarterly monitoring project. The project includes quarterly site visits to make field observations of groundwater conditions and collect ground-water samples and submit samples for total petroleum hydrocarbon analyses. Approximate location of the groundwater monitoring wells and other pertinent site features are shown on the Site Plan/Well Location Map (Figure 2).

Background

In April and May of 1989, SRH Environmental Management (SRH) conducted a groundwater contamination remedial investigation at the site. During this investigation, SRH conducted a 45-point soil gas survey, directed the drilling of nine soil borings and the conversion of six of the soil borings into groundwater monitoring wells, and collected groundwater samples. Results of this investigation indicated the presence of petroleum hydrocarbon contamination in the soils and groundwater beneath the site. The affected area is most heavily contaminated in areas to the north and east of a former subsurface fuel line. Results of a chromatographic fingerprint profile of the contaminated material suggested the contamination at the site was due to a release of diesel and/or blowing distillate. Details of this investigation are described in SRH's report entitled, "Groundwater Contamination Remedial Investigation," dated August 28, 1989.

10950 SW 5th Street
Suite 310
Beaverton, OR 97005
(503) 520-1433
(503) 520-1543 FAX



REFERENCE: USGS 7.5X15 MINUTE QUADRANGLE, PORTLAND, OREGON (1977)

SCALE 1:24,000

1 ½ 0 1 MILE

1,000 2,000 3,000 4,000 5,000 6,000 7,000 FEET

N

SEACOR

10950 S.W. 5th Street
Suite 310
Beaverton, Or. 97005

DWN S. SPENCER
APPR
DATE 1/15/92
JOB# F0010-002-02

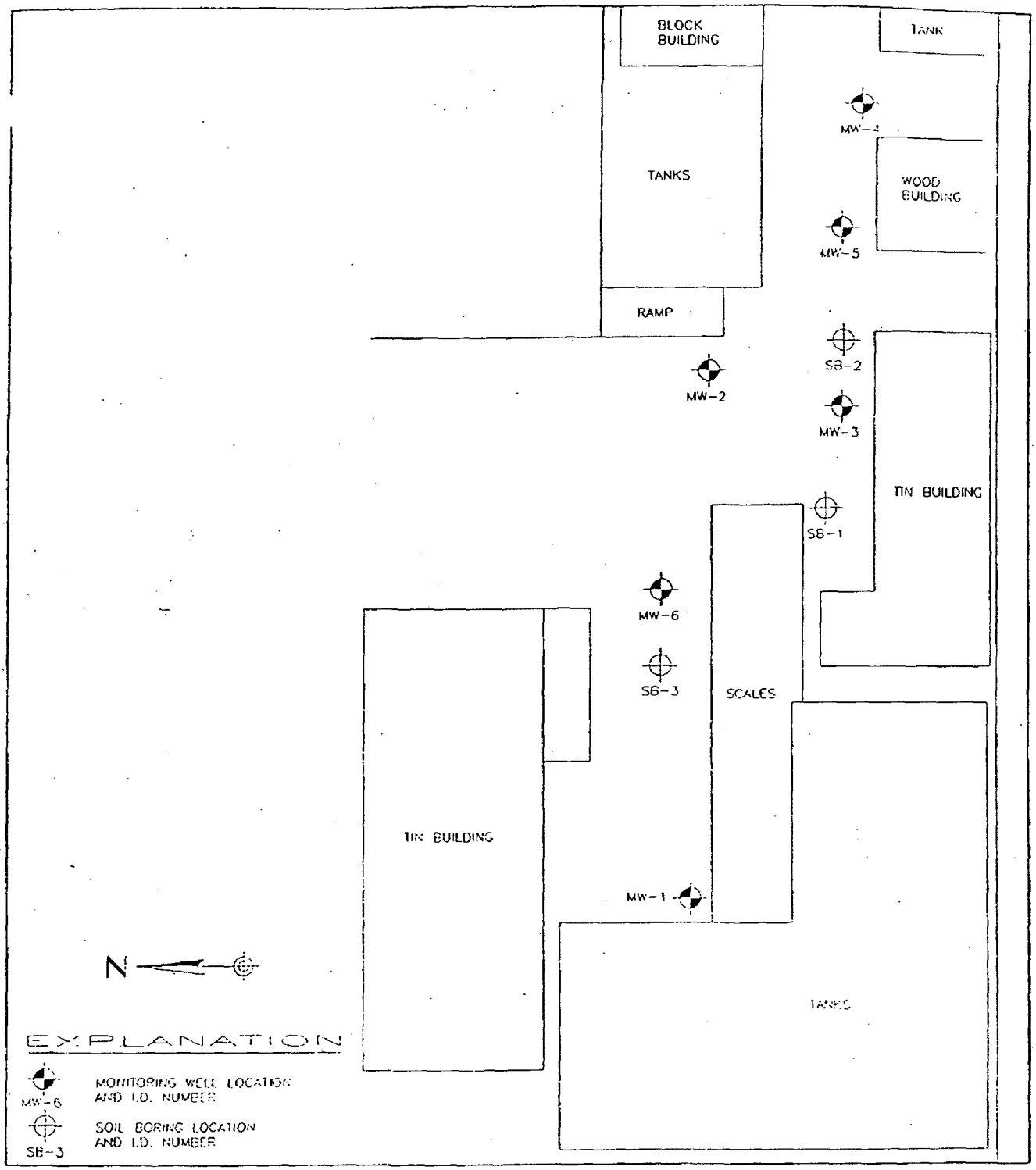
FIGURE NO. 01

SITE LOCATION MAP

TRUMBULL ASPHALT
PORTLAND, OREGON

EP003102.DWG

SCHN00171934



SEACOR

10950 S.W. 5th Street
Suite 310
Beaverton, Or. 97005

DWN S. SPENCER
APPR
DATE 1/15/92
JOB# F0010-002-02

FIGURE NO. 02

GENERALIZED SITE MAP

TRUMBALL ASPHALT
PORTLAND, OREGON

F001002.DWG

SCHN00171935

Recommendations of this report included quarterly groundwater monitoring of the wells at the site.

Subsequent to SRH's Groundwater Contamination Remedial Investigation Report, four groundwater monitoring events were completed at the Trumbull site over the past 1-1/2 years. During this time, all wells exhibited hydrocarbons present above laboratory detection limits, except MW-2. Total petroleum hydrocarbon concentrations in the wells have generally been below 5 milligrams per liter (mg/L), except in MW-5, where free-phase (floating) hydrocarbons have been measured during each monitoring event.

Details of the previous groundwater monitoring events are included in SRH's Quarterly Groundwater Monitoring Reports, dated June 19, 1990, February 15, 1991, June 7, 1991, and August 23, 1991. In each of these previous rounds of quarterly monitoring, groundwater elevations were measured and groundwater samples collected in each of the six existing groundwater monitoring wells on site. Groundwater samples were submitted to an off-site laboratory for total petroleum hydrocarbons (TPH) analyses according to Environmental Protection Agency (EPA) Method 418.1.

In April 1991, a bail-down test was attempted of MW-5 to determine if a sufficient thickness of floating hydrocarbon liquid was present to warrant a free-product recovery system. Based on the results of the bail-down test, thickness of free-product in the wells is not substantial enough to warrant the implementation of a permanent free-product recovery system; however, recommendations for regular examination of MW-5 for the presence of hydrocarbons (and product removal, if observed) were made. Details of these activities were summarized in SRH correspondence dated April 19, 1991.

Field Activities (Current Phase)

On January 10, 1992, as part of the current phase of this project, a SEACOR geologist measured static water levels from MW-1 to MW-6. Depths from the top of the well casings to the static water levels were measured to the nearest 0.01 foot with an electric water-level indicator. The static water levels measured during this phase and the calculated relative groundwater elevations are listed in Table 1.

Subsequent to measuring water levels, the geologist used a dedicated disposable polyethylene bailer to collect a sample of groundwater from each well for subjective analysis. The field geologist observed floating product in MW-5. Thickness of the product in the bailer was approximately 0.2 feet.

Table 1. Summary of Groundwater Elevations
Owens-Corning Fiberglas, Trumbull Asphalt

Well No.	TOC[a] Elevation	Static Water Level (feet)	Groundwater Elevation (feet)[b]
MW-1	100.64	8.2	92.44
MW-2	99.68	7.3	92.38
MW-3	99.88	7.59	92.29
MW-4	100.23	8.0	92.23
MW-5	100.00	7.9	—[c]
MW-6	99.92	7.6	92.32

[a] Top of casing.
[b] Relative elevation when instrument station is assigned arbitrary elevation of 100 feet.
[c] Groundwater elevation influenced due to floating product in well.

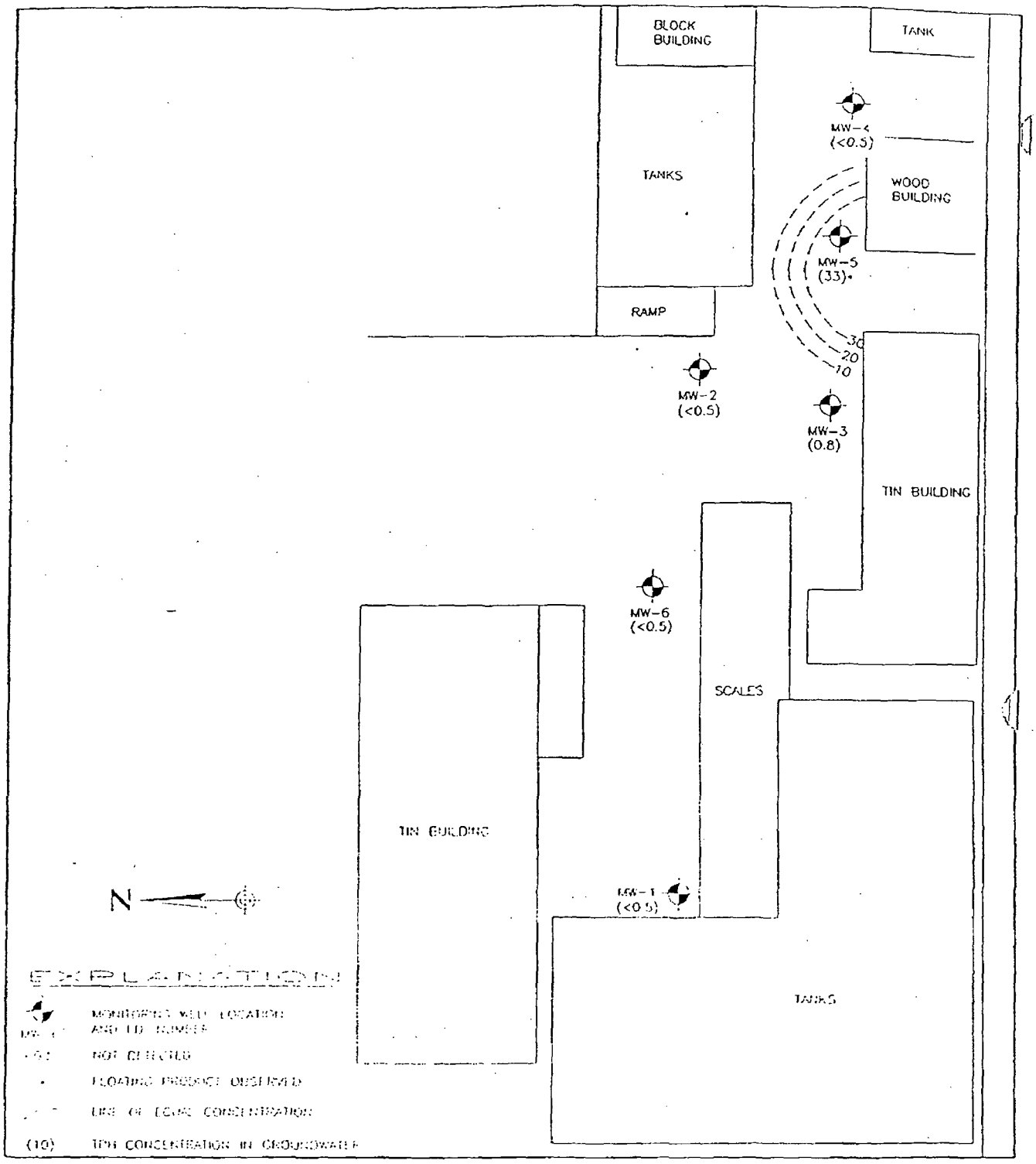
As part of the groundwater monitoring project, the geologist then purged the wells of approximately three well volumes of water. During the sampling event, an apparent hydrocarbon sheen was observed on the water purged from MW-3.

Following the purge period and after the water levels in the wells recovered to at least 85% of static conditions, the geologist collected water samples from each well with a dedicated disposable polyethylene bailer. The water samples were stored in laboratory-cleaned 1-liter amber glass bottles. Hydrochloric acid was added to the vials prior to sampling as a preservative for the groundwater sample. The vials were filled to capacity with zero headspace to prevent volatilization in the sample vials. The geologist initiated a chain-of-custody record in the field and the record accompanied the samples to the laboratory. A copy of the chain-of-custody record for the groundwater samples is included as Attachment 1.

Each sample bottle was sealed with a Teflon-lined cap, labeled, and placed on ice for transport to Pacific Environmental Laboratory, Inc. of Beaverton, Oregon. Water samples were analyzed for TPH by EPA Method 418.1.

Groundwater Sample Analytical Results (Current Phase)

Results of laboratory analyses of the groundwater samples collected during the current monitoring event indicated concentrations of TPH ranging from 0.8 to 35 mg/L in MW-3 and MW-5, respectively. Results of laboratory analysis of groundwater samples collected from MW-1, MW-2, MW-4, and MW-6 indicated no detectable concentrations of TPH. Results of laboratory analyses of the current sampling are presented in Table 2 and are shown on the TPH Concentration Map (Figure 3). A copy of the laboratory test report is included as Attachment 2.



SEACOR

10950 S.W. 5th Street
Suite 310
Beaverton, Or. 97005

DWN S. SPENCER
APPR
DATE 1/15/92
JOB # F0010-002-02

FIGURE NO. 03

TPH CONCENTRATION MAP

TRUMBALL ASPHALT
PORTLAND, OREGON

SCHN00171938

Table 2. Groundwater Analytical Results Summary
Owens-Corning Fiberglas, Trumbull Asphalt

Sample I.D.	Well No.	Total Petroleum Hydrocarbons[a]
101	MW-1	<0.5[c]
102	MW-2	<0.5
103	MW-3	0.8
104	MW-4	<0.5
105	MW-5	33
106	MW-6	<0.5
107	MW-5[b]	35
108	Field Blank	<0.5

[a] EPA Method 418.1, concentration in milligrams per liter.
[b] Duplicate sample.
[c] Not detected, less than method detection limit.

Groundwater Gradient and Flow Direction

Based on groundwater elevations collected on January 10, 1991, groundwater gradient beneath the site is approximately 0.003 (or 0.3 feet vertical for every 100 feet horizontal) with an inferred flow direction to the ~~east.~~ Groundwater elevations, contours of equal elevations, and inferred flow direction arrow are shown on the Groundwater Gradient Map (Figure 4).

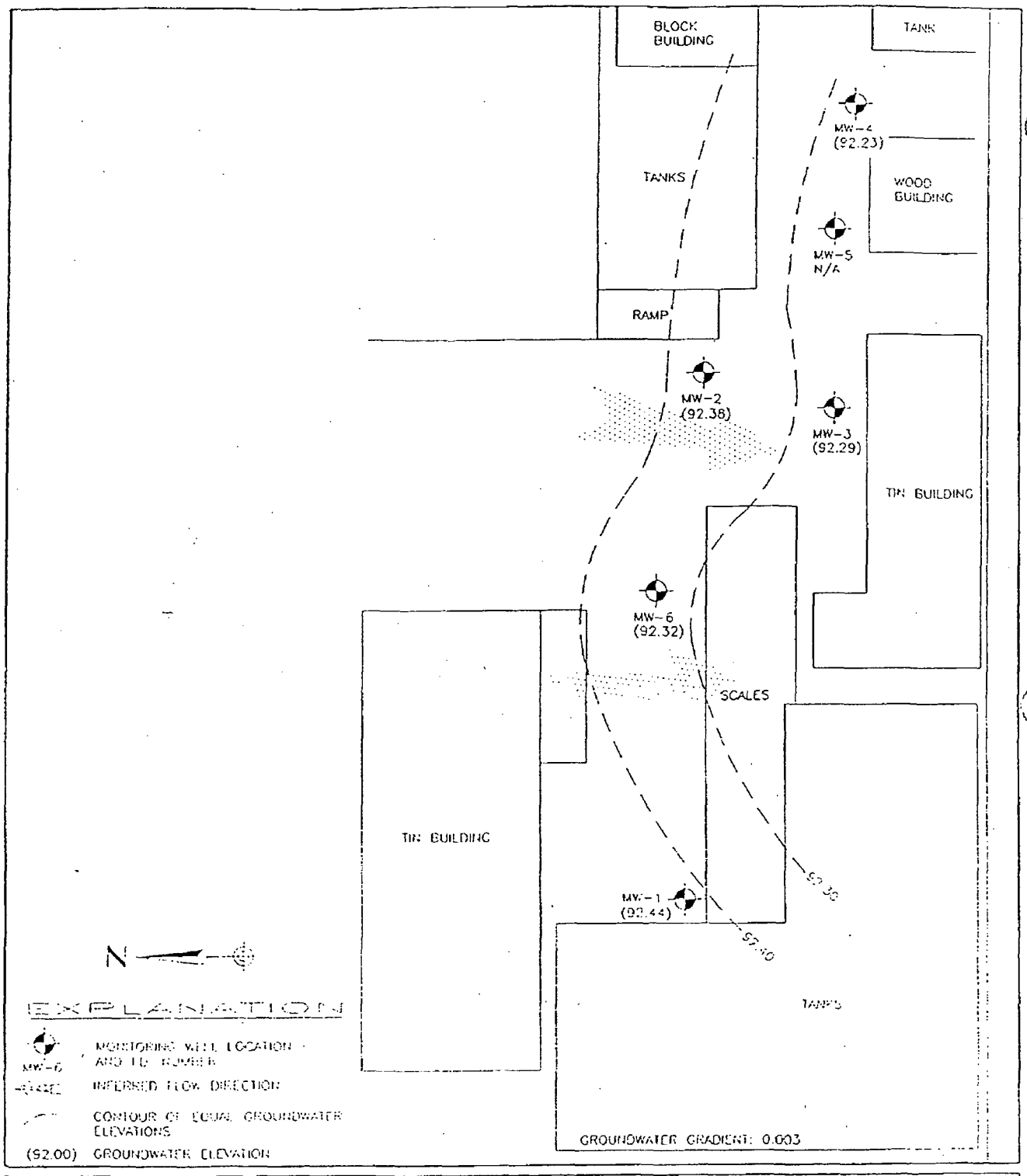
If you have questions about this letter report, I can be contacted at (503) 520-1433.

Sincerely,
Science & Engineering Analysis Corporation

Mark A. Trewartha
Associate Geologist

MAT:lew

cc: Mr. Andree Pollock, DEQ Northwest Region



SEACOR

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Beaverton, Or. 97005

DWN S. SPENCER
APPR
DATE 1/15/92
JOB# F0010-002-02

FIGURE NO. 04

GROUNDWATER GRADIENT MAP

TRUMBALL ASPHALT
PORTLAND, OREGON

F001003.DWG

SCHN00171940

SEACOR
Science & Engineering Analysis Corporation

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
JAN 21 1993
NORTHWEST REGION

January 19, 1993

Mr. Dave Crowle
Owens-Corning Corporation
Fiberglas Tower
Toledo, Ohio 43659

RE: Status Report on Quarterly Groundwater Monitoring
Trumbull Asphalt, Portland, Oregon
SEACOR PN: F0059-001-02

Dear Mr. Crowle:

This letter report presents results of groundwater depth measurements and laboratory analyses of groundwater samples which Science & Engineering Analysis Corporation (SEACOR) collected from monitoring wells at the Trumbull Asphalt site. The site is located at 3605 NW 35th Avenue in Portland, Oregon. The approximate location of the site is shown on the Site Location Map (Figure 1). The groundwater samples were collected and analyzed as part of an ongoing quarterly monitoring project. The project includes quarterly site visits to make field observations of groundwater conditions and collect groundwater samples and submit samples for total petroleum hydrocarbon analyses. Approximate location of the groundwater monitoring wells and other pertinent site features are shown on the Site Plan/Well Location Map (Figure 2).

Background

In April and May of 1989, SRH Environmental Management (SRH) conducted a groundwater contamination remedial investigation at the site. During this investigation, SRH conducted a 45-point soil gas survey, observed the drilling of nine soil borings and the conversion of six of the soil borings into groundwater monitoring wells, and collected soil and groundwater samples. Results of this investigation indicated the presence of petroleum hydrocarbon contamination in the soil and groundwater beneath the site. Details of this investigation are described in SRH's report entitled, "Groundwater Contamination Remedial Investigation," dated August 28, 1989. Recommendations of this report included quarterly groundwater monitoring of the wells at the site.

Subsequent to SRH's Groundwater Contamination Remedial Investigation Report, five additional groundwater monitoring events were completed at the Trumbull site since 1989. During this time, all well samples exhibited hydrocarbons above laboratory detection limits, except the sample collected from MW-2. Total petroleum hydrocarbon (TPH) concentrations in the wells have generally been below 5 milligrams per liter

7014 S.W. Mohawk Street, P.O. Box 1508, Tualatin, OR 97062-1508 (503) 691-2030 Ph (503) 692-7074 Fax

SCHN00171941

(mg/L), except in MW-5. Free-phase (floating) hydrocarbons have been measured in MW-5. Details of the previous groundwater monitoring events are included in SRH's and SEACOR's Quarterly Groundwater Monitoring Reports.

In April 1991, two bail-drawdown tests were conducted in MW-5 to determine if a sufficient thickness of floating hydrocarbon product was present to warrant a free-product recovery system. Based on the results of the bail-drawdown tests, recovery of free product in the wells is not substantial enough to warrant the installation of a permanent free-product recovery system. Details of these activities were summarized in SRH correspondence dated April 19, 1991.

Field Activities (Current Phase)

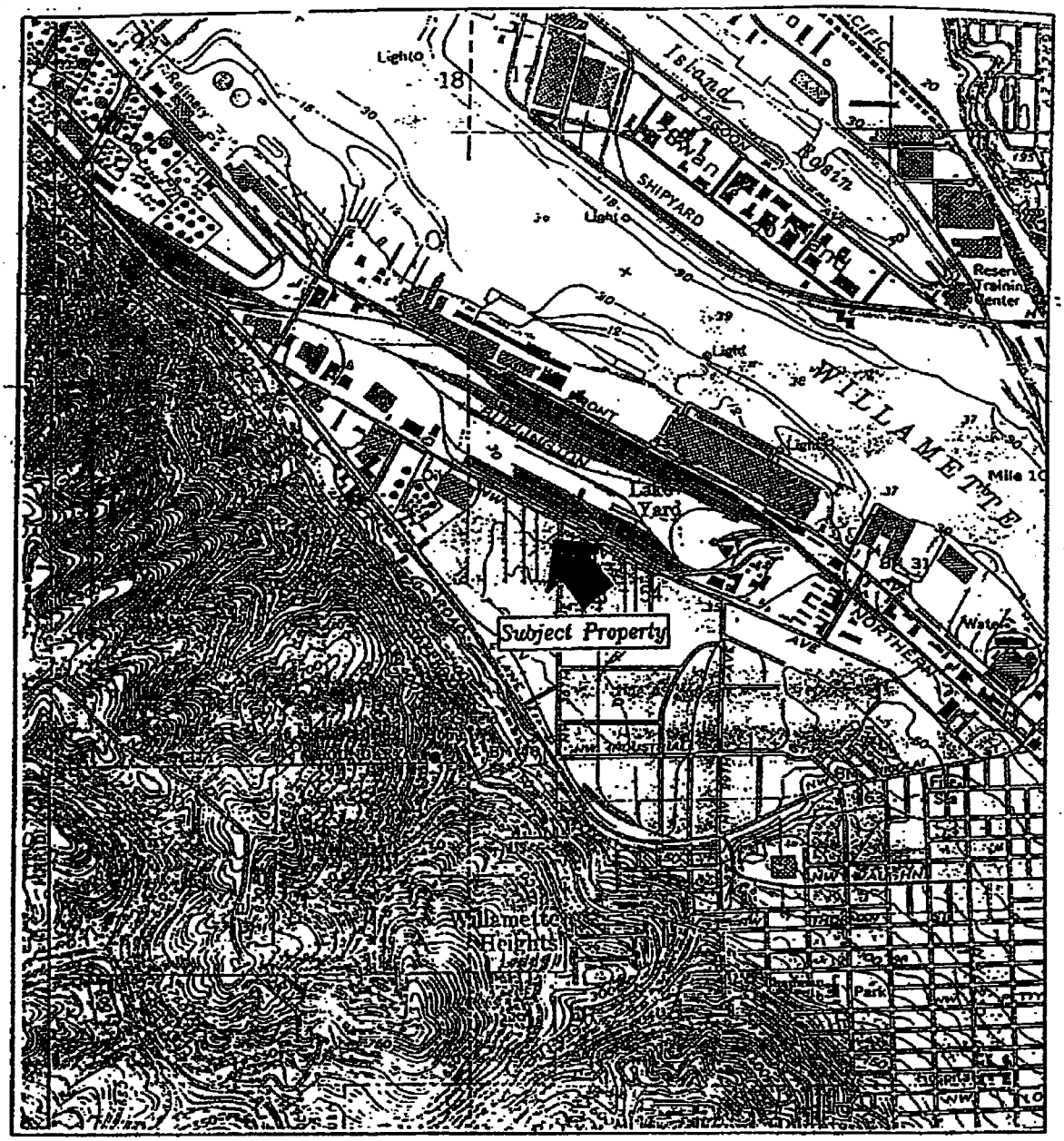
On December 10, 1992, as part of the current phase of this project, a SEACOR geologist measured static water levels from MW-1 through MW-6. Depths from the top of the well casings to the static water levels were measured to the nearest 0.01 foot with an electric water-level indicator. The static water levels measured during this phase and the calculated relative groundwater elevations are listed in Table 1.

Subsequent to measuring water levels, the geologist used a dedicated disposable polyethylene bailer to collect a sample of groundwater from each well for subjective analysis. The field geologist observed floating product in MW-5. Thickness of the floating product in MW-5 during field activities ranged from a sheen to approximately 0.25 inches.

As part of the groundwater monitoring project, the geologist then purged the wells of approximately three well volumes of water. Following the purge period and after the water levels in the wells recovered to at least 85% of static conditions, the geologist collected water samples from each well with a dedicated disposable polyethylene bailer. The water samples were stored in laboratory-cleaned 1-liter amber glass bottles and 40-milliliter glass vials. Hydrochloric acid was added to the vials prior to sampling as a preservative for the groundwater sample. The vials were filled to capacity with zero headspace to prevent volatilization in the sample vials. The geologist initiated a chain-of-custody record in the field and the record accompanied the samples to the laboratory.

A copy of the chain-of-custody record for the groundwater samples is included as Attachment 1.

SCHN00171942

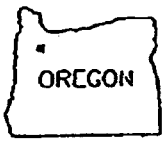


REFERENCE: USGS 7.5X15 MINUTE QUADRANGLE, PORTLAND, OREGON (1977)

SCALE 1:24,000

1 1/2 0 1 MILE

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 FEET

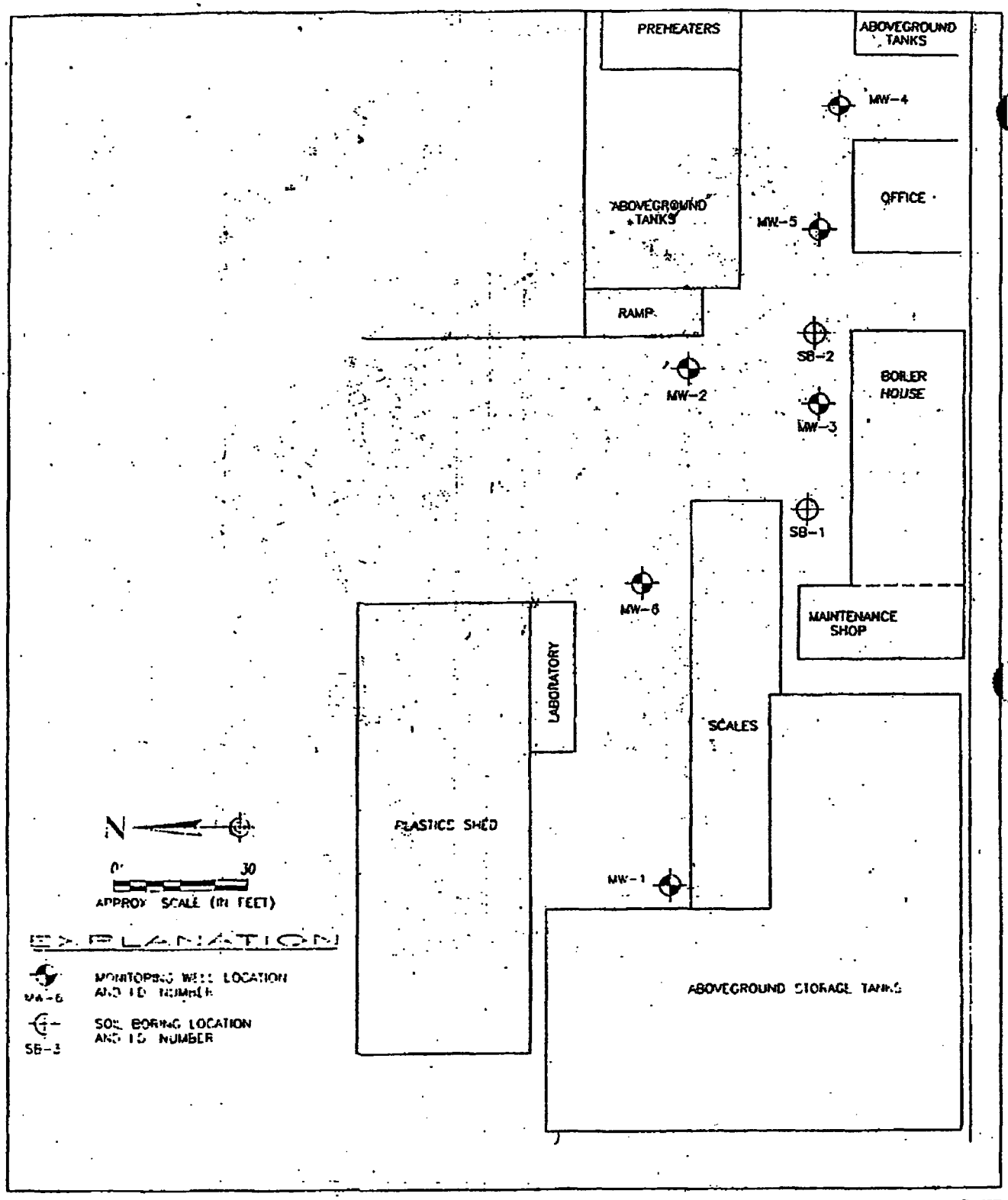


QUADRANGLE LOCATION

SEACOR 7614 S.W. Mohawk Street Tualatin, OR 97062	DRAWN BY: S. SPENCER APPROVED BY: MAK DATE: 01/15/92 JOB NO.: F0059-001-02	SITE LOCATION MAP TRUMBULL ASPHALT PORTLAND, OREGON	FIGURE 1

LOC-1.DWG

SCHN00171943



SEACOR 7614 S.W. Mohawk Street Tualatin, OR 97062	DRAWN BY S. SPENCER APPROVED BY: DATE 12/29/92 JOB NO. F0059-001-02	SITE PLAN AND WELL LOCATION MAP TRUMBULL ASPHALT PORTLAND, OREGON	FIGURE 2

F001003.DWG

SCHN00171944

Each sample bottle was sealed with a Teflon-lined cap, labeled, and placed on ice for transport to Pacific Environmental Laboratory, Inc. (PEL) in Beaverton, Oregon. Water samples were analyzed for TPH by Department of Environmental Quality (DEQ) Method TPH 418.1.

Groundwater Sample Analytical Results (Current Phase)

Results of laboratory analyses of the groundwater samples collected during the current monitoring event indicated concentrations of TPH ranging from nondetectable to 18 milligrams per liter (mg/L). Results of laboratory analysis of groundwater samples collected from MW-4 and MW-6 indicated no detectable concentrations of TPH. Highest concentrations of TPH were identified in the water sample collected from MW-5. Results of laboratory analysis of groundwater samples collected during the current phase monitoring event are consistent with results of laboratory analysis of previous monitoring events. Results of the current sampling event are presented in Table 2. A copy of the laboratory test report from the current sampling event are included as Attachment 2.

Groundwater Gradient and Flow Direction

Based on groundwater elevations collected on December 10, 1992, groundwater gradient beneath the site is approximately 0.001 (or 0.1 foot vertical for every 100 feet horizontal) with an inferred flow direction to the southeast. Groundwater elevations collected during the previous groundwater monitoring events indicated average groundwater gradients of 0.002 and 0.003 with inferred flow directions to the southeast and south. Groundwater elevations, contours of equal elevations, and inferred flow direction arrow evaluated from the December 10, 1992 groundwater monitoring event are shown on the Groundwater Gradient Map (Figure 3).

If you have questions about this letter report, please contact us at (503) 691-2030.

Sincerely,
Science & Engineering Analysis Corporation

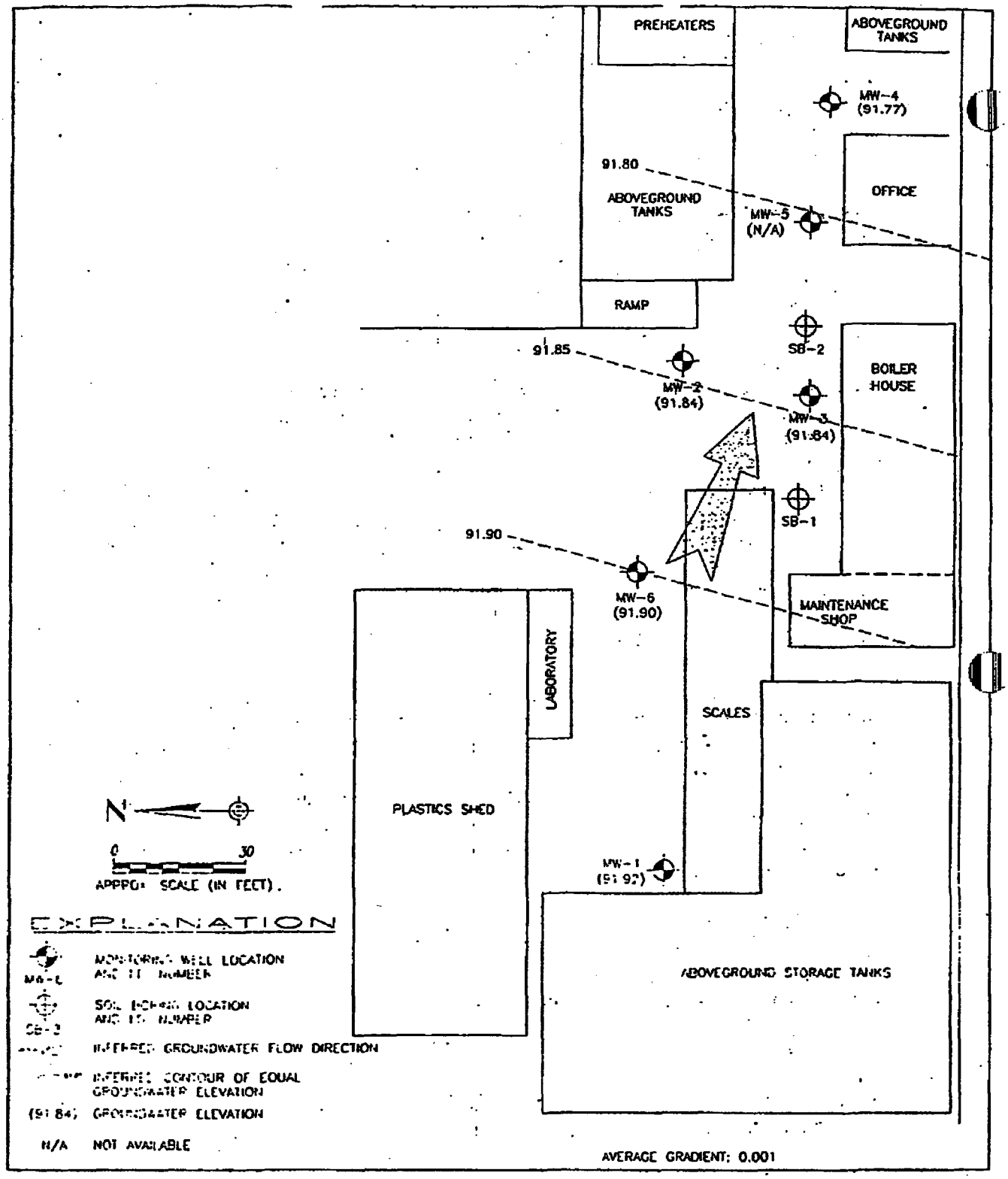
Mark A. Trewartha, RG
Associate Hydrogeologist-Geologist

Steven E. Locke, PE
Principal Chemical Engineer

MAT/SEL:kh
Attachments

cc: Mr. Ray Peterson, DEQ Northwest Region

59-001-0.QM3
January 19, 1993



SEACOR 7614 S.W. Mohawk Street Tualatin, OR 97062	DRAWN BY: S. SPENCER APPROVED BY: DATE: 12/29/92 JOB NO.: F0059-001-02	GROUNDWATER GRADIENT MAP TRUMBULL ASPHALT PORTLAND, OREGON	FIGURE 3

F001003.DWG

SCHN00171946

Table 1. Summary of Groundwater Elevations
Owens-Corning Corporation
Trumbull Asphalt Facility
3605 NW 35th Avenue
Portland, Oregon

Well No.	Date Measured	Top of Casing Elevation (feet)[a]	Static Water Level (feet)[b]	Groundwater Elevation (feet)[a]
MW-1	6/27/89	100.64	8.11	92.53
	1/11/91	100.64	8.33	92.31
	4/23/91	100.64	7.73	92.91
	7/26/91	100.64	8.24	92.40
	1/10/92	100.64	8.20	92.44
	6/10/92	100.64	8.30	92.34
	9/10/92	100.64	9.08	91.56
	12/10/92	100.64	8.72	91.92
MW-2	6/27/89	99.68	7.19	92.49
	1/11/91	99.68	7.48	92.20
	4/23/91	99.68	6.87	92.81
	7/26/91	99.68	7.37	92.31
	1/10/92	99.68	7.30	92.38
	6/10/92	99.68	7.50	92.18
	9/10/92	99.68	8.16	91.52
	12/10/92	99.68	7.84	91.84
MW-3	6/27/89	99.88	7.42	92.46
	1/11/91	99.88	6.22	93.66
	4/23/91	99.88	7.10	92.78
	7/26/91	99.88	7.65	92.23
	1/10/92	99.88	7.59	92.29
	6/10/92	99.88	7.70	92.18
	9/10/92	99.88	8.40	91.48
	12/10/92	99.88	8.04	91.84
MW-4	6/27/89	100.23	7.85	92.38
	1/11/91	100.23	8.05	92.18
	4/23/91	100.23	7.56	92.67
	7/26/91	100.23	8.04	92.19
	1/10/92	100.23	8.00	92.23
	6/10/92	100.23	8.14	92.09
	9/10/92	100.23	8.80	91.43
	12/10/92	100.23	8.46	91.77

[a] Relative to 100 feet elevation at MW-5 top of casing.
[b] Feet below top of casing

SCHN00171947

Table 1. Summary of Groundwater Elevations (cont'd)
Owens-Corning Corporation
Trumbull Asphalt Facility
3605 NW 35th Avenue
Portland, Oregon

Well No.	Date Measured	Top of Casing Elevation (feet)[a]	Static Water Level (feet)[b]	Groundwater Elevation (feet)[a]
MW-5	6/27/89	100.00	7.58	92.42
	1/11/91	100.00	--[c]	--
	4/23/91	100.00	--	--
	7/26/91	100.00	--	--
	1/10/92	100.00	--	--
	6/10/92	100.00	--	--
	9/10/92	100.00	--	--
	12/10/92	100.00	--	--
MW-6	6/27/89	99.92	7.42	92.50
	1/11/91	99.92	8.25	91.67
	4/23/91	99.92	7.08	92.84
	7/26/91	99.92	7.58	92.34
	1/10/92	99.92	7.60	92.32
	6/10/92	99.92	7.64	92.28
	9/10/92	99.92	8.40	91.52
	12/10/92	99.92	8.02	91.90

[a] Relative to 100 feet elevation at MW-5 top of casing.
[b] Feet below top of casing
[c] "--" Not available. Free product observed.

59-001-0.QM3
January 19, 1993

Table 2. Groundwater Analytical Results Summary
Owens-Corning Corporation
Trumbull Asphalt Facility
3605 NW 35th Avenue, Portland, Oregon

Well No.	Sampling Date	Total Petroleum Hydrocarbons[c]	Aromatic Volatile Organics[a]			
			Benzene	Toluene	Ethyl-benzene	Xylene[b]
MW-1	5/11/89	8.4 / 71.0[d]	---[e]	---	---	---
	5/11/90	4.6	---	---	---	---
	1/11/91	2.0	---	---	---	---
	4/23/91	<0.5[f]	---	---	---	---
	7/26/91	1.3	---	---	---	---
	1/10/92	<0.5	---	---	---	---
	6/10/92	2.5[d]	<0.5	<0.5	<0.5	0.68
	9/10/92	16.0[d]	<0.5	2.2	<0.5	3.40
	12/10/92	1.6	---	---	---	---
MW-2	5/11/89	2.0 / 1.4[d]	---	---	---	---
	5/11/90	0.7	---	---	---	---
	1/11/91	<0.5	---	---	---	---
	4/23/91	<0.5	---	---	---	---
	7/26/91	<0.5	---	---	---	---
	1/10/92	<0.5	---	---	---	---
	6/10/92	0.5[d]	<0.5	<0.5	<0.5	<0.5
	9/10/92	0.8[d]	<0.5	<0.5	<0.66	<0.5
	12/10/92	0.53	---	---	---	---
MW-3	5/11/89	14.8 / 22.4[d]	---	---	---	---
	5/11/90	8.0	---	---	---	---
	1/11/91	14.0	---	---	---	---
	4/23/91	0.7	---	---	---	---
	7/26/91	3.5	---	---	---	---
	1/10/92	0.8	---	---	---	---
	6/10/92	1.2[d]	<0.5	<0.5	<0.5	<0.5
	9/10/92	3.3[d]	<0.5	<0.5	<0.5	3.1
	12/10/92	0.66	---	---	---	---
DEQ BNGCL's[g]		NA	5	700	2,000	10,000

[a] EPA Method 8020, concentration in micrograms per Liter (ug/L).
[b] Concentration represents sum of xylene isomers.
[c] EPA Method 418.1, concentrations in milligrams per Liter (mg/L).
[d] EPA Method 8015 modified, concentrations in mg/L.
[e] --- = not available.
[f] <0.5 = not detected at or above method detections limits.
[g] DEQ BNGCL's = DEQ Basic Numerical Groundwater Cleanup Levels for Petroleum Substances.

59-001-0.QM3
January 19, 1993

Table 2. Groundwater Analytical Results Summary (cont'd)
Owens-Corning Corporation
Trumbull Asphalt Facility
3605 NW 35th Avenue, Portland, Oregon

Well No.	Sampling Date	Total Petroleum Hydrocarbons[c]	Aromatic Volatile Organics[a]			
			Benzene	Toluene	Ethyl-benzene	Xylene
MW-4	5/23/89	0.20	---[e]	---	---	---
	5/11/90	<0.5[f]	---	---	---	---
	1/11/91	<0.5	---	---	---	---
	4/23/91	<0.5	---	---	---	---
	7/26/91	0.6	---	---	---	---
	1/10/92	<0.5	---	---	---	---
	6/10/92	<0.5[d]	<0.5	<0.5	0.51	2.5
	9/10/92	<0.5[d]	<0.5	<0.5	<0.5	2.4
	12/10/92	<0.5	---	---	---	---
MW-5	5/23/89	12.4	---	---	---	---
	5/11/90	180.0	---	---	---	---
	1/11/91	---	---	---	---	---
	4/23/91	40.0	---	---	---	---
	7/26/91	160.0	---	---	---	---
	1/10/92	33.0	---	---	---	---
	6/10/92	50.0[d]	<0.5	<0.5	<0.5	<0.5
	9/10/92	62.0/140[*]	<0.5	<0.5	<0.5	8.3
	12/10/92	18.0/18.0[*]	---	---	---	---
MW-6	5/23/89	0.92	---	---	---	---
	5/11/90	1.3	---	---	---	---
	1/11/91	1.1	---	---	---	---
	4/23/91	<0.5	---	---	---	---
	7/26/91	1.0	---	---	---	---
	1/10/92	<0.5	---	---	---	---
	6/10/92	<0.5[d]	<0.5	<0.5	<0.5	<0.5
	9/10/92	1.1[d]	<0.5	<0.5	<0.5	<0.5
	12/10/92	<0.5	---	---	---	---
DEQ BNGCL's		NA	5	700	2,000	10,000

[a] EPA Method 8020, concentration in micrograms per Liter (ug/L).
[b] Concentration represents sum of xylene isomers.
[c] EPA Method 418.1, concentrations in milligrams per Liter (mg/L).
[d] EPA Method 8015 modified, concentrations in mg/L.
[e] --- = not available.
[f] <0.5 = not detected at or above method detections limits.
[g] DEQ BNGCL's = DEQ Basic Numerical Groundwater Cleanup Levels for Petroleum Substances
[*] Duplicate sample results

59-001-0.QM3
January 19, 1993

ATTACHMENT 1
CHAIN-OF-CUSTODY RECORD

PACIFIC ENVIRONMENTAL LABORATORY INC.

9405 S.W. Barbur Ave
Portland, OR 97225
(503) 644-0569
Fax (503) 644-2202

CHAIN OF CUSTODY RECORD

COMPANY: SenCorp, Inc.
PROJECT NAME: Trumball Asphalt
LAB PROJECT NUMBER: 92-4019
PROJECT MANAGER: Mark Trowbridge
PROJECT NUMBER: F0010-002-02
COLLECTED BY: David Samples
P.O. NUMBER:
RUSH ☐ YES ☒ NO

COMMENTS

IF SAMPLE IS LIQUID & HAS SEDIMENT OR PARTICULATE, SHALL WE:
_____ Test Filtrate Only?
_____ Mix Sample by Shaking?
_____ Test Particulate Only?

IF SAMPLE IS MULTI-PHASED, SHALL WE:
_____ Test Each Phase separately?
_____ Test only ONE Phase? Which Phase?
_____ Mix All Phases by Shaking?

REF NO	SAMPLE I.D.	DATE	TIME	PRESERV	MATRIX: SOIL	MATRIX: WATER	MATRIX: OTHER	NUMBER OF CONTAINERS	TPH-HCID CARDEO	QUANT. IF DETECTED (✓)	TPH-Gasoline CARDEO	TPH-Diesel CARDEO	TPH-418.1 Modified CARDEO	8015M - Gas	8015M - Diesel	TPH 418.1	BTEX 602/8020	Halogenated Volatiles 601/8010	Volatiles 524/8240	Semivolatiles 625/8270	PCB's 608/8080	Chlorinated Pesticides 608/8080	TCLP (8) Metals						REMARKS
1	MW-1-121092	12/10/92	12:32	NONE		✓										✓													
2	MW-2-121092		11:50			✓										✓													
3	MW-3-121092		13:45			✓										✓													
4	MW-4-121092		12:57			✓										✓													
5	MW-5-121092		14:45			✓										✓													
6	MW-6-121092		12:07			✓										✓													
7	Duplicate					✓										✓													
8	Trip Blank					✓										✓													

RELINQUISHED BY	COMPANY	DATE/TIME	RECEIVED BY	COMPANY
D. Samples	SenCorp, Inc.	12/10/92 1815	[illegible]	PEL
RELINQUISHED BY	COMPANY	DATE/TIME	RECEIVED BY	COMPANY
RELINQUISHED BY	COMPANY	DATE/TIME	RECEIVED BY	COMPANY

Note: Samples are discarded 30 days after receipt unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

SCHN00171952

ATTACHMENT 2
LABORATORY TEST REPORT AND
CHROMATOGRAMS

PACIFIC
ENVIRONMENTAL
LABORATORY INC

December 16, 1992

SEACOR
P.O. Box 1508
Tualatin, OR 97062

Attn: Mark Trewartha

Re: JOB #F0010-002-02
PROJECT - TRUMBALL ASPHALT
PEL #92-4019

Enclosed is the lab report for your samples which were received on December 10, 1992.

I. Sample Description

Eight Water Samples

The samples were received under a chain of custody.

The samples were received in containers consistent with EPA protocol.

II. Quality Control

No project specific QC was requested. In-house QC data is available upon request.

III. Analytical Results

Test methods may include minor modifications of published methods such as detection limits or parameter lists. Solid and waste samples are reported on an "as received" basis unless otherwise noted.

Compounds not detected are listed under results as ND.

Sincerely,

Howard Holmes
Project Manager

Rob May
Project Manager

9405 S.W. Nimbus Ave ▪ Beaverton, OR 97005 ▪ (503) 644-0660 ▪ FAX # (503) 644-2202

PACIFIC ENVIRONMENTAL LABORATORY INC

METHOD: Total Petroleum Hydrocarbons per EPA 418.1
Results in mg/L (ppm)

Compound	MW-1-121092	MW-2-121092	MW-3-121092	Detection Limit
TPH	1.6	0.53	0.66	0.50

Compound	MW-4-121092	MW-5-121092	MW-6-121092	Detection Limit
TPH	ND	18	ND	0.50

Compound	Duplicate	Trip Blank	Method Blank	Detection Limit
TPH	18	ND	ND	0.50

9405 S.W. Nimbus Ave. ■ Beaverton, OR 97005 ■ (503) 644-0660 ■ FAX # (503) 644-2202

DEQ Files on Terminal Transfer Site
March 1989–April 1996

SCHN00171956

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

March 2, 1989 J\FINALRPT.436

Prendergast & Associates, Inc.
121 SW Morrison Street, Suite 1200
Portland, OR 97204

Attention: John Carroll

SUBJECT: **PRELIMINARY SITE SCREENING, TERMINAL TRANSFER PROPERTY, 3601 N.W. YEON STREET, PORTLAND, OREGON**

At your request, Geotechnical Resources, Inc. (GRI) has completed a preliminary site screening investigation for the Terminal Transfer property at 3601 NW Yeon Street in Portland, Oregon. The general location of the site is shown on the Vicinity Map, Figure 1. The purpose of this study was to evaluate, on a preliminary basis, the potential for and/or presence of contamination in the soil and groundwater beneath the site. Our scope of work included a limited review of the previous uses of the property and adjacent properties, subsurface explorations, soil and groundwater collection and analysis, pump testing, office studies, and preparation of this report.

SITE DESCRIPTION

General

As shown on Figure 1, the property is located in Portland's Northwest industrial district. The property occupies about 9.3 acres and is bounded by NW Yeon Street on the north and NW Guam on the south. The configuration of the property is shown on the Site Plan, Figure 2. Since its development in the late 1960s, the property has been used as leased administrative office space and as a motor freight truck terminal and warehouse. Most of the site is occupied by a large warehouse with adjoining truck service facilities, including a repair shop, degreasing station, an oil-water separator, fuel islands, and hydrants. The following below-ground tanks are also present on the site: one 6,000-gal., new oil; one 2,000-gal., waste oil; one 4,000-gal., regular gasoline; one 12,000-gal., unleaded gasoline; and two 12,000-gal., diesel tanks. The approximate location of these underground storage tanks is shown on Figure 2.

From conversations with Dick Kathrens of Terminal Transfer, Inc. (after our drilling program was completed), we understand that a below-ground, on-site release of approximately 500 to 600 gal. of diesel fuel occurred 7 to 8 years ago in the vicinity of boring B-3, see Figure 2. The leak was detected while making daily tank inventory measurements. The discharge apparently occurred as a result of a loose or broken fitting in one of the fleet fueling system hydrants that runs along the center of the main driveway. Mr. Kathrens indicated that the discharge probably occurred over a period of a few days and was corrected by replacing the defective fitting. No attempt was made to recapture or clean up the spilled diesel.

Topography

Based on our review of the available maps and our observations at the site, the ground surface is relatively flat with an average elevation of about 35 ft. Portions of the site not occupied by existing buildings are covered with asphaltic-concrete pavement.

Geology

The site is located in the Guilds Lake industrial area. In the early 1900s, Guilds Lake was filled with material sluiced from the adjacent hills and dredged from the Willamette River. The fill materials are underlain by predominantly silty and sandy floodplain soils of the nearby Willamette River. The floodplain soils are underlain at depth by gravel.

Regional Groundwater

Groundwater levels in the project area are influenced by precipitation, recharge from the Tualatin Mountains (Portland's West Hills) to the southwest, and possibly the nearby Willamette River. Perched, near-surface groundwater can occur over silty lenses and in the old lake fill.

BACKGROUND

The property immediately west of the site (3720 NW Yeon) is occupied by the Chase Bag Company, see Figure 2. The Chase building, presently a paper bag fabrication plant, was originally built in the early 1950s for the Willard Storage Battery Company. We were not able to determine whether the building was originally used as a manufacturing plant or as a warehouse. In the early 1960s, the property was purchased by Great Western Chemical Company and used as an office/warehouse. The remainder of the block is occupied by the Nabisco Brands warehouse, the Gelco Trailer leasing yard, and the Standard Steel Tube and Supply warehouse.

The property immediately east of the site is occupied by Trammell-Crow's Northwest Corporate Park, which houses a number of administrative offices, small warehouses, and retailers. This property was previously owned by Timber Structures, Inc., which operated a small sawmill and structural timber fabricating plant there for many years.

SCHN00171958

The property north of the site, across NW Yeon Street, is a rail switchyard operated by Portland Terminal Railroad Company. The property south of the site, across NW Guam Street, is occupied by Del Monte Corporation (2840 NW Guam) and Holman Transfer Company (3250 NW Guam). Both of these facilities are warehouses.

Potential sources of soil and groundwater contamination in the area include several nearby manufacturing facilities and underground storage tanks. Nearby facilities which are being tracked by the U.S. Environmental Protection Agency (EPA) Comprehensive Environmental Compensation and Liability Information System (CERCLIS) include Hercules, Inc. (3366 NW Yeon), Mogul Corporation (2852 NW 31st), and Columbia American Plating Company (3003 NW 35th). Our conversations with the Oregon Department of Environmental Quality (DEQ) staff indicate that potential environmental hazards associated with Hercules, Inc. (a manufacturer of industrial resins) and Mogul Corporation (a manufacturer of water treatment chemicals) operations are negligible. The DEQ staff indicated, however, that the Columbia American Plating Company facility could be a significant potential source of groundwater contamination.

In addition to the on-site underground storage tanks, there are numerous other tanks in the area. A list of tanks which appear on the DEQ Underground Storage Tank inventory (UST) is provided below. Our conversations with DEQ staff indicate that there have been no significant leakages, spills, or other releases reported for these tanks in recent years.

LICENSED UNDERGROUND STORAGE TANKS IN THE VICINITY OF 3601 N.W. YEON STREET, PORTLAND, OREGON

DEQ Facility Number	Owner	Address
6320	Chase Bag Company	3720 NW Yeon
1750	Coca Cola of Oregon	3599 NW Yeon
4544	American Steel Company	4033 NW Yeon
4641	Holman Transfer Company	3250 NW Guam
3687	Portland Terminal Railroad	3500 NW Yeon
3976	Star Oil Company	3599 NW Yeon
8277	Terminal Transfer Company	3601 NW Yeon
5039	ANR Freight Systems	3333 NW 35th
2497	Chemical Distributors, Inc.	2750 NW 31st
4358	Hill Investment, Inc.	3322 NW 35th
1862	Wade Manufacturing, Inc.	2420 NW 31st
523	Hercules, Inc.	3366 NW Yeon

SCHN00171959

SUBSURFACE EXPLORATIONS

General

On November 30, and December 1, 1988, five borings, designated B-1 through B-5, were drilled to depths of 26.5 to 31.5 ft. The borings, located on Figure 2, were made to evaluate soil stratigraphy, obtain soil samples for chemical analysis, examine soil samples for indications of contamination, and permit the installation of groundwater observation standpipes and a groundwater monitoring well. Logs of the borings and a description of the drilling and sampling techniques are provided in Appendix A.

Soils

All of the borings encountered predominantly sandy soils from the ground surface to the maximum depth explored. These soils are likely materials used to fill the old Guilds Lake. The sand fill varies from brown to gray, is generally fine to medium grained, and contains a trace of silt. The sand contains occasional thin interbeds of silt and wood debris. Based on N-values in the range of 10 to 44 blows/ft, the average relative density of the sand fill ranges from medium dense to dense. The moisture content of the sand fill ranges from about 10% (above the water level) to 45% (below the water level).

While drilling boring B-3, strong petroleum odors and an oily sheen were noted in the groundwater and in soils below a depth of about 5 ft.

Groundwater

As the borings were completed, $^{3}/_{4}$-in.-I.D. standpipes were installed in borings B-1, B-2, B-4, and B-5, to permit measurements to be made to the depth of the groundwater level. Due to the presence of the oily sheen and petroleum odors in boring B-3, a 2-in.-I.D. monitoring well was installed in the boring to permit groundwater sampling and pumping. The groundwater levels measured during this investigation are shown graphically on the boring logs (12.2.89), Figures 1A through 5A, and summarized below.

SUMMARY OF GROUNDWATER LEVELS

	Depth to Groundwater, ft				
Boring	12/2/88	12/9/88	12/15/88	1/30/89	2/7/89
B-1	12.9	12.9	12.9	12.7	12.9
B-2	12.8	12.7	12.8	12.5	12.8
B-3	10.2	10.0	10.1	10.8	10.3
B-4	11.2	11.2	11.2	11.0	11.2
B-5	11.9	11.9	11.9	11.5	11.9

SCHN00171960

On February 7, 1989, a pump-out test was conducted in the monitoring well installed in boring B-3. The test indicates that the groundwater level can be drawn down about 4 ft in 30 minutes at a pump rate of 10 gpm. Prior to the pump test, about 2 in. of free product was observed on the groundwater surface. After the pump test and a short recovery period, the free-product thickness was about 10 in. Based on its odor and appearance, the free product appears to be diesel.

SAMPLING AND CHEMICAL ANALYSIS

General

Because the site does not have a known history of contamination, and high levels of contamination were not anticipated, our original sampling program was to be limited to taking soil samples from the borings for chemical analysis. The soil samples would have provided an indication of contamination on the site. However, the testing program was expanded following the discovery of petroleum hydrocarbon contamination in boring B-3, the eventual formation of a layer of free product on the surface of the groundwater, preliminary chemical testing, and a meeting with Mr. Loren Garner of DEQ.

Initial observations and the chemical data indicated that the elevated levels of petroleum contamination in boring B-3 were probably limited to the partially saturated soil zone above the groundwater table, see soil test data in Table 1 and groundwater test data dated December 9 and 15, 1988, in Table 2. The December 15, 1988, test data also revealed that the groundwater contains levels of benzene and vinyl chloride that are above EPA safe drinking water standards; low levels of other chemicals were also present.

These observations and chemical test data were discussed with Mr. Garner (DEQ) on January 20, 1989. At that time, he indicated that there appeared to be several methods to mitigate the diesel contamination, assuming that it was confined to the soil. He also suggested that groundwater treatment would probably not be required if the benzene and vinyl chloride appeared to be at local background levels and not generated on site.

On January 30, 1989, additional groundwater samples were obtained from observation standpipes in borings B-1, B-2, B-3, and B-5, to attempt to document background contamination in the groundwater at the site. During the sampling, about 2 in. of free product was detected on the surface of the groundwater in boring B-3. The results of the January 30, 1989, testing are also presented in Table 2. A more detailed discussion of the results of the chemical testing is provided below.

SCHN00171961

Soil

Selected soil samples obtained from the borings on November 30, and December 1, 1988, were submitted to Coffey Laboratories, Inc. (CLI) for analysis for Total Petroleum Hydrocarbon (TPH) and Polychlorinated Biphenyls (PCBs). The results of the chemical analyses are summarized on Table 1; the CLI laboratory report is provided in Appendix A.

For soil samples obtained from borings B-1, B-2, B-4, and B-5, the TPH levels range from a maximum of 35.5 milligrams per kilogram (mg/kg) at a depth of 5 ft in B-4, to below the detection limit of 3 mg/kg in other samples. Milligrams per kilogram (mg/kg) is often referred to as parts per million. A maximum TPH level of 5,800 mg/kg was detected in the sample from a depth of 5 ft in boring B-3. The TPH level decreased to 8.5 mg/kg in the sample from 15 ft and below the detection limit of 3 mg/kg in the sample from 30 ft.

PCBs were not detected in the soil samples obtained from the borings. The PCB detection limits range from 0.2 to 2 mg/kg.

Groundwater

Groundwater samples were obtained from the monitoring well in boring B-3 on December 9 and 15, 1988. Prior to sampling, the depth to groundwater was measured in the monitoring well and standpipes. The groundwater samples obtained on December 9, 1988, were analyzed by CLI for TPH; all subsequent samples were analyzed for volatile organics (EPA Method 624, GC/MS). The results of the groundwater analyses are summarized in Table 2; the CLI laboratory report is provided in Appendix B. The data for December 9 indicate the presence of relatively low levels of TPH; however, the results of EPA Method 624 (CG/MS), performed on the samples collected December 15, indicate that elevated levels of benzene and vinyl chloride are present.

On January 30, 1989, in an attempt to document groundwater contamination levels across the site, groundwater samples were obtained from the observation standpipes in borings B-1, B-2, B-4, and B-5, and from the monitoring well in B-3. It should be noted that the observation standpipes are not constructed as permanent monitoring wells. However, in our opinion, the groundwater samples obtained from the standpipes are suitable for chemical analyses to evaluate whether significant levels of contamination are present in the groundwater.

The analyses indicated detectable levels of benzene (<1 to 49 $\mu g/l$), 1,2-dichloroethane (up to 3.2 $\mu g/l$), ethylbenzene (up to 27.5 $\mu g/l$), methylene chloride (<1 to 9.8 $\mu g/l$), toluene (up to 2.2 $\mu g/l$), trichlorofluoromethane (up to 5.4 $\mu g/l$), and vinyl chloride (up to 16 $\mu g/l$). Benzene and ethylbenzene are often associated with contamination by petroleum products; vinyl chloride is commonly associated with the degradation of organic solvents used for degreasing.

SCHN00171962

CONCLUSIONS

Our review of the historical uses of the Terminal Transfer site and surrounding properties, and our review of the EPA's CERCLIS and DEQ's UST lists, indicates that no significant leakage, spills, or other releases have been reported in recent years. However, it is apparent from our subsurface explorations and chemical analyses that a diesel release did occur in the vicinity of boring B-3 and that the soil and shallow groundwater are contaminated. As a result, the major focus of this study was directed toward mitigation of this observed contamination.

The contamination and free product observed in boring B-3 are probably the result of the 7- to 8-year-old fuel spill described by Mr. Kathrens. Although the chemical analyses do not identify a specific product, the contaminant physically appears to be diesel fuel. It appears that the fuel product source was shallow and the product percolated downward to the top of the groundwater. The examination of the soil samples obtained from other borings and the results of chemical analyses indicate that the contamination is localized in the vicinity of boring B-3. The chemical analyses of soil samples indicate that the contamination has not penetrated to significant depths below the groundwater surface.

Although the analyses indicate that contamination of the groundwater has occurred, the contamination appears localized, does not appear to be mobile, and the levels of contamination are low. Based on discussions with DEQ staff, we anticipate that mitigation measures would include:

1) a pump-out and recovery well, or wells, to remove the free product from the groundwater,

2) excavation and disposal of contaminated soil, and

3) monitoring of groundwater quality as the levels of contamination decline due to dilution, dissipation, and biodegradation.

The results of the pump test in boring B-3 indicate that the soil and groundwater conditions are favorable for recovery of the free product.

LIMITATIONS

This report has been prepared to aid Prendergast & Associates, Inc. in evaluating potential soil and groundwater contamination at the described site. The scope is limited to the location and activities described herein. In the performance of an investigation of this type, specific information is obtained at specific locations at specific times. However, it is acknowledged that variations in soil and groundwater conditions may exist between sampling locations. The

SCHN00171963

conclusions and recommendations presented in this report are based on our understanding of the project and the results of our investigations and testing as described in this report. No other warranty or representation, either expressed or implied, is included or intended in this report.

If you have any questions regarding this correspondence, please contact us at your convenience.

Respectfully submitted for,
GEOTECHNICAL RESOURCES, INC.

REGISTERED PROFESSIONAL ENGINEER 8230 OREGON Sept. 20, 197[illegible] DAVID D. DRISCOLL, SR.

David D. Driscoll, P.E.
Principal

Willard S. Titus
Staff Geologist

SCHN00171964

TABLE 1

SUMMARY OF CHEMICAL ANALYSES--SOIL (See Appendix B)

Location	Sample	Total Petroleum Hydrocarbons (mg/kg)	PCBs (mg/kg)
B-1	S-6	<3	<0.2
B-2	S-6	<3	<0.2
B-3	S-2	5,800	<2
	S-6	8.6	<0.2
	S-10	<3	<0.2
B-4	S-5	35.5	<0.2
	S-10	<3	<0.2
B-5	S-5	<3	<0.2

"<" = none detected at or above the indicated value and represents the detection limit for the method

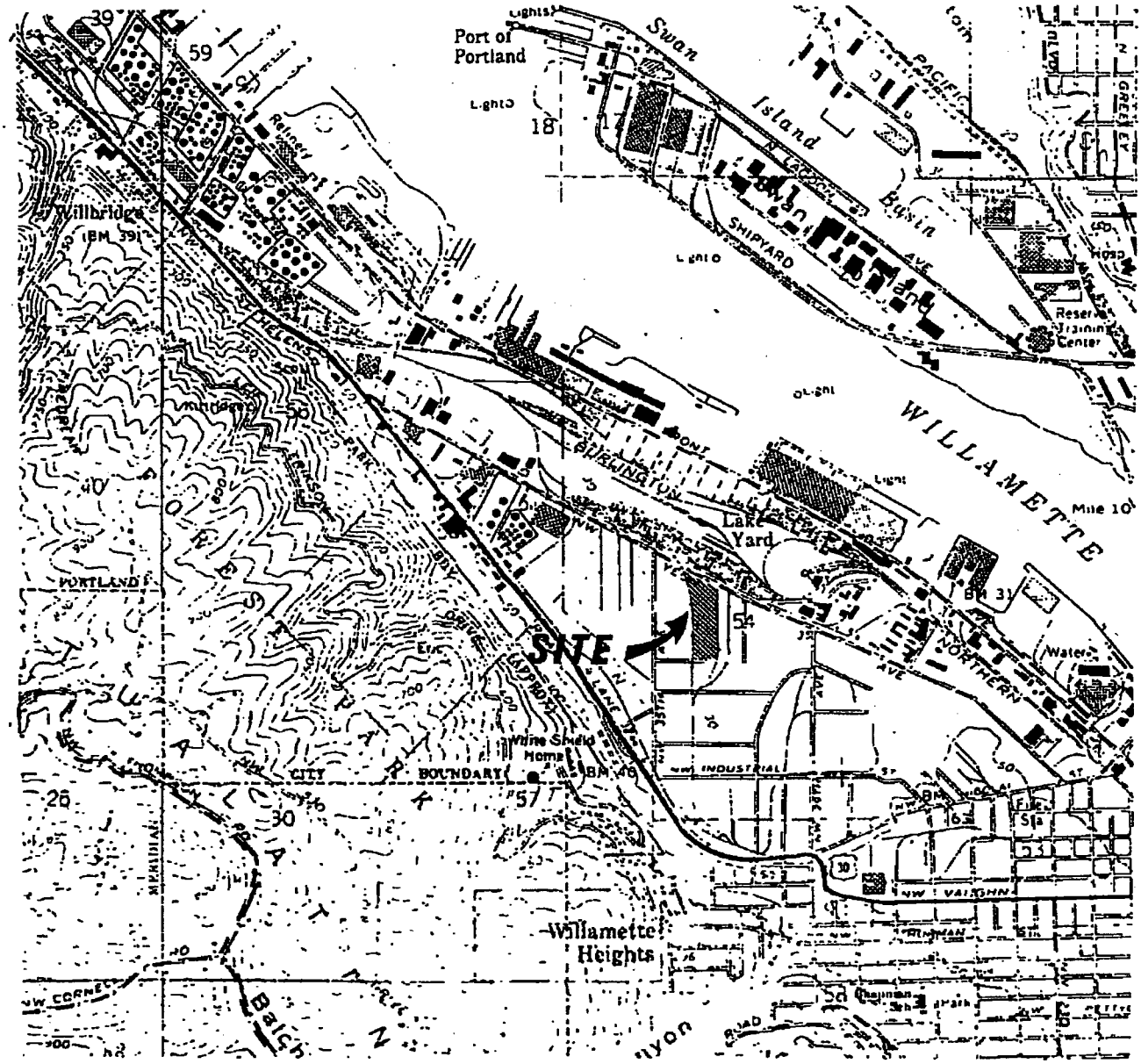
TABLE 2

SUMMARY OF CHEMICAL ANALYSES--WATER (See Appendix B)

Source	Date Sampled	Depth (ft below ground surface)	Total Petroleum Hydrocarbon (mg/l)	Benzene (µg/l)	1,2-dichloro-ethane (µg/l)	Ethyl-benzene (µg/l)	Methylene chloride (µg/l)	Toluene (µg/l)	Trichloro-fluoro-methane (µg/l)	Vinyl chloride (µg/l)	Chloroform (µg/l)
B-3	12/9/88	11.5	4.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B-3	12/9/88	23.5	4.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B-3	12/15/88	11.5	N/A	14*	0.9	5.9	<1	0.5	4.5	14*	N/D
B-3	12/15/88	23.5	N/A	20*	1.7	9.6	9.8	0.7	5.4	16*	N/D
B-1	1/30/89	11.5	N/A	<1	N/D	N/D	N/D	N/D	4.9	N/D	N/D
B-2	1/30/89	11.5	N/A	<1	N/D	N/D	N/D	N/D	<1.0	N/D	N/D
B-3**	1/30/89	11.5	N/A	49*	3.2	27.5	N/D	2.2	N/D	<10	N/D
B-5	1/30/89	11.5	N/A	1	N/D	N/D	N/D	N/D	N/D	5.5*	N/D
Field Blank	1/30/89	--	N/A	1	N/D	N/D	N/D	0.6	4.4	N/D	1.5
Detection Limit		--		1	0.5	1.0	1.0	0.5	1.0	5.0	0.5
EPA/DEQ Standard		--	None	5	5.0	None	None	None	None	2.0	None

N/A = not analyzed
N/D = not detected
* = in excess of EPA/DEQ Standards
** = free product floating on groundwater surface
"<" = none detected at or above the indicated value and represents the detection limit for the method

SCHN00171966



USGS TOPOGRAPHIC MAP
PORTLAND OREG.-WASH. QUAD PR 1977

N

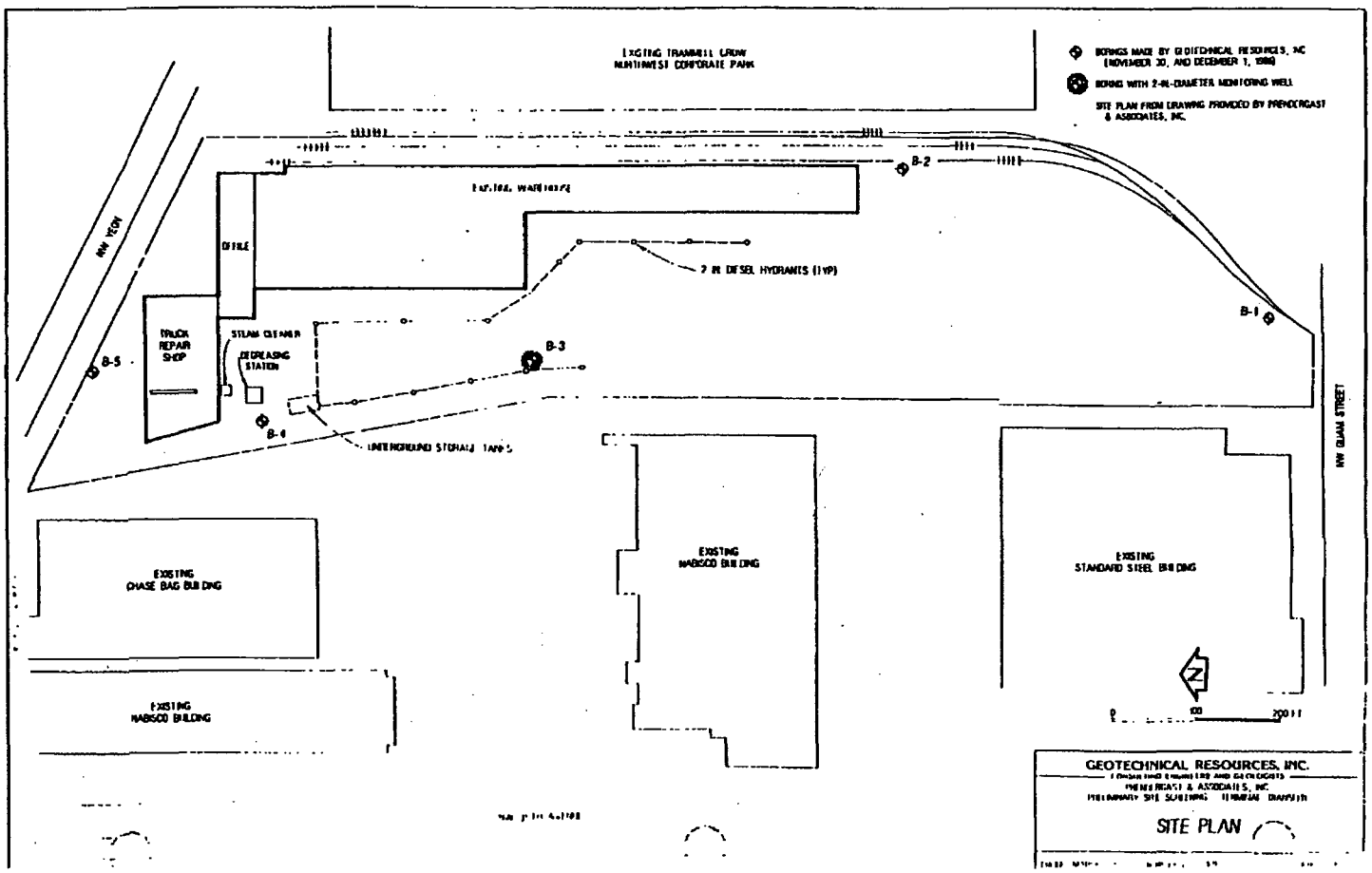
0 1/2 1 MILE

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS
PRENDERGAST & ASSOCIATES, INC.
PRELIMINARY SITE SCREENING - TERMINAL TRANSFER

VICINITY MAP

DATE MARCH 1989 JOB NO. 436 FIG. 1

SCHN00171967



SCHN00171968

APPENDIX A

FIELD EXPLORATIONS

General

On November 30, and December 1, 1988, a field exploration program was conducted to investigate the soil and groundwater contamination at the site. The program consisted of drilling and sampling soils at five locations, B-1 through B-5; installing a groundwater monitoring well in boring B-3; installing observation standpipes in borings B-1, B-2, B-4, and B-5; periodically measuring groundwater levels in each well/standpipe; and sampling groundwater in the monitoring well. The Site Plan, Figure 2, shows the location of the borings and monitoring well installation.

The following subsections contain a description of the drilling, well installation, and sampling procedures.

Borings

All drilling and sampling were performed using a truck-mounted Mobile B-61 drill rig provided and operated by Subterranean, Inc. of Sumner, Washington. The borings were made using hollow-stem auger drilling techniques. All work was observed by an engineering geologist provided by GRI, who maintained a detailed log of the conditions and materials disclosed during the course of the work.

Soil samples were recovered from the borings at 2.5-ft intervals of depth using a standard split-spoon sampler. At the time of the sampling, the Standard Penetration Test was performed. This test consists of driving the sampler into the soil a distance of 18 in. using a 140-lb hammer dropped 30 in. The number of blows required to drive the sampler the last 12 in. is known as the Standard Penetration Resistance, or N-value. The N-values provide a measure of the relative density of granular soils, such as sand, and the relative consistency or stiffness of cohesive soils, such as clayey silt. Each sample was carefully examined by the engineering geologist. A representative portion of the sample was saved in an airtight jar for further examination in our laboratory or for chemical analysis by Coffey Laboratories, Inc. (CLI), an EPA-approved testing laboratory in Portland, Oregon.

The soil samples obtained from borings B-1 through B-5 were examined in the field for visible presence of sheen and noticeable chemical or petroleum odor. These observations are noted on the boring logs.

SCHN00171969

To prevent cross-contamination of volatile organics between boring locations, the drill rig, auger sections, and split spoon sampler were steam-cleaned prior to the start of drilling each boring.

Monitoring Well Installation and Sampling

The water quality monitoring well installed in boring B-3 consists of a 2-in.-I.D. slotted PVC well screen surrounded by a sand filter. The upper 10 ft of the well consists of a solid pipe section sealed with bentonite to prevent infiltration of surface runoff into the well. The well was provided with a steel cover embedded in concrete to prevent inadvertent damage to the well head. The monitoring well construction details are shown on the log of boring B-3, Figure 3A.

On December 9, 1988, after the monitoring well had reached equilibrium with the local water table, it was developed by surging, swabbing, and removing in excess of 10 well volumes of groundwater with a suction pump. All equipment used inside the well was triple-washed and rinsed with distilled water before use. The development purges the well of suspended solids and was repeated each time a groundwater sample was collected from the well.

The well was allowed to recover from the developing and purging operation prior to sampling. A Teflon hand bailer, triple-washed and rinsed, first in distilled water and then in water produced by the well, was used to collect and transfer samples to containers provided by the analytical laboratory. The samples were iced immediately after collection and delivered to CLI for chemical testing.

On January 30, 1989, a field blank sample of the distilled water used as a final rinse for the sampling equipment was obtained at the time of groundwater sampling. The purpose of obtaining a field blank sample is to check for possible contamination of the groundwater samples by the sampling equipment. The distilled water was poured into the Teflon sample bailer, then into a sample container supplied by CLI.

Observation Standpipes

Observation standpipes were installed in borings B-1, B-2, B-4, and B-5, to permit measurement of the groundwater level. The standpipes consist of a slotted $^{3}/_{4}$-in.-I.D. plastic riser pipe placed into an open boring which is then backfilled with soil. Groundwater enters the riser pipe through the slots and rises to a static level. The position of the groundwater level is measured using an electric probe lowered into the pipe. Groundwater level data is summarized on page 4.

SCHN00171970

Groundwater samples were also collected from the observation standpipes installed in borings B-1, B-2, and B-5. Prior to collecting these samples, the standpipes were developed and purged as described above. However, the lack of a clean sand backfill around the standpipe resulted in a turbid discharge. Due to the small diameter of the standpipes, the normal Teflon hand bailer could not be used for sample collection. Substitute bailers constructed of $^{1}/_{2}$-in.-diameter copper pipe were fabricated to recover samples from the standpipes. These bailers were cleaned thoroughly before use and discarded afterward. In all other respects, sample collection and handling was identical to that used for sampling the monitoring well.

Logs of Borings and Monitoring Well Construction

The logs of the borings made for this investigation are shown on Figures 1A through 5A. Each log describes the various types of materials encountered in the borings and notes the depths where materials and/or the characteristics of the materials changed. Table 1A defines the terminology used to describe the soils. To the right of the classification of materials, the samples that were taken during the drilling operations are indicated. Farther to the right, the standard penetration resistances, or N-values, recorded during the split-spoon sampling are plotted. Construction details of the monitoring well in boring B-3 are shown on Figure 3A.

SCHN00171971

TABLE 1A

GUIDELINES FOR CLASSIFICATION OF SOIL

Description of Relative Density for Granular Soil

Relative Density	Standard Penetration Resistance (N-values) blows per foot
very loose	0 - 4
loose	4 - 10
medium dense	10 - 30
dense	30 - 50
very dense	over 50

Description of Consistency for Fine-Grained (Cohesive) Soils

Consistency	Standard Penetration Resistance (N-values) blows per foot	Torvane Undrained Shear Strength, tsf
very soft	2	less than 0.125
soft	2 - 4	0.125 - 0.25
medium stiff	4 - 8	0.25 - 0.50
stiff	8 - 15	0.50 - 1.0
very stiff	15 - 30	1.0 - 2.0
hard	over 30	over 2.0

Sandy silt materials which exhibit general properties of granular soils are given relative density description.

Grain-Size Classification

Boulders
12 - 36 in.

Cobbles
3 - 12 in.

Gravel
1/4 - 3/4 in. (fine)
3/4 - 3 in. (coarse)

Sand
No. 200 - No. 40 sieve (fine)
No. 40 - No. 10 sieve (medium)
No. 10 - No. 4 sieve (coarse)

Silt/Clay - pass No. 200 sieve

Modifier for Subclassification

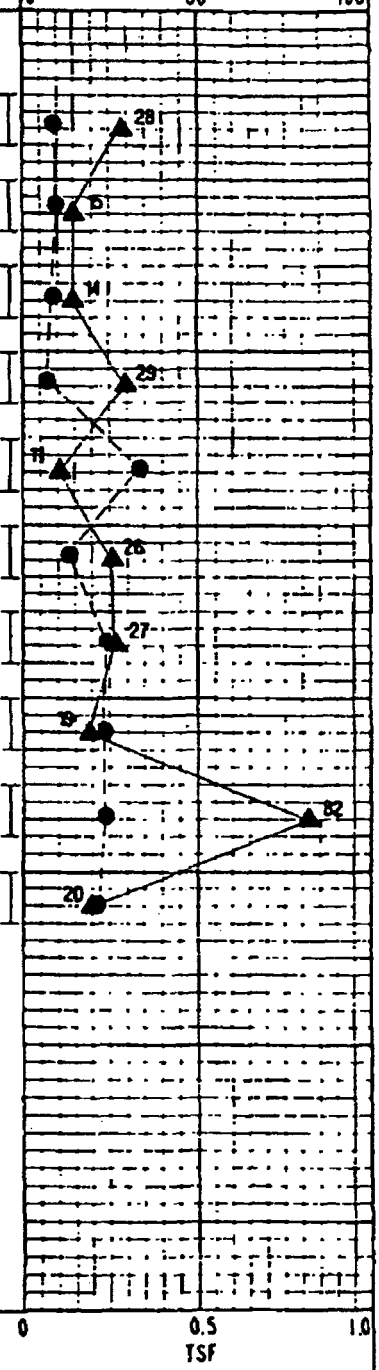
Adjective	Percentage of Other Material In Total Sample
clean	0 - 1.5
trace	1.5 - 10
some	10 - 30
sandy, silty, clayey, etc.	30 - 50

DEPTH, FT.	GRAPHIC LOG	CLASSIFICATION OF MATERIAL SURFACE ELEVATION: 36.2 FT ±	DEPTH, FT.
5 10		Medium dense, brown SAND; fine to medium grained, trace silt	
15		Medium dense, brown SAND; fine to medium grained, trace silt, trace to some fine gravel	14.5
20		Medium dense to dense, brown SAND; fine to medium grained, trace silt gray, silty below 25 ft	22.0
25 30 35		(11/30/88)	26.5

GROUNDWATER (12/2/88)

SAMPLES: S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-8, S-9, S-10

STD. PENETRATION RESISTANCE
(140 LB. WEIGHT, 30" DROP)
▲ BLOWS PER FOOT
● MOISTURE CONTENT, %



LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- XX CORE RUN
- * SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT
- ▼ WATER LEVEL
- SLOTTED PVC
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- ■ UNDRAINED SHEAR STRENGTH (TSF)

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

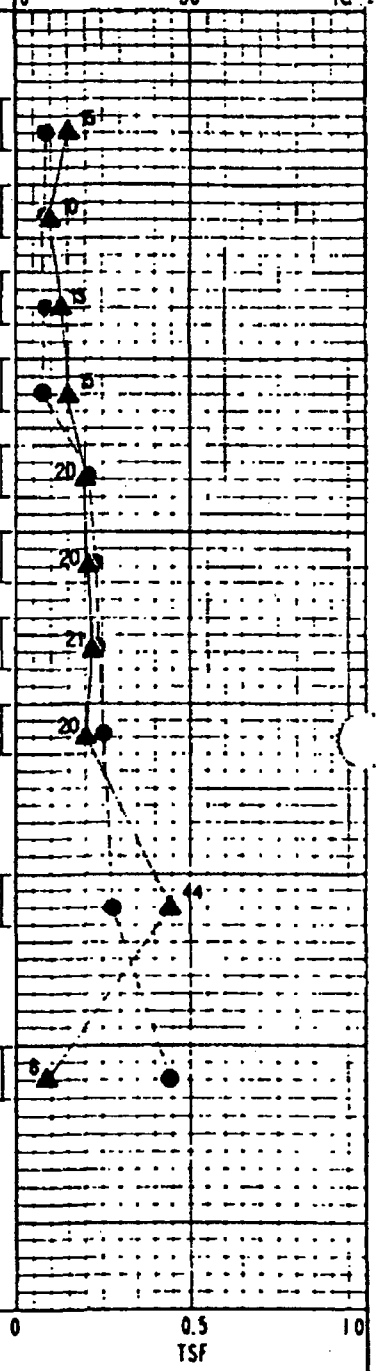
BORING B-1

DATE MARCH 1989 JOB NO. 436 FIG. 1A

SCHN00171973

DEPTH, FT.	GRAPHIC LOG	CLASSIFICATION OF MATERIAL SURFACE ELEVATION: 36.4 FT ±	DEPTH, FT.	GROUNDWATER	SAMPLES
5		Medium dense, brown SAND; fine to medium grained, trace silt			S-1, S-2, S-3, S-4
10			9.5	(12/2/88)	
15		Medium dense, brown SAND; fine to medium grained, trace silt, trace to some fine gravel			S-5, S-6, S-7
20			19.5		S-8
25		Medium dense, gray SAND; fine to medium grained, trace to some silt			S-9
30		woody debris at 30.5 ft	31.0		S-10
		Medium stiff, gray SILT: (11/30/88)	31.5		
35					

STD. PENETRATION RESISTANCE
(140 LB. WEIGHT, 30" DROP)
▲ BLOWS PER FOOT
● MOISTURE CONTENT, %



LEGEND

- 2.0" O.D. SPLIT SPOON SAMPLE
- 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- * SAMPLE NOT RECOVERED

ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- WATER LEVEL
- SLOTTED PVC
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- ■ UNDRAINED SHEAR STRENGTH (TSF)

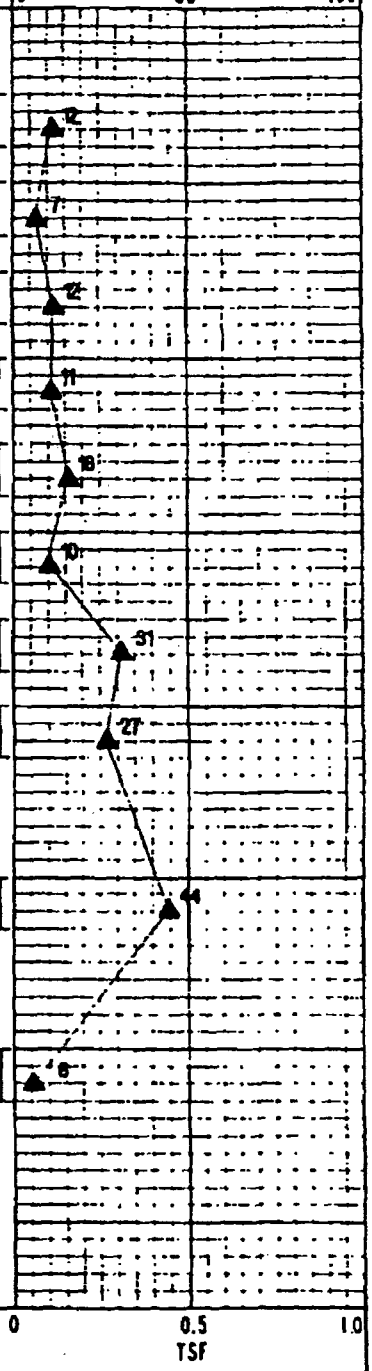
GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

BORING B-2

DATE MARCH 1989 JOB NO 436 FIG 2A

SCHN00171974

DEPTH, FT.	GRAPHIC LOG	CLASSIFICATION OF MATERIAL SURFACE ELEVATION: 34.5 FT ±	DEPTH, FT.	GROUNDWATER	SAMPLES
		Medium dense, gray SAND; fine to medium grained, trace silt	4.5		S-1
5		Loose, gray SAND; fine to medium grained, some silt, petroleum odor	7.0	(12/2/88)	S-2, S-3
10, 15		Medium dense, gray SAND; fine to medium grained, trace to some silt, petroleum odor	17.0		S-4, S-5, S-6
20, 25, 30		Medium dense to dense, gray SAND; fine to medium grained, trace silt, petroleum odor	31.5		S-7, S-8, S-9, S-10
35		(11/30/88)			



WELL COMPLETION DETAILS

- CEMENT GROUT
- BENTONITE
- COLORADO SAND
- 2-IN-O.D. PVC PIPE
- BLANK
- 0.020-IN. SLOTS

LEGEND

- 2.0" O.D. SPLIT SPOON SAMPLE
- 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- * SAMPLE NOT RECOVERED
- WATER LEVEL
- SLOTTED PVC
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- ■ UNDRAINED SHEAR STRENGTH (TSF)

ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

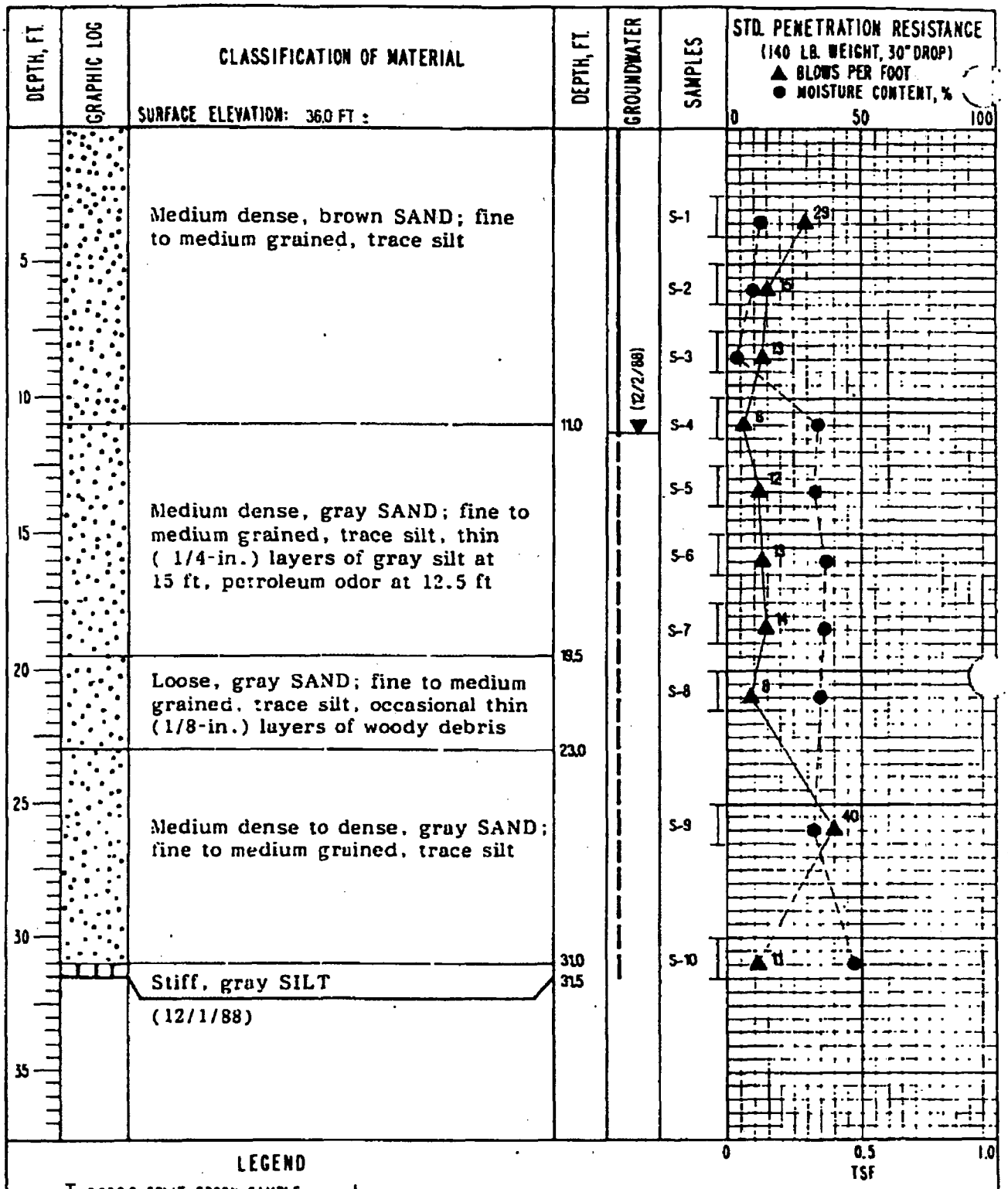
GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

BORING B-3

DATE MARCH 1989 JOB NO. 436 FIG 3A

SCHN00171975

DEPTH, FT.	GRAPHIC LOG	CLASSIFICATION OF MATERIAL SURFACE ELEVATION: 36.0 FT ±	DEPTH, FT.
		Medium dense, brown SAND; fine to medium grained, trace silt	11.0
		Medium dense, gray SAND; fine to medium grained, trace silt, thin (1/4-in.) layers of gray silt at 15 ft, petroleum odor at 12.5 ft	18.5
		Loose, gray SAND; fine to medium grained, trace silt, occasional thin (1/8-in.) layers of woody debris	23.0
		Medium dense to dense, gray SAND; fine to medium grained, trace silt	31.0
		Stiff, gray SILT (12/1/88)	31.5



LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- ▮ NX CORE RUN
- * SAMPLE NOT RECOVERED

ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- SLOTTED PVC
- ◆ TORVANE STRENGTH TONS/SQ.FT.(TSF)
- ■ UNDRAINED SHEAR STRENGTH (TSF)

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

BORING B-4

DATE MARCH 1989 JOB NO. 436 FIG 4A

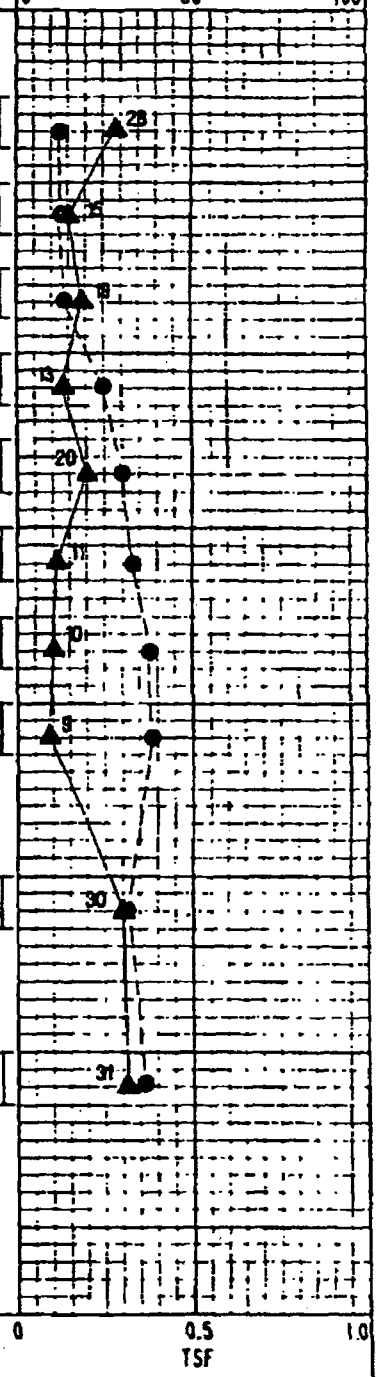
SCHN00171976

DEPTH, FT.	GRAPHIC LOG	CLASSIFICATION OF MATERIAL SURFACE ELEVATION: 35.9 FT ±	DEPTH, FT.
5 10		Medium dense, brown SAND; fine to medium grained, trace to some silt	12.0
15		Medium dense, gray SAND; fine to medium grained, trace silt	19.5
20 25 30		Loose, gray SAND; fine to medium grained, trace silt, occasional thin (1/4-in.) layers of woody debris at 20 ft medium dense to dense below 25 ft	31.5
35		(12/1/88)	

GROUNDWATER: (12/2/88)

SAMPLES: S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-8, S-9, S-10

STD. PENETRATION RESISTANCE
(140 LB. WEIGHT, 30" DROP)
▲ BLOWS PER FOOT
● MOISTURE CONTENT, %



LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- ▌ NX CORE RUN
- * SAMPLE NOT RECOVERED

ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- SLOTTED PVC
- ◆ TORVANE STRENGTH TONS/SQ.FT.(TSF)
- ■ UNDRAINED SHEAR STRENGTH (TSF)

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

BORING B-5

DATE MARCH 1989 JOB NO. 436 FIG 5A

SCHN00171977

APPENDIX B

CHEMICAL ANALYSES

Selected soil samples obtained from the borings on November 30, and December 1, 1988, and groundwater samples obtained on December 9, and 15, 1988, and January 30, 1989, were delivered to Coffey Laboratories, Inc. (CLI) for chemical analyses. The results of the chemical analyses are provided in the attached laboratory reports. Also provided are the results of analyses of the soil samples obtained from boring B-3A made by Geotechnical Resources, Inc. in 1986.

SCHN00171978

APPENDIX C

PUMP-OUT TEST

A pump-out test was performed on boring B-3 on February 7, 1989, to determine if it might be practical to recover free product from the groundwater by pumping. During the test, the well was pumped at rates of 2, 6, and 10 gpm until steady-state drawdown was achieved. Subsequently, the well was allowed to recover and was pumped at 10 gpm until equilibrium was reached. Prior to the start of the test, the thickness of free product was measured at 2 in. After the final pumping at 10 gpm and a short recovery period, the thickness of free product was 10 in. The pump-test data is provided below and summarized on Figure 1C.

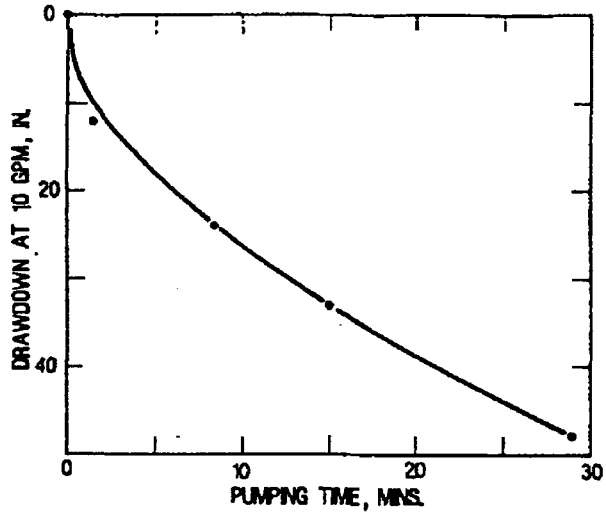
PUMP-TEST DATA
MONITORING WELL B-3
FEBRUARY 7, 1989

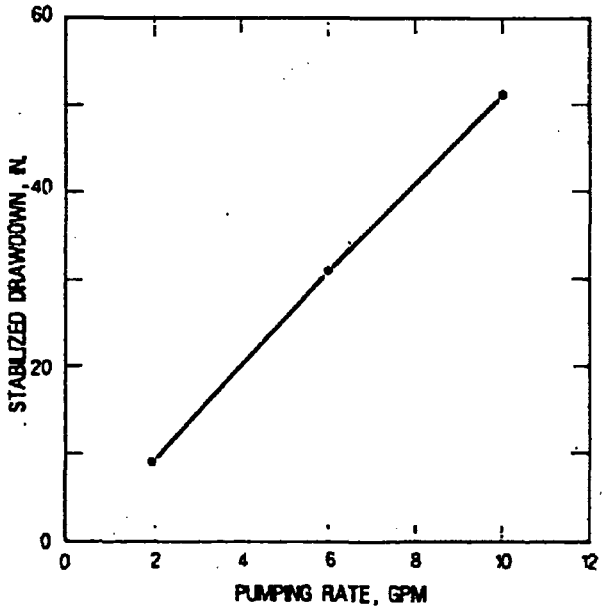
Elapsed Time, min.	Pumping Rate, gpm	Drawdown, in.
1.3	10	12
8.3	10	24
14.0	10	33
17.0	10	40
29.0	10	48

Stabilized Drawdown, in.	Pumping Rate, gpm
9	2
31	6
51	10

Projected Drawdown at 3 gpm = 14 in.
Initial Free-Product Thickness = 2 in.
Final Free-Product Thickness = 10 in.

SCHN00171979





GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS
PRENDERGAST & ASSOCIATES, INC.
PRELIMINARY SITE SCREENING - TERMINAL TRANSFER

PUMP TEST RESULTS
(MONITORING WELL B-3)

DATE MARCH 1989 JOB NO. 436 FIG. 1C

SCHN00171980

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

December 14, 1988
Log #A881202-P8
PO # 436

Geotechnical Resources, Inc.
7412 SW Beaverton Hillsdale Hwy
Suite 102
Portland, OR 97225
Attention: W.S. Titus

Sample Received: 12/2/88

Sample ID: #1-TT,B-1,S-6, 11/30/88
#2-TT,B-2,S-6, 11/30/88
#3-TT,B-3,S-2, 11/30/88
#4-TT,B-3,S-6, 11/30/88
#5-TT,B-3,S-10, 11/30/88
#6-TT,B-4,S-5, 12/1/88
#7-TT,B-4,S-10, 12/1/88
#8-TT,B-5,S-5, 12/1/88

SAMPLE ID	TOTAL PETROLEUM HYDROCARBONS EPA 418.1	PCB'S EPA 8080
#1	< 3	< 0.2
#2	< 3	< 0.2
#3	5,800	< 2
#4	8.6	< 0.2
#5	< 3	< 0.2
#6	35.5	< 0.2
#7	< 3	< 0.2
#8	< 3	< 0.2

Results expressed as mg/kg unless otherwise noted.

The less than < symbol means none detected at or above the indicated value and represents the detection limit for the method.

Sincerely,

Victor A. Perry,
Quality Assurance

Sincerely,

Susan M. Coffey
President

SMC/mln

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the report date, or until the maximum holding time expires.

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

December 13, 1988
Log #A881209-X2
PO# 436

Geotecnnical Resources, Inc.
7412 SW Beaverton Hills Hwy
Suite 102
Portland, OR 97225
Attention: Willard Titus

Sample Collected: 12/09/88 a.m.
Sample Received: 12/09/88

SAMPLE ID	TOTAL PETROLEUM HYDROCARBONS Modified EPA 418.1	UNITS
TT-B-3 #1 (12/09/88)	4.7	mg/L
TT-B-3 #2 (12/09/88)	4.0	mg/L

Sincerely,

Victor A. Perry,
Quality Assurance

Sincerely,

Susan M. Coffey
President

SMC/lws

[illegible] Samples are retained a maximum of 15 days from the report date [illegible] the maximum holding time expires

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

December 20, 1988
Log# A881215-K2

Geotechnical Resources, Inc.
7412 SW Beaverton-Hillsdale Hwy.
Suite 102
Portland, OR 97225
Attention: Bill Titus

Sample Collected: 12/15/88, pm
Sample Received: 12/15/88

SUBJECT: EPA Method 624 - Volatile Organics GC/MS

VOLATILES	DETECTION LIMIT	LABORATORY BLANK	TT B-3 3B
Benzene	1.0	1.2	14
Bromodichloromethane	0.5	ND	ND
Bromoform	1	ND	ND
Bromomethane	5	ND	ND
Carbon tetrachloride	0.5	ND	ND
Chlorobenzene	0.5	ND	ND
Chloroethane	5	ND	ND
2-Chloroethylvinyl ether	50	ND	ND
Chloroform	0.5	ND	ND
Chloromethane	10	ND	ND
Dibromochloromethane	0.5	ND	ND
1,2-Dichlorobenzene	0.5	ND	ND
1,3-Dichlorobenzene	0.5	ND	ND
1,4-Dichlorobenzene	0.5	ND	ND
1,1-Dichloroethane	0.5	ND	ND
1,2-Dichloroethane	0.5	ND	ND
1,1-Dichloroethene	0.5	ND	ND
trans-1,2-Dichloroethene	0.5	ND	0.9
1,2-Dichloropropane	1	ND	ND
cis-1,3-Dichloropropene	0.5	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND
Ethylbenzene	1	ND	5.9
Methylene chloride	1.0	2.8	ND
1,1,2,2-Tetrachloroethane	0.5	ND	ND
Tetrachloroethene	0.5	ND	ND
Toluene	0.5	< 0.5, trace	0.5
1,1,1-Trichloroethane	0.5	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND
Trichloroethene	0.5	ND	ND
Trichlorofluoromethane	1.0	12	4.5
Vinyl Chloride	10	ND	14
Xylenes	5	ND	ND

Results expressed as ug/L unless otherwise noted.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

December 20, 1988
Log# A881215-K2

Geotechnical Resources, Inc.
Page 2

Sample Collected: 12/15/88, pm

SUBJECT: EPA Method 624 - Volatile Organics GC/MS

ANALYTE	DETECTION LIMIT	TT B-3 4B
Benzene	1.0	20
Bromodichloromethane	0.5	ND
Bromoform	1	ND
Bromomethane	5	ND
Carbon tetrachloride	0.5	ND
Chlorobenzene	0.5	ND
Chloroethane	5	ND
2-Chloroethylvinyl ether	50	ND
Chloroform	0.5	ND
Chloromethane	10	ND
Dibromochloromethane	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
1,1-Dichloroethane	0.5	ND
1,2-Dichloroethane	0.5	ND
1,1-Dichloroethene	0.5	ND
trans-1,2-Dichloroethene	0.5	1.7
1,2-Dichloropropane	1	ND
cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
Ethylbenzene	1	9.6
Methylene chloride	1.0	9.8*
1,1,2,2-Tetrachloroethane	0.5	ND
Tetrachloroethene	0.5	ND

Results expressed as ug/L unless otherwise noted.

* The Methylene chloride result may be due to travel/laboratory contamination.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

December 20, 1988
Log# A881215-K2

Geotechnical Resources, Inc.
Page 3

Sample Collected: 12/15/88, pm

SUBJECT: EPA Method 624 - Volatile Organics GC/MS

ANALYTE	DETECTION LIMIT	TT B-3 4B (Continued)
Toluene	0.5	0.7
1,1,1-Trichloroethane	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Trichloroethene	0.5	ND
Trichlorofluoromethane	1.0	5.4
Vinyl Chloride	10	16
Xylenes	5	ND

Results expressed as ug/L unless otherwise noted.

Sincerely,

Victor A. Perry,
Quality Assurance

Sincerely,

Susan M. Coffey
President

SMC/gle

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the report date, or until the maximum holding time expires.

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

February 3, 1989
Log #A890130-K
PO# 436

Geotechnical Resources
7412 SW Beaverton Hills Hwy.
Suite 102
Portland, OR 97225
Attention: Bill Titus

Sample Collected: 01/30/89
Sample Received: 01/30/89

Analysis Requested: Volatile Organics by EPA Method 624, GC/MS

ANALYTE	DETECTION LIMIT	LABORATORY BLANK	436-1
Benzene	1	< 1 trace	< 1 trace
Bromodichloromethane	0.5	ND	ND
Bromoform	1	ND	ND
Bromomethane	5	ND	ND
Carbon tetrachloride	0.5	ND	ND
Chlorobenzene	0.5	ND	ND
Chloroethane	5	ND	ND
2-Chloroethylvinyl ether	50	ND	ND
Chloroform	0.5	ND	ND
Chloromethane	10	ND	ND
Dibromochloromethane	0.5	ND	ND
1,2-Dichlorobenzene	0.5	ND	ND
1,3-Dichlorobenzene	0.5	ND	ND
1,4-Dichlorobenzene	0.5	ND	ND
1,1-Dichloroethane	0.5	ND	ND
1,2-Dichloroethane	0.5	ND	ND
1,1-Dichloroethene	0.5	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND
1,2-Dichloropropane	1	ND	ND
cis-1,3-Dichloropropene	0.5	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND
Ethyl benzene	1	ND	ND
Methylene chloride	1	ND	ND

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

Log #A890130K2

Analysis Requested: Volatile Organics by EPA Method 524. GC/MS Con't

ANALYTE	DETECTION LIMIT	LABORATORY BLANK	436-1
1,1,2,2-Tetrachloroethane	0.5	ND	ND
Tetrachloroethene	0.5	ND	ND
Toluene	0.5	ND	ND
1,1,1-Trichloroethane	0.5	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND
Trichloroethene	0.5	ND	ND
Trichlorofluoromethane	1	< 1 trace	4.9
Vinyl chloride	5	ND	ND

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed

REPORT CONTINUES

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

Log #A890130-

Geotechnical Resources
Page 3
Sample Received: 01/30/89

Analysis Requested: Volatile Organics by EPA Method 624, GC/MS

ANALYTE	DETECTION LIMIT	436-2	436-3
Benzene	1	< 1 trace	48.8
Bromodichloromethane	0.5	ND	ND
Bromoform	1	ND	ND
Bromomethane	5	ND	ND
Carbon tetrachloride	0.5	ND	ND
Chlorobenzene	0.5	ND	ND
Chloroethane	5	ND	ND
2-Chloroethylvinyl ether	50	ND	ND
Chloroform	0.5	ND	ND
Chloromethane	10	ND	ND
Dibromochloromethane	0.5	ND	ND
1,2-Dichlorobenzene	0.5	ND	ND
1,3-Dichlorobenzene	0.5	ND	ND
1,4-Dichlorobenzene	0.5	ND	ND
1,1-Dichloroethane	0.5	ND	ND
1,2-Dichloroethane	0.5	ND	ND
1,1-Dichloroethene	0.5	ND	ND
trans-1,2-Dichloroethene	0.5	ND	3.2
1,2-Dichloropropane	1	ND	ND
cis-1,3-Dichloropropene	0.5	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND
Ethyl benzene	1	ND	27.5
Methylene chloride	1	ND	ND

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

Log #A890130K2

Analysis Requested: Volatile Organics by EPA Method 624, GC/MS Con't.

ANALYTE	DETECTION LIMIT	436-2	436-3
1,1,2,2-Tetrachloroethane	0.5	ND	ND
Tetrachloroethene	0.5	ND	ND
Toluene	0.5	ND	2.2
1,1,1-Trichloroethane	0.5	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND
Trichloroethene	0.5	ND	ND
Trichlorofluoromethane	1	< 1 trace	ND
Vinyl chloride	5	ND	<10 trace*

*Manipulation of the sample necessary to separate water and oil layers may have caused loss of vinyl chloride prior to analysis.

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

Log #A890130--

Geotechnical Resources
Page 5
Sample Received: 01/30/89

Analysis Requested: Volatile Organics by EPA Method 624, GC/MS

ANALYTE	DETECTION LIMIT	436-5	436-6
Benzene	1	1.0	1.0
Bromodichloromethane	0.5	ND	ND
Bromoform	1	ND	ND
Bromomethane	5	ND	ND
Carbon tetrachloride	0.5	ND	ND
Chlorobenzene	0.5	ND	ND
Chloroethane	5	ND	ND
2-Chloroethylvinyl ether	50	ND	ND
Chloroform	0.5	ND	1.5
Chloromethane	10	ND	ND
Dibromochloromethane	0.5	ND	ND
1,2-Dichlorobenzene	0.5	ND	ND
1,3-Dichlorobenzene	0.5	ND	ND
1,4-Dichlorobenzene	0.5	ND	ND
1,1-Dichloroethane	0.5	ND	ND
1,2-Dichloroethane	0.5	ND	ND
1,1-Dichloroethene	0.5	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND
1,2-Dichloropropane	1	ND	ND
cis-1,3-Dichloropropene	0.5	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND
Ethyl benzene	1	ND	ND
Methylene chloride	1	ND	ND

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
4914 N.E. 122nd Ave.
Portland, OR 97230
Phone: (503) 254-1794

Log #A890130K2

Analysis Requested: Volatile Organics by EPA Method 624, GC/MS Con't

ANALYTE	DETECTION LIMIT	436-5	436-6
1,1,2,2-Tetrachloroethane	0.5	ND	ND
Tetrachloroethene	0.5	ND	ND
Toluene	0.5	ND	0.6
1,1,1-Trichloroethane	0.5	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND
Trichloroethene	0.5	ND	ND
Trichlorofluoromethane	1	ND	4.4
Vinyl chloride	5	5.5	ND
Xylenes (Total)	2	ND	ND

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

Sincerely,

Victor A. Perry,
Quality Assurance

Sincerely,

Susan M. Coffey,
President

SMC/lws

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the report date or until the maximum hold time, whichever is

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

FILE COPY

February 27, 1990

J\FUELLTR.436

Prendergast & Associates
121 SW Morrison Street, Suite 1200
Portland, OR 97204

Attention: John Carroll

SUBJECT: FUEL LINE DECOMMISSIONING, TERMINAL TRANSFER, 3601 NW YEON, PORTLAND, OREGON

At your request, Geotechnical Resources, Inc. (GRI) is monitoring the fuel line decommissioning being performed by Pacific Tank and Construction Company (PTCC) at the Terminal Transfer property on 3601 NW Yeon Street, Portland, Oregon. The purpose of this letter is to notify you that an area of hydrocarbon contamination was encountered this morning along about a 40-ft length of the eastern fuel line. This area of contamination is about 150 to 200 ft southeast of the contaminated zone identified in our report of March 2, 1989.

Recognizing that an additional several hundred feet of fuel line must be removed and that other contaminated zones may exist, we recommend the following phased approach for decommissioning, investigation, and mitigation.

1) Observe the subgrade of all fuel line excavations; sample the exposed subgrade at selected locations.

2) Identify all portions of trench that exhibit evidence of discoloration, odor, sheen, or free product. Inventory these locations and identify in the field by painting the pavement. Use hand auger to obtain soil samples below trench subgrade in these areas for chemical testing.

3) Decommission fuel line by removal in accordance with PTCC proposal.

4) Backfill fuel line trenches with the excavated material, being careful to replace the backfill at its original location.

5) Complete Phase I laboratory testing and evaluate relative level of contamination of identified areas.

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6) On completion of fuel line decommissioning, evaluate all areas of identified contamination to document the vertical and lateral extent of the contamination. This work will include additional trenching, sampling, and testing.

7) Upon completion of the above, a program for final decommissioning will be prepared for review by the DEQ and completion by PTCC.

In our opinion, this approach will be most efficient and cost effective with respect to the efforts of PTCC and GRI. This approach will also provide you with an appreciation for the costs associated with the decommissioning that would be in excess of the estimate prepared by PTCC in their letters dated February 9, 1990.

We will keep you informed of our observations related to the fuel line decommissioning.

Respectfully submitted for,

GEOTECHNICAL RESOURCES, INC.

David D. Driscoll, P.E.
Principal

SCHN00171993

GEOTECHNICAL RESOURCES, INC.

CONSULTING ENGINEERS AND GEOLOGISTS

March 9, 1990

J\DECOMMIS.436

Prendergast & Associates
121 SW Morrison Street, Suite 1200
Portland, OR 97204

Attention: John Carroll

SUBJECT: FUEL LINE DECOMMISSIONING, TERMINAL TRANSFER, 3601 NW YEON, PORTLAND, OREGON

At your request, Geotechnical Resources, Inc. (GRI) has completed the monitoring of the fuel line decommissioning being performed by Pacific Tank and Construction Company (PTCC) at the Terminal Transfer property at 3601 NW Yeon Street in Portland, Oregon. The attached map shows the location of the fuel lines being decommissioned. During the decommissioning process, we examined the subgrade of all fuel line excavations, collected soil samples at regular intervals for chemical analysis, and observed replacement of the excavated material. Sampling locations are indicated on the attached map.

During our work, we noted an area of hydrocarbon contamination along a 40-ft length of the eastern fuel line. The results of chemical analysis of samples from the excavation subgrade in this area and from a shallow test pit excavated in the center of the area are provided below.

Sampling Station Number	Depth, ft	Total Petroleum Hydrocarbon, ppm
4	2	14.3
5	2	<3.0
6	2	<3.0
6	3	283.0
6	5	378.0
6	7	6.9
7	2	<3.0
8	2	<3.0

It appears that the levels of contamination are relatively low and that the extent of area involved is limited. Remediation of this sort of condition is commonly accomplished by removing the source (which has been accomplished), excavating and disposing of the contaminated material off-site, and backfilling the excavation with clean fill.

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During the decommissioning of the western fuel line, we detected strong petroleum odors and observed a sheen on the soils excavated from the entire length of the line. It is our opinion that this contamination is related to the diesel spill which we documented during our subsurface exploration work in that area last spring (refer to our report to you dated March 2, 1989). It appears that the levels of contamination are relatively high and that the area involved is substantial, not only in areal extent but in depth. In addition, based on our previous work, it is apparent that free product has reached the local groundwater table.

If you have any questions regarding this matter, please feel free to contact me at any time.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

David D. Driscoll

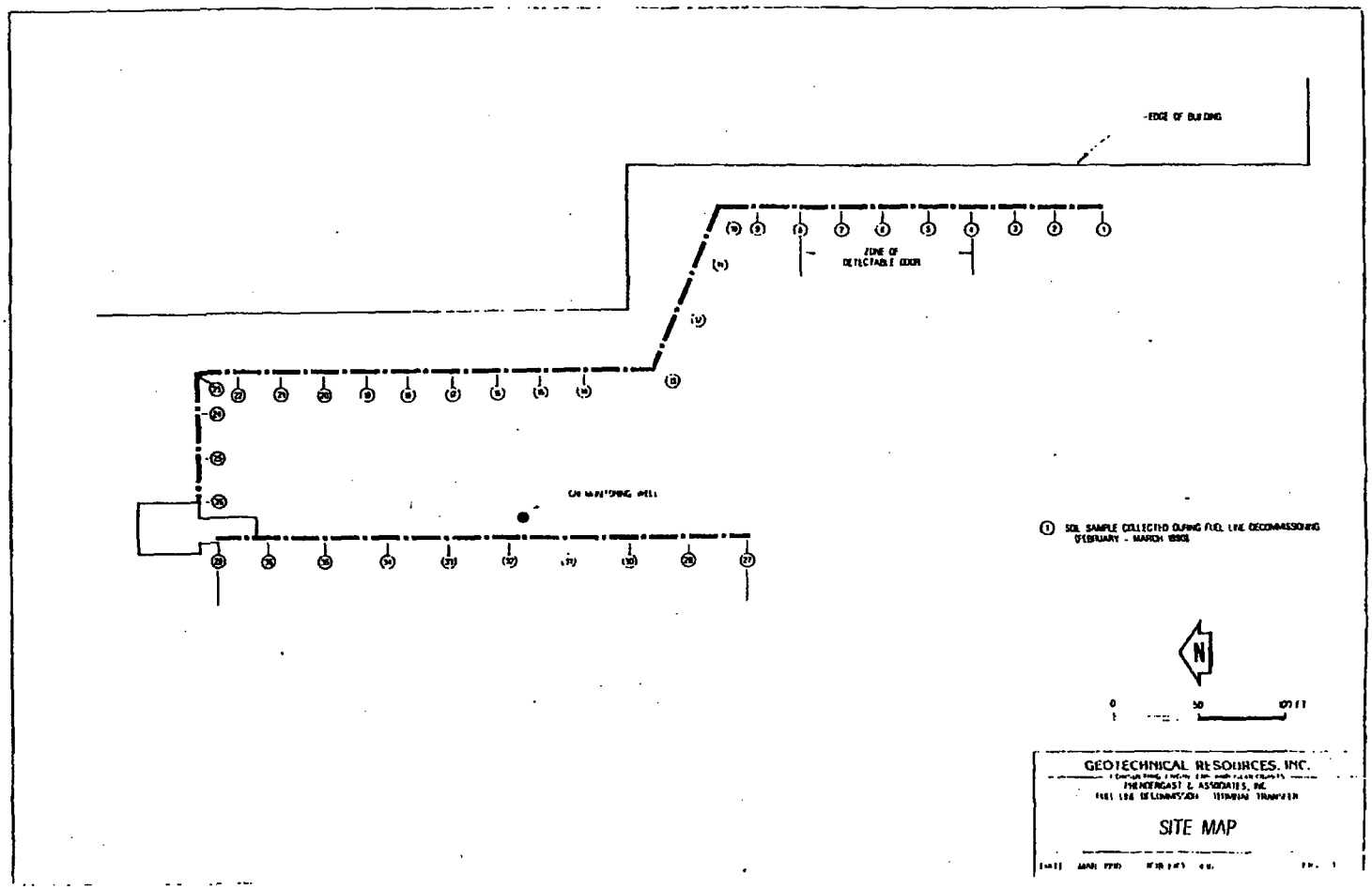
David D. Driscoll, P.E.
Principal

Willard S. Titus

Willard S. Titus
Staff Geologist

Attachment: Site Plan

SCHN00171995



SCHN00171996

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

March 30, 1990

J/SKEDULE.655

FILE COPY

Northwest Region
Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204

Attention: Loren Garner

SUBJECT: REMEDIATION OF HYDROCARBON RELEASE, TERMINAL TRANSFER PROPERTY, 3601 NW YEON ST., PORTLAND, OREGON

At the request of John Carroll of Prendergast & Associates, Geotechnical Resources, Inc. (GRI), is conducting an evaluation of the hydrocarbon contamination that has occurred at the above-referenced site. The evaluation is being completed as part of Prendergast & Associates' "due diligence" in preparing to purchase the property.

During the first phase of our investigation, hydrocarbon contamination was observed in the soil and on the groundwater surface as "free product." The observed soil and groundwater contamination at the site was reportedly associated with the underground fueling system installed and operated by Mr. Richard Kathrens, the present owner of Terminal Transfer. As a result, Prendergast & Associates made a prepurchase agreement with Mr. Kathrens to have the underground fuel lines removed. That work was accomplished during the first week of March 1990. The work was conducted by Pacific Tank and Construction Company and observed by GRI personnel. GRI's report of the fuel line decommissioning project is attached.

During the fuel line decommissioning project, an area of fuel contamination was discovered along a 40-ft length of the eastern fuel line. This contamination appears to be the result of leakage from a joint or fitting in the eastern fuel line which reportedly carried gasoline. GRI conducted a preliminary investigation of the problem and concluded that the levels of contamination are relatively low, limited in area, and that the contamination is unrelated to the previously reported and more extensive diesel contamination along the western fuel line. To expedite the sale of the property, Prendergast & Associates has agreed to remediate the gasoline contamination along the eastern fuel line.

Scope of Work

Based on our conversations with you on March 27, 1990, we propose to undertake the following scope of work to assist in the remediation of the eastern fuel line.

1) An exploratory boring will be drilled in the center of the contaminated area. This boring will extend 10 ft below the static groundwater level and will be completed as a monitoring well. Soil samples will be collected as the boring is advanced; groundwater samples will be collected from the monitoring well after it is completed. The soil and groundwater samples will be analyzed for total petroleum hydrocarbons (TPH). Subsequently, the soil sample with the highest level of TPH will be analyzed for benzene, toluene, xylene, and ethylbenzene (BTX&E). The results of these analyses will be used to determine the nature of the contamination, the depth of the contaminated soil, and the degree to which the groundwater quality has been affected.

2) The asphalt and concrete pavement in the immediate vicinity of the portion of the east fuel line that leaked will be removed and the contaminated soil (soil containing TPHs in excess of 80 ppm) will be excavated. Soil samples will be collected from the bottom and sidewalls of the excavation to document that the removal of contaminated soil has been completed.

3) The contaminated soil will either be removed from the site and disposed of in an approved landfill or spread in a thin layer on the site and aerated. TPH levels in the aerated soil will be monitored until they drop below 80 ppm. At that time, the soil will be returned to the excavation as compacted structural fill and the pavement will be replaced.

4) Informal reports will be made to your office as the work progresses; a formal report of the project will be made to you when the work has been completed.

It should be understood that GRI's participation in the remediation effort will be limited to observations and testing and establishment of the limits of excavation; the actual excavation will be performed by a DEQ-approved subcontractor retained by Prendergast & Associates.

It is our intention to begin the work outlined above on or about April 7, 1990. Please contact me as soon as possible if you have any suggestions or comments you would like to discuss.

Respectfully submitted for,
GEOTECHNICAL RESOURCES, INC.

David D. Driscoll

David D. Driscoll, P.E.
Principal

Attachment: GRI report to Prendergast & Associates regarding decommission of eastern fuel line (March 9, 1990)

cc: John Carroll/Prendergast & Associates

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

May 31, 1990 J\REMEDIAT.655

Prendergast & Associates, Inc.
121 SW Morrison Street, Suite 1200
Portland, OR 97204

Attention: John Carroll

SUBJECT: REMEDIATION OF SOIL AND GROUNDWATER CONTAMINATION BY HYDROCARBONS, TERMINAL TRANSFER FACILITY, PORTLAND, OREGON

As discussed in our attached letter dated March 9, 1990, soil contamination due to gasoline was revealed during removal of old fuel distribution lines at the above-referenced facility A groundwater monitoring well was subsequently installed in boring B-6 located in the area of the contaminated soil as shown on the attached Site Map. Also attached are the log of boring B-6 with well construction details , and the results of chemical analyses of soil and groundwater samples obtained from boring B-6 on April 12 and 13, and May 10, 1990. We anticipate that the soil and groundwater contamination is localized.

Based on our understanding of the soil and groundwater conditions at the site and discussions with Oregon Department of Environmental Quality (DEQ) personnel, we recommend the following approach to remediate the soil and groundwater contamination:

1. Excavate and remove contaminated soil taking care not to disturb the existing monitoring well. Remove all soils exhibiting odor, sheen, or discoloration. Contaminated soil is defined as soil containing total petroleum hydrocarbons (TPH) in excess of 80 ppm.

2. Sample and analyze soils in the bottom and sidewalls of the excavation to document removal of contaminated soils.

3. Remove the excavated contaminated soils from the site and disposed of at an approved landfill, or spread in a thin layer over the ground surface and aerated to reduce the level of the volatile organic compounds to an acceptable level (less than 80 ppm TPH).

4. Backfill the excavation with imported, uncontaminated fill, or with the treated soil that was removed from the excavation.

5. Pump and periodically sample the existing 2-in.-diameter monitoring well in boring B-6 until levels of Benzene, Toluene, Xylene, and Ethylbenzene (BTX&E)

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are reduced to acceptable levels. Based on our field observations, we anticipate that the well can be pumped continuously at a rate of 2 to 3 gpm. The limited pumping and chemical analysis data suggest that the BTX&E levels lower rapidly with pumping. We anticipate that the pumped water can be disposed of in the City's sewer; however, this will be confirmed with the City prior to groundwater pumping.

6. Groundwater samples will be obtained during pumping and 1 month and 3 months after completion of groundwater pumping and the samples will be analyzed for BTX&E to evaluate and document the remediation.

All remediation activities will be coordinated, observed, and documented by a geologist or geotechnical engineer provided by this office. Please contact the undersigned if you have any questions.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

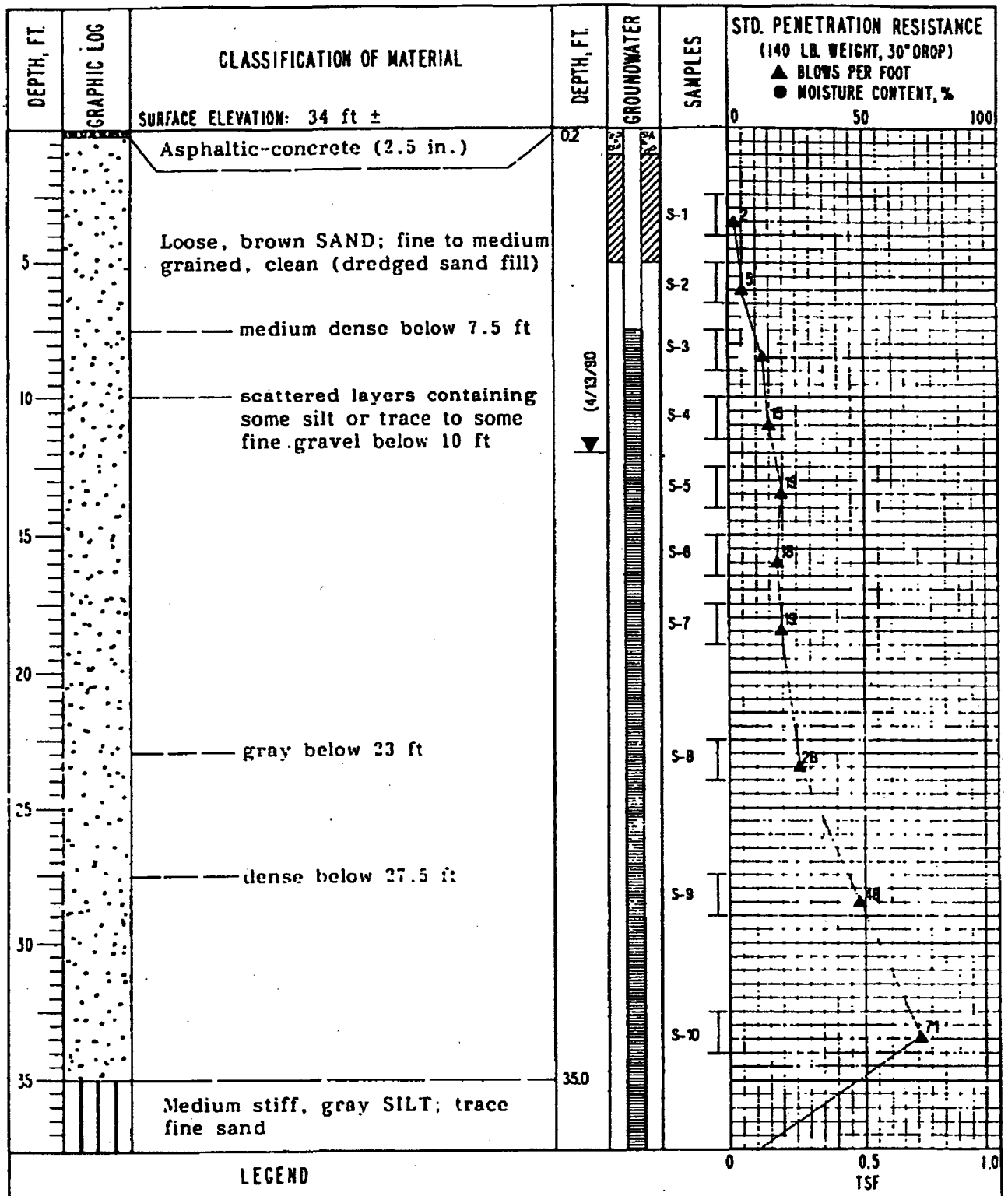
Dwight J. Hardin, P.E.
Principal

Willard S. Titus
Staff Geologist

Attachments:

Site Map (dated May 1990)
Log of boring B-6 (dated May 1990)
Analytical test results (dated April 17, 18, and May 18, 1990)
Letter from GRI to Joh Carroll (dated March 9, 1990)

SCHN00172000



LEGEND

- 2.0" O.D. SPLIT SPOON SAMPLE
- 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- * SAMPLE NOT RECOVERED

ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT

- WATER LEVEL
- SLOTTED PVC
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- ■ UNDRAINED SHEAR STRENGTH (TSF)

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

BORING B-6

DATE MAY 1990 JOB NO 655 FIG 6A

SCHN00172001

DEPTH, FT.	GRAPHIC LOG	CLASSIFICATION OF MATERIAL SURFACE ELEVATION: 34 ft ±	DEPTH, FT.	GROUNDWATER	SAMPLES	STD. PENETRATION RESISTANCE (140 LB. WEIGHT, 30" DROP) ▲ BLOWS PER FOOT ● MOISTURE CONTENT, %
		Medium stiff, gray SILT; trace fine sand	39.0		S-11	
40		(4/12/90)				
45		NOTE: See figure 3A for Well Completion Details				
50						
55						
60						
65						
70						
75						

0 50 100

0 0.5 1.0
TSF

LEGEND

- 2.0" O.D. SPLIT SPOON SAMPLE
- 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- * SAMPLE NOT RECOVERED

ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT

- WATER LEVEL
- SLOTTED PVC
- ◆ TORVANE STRENGTH TONS/SQ.FT. (TSF)
- ■ UNDRAINED SHEAR STRENGTH (TSF)

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

BORING B-6 (CONT.)

DATE MAY 1990 JOB NO. 655 FIG. 6A

SCHN00172002

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

April 17, 1990
Log # A900413-H10
PO # 655

Geotechnical Resources, Inc.
7412 SW Beaverton-Hillsdale, Hwy
Suite 102
Portland, OR 97225
Attention: Liane Scull

PROJECT NAME: Terminal Transfer PROJECT NUMBER: 655

Sample(s) Collected: 4/12/90
Sample(s) Received: 4/13/90

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

SAMPLE ID	SAMPLE RESULTS
655: B-1,S-1;2.5', 1450 HRS	117
655: B-1,S-2;5', 1458 HRS	180
655: B-1,S-3;7.5', 1500 HRS	34
655: B-1,S-4;10', 1503 HRS	126
655: B-1,S-5;12.5', 1508 HRS	ND
655: B-1,S-6;15', 1512 HRS	12
655: B-1,S-7;17.5', 1517 HRS	ND
655: B-1,S-8;22.5', 1527 HRS	10
655: B-1,S-9;27.5', 1539 HRS	15
655: B-1,S-10;32.5' 1555 HRS	21
655: B-1,S-10;32.5/DUPLICATE	15

Note: References to B-1 on this report refer to GRI boring B-6

Detection Limit: 3.0 mg/kg

Results expressed as mg/kg unless otherwise noted.

ND means none detected at or above the detection limit listed.

Sincerely,

Victor A. Perry,
Quality Assurance

Sincerely,

Renee Chauvin,
Technical Director

RJC/mlh

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

April 18, 1990
Log #A900413-AL

Geotechnical Resources, Inc.
7412 SW Beav.-Hills Hwy
Portland, OR 97225
Attention: Tim Pfeiffer

PROJECT NAME: Terminal Transfer PROJECT NUMBER: 655

Samples Collected: 04/13/90 1515 hrs.
Samples Received: 04/13/90

Analysis Requested: Total Petroleum Hydrocarbons in water by EPA Method 418.1

SAMPLE ID	SAMPLE RESULTS
#655, B1	6.0

Detection Limit: 0.2 mg/L

Results expressed as mg/L unless otherwise noted.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

Log #A900413-AL

Geotechnical Resources, Inc.
Page 2

Samples Collected: 04/13/90 1515 hrs.
Samples Received: 04/13/90

Analysis Requested: Volatile Organics in water by EPA Method 624, GC/MS

ANALYTE	DETECTION LIMIT	LABORATORY BLANK
Acetone	1000	ND
Acetonitrile	1000	ND
Acrylonitrile	250	ND
Benzene	10	ND
Bromodichloromethane	2.5	ND
Bromoform	5	ND
Bromomethane	50	ND
2-Butanone (MEK)	500	ND
Carbon disulfide	25	ND
Carbon tetrachloride	2.5	ND
Chlorobenzene	2.5	ND
Chloroethane	50	ND
2-Chloroethylvinyl ether	250	ND
Chloroform	2.5	ND
Chloromethane	50	ND
Dibromochloromethane	2.5	ND
Dibromomethane	5	ND
Dichlorodifluoromethane	25	ND
1,2-Dichlorobenzene	5	ND
1,3-Dichlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
1,1-Dichloroethane	2.5	ND
1,2-Dichloroethane	2.5	ND
1,1-Dichloroethene	2.5	ND
trans-1,2-Dichloroethene	2.5	ND
1,2-Dichloropropane	5	ND
cis-1,3-Dichloropropene	2.5	ND
trans-1,3-Dichloropropene	2.5	ND
1,4-Dioxane	1000	ND

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

Log# A900413-AL

Geotechnical, Inc.
Page 3

Analysis Requested: Volatile Organics in water by EPA Method 624, GC/MS

ANALYTE	DETECTION LIMITS	LABORATORY BLANK
Ethyl acetate	250	ND
Ethyl benzene	5	ND
2-Hexanone	500	ND
Methylene chloride	10	ND
4-Methyl-2-pentanone	500	ND
Styrene	25	ND
1,1,2,2-Tetrachloroethane	2.5	ND
Tetrachloroethene	2.5	ND
Toluene	2.5	ND
1,1,1-Trichloroethane	2.5	ND
1,1,2-Trichloroethane	2.5	ND
Trichloroethene	2.5	ND
Trichlorofluoromethane	5	ND
1,2,3-Trichloropropane	5	ND
Vinyl acetate	500	ND
Vinyl chloride	50	ND
Xylenes (Total)	10	ND

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

Log #A900413-AL

Geotechnical Resources, Inc.
Page 4

Samples Collected: 04/13/90 1515 hrs.
Samples Received: 04/13/90
Sample ID: #655, B-1

Analysis Requested: Volatile Organics in water by EPA Method 624, GC/MS

ANALYTE	DETECTION LIMITS	SAMPLE RESULTS
Acetone	1000	ND
Acetonitrile	1000	ND
Acrylonitrile	250	ND
Benzene	10	734
Bromodichloromethane	2.5	ND
Bromoform	5	ND
Bromomethane	50	ND
2-Butanone (MEK)	500	ND
Carbon disulfide	25	ND
Carbon tetrachloride	2.5	ND
Chlorobenzene	2.5	ND
Chloroethane	50	ND
2-Chloroethylvinyl ether	250	ND
Chloroform	2.5	ND
Chloromethane	50	ND
Dibromochloromethane	2.5	ND
Dibromomethane	5	ND
Dichlorodifluoromethane	25	ND
1,2-Dichlorobenzene	5	ND
1,3-Dichlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
1,1-Dichloroethane	2.5	ND
1,2-Dichloroethane	2.5	ND
1,1-Dichloroethene	2.5	ND
trans-1,2-Dichloroethene	2.5	ND
1,2-Dichloropropane	5	ND
cis-1,3-Dichloropropene	2.5	ND
trans-1,3-Dichloropropene	2.5	ND
1,4-Dioxane	1000	ND

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

Log #A900413-AL

Geotechnical Resources, Inc.
Page 5

Samples Collected: 04/13/90 1515 hrs.
Samples Received: 04/13/90
Sample ID: #655, B-1

Analysis Requested: Volatile Organics in water by EPA Method 624, GC/MS

ANALYTE	DETECTION LIMIT	SAMPLE RESULTS
Ethyl acetate	250	ND
Ethyl benzene	5	1280
2-Hexanone	500	ND
Methylene chloride	10	ND
4-Methyl-2-pentanone	500	ND
Styrene	25	ND
1,1,2,2-Tetrachloroethane	2.5	ND
Tetrachloroethene	2.5	ND
Toluene	2.5	5810
1,1,1-Trichloroethane	2.5	ND
1,1,2-Trichloroethane	2.5	ND
Trichloroethene	2.5	ND
Trichlorofluoromethane	5	ND
1,2,3-Trichloropropane	5	ND
Vinyl acetate	500	ND
Vinyl chloride	50	ND
Xylenes (Total)	10	6950

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

Sincerely,

Victor A. Perry,
Quality Assurance

Sincerely,

Susan M. Coffey
President

SMC/lws

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the report date, or until the maximum holding time expires.

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

May 18, 1990
Log #A900510-AE
PO #655

Geotechnical Resources, Inc.
7412 SW Beaverton-Hillsdale Hwy.
Suite 102
Portland, OR 97225
Attention: Tim Pfeiffer

PROJECT NAME: Terminal Transfer PROJECT NUMBER: 655

Sample Collected: 05/10/90, 1605 hrs.
Sample Received: 05/10/90

Analysis Requested: BTXE in wastewater by EPA Method 8020,GC/PID

ANALYTE	DETECTION LIMIT	LABORATORY BLANK	BH-1 RESULTS
Benzene	0.2	ND	428
Ethylbenzene	0.2	ND	572
Toluene	0.3	ND	2,380
Total Xylenes	0.3	ND	2,890

Results expressed as ug/L unless otherwise noted.

ND means none detected at or above the detection limit listed.

Sincerely,

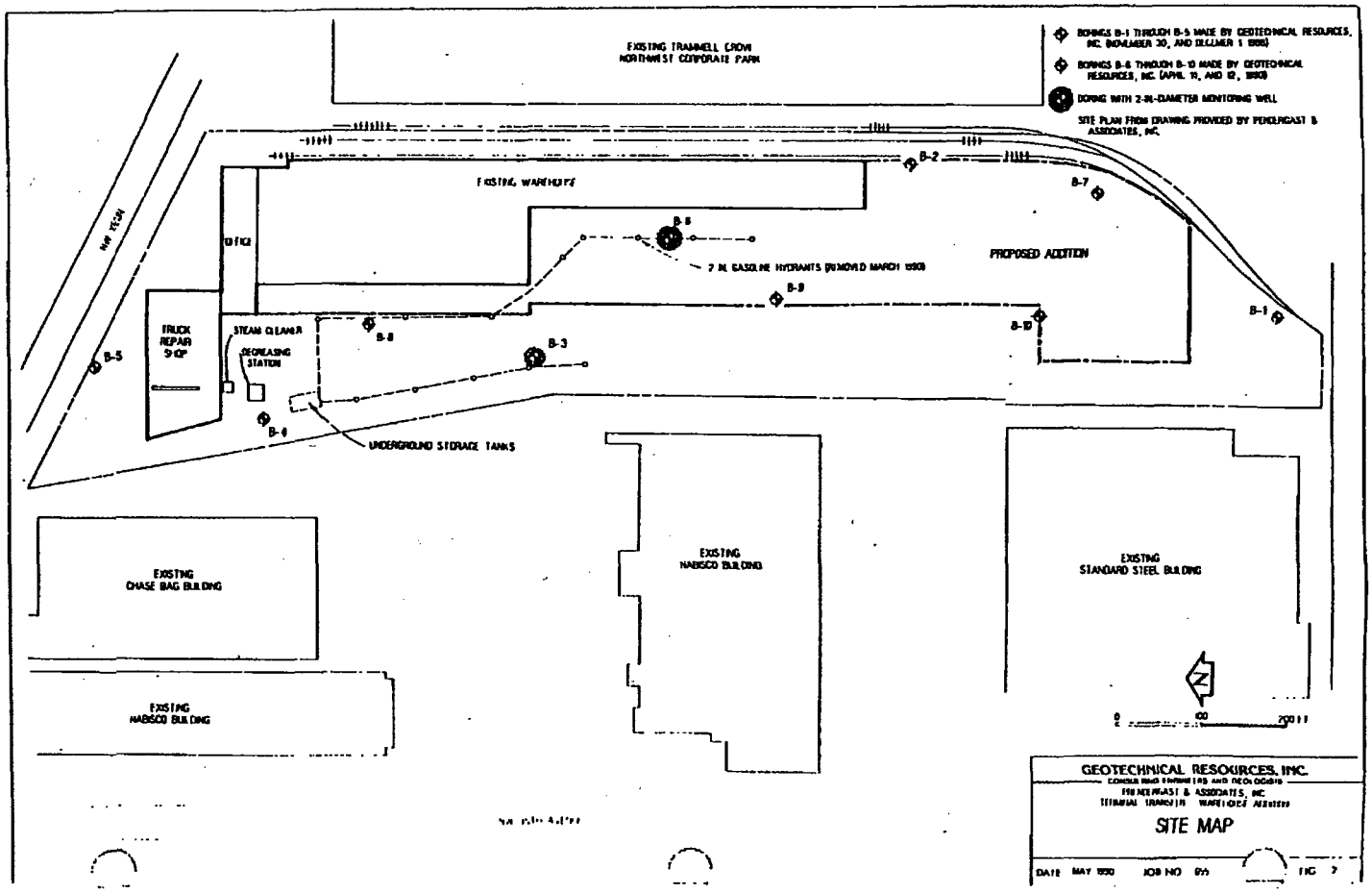
Victor A. Perry,
Quality Assurance

Sincerely,

Renee Chauvin,
Technical Director

RJC/daj

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the report date, or until the maximum holding time expires.



SCHN00172010

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

FILE COPY

June 4, 1990

J\H2ODISP.655

Harry Edmonds
City of Portland, Environmental Services
Industrial Waste Section
1120 SW Fifth Avenue Room 400
Portland, Oregon 97201

SUBJECT: DISPOSAL OF CONTAMINATED GROUNDWATER, TERMINAL TRANSFER PROPERTY, 3601 NW YEON STREET, PORTLAND, OREGON

Geotechnical Resources, Inc. (GRI) has been retained by Prendergast & Associates, Inc. to assist them with the mitigation of a soil and groundwater contamination condition at the Terminal Transfer property. GRI will observe all remedial work to be completed for Prendergast & Associates. The mitigation will involve removal of contaminated soil and pumping approximately 10,000 gallons of contaminated groundwater from a monitoring well on the property. Based on recent chemical analyses of groundwater from this well, we anticipate that the groundwater may contain the following contaminants:

	Concentration, mg/l	
Contaminant	April 13, 1990	May 10, 1990
Benzene	0.73	0.42
Ethylbenze	1.28	0.57
Toluene	5.81	2.38
Xylene	6.95	2.89

We have been advised by your office that the property is served by separate storm and sanitary sewers. We would like to pump approximately 10,000 gallons at a rate of 3 to 5 gpm into the sanitary sewer system. Samples of the discharged water will be sampled periodically for BTX&E testing.

We appreciate your prompt attention to our request for disposal since our client has scheduled remediation during the latter part of this week.

Sincerely,
GEOTECHNICAL RESOURCES, INC.

David D. Driscoll

David D. Driscoll, P.E.
Principal

7412 S.W. Beaverton-Hillsdale Hwy • Suite 102 • Portland, Oregon 97225 • (503) 292-2621

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

June 14, 1990 J\SPECPERM.855

Oregon Department of Environmental Quality
Water Quality Section
811 SW Sixth Avenue
Portland, Oregon 97204

Attention: Kent Ashbaker

SUBJECT: REMEDIATION PLAN FOR SOIL AND GROUNDWATER OCNTAMINATION BY GASOLINE, TERMINAL TRANSFER FACILITY, PORTLAND, OREGON

We are representing Prendergast & Associates, Inc., a firm which is currently negotiating the purchase of a 9.3-acre parcel located at 3601 NW Yeon Street in Portland, Oregon. The property is occupied by an office building, a motor freight terminal, and warehouse facilities. The location of these facilities is shown on the attached map.

A series of vehicle fueling stations were connected to a group of underground petroleum storage tanks by underground fuel lines when the existing buildings at the site were built. As a part of the pre-sale arrangements between our client and the current owner, the underground fuel lines and vehicle fueling stations were drained and removed under our observation in April 1990. During that work, we noted an area of gasoline contamination along a 40-ft length of the eastern fuel line. Chemical analysis of soils from a test pit excavated in the center of the contaminated area indicated that the contamination extended to a depth of about 6 ft. Total petroleum hydrocarbons up to 378 mg/kg were found in the shallow soils. A groundwater monitoring well was installed in a boring drilled in this area and a series of groundwater samples were collected. The results of analysis of those samples are as follows:

	Concentrations, mg/l				
Date	TPH	Benzene	Toluene	Xylene	Ethylbenzene
4/13/90	6.0	0.734	5.810	6.950	1.280
5/10/90	NA	0.428	2.380	2.890	0.572
6/8/90	1.8	NA	NA	NA	NA

We are preparing to remediate the contaminated area by removing the contaminated soil; backfilling the excavation with clean, imported material; and pumping groundwater from the monitoring well until the remaining groundwater meets the primary and secondary water quality standards promulgated by your department (0.05 mg/l benzene). Periodic samples will be collected as pumping progresses to monitor the quality of the groundwater.

7412 S.W. Beaverton-Hillsdale Hwy • Suite 102 • Portland, Oregon 97225 • (503) 292-2621

We hereby request a special permit to spray irrigate the southeast quarter of the property with the groundwater pumped from the monitoring well for a period of time not to exceed 60 days. Please note that the groundwater meets your standards for wastewater to be used for land irrigation and that no free product is involved. We anticipate that the quality of the groundwater will improve rapidly as pumping progresses and that a considerable reduction of the volatile organic contaminants will occur during the spraying process. We believe, therefore, that the spray irrigation will have no measurable impact on the soil or groundwater quality in the irrigated area. The rate of pumping will be no more than 5 gpm and the application of the irrigation water will be carefully managed so that runoff and ponding will not occur.

It is our understanding that a $125.00 fee is required for this application for a special permit. A check for that amount is enclosed. If you have any questions or comments regarding this matter, please do not hesitate to call me at any time.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

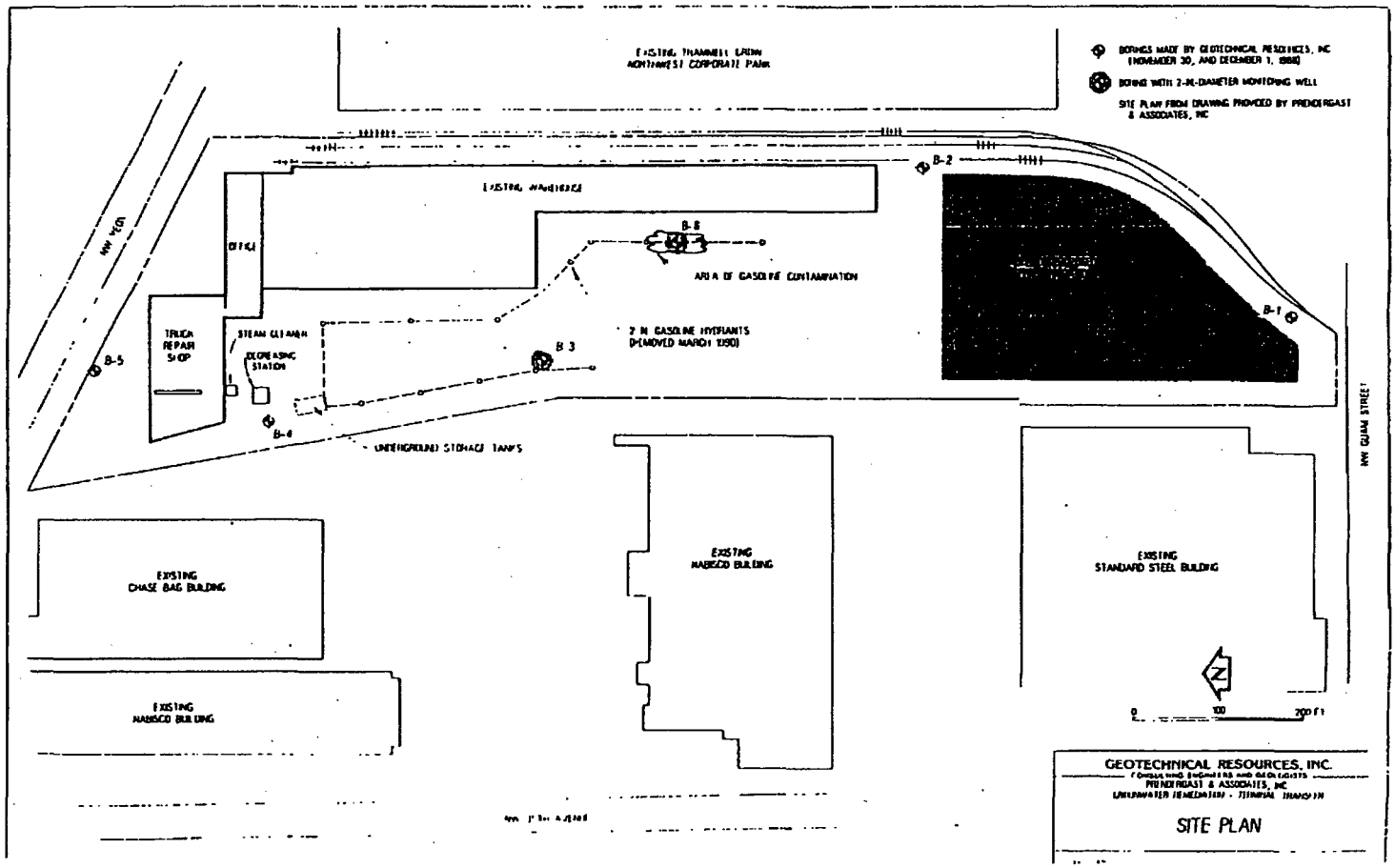
David D. Driscoll

David D. Driscoll, P.E.
Principal

Willard S. Titus
Staff Geologist

Enclosure: Check No. 7695 in the amount of $125.00

SCHN00172013



SCHN00172014

GEOTECHNICAL RESOURCES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

June 19, 1990 J/REMEDPLN.655

Oregon Department of Environmental Quality
Environmental Cleanup Division
811 SW Sixth Avenue
Portland, Oregon 97204

Attention: Mike Fernandez

SUBJECT: REMEDIATION PLAN FOR SOIL AND GROUNDWATER CONTAMINATION BY GASOLINE, TERMINAL TRANSFER FACILITY, PORTLAND, OREGON

We have been retained by Prendergast & Associates to assist them with the remediation of a gasoline spill at the Terminal Transfer facility at 3601 NW Yeon in Portland, Oregon. As a result of our meeting with you on May 31, 1990, regarding remediation of the gasoline contamination along the eastern fuel line at Terminal Transfer, we are proceeding with plans to excavate the contaminated soil. Soil which exhibits odor, sheen, discoloration or total petroleum hydrocarbon (TPH) levels in excess of 80 mg/kg will be excavated. We will observe the work in the field and collect samples from the sidewalls and bottom of the excavation to document the removal of the contaminated soils.

The contaminated soil will be treated on site by aeration. It is our intention to spread and aerate the soil either on the existing asphalt in the vicinity of the contaminated area or on a plastic liner over the bare soil in the southeastern corner of the property. In either case, a plastic liner will be used to cover the soil to prevent contaminant leaching during periods of rainfall. When the TPH levels in the soil drop below 80 mg/kg, the soil will be replaced in the excavation or used as fill at other locations on the site.

After the contaminated soil has been removed from the excavation, it is our intention to begin pumping the contaminated groundwater from monitoring well B-6 at a rate of 3 to 5 gallons/min. This pumping will continue until the groundwater quality meets your current primary and secondary standards for volatile hydrocarbons. We are making arrangements with Kent Ashbaker of the Water Quality Section for a special permit for disposal of the contaminated groundwater.

A contour map of the local piezometric surface at the site is enclosed. Due to the extremely low hydraulic gradient across the site, we see no necessity for the installation of additional "down-gradient" monitoring wells. Samples will be collected from monitoring well B-6 periodically as pumping progresses and on a quarterly schedule for a complete hydrologic cycle (approximately one year). These samples will be analyzed for TPH, benzene, toluene, xylene, and ethylbenzene. If these

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samples document compliance with your primary and secondary water quality standards, we will consider the remediation to be complete.

If you have any questions or comments regarding this matter, please do not hesitate to contact me at any time.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

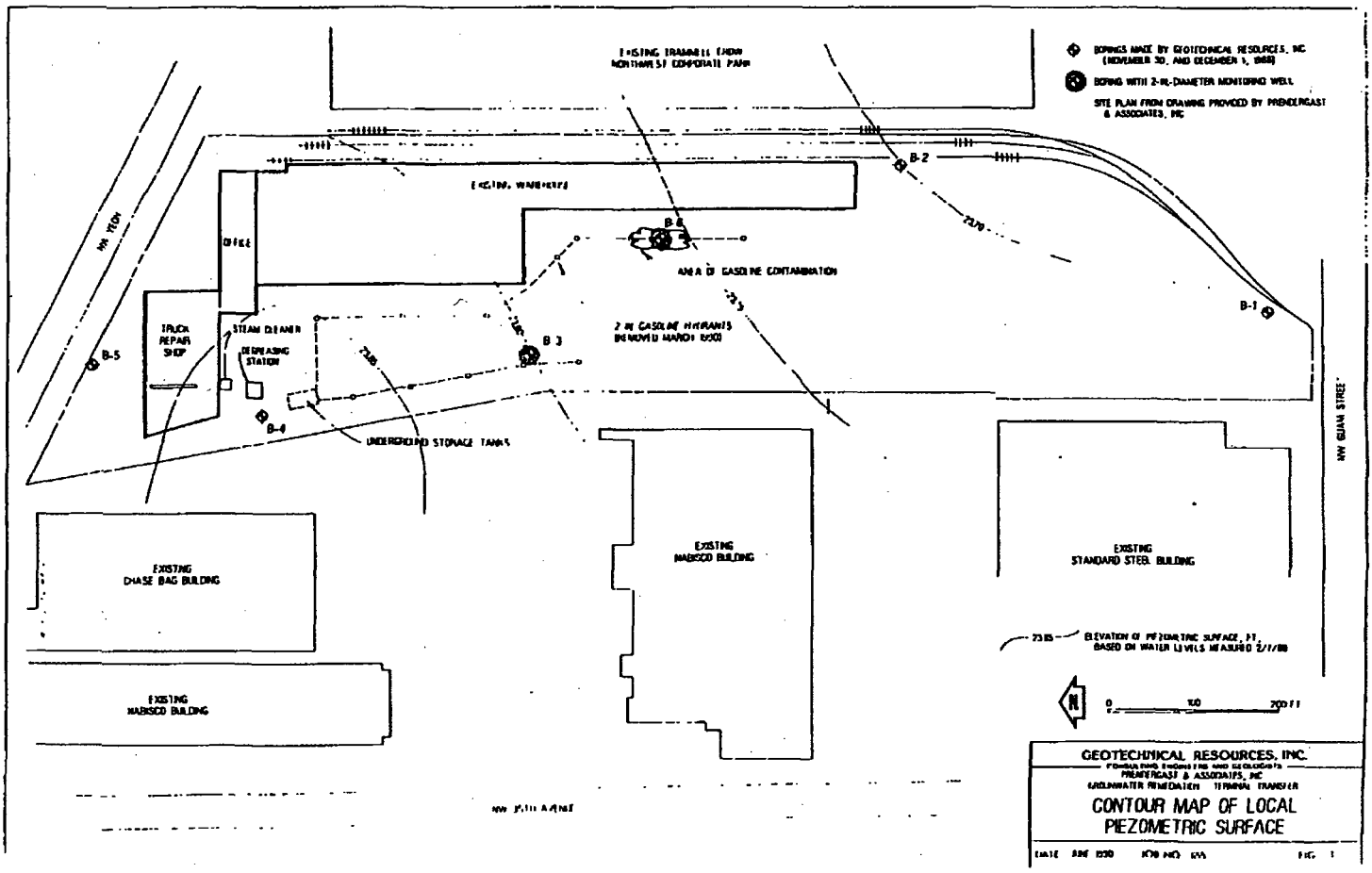
David D. Driscoll, P.E.
Principal

Willard S. Titus
Staff Geologist

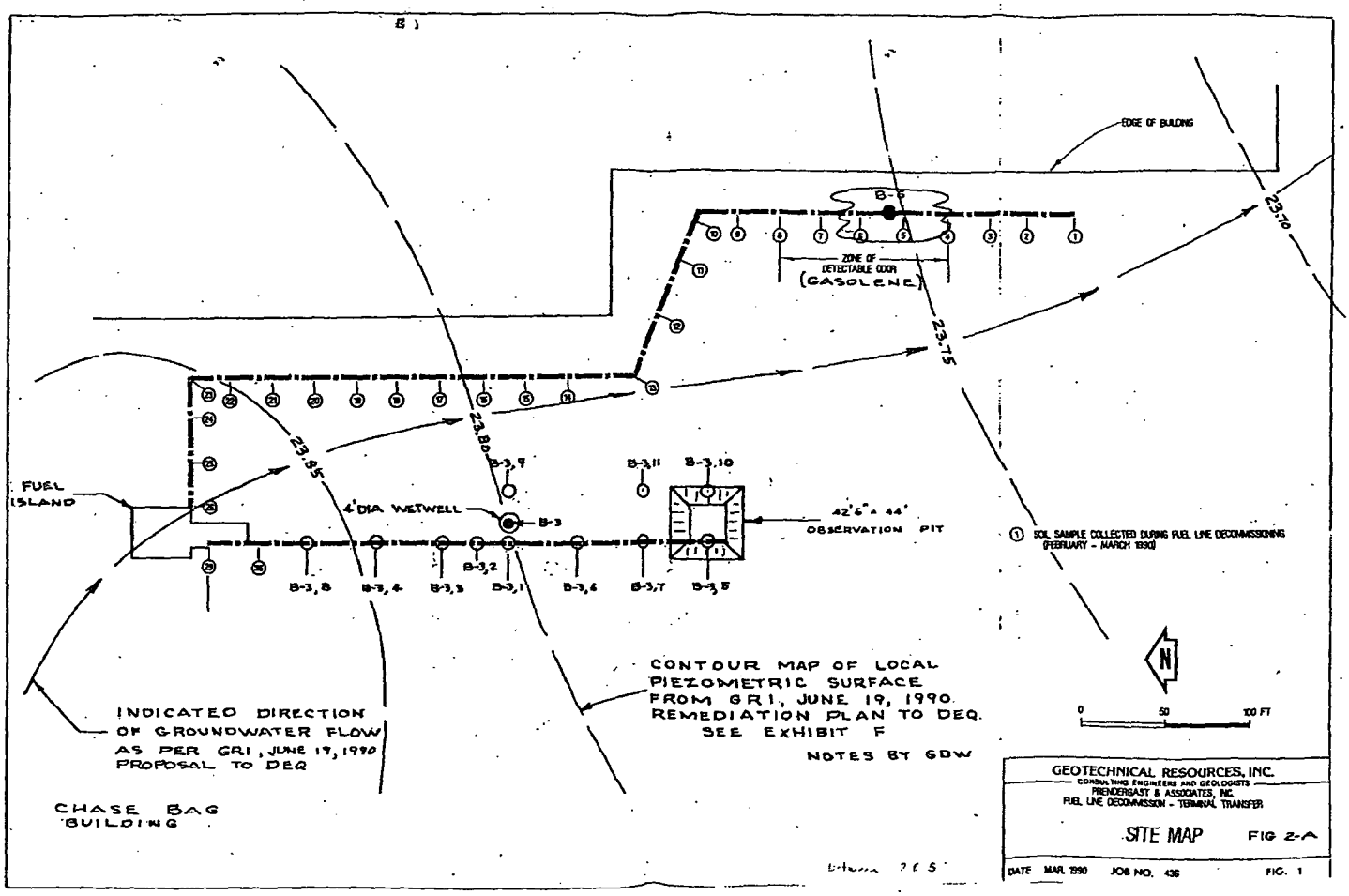
Enclosures: Contour Map of Local Piezometric Surface

cc: John Carroll, Prendergast & Associates
Kent Ashbaker, Water Quality Section, DEQ

SCHN00172016



SCHN00172017



SCHN00172018

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

1 1995

NORTHWEST REGION

MEMORANDUM

TO:	Jeff Ward	*DATE:*	January 14, 1991
FROM:	Bill Titus	*JOB NO.:*	655
COPIES TO:	John Carroll / Prendergast Rob Ball / Ball Janik Novack		

SUBJECT: *MEETING WITH DEQ REGARDING TERMINAL TRANSFER/YEON PROPERTY*

Attached are my notes from the meeting we had this morning with George and Mike Fernandez. If you have any questions, comments, additions, deletions, or corrections, please let me know.

Signed: W Titus

Date: January 14, 1991

7412 SW Beaverton-Hillsdale Hwy
Suite 102
Portland, Oregon 97225
Phone (503) 292-2621
FAX (503) 297-1696

EXHIBIT 2
PAGE 1 OF 4

GEOTECHNICAL RESOURCES, INC.
Consulting Engineers and Geol[illegible]ts
7412 SW Bvtn-Hillsdle Hwy, Ste 102
Portland, OR 97225
(503) 292-2621 (FAX) 297-1696

CALL/MEETING RECORD

Date: January 14, 1991 Job No.: 655

Time: AM

TPH - 500 PPM AS ASSIGNED BY DEQ

☐ Telephone Call ■ Meeting (Attendees:)

Subject: SOIL REMEDIATION AT TERMINAL TRANSFER/YEON STREET PROPERTY

Copies to:

To: George Ward, Ward Assc

From: Jeff Ward, Soil Tech

Phone: Bill Titus, GRI

Mike Fernandez, DEQ

George Ward, Jeff Ward, and I met this morning with Mike Fernandez (DEQ) to discuss the status of the soil remediation at the Terminal Transfer/Yeon Street property.

George reported that all contaminated sand has been removed from the main excavation and that a portion of the contaminated stockpile has been removed from the site.

George and I presented separate summaries of the history of soil sampling and analyses at the site. The material which I presented has been delivered to Mike Fernandez, George Ward, John Carroll, and Rob Ball. George did not provide me with a copy of his data, but indicated that he would do so.

I presented opinions, based on the soil samples which I collected last Thursday (1/10/91), that:

1. The original excavation appears to have been successful in removing the contaminated soil on the property from the ground, but may not have reached the limits of soil contamination along the western boundary of the property.

2. The fill placed within the excavation up to, but not including, the pozzolanic liner appears to meet the 500 ppm (TPH) cleanup level assigned to the site by DEQ.

3. The pozzolan liner which, until recently, served as a barrier between the underlying clean fill and the overlying contaminated soil undergoing treatment is contaminated beyond the 500 ppm (TPH) cleanup level assigned to the site be DEQ.

George expressed opinions that:

1. The pozzolan is not contaminated.

2. If the pozzolan is contaminated, it poses no real hazard.

3. If the pozzolan is contaminated, it is contaminated only in those areas where samples show it be contaminated and not elsewhere.

4. The site cleanup standard should be raised from 500 to 1,000 ppm and by the new, higher cleanup standard, the pozzolan is not contaminated.

Mike Fernandez examined the data and listened to the opinions and stated the following as DEQ's position:

1. The site is presently being considered by DEQ as a "Level II" site, with a soil cleanup standard of 500 ppm (TPH). If, at some future date, Dick Kathrens or George Ward were to submit data and arguments supporting a less-stringent cleanup standard, DEQ would reconsider the matter.

2. The depth of excavation at the site is sufficient and the lateral extent of the excavation on its northern, eastern, and southern boundaries is also sufficient. Mike expressed concern about the western boundary.

3. The fill placed within the excavation up to, but not including, the pozzolan liner meets DEQ's cleanup standard (500 ppm).

4. Portions of the pozzolan liner are contaminated in excess of the "Level II" (500 ppm, TPH) cleanup standard and must be remediated. If this remediation consists of off-site disposal, then the remediation could proceed as follows:

   a. Off-site disposal of all pozzolan without further testing, or

   b. Off-site disposal of all contaminated pozzolan with sampling to demonstrate that the remaining pozzolan meets the 500 ppm cleanup standard.

5. When the pozzolan problem is solved, the excavation may be backfilled.

6. Problems remaining to be addressed at the site include possible soil contamination along the western boundary of the property and on the properties immediately west of the site and groundwater beneath the site and the adjacent sites.

Mike indicated that he will prepare a letter outlining these points by Thursday (1/17/91).

George and I indicated to one another and to Mike Fernandez that we would pass this information along to our respective clients.

AROMATIC VOLATILE ORGANICS IN WATER (EPA METHOD 602)

	MW-1	MW-1 (Dup.)	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-17	MW-18	MW-19	MW-20	Detection Limit, ug/l	DEQ Standard, ug/l
Benzene	ND	ND	ND	ND	ND	23	54	ND	ND	6.5	ND	ND	ND	ND	ND	3.5	NA	NA	NA	NA	5.0	5
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	5.0	Unknown
Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	5.0	Unknown
Ethylbenzene	ND	ND	ND	ND	ND	3.5	<5.0	ND	ND	32	ND	ND	ND	ND	ND	5.0	NA	NA	NA	NA	5.0	700
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	5.0	2,000
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	2.0	9.7	ND	ND	ND	ND	ND	<5.0	NA	NA	NA	NA	5.0	10,000

ND = None detected
NA = Not analyzed

All units in ppb

SCHN00172022

HALOGENATED VOLATILE ORGANICS IN WATER (EPA METHOD 601)

	MW-1	MW-1 (Dup.)	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-17	MW-18	MW-19	MW-20	Detection Limit, ug/l	DEQ Standard, ug/l
Benzene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	390	0.9	ND	ND	0.5	5
Bromodichloromethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Bromoform				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Bromomethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	2.0	Unknown
Carbon Tetrachloride				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Chlorobenzene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Chloroethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	2.0	Unknown
2-Chloroethylvinylether				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	1.0	Unknown
Chloroform				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Chloromethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	2.0	Unknown
Dibromochloromethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
1,2-Dichlorobenzene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
1,3-Dichlorobenzene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
1,4-Dichlorobenzene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Dichlorodifluoromethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	2.0	Unknown
1,1-Dichloroethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
1,2-Dichloroethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
1,1-Dichloroethene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Trans-1,2-dichloroethene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
1,2-Dichloropropane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Cis-1,3-Dichloropropene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Trans1,-3-Dichloropropene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Ethylbenzene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	700
Methylene Chloride				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Toluene				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	2,000
1,1,2,2-Tetrachloroethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Tetrachloroethene				4.0	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
1,1,1-Trichloroethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
1,1,2-Trichloroethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Trichloroethene				2.0	ND	NA	NA	NA	NA	NA	NA	NA	0.5	ND	NA	NA	ND	ND	ND	ND	0.5	Unknown
Trichlorobromomethane				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	2.0	Unknown
Vinyl Chloride				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	2.0	Unknown
Total Xylenes				ND	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	ND	ND	ND	0.5	10,000

ND = None detected
NA = Not analyzed

All units in ug/l

SCHN00172023

POLYNUCLEAR AROMATIC HYDROCARBONS IN WATER (EPA METHOD 8310)

	MW-1	MW-1 (Dup.)	MW-3	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-17	MW-18	MW-19	MW-20	Detection Limit, ug/l	DEQ Standard, ug/l
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.06	ND	ND	ND	ND	ND	ND	ND	ND	*	*	10	21
Acenaphthylene	ND	ND	ND	ND	ND	ND	115.5	ND	13.42	ND	4.42	ND	2.58	5.74	ND	195.1	*	*	*	*	1.5	Unknown
Acenaphthene and Fluorene	ND	ND	ND	ND	ND	ND	27.99	ND	16.38	ND	ND	ND	ND	ND 0.14	ND ND	54.74 2.46	ND *	ND *	*	*	2.0 0.10	700 Unknown
Phenanthrene	8.18	ND	ND	ND	ND	ND	ND	ND	4.42	ND	ND	ND	ND	ND	ND	ND	ND	ND	*	*	0.10	2,100
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28	ND	8.42	ND	ND	*	*	0.25	280
Fluoranthene	1.68	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.29	ND	ND	*	*	0.20	210
Pyrene	ND	ND	ND	ND	ND	ND	0.23	ND	ND	1.13	ND	ND	ND	ND	ND	ND	0.2	0.3	*	*	0.28	0.1
Benzo(a)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	0.3	*	*	0.15	0.2
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.55	0.3	0.5	*	*	0.10	0.2
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	0.08	ND	ND	*	*	0.05	0.2
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	0.12	0.4	0.5	*	*	0.05	0.2
Benzo(a)pyrene	0.14	ND	ND	ND	ND	ND	ND	ND	ND	0.13	ND	ND	ND	ND	ND	ND	ND	ND	*	*	0.05	0.3
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	*	*	*	*	0.10	Unknown
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*	*	0.10	Unknown
Indeno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND									

ND = None detected
* = Data pending

All units in ug/l

SCHN00172024

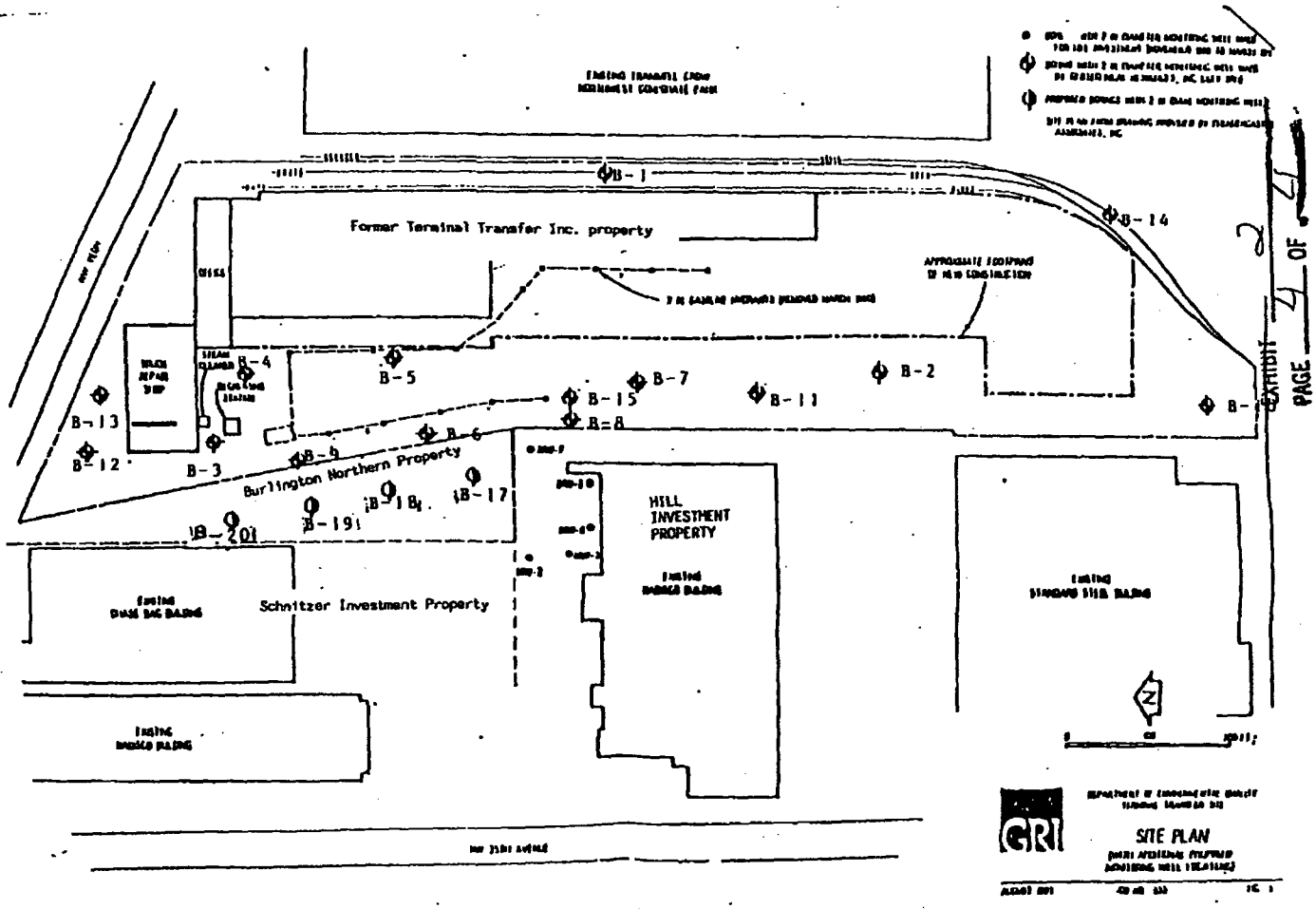


Figure 2

Note: B-16 Not Installed

Locations of monitoring wells determined by GRI & DEQ, August 19, 1991
Number of monitoring wells to be drilled on TTI Site = 15
Number of monitoring wells to be drlled on BNRR Site = 4

SCHN00172025

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

FILE COPY

MEMORANDUM

TO:	George Ward	*DATE:*	January 14, 1991
FROM:	Bill Titus	*JOB NO.:*	~~665~~ 655
COPIES TO:	Mike Fernandez / DEQ John Carroll / Prendergast Rob Ball / Ball Janik Novack		

SUBJECT: *RESULTS OF TPH ANALYSES OF SOIL SAMPLES COLLECTED AT TERMINAL TRANSFER BY GRI*

Last Friday (1/11/91) afternoon, you asked me to summarize the analytical results of our soil sampling work related to the diesel contamination at the Terminal Transfer/Yeon Street property. That summary is attached. It consists of a listing of the samples, pertinent information describing the general location and type of material sampled, and the TPH concentrations reported by the laboratory. A sketch showing the approximate sampling locations and copies of the laboratory reports are also attached.

Signed: WSTitus

Date: January 14, 1991

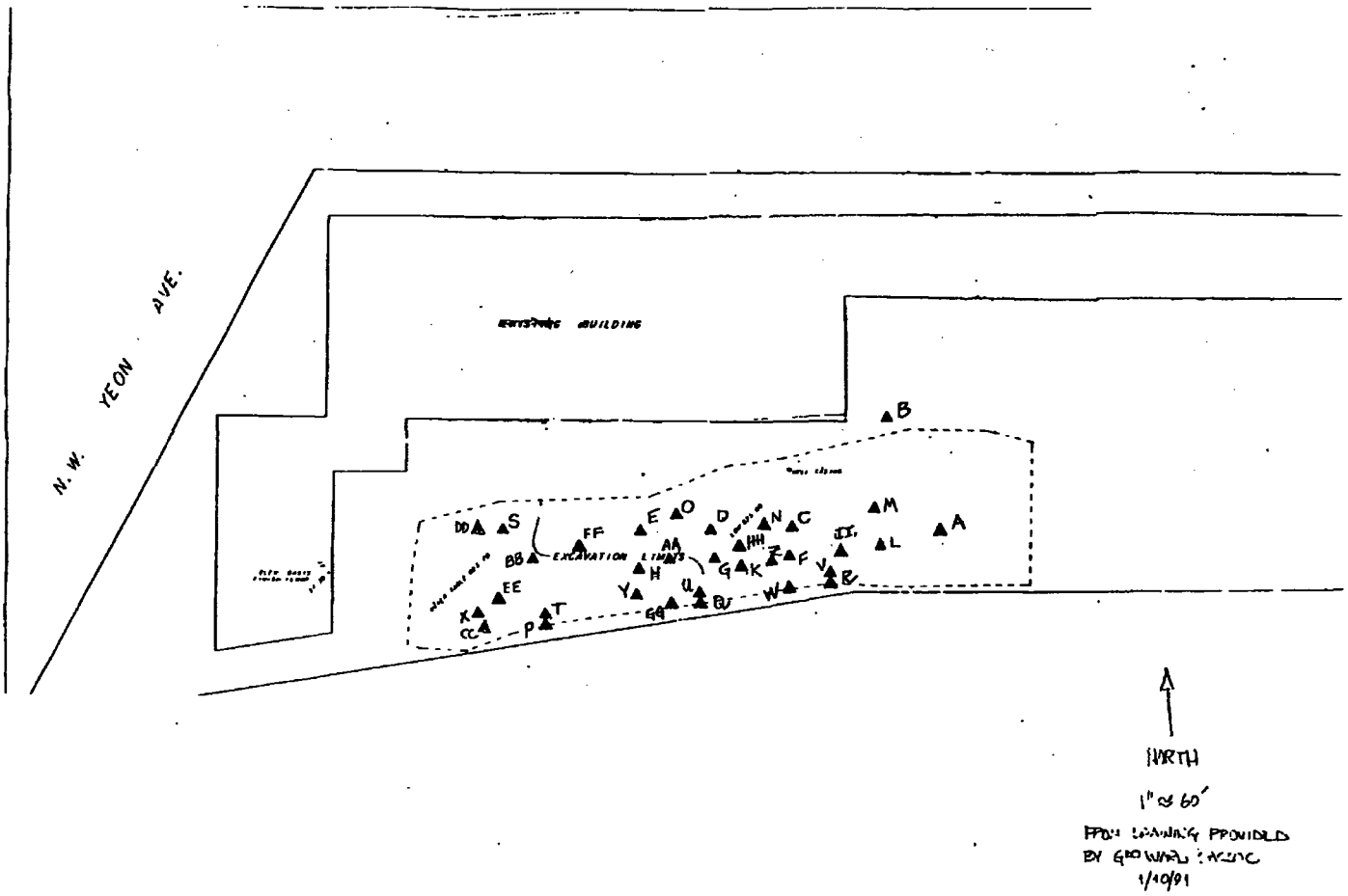
J\TPHRESLT.665

7412 SW Beaverton-Hillsdale Hwy
Suite 102
Portland, Oregon 97225
Phone: 503 292 2021
FAX: 503 297 1896

SAMPLE DESIGNATION	DATE COLLECTED	COLLECTOR	GENERAL LOCATION	MAP SYMBOL	DEPTH (BELOW ASPHALT UNLESS NOTED OTHERWISE)	MATERIAL SAMPLED	ANALYTICAL RESULTS (PPM TPH)	RELEVANT NOTES, SVR	COMMENTS
11-13-90-4	11/13/90	LMS	MAIN EXCAV.	AA	5-6'	REMEDIATION PILE	2,500	SVR 11/13/90	SOIL BEING TREATED AT TIME
11-13-90-5	11/13/90	LMS	MAIN EXCAV.	BB	5-6'	REMEDIATION PILE	7,000	SVR 11/13/90	SOIL BEING TREATED AT TIME
01-07-91 E	01/07/91	WST	MAIN EXCAV.	CC	5-6'	REMEDIATION PILE	2,030	SVR 01/07/91	FLASH PT, BTEX & PAH AVAILABLE
01-07-91 W	01/07/91	WST	MAIN EXCAV.	DD	5-6'	REMEDIATION PILE	2,030	SVR 01/07/91	FLASH PT, BTEX & PAH AVAILABLE
655-1A	01/10/91	WST	MAIN EXCAV. FLOOR	EE	0.5"	POZZOLAN LINER	360	SVR 01/10/91	PORTIONS IN STORAGE
655-1B	01/10/91	WST	MAIN EXCAV. FLOOR	EE	3.0"	COMPACTED FILL	430	SVR 01/10/91	PORTIONS IN STORAGE
655-1C	01/10/91	WST	MAIN EXCAV. FLOOR	EE	5.5"	NATIVE SAND	33	SVR 01/10/91	PORTIONS IN STORAGE
655-2A	01/10/91	WST	MAIN EXCAV. FLOOR	FF	0.25"	POZZOLAN LINER	1,100	SVR 01/10/91	PORTIONS IN STORAGE
655-2B	01/10/91	WST	MAIN EXCAV. FLOOR	FF	3.0"	COMPACTED FILL	90	SVR 01/10/91	PORTIONS IN STORAGE
655-2C	01/10/91	WST	MAIN EXCAV. FLOOR	FF	6.0"	NATIVE SAND	TR<6	SVR 01/10/91	PORTIONS IN STORAGE
655-3A	01/10/91	WST	MAIN EXCAV. FLOOR	GG	0.5"	POZZOLAN LINER	560	SVR 01/10/91	PORTIONS IN STORAGE
655-3B	01/10/91	WST	MAIN EXCAV. FLOOR	GG	2.5"	COMPACTED FILL	58,000	SVR 01/10/91	PORTIONS IN STORAGE
655-3C	01/10/91	WST	MAIN EXCAV. FLOOR	GG	6.5"	NATIVE SAND	TR<6	SVR 01/10/91	PORTIONS IN STORAGE
655-4A	01/10/91	WST	MAIN EXCAV. FLOOR	HH	0.25"	POZZOLAN LINER	730	SVR 01/10/91	PORTIONS IN STORAGE
655-4B	01/10/91	WST	MAIN EXCAV. FLOOR	HH	2.0"	COMPACTED FILL	ND<6	SVR 01/10/91	PORTIONS IN STORAGE
655-4C	01/10/91	WST	MAIN EXCAV. FLOOR	HH	6.0"	NATIVE SAND	10	SVR 01/10/91	PORTIONS IN STORAGE
655-5A	01/10/91	WST	MAIN EXCAV. FLOOR	II	0.5"	POZZOLAN LINER	510	SVR 01/10/91	PORTIONS IN STORAGE
655-5B	01/10/91	WST	MAIN EXCAV. FLOOR	II	2.5"	COMPACTED FILL	670	SVR 01/10/91	PORTIONS IN STORAGE
655-5C	01/10/91	WST	MAIN EXCAV. FLOOR	II	6.0"	NATIVE SAND	50	SVR 01/10/91	PORTIONS IN STORAGE
655-6A	01/10/91	WST	MAIN EXCAV. FLOOR	A	0.5"	POZZOLAN LINER	920	SVR 01/10/91	PORTIONS IN STORAGE
655-6B	01/10/91	WST	MAIN EXCAV. FLOOR	A	2.0"	COMPACTED FILL	210	SVR 01/10/91	PORTIONS IN STORAGE
655-6C	01/10/91	WST	MAIN EXCAV. FLOOR	A	6.5"	NATIVE SAND	ND<6	SVR 01/10/91	PORTIONS IN STORAGE

* DEPTH MEASURED FROM TOP OF POZZOLAN LINER, APPROX 5-6' BELOW ASPHALT SURFACE

SCHN00172027



SCHN00172028

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

August 29, 1990
Log #A900821-N4

Geotechnical Resources, Inc.
7412 SW Beaverton-Hillsdale Hwy.
Suite 102
Portland, OR 97225
Attention: Bill Titus

PROJECT NAME: Terminal Transfer PROJECT NUMBER: 655

Samples Collected: 08/21/90
Samples Received: 08/21/90

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

SAMPLE ID	SAMPLE RESULTS
GW-1 (WL)	70,500
GW-2 (WL +3)	4,800
GW-3 (WL +6)	2,400
Detection Limit:	8

Results expressed as mg/kg unless otherwise noted.

Analysis Requested: Oil & Grease in soil by modified EPA Method 413.2. freon-extractable

SAMPLE ID	SAMPLE RESULTS
GW-4	160

Results expressed as mg/L unless otherwise noted.

Detection Limit: 0.2 mg/L

REPORT CONTINUES

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

September 24, 1990
Log # A900919-L10

Geotechnical Resources, Inc.
7412 SW Beaverton-Hillsdale, Hwy
Suite 102
Portland, OR 97225
Attention: Bill Titus

PROJECT NAME: Terminal Transfer PROJECT NUMBER: 655

Sample(s) Collected: 9/19/90
Sample(s) Received: 9/19/90

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

SAMPLE ID	SAMPLE RESULTS
655-10N	ND
655-11N	ND
655-12N	ND
655-13N	21,000
655-14N	52,000
655-15S	ND
655-16S	trace,<4
655-17S	ND
655-18S	3,900
655-19S	29,900

Detection Limit: 4 mg/kg

Results expressed as mg/kg unless otherwise noted.

ND means none detected at or above the detection limit listed.

The less than "<" symbol means none detected at or above the indicated value and represents the detection limit for the method.

Sincerely,

Victor A. Perry,
Quality Assurance

Sincerely,

Renee Chauvin,
Technical Director

RJC/mlh

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the report date or until the maximum holding time expires.

RECEIVED
SEP 26 1990

SCHN00172030

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

October 3, 1990
Log # A901001-K9

Geotechnical Resources, Inc.
7412 SW Beaverton-Hillsdale, Hwy
Suite 102
Portland, OR 97225
Attention: Liane Scull/Dave Driscoll

PROJECT NAME: Terminal Transfer PROJECT NUMBER: 655

Sample(s) Received: 10/1/90

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

SAMPLE ID	SAMPLE RESULTS
655-ZZ, 9/28/90, 1520 hrs	ND
655-EX1, 9/29/90	11
655-EX2, 9/29/90	1,700
655-EX3, 9/29/90	20
655-EX4, 9/29/90	150
655-EX5, 9/29/90	170
655-EX6, 9/29/90	170
655-EX7, 9/30/90	530
655-EX8, 9/30/90	9

Detection Limit: 4 mg/kg

Results expressed as mg/kg unless otherwise noted.

ND means none detected at or above the detection limit listed.

Sincerely,
Victor A. Perry,
Quality Assurance

Sincerely,
Renee Chauvin,
Technical Director

[illegible]/mlh

[illegible] use of the client. Samples are retained a maximum of 15 days from the [illegible] the maximum holding time expires

SCHN00172031

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

Log #A901010-E12

Geotechnical Resources, Inc.
Page 6

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

SAMPLE ID		SAMPLE RESULTS
655YY	10/01/90, 1545 hrs.	trace < 4
655XX1	10/09/90	86
655XX2	10/09/90	ND
655XX3	10/09/90	ND
655XX4	10/09/90	11
655XX5	10/09/90	trace < 4
655XX6	10/09/90	36
655XX7	10/09/90	613
655XX8	10/09/90	ND
655XX9	10/09/90	94
655XX10	10/09/90	ND

ND means none detected at or above the detection limit listed.

The less than "<" symbol means none detected at or above the indicated value and represents the detection limit for the method.

Detection Limit: 4 mg/kg

Results expressed as mg/kg unless otherwise noted.

Sincerely,

Victor A. Perry,
Quality Assurance

Sincerely,

Renee Chauvin,
Technical Director

RJC/lws

This report is for the sole and exclusive use of the client.
Samples are retained a maximum of 15 days from the report date or until the maximum holding time expires.

SCHN00172032

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

October 17, 1990
Log # A901002-AP4

Geotechnical Resources, Inc.
7412 SW Beaverton-Hillsdale Hwy
Suite 102
Portland, OR 97225
Attention: Liane Scull/Dave Driscoll

PROJECT NAME: Terminal Transfer PROJECT NUMBER: 655

Sample(s) Collected: 10/2/90, 1430 hrs
Sample(s) Received: 10/2/90

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

SAMPLE ID	SAMPLE RESULTS
655 EX 9	1,400
655 EX 10	600
655 EX 11	8
655 EX 12	59

Detection Limit: 4 mg/kg

Results expressed as mg/kg unless otherwise noted.

Sincerely,
Victor A. Perry,
Quality Assurance

Sincerely,
Renee Chauvin,
Technical Director

RJC/mlh

This report is for the sole and exclusive use of the client. Samples are retained 6 months from the report date, or until the maximum holding time expires.

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

October 18, 1990
Log #A901017-S

Geotechnical Resources, Inc.
7412 SW Beaverton-Hillsdale Hwy
Suite 102
Portland, OR 97225
Attention: Bill Titus

PROJECT NAME: Terminal Transfer PROJECT NUMBER: 655

Sample(s) Collected: 10/17/90
Sample(s) Received: 10/17/90

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

SAMPLE ID	SAMPLE RESULTS
655-017A	37

Detection Limit: 4 mg/kg

Results expressed as mg/kg unless otherwise noted.

Sincerely,

Victor A. Perry,
Quality Assurance

Sincerely,

Renee Chauvin,
Technical Director

RJC/mlh

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the report date, or until the maximum holding time expires.

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

November 15, 1990
Log # A901113-L5

Geotechnical Resources, Inc.
7412 SW Beaverton-Hillsdale, Hwy
Suite 102
Portland, OR 97225
Attention: Dave Driscoll/Liane Scull

PROJECT NAME: Terminal Transfer PROJECT NUMBER: 655

Sample(s) Collected: 11/13/90, 1130 hrs
Sample(s) Received: 11/13/90

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

SAMPLE ID	SAMPLE RESULTS
11-13-90-1	6,200
11-13-90-2	4,500
11-13-90-3	5,300
11-13-90-4	2,500
11-13-90-5	7,000

Detection Limit: 4 mg/kg

Results expressed as mg/kg unless otherwise noted.

Sincerely,
Victor A. Perry,
Quality Assurance

Sincerely,
Renee Chauvin,
Technical Director

RJC/mlh

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the report date, or until the maximum holding time expires.

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

FACSIMILE TRANSMITTAL LOG

TO: COMPANY NAME: Geotechnical Resources
ATTENTION: Bill Titus
PHONE # (___) 297-1696

DATE: 1/11/91

OF PAGES (INCLUDING COVER SHEET): 2
TELECOPIER PHONE #: (503) 254-1452
CONFIRMATION PHONE #: (503) 254-1794

COMMENTS: TPH for Terminal Transfer
samples rec'd 1/10/91

PLEASE LET US KNOW IF THE TELECOPY IS UNSATISFACTORY

CLOM\FORM\HELP\FAX.FRM REV. March 8, 1990

Soil samples [illegible]

SCHN00172036

RUSH

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

DRAFT

COFFEY LABORATORIES • WORKSHEET

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

Client: Geotech Res Job # A910110-AG18

Analyst: DR. & JAG Report Date: 1/11

Date Analyzed: 1/11 Date Extracted: 1/10

Logbook Reference: Log 169 p. 69 Reviewed 1/11

Standard's Reference Job Number: A910110-AG18

QC Reference Job Number: A910110-AG18

Prep.Info/Comments:

Units: mg/kg Detection Limit: 6 mg/kg

SAMPLE ID	Sample ID	TPH	SAMPLE ID	Sample ID	TPH
AG1	1A	360	14	5B	670
2	1B	430	15	5C	50
3	1C	33	16	6A	720
4	2A	1100	17	6B	210
5	2B	90	18	6C	N.D.
6	2C	Trace, <6			
7	3A	560			
8	3B	58,000			
9	3C	Trace, <6			
10	4A	730			
11	4B	N.D.			
12	4C	10			
13	5A	510			

SCHN00172037

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

FACSIMILE TRANSMITTAL LOG

TO: COMPANY NAME: SRI
ATTENTION: Bill Titus
PHONE # (___) 297-1696

DATE: 1/9/91

OF PAGES (INCLUDING COVER SHEET): 7

TELECOPIER PHONE #: (503) 254-1452

CONFIRMATION PHONE #: (503) 254-1794

COMMENTS: Results for Terminal Transfer

PLEASE LET US KNOW IF THE TELECOPY IS UNSATISFACTORY

CLOM\FORM\HELP\FAX.FRM REV. March 8, 1990

01 09 91 04:05PM COFFEY LAB P01

SCHN00172038

COFFEY LABORATORIES * MULTIPLE PARAMETER ANALYSIS * DATA FORM

ANALYST: _____ DATE: _____

LAB ID: _____

PARAMETER	METHOD	DET. LIMIT	6SS-1-7T 91-E	91-W		UNITS	LIMITS
Flash Point	EPA020	—	130	139		°F	
					Add	TPH,	
						8010/8020	
						HCID	
						PCBs	

ADD ON: _____ 601/602 _____ PCBs _____ Solvent Scan

CLOM\FORM\DATA\GEN-1.DAT REVISED 12/15/88

RUSH

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

COFFEY LABORATORIES * WORKSHEET

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

Client: Geotech Res Job # H910107-AA

Analyst: J. Gish Report Date: 1/9/91

Date Analyzed: 1/8/91 Date Extracted: 1/8/91

Logbook Reference: Log 169 p. 67 Reviewed M 1/9

Standard's Reference Job Number: A910108-2

QC Reference Job Number: A910108-2

Prep.Info/Comments:

Units: mg/kg Detection Limit: 5.0

SAMPLE ID	TPH	SAMPLE ID	TPH
AA1	2030	91-E	
AA2	2030	91-W	

CLON\FORM\WORK\MCD-TPH.WRK REV - August 20 1989

RUSH

COFFEY LABORATORIES WORKSHEET

Analysis Requested: Purgeable Halocarbons and Aromatics in Soil by EPA Methods 8010/8020 GC/PID/HED

Client: Geotech Res Job #: H910107-AA2

Analyst: KLT Report Date: 1-9-91

Date Analyzed: 1-9-91 Date Extracted: 1-8-91

Logbook Reference: Log 183 p. 48 Reviewed: N

Prep. Info/Comments: 25ml purge STDs vancouver D90228-C14

Units: Mg/Kg Xy I.D questionable

COMPOUND	DET. LIMIT	LAB BLANK	91-E 107-AA1	91-W 107-AA2		
Benzene	0.15	ND	ND	ND		
Bromodichloromethane	0.15					
Bromoform	0.15					
Bromomethane	0.30					
Carbon tetrachloride	0.15					
Chlorobenzene	0.15					
Chloroethane	0.30					
2-Chloroethylvinylether	0.30					
Chloroform	0.15					
Chloromethane	0.30					
Dibromochloromethane	0.15					
1,2-Dichlorobenzene	0.15					
1,3-Dichlorobenzene	0.15					
1,4-Dichlorobenzene	0.15					
Dichlorodifluoromethane	0.60					

Continued

01 08 91 04:05PM *COFFEY LAB P04

SCHN00172041

Purgeable Halocarbons and Aromatics by EPA Methods 8010/8020, Continued

Job #_____ Client: _____

COMPOUND	DET. LIMIT	LAB BLANK	91-E 107-AA1	91-W 107-AA2		
1,1-Dichloroethane	0.15	ND	ND	ND		
1,2-Dichloroethane	0.15					
1,1-Dichloroethene	0.15					
trans-1,2-Dichloroethene	0.15					
1,2-Dichloropropane	0.15					
cis-1,3-Dichloropropene	0.15					
trans-1,3-Dichloropropene	0.15					
Ethylbenzene	0.15					
Methylene chloride	0.60					
Toluene	0.15					
1,1,2,2-Tetrachloroethane	0.15					
Tetrachloroethene	0.15					
1,1,1-Trichloroethane	0.15					
1,1,2-Trichloroethane	0.15					
Trichloroethene	0.15					
Trichlorofluoromethane	0.60					
Vinyl chloride	0.60					
Total Xylenes	0.15		0.69	0.51		

clom\form\work\8010/8020.wrk rev. October 23, 1990

COFFEY LABORATORIES * WORKSHEET

Analysis Performed: Hydrocarbon Scan of Soil by modified EPA Method 8015, GC/FID.

Client Geotech Res Job # H910107-AA2

Analyst PAB Report Date 9 Jan 91

Date Analyzed 8-9 Jan 91 Date Extracted 8 Jan 91

LogBook Reference: Log 158 page 96 Reviewed [illegible] 1/9

Standards Reference Job Number: This Job

QC Reference Job Number: Rental Envi A910108-FH

Prep. Info./Comments: ~15gm → 20ml DCM

Rush

Units mg/kg

COMPONENT	DETECTION LIMIT		91-E AA1	91-W AA2	
Gasoline	15		ND	ND	
Diesel ~~like mixture~~ (*)	20		5600	4400	

(*) The hydrocarbon contaminant is of the same boiling range as diesel #2, though the fingerprint does not match that of the reference standard. Quantitations are approximate.

CLDM\FORM\WORK\HCSCAN.WRK REV. October 19, 1990

COFFEY LABORATORIES * WORKSHEET

Analysis Requested: PCBs in Soil, by modified EPA Method 8080 GC/ECD.

Client: Geotech Res Job # H910107-AA2

Analyst: J.L. Report Date: 1/8/91

Date Analyzed: 1/8/91 Date Extracted: 1/7/91

Logbook Reference: Log 170 p. 58 Reviewed [illegible] 1/9/91

Clay Inc. Comment:

Units: mg/Kg Detection Limit: 2.0

SAMPLE ID	PCB	AROCLOR	SAMPLE ID	PCB	AROCLOR
AA1	ND	—	91-E		
AA2	ND	—	91-W		

CLOM\FORM\WORK\PCB.WRK REV. May 15, 1989

SCHN00172044

GRI

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

FILE COPY

January 15, 1991

J/FIELDSUM.655

George D. Ward and Associates
4941 S.W. 26th Drive
Portland, OR 97201

Attention: George Ward

SUBJECT: PETROLEUM CONTAMINATION OF SOILS, TERMINAL TRANSFER/YEON STREET PROPERTY, PORTLAND, OREGON

In accordance with an agreement reached this morning between Dick Kathrens, John Carroll, Willard Titus, and you, Mr. Titus, a registered geologist from this office, observed the subsurface conditions in a test pit excavated on the western margin of the main excavation at the Terminal Transfer site. The test pit, designated TP-1-15-91, was excavated by Dale Britton of Dale Britton Excavating at the approximate location shown on the attached Site Map, Figure 1. The purpose of the test pit was to expose the native subsurface materials along a portion of the western sidewall of the main excavation so that direct observations of the condition of those materials could be made and discrete, representative, properly documented soil samples could be collected for laboratory analysis.

As the excavation of the test pit progressed, Mr. Titus noted the appearance and odor of the exposed soils. You shared in these observations and took a number of photographs documenting the field techniques employed and the conditions observed. Mr. Titus collected representative soil samples at carefully measured depths of 2, 4, 6, 7, 8, 9, and 9.5 ft below the top of the original asphalt paving at that location. The soil samples were placed in sealed glass containers, iced, and delivered to Coffey Laboratories, Inc. for total petroleum hydrocarbon (TPH) analysis on a rush basis. The results of these analyses are expected by tomorrow afternoon. A log of the test pit, which describes the materials and conditions observed and the sample depths, is provided on Figure 2.

Mr. Titus' observations indicate that the soil profile at the test pit location is covered with a 2-in.-thick layer of asphalt and 6 to 8 inches of crushed rock base course. Directly below this paving material, the soil consists of medium dense, brown, silty sand with thin, irregular but clearly visible layers and lenses of clean sand and sandy silt. Occasional pebbles, cobbles and boulders were encountered within this sandy material. To a depth of about 4 ft, this zone was free of detectable petroleum odors, but slight to moderately strong petroleum odors were unmistakable from about 4 to 8.8 ft. At a depth of 8.8 ft, the color of the material changed abruptly to a uniform dull gray. The soil below the color boundary was moist and exhibited strong to very strong petroleum odors and film of an oily fluid resembling diesel fuel could be seen coating the sand grains. At a depth of 9.5 ft, the sandy soil appeared to be saturated with the oily fluid and free product was observed oozing from the sidewall of the excavation. The sidewalls of the

7412 SW Beaverton Hillsdale Hwy
Suite 102
Portland, Oregon 97225
Phone 503 292 2621
Fax 503 297 [illegible]

GRI

excavation became unstable as the excavation advanced below 9.5 ft and discrete, representative soil samples could not be collected below that depth. The excavation was extended to a depth of approximately 10.5 ft, and the static water level was observed to be at approximately 10 ft. An unmistakable oily film was observed floating on the surface of the water that collected in the bottom of the pit.

The observations described above suggest that substantial portions of the native material left in place west of the western margin of the main excavation are contaminated with petroleum products at levels estimated to be in excess of 500 ppm TPH, the cleanup level established for the site by the Oregon Department of Environmental Quality (DEQ). It also appears that free product may be present. This conclusion is subject to verification by the chemical testing mentioned above. Subject to the results of this chemical testing and your observations at the site, we assume that you also now agree that significant contamination still exists along the west property line. We have again advised Prendergast & Associates, Inc. that, in our opinion, the lateral extent of the contamination in a westerly direction must be defined to satisfy DEQ's closure requirements. Additionally, we have advised Prendergast & Associate, Inc. that, in our opinion, immediate steps should be taken to prevent the recontamination of remediated portions of the site by seepage of diesel from the west.

Prevention of recontamination from the west could consist of a protective barrier installed between the remediated portion of the property and the contamination. The barrier could consist of a passive, impermeable slurry or sheet pile wall, or an active well curtain or french drain system pumped in such a way as to maintain a measurable gradient in the local water table away from the remediated portion of the site. Alternatively, the excavation could be expanded to the west removing the contaminated soil. In any case, until additional work is accomplished, the remediated portion of the site is subject to the potential for recontamination.

If you have any questions or comments regarding this matter, or if we can be of any assistance to you in your efforts to define and minimize the hazard presented by the contamination described above, please do not hesitate to contact us at any time.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

REGISTERED PROFESSIONAL ENGINEER 8230 OREGON Sept. 20, 1972 DAVID D. DRISCOLL

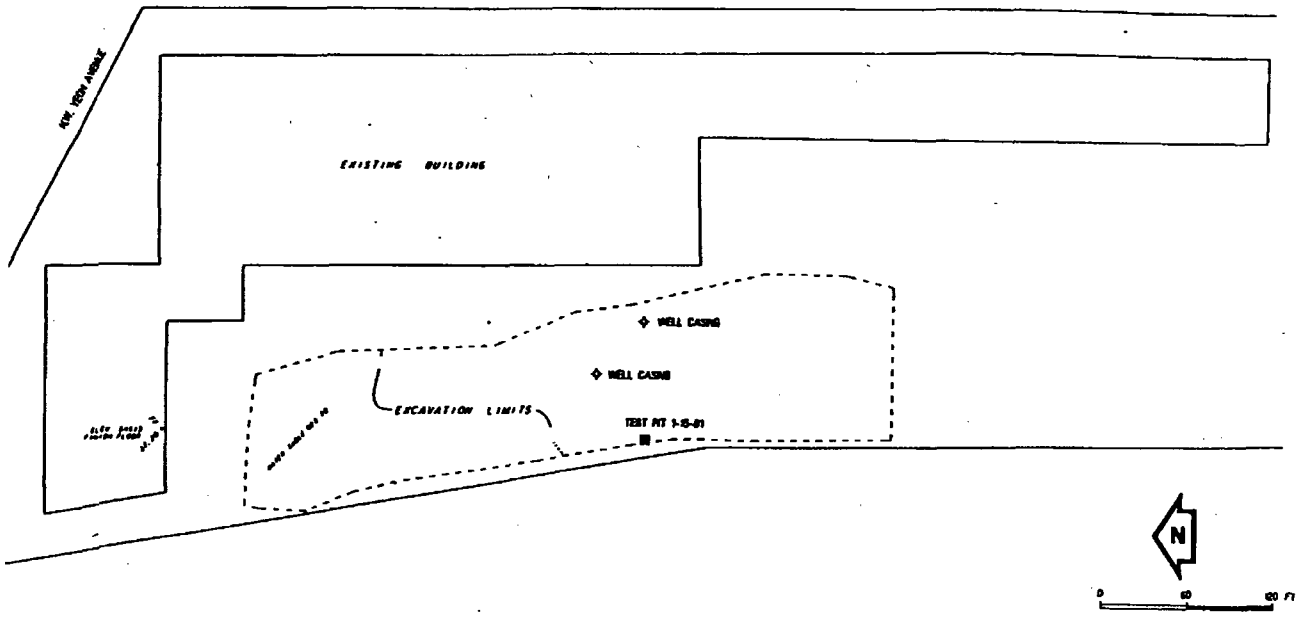
David D. Driscoll, P.E.
Principal

REGISTERED PROFESSIONAL GEOLOGIST OREGON GH21

Willard S. Titus, P.G.
Staff Geologist

cc: Dick Kathrens / Terminal Transfer
Rob Ball / Ball Janik Novack

SCHN00172046



SITE MAP FROM DRAWING PROVIDED BY GEORGE WARD & ASSOCIATES JANUARY 14, 1998

GRI

PRENDERGAST & ASSOCIATES, INC
TERMINAL TRANSFER

SITE MAP

SCHN00172047

TP-1-15-91 Approx. EL. 30 ft

0 – Asphaltic concrete pavement (2 in.) over crushed rock base course (8 in.)

1 – Medium dense, brown, silty SAND with thin (1/4 to 3 in.) layers of clean sand and sandy silt. Occasional pebbles, cobbles, and boulders. Soil is dry, no detectable petroleum odors.

2 – □ 1-15-91A

3

4 – ------ slight to moderate petroleum odor at 4 ft, odor increases with depth

□ 1-15-91B

5

6 – □ 1-15-91C

7 – □ 1-15-91D

8 – □ 1-15-91E

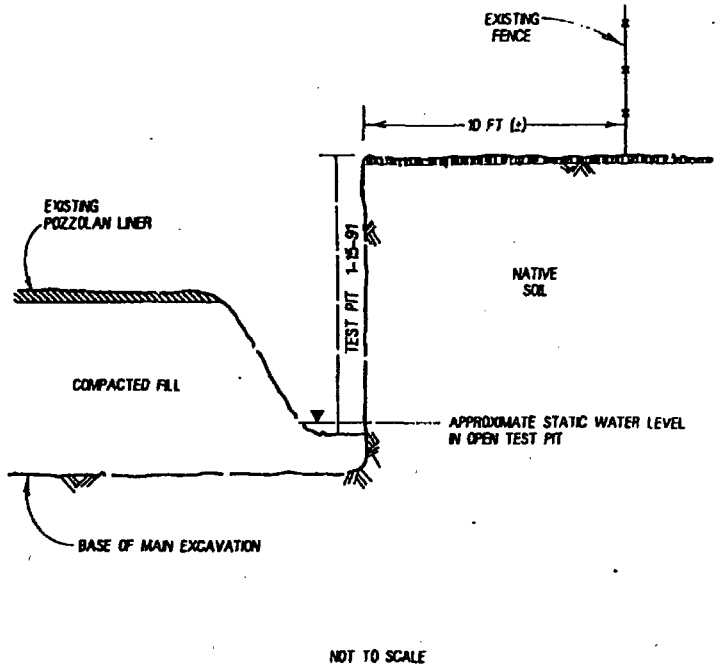
9 – ------- gray, moist to saturated with oily fluid, strong petroleum odor below 8.8 ft

□ 1-15-91F

□ 1-15-91G

10

Bottom of test pit 10.5 ft (1/15/91)
Sidewalls cave below 9.5 ft
Oily fluid seepage observed below 9 ft
Approximate static water level 10 ft in open excavation



GRI

PRENDERGAST & ASSOCIATES, INC.
TERMINAL TRANSFER

TEST PIT LOG AND TEST PIT SKETCH

JAN. 1991 JOB NO. 655 FIG.

SCHN00172048

GRI

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

FILE COPY

January 17, 1991

George D. Ward and Associates
4941 S.W. 26th Drive
Portland, Oregon 97201

Attention: George Ward

SUBJECT: PETROLEUM CONTAMINATION OF SOILS, TERMINAL TRANSFER/YEON STREET PROPERTY, PORTLAND, OREGON

In a letter dated January 15, 1991, we described the conditions which you and Willard Titus, a registered geologist from our office, observed in a test pit (TP-1-15-91) excavated along the western margin of the main excavation at the Terminal Transfer site. We indicated that seven soil samples were collected by Mr. Titus at that time and that the samples were being analyzed on a rush basis by Coffey Laboratories, Inc. (CLI) for total petroleum hydrocarbons (TPH).

A summary of the analyses is attached for your information. These results and previous observations at the site reinforce the opinion stated in our January 15 letter, that substantial portions of the native material west of the western margin of the excavation are contaminated with petroleum products at levels in excess of the 500-ppm TPH cleanup standard established for the site by the Oregon Department of Environmental Quality (DEQ) and that free product may be involved. We do not know the lateral extent of the contamination, but suspect that it may extend for considerable distances north, south, and west of test pit TP-1-15-91. We have no reason to believe that the contamination stops at the western boundary of the Terminal Transfer property. Indeed, it may continue beneath the adjacent properties to the west.

We have again advised Prendergast & Associates, Inc. that, in our opinion, the lateral extent of the contamination must be defined to satisfy DEQ's closure requirements and that immediate steps should be taken to prevent the recontamination of remediated portions of the Terminal Transfer site by seepage of diesel fuel from the west. In regard to protecting the remediated portions of the site, we have advised Prendergast & Associates that, in our opinion, it may be most cost effective to install the required measures to prevent recontamination before the western portion of the main excavation has been backfilled.

GRI

If you have any questions or comments regarding this matter, or if we can be of any assistance to you in your efforts to define and minimize the hazard presented by the contamination described above, please do not hesitate to contact us at any time.

Sincerely,
GEOTECHNICAL RESOURCES, INC.

David D. Driscoll, P.E.
Principal

Willard S. Titus, P.G.
Staff Geologist

Enclosure: Coffey Laboratories Worksheet (Draft)

cc: John Carroll / Prendergast & Associates, Inc.
Dick Kathrens / Terminal Transfer
Rob Ball / Ball Janik Novack

SCHN00172050

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

FACSIMILE TRANSMITTAL LOG

TO: COMPANY NAME: G.R.I.
ATTENTION: Bill Titus
PHONE # (___) 297-1696

DATE: 1/16/91

OF PAGES (INCLUDING COVER SHEET): 2
TELECOPIER PHONE #: (503) 254-1452
CONFIRMATION PHONE #: (503) 254-1794

COMMENTS: TPH results for Terminal Transfer Samples rec'd 1/15/9

PLEASE LET US KNOW IF THE TELECOPY IS UNSATISFACTORY

CLOM\FORM\HELP\FAX.FRM REV. March 8, 1990

SCHN00172051

Rush CT

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

DRAFT

COFFEY LABORATORIES * WORKSHEET

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

Client: Geotech Res Job # A910115-U

Analyst: J. Nish Report Date: 1/16/91

Date Analyzed: 1/16 Date Extracted: 1/15

Logbook Reference: Log 169 p. 73 Reviewed M 1/16

Standard's Reference Job Number: A910115-U

QC Reference Job Number: A910115-U

Prep.Info/Comments:

Units: mg/kg Detection Limit: 5.0

SAMPLE ID	TPH	SAMPLE ID	TPH
U1	ND	1-15-91 A	2'
U2	ND	B	4'
U3	ND	C	6'
U4	9600	D	7'
U5	35,000	E	8'
U6	86,000	F	9'
U7	25,000	G	9.5'

CLOM:FORM\WORK\MGD-TPH.WRK REV. August 29, 1990

SCHN00172052

GRI

Geotechnical Resources Incorporated

Consulting Engineers and Geologists

MEMORANDUM

FILE COPY

TO:	George Ward / George D. Ward & Associates	*DATE:*	January 18, 1991
FROM:	Bill Titus / GRI	*JOB NO.:*	655
COPIES TO:	John Carroll / Prendergast & Associates Dick Kathrens / Terminal Transfer		

SUBJECT: *COLLECTION OF SAMPLES OF MATERIAL IN-PLACE AT WESTERN PROPERTY LINE AT TERMINAL TRANSFER/YEON PROPERTY*

From conversations with you yesterday afternoon and with Jeff Ward this morning, we understand that you are in the process of excavating and disposing of the contaminated material which remains in place between the western sidewall of the main excavation and the western property line at the Terminal Transfer site. In our opinion, it would be prudent to collect and analyze discrete, representative samples of the material exposed along the western sidewall of your new excavation, which I understand will be along the western boundary of the property. The results of these analyses will allow you to characterize the contamination which may be present beneath the properties immediately west of the Terminal Transfer site, to determine what measures will be necessary to remediate that contamination and to design and install an effective protective barrier to prevent recontamination of the remediated portion of the Terminal Transfer site.

John Carroll has asked me to tell you that, in his opinion, the remediation of contamination of the adjoining properties and the installation of a protective barrier is not his responsibility. John also requested that we inform you that, in his opinion, the responsibility for all remediation, including the installation of a protective barrier, lies with Dick Kathrens.

Signed: WS Titus Date: January 18, 1991

Reviewed: Drew Driscoll Date: 1/18/91

J\COLLECT.655

SCHN00172053

GEORGE D. WARD & ASSOCIATES

4941 S.W. 26th Dr., Portland, Oregon 97201
293-6075

ENVIRONMENTAL CONSULTING ENGINEERS

January 18, 1991

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
DEC 13 1995
NORTHWEST REGION

Mr. Mike Fernandez
Department of Environmental Quality
811 S.W. Sixth Avenue
Portland, OR 97204

Subject: Terminal Transfer Inc.

Dear Mr. Fernandez:

This is to confirm my Jan. 17 verbal notification to you that partial backfilling of the remediation area at the Terminal Transfer site has started as mutually agreed upon Jan. 15 by Dick Kathrens and John Carroll. A meeting between the two, which also included Bill Titus, me, and others, took place at the site on the above date.

Reference to the same meeting is included in a letter from Mr. Driscoll to me dated Jan. 15. It is my understanding that you also have a copy of that letter, which includes a discussion concerning the west perimeter of the remediation zone. Backfilling against the original west sidewall will not be part of the partial backfilling underway at this time. Instead, excavation all the way to the static water table will continue westward to the maximum extent possible. The method to be used in accomplishing this additional excavation safely is described later in this letter.

It was this firm's professional opinion during the original excavation that it would be extremely unsafe to leave the steeply sloping west face of the excavation open to a depth of 12 ft. over its entire length for an extended period of time. For safety purposes the top of the cut was therefore held approximately 5 ft. to 10 ft. east of the west property line as marked on the Nov. 6, 1990 Limit of Excavation survey completed by a licensed surveyor under my direction. To prevent undermining the nearby railroad while the initial excavation was in progress, the toe of the original slope was held out an additional 10 ft. from the top of the initial cut at pavement level.

All involved recognized that this would leave an unexcavated wedge of soil approximately 20 ft. wide as measured at the bottom of the cut, and that additional closure sampling within this wedge would likely be required before closure approval could be obtained.

However, closure samples along the west embankment were obtained at a later date as follows. Backfilling of the original excavation with clean sand was permitted to proceed until the depth of the original cut was reduced from 12 ft. to approximately 6 ft. Potholes were then cut into the embankment, each reaching to the water table and within approximately 4 ft. of the west property line. Between Oct. 9 and Oct. 17, 1990, a total of 21 closure samples were taken at various depths from four pothole locations along the

EXHIBIT 3
PAGE 1 OF 2

west embankment. Of these, 10 were taken by GRI and 11 by myself. The lab results of all 21 closure samples were either below the level of detection or less than 500 ppm TPH.

On Jan. 10, 1991, three additional closure samples were taken by Mr. Titus from the west embankment. Of these, one was above 500 ppm. On Jan. 15, six more closure samples were taken by Mr. Titus from the west embankment but at a location approximately 150 ft. south of the Jan. 10 sampling point. Four of the six were above 500 ppm.

In summary, a total of 30 closure samples have now been taken over the 450-ft. length of the west embankment. Of these, a total of 5 were above 500 ppm. In view of this new information, Mr. Kathrens has issued the following instructions.

Effective immediately, his contractors have been instructed to excavate all remaining diesel-contaminated sand along the western boundary of the original remediation area. To the extent possible, the face of the excavation is to extend as close to the west property line as possible and is to extend into and slightly below the water table. Care shall be taken to avoid undermining either the existing cyclone fence or the railroad subgrade. All personnel are to be kept away from the exposed embankment during excavation to avoid injury should unavoidable slides occur.

Only short lengths of embankment approximately 15 ft. in length shall be exposed at a time. Backfilling of each completed section with clean material up to approximately 7 ft. below pavement level will be done immediately following the removal of contaminated soil.

Only clean sand taken from the upper level of the west embankment will be used to backfill up to the 3 ft. level above the water table. Once the 3 ft. level is reached, all backfilling against the new west sidewall will stop until a mutually agreeable closure plan is developed. In no case will filling continue until the final closure plan is approved by DEQ.

Cordially yours,

George D. Ward
Professional Engineer

GDW:ms
cc: Bill Titus
John Carroll
Dick Kathrens
Bob Wall
Soil Tech Inc.

EXHIBIT 3
PAGE 2 OF 2

TPH - 500 ppm

file copy
6/3/92
Hand carry

Michael Fernandez
DEQ
811 S.W. Sixth Ave.
Portland, Or. 97204

6/3/92

SUBJECT:

Terminal Transfer Inc.

Loader Rental Cost for June Escrow Release.

Dear Mr. Fernandez,

Listed below is the explanation of cost to rent a front end loader for the Terminal Transfer project that you requested. Soil Tech will be using this equipment to move treated soils off the work area where we are currently farming petroleum contaminated soils. At this time we have about 14 to 15,000 cu. yds of which some 10,000 are being farmed. The remaining 4 to 5,000 yds are under a portion of these soils. We need to move the top lift off (which are at 500ppm or less) so we can start farming the rest of the soils for treatment. *

Loader rental for June

Rental of loader $1275.00 per week 2 week rent	------	$2,550.00
Move in and out allow $150.00 each way	----------	$300.00
Fuel Allow $50.00 per day X 10 days	----------	$500.00
TOTAL		$3,350.00

Cordially yours,

Jeff P. Ward
Soil Tech Inc.

* Note reference to 500ppm

EXHIBIT 4
PAGE 1 OF 1

SCHN00172056

Environmental Scientists from SRH supervised the drilling and logging of all of the soil borings and monitoring wells. Soil samples were taken throughout the depth, and soil types were visually classified according to the Unified Soil Classification System. Well logs were prepared for each soil boring and are presented in Appendix B. The results are summarized below.

The subsurface units at the site were generally consistent and can be categorized into four basic units:

1) A 0.8-foot-thick layer of asphalt pavement and crushed rock subgrade. This layer was found at the surface in all of the borings.

2) A 3- to 6-foot-thick layer of dry to moist, mottled medium gray, pebbly, silty, fine to medium **SAND**. This layer is interpreted to represent a man-made fill, placed on the site in the past to bring it level to the local road. This unit also contained some crushed rock and bits of organic material.

3) A 0.5- to 1-foot-thick layer of moist to wet, mottled medium gray and brown, clayey, fine sandy **SILT**, with small organics pieces and numerous root holes. The silt showed extremely low plasticity in field plasticity index tests. This layer is interpreted to represent the old topsoil horizon on the site. This unit was encountered in all of the drill holes at a depth ranging from about 3 to 6 feet.

4) A layer of unknown thickness of moist to wet, mottled medium gray, slightly silty, fine to medium **SAND**. This unit was encountered in all of the drill holes immediately below the silt layer, at a depth of about 7 to 10 feet. This unit represents the overbank deposits of the ancestral Willamette River. All drill borings were completed in this unit.

A geologic cross-section was developed across the site from west to east. This shows the thickness and location of each of the above-described units, and shows a visual representation of each of the test borings. The cross-section is presented in Figure 6.

6.2 Hydrogeology

6.2.1 Direction and Velocity of Movement

At the time of measurement, June 27, 1989, the water table was observed to be at a depth of about 8 to 9 feet. Observations by the USGS and proprietary sources indicates this level fluxes in response to the local recharge from the nearby West Hills, and may reach near the ground surface during prolonged, wet winter months. However, no observations have been made on the Trumbull site during the winter for this project.

EXHIBIT 5
PAGE 1 OF 3

The depths to groundwater have been plotted on a site map and are presented in Figure 7. This plot shows that the local groundwater flow is to the east and perhaps slightly to the south. The general flow of the upper groundwater beneath the site is to the east, toward the Willamette River.

The total hydrologic relief over the site was about 0.2 feet on the day of measurement. This relief can be expected to change in response to the local recharge conditions. This relief over the site results in a local hydraulic gradient of about $1/10^3$. This means that for every 1,000 feet of horizontal measurement, the level of the groundwater can be expected to be about 1 foot lower.

If an assumption of the hydraulic conductivity of the medium sand aquifer is on the order of about 3 to 30 feet per day (as taken from published tables for sands of similar size and classification), and the porosity is on the order of 30% (also taken from published tables), the local velocity of the groundwater is on the order of 0.09 to 0.9 feet per day, which is relatively slow.

6.2.2 Aquifer Characteristics

From a hydrogeological point of view, the top sand fill and the bottom natural sandy layer are the two available aquifers for fluid movement, and both are fairly permeable in the horizontal and vertical axes. The naturally occurring sand at depth appears to be quite uniform and forms the native formation containing the local uppermost aquifer. This aquifer is classified as unconfined, which means that it has no pressure (as in an artesian aquifer) other than that imposed on it by gravity. Petroleum product, driven by gravity and rainwater, could easily move downward or laterally through either of these units.

Separating the upper fill and the lower sands are sandy silts which have a much lower permeability, but do not have a major role in affecting the horizontal flow of the vadose or saturated aquifer systems, forming neither a cap nor a barrier. The silts do, however, affect the infiltration of surface waters in a vertical sense, and will slow, or perhaps prohibit, the migration of the contaminants downward toward the local uppermost groundwater body.

The upper fill material was not saturated, but inspection of the soil samples indicated that the lower portions of the overlying fill have a higher moisture content than the upper portions of the underlying native sand unit. This indicates that the silts are acting as at least a partial barrier to downward movement of water in some portions of the project site.

7.0 PRODUCT RECOVERY

The recovery of the free product from the groundwater was undertaken so as to partially remediate the groundwater contamination, in addition to providing further development for the monitoring wells.

EXHIBIT 5
PAGE 2 OF 3

Figure 7.

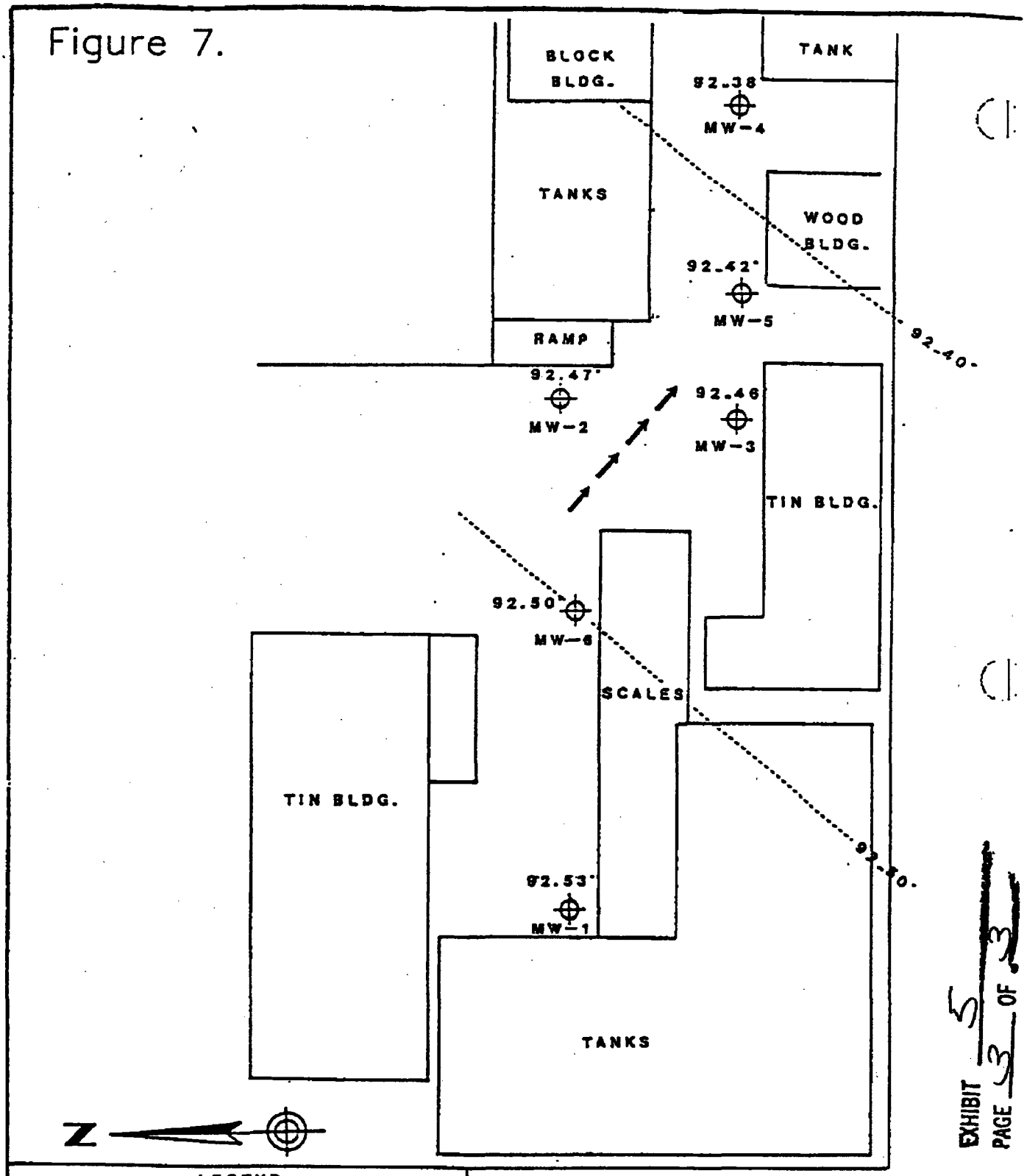


EXHIBIT 5 PAGE 3 OF 3

LEGEND

⊕ = MONITORING WELL LOCATION

↗ = DIRECTION OF GROUNDWATER MOVEMENT

MW = MONITORING WELL NUMBER

92.50' = GROUNDWATER ELEVATION (RELATIVE)

SRH ENVIRONMENTAL MANAGEMENT

SCALE 1"=30'	CHECKED BY	DRAWN BY
DATE		
SIZE	TRUMBULL ASPHALT GROUNDWATER ELEVATIONS AND MOVEMENT	DRAWING NO.

SCHN00172059

SECTION 1 INTRODUCTION

On August 30, 31, and September 6, 1990 Riedel Environmental Services, Inc. (RES) conducted a limited soil and ground water investigation at the Nabisco warehouse property in Portland Oregon. This was in an effort to delineate the extent of soil and ground water contamination associated with the earlier removal of four underground storage tanks (USTs) located on the property. In addition, an asbestos survey of the warehouse and office buildings was conducted to determine if asbestos containing materials (ACM) were present. The scope of work was later increased to include sampling for solvents.

1.1 Location and Regional Hydrogeology

The site is located at 3322 N.W. 35th in Portland, Oregon approximately one-half mile south of the Willamette River, Section 54, Township 1N, Range 1E (see Figure 1).

This region was originally a low lying area adjacent to the Willamette River, until it was filled with dredged river sands in the early 1900's. Since the mid 1900's, the area surrounding the site has been used for industrial purposes and remains so today.

Depth to ground water in the silty dredge sands is generally less than 20 feet and tends to flow from the northwest to the southeast.

1.2 Review of Oregon Department of Environmental Quality (DEQ) Files

Prior to performing field activities, RES reviewed records at the Oregon Department of Environmental (DEQ) Regional Office in Portland, Oregon. In addition to the Nabisco property, information was available on the Owens/Corning Fiberglass property located approximately 100 yards northwest of the Nabisco site. Copies of excerpts from these two files are included in Appendix A. In addition, RES spoke with the case officer for the Terminal Transfer site located along the eastern boundary of the Nabisco property. The following is a brief summary of our findings:

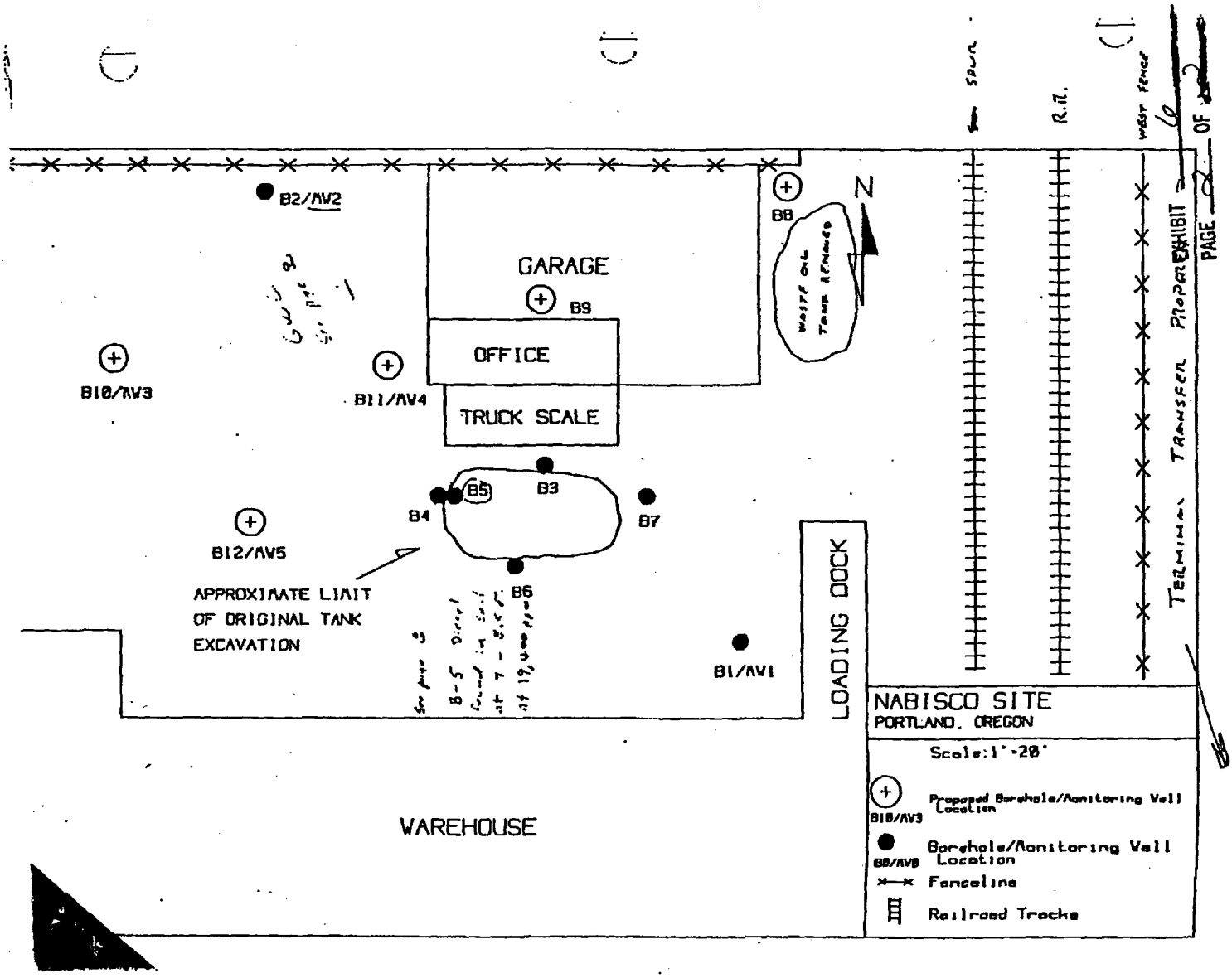
- Nabisco Site: UST site with diesel contamination

  DEQ has requested confirmation sampling to document the cleanup effort associated with the tank removal.

EXHIBIT 6
PAGE 1 OF 2

SECTION 2 SECTION 3 SECTION 4 SECTION 5 SECTION 6

SCHN00172060

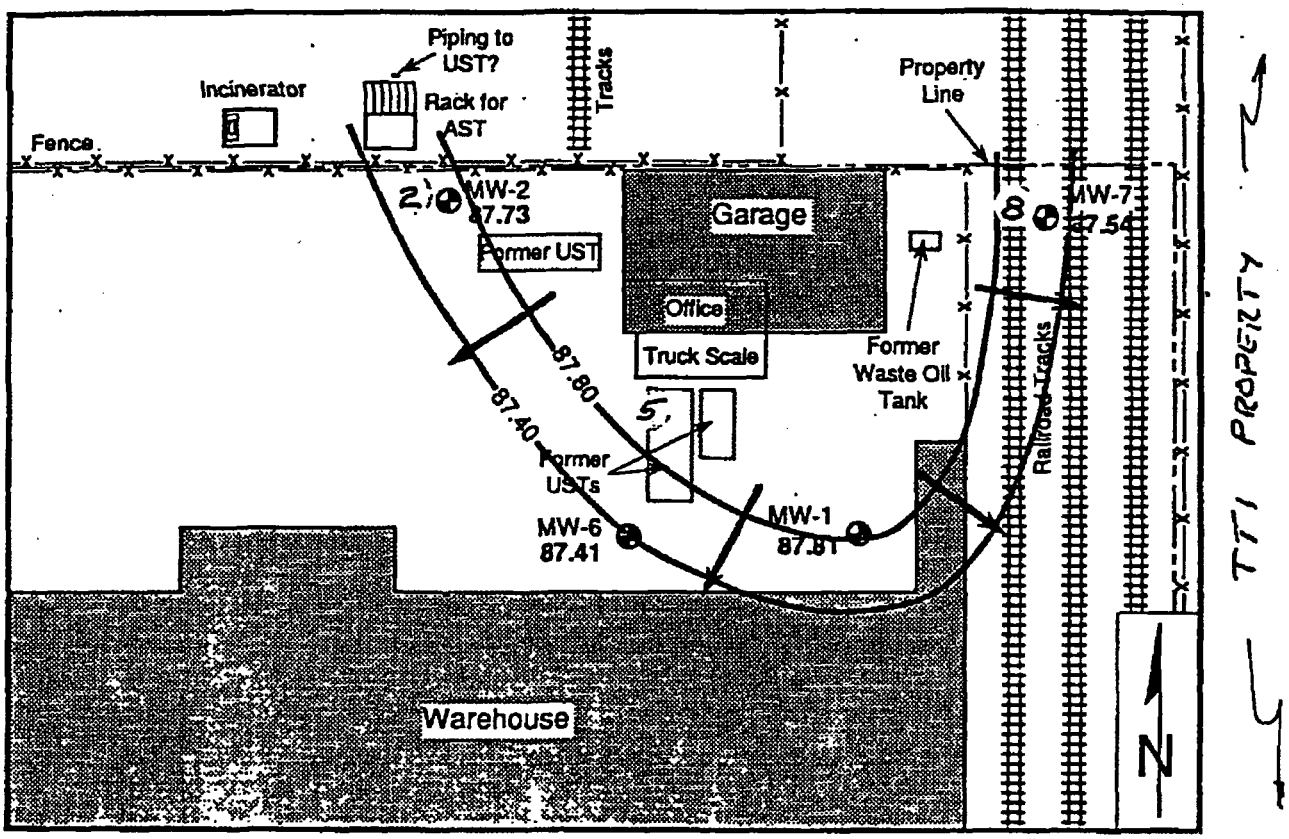


SCHN00172061

Groundwater Elevations

DEC 1 3 1995

3322 NW 35th Avenue, Portland, Oregon
September 26, 1991



Note: Base Map prepared from Figure 2 of the November 10, 1990, report by Riedel Environmental Services, Inc., entitled "Nabisco Warehouse Site, Soil and Ground Water Sampling, Round II" and from visual reconnaissance by a representative of Hart Crowser. Groundwater elevations measured relative to an assumed reference datum of 100.00 feet.

Legend

MW-2 86.76	Monitoring Well Location and Number Relative Groundwater Elevation
UST	Underground Storage Tank
AST	Above Ground Storage Tank
87.40	Estimated Groundwater Elevation Contour
	Estimated Direction of Groundwater Flow

0 40 80
Scale in Feet

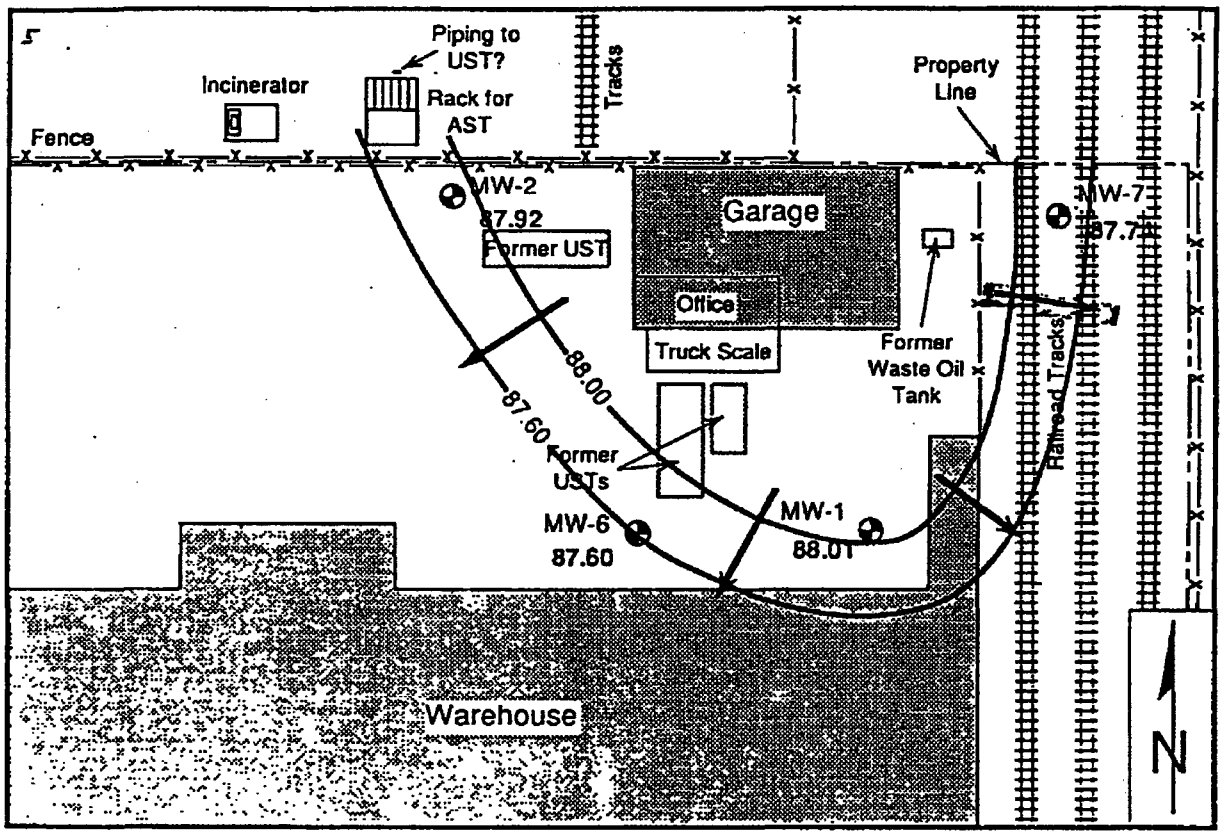
HARTCROWSER
J-5115-05 11/91
Figure 3

EXHIBIT 7
PAGE 1 OF 8

SCHN00172062

Groundwater Elevations

3322 NW 35th Avenue, Portland, Oregon
March 31, 1992



Note: Base Map prepared from Figure 2 of the November 10, 1990, report by Riedel Environmental Services, Inc., entitled "Nabisco Warehouse Site, Soil and Ground Water Sampling, Round II" and from visual reconnaissance by a representative of Hart Crowser. Groundwater elevations measured relative to an assumed reference datum of 100.00 feet.

Legend

MW-2 87.92	Monitoring Well Location and Number Relative Groundwater Elevation
UST	Underground Storage Tank
AST	Above Ground Storage Tank
87.40	Estimated Groundwater Elevation Contour
	Estimated Direction of Groundwater Flow

0 40 80
Scale in Feet

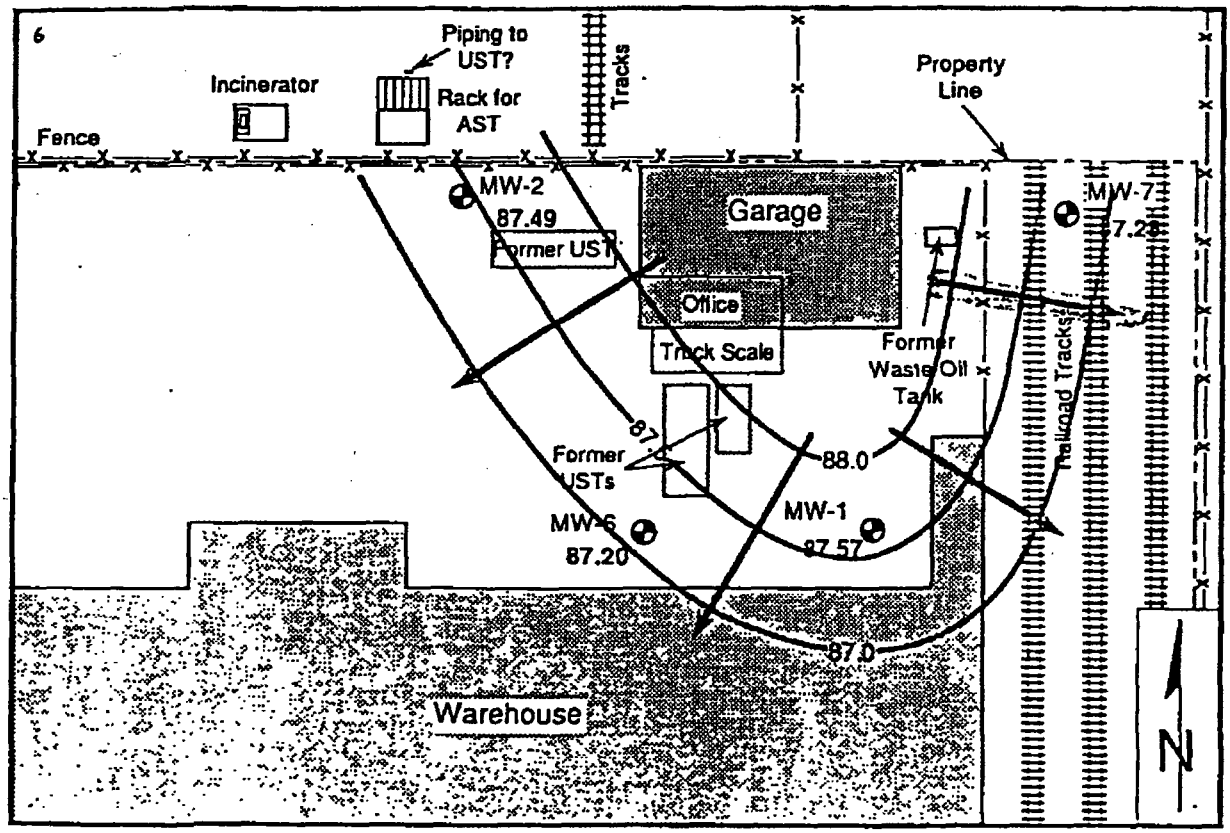
HARTCROWSER
J-5115-05 4/92
Figure 3

EXHIBIT 7
PAGE 2 OF 8

SCHN00172063

Groundwater Elevations

3322 NW 35th Avenue, Portland, Oregon
June 29, 1992



Note: Base Map prepared from Figure 2 of the November 10, 1990, report by Riedel Environmental Services, Inc.; entitled "Nabisco Warehouse Site, Soil and Ground Water Sampling, Round II" and from visual reconnaissance by a representative of Hart Crowser. Groundwater elevations measured relative to an assumed reference datum of 100.00 feet.

Legend

MW-2 87.92	Monitoring Well Location and Number Relative Groundwater Elevation
UST	Underground Storage Tank
AST	Above Ground Storage Tank
87.40	Estimated Groundwater Elevation Contour
	Estimated Direction of Groundwater Flow

0 40 80
Scale in Feet

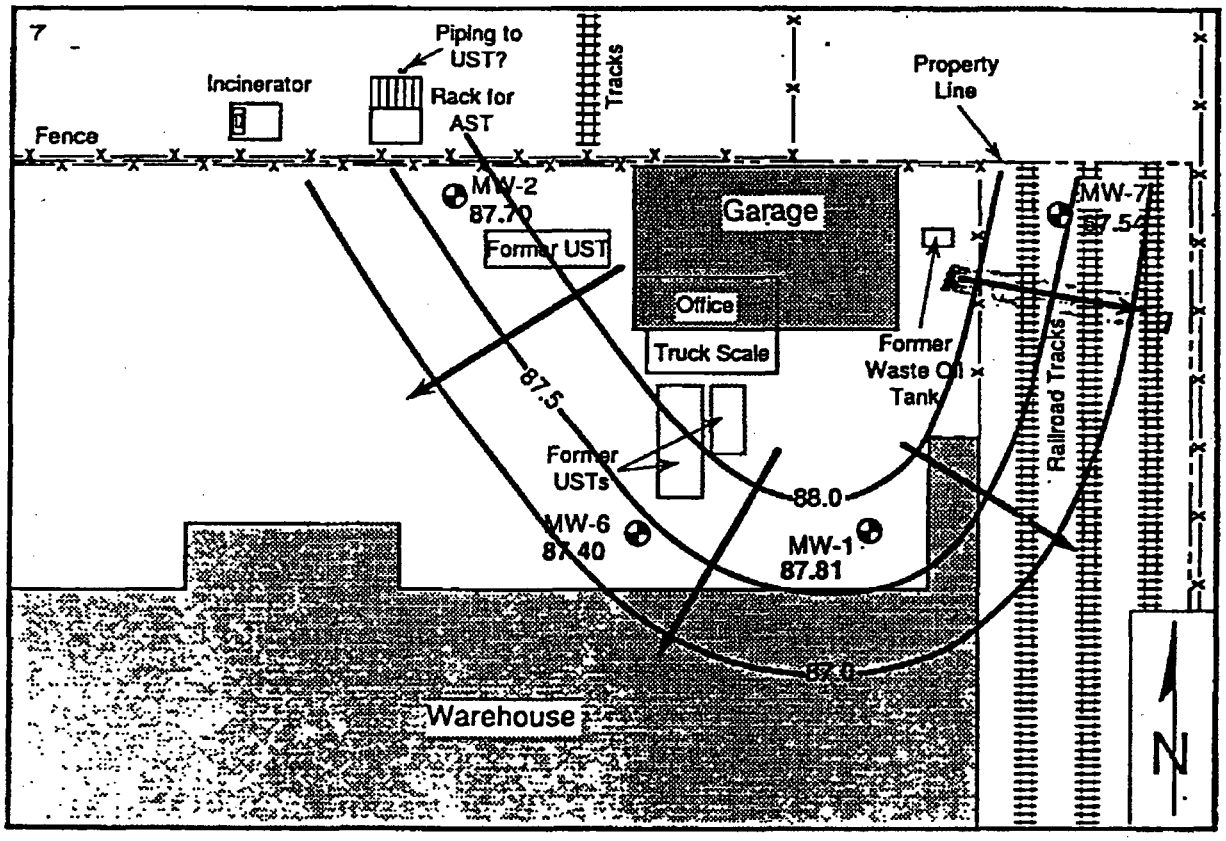
HARTCROWSER
J-5115-05 4/92
Figure 3

EXHIBIT 7
PAGE 3 OF 8

SCHN00172064

Groundwater Elevations

3322 NW 35th Avenue, Portland, Oregon
February 18, 1993



Note: Base Map prepared from Figure 2 of the November 10, 1990, report by Riedel Environmental Services, Inc., entitled "Nabisco Warehouse Site, Soil and Ground Water Sampling, Round II" and from visual reconnaissance by a representative of Hart Crowser. Groundwater elevations measured relative to an assumed reference datum of 100.00 feet.

Legend

MW-2 87.81	Monitoring Well Location and Number Relative Groundwater Elevation
UST	Underground Storage Tank
AST	Above Ground Storage Tank
87.5	Estimated Groundwater Elevation Contour
	Estimated Direction of Groundwater Flow

0 40 80
Scale in Feet

HARTCROWSER
J-5115-05 4/92
Figure 3

PAGE 4 OF 8

SCHN00172065

GRI

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

MEMORANDUM

FILE COPY

TO:	John Carroll / Prendergast & Associates	*DATE:*	January 30, 1991
FROM:	Dave Driscoll / Geotechnical Resources, Inc.	*JOB NO.:*	655
COPIES TO:			

SUBJECT: *MATERIALS AND INFORMATION, SOIL REMEDIATION AT TERMINAL TRANSFER/YEON STREET PROPERTY, PORTLAND, OREGON*

I spoke with George Ward on the telephone on Friday afternoon (January 25, 1991). We discussed George's proposal to install a barrier composed of high-density polypropylene "C-drain" fabric along the western boundary of the Terminal Transfer property.

During that and previous conversations with George, GRI has raised the following questions:

1) Is polypropylene resistant to deterioration caused by the organic constituents present in the free product and contaminated soils which are present along the western boundary of the site?

2) The "C-drain" material was designed to channel and direct the flow of a non-viscous fluid (water). How will it perform with diesel oil? Is there any documented performance history with respect to increased rate of fabric clogging in the presence of diesel?

3) Exactly where and how will the barrier be installed? Plans, specifications, and details regarding the ancillary equipment to be used with the barrier (wells, sumps, drain lines, pumps, sealing joints, etc.) need to be developed and assembled and reviewed prior to start of construction.

4) Regarding installation, I indicated to George that any "impermeable barrier" should extend from at least 2 ft below low water level to at least 2 ft above high water level to intercept the floating layer of free product. I also indicated

7412 SW Beaverton-Hillsdale Hwy
Suite 102
Portland, Oregon 97225
Phone (503) 292-2621
FAX (503) 297-1696

GRI

that the range of groundwater fluctuation needed to be documented and that we would make our groundwater level data available to George.

5) Has DEQ approved a cut-off system to solve a similar problem? What were the details of installation and how has it performed?

6) Given the lack of useful information regarding the nature and extent of the free product and contaminated soil and groundwater that is present along and west of the western boundary of the property line, is DEQ in a position to approve the installation of such a cut-off system at Terminal Transfer and approve closure?

George indicated that he would check into items 1 through 5 and respond to GRI. We have not heard from him since. Item 6 is an issue of continuing concern. We wonder if he still intends to proceed with the installation of the barrier.

Whatever his plans are regarding the installation of an impermeable barrier along the western margin of the property, GRI is still concerned that he has not taken action to define the nature and extent of the contamination in that area. We have told him repeatedly in the past and as recently as last Friday that we do not believe the site will be closed by DEQ until the west-side issue is resolved.

If you have questions, please contact me at your earliest possible convenience.

Signed: _____ Date: January 30, 1991

J\MATERIAL.655

SCHN00172067

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

January 30, 1991 J/ADDITION.655

George D. Ward & Associates
4941 S.W. 26th Drive
Portland, Oregon 97201

Attention: George Ward

SUBJECT: ADDITIONAL PETROLEUM CONTAMINATION, TERMINAL TRANSFER/YEON STREET PROPERTY, PORTLAND, OREGON

On January 24, 1991, Geotechnical Resources, Inc. (GRI) was informed by Newell Warren of the Westwood Corporation (the contractor responsible for the new construction at the Terminal Transfer site) that heavily contaminated soil and free product were encountered during excavation of the existing brick sewer manhole on column line 39.3 about 160 ft west of the new warehouse. Mr. Warren also reported this occurrence to the City of Portland building inspector responsible for observing the sewer construction in progress at the site. We understand that the inspector made a photographic record of the conditions. GRI subsequently notified John Carroll of Prendergast & Associates, Inc., who requested that GRI complete a preliminary analysis of the condition. The following is a brief summary of our findings.

During the course of the preliminary investigation of the condition, we discovered that the contractor had been pumping the groundwater within an excavation around the manhole for approximately 48 hours, at a rate sufficient to maintain the groundwater about 12 inches below the static water level. Contaminated soil and free product were observed within the sidewalls of the excavation, particularly along the northwest side. A series of soil samples were collected at the locations and depths indicated on Figure 1. These samples were analyzed for total petroleum hydrocarbons (TPH); the test results are attached. An additional hydrocarbon identification analysis (HCID) is being performed on soil sample 655-1-24-91-5. The results of this analysis will be reported to you as soon as they are available.

Please note that, although the analytical results indicate that the level of soil contamination is variable, some of the soil is contaminated at levels in excess of the 500-ppm (TPH) cleanup standard designated for the site by the Oregon Department of Environmental Quality. We have forwarded this information to you at the request of Prendergast & Associates so that you can determine the nature and extent of the contamination and the appropriate mitigation measures.

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Suite 302
Portland, Oregon 97225
Phone (503) 292-2021
FAX (503) 297-9080

GRI

If you have any questions regarding this matter, please do not hesitate to contact the undersigned at any time.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

David D. Driscoll

Willard S. Titus
by

David D. Driscoll, P.E.
Principal

Willard S. Titus, P.G.
Staff Geologist

cc: John Carroll / Prendergast & Associates
Rob Ball / Ball Janik Novack
Dick Kathrens / Terminal Transfer

SCHN00172069

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

January 25,1991
Log #A910124-Z7

Geotechnical Resources, Inc.
7412 Beaverton-Hillsdale Hwy.
Suite 102
Portland, OR 97225
Attention: Bill Titus

PROJECT NAME: Terminal Transfer PROJECT NUMBER: 655

Sample Collected: 01/24/91, 1045 hrs.
Sample Received: 01/24/91

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1.

SAMPLE ID	SAMPLE RESULT
655-1-24-91-1	ND
655-1-24-91-2	59
655-1-24-91-3	16
655-1-24-91-4	550
655-1-24-91-5	1,200
655-1-24-91-6	270
655-1-24-91-7	170

Detection Limit: 5.0 mg/kg

Results expressed as mg/kg unless otherwise noted.

ND means none detected at or above the detection limit listed.

Sincerely,

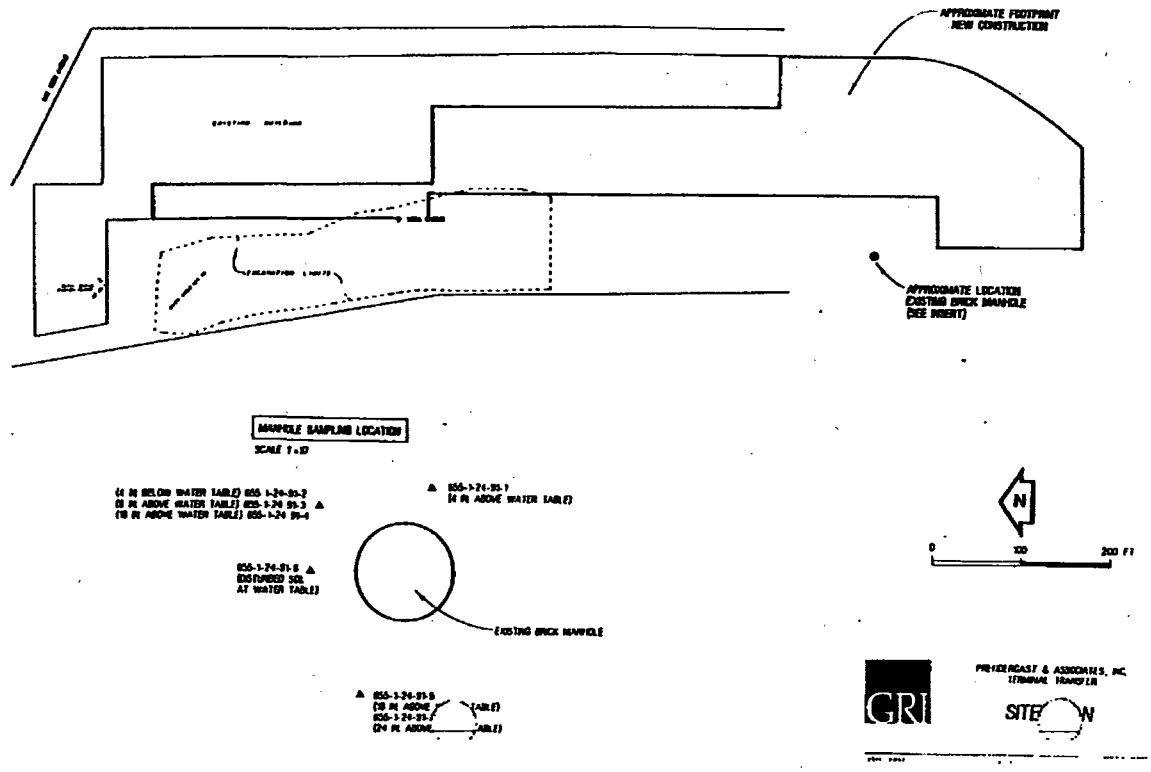
Victor A. Perry,
Quality Assurance

Sincerely,

Renee Chauvin,
Technical Director

RJC/lws

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the report date, or until the maximum holding time expires.



SCHN00172071

GRI

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

February 8, 1991 J\RESULTS.655

George D. Ward & Associates
4941 SW 26th Drive
Portland, OR 97201

Attention: George Ward

SUBJECT: SOIL AND GROUNDWATER MONITORING DATA SUMMARY, TERMINAL TRANSFER/YEON STREET PROPERTY, PORTLAND, OREGON

On February 1, 1991, you requested a summary of the analytical results of the soil and groundwater monitoring program which we have carried out at the Terminal Transfer/Yeon Street property on behalf of Prendergast & Associates.

The data for work done prior to March 2, 1989, were summarized in our initial report to Prendergast & Associates dated March 2, 1989. We have already provided you with a copy of that report. On January 14, 1991, we provided you with a summary of our soil monitoring data and copies of the laboratory reports of that work. Attached is a copy of the January 14, 1991, summary, updated to include our most recent work. Also attached is a summary of all of the data generated during our groundwater monitoring program and copies of the corresponding laboratory reports.

You have also requested a copy of the corrective action plan which we prepared for Prendergast & Associates relating to the gasoline contamination on the eastern portion of the property. A copy of that plan is enclosed.

If you have any questions or comments regarding this material, or if I can be of any assistance to you, please feel free to contact me.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

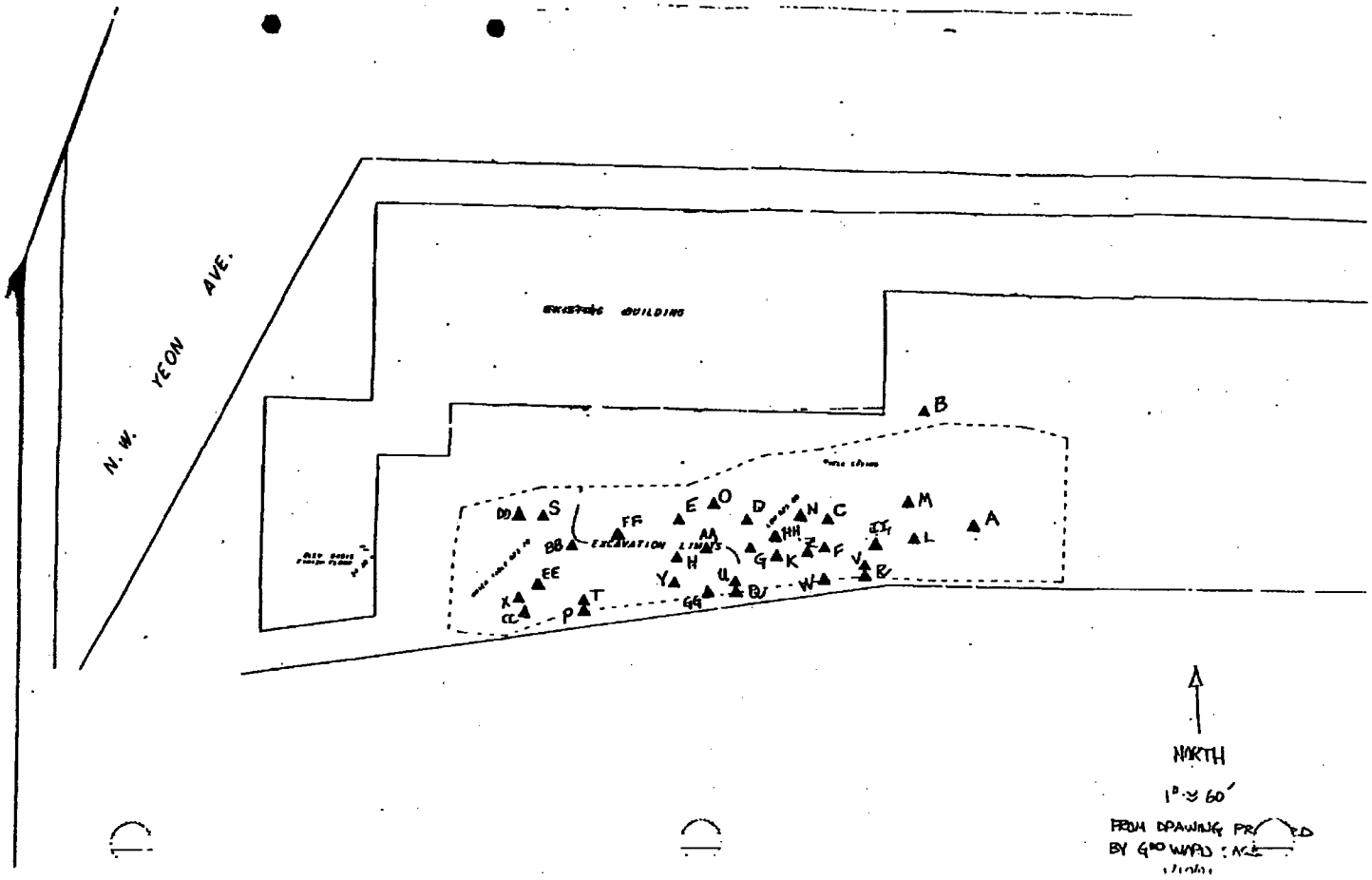
David D. Driscoll

David D. Driscoll, P.E.
Principal

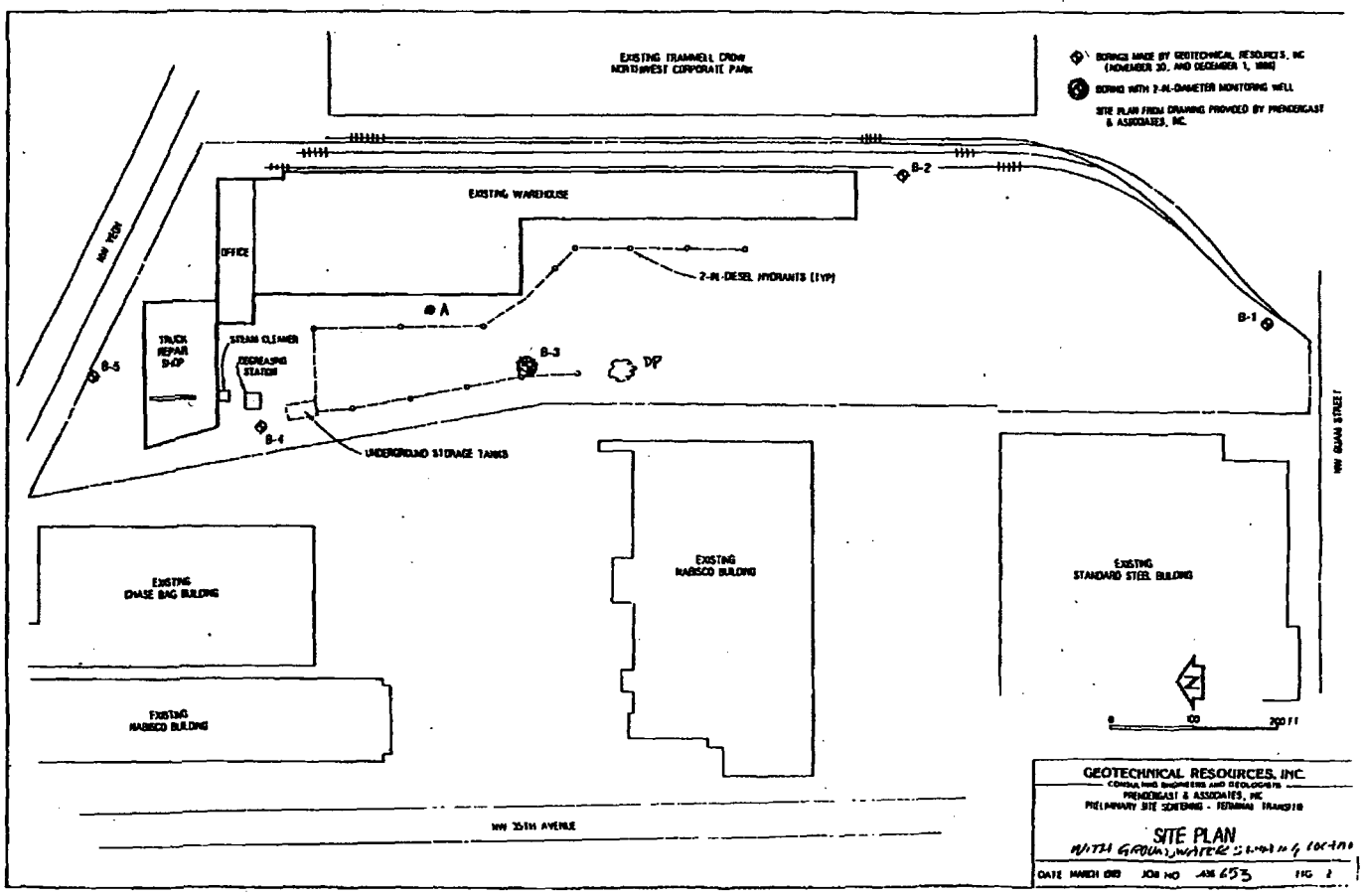
Enclosed: Soil Monitoring Data Summary
Groundwater Monitoring Program Data Summary
Laboratory Reports
Reports by GRI entitled "Remediation of Soil and Groundwater Contamination by Hydrocarbons, Terminal Transfer Facility, Portland, Oregon," dated May 31, 1990, and "Remediation Plan for Soil and Groundwater Contamination by Gasoline, Terminal Transfer Facility, Portland, Oregon," dated June 19, 1990)

cc: John Carroll / Prendergast & Associates, Inc. (letter only)
Robert Ball / Ball Janik Novack (letter only)
Mike Fernandez / DEQ

7412 SW Beaverton-Hillsdale Hwy
Suite 102
Portland, Oregon 97225
Phone (503) 292-2621
FAX (503) 297 1696



SCHN00172073



SCHN00172074

SAMPLE DESIGNATION	DATE COLLECTED (mo/day/yr)	COLLECTOR	GENERAL LOCATION	MAP SYMBOL	DEPTH (BELOW ASPHALT UNLESS NOTED OTHERWISE)	MATERIAL SAMPLED	ANALYTICAL RESULTS (PPM TPH)	RELEVANT NOTES, SVR	COMMENTS
GW-1	8/21/90	WST	S. WALL EXPL. PIT	A	10'	NATIVE SAND	70,500	SVR 8/21/90	OIL & WATER SATURATED
GW-2	8/21/90	WST	S. WALL EXPL. PIT	A	8'	NATIVE SAND	4,800	SVR 8/21/90	MOIST
GW-3	8/21/90	WST	S WALL EXPL. PIT	A	5'	NATIVE SAND	2,400	SVR 8/21/90	DRY
655-10N	9/19/90	WST	N. WALL EXPL. PIT	A	2'	NATIVE SAND	ND<4	SVR 9/19/90	DRY
655-11N	9/19/90	WST	N. WALL EXPL. PIT	A	4'	NATIVE SAND	ND<4	SVR 9/19/90	DRY
655-12N	9/19/90	WST	N WALL EXPL. PIT	A	6'	NATIVE SAND	ND<4	SVR 9/19/90	MOIST
655-13N	9/19/90	WST	N. WALL EXPL. PIT	A	8'	NATIVE SAND	21,000	SVR 9/19/90	MOIST
655-14N	9/19/90	WST	N. WALL EXPL. PIT	A	10'	NATIVE SAND	52,000	SVR 9/19/90	OIL & WATER SATURATED
655-15S	9/19/90	WST	S. WALL EXPL. PIT	A	2'	NATIVE SAND	ND<4	SVR 9/19/90	DRY
655-16S	9/19/90	WST	S. WALL EXPL. PIT	A	4'	NATIVE SAND	TR<4	SVR 9/19/90	DRY
655-17S	9/19/90	WST	S WALL EXPL. PIT	A	6'	NATIVE SAND	ND<4	SVR 9/19/90	MOIST
655-18S	9/19/90	WST	S. WALL EXPL. PIT	A	8'	NATIVE SAND	3,900	SVR 9/19/90	MOIST
655-19S	9/19/90	WST	S WALL EXPL. PIT	A	10'	NATIVE SAND	29,000	SVR 9/19/90	OIL & WATER SATURATED
⊕ 655-22	9/28/90	LMS	POTHOLE SE OF EXC.	B	11'	NATIVE SAND	ND<4	SVR 9/27/90	AT SWL
655-EX1	9/29/90	LMS	STOCKPILE IN EXC.	C	N/A	EXCAVATED SAND	11	SVR 9/29/90	COMPOSITE SAMPLE
655-EX2	9/29/90	LMS	STOCKPILE IN EXC.	D	N/A	EXCAVATED SAND	1,700	SVR 9/29/90	COMPOSITE SAMPLE
655-EX3	9/29/90	LMS	STOCKPILE IN EXC.	E	N/A	EXCAVATED SAND	20	SVR 9/29/90	COMPOSITE SAMPLE
655-EX4	9/29/90	LMS	IMPORTED FILL	F	8'	COMPACTED FILL	150	SVR 9/29/90	DISCRETE SAMPLE
655-EX5	9/29/90	LMS	IMPORTED FILL	G	8'	COMPACTED FILL	170	SVR 9/29/90	DISCRETE SAMPLE
655-EX6	9/29/90	LMS	IMPORTED FILL	H	8'	COMPACTED FILL	170	SVR 9/29/90	DISCRETE SAMPLE
655-EX7	9/30/90	LMS	S. STOCKPILE	I	N/A	EXCAVATED SAND	530	SVR 9/30/90	DISCRETE SAMPLE
655-EX8	9/30/90	LMS	S. STOCKPILE	J	N/A	EXCAVATED SAND	9	SVR 9/30/90	DISCRETE SAMPLE
⊕ 655-YY	10/01/90	LMS	E. MARGIN OF EXC.	O	11	NATIVE SAND	TR<4	SVR 10/01/90	AT SWL
655-EX9	10/02/90	LMS	STOCKPILE IN EXC.	K	N/A	EXCAVATED SAND	1,400	SVR 10/02/90	
655-EX10	10/02/90	LMS	STOCKPILE IN EXC.	L	N/A	EXCAVATED SAND	600	SVR 10/02/90	
655-EX11	10/02/90	LMS	STOCKPILE IN EXC.	M	N/A	EXCAVATED SAND	8	SVR 10/02/90	
655-EX12	10/02/90	LMS	STOCKPILE IN EXC.	N	N/A	EXCAVATED SAND	59	SVR 10/02/90	
655-XX1	10/09/90	LMS	W. WALL, EXC	P	4-5"	NATIVE SAND ?	86	SVR 10/09/90	PROB. COMPOSITE ?
655-XX2	10/09/90	LMS	W. WALL, EXC.	P	11-12"	NATIVE SAND ?	ND<4	SVR 10/09/90	PROB. COMPOSITE ?
655-XX3	10/09/90	LMS	W. WALL, EXC.	Q	4-5"	NATIVE SAND ?	ND<4	SVR 10/09/90	PROB. COMPOSITE ?
655-XX4	10/09/90	LMS	W. WALL, EXC.	Q	11-12"	NATIVE SAND ?	11	SVR 10/09/90	PROB. COMPOSITE ?
655-XX5	10/09/90	LMS	W. WALL, EXC.	R	4-5"	NATIVE SAND ?	TR<4	SVR 10/09/90	PROB. COMPOSITE ?
655-XX6	10/09/90	LMS	W. WALL, EXC.	R	11-12"	NATIVE SAND ?	36	SVR 10/09/90	PROB. COMPOSITE ?
⊕ 655-XX7	10/09/90	LMS	BOTTOM OF EXC.	S	12'	NATIVE SAND	613	SVR 10/09/90	1 FT BELOW SWL
⊕ 655-XX8	10/09/90	LMS	BOTTOM OF EXC.	T	12'	NATIVE SAND	ND<4	SVR 10/09/90	1 FT BELOW SWL
⊕ 655-XX9	10/09/90	LMS	BOTTOM OF EXC.	U	12'	NATIVE SAND	94	SVR 10/09/90	1 FT BELOW SWL
⊕ 655-XX10	10/09/90	LMS	BOTTOM OF EXC.	V	12'	NATIVE SAND	ND<4	SVR 10/09/90	1 FT BELOW SWL
655-17A	10/17/90	WST	W WALL, EXC	W	10-12'	NATIVE SAND ?	37	SVR 10/17/90	PROB. COMPOSITE ?
11-13-90-1	11/13/90	LMS	MAIN EXCAV.	X	5-6'	REMEDIATION PILE	6,200	SVR 11/13/90	SOIL BEING TREATED ON-SITE
11-13-[illegible]	11/13/90	LMS	MAIN EXCAV.	Y	5-6'	REMEDIATION PILE	4,500	SVR 11/13/90	SOIL BEING TREATED ON-SITE
11-13-[illegible]	11/13/90	LMS	MAIN EXCAV.	Z	5-6'	REMEDIATION PILE	5,300	SVR 11/13/90	SOIL BEING TREATED ON-SITE

SCHN00172075

SAMPLE DESIGNATION	DATE COLLECTED	COLLECTOR	GENERAL LOCATION	MAP SYMBOL	DEPTH (BELOW ASPHALT UNLESS NOTED OTHERWISE)	MATERIAL SAMPLED	ANALYTICAL RESULTS (PPM TPH)	RELEVANT NOTES, SVR	COMMENTS
11-13-90-4	11/13/90	LMS	MAIN EXCAV.	AA	5-6'	REMEDIATION PILE	2,500	SVR 11/13/90	SOIL BEING TREATED AT TIME
11-13-90-5	11/13/90	LMS	MAIN EXCAV.	BB	5-6'	REMEDIATION PILE	7,000	SVR 11/13/90	SOIL BEING TREATED AT TIME
01-07-91 E	01/07/91	WST	MAIN EXCAV.	CC	5-6'	REMEDIATION PILE	2,030	SVR 01/07/91	FLASH PT, BTEX, PAH & HCID AVAILABLE
01-07-91 W	01/07/91	WST	MAIN EXCAV.	DD	5-6'	REMEDIATION PILE	2,030	SVR 01/07/91	FLASH PT, BTEX, PAH & HCID AVAILABLE
655-1A	01/10/91	WST	MAIN EXCAV. FLOOR	EE	0.5'	POZZOLAN LINER	360	SVR 01/10/91	PORTIONS IN STORAGE
655-1B	01/10/91	WST	MAIN EXCAV. FLOOR	EE	3.0'	COMPACTED FILL	430	SVR 01/10/91	PORTIONS IN STORAGE
655-1C	01/10/91	WST	MAIN EXCAV. FLOOR	EE	5.5'	NATIVE SAND	33	SVR 01/10/91	PORTIONS IN STORAGE
655-2A	01/10/91	WST	MAIN EXCAV. FLOOR	FF	0.25'	POZZOLAN LINER	1,100	SVR 01/10/91	PORTIONS IN STORAGE
655-2B	01/10/91	WST	MAIN EXCAV. FLOOR	FF	3.0'	COMPACTED FILL	90	SVR 01/10/91	PORTIONS IN STORAGE
655-2C	01/10/91	WST	MAIN EXCAV. FLOOR.	FF	6.0'	NATIVE SAND	TR<6	SVR 01/10/91	PORTIONS IN STORAGE
655-3A	01/10/91	WST	MAIN EXCAV. FLOOR	GG	0.5'	POZZOLAN LINER	560	SVR 01/10/91	PORTIONS IN STORAGE
655-3B	01/10/91	WST	MAIN EXCAV. FLOOR?	GG	2.5'	COMPACTED FILL?	58,000	SVR 01/10/91	PORTIONS IN STORAGE
655-3C	01/10/91	WST	MAIN EXCAV. FLOOR	GG	6.5'	NATIVE SAND	TR<6	SVR 01/10/91	PORTIONS IN STORAGE
655-4A	01/10/91	WST	MAIN EXCAV. FLOOR	HH	0.25'	POZZOLAN LINER	730	SVR 01/10/91	PORTIONS IN STORAGE
655-4B	01/10/91	WST	MAIN EXCAV. FLOOR	HH	2.0'	COMPACTED FILL	ND<6	SVR 01/10/91	PORTIONS IN STORAGE
655-4C	01/10/91	WST	MAIN EXCAV. FLOOR	HH	6.0'	NATIVE SAND	10	SVR 01/10/91	PORTIONS IN STORAGE
655-5A	01/10/91	WST	MAIN EXCAV. FLOOR	II	0.5'	POZZOLAN LINER	510	SVR 01/10/91	PORTIONS IN STORAGE
655-5B	01/10/91	WST	MAIN EXCAV. FLOOR	II	2.5'	COMPACTED FILL	670	SVR 01/10/91	PORTIONS IN STORAGE
655-5C	01/10/91	WST	MAIN EXCAV. FLOOR	II	6.0'	NATIVE SAND	50	SVR 01/10/91	PORTIONS IN STORAGE
655-6A	01/10/91	WST	MAIN EXCAV. FLOOR	A	0.5'	POZZOLAN LINER	720	SVR 01/10/91	PORTIONS IN STORAGE
655-6B	01/10/91	WST	MAIN EXCAV. FLOOR	A	2.0'	COMPACTED FILL	210	SVR 01/10/91	PORTIONS IN STORAGE
655-6C	01/10/91	WST	MAIN EXCAV. FLOOR	A	6.5'	NATIVE SAND	ND<6	SVR 01/10/91	PORTIONS IN STORAGE
01-15-91-A	01/15/91	WST	W. WALL, EXCAV.	W	2.0'	NATIVE SAND	ND<5	LTR 01/15/91	IN-PLACE SOIL, DISCRETE SAMPLE
01-15-91-B	01/15/91	WST	W. WALL, EXCAV.	W	4.0	NATIVE SAND	ND<5	LTR 01/15/91	IN-PLACE SOIL, DISCRETE SAMPLE
01-15-91-C	01/15/91	WST	W. WALL, EXCAV.	W	6.0	NATIVE SAND	ND<5	LTR 01/15/91	IN-PLACE SOIL, DISCRETE SAMPLE
01-15-91-D	01/15/91	WST	W. WALL, EXCAV.	W	7.0'	NATIVE SAND	3,600	LTR 01/15/91	IN-PLACE SOIL, DISCRETE SAMPLE
01-15-91-E	01/15/91	WST	W. WALL, EXCAV.	W	8.0'	NATIVE SAND	35,000	LTR 01/15/91	IN-PLACE SOIL, DISCRETE SAMPLE
01-15-91-F	01/15/91	WST	W. WALL, EXCAV.	W	9.0'	NATIVE SAND	86,000	LTR 01/15/91	IN-PLACE SOIL, DISCRETE SAMPLE
01-15-91-G	01/15/91	WST	W WALL, EXCAV	W	9.5	NATIVE SAND	25,000	LTR 01/15/91	IN-PLACE SOIL, DISCRETE SAMPLE
01-24-91-1	01/24/91	LMS	BRICK MANHOLE	NOT SHOWN	+4" **	NATIVE SAND	ND<5	LTR 01/30/91	
01-24-91-2	01/24/91	LMS	BRICK MANHOLE	NOT SHOWN	-4" **	NATIVE SAND	59	LTR 01/30/91	
01-24-91-3	01/24/91	LMS	BRICK MANHOLE	NOT SHOWN	+6" **	NATIVE SAND	16	LTR 01/30/91	
01-24-91-4	01/24/91	LMS	BRICK MANHOLE	NOT SHOWN	+18" **	NATIVE SAND	550	LTR 01/30/91	
01-24-91-5	01/24/91	LMS	BRICK MANHOLE	NOT SHOWN	+18" **	NATIVE SAND	1,200	LTR 01/30/91	HCID AVAILABLE
01-24-91-6	01/24/91	LMS	BRICK MANHOLE	NOT SHOWN	0" **	NATIVE SAND	270	LTR 01/30/91	
01-24-91-7	01/24/91	LMS	BRICK MANHOLE	NOT SHOWN	+24" **	NATIVE SAND	190	LTR 01/30/91	

(*) SAMPLE MAY BE USEFUL FOR "CLOSURE"

SCHN00172076

SAMPLE DESIGNATION	DATE COLLECTED	COLLECTOR	GENERAL LOCATION	MAP SYMBOL	RELEVANT NOTES, SVR	TOTAL PETROLEUM HYDROCARBON (PPM)	BENZENE (PPB)	TOLUENE (PPB)	XYLENES (PPB)	ETHYLBENZENE (PPB)	OTHER (SPECIFY)	COMMENTS
TT-83-1	12/09/88	WST	B-3 @ 11.5'	B-3	RPT 3/2/89	4.7	NA	NA	NA	NA		
TT-83-2	12/09/88	WST	B-3 @ 23.5'	B-3	RPT 3/2/89	4.0	NA	NA	NA	NA		
TT-83-3B	12/15/88	WST	B-3 @ 11.5'	B-3	RPT 3/2/89	NA	14	0.5	ND<5	5.9	VINYL CHLORIDE @ 14 ppb	
TT-83-4B	12/15/88	WST	B-3 @ 23.5'	B-3	RPT 3/2/89	NA	20	0.9	ND<5	9.6	VINYL CHLORIDE @ 16 ppb	
436-1	01/30/89	WST	B-1 @ 11.5'	B-1	RPT 3/2/89	NA	TRACE < 1	ND<0.5	NA	ND<1	TRICHLOROFLUOROMETHANE @ 4.9	
436-2	01/30/89	WST	B-2 @ 11.5'	B-2	RPT 3/2/89	NA	TRACE < 1	ND<0.5	NA	ND<1		
436-3	01/30/89	WST	B-3 @ 11.5'	B-3	RPT 3/2/89	NA	48.8	3.2	NA	27.5	TRANS-1,2-DICHLOROETHENE @ 3.2	
436-5	01/30/89	WST	B-5 @ 11.5'	B-5	RPT 3/2/89	NA	1.0	ND<0.5	ND<2	ND<1		
436-6	01/30/89	WST	FIELD BLANK	NA	RPT 3/2/89	NA	1.0	0.8	ND<2	ND<1	TRICHLOROFLUOROMETHANE @ 4.4	
01/19 TPH results 655-B-1	04/13/90	TJP	B-6	B-6	RPT 5/31/90	6.0	734	3810	6,950	1280		
655-BH1	05/10/90	TJP	B-6	B-6	RPT 5/31/90	NA	428	2,380	2,890	592		
655-B6	06/08/90	WST	B-6	B-6	NA	1.8	NA	NA	NA	NA		
655-B6A	07/10/90	WST	B-6	B-6	SVR 7/12/90	0.3	ND<2	ND<0.5	ND<2	ND<1	pH @ 7.16	
655-B6B	07/11/90	WST	B-6	B-6	SVR 7/12/90	0.2	46	200	230	20	pH @ 7.06	
? TPH 655-B6C	07/16/90	WST	B-6	B-6	SVR 7/16/90		120	500	530	96	pH @ 7.83	
? TPH GW1-4	08/21/90	WST	INITIAL DIESEL PIT	DP	SVR 8/21/90	NA	TRACE<20	ND<5	26	17	SURFACE OF SWL IN PIT	
GW1-4	08/21/90	WST	INITIAL DIESEL PIT	DP	SVR 8/21/90	NA	TRACE<20	ND<5	45	21	DUPLICATE ANALYSIS	
655-20W	09/19/90	WST	6TH WARD WELL IN PIT	DP	SVR 9/19/90	590	67	ND<10	2,000	2400	PURGED MONITORING WELL	
655-AA	09/22/90	LHS	B-6	B-6	SVR 9/22/90	(0.4 = 0.4)	35.8	55.5	169	113	pH @ 6.98	
655-BB	10/02/90	LHS	B-6	B-6	SVR 10/02/90	ND < 0.4	140	230	410	140	pH @ 7.30	
655-CC	10/05/90	LHS	B-6	B-6	NA	0.6	157	452	517	104	pH @ 6.88	
655-DD	10/08/90	LHS	B-6	B-6	NA	0.4	210	330	470	110	pH @ 6.99	
655-1-3-91	01/03/91	WST	6TH WARD WELL "A"	A	SVR 01/03/91	250	4.3	ND<0.5	ND<2	1.6	PHENANTHRENE @ 680 ppb, CIS/TRANS-1,2-DICHLOROETHENE @ 1.1	

SCHN00172077

GRI

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

February 21, 1991

J/220TANKS.655

Prendergast & Associates, Inc.
121 SW Morrison Street, Suite 1200
Portland, Oregon 97204

Attention: John Carroll

SUBJECT: PRELIMINARY REPORT, UNDERGROUND STORAGE TANK DECOMMISSIONING, TERMINAL TRANSFER, 3601 NW YEON STREET, PORTLAND, OREGON

At your request, Willard Titus of Geotechnical Resources, Inc. (GRI) observed the decommissioning of three underground storage tanks (USTs) located immediately south of the truck repair facility on the northern portion of the Terminal Transfer property. The tanks were pumped, purged, and rendered inert by Spencer Environmental, Inc. and were excavated by Konell Construction on February 19 and 20, 1991.

The three tanks were located close to one another, as shown on the attached sketch. The largest of the tanks was 8 ft in diameter, 17 ft long, and had a capacity of approximately 6,400 gallons. We were unable to determine the contents of the tank, but the Spencer Environmental representative who pumped it offered the opinion that it contained clean lubricating oil. The second tank was 4 ft in diameter, 12 ft long, and had a capacity of approximately 1,220 gallons. The tank appeared to have been used to store waste oil. The third tank was 6 ft in diameter, 9 ft long, and had a capacity of approximately 1,900 gallons. This tank was used to store gasoline. None of the tanks appeared to have been perforated; however, the integrity of the piping could not be verified due to damage incurred during excavation. All of the tanks were bedded in and backfilled with relatively clean sand. Groundwater was not encountered in the excavation.

As each tank was removed, soil samples were collected from the base of the excavation directly beneath each end of the tank. These samples were placed in clean glass containers and delivered to Coffey Laboratories, Inc. (CLI) for analysis on February 20, 1991. The locations of the soil samples are shown on the attached sketch. Each of the samples was analyzed for total petroleum hydrocarbons (TPH). The samples from the area beneath the waste oil tank were also analyzed for volatile chlorinated solvents (EPA Method 8010), volatile aromatic solvents (EPA Method 8020), polychlorinated biphenyls (EPA Method 8080), and leachable metals (TCLP). The results of the TPH analyses are summarized below:

7412 SW Beaverton-Hillsdale Hwy
Suite 102
Portland, Oregon 97225
Phone (503) 292-2621
FAX (503) 297-1696

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Date	Sample No.	Depth, ft	Total Petroleum Hydrocarbons, ppm
2/19/91	655-2-19-NC	12.5	270
2/19/91	655-2-19-SC	12.5	61
2/19/91	655-2-19-NE	12.5	52,000
2/19/91	655-2-19-SE	12.5	21
2/20/91	655-2-20-NW	8.5	6,400
2/20/91	655-2-20-SW	8.5	8

The additional analyses of the samples from beneath the waste oil tank are not yet complete. Those results will be forwarded to you as soon as they are available.

Based on the testing summarized above, it is our opinion that some of the soil removed from the excavation during the decommissioning of the USTs and some of the soil not yet excavated is contaminated with petroleum hydrocarbons in excess of the 500 ppm (TPH) cleanup standard set for the site by the Department of Environmental Quality (DEQ). We recommend that the existing excavation be enlarged to the east and west until the bottom and sidewalls are free of contamination above the 500-ppm (TPH) level. All of the excavated soils should be disposed of off site. We recommend that no further excavation be completed to the north because of the risk of damage to the truck repair facility.

We are in the process of preparing a report of our activities and observations for your review and submittal to DEQ. If you have any questions regarding this matter, or if we can be of further assistance, please do not hesitate to call at any time.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

REGISTERED PROFESSIONAL ENGINEER 18230 OREGON Sept. 20, 1974 DAVID D. DRISCOLL, SR.

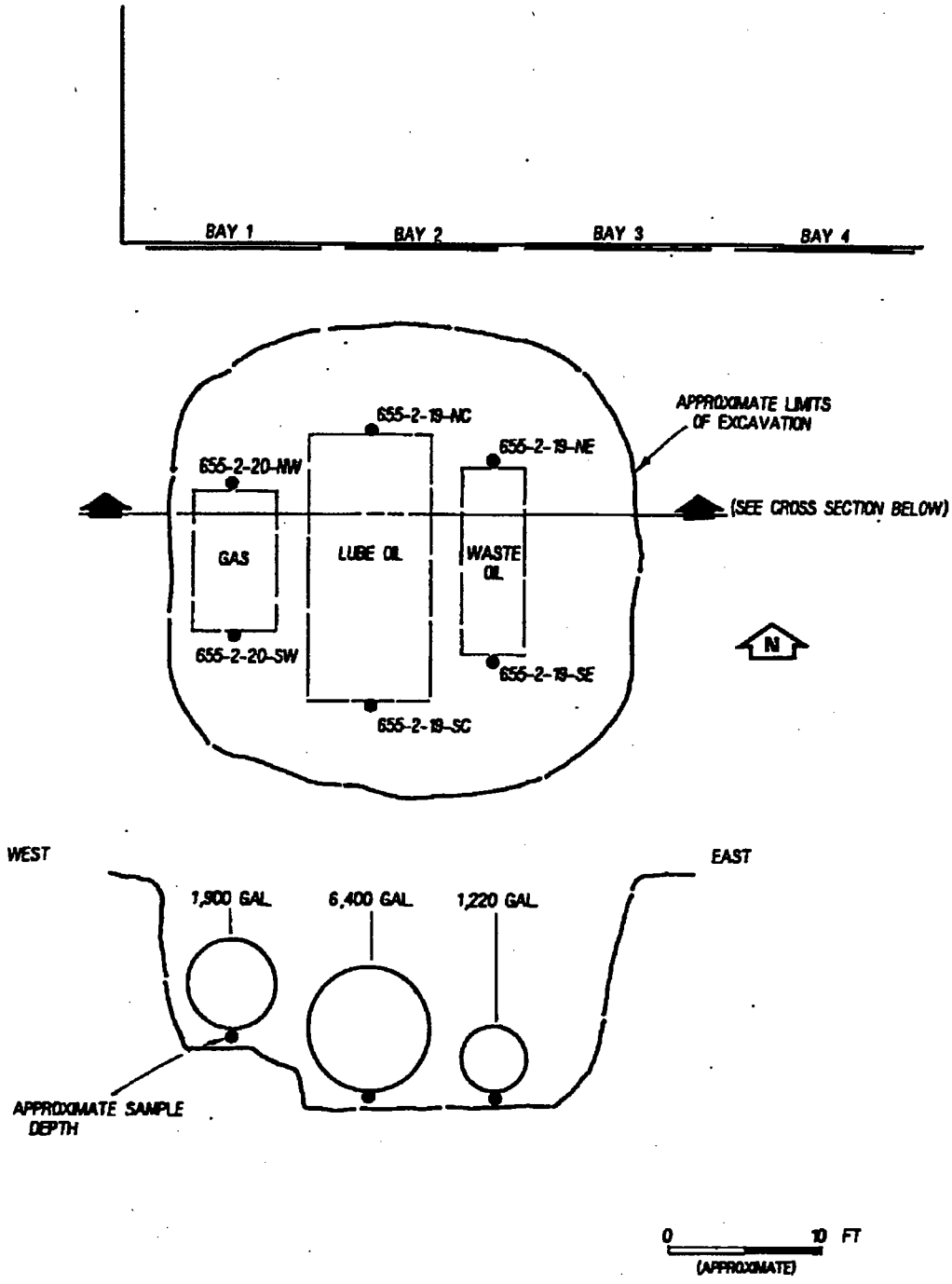
REGISTERED PROFESSIONAL OREGON WILLARD S. TITUS GEOLOGIST

David D. Driscoll, P.E.
Principal

Willard S. Titus, P.G.
Staff Geologist

Attachment: Site Map

SCHN00172079



GRI

PRENDERGAST & ASSOCIATES, INC.
TERMINAL TRANSFER UST DECOMMISSION

SITE MAP

FEB. 1991 JOB NO. 655 FIG. 1

SCHN00172080

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

FILE COPY

February 27, 1991

J/RESPONSE.655

Prendergast & Associates, Inc.
121 SW Morrison Street, Suite 1200
Portland, OR 97204

Attention: John Carroll

SUBJECT: REVIEW OF CORRECTIVE ACTION PLAN DEVELOPED FOR THE TERMINAL TRANSFER/YEON STREET PROPERTY BY GEORGE D. WARD AND ASSOCIATES

At your request, Geotechnical Resources, Inc. (GRI) has reviewed the corrective action plan (CAP) for the Terminal Transfer/Yeon Street property which George D. Ward and Associates (GDWA) submitted to the Oregon Department of Environmental Quality (DEQ) on February 18, 1991. The CAP appears to have been submitted in response to DEQ's requirements set forth in a letter to Dick Kathrens from Michael Fernandez (DEQ Environmental Cleanup Division) dated July 3, 1990.

The CAP prepared by GDWA deals with a number of topics and issues not directly related to the remediation of the site or to the nature of the corrective actions performed or proposed to be performed at the site. We have not prepared a detailed, point-by-point critique of the plan, rather, we have outlined our concerns regarding the overall completeness and direction of the document.

1) Reference is made to the attached outline prepared by DEQ entitled "Corrective Action Plan (CAP) Guidance." The purpose of this outline is to document the minimum level of effort and information required by DEQ in a CAP. Comparison of the CAP prepared by GDWA with the outline quickly reveals a number of areas of incompleteness or omission. In our opinion, the document as it presently stands is not a CAP. We believe that the overall quality and ultimate acceptability of the document would be significantly improved if the CAP followed the attached DEQ outline.

2) The CAP does not address the source of contamination and potential for on-site and off-site migration. Free product and grossly contaminated soils have been traced up to the western property line. It is our opinion that significant soil contamination exists beyond the western property line and that migration of contaminated groundwater may also have occurred. The corrective action plan contains no provisions to investigate the extent of this problem and contains no

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discussion of remedial activities to correct it. In our opinion, subsurface explorations designed to determine the limits and degree of on-site and off-site soil and groundwater contamination should be a part of the CAP and a remedial action plan and long-term monitoring plan based on the results of the explorations should be included in the CAP.

3) Recent soil sampling and analytical work by GRI indicates that soil contamination in excess of the soil cleanup standard specified for the site by DEQ is still present. Specifically, soils containing total petroleum hydrocarbon (TPH) concentrations up to 1,200 ppm were found in the southern portion of the property on January 24, 1991, during the renovation of a sewer manhole. The results of this work were forwarded to Mr. Ward on January 30, 1991. A chromatographic comparison indicates that the contaminants in this area are identical to the contaminants in the area of known diesel contamination in the northern and western portions of the site.

   In addition, soils containing TPH concentrations up to 52,000 ppm were found on February 19 and 20, 1991, during the decommissioning of three underground storage tanks adjacent to the former truck maintenance shop. We have reason to believe that these tanks contained lube oil, waste oil, and gasoline. The results of this work were forwarded to Mr. Ward on February 22, 1991. We believe that the CAP should address these problems and should specify the remedial actions to be taken to correct them.

4) The nature and extent of the groundwater contamination at the site has not, in our opinion, been investigated thoroughly and no remedial measures are proposed in the CAP. In our opinion, a series of properly designed monitoring wells should be installed in such a way as to allow the quality of the groundwater at the site to be determined. This work, along with a specific program for sampling and analysis, a specific remedial action plan, and a long-term monitoring plan should be included in the CAP. In this regard, we are not yet convinced that the levels of groundwater contamination observed during our work on the eastern portion of the site are separate and distinct from groundwater contamination which might be found on other portions of the site. The program of explorations, sampling and monitoring described above should be capable of identifying the source(s) and migration path(s) of contaminated groundwater on the site.

5) The CAP does not include a discussion of the cleanup standards to be applied to the soil and groundwater at the site. In the absence of such a discussion and a request that a set of site-specific cleanup standards be assigned to the site, it

SCHN00172082

GRI

is our understanding that DEQ will apply a Level 2 soil matrix cleanup standard (soil) and the secondary drinking water standards (groundwater) to the site. It is our opinion that a thorough documentation of the potential environmental hazards and background levels of contamination on adjacent sites, the lack of potential downgradient receptors, and the absence of existing and future users of the near-surface aquifer could be used to make a good case for a set of site-specific cleanup standards less restrictive that the standards which DEQ is likely to apply to the site.

6) The CAP does not include a schedule for the implementation of the corrective action. It is our opinion that a specific schedule for each of the activities should be incorporated into the CAP and that the schedule should include the dates by which regular status reports must be submitted to DEQ.

If you have any questions, please contact the undersigned at your convenience.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

REGISTERED PROFESSIONAL ENGINEER 8230 OREGON Sept. 20, 19 DAVID D. DRISCOLL, SR.

REGISTERED PROFESSIONAL OREGON WILLARD S. TITUS G1121 GEOLOGIST

David D. Driscoll, P.E.
Principal

Willard S. Titus, P.G.
Staff Geologist

cc: Mike Fernandez / DEQ
George Ward / George D. Ward & Associates
Rob Ball / Ball Janik Novack
Bob Wall / Wall & Wall PC

SCHN00172083

GUIDANCE FOR CORRECTIVE ACTION PLANS FOR CONFIRMED RELEASES FROM UNDERGROUND STORAGE TANKS

JANUARY 16, 1990

DEQ may require owners, permittees or responsible persons to submit a corrective action plan (CAP) at any point after they have submitted information in compliance with OAR 340-122-220 through 340-122-230 (initial response to a release, initial abatement measures and site check, and initial site characterization) or 340-122-305 through 340-122-360 (numeric cleanup levels for soils). Typically, a CAP will be required when the responsible person is performing a corrective action at a site where groundwater has been contaminated or where attaining the numeric soil cleanup levels established by DEQ is not feasible.

The attached guidance document lists items which must be addressed in a corrective action plan in order for DEQ to determine if a proposed corrective action will adequately protect human health, safety, welfare, and the environment. Plans must contain this or equivalent information in order to be considered for review by DEQ staff. If any of the required information cannot be obtained, a statement to that effect should be included in the plan. If required information is omitted because it seems irrelevant, a rationale for this omission should be included in the plan. Any required information which has been submitted in order to fulfill other DEQ reporting requirements such as the 20 day report required under OAR 340-122-225 or the 45 day report required under OAR 340-122-230 must be summarized in sufficient detail to enable the CAP to stand on its own as a complete document.

It is extremely important that reports be complete and clearly written. If information has been omitted from a report or the report is unclear, DEQ may reject the report, require additional work, or conduct the additional necessary work with DEQ staff or contractors and attempt to recover the cost of this work from the responsible persons.

CORRECTIVE ACTION PLAN GUIDANCE

The following factors should be considered in determining if a Corrective Action Plan for a petroleum product release adequately protects public health, safety, welfare and the environment.

1. Background

   All Sites
   a. type of product released
      i) chemical properties
      ii) physical properties
      iii) persistence
      iv) potential for migration
   b. quantity of product released (if known)
   c. quantity of product recovered (if known)
   d. location of release on site
   e. method of release detection
   f. observed contamination (visual, odors, vapor survey results, aging, degree of decomposition)
   g. extent of contamination
   h. contaminant analytical results
      i) rationale for sampling locations
      ii) relationship between sampling locations and known areas of contamination
      iii) sample collection, preservation, and storage procedures
      iv) analytical results (including dates of analyses, analytical methods, method detection limits, QA\QC information generated during the investigation)
   i. legal description of property
   j. present owner
   k. present land use

2. General location map

   All Sites
   a. streets
   b. site location
   c. locations of wells potentially affected by release
      i) wells listed with the Oregon Water Resources Department
      ii) wells identified during field surveys

3. Detailed site plan

   All Sites
   a. adjacent land use
   b. fences\property boundaries
   c. buildings and other structures

d. ground cover
e. location of tanks and ancillary equipment (present and past)
f. location and dimensions of excavations
g. location of soil stockpiles
h. subsurface features (potential migration pathways)
i. locations of releases
j. locations of monitoring wells, borings, and all sampling events

4. Hydrogeologic characteristics of the facility and the surrounding area.

<u>Soil contamination only</u>
a. area soil (type, thickness, classification, etc)
b. soil characteristics (ASTM D2488-84 and D2487-85 classification, grain size, sorting texture, etc.)
c. depth to water table and seasonal fluctuations
d. groundwater quality in potentially affected aquifers
e. site surface features (general surface contours and gradient, direction and fate of runoff, etc.)

<u>Soil and groundwater contamination</u>
f. area bedrock (type, thickness, formation name, etc.)
g. boring logs (description, methods, odors, blow count, etc.)
h. general description of aquifers
i. perched conditions
j. potential or actual connection to other aquifers
k. monitoring well installation
   i) well locations
   ii) well depths
   iii) length of screened intervals
   iv) measured depth to water
   v) drilling methods
   vi) construction materials and installation methods
   vii) well development and completion methods
l. surveyed elevations of monitoring wells
m. water table maps
n. groundwater gradient (vertical and horizontal direction and magnitude)
o. description of sampling activities
q. analytical results

5. The proximity, quality, and current and future uses of nearby surface water and groundwater.

<u>Soil Contamination Only</u>
a. proximity to surface water and groundwater
b. groundwater/surface water discharge points
c. identification of all nearby wells and their uses
   i) identification of all wells listed with the Oregon

Water Resources Department and field confirmation of their locations

ii) a field survey to identify wells for which no logs are on file

iii) for all located wells, to the extent practicable, identify:

1) the owner
2) the address
3) the map location
4) the driller
5) the date drilled
6) the total depth of the well
7) the reported or measured depth to water
8) the casing and screen materials
9) the screened interval
10) seal types, depths, and intervals
11) static pumping levels
12) approximate land surface elevation
13) reported water quality and use of well

<u>All Sites</u>

d. current and future uses of groundwater

6. The potential effects of residual contamination on nearby surface water and groundwater.

<u>All Sites</u>

Describe potential effects based on information given in Items 1 through 5 above.

7. An exposure assessment.

<u>All Sites</u>

a. potential routes of exposure and concentration
b. characterization of toxic effects
c. populations at risk
d. potential or actual adverse impact on:
   i) biological receptors
   ii) present and future uses of the environment
   iii) ecosystems and natural resources
   iv) aesthetic characteristics of the environment
e. extent to which substances have migrated or are expected to migrate and the threat such migration might pose to public health, safety or welfare and the environment
f. potential for further release of any substances or treatment residuals that might remain after remedial action

8. The impact of the release on adjacent properties.

<u>All Sites</u>

a. extent of release (current and potential)
   i) soil

ii) groundwater
iii) surface water
iv) air\vapor

b. description of past vapors/seepage into nearby buildings

9. Cleanup Options

The CAP will identify those cleanup actions which will protect public health, safety, welfare and the environment. Potential cleanup actions should include combinations of:

<u>All Sites</u>

a. soil excavation and treatment/disposal
b. in-place soil treatment
   i) active
   ii) passive (eg., natural degradation with monitoring)
c. product recovery
e. groundwater removal and treatment
f. groundwater gradient control
g. vapor control measures
h. drinking water supply replacement
i. resident relocation

10. Proposed Cleanup Levels

a. proposed cleanup levels
b. justification for the proposed cleanup levels

Site maps, equipment diagrams, specifications, calculations etc. must be presented which demonstrate that the cleanup protects public health, safety, welfare and the environment. Only very limited detail is provided in this document because cleanup actions are site specific. Selection of a cleanup action will depend on the responsible person's proposal and review by the DEQ staff.

DEC 15 1995

NORTHWEST REGION

Oregon

DEPARTMENT OF ENVIRONMENTAL QUALITY

March 18, 1991

George D. Ward
George D. Ward & Associates
4941 S.W. 26th Dr.
Portland, OR 97201

Re: Terminal Transfer, Inc.
File No. 26-89-013

Dear Mr. Ward:

In your March 12, 1991 letter you request written confirmation from DEQ that all "corrective action mitigation activities described above through March, 1991, and that the site, as defined in Schedule I and II of the October 4, 1990 Contract of Sale Agreement between Terminal Transfer, Inc. and Yeon St. Partners (Prendergast & Associates), is now in compliance with all applicable Oregon laws and regulations". While we cannot speak to other laws and regulations that may be applicable, DEQ has determined under ORS Chapters 465 and 466 that, based on information submitted to date, all contaminated soil related to the diesel fuel release has been excavated with the exception of contaminated soil which could not be removed without endangering the railroad line which runs along the western boundary of the property. Removal of this soil will not be required but because further contamination may exist at and possibly beyond the western property line, investigation and possibly remediation of this contamination will be required.

Please be advised that this letter does not release Terminal Transfer, Inc. from responsibility for groundwater monitoring and any necessary remediation of contaminated groundwater from either the diesel fuel release or the gasoline release discovered on the site; for remediation of contaminated soil from the gasoline release; for investigation and possibly remediation of any contamination remaining at or beyond the western property boundary; or for further remediation of the release from the underground storage tanks removed from the area adjacent to the truck repair shop if DEQ determines that such measures are necessary.

811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229-5696

EXHIBIT 8
PAGE 1 OF 2

DEQ-1

I am presently in the process of preparing a letter to your client, Dick Kathrens, which provides comments regarding the deficiencies in the site corrective action plan dated February 18, 1991. DEQ will approve the corrective action plan after it is modified to DEQ's satisfaction.

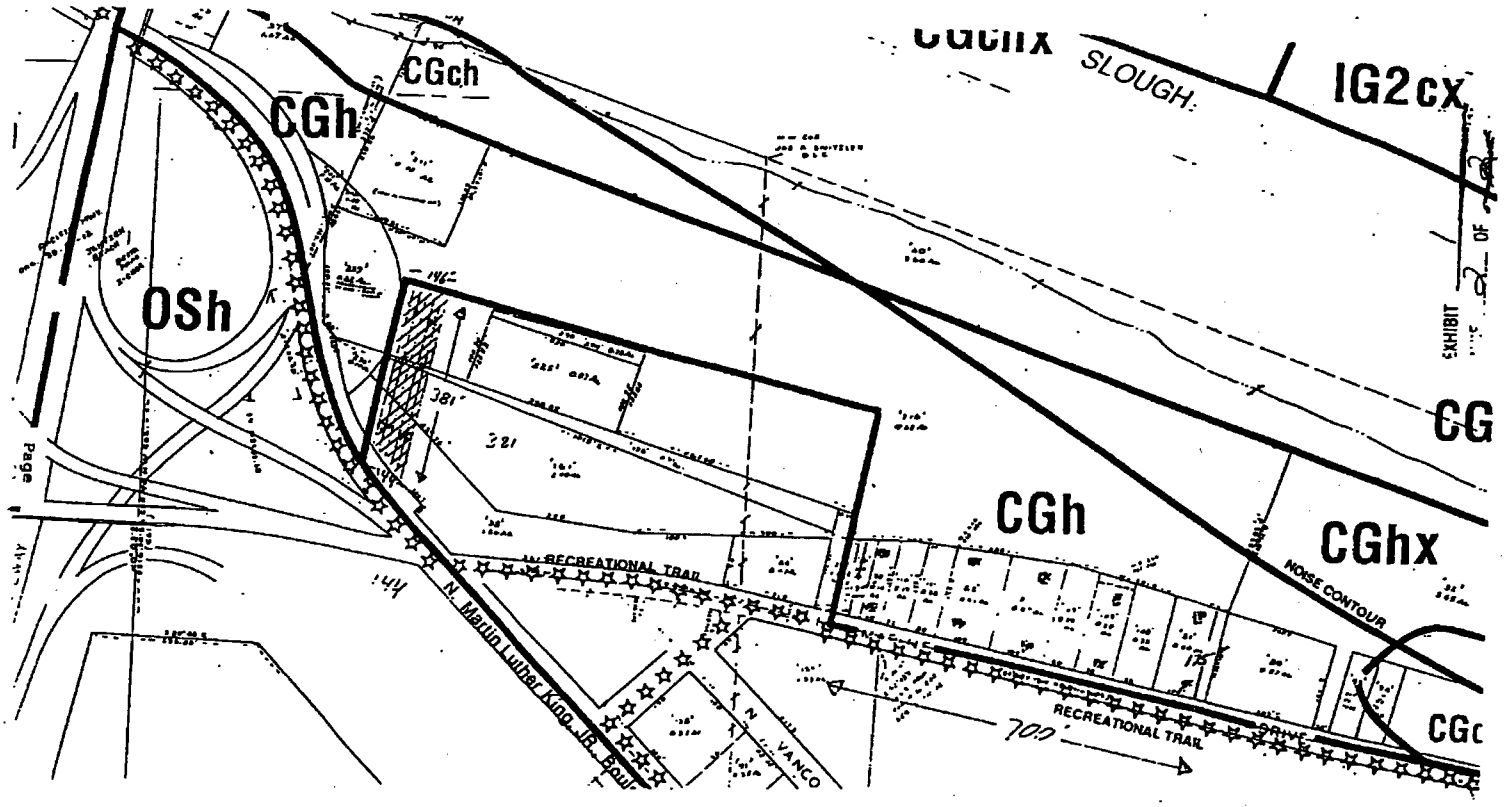
I hope this letter clearly states DEQ's position on the status of Terminal Transfer's site cleanup. If you have any questions concerning the cleanup, please contact me at 229-6793.

Sincerely,

Michael A. Fernandez
Sr. Environmental Engineer
UST Cleanup Section

cc: Lon Revall, UST Cleanup Manager
Andree Pollock, NWR, DEQ

EXHIBIT 8
PAGE 2 OF 2



SCHN00172091

WST

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

April 8, 1991

J\SUMMARY3.655

Prendergast & Associates, Inc.
121 SW Morrison Street, Suite 1200
Portland, OR 97204

Attention: John Carroll

SUBJECT: SUMMARY OF ENVIRONMENTAL ACTIVITIES, TERMINAL TRANSFER/YEON STREET PROPERTY, 3601 N.W. YEON STREET, PORTLAND, OREGON

At your request, Geotechnical Resources, Inc. (GRI) has prepared the following brief summary of the environmental summary and related remedial activities which have been conducted at the Terminal Transfer/Yeon Street property.

ENVIRONMENTAL SITE ASSESSMENT

During the winter of 1989, a level I environmental site assessment was completed on the subject site. The studies revealed that free diesel product was floating on the groundwater.

Below-ground fuel storage and delivery systems for diesel and gasoline were identified as potential sources of soil and groundwater contamination in the site assessment. The diesel system was located along the central and western side of the property; the gasoline delivery system was located on the central and eastern portion of the property, immediately west of the original building limits. The results of this investigation are presented in a GRI report dated March 2, 1989.

During the summer of 1990, a level II site assessment of soil and groundwater contamination associated with the leakage of diesel fuel from the western fuel delivery system was instituted by George D. Ward & Associates (GDWA) for the seller. The purpose of this work was to determine the nature and extent of the diesel fuel contamination discovered during the level I site assessment completed by GRI in December 1989. This work included the installation of additional monitoring and product recovery wells and a soil sampling and analysis program. Based on these studies and agreements with DEQ, GDWA, and GRI, a program of remediation on behalf of the seller was initiated.

REMEDIATION

Remediation on the site was completed in phases:

1. In March 1990, the underground fuel lines and fueling hydrants associated with the gasoline and diesel fuel delivery systems were decommissioned. This work

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Phone (503) 292 2621

was accomplished in accordance with UST General Provisions ORS 446.705 through 446.835 and UST Rules--OAR Chapter 340. During decommissioning, gasoline- and diesel-contaminated soils were encountered. A remediation program to mitigate the soil and groundwater contamination due to the leakage of gasoline from the eastern fuel line was prepared and submitted to DEQ on June 19, 1990. During the implementation of this remediation plan, the soil contamination limits were defined, the gasoline-contaminated soil was excavated until acceptable, and closure samples from the excavation were obtained and analyzed. A recovery well was installed and groundwater was pumped and periodically sampled and analyzed. The groundwater pumping program was terminated when the test data indicated that contaminated groundwater was being drawn in from other portions of the site. All of this work was observed and/or performed by personnel from GRI.

2. During the fall and winter of 1991, the diesel-contaminated soil on the central and western portion of the property was excavated under the direction of GDWA for the seller. The diesel-contaminated soil was excavated laterally to the north, east, and south until closure samples that met DEQ's guidelines were obtained. Contamination remaining on the west property line has been isolated with an impermeable membrane. Excavated soils with elevated levels of contamination (about 23,000 yd^3) have been removed from the site. All work was observed on an intermittent basis by GRI. Documentation of successful completion of this element of work is presented in a letter from Mike Fernandez of DEQ to GDWA dated March 18, 1991.

3. In October 1990, three USTs were decommissioned by removal under the direction of GDWA as part of the excavation of diesel-contaminated soil described in item 2 above. In February 1991, three additional tanks were decommissioned by removal. Tank decommissioning was performed by Konell Construction, Sandy, Oregon; the limits of overexcavation of contaminated soil was established by GDWA for the seller.

CORRECTIVE ACTION PLAN

Pursuant to ORS Chapters 465 and 466, a comprehensive corrective action plan for the site was submitted to DEQ by GDWA on February 11, 1991. That plan documented the corrective actions already taken at the site and proposed specific actions to be taken to mitigate each of the remaining environmental considerations. Much of the remedial action discussed in the corrective action plan has already been accomplished.

SCHN00172093

GRI

CONCLUSIONS

1. The major contaminant is diesel fuel.

2. The on-site sources of contamination have been removed.

3. The diesel-contaminated soils have been removed from the site pursuant to DEQ's direction.

4. In our opinion, the remaining remediation activities can be accomplished without major disturbance to the operation of the site. It is very likely that the remaining remediation can be accomplished with wells (withdrawal and injection) and stripper columns.

If you have any questions or comments regarding the matters discussed above, please feel free to contact us at any time.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

REGISTERED PROFESSIONAL ENGINEER 8230 OREGON Sept. 20, 1974 DAVID D. DRISCOLL, JR.

David D. Driscoll, P.E.
Principal

REGISTERED PROFESSIONAL OREGON G1121 GEOLOGIST

Willard S. Titus, P.G.
Project Geologist

SCHN00172094

May 1, 1991 J/GASREMED.655

Oregon Department of Environmental Quality
Environmental Cleanup Division
811 SW Sixth Avenue
Portland, OR 97204

Attention: Michael A. Fernandez
Sr. Environmental Engineer

SUBJECT: REMEDIATION OF SOIL AND GROUNDWATER CONTAMINATION BY GASOLINE; TERMINAL TRANSFER FACILITY (FILE NO. 26-89-013); PORTLAND, OREGON

As you know, Geotechnical Resources, Inc. (GRI) has been retained by Prendergast & Associates, Inc. (Prendergast) to assist them with the investigation and remediation of soil and groundwater contamination associated with an underground gasoline distribution system at the Terminal Transfer property at 3601 N.W. Yeon Street in Portland, Oregon. The location of the property is shown on the attached Vicinity Map, Figure 1. The purpose of this letter is to address Item 3 and 5 of your letter dated March 26, 1991, to Dick Kathrens. Regarding Item 3, a copy of a letter documenting work completed by GRI is attached; remediation of soil contamination related to Item 3 was completed by George D. Ward & Associates (GDWA). The following paragraphs deal with Item 5 only.

Background

The underground gasoline distribution system cited in your Item 5 was identified as one of several potential sources of contamination during a preliminary site screening performed by GRI before Prendergast purchased the property from Dick Kathrens, the previous owner. You were provided with a copy of our report dated March 2, 1989, summarizing the results of the preliminary site screening. Prendergast decommissioned the underground gasoline distribution system to evaluate the potential for and mitigate, if present, related soil contamination. The remainder of the site remediation was the responsibility of Dick Kathrens and was completed by GDWA. Presently, the construction of new buildings and paving on the site has been completed.

Gasoline Line Decommissioning

During the decommissioning process, an area of gasoline contamination was discovered along a 40-ft length of the fuel line, in the location shown on Figure 2. Although the property was still owned by Kathrens at that time, Prendergast proceeded with the remediation of the contamination associated with that portion of the gasoline distribution system. On March 27, 1990, GRI personnel met with Loren Garner of the DEQ Northwest Region office to discuss the details of the remediation work. A report describing the decommissioning work, the nature and extent of the contamination discovered during the decommissioning work, and a proposed exploration and

remediation plan was submitted to Mr. Garner on March 30, 1990 (copy attached). The exploration and remedial measures included drilling an exploratory boring, installing a monitoring well in the center of the contaminated area, soil and groundwater sampling, and excavation and disposal of all soil with total petroleum hydrocarbon (TPH) concentrations in excess of 80 mg/kg.

Exploration

On April 11, 1990, the exploratory boring and monitoring well, designated B-6, were installed at the location shown on Figure 2. Soil samples were collected as the boring was advanced and groundwater samples were collected from the completed monitoring well. Details of this work, the results of laboratory analyses of the samples, and a revised remediation plan were summarized in a draft report to Prendergast dated May 31, 1990 (copy attached). As a result of a meeting with you on May 31, 1990, the remediation plan was finalized and submitted to you on June 19, 1990 (copy attached). The remediation plan included excavation and treatment of all soil with TPH concentrations in excess of 80 mg/kg and a program of pumping and aeration by spraying designed to bring the volatile hydrocarbon concentrations in the groundwater within DEQ's primary and secondary standards of 5 μg/l benzene. The groundwater was periodically sampled and tested during the pumping phase to monitor water quality.

Soil Remediation

On June 27, 1990, excavation of the gasoline-contaminated soil began with an initial rectangular excavation approximately 30 ft by 20 ft by 11.5 ft deep. Five soil samples, designated M-1 through M-5, were collected from the bottom and sidewalls of the excavation at the locations shown on Figure 3. These samples were analyzed for TPH by EPA method 418.1 (modified) by Coffey Laboratories, Inc. The results of these analyses, summarized in Table 1, indicate that the soil exposed in the sidewalls and ends of the excavation met the 80 mg/kg (TPH) standard adopted for the remediation, but that soil on the bottom of the central portion exceeded that standard. On June 28, 1990, the central portion of the excavation was deepened to 14 ft to remove the remaining contaminated soil. Two soil samples, designated M-6 and M-7, were collected from the bottom of the deepened excavation at the locations shown on Figure 3. The results of these analyses, also summarized in Table 1, indicate that the soil exposed in the bottom of the deepened excavation met the 80 mg/kg (TPH) standard adopted for the remediation. Chain-of-custody documents and laboratory reports for the analytical results referred to above are included in Attachment A.

The soil removed from the excavation consisted of approximately 300 cubic yards of medium dense, brown to gray, fine- to medium-grained sand with a trace to some silt. The soil was stockpiled along the western portion of the Terminal Transfer property, on a polyethylene film liner. The stockpile was covered with polyethylene film to prevent leaching of the contaminants by rainwater. During the week of January 7, 1991, this soil was hauled to an off-site facility for treatment and subsequent disposal by Dick Kathrens.

SCHN00172096

Groundwater Remediation

On July 9, 1990, DEQ issued GRI a special permit (copy attached) to dispose of groundwater pumped from monitoring well B-6 by spray aeration irrigation onto the southeastern portion of the Terminal Transfer property. The discharge permit was limited to a 60-day period and contained specific conditions regarding the quality of the discharged water and the control of ponding and runoff. On July 10, pumping of groundwater from monitoring well B-6 began. A surface-mounted centrifugal pump was used to draw water from the well at rates which ranged from 5 to 15 gpm. Drawdown in the well during pumping ranged from approximately 0.25 ft at 5 gpm to about 1.0 ft at 15 gpm. The water was pumped through a 1-in. polyethylene line to the discharge area, where rotating spray nozzles, directed upwards, were used to aerate and disperse the water. The discharge points were moved periodically to prevent ponding and run-off.

Between April 13 and October 8, 1990, approximately 119,000 gallons of groundwater were pumped from the monitoring well during three discrete pumping periods (April 13 to May 5, 1990, July 10 to July 26, 1990, and September 27 to October 8, 1990). These pumping periods were separated by 8-week recovery intervals, during which time no groundwater was pumped. Water samples were collected as the pumping progressed. These samples were analyzed for TPH (EPA method 418.1), pH (EPA method 150.1) and volatile organic constituents (EPA method 624) by Coffey Laboratories, Inc. The volumes pumped and the results of these analyses are summarized in Table 2 and are shown graphically on Figure 4.

During the first pumping period, a relatively small withdrawal of groundwater (440 gallons) resulted in a large decrease (42%) in the benzene concentration, even though the contaminated soil was still present in the vicinity of the monitoring well at that time. At the end of the first pumping period, the contaminated soil was excavated, as described above. During the second pumping period, 8,660 gallons of groundwater were withdrawn. As the pumping progressed, the benzene concentration in the groundwater increased from 46 $\mu g/l$ to 160 $\mu g/l$, at a decreasing rate. The same phenomenon occurred during the third pumping period, when the removal of 110,000 gallons of groundwater resulted in a progressive increase in benzene concentration from 35.8 $\mu g/l$ to 210 $\mu g/l$. During the two 8-week intervals between pumping periods, the concentrations of benzene dropped from 428 $\mu g/l$ to 46 $\mu g/l$ and from 160 $\mu g/l$ to 35.8 $\mu g/l$, respectively.

Conclusions

The results described above lead us to the following conclusions:

1) A break or leak in the underground gasoline distribution line on the Terminal Transfer property resulted in the release of an unknown quantity of gasoline which contaminated the soil and groundwater in the immediate vicinity, see Figure 2.

2) Soil contamination was limited to a volume of approximately 300 cubic yards. That soil was excavated on June 27 and June 28, 1990. Closure samples collected from the sidewalls and bottom of the excavation demonstrate compliance with the cleanup level established for the site (80 mg/kg TPH). The contaminated soil was removed from the site on January 7, 1991.

SCHN00172097

3) Groundwater contamination, characterized by elevated levels of benzene (734 $\mu g/l$) and other volatile organic contaminants resulted from the gasoline release. Removal of the contaminated soil and limited pumping of the groundwater resulted in a substantial reduction of the benzene levels. During extended pumping, however, the benzene levels increased, indicating the presence of other sources of hydrocarbon contamination on the site.

4) A comprehensive groundwater quality assessment program will be required to determine the spatial distribution of sources of contamination and to assess their effect on the local groundwater quality. The results of this work would serve as the basis for the design of an effective groundwater remediation program or completion of a risk analysis to demonstrate that remediation of the groundwater is not warranted.

If you have any questions or comments regarding this matter of if we can be of further assistance, please do not hesitate to contact us at any time.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

David D. Driscoll, P.E.
Principal

cc: John Carroll / Prendergast & Associates, Inc.
Rob Ball / Ball, Janik, Novack
George Ward / George D. Ward & Associates
Dick Kathrens / Terminal Transfer

SCHN00172098

Table 1

SOIL CHEMICAL ANALYSES

Sample Designation	Date Collected	Approximate Depth Below Ground Surface, ft	TPH, mg/kg (EPA 418.1)	Sample Location
655, M-1	6/27/90	11	5,000	Center, bottom
655, M-2	6/27/90	8	N.D.	West sidewall
655, M-3	6/27/90	11	15	South end, bottom
655, M-4	6/27/90	8	N.D.	East sidewall
655, M-5	6/27/90	11	7	North end, bottom
655, M-6	6/29/90	14	13	North center, bottom
655, M-7	6/29/90	14.0	69	South center, bottom
655, M-7*	6/29/90	14.0	54	Duplicate

N.D. = None detected at or above detection limit

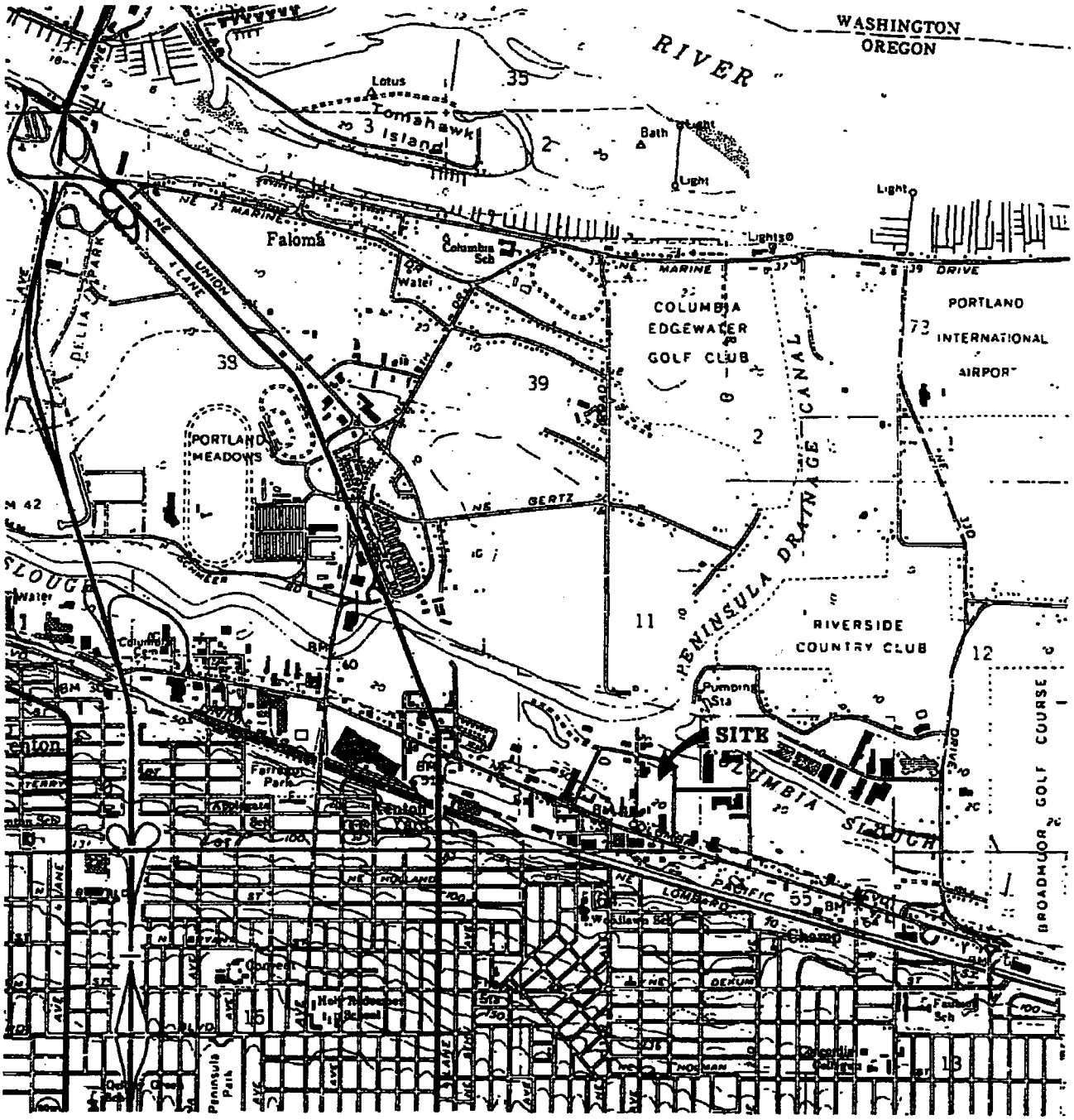
* = Duplicate sample

Table 2

GROUNDWATER CHEMICAL ANALYSES

Sample	Date Collected	Cumulative Volume Pumped, gal.	TPH, mg/l (EPA 418.1)	pH	Benzene, µg/l	Toluene, µg/l	Xylenes, µg/l	Ethylbenzene, µg/l
655, B-1	4/13/90	40	6.0	--	734	5,810	6,950	1,280
BH-1	5/10/90	440	--	--	428	2,380	2,890	572
655, B-6	6/8/90	500	1.8	--	--	--	--	--
655, B-6(A)	7/10/90	500	0.3	7.16	N.D.	N.D.	N.D.	N.D.
655, B-6(B)	7/11/90	1,500	0.2	7.06	46	200	220	20
655, B-6(C)	7/16/90	2,500	0.5	7.83	120	500	530	96
655, B-6(D)	7/26/90	9,000	0.3	6.28	160	470	580	150
655 AA	9/27/90	10,500	0.4	6.98	35.8	55.5	169	113
655 BB	10/02/90	33,000	<0.4	7.30	140	290	410	140
655 CC	10/05/90	55,000	0.6	6.88	157	452	517	104
655 OO	10/08/90	119,000	0.4	6.79	210	330	470	110

N.D. = None detected at or above detection limit
< = None detected at or above indicated value and represents detection limit for the method
-- = Not tested



USGS TOPOGRAPHIC MAP
PORTLAND, OREG. QUAD

N

0 1/2 1 MILE

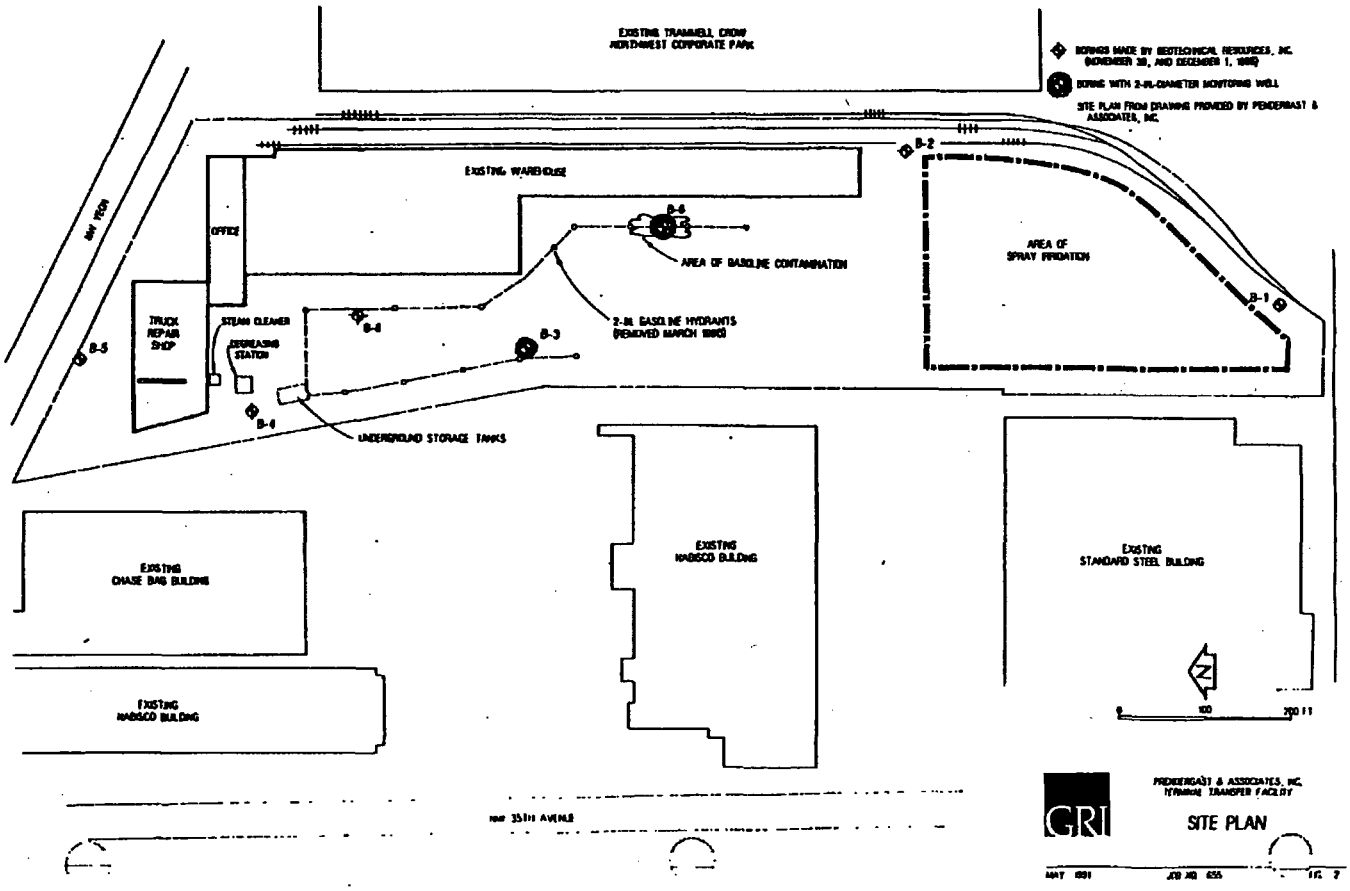
PRENDERGAST & ASSOCIATES, INC.
TERMINAL TRANSFER FACILITY

GRI

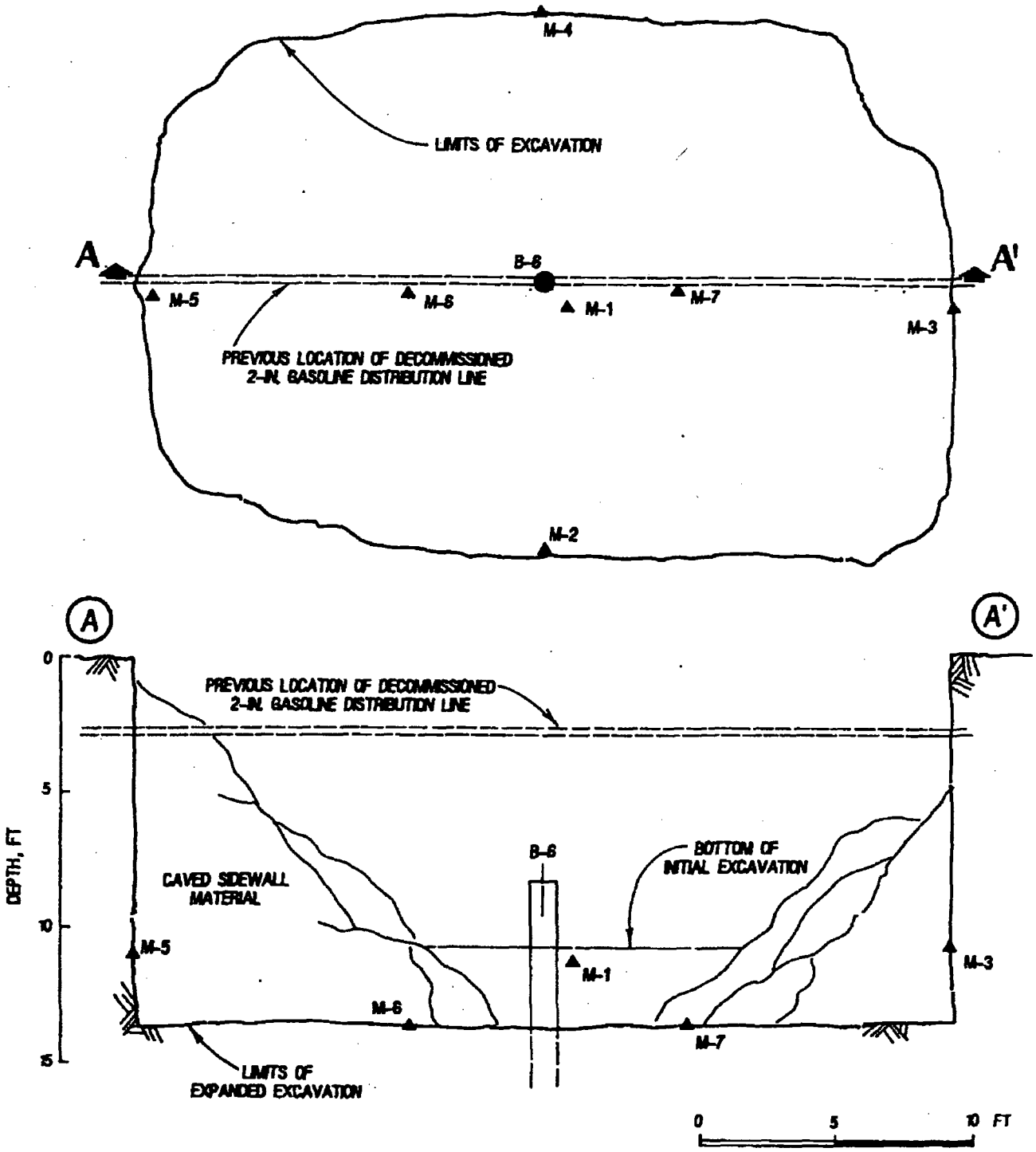
VICINITY MAP

MAY 1991 JOB NO. 655 FIG. 1

SCHN00172101



SCHN00172102



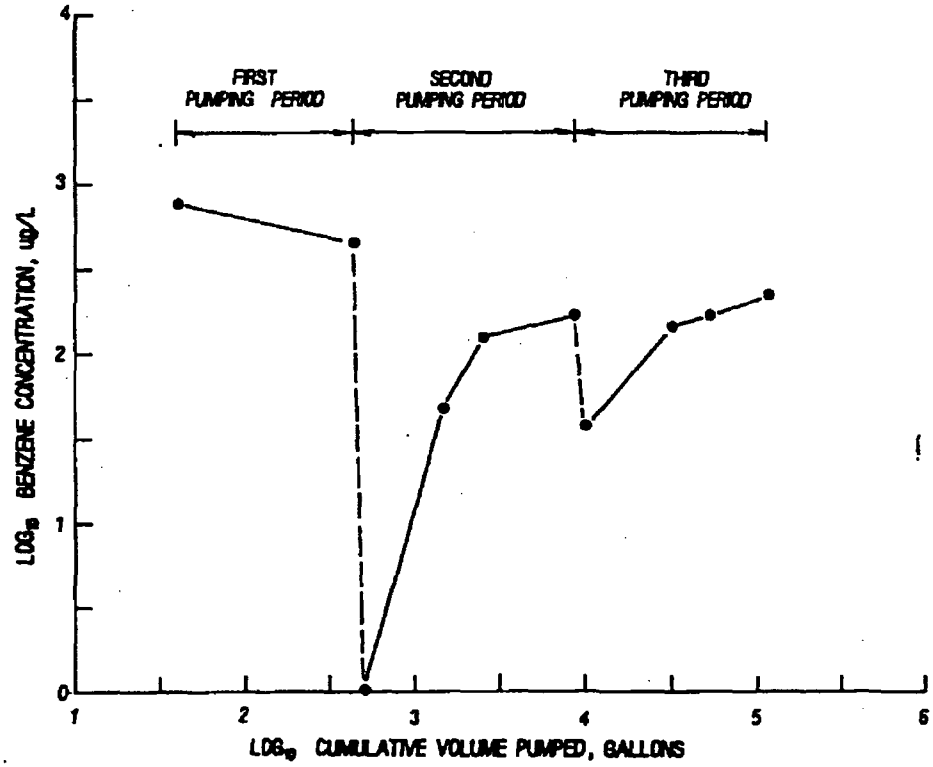
PRENDERGAST & ASSOCIATES, INC.
TERMINAL TRANSFER FACILITY

GRI

GASOLINE-CONTAMINATED SOIL REMEDIATION DETAILS

MAY 1991 | JOB NO. 655 | FIG. 3

SCHN00172103



GRI

PRENDERGAST & ASSOCIATES, INC.
TERMINAL TRANSFER FACILITY

BENZENE CONCENTRATION VERSUS VOLUME PUMPED

MAY 1991 | JOB NO - 555 | FIG. 4

SCHN00172104

Preliminary Report, Underground Storage Tank Decommissioning, Terminal Transfer, 3601 NW Yeon, Portland, Oregon

(February 21, 1991)

SCHN00172105

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

February 21, 1991

J/220TANKS.655

Prendergast & Associates, Inc.
121 SW Morrison Street, Suite 1200
Portland, Oregon 97204

Attention: John Carroll

SUBJECT: PRELIMINARY REPORT, UNDERGROUND STORAGE TANK DECOMMISSIONING, TERMINAL TRANSFER, 3601 NW YEON STREET, PORTLAND, OREGON

At your request, Willard Titus of Geotechnical Resources, Inc. (GRI) observed the decommissioning of three underground storage tanks (USTs) located immediately south of the truck repair facility on the northern portion of the Terminal Transfer property. The tanks were pumped, purged, and rendered inert by Spencer Environmental, Inc. and were excavated by Konell Construction on February 19 and 20, 1991.

The three tanks were located close to one another, as shown on the attached sketch. The largest of the tanks was 8 ft in diameter, 17 ft long, and had a capacity of approximately 6,400 gallons. We were unable to determine the contents of the tank, but the Spencer Environmental representative who pumped it offered the opinion that it contained clean lubricating oil. The second tank was 4 ft in diameter, 12 ft long, and had a capacity of approximately 1,220 gallons. The tank appeared to have been used to store waste oil. The third tank was 6 ft in diameter, 9 ft long, and had a capacity of approximately 1,900 gallons. This tank was used to store gasoline. None of the tanks appeared to have been perforated; however, the integrity of the piping could not be verified due to damage incurred during excavation. All of the tanks were bedded in and backfilled with relatively clean sand. Groundwater was not encountered in the excavation.

As each tank was removed, soil samples were collected from the base of the excavation directly beneath each end of the tank. These samples were placed in clean glass containers and delivered to Coffey Laboratories, Inc. (CLI) for analysis on February 20, 1991. The locations of the soil samples are shown on the attached sketch. Each of the samples was analyzed for total petroleum hydrocarbons (TPH). The samples from the area beneath the waste oil tank were also analyzed for volatile chlorinated solvents (EPA Method 8010), volatile aromatic solvents (EPA Method 8020), polychlorinated biphenyls (EPA Method 8080), and leachable metals (TCLP). The results of the TPH analyses are summarized below:

7412 SW Beaverton Hillsdale Hwy
Suite 102
Portland, Oregon 97225
Phone (503) 292 2621
FAX (503) 297 1696

GRI

Date	Sample No.	Depth, ft	Total Petroleum Hydrocarbons, ppm
2/19/91	655-2-19-NC	12.5	270
2/19/91	655-2-19-SC	12.5	61
2/19/91	655-2-19-NE	12.5	52,000
2/19/91	655-2-19-SE	12.5	21
2/20/91	655-2-20-NW	8.5	6,400
2/20/91	655-2-20-SW	8.5	8

The additional analyses of the samples from beneath the waste oil tank are not yet complete. Those results will be forwarded to you as soon as they are available.

Based on the testing summarized above, it is our opinion that some of the soil removed from the excavation during the decommissioning of the USTs and some of the soil not yet excavated is contaminated with petroleum hydrocarbons in excess of the 500 ppm (TPH) cleanup standard set for the site by the Department of Environmental Quality (DEQ). We recommend that the existing excavation be enlarged to the east and west until the bottom and sidewalls are free of contamination above the 500-ppm (TPH) level. All of the excavated soils should be disposed of off site. We recommend that no further excavation be completed to the north because of the risk of damage to the truck repair facility.

We are in the process of preparing a report of our activities and observations for your review and submittal to DEQ. If you have any questions regarding this matter, or if we can be of further assistance, please do not hesitate to call at any time.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

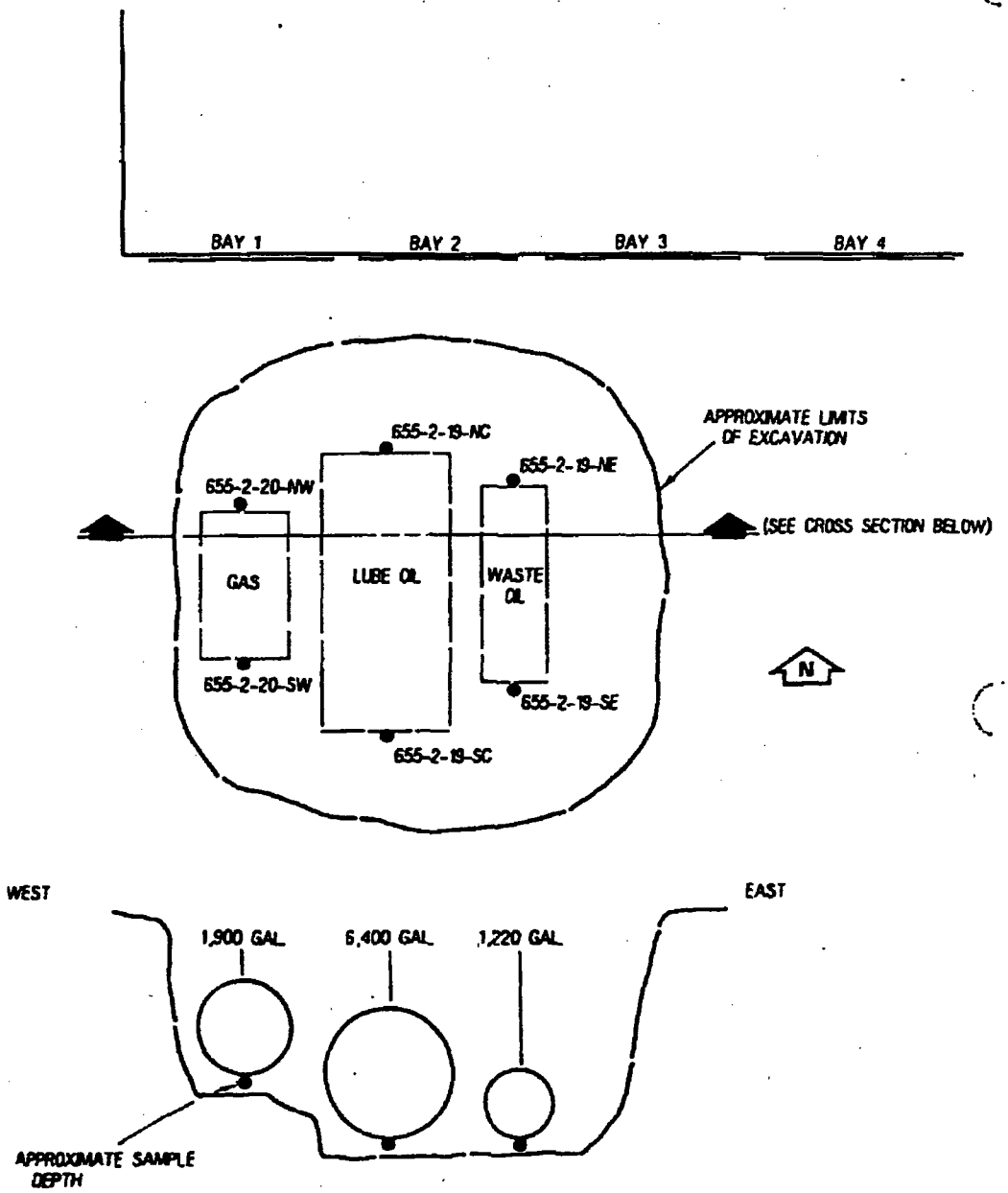
REGISTERED PROFESSIONAL ENGINEER 18230 OREGON Sept. 20, 1974 DAVID D. DRISCOLL, SR.

REGISTERED PROFESSIONAL OREGON WILLARD S. TITUS G121 GEOLOGIST

David D. Driscoll, P.E.
Principal

Willard S. Titus, P.G.
Staff Geologist

Attachment: Site Map



GRI

PRENDERGAST & ASSOCIATES, INC
TERMINAL TRANSFER UST DECOMMISSION

SITE MAP

FEB. 1991 JOB NO. 655 FIG. 1

SCHN00172108

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

February 26, 1991
Log # H910220-U6
PO# 655

Attention: Bill Titus
Geotechnical Resources, Inc.
7412 SW Beaverton-Hillsdale, Hwy
Suite 102
Portland, OR 97225

PROJECT: Terminal Transfer PROJECT # 655

Samples Received: 2/20/91

Analysis Requested: Total Petroleum Hydrocarbons in soil by modified EPA Method 418.1

SAMPLE ID	SAMPLE RESULTS
655-2-19-NC, 2/19/91	270
655-2-19-SC, 2/19/91	61
655-2-19-NE, 2/19/91	52,000
655-2-19-SE, 2/19/91	21
655-2-19-NW, 2/20/91	6,400
655-2-20-SW, 2/20/91	8

Detection Limit: 5 mg/kg

Results expressed as mg/kg unless otherwise noted.

Sample ID: #3 655-2-19-NE
#4 655-2-19-SE

SUBJECT: TCLP Analysis

ANALYTE	METHOD	DETECTION LIMIT	SAMPLE RESULTS	SAMPLE RESULTS	EPA LIMIT
Arsenic	*	0.3	ND	ND	5.0
Barium	*	0.01	0.35	0.38	100
Cadmium	*	0.02	ND	ND	1.0
Chromium	*	0.05	ND	ND	5.0
Lead	*, 7420	0.1	ND	ND	5.0
Mercury	*, 7470	0.05	ND	ND	0.2
Selenium	*	0.2	ND	ND	1.0
Silver	*	0.05	ND	ND	5.0

Results are reported in milligrams per liter (mg/L)

* Leachate preparation by EPA SW-846 Method 1311. Analysis by EPA SW-846 Method 6010, ICP, unless otherwise noted.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

Log # H910220-U6

Geotechnical Resources, Inc.
Page 2

Analysis Requested: Purgeable Halocarbons and Aromatics in soil by EPA Methods 8010/8020, GC/PID/HED.

Sample ID: #3 655-2-19-NE

ANALYTE	DETECTION LIMITS	LABORATORY BLANK	SAMPLE #3 RESULTS
Benzene	0.15	ND	ND
Bromodichloromethane	0.15	ND	ND
Bromoform	0.15	ND	ND
Bromomethane	0.60	ND	ND
Carbon tetrachloride	0.15	ND	ND
Chlorobenzene	0.15	ND	ND
Chloroethane	0.30	ND	ND
2-Chloroethylvinylether	0.60	ND	ND
Chloroform	0.15	ND	ND
Chloromethane	0.30	ND	ND
Dibromochloromethane	0.15	ND	ND
1,2-Dichlorobenzene	0.15	ND	ND
1,3-Dichlorobenzene	0.15	ND	ND
1,4-Dichlorobenzene	0.15	ND	ND
Dichlorodifluoromethane	0.60	ND	ND
1,1-Dichloroethane	0.15	ND	ND
1,2-Dichloroethane	0.15	ND	ND
1,1-Dichloroethene	0.15	ND	ND
trans-1,2-Dichloroethene	0.15	ND	ND
1,2-Dichloropropane	0.15	ND	ND
cis-1,3-Dichloropropene	0.15	ND	ND
trans-1,3-Dichloropropene	0.15	ND	ND
Ethylbenzene	0.15	ND	ND
Methylene chloride	0.15	ND	ND
Toluene	0.15	ND	ND
1,1,2,2-Tetrachloroethane	0.15	ND	ND
Tetrachloroethene	0.15	ND	0.4
1,1,1-Trichloroethane	0.15	ND	ND
1,1,2-Trichloroethane	0.15	ND	ND
Trichloroethene	0.15	ND	ND
Trichlorofluoromethane	0.60	ND	ND
Vinyl chloride	0.60	ND	ND
Total Xylenes	0.15	ND	ND

Results expressed as mg/kg unless otherwise noted.

ND means none detected at or above the detection limit listed.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

Log # H910220-U6

Geotechnical Resources, Inc.
Page 3

Analysis Requested: Purgeable Halocarbons and Aromatics in soil by EPA Methods 8010/8020, GC/PID/HED.

Sample ID: #4 655-2-19-SE

ANALYTE	DETECTION LIMITS	LABORATORY BLANK	SAMPLE #4 RESULTS
Benzene	0.15	ND	ND
Bromodichloromethane	0.15	ND	ND
Bromoform	0.15	ND	ND
Bromomethane	0.60	ND	ND
Carbon tetrachloride	0.15	ND	ND
Chlorobenzene	0.15	ND	ND
Chloroethane	0.30	ND	ND
2-Chloroethylvinylether	0.60	ND	ND
Chloroform	0.15	ND	ND
Chloromethane	0.30	ND	ND
Dibromochloromethane	0.15	ND	ND
1,2-Dichlorobenzene	0.15	ND	ND
1,3-Dichlorobenzene	0.15	ND	ND
1,4-Dichlorobenzene	0.15	ND	ND
Dichlorodifluoromethane	0.60	ND	ND
1,1-Dichloroethane	0.15	ND	ND
1,2-Dichloroethane	0.15	ND	ND
1,1-Dichloroethene	0.15	ND	ND
trans-1,2-Dichloroethene	0.15	ND	ND
1,2-Dichloropropane	0.15	ND	ND
cis-1,3-Dichloropropene	0.15	ND	ND
trans-1,3-Dichloropropene	0.15	ND	ND
Ethylbenzene	0.15	ND	ND
Methylene chloride	0.15	ND	ND
Toluene	0.15	ND	ND
1,1,2,2-Tetrachloroethane	0.15	ND	ND
Tetrachloroethene	0.15	ND	ND
1,1,1-Trichloroethane	0.15	ND	ND
1,1,2-Trichloroethane	0.15	ND	ND
Trichloroethene	0.15	ND	ND
Trichlorofluoromethane	0.60	ND	ND
Vinyl chloride	0.60	ND	ND
Total Xylenes	0.15	ND	ND

Results expressed as mg/kg unless otherwise noted.

ND means none detected at or above the detection limit listed.

REPORT CONTINUES

COFFEY LABORATORIES, INC.
12423 N.E. WHITAKER WAY
PORTLAND, OR 97230
PHONE: (503) 254-1794
FAX: (503) 254-1452

Log # H910220-U6

Geotechnical Resources, Inc.
Page 4

Analysis Requested: Polychlorinated Biphenyls (PCBs) in soil, by modified EPA Method 8080, GC/ECD.

SAMPLE ID	PCB (mg/kg)	AROCLOR
655-2-19-NE	ND	---
655-2-19-SE	ND	---

Detection Limit: 0.5 mg/kg

ND means none detected at or above the detection limit listed.

Sincerely,

Victor A. Perry,
Quality Assurance

Sincerely,

Renee Chauvin,
Technical Director

RJC/mlh

This report is for the sole and exclusive use of the client. Samples are retained a maximum of 15 days from the report date, or until the maximum holding time expires.

Remediation of Hydrocarbon Release, Terminal Transfer Property, 3601 NW Yeon Street, Portland, Oregon

(March 30, 1990)

SCHN00172113

Geotechnical Resources Incorporated

Consulting Engineers & Geologists

August 12, 1991

J/PROGRAM2.655

RECEIVED
AUG 13 1991
Environmental Cleanup Div.

Environmental Cleanup Division
Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204-1390

Attention: Michael A. Fernandez

SUBJECT: SOIL AND GROUNDWATER INVESTIGATION PROGRAM, TERMINAL TRANSFER SITE, 3601 NW YEON STREET, PORTLAND, OREGON (DEQ FILE NO. 26-89-013)

At the direction of Yeon Street Partners (Yeon), Geotechnical Resources, Inc. (GRI) has developed and begun the implementation of a soil and groundwater investigation program for the Terminal Transfer site. The purpose of the exploration program is to further characterize the subsurface conditions by determining the nature and extent of significant areas of soil and/or groundwater contamination which may still be present on the site and to more accurately determine the direction of local groundwater movement so that a Closure Report (CR) or comprehensive Corrective Action Plan (CAP) can be prepared for the site.

Background

Representatives of GRI and Yeon met with you on July 22, and August 7, 1991, to discuss a preliminary draft of the exploration program. You indicated during those meetings that the exploration program, with some minor changes, would meet with your approval. Your suggestions were incorporated into the design of the exploration program, which is described in general terms below.

Scope of Work

The following scope of work was based on our understanding of the existing site conditions, previous remedial work at the site, and our discussions with you.

1) **Monitoring Wells.** Fifteen (15) monitoring wells were installed in the approximate locations indicated on the attached Site Plan. The wells were installed by a licensed driller working under the observation of a qualified geotechnical engineer or engineering geologist. The wells were completed at a depth of approximately 25 ft and were screened below a depth of approximately 10 ft. Upon completion, the wells were developed by pumping until the discharge flowed clear.

2) **Soil Samples.** Representative soil samples were collected at specified depth intervals as the borings for the monitoring wells were advanced. These samples were

7412 SW Beaverton-Hillsdale Hwy
Suite 102
Portland, Oregon 97225
Phone (503) 292-2621
FAX (503) 297-1896

GRI

examined and classified in the field and delivered to a certified laboratory for analyses. The specific depths sampled and the laboratory analyses to be performed are summarized in the attached table.

3) **Groundwater Monitoring.** Groundwater samples were collected from each of the monitoring wells. The wells were purged prior to the collection of these samples. The specific analyses to be performed are summarized in the attached table.

4) **Water Table Characterization.** Following the collection of the groundwater samples described above, the static water levels in the monitoring wells and in five monitoring wells installed on the Hill Investment property west of the site will be measured. The approximate locations of these monitoring wells are shown on the attached Site Plan. Using these data, the gradient and direction of the local groundwater flow will be determined.

5) **Report.** At the conclusion of the work outlined above, a progress report describing the work accomplished and our findings, conclusions, and recommendations will be prepared and submitted for your use.

Off-Site Contamination

During the August 7, 1991, meeting referred to above, you indicated that the collection and analysis of soil samples from the properties west of the site would be required to demonstrate the extent to which contamination from the site may have migrated in a westerly direction. We discussed the feasibility of using the data collected by Hill Investments, Inc. during their investigation of subsurface conditions on the former Nabisco property west of the site for that purpose. We have obtained and reviewed that data, which is summarized in a CAP prepared by Hart Crowser, Inc. (HCI).

The data indicate that the soil beneath some areas of the former Nabisco property is contaminated with diesel fuel, but that this contamination has not significantly affected the groundwater quality. In their CAP for the former Nabisco property, HCI expressed the opinion that removal or treatment of the contaminated soil would not be necessary as the contamination is not exposed at the ground surface and is not affecting the groundwater. The CAP proposed no remedial action, pending demonstration (by quarterly monitoring for a period of 1 year) that the diesel-contaminated soil is not affecting the local groundwater quality. In a letter to Hill Investments dated July 17, 1991, DEQ approved this approach. If the groundwater monitoring portion of the exploration program outlined above indicates that the groundwater beneath the Terminal Transfer site is not being affected by diesel contamination, we anticipate taking a similar approach in the Terminal Transfer CAP. Since the precise extent of the soil contamination is not a critical variable in this approach, we see no need for the off-site explorations which you suggested.

GRI

Status of Investigation

The program of exploration is already well underway. The drilling of the borings, soil sampling, and installation of the monitoring wells began on July 23, 1991, and was completed on August 1, 1991. Development and purging of the wells began on July 31, 1991, and was completed on August 2, 1991. Collection of groundwater samples was started on August 2, 1991, and completed August 5, 1991. The chemical analysis of the soil and groundwater samples is scheduled for completion by August 12, 1991. Measurements of the depth to groundwater will be obtained twice weekly beginning on August 12, 1991. We anticipate that the progress report for the exploration program will be submitted to you by August 16, 1991.

The CR or CAP for the site will be drafted after the results of the chemical analyses discussed above have been completed and evaluated by GRI. We anticipate that the CAP will be submitted to you by August 23, 1991.

The three-party remediation agreement and release dated June 3, 1991, between Yeon Street Partners, R. T. Kathrens, and DEQ requires that DEQ review the investigation plan and either approve it or request or make modifications to correct its deficiencies. Based on our meeting of July 22, 1991, we anticipate that you will find the plan to be satisfactory. If this is the case, we would appreciate a letter to that effect as soon as possible. If you have any questions or comments regarding this matter, please do not hesitate to call us at any time.

Sincerely,

GEOTECHNICAL RESOURCES, INC.

REGISTERED PROFESSIONAL ENGINEER 8230 OREGON Sept. 20, 1974 DAVID D. DRISCOLL SR.

David D. Driscoll, P.E.
Principal

REGISTERED PROFESSIONAL OREGON WILLARD S. TITUS G1721 GEOLOGIST

Willard S. Titus, P.G.
Project Geologist

Attachment: Table
Site Plan

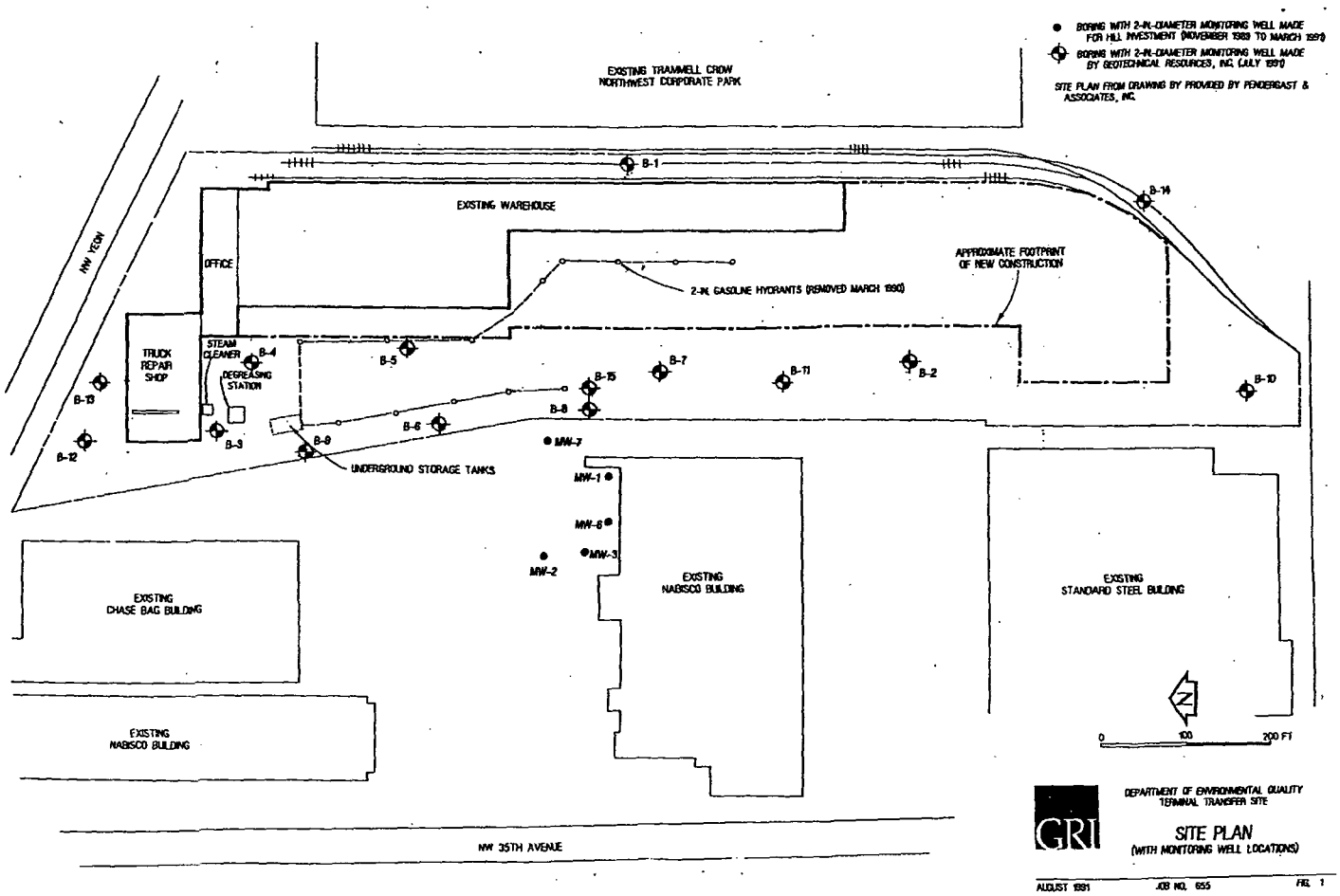
cc: John Carroll / Prendergast & Associates, Inc.
Rob Ball / Ball Janik Novack
Bob Wall / Wall & Wall PC

SCHN00172116

SUMMARY OF SAMPLING AND ANALYSES

Monitoring Well	Soil Sampling Depths, ft*	TPH (HCID), Soil	TPH (D) or TPH (G), As Appropriate, Soil	EPA 602, Soil	TPH (418.1), Groundwater	EPA 601, Groundwater	EPA 602, Groundwater	EPA 8310, Groundwater
MW-1	8, 10, 12	X	X	X	X		X	X
MW-2	8, 10, 12	X	X	X	X		X	X
MW-3	8, 10, 12	X	X	X	X	X	X	X
MW-4	8, 10, 12	X	X	X	X	X	X	X
MW-5	8, 12	X	X	X	X		X	X
MW-6	8, 12	X	X	X	X		X	X
MW-7	8, 10, 12	X	X	X	X		X	X
MW-8	8, 12	X	X	X	X		X	X
MW-9	8, 12	X	X	X	X		X	X
MW-10	8, 12	X	X	X	X		X	X
MW-11	8, 12	X	X	X	X		X	X
MW-12	8, 12	X	X	X	X	X	X	X
MW-13	8, 12	X	X	X	X	X	X	X
MW-14	8, 12	X	X	X	X		X	X
MW-15	8, 12	X	X	X	X		X	X

*Assuming water table at 12 ft. If substantial differences are found, the 12-ft sample will be collected at the water table.



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GEORGE D. WARD & ASSOCIATES

4941 S.W. 26th Dr., Portland, Oregon 97201
(503)293-6075 FAX(503) 243-6815

ENVIRONMENTAL CONSULTING ENGINEERS

DEPT. OF ENVIRONMENTAL QUALITY
RECEIVED:
JUN 30 1993
ENVIRONMENTAL CLEANUP DIVISION

June 28, 1993

H. B. Fuller Company
14025 N. Rivergate Blvd.
Portland, OR 97203

Gentlemen:

It would be appreciated if you could assist us in determining the chemical components of a dry powder observed in 50 gallon containers found abandoned on the former Chase Bag Company site located on N.W. Yeon Avenue, Portland, Oregon.

Labels on each of approximately 35 drums indicate the material was shipped to the Chase Bag Company from H. B. Fuller. The following information was also included on each label.

WB 3887
PCM - 105
532
20 584
8/28/90

Photos of the drums taken in early 1991 are attached in the event they might be of assistance to you in identifying their contents.

Our purpose in asking for your assistance results from our being asked by the former owner of the property located east of the previous Chase Bag facility to do an evaluation of properties adjacent to our client's parcel. Since the drums appeared to have been abandoned and some were leaking their contents could be of importance to our survey.

Thank you for any assistance you are able to offer.

Cordially yours,

George D. Ward

George D. Ward
Professional Engineer

Enclosure

cc: Dick Kathrens
Department of Environmental Quality

GDW/daa

PHOTO 3: *View looking north through south fence of Schnitzer Investment Corp. property. Cluster in foreground shows approximately 35, badly weathered fiber drums surrounded by "CAUTION" marker. All contained granular chemicals. Manufacturer and code number of contents was recorded. Group of drums in background described in Photo 1.*

PHOTO 4: *View looking west through east fence of Schnitzer Investment Corp. property. Some drums were open top and contained what appeared to be granular chemicals and petroleum-like substance. Accumulation on loading dock near drums could not be identified.*

Photos by GDW, 2/15/91

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
Five Centerpointe Dr., Suite 240
Lake Oswego, Oregon 97035
FAX 503.620.6918
503.620.7284

DEPT OF ENVIRONMENTAL QUALITY
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OCT 14 1993
NORTHWEST REGION

J-5115-05

Wednesday, October 13, 1993

Hill Investment Company
7582 Via de la Siesta
Scottsdale, AZ 85258

Attn: Mr. Ray Agostino

Re: Semi-Annual Monitoring Report (March through August, 1993)
Hill Investment Company Warehouse
3322 NW 35th
Portland, Oregon 97210
LUST #26-89-280

Dear Mr. Agostino:

This letter report summarizes our activities during the last half-year (March through August 1993) regarding the Hill Investment Company site at 3322 NW 35th, Portland, Oregon.

This letter report includes discussion of the following:

- Description of the semi-annual groundwater sampling and analysis program;
- Groundwater flow direction and gradient;
- Analytical results; and
- Activities planned for the next half-year (September through February).

SUMMARY OF FINDINGS

The following is a summary of our findings. Additional information is included in the balance of the report.

- The groundwater flow direction and gradient appeared unchanged except for a slight overall decrease in water level;

- The DEQ regulatory thresholds for benzene were exceeded in both of the monitoring wells sampled. The benzene concentrations in MW-6 and MW-7 were 0.033 mg/L and 0.030 mg/L, respectively. The DEQ regulatory threshold for benzene is 0.005 mg/L.

SEMI-ANNUAL GROUNDWATER SAMPLING AND ANALYSIS

We collected groundwater samples from monitoring wells MW-6 and MW-7 on September 2, 1993, in general accordance with the revised sampling scope of work as described in our March 30, 1993, letter to DEQ (Attachment A). The methods used to purge and sample the wells are in general accordance with EPA protocol. Figure 1 shows the site location and Figure 2 presents a site plan.

The groundwater samples were submitted to Hughes Analytical Laboratory and analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8020. The analytical laboratory reports are included in Attachment B. The water levels from the monitoring wells were measured and recorded in the field log. Table 1 (Groundwater Elevations) and Table 2 (Groundwater Chemical Analysis Results) present the results of the sampling and chemical analysis. Figure 3 shows the estimated groundwater elevation contours based on the water level data gathered in September 1993.

GROUNDWATER FLOW DIRECTION AND GRADIENT

Water levels measured during this sampling event were about 0.4 feet lower in elevation than those measured during the previous sampling event. Groundwater contours are consistent with previous data. Specifically, the surface of the water table appears to form a low ridge which trends in a southerly direction across the eastern two thirds of the site. The resultant groundwater flow directions are to the southwest across the western side of the site, and to the east or southeast across the eastern side of the site (Figure 3). The groundwater flow pattern is likely a result of influences imposed by local subsurface conditions.

ANALYTICAL RESULTS

BTEX Compounds Detected in Both Monitoring Wells Sampled

Table 2 presents the groundwater analytical results for BTEX. Benzene was detected in both of the monitoring wells sampled, MW-6 and MW-7, at concentrations of 0.033 mg/L and 0.030 mg/L, respectively. The DEQ numeric groundwater cleanup level for benzene is 0.005 mg/L.

EXHIBIT 7
PAGE 6 OF 8

Quality Assurance/Quality Control (QA/QC)

Laboratory QA/QC

BTEX analysis of the duplicate sample, labeled MW-8, showed a comparable benzene concentration with that of the original sample, MW-6, suggesting good reproducibility of results. (The analytical laboratory reported that the second sample vile for MW-6 contained only 0.0022 mg/L benzene. However, the results from the duplicate sample MW-8 suggest that the second analysis for MW-6 was erroneous.)

All surrogate recoveries for the BTEX analyses were within QC limits. The QA/QC data are presented in the laboratory analytical report in Attachment B.

Field QA/QC

None of the analytes tested in the trip blank or transfer blank samples were detected at concentrations above the method detection limits, indicating that contamination of samples could not likely have occurred during the sample transport or collection process.

SCHEDULE OF FUTURE ACTIVITIES

Currently planned activities for the sampling event (February 1994) include:

- Groundwater sampling and analysis to include all four monitoring wells on the site; and
- Preparation of the sampling report.

If you have any questions regarding this project, please call us at (503) 620-7284.

Sincerely,

HART CROWSER, INC.

GREGORY E. KUPILLAS, R.G.
Project Manager

HERBERT F. CLOUGH, P.E.
Associate

EXHIBIT 7
PAGE 7 OF 8

Attachments: Table 1 - Well Casing and Groundwater Elevations
Table 2 - Groundwater Chemical Analysis Results - BTEX
Figure 1 - Site Location Map
Figure 2 - Site and Exploration Plan
Figure 3 - Groundwater Elevations
Attachment A - Copy of March 30, 1993 letter to DEQ
Attachment B - Analytical Laboratory Report (September 1993)

c: Department of Environmental Quality, UST Department, Northwest Region

GEORGE D. WARD & ASSOCIATES

4941 S.W. 26th Dr., Portland, Oregon 97201
293-6075

ENVIRONMENTAL CONSULTING ENGINEERS

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SEP 1 1 1995
Waste Management & Cleanup Division
Department of Environmental Quality

Michael Fernandez
DEQ
Environmental Cleanup Division
811 S.W. Sixth Ave.
Portland, OR 97204

May 12, 1994

SUBJECT: Terminal Transfer, Inc. - Completion of off-site treatment of diesel contaminated soil - N. MARINE DR.

Dear Mr. Fernandez:

This letter report is in fulfillment of item 4 contained in DEQ's OFF-SITE TREATMENT PERFORMANCE STANDARDS and part of the OFF-SITE TREATMENT PERMIT signed by Dick Kathrens 2/1/91. A complete copy of the permit is attached as APPENDIX A.

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The performance standards included in item 4 are as follows:

> "Submit final written report documenting final petroleum contamination levels and disposition of treated soil."

The report that follows includes the results of 218 laboratory analysis obtained from soil samples taken from diesel contaminated soil that originated on Terminal Transfer's property located on Yeon Ave. in Northwest Portland. Included are lab results of background samples taken from the most heavily contaminated stockpile of excavated soil immediately prior to the introduction of exogenous microorganisms and nutrients that initiated the bio-remediation treatment process in late 1990.

Property ownership agreements and construction deadlines that followed resulted in the relocation of the entire volume of contaminated soil from Northwest Portland to

SCHN00172125

an off-site treatment facility also owned by Mr. Kathrens and located on North Marine Drive. As the bio-remediation process continued at the new, off-site treatment facility, the rate of sampling and testing was gradually increased in anticipation that the declining level of contamination would eventually allow the removal and off-site utilization of the treated soil for specific construction purposes. Guidelines used in selecting potential construction uses are outlined in DEQ's Policy for Reuse of Petroleum Contaminated Soil (Policy 550).

CONCLUSION: Based on the results of the 218 soil samples submitted for laboratory analysis and summarized in this report, it is the professional opinion of George D. Ward & Associates that the selected method of bio-remediation treatment for previously contaminated soil removed from the former Terminal Transfer Property was entirely successful.

By January of 1992, the average level of diesel contamination in all soil undergoing treatment dropped below 1,000 ppm and with the rate of TPH decline continuing. Efforts were then started to find potential buyers for the treated soil using DEQ Policy 550 as a guideline.

PROJECT HISTORY: During the month of July, 1990 eleven exploratory monitoring wells were constructed on Terminal Transfer's Yeon Ave. property under the direction of George D. Ward & Associates. The presence of diesel fuel at the static watertable was subsequently detected in three of the eleven exploratory wells.

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On Aug. 16, 1990 a 40 Ft X 40 Ft exploratory pit was excavated to approximately 18" below the static watertable. All sand removed from the initial exploration pit was stockpiled on an asphalt paved surface located on the TTI site.

Mass excavation of sand from the area suspected of being contaminated continued with clean sand being stockpiled on-site and kept isolated from sand found by laboratory analysis to be contaminated.

On Oct. 27, 1990, nutrients and microorganisms selected for their ability to biodegrade petroleum hydrocarbons in soil were applied in liquid form to the surfaces of all contaminated soil stockpile areas. Blending of microorganisms and nutrients into the contaminated soil using the BROWN BEAR soil auger was first started on Oct. 29, 1990 and continued throughout the remainder of the treatment process that ended in late 1992.

The microbiological treatment of diesel contaminated sand at the original TTI site continued until mid-January 1991. In late January, 1991, an addendum application was filed with DEQ authorizing the relocation of 15,000 cubic yards of partially treated sand from TTI's Yeon Ave. property to the off-site location on North Marine Drive where the microbiological treatment process was to be continued.

<u>OFF-SITE TREATMENT</u>: Upon it's arrival at the off-site treatment location, approximately 75 percent of the 15,000 cu. yds of soil proposed for the continuation of treatment was spread to a uniform depth on the east side of the N. Marine Drive site. This area will later be referred to as the EAST TREATMENT ZONE. The remaining

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25 percent was spread to a uniform depth on the west side of the same parcel. This area is referred to as the WEST TREATMENT ZONE. Both designations are used in describing locations where field samples were taken and as reported in Chain of Custody forms and lab analysis reports that follow.

The treatment procedure involving the liquid application of nutrients plus selected microorganisms to the soil being treated, at the same time mixing and aereation using the BROWN BEAR was occurring, continued throughout 1991 and most of 1992. Samples were taken periodically to determine the effectiveness of the biodegradation process. The results of 218 field samples and laboratory analysis are summarized in FIGURE 1.

As noted in FIGURE 1 and APPENDIX B the average level of diesel contamination found in background samples taken Nov. 12, 1990 from contaminated soil stockpiled at the Yeon Ave. site <u>before</u> biological treatment began was 9,250 parts per million diesel. Two background samples were analyzed with their TPH levels recorded at 7,500 ppm and 11,000 ppm. The average of 9,250 ppm reported above is the average of the two.

The next soil sampling episode occurred on Aug. 13, 1991 at which time the level of contamination had dropped to an average of 1,200 ppm in the East Treatment Zone. This reduction follows a treatment period of 275 days. Samples were not taken from the West Treatment Zone until April 6, 1992. Following this date, two curves are shown in FIGURE 1. One is for the East Treatment Zone and the other represents the West Treatment Zone. Both treatment and sampling by this time were being

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conducted by SOIL TECH INCORPORATED who continued managing both functions throughout the remainder of the project.

It should be noted that the lab analysis for the Nov. 12, 1990 background sample at the TTI site was conducted by Coffee Laboratories Inc. and is reported in their Nov. 27, 1990, Log No. A901112-L13 using the modified EPA method 418.1 (APPENDIX B). All following, off-site treatment analysis were conducted by the Oregon Analytical laboratories (OAL) using the same analytical procedure. Results of the OAL analysis are discussed later and are also included in the APPENDIX along with their Chain of Custody forms.

SAMPLING PROTOCOL: At the time the contaminated soil was moved from the TTI site on N.W. Yeon Ave. to the off-site treatment facility on N. Marine Drive no specific protocol describing the total number of samples to be analyzed and been established. As the levels of contamination approached an acceptable level for use in compliance with DEQ's Policy No. 550, the following sampling protocol was then established between DEQ and SOIL TECH INC.

TREATMENT AREA	NUMBER OF SAMPLES REQUIRED BY DEQ
EAST TREATMENT ZONE (AREA A)	One sample per 150 cu. yds.
WEST TREATMENT ZONE (AREA B)	One sample per 100 cu. yds.

A uniform distribution of sampling points was achieved by establishing a grid system for each of the two treatment zones. Examples of the grid systems used are attached to the Chain of Custody forms in the APPENDIX for the applicable sampling episode.

SCHN00172129

LABORATORY RESULTS & CHAIN OF CUSTODY FORMS:

Copies of all laboratory analysis and their associated chain of Custody forms are included in APPENDIX B through I. The results for specific sampling dates may be found as follows:

Date Sample Taken	Treatment Zone	Number of Samples Taken	Average TPH-D (PPM)	Results Located in Appendix
Nov. 12, 90	Yeon Ave.	2	9,250	B
Aug. 13, 91 Nov. 15, 91	East East	3 4	1,200 1,088	C D
Apr. 6, 92 Apr. 6, 92	East West	10 6	607 718	E E
Apr. 28, 92 Apr. 28, 92	East West	63 28	842 938	F F
May 30, 92 May 30, 92	East West	29 18	889 701	G G
Aug. 14, 92 Aug. 14, 92	East West	6 2	953 270	H H
Dec. 23, 92 Dec. 23, 92 Dec. 23, 92	East East West	33 2 12	402* 295* 276*	I I I
TOTAL NUMBER OF ANALYSIS:		218		

* The Oregon Analytical laboratory analysis sheets for the 47 samples taken Dec. 23, 92 contained the following footnote.

> "Samples contained no diesel fuel. Concentrations reported are for a "hump" extending from C16 - C28. Suspect bio-remediation by-products."

SCHN00172130

It is for this reason that the levels of contamination for both the East and West Treatment Zones drop to zero TPH-D at 12/23/92 as shown on FIGURE 1. This same information was reported by SOIL TECH INC. in its Jan. 11, 1993 report to DEQ (See APPENDIX J). (SOIL TECH's letter requested a letter from DEQ acknowledging its acceptance of the above off-site utilization conditions and requirements).

Considering that no diesel fuel was found in any of the 47, 12/23/92 soil samples analyzed leads to the obvious conclusion that the bio-remediation process was entirely successful in removing all of the diesel contamination known to have been as high as 11,000 ppm when the treatment process was first started. As noted, by the time the Dec. 23, 1992 sampling episodes was completed, the bio-remediation treatment process followed by sampling and analysis had been in operation continuously for a period of 771 days. It is scientifically probable that the microbiologal degradion process continued well beyond the final sampling date of 12/23/93 and will continue to remain active so long as a source of nutrients remains available for either exogenous or indigenous microorganisms present in the soil mass.

What appears to be a sudden increase in the average TPH concentrations in both the east and west treatment zones during April, 1992 results from the following. For logistical purposes it was necessary that the BROWN BEAR mixing and aereation process start at the top level of each stockpile and work down through successive layers of contaminated soil until adequate treatment of each layer was achieved. As treatment was achieved clean soil contained in the layer previously treated was stripped off and stockpiled and the process repeated on the next layer thus exposed. What looks like an increase in TPH levels is actually the results of early sampling in

SCHN00172131

the next lower level prior to it's receiving equal time and treatment as the layer immediately above it.

DISPOSITION OF TREATED SOILS:

By July, 1992 the average TPH-D for soil in the west treatment zone dropped below 500 ppm-D. As a result, the first serious effort to find a market for adequately treated soil was on Sept. 16, 1992 when and ad was placed in the Daily Journal of Commerce. Also, on Sept. 16, 1992 a letter was directed to METRO to determine if that agency could use treated soil as part of its closure program for the St. Johns Landfill. DEQ was notified by letter, Nov. 5, 1992, of the METRO opportunity. Efforts to market the sand through Ross Island Sand & Gravel and Sack-Crete Inc. followed.

On Feb. 4, 1993, a firm offer to utilize a portion of the treated sand was received from Western Paving & Construction. This was the direct result of the D.J. of C. ad. The intended use for the sand was as sub-grade fill for a private access road on land owned by Burlington Northern Railroad in it's Barnes Yard located off Columbia Blvd. in North Portland.

A Dec. 4, 1992 letter to Mr. Ken Vancil with Western Paving and Construction informed him of DEQ's reuse requirements and outlined other conditions under which his firm would be authorized to purchase properly treated sand specifically for the road construction project described earlier. Mr. Vancil acknowledged the requirements

SCHN00172132

and over a period of time was able to utilize a considerable portion of the original 15,000 cu. yds. of treated material.

Other more recent uses included compacted fill material beneath a concrete floor in an industrial building under construction in North Portland. Conditions required by DEQ Policy 550 were met.

Current uses for the remaining volume of fully treated sand include compacted fill material for use in the Oregon Department of Transportation's mechanically reinforced earth retaining wall systems now under construction in Southeast Portland. Laboratory tests have also shown that it works exceptionally well as a source of mineral fines required as part of the aggregate requirements for roller compacted concrete. Negotiations are currently in progress with Nichols Marine in St. Johns who are likely to use the entire remaining volume this summer in their current shipyard improvement program.

It is also possible that some, or possibly all, of the remaining volume might be of use as fill material in its present location on the west side of Mr. Kathren's property on N. Marine Drive. DEQ comments on this possibility are hereby requested.

Copies of correspondence, notes and the D.J. of C. ad supporting the above are included in APPENDIX K.

DEQ SIGN-OFF:

Neither DEQ's Policy 550 or Mr. Kathrens existing OFF-SITE TREATMENT PERMIT

SCHN00172133

appear to include wording that would specify clearly when an off-site treatment program, such as Mr. Kathrens', has met all of DEQ's requirements and can be considered complete from a legal point of view. In the event Mr. Kathren might wish to sell his N. Marine Dr. property, a letter from DEQ certifying satisfactory completion becomes absolutely essential. DEQ's written confirmation of the projects satisfactory completion is also required by Section 1.4 of the June 3, 1991 DEQ, YSP, TTI Agreemtent. Without it, Mr. Kathrens ability to withdraw any funds remaining in the escrow account could be jeopardized.

For this reason, after you have had an opportunity to review this concluding report, Mr. Kathrens has asked that we request a letter from DEQ assuring all concerned that all off-site mitigation requirements associated with the original Yeon Ave. clean-up project have been completed to the full satisfaction of the state.

Respectfully Submitted,

George D. Ward

George D. Ward
Professional Engineer

GDW/ga

cc: Dick Kathrens
SOIL TECH INC.

SCHN00172134

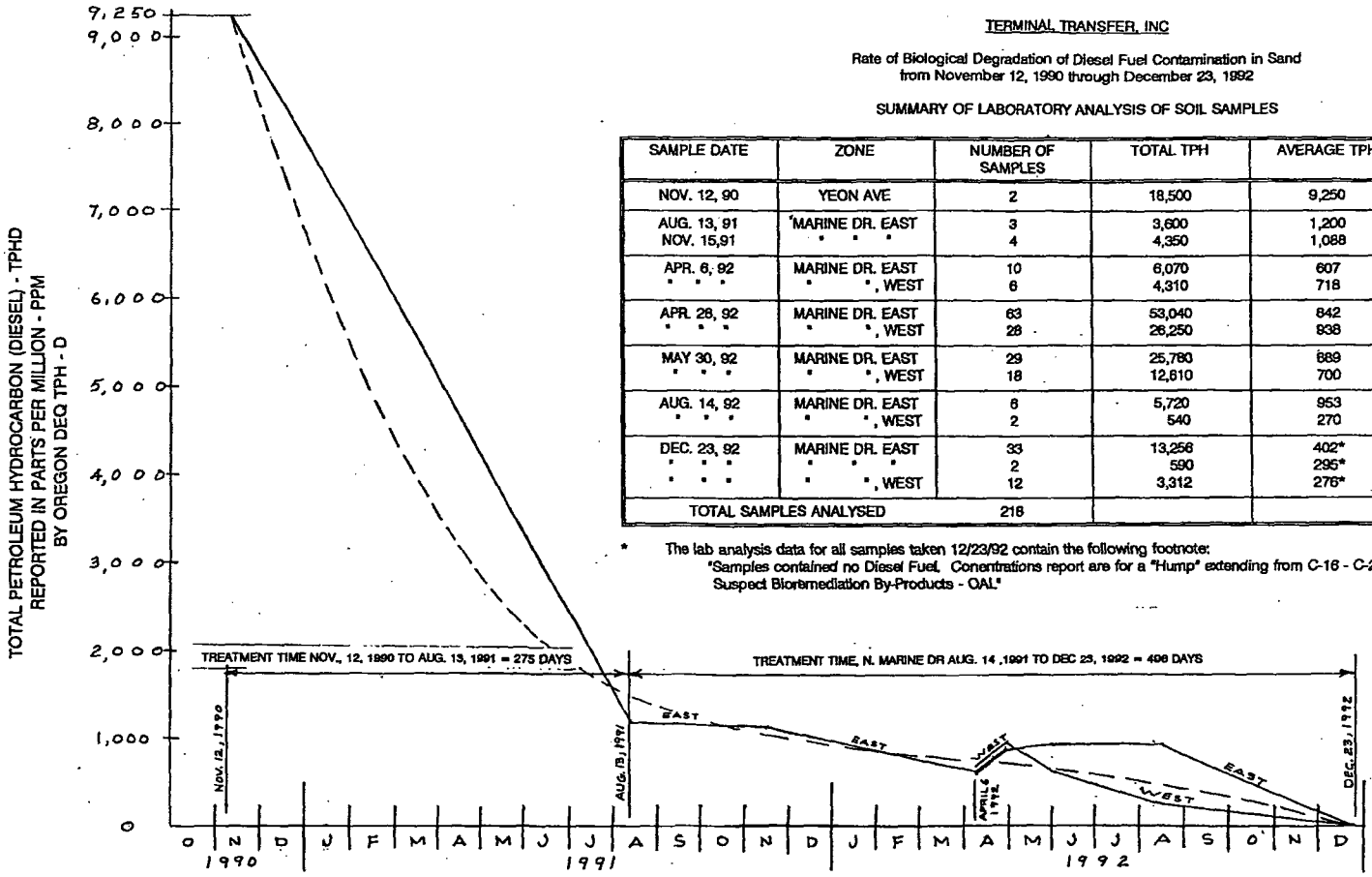
TERMINAL TRANSFER, INC

Rate of Biological Degradation of Diesel Fuel Contamination in Sand
from November 12, 1990 through December 23, 1992

SUMMARY OF LABORATORY ANALYSIS OF SOIL SAMPLES

SAMPLE DATE	ZONE	NUMBER OF SAMPLES	TOTAL TPH	AVERAGE TPH
NOV. 12, 90	YEON AVE	2	18,500	9,250
AUG. 13, 91	MARINE DR. EAST	3	3,600	1,200
NOV. 15,91	" " "	4	4,350	1,088
APR. 6, 92	MARINE DR. EAST	10	6,070	607
" " "	" ", WEST	6	4,310	718
APR. 28, 92	MARINE DR. EAST	63	53,040	842
" " "	" ", WEST	28	26,250	938
MAY 30, 92	MARINE DR. EAST	29	25,780	889
" " "	" ", WEST	18	12,610	700
AUG. 14, 92	MARINE DR. EAST	6	5,720	953
" " "	" ", WEST	2	540	270
DEC. 23, 92	MARINE DR. EAST	33	13,256	402*
" " "	" " "	2	590	295*
" " "	" ", WEST	12	3,312	276*
TOTAL SAMPLES ANALYSED		218		

* The lab analysis data for all samples taken 12/23/92 contain the following footnote:
"Samples contained no Diesel Fuel. Conentrations report are for a "Hump" extending from C-16 - C-28. Suspect Bioremediation By-Products - OAL"



DATES OF MAJOR SOIL SAMPLING EPISODES

FIGURE 1

SCHN00172135

GEORGE D.WARD & ASSOCIATES

4941 S.W. 26th Dr., Portland, Oregon 97201
(503) 293-6075 FAX (503) 243-6815

ENVIRONMENTAL CONSULTING ENGINEERS

FINAL SITE CLOSURE REPORT

Former Terminal Transfer Inc. Property
3601 N.W. Yeon Street
Portland, Oregon

Prepared for
Mr. Richard J. Kathrens

Part One

Northwest Yeon Street Only

By:

George D. Ward

George D. Ward

July 26, 1994

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Waste Management & Cleanup Division
Department of Environmental Quality

TABLE OF CONTENTS

PURPOSE AND SCOPE 1
BACKGROUND 2
Initial Site Investigation by Geotechnical Resources Inc. 3
Continuation of Site Investigation by George D. Ward & Associates 3
Major Excavation of 30,000 cubic yards 3
DEQ Acknowledgment of Removal of Contaminated Soil 4
Assumed Westerly Migration of Groundwater 5
Remediation Agreement and Release 5
Additional Monitoring Wells Required by DEQ 5
SUMMARY OF MONITORING EPISODES 7
Rounds I, II, III, IV & VI 8
Round V 9
SUMMARY OF FINDINGS 10
ROUND I 11
Closure Samples 14
Field Observations 15
Previously Reported Releases 15
Newly Observed Releases 15
Photos 17
Figure 1 ..... 17A
DEQ Confirmation of Releases 18
Additional Photos 20
Releases on Adjacent Properties 25
ROUND II 34
Additional Monitoring Wells 34
Total Petroleum Hydrocarbon Concentration 35
Benzene Concentration 36
Direction of Groundwater Movement 37
Geotechnical Resources Inc. Conclusion 37
ROUND III 39
Groundwater Sampling 38
Analytical Results 40
Off-site Monitoring 41
Waste Oil Dump 42
Laboratory Results 43
Figure 2 45
Figure 3 46
Groundwater Flow Direction and Gradient 47
Conclusion 48

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ROUND IV 50
Wells Sampled 50
Laboratory Results 51
Table 3 52
Table 4 53
Table 5 54
Table 6 55
Static Groundwater Elevation 56
Conclusion 57
Table 7 58
ROUND V 59
Off-site Groundwater Monitoring by Hart Crowser Inc. 59
DEQ Confirmation of Off-site Contamination 60
Product Recovery Pit on Terminal Transfer Property 61
Figure 4 63
Photos of Product Recovery 64
Soil with Petroleum Hydrocarbons East of Garage 68
Conclusion 69
ROUND VI 70
Wells specified for monitoring by DEQ 71
Laboratory results 72
Laboratory results 73
Laboratory results 74
Laboratory results 75
Discussion of results 76
Conclusion 79

TABLES

Table 1 - ROUND I, closure sample results
Table 2 - ROUND III, June 22, 1992 chemical analysis
Tables 3 thru 6 - ROUND IV, August 3, 1992 chemical analysis
Table 7 - Summary of groundwater elevation measurements

FIGURES

Figure 1 - Site plan duplicated from Corrective Action Plan
Figure 2 - Site plan showing locations of additional monitoring wells
Figure 3 - Site plan of hill Investment Inc. property
Figure 4 - Construction details of 50 ft X 50 ft exploration pit

ATTACHMENTS

Attachment No. 1 - Groundwater directional diagrams by Hart Crowser Inc.
Attachment No. 2 - DEQ of confirmed releases on nearby properties
Attachment No. 3 - DEQ letter listing possible sources of contamination
Attachment No. 4. - DEQ letter confirming satisfactory removal of contaminated soil and notices of completion
Attachment No. 5 - ROUND II, chemical analysis
Attachment No. 6. - 6/22/94, Chain of Custody forms and lab reports
Attachment No. 7. - 8/3/92, Chain of Custody forms and lab reports
Attachment No. 8. - 8/7/92, Chain of Custody forms and lab reports

EXHIBITS

Exhibit A - North harbor Drive, Off-Site Treatment Report

FINAL SITE CLOSURE REPORT

FORMER TERMINAL TRANSFER INC. PROPERTY

3601 N.W. YEON STREET, PORTLAND OREGON

PURPOSE & SCOPE

The purpose of this report and attachments is to inform DEQ that it is the opinion of George D. Ward & Associates that remediation and long-term monitoring of the former Terminal Transfer Inc. property located at 3601 NW Yeon Avenue, Portland OR 97210 has been successfully completed. Accordingly, we request that DEQ review the attached documentation, and upon its acceptance, declare the site as officially closed.

We suggest May 12, 1994, at which time the Off-Site Treatment Project was completed, as the final closure date. We offer the following summary of major events in support of the above conclusion. The supporting information that follows summarizes a series of investigation and closure activities conducted at the site over the previous five and one half years. The initial site investigation by Geotechnical Resources Inc. began December 2, 1988. On January 25, 1990 Mr. Richard Kathrens, owner of the property at that time, retained the firm of George D. Ward & Associates to continue with the site investigation and to proceed with mitigation if required.

SCHN00172140

The objective of this final report is to present the results of site investigation activities conducted at the site by both George D. Ward & Associates (GWA) and Geotechnical Resources Inc. (GRI). Remediation and monitoring activities conducted by GWA were performed on behalf of Dick Kathrens representing Terminal Transfer Inc. Similar activities conducted by GRI were performed on behalf of Prendergast and Associates, Inc.

Terminal Transfer Inc. had previously offered to sell the property, and Prendergast and Associates, Inc. had agreed to purchase it. Completion of the Sale and Purchase Agreement was contingent on the successful mitigation of any contamination found on the site by either consulting firms as both proceeded with their individual environmental investigations. It is for this reason that the results of laboratory analysis of soil and groundwater closure samples taken by both firms have been included in the attachments to this report.

One of the most significant requirements in the final environmental assessment by both consulting firms was to determine the direction of groundwater movement and the environmental impact it might have on nearby properties in the event the direction of movement was found to be in a westerly direction as perceived from the beginning by GRI. (GRI's original assumption that the direction of groundwater movement was toward the west was later proven to be incorrect.)

For assistance in making this determination, GWA included in its investigation a review of DEQ file reports applicable to nearby properties located in a westerly direction from the former

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Terminal Transfer property. Included in the review are the results of nearly two years of groundwater movement observations and conclusions conducted by Hart Crowser Inc., on behalf of the Hill Investment Company whose property is located directly west of the subject site. Results and conclusions reported by the adjacent property owner's consultant are included as part of the attachment to this report.

BACKGROUND

The first site investigation began December 2, 1988 by GRI as directed by Prendergast and Associates Inc. On January 25, 1990, Dick Kathrens, owner of Terminal Transfer, Inc. retained George D. Ward & Associates for the purpose of conducting a parallel site investigation on his behalf. The specific environmental assessment responsibilities of each firm was included as part of the Sale and Purchase Agreement.

Both engineering firms continued to represent their respective clients throughout a prolonged period of site investigation and mitigation activities. Each firm took both individual, as well as parallel, soil and groundwater samples with the results being shared between both consulting firms. Copies of laboratory results of all soil and groundwater investigation activities compiled by both consulting firms were also submitted to DEQ as they became available.

By October 9, 1990, following a massive excavation and contaminated soil removal plan, it was determined by both consulting firms that all possible quantities of diesel fuel contaminated soil

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had been removed from the 30,000 cu. yd. mass excavation pit and that all floating, free product had been completely removed from the exposed groundwater surface over an area of approximately one acre. Backfilling of the one acre remediation zone with clean fill material started October 10, 1990.

Based on the successful mitigation results, substantiated and mutually agreed upon by both firms, the results of independent lab analysis from a combined total of 94 soil and groundwater closure samples were submitted to DEQ and are included as Appendix "A" in the February 11, 1991 CAP prepared by GWA. Additional sampling results and final closure recommendations were submitted by Geotechnical Resources in its October 4, 1991 report requested by DEQ.

DEQ, in its March 18, 1991 letter to George D. Ward and Associates, acknowledged that all possible contaminated soil related to a reported diesel release on the Terminal Transfer site had been excavated and removed from the site for off-site treatment. (See Attachment No. 4) One minor exception was the possibility of a small wedge of suspected, diesel contaminated soil along a portion of the west property line that could not safely be removed without endangering a nearby railroad. Therefore, even if contamination did exist, the removal of soil within the assumed wedge was not required by DEQ. Included in DEQ's letter that provided qualified closure approval was notification that Terminal Transfer Inc. was still not released from the responsibility for groundwater monitoring and investigation and possibly remediation of any contamination remaining at or beyond its western property boundary.

SCHN00172143

More recently the investigation by Hart Crowser conducted on behalf of Hill Investment, Inc. established that the true direction of groundwater movement on the Hill Investment property was not westerly. Instead it was proven to be just the opposite and moving toward the east and southeast. Their findings were first reported Sept. 6, 1991. Four additional Hart Crowser groundwater movement reports followed. All five reports verify Hart Crowser's initial finding that the direction of groundwater movement along the Hill Investment, Inc., east boundary line is either directly east or to the southeast. This is directly toward the location on Mr. Kathrens property where diesel fuel contamination was detected on the surface of the watertable by both GRI and GWA during the initial and totally independent groundwater monitoring activities of both consulting firms.

The original belief by GRI and subsequently by DEQ that diesel contamination had migrated in a westerly direction and impacted adjacent properties to the west was a major point of concern during property ownership exchange negotiations. This resulted in a June 3, 1991 mitigation agreement between DEQ, Terminal Transfer Inc. and Prendergast and Associates, Inc. In the agreement, in Recital D, Terminal Transfer stated that it believed it had cleaned contamination from soils and groundwater on its property, and that any additional contamination would be from sources off the property for which it was not legally responsible.

DEQ continued to believe that the full nature and extent of soil and groundwater contamination on the property to the west or its source had not been fully determined. In order to resolve the migration issue, DEQ directed GWA to drill additional monitoring wells, some of which were

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required to be located off-site and to the west on Burlington Northern Railroad property. On the advice of council, Terminal Transfer was prevented from authorizing the drilling of monitoring wells outside the boundaries of its property.

DEQ then instructed Prendergast and Associates to direct GRI to proceed with the drilling and monitoring of four new wells on BNRR property, plus 15 additional wells on the Terminal Transfer site. The findings of GRI's final soil and groundwater investigation are summarized in its October 4, 1991 report to DEQ. These same GRI findings and conclusions are identified in an attachment to this report as ROUND II of a series of four major soil and groundwater monitoring events applicable to the Terminal Transfer site.

On May 11, 1992, GWA was instructed by Mr. Kathrens to resume all responsibilities for monitoring a portion of the 19 additional wells drilled by GRI on TTI and Burlington Northern Railroad property. DEQ made the selection of specific wells in which monitoring was to continue. As directed by Mr. Kathrens, GRI was no longer involved in the three additional monitoring episodes that followed on each of the above properties. These are referred to as ROUND III, ROUND IV and ROUND VI in the following summary.

SCHN00172145

SUMMARY OF MONITORING EPISODES

The following is a summary of dates on which six major soil and groundwater monitoring events have occurred. All samples were delivered to certified laboratories, and the analytical testing procedures used by each are reported in the individual laboratory reports. All sampling and analysis were conducted in compliance with applicable EPA protocol.

SCHN00172146

SAMPLING EPISODES

ROUND NUMBER	CONSULTANT	DATE
I	George D. Ward & Associates in conjunction with Geotechnical Resources, Inc.	October 1990 thru January 1991
II	Geotechnical Resources, Inc.	July & August 1991
III	George D. Ward & Associates	June 1992
IV	George D. Ward & Associates	August 1992
VI	George D. Ward & Associates	October 6 & 7, 1992

Because of DEQ's continuing concern for GRI's assumed westerly migration of the groundwater system beneath the TTI property, a great deal of emphasis was placed on this issue during the preparation of this final report. Included in this evaluation was the results of numerous groundwater movement studies conducted by other consulting firms on behalf of owners of properties located west of the TTI site. Previous groundwater studies on the NABISCO/Hill Investment site were conducted by the Tom New Construction Co., Riedel Environmental Services, Geotechnical Resources Inc. and Hart Crowser, Inc.

Of these, the most significant is a series of direction of groundwater movement diagrams and conclusions reported by Hart Crowser, Inc. over a 22 month period, on behalf of the Hill Investment property also known as the NABISCO site. Also noted was a July 17, 1991 letter from DEQ to John Chamberland, Hill Investment, confirming the Nov. 17, 1989 discovery of a diesel release from an underground storage tank located on the NABISCO site. The location of the

SCHN00172147

NABISCO diesel release is directly upslope and approximately 100 ft west of GRI's exploration well B-3 where that firm first detected diesel contamination floating on the surface of the static watertable December 2, 1988. Diesel contamination was also detected by GWA in 1990 following the installation of additional monitoring wells and the construction of a 4 ft. diameter by 14 ft. deep perforated concrete wet-well in the same area as GRI's monitoring well B-3.

Due to the close relationship to the probable direction of groundwater flow and gradient on the Terminal Transfer site, it is appropriate to designate the results of all five Hart Crowser site assessments of the nearby, Hill Investment site as Round V as follows:

ROUND NUMBER	CONSULTANT	DATE
V	Hart Crowser, Inc. site assessment of Hill Investment property	August 1991 thru September 2, 1993

All Hart Crowser site assessment information either included or referred to in this report is available from DEQ's public information files. Only Hart Crowser data applicable to the direction of groundwater flow and its gradient is included in the attachments to this report. (See Attachment No. 1)

The utilization of technical data developed by an independent professional consulting engineering firm concerning land located immediately west of the TTI site is appropriate in that it responds to DEQ's safeguards included in the June 3, 1991 Remediation Agreement and Release. The fundamental issue that resulted in the June 3, 1991 Mitigation Agreement was the unproven direction of groundwater movement at that time.

SCHN00172148

There is now a significant source of additional, independent and highly reliable data verifying that the direction of groundwater movement beneath the Terminal Transfer site does not move in a westerly direction. The true direction of groundwater movement, as determined in five totally independent reports, is consistently toward the southeast. For this reason, Terminal Transfer should no longer be required to monitor either the direction of or the quality of the groundwater system located beyond the western boundary of its former property.

All Hart Crowser data obtained from the DEQ files is contained in attachment No. 1. The dates of the five, Hart Crowser groundwater directional reports and diagrams are:

1. September 26, 1991
2. March 31, 1992
3. June 29, 1992
4. February 18, 1993
5. September 2, 1993

SUMMARY OF FINDINGS

The following presents a summary of soil and groundwater data revealed during each major monitoring episode. Additional details may be found in the various reports submitted earlier to DEQ by GWA and GRI. The most significant source of information is contained in the Corrective Action Plan prepared by GWA February 11, 1991.

SCHN00172149

SOIL AND GROUNDWATER SAMPLING

ROUND 1

During the initial site investigation activities by both GWA and GRI, and as the excavation of approximately 30,000 cu. yds. of material progressed, a substantial number of totally independent soil and groundwater samples were subjected to laboratory analysis by both firms. In all cases, copies of the laboratory analysis were submitted to DEQ and also shared between the two consulting firms.

The parallel objective of both consulting firms was to establish the maximum outer boundary of the zone of diesel contamination. Not all of the results of the original, 94 exploratory sampling and resulting laboratory analysis are included in this final report. (See Feb. 11, 1991 Corrective Action Play by GWA.) However, the results of 17 samples taken specifically for closure purposes by GWA are included in Table No. 1.

In October, 1990, it was concluded by both consulting firms that except for the west boundary, the remaining outer boundary of contamination had been established. As preparations for backfilling of the one acre excavated area were being made, a plan was developed in which both consulting firms were to take a series of independent closure samples to verify that no contamination from petroleum by hydrocarbons above acceptable limits remained in the approximately one acre mitigation area.

SCHN00172150

The combined number of investigation and closure samples submitted to DEQ by GWA and GRI as a result of this concentrated effort are as follows:

FIRM	NUMBER OF CLOSURE SAMPLES RECORDED
George D. Ward & Associates	53
Geotechnical Resources, Inc.	41
TOTAL	94

Copies of each firm's laboratory analysis results were submitted to DEQ as part of the February 11, 1991 CAP. Also included was a summation of the results of both firms and a location map showing where each of the 94 closure samples was collected. (See Exhibit A from the February 11, 1991 CAP.)

Benzene, the BTEX component of primary concern, was detected in groundwater samples at GWA sampling points 22 and 26 at concentrations of 75.4 and 18 ppb. Sampling point 22 was from the saturated zone at the groundwater level in a deep notch excavated intentionally by GRI directly into the suspected wedge of contamined soil allowed by DEQ to remain along the west property line due to its location beneath a nearby railroad spur. The sampling point location and procedure for sampling was selected by GRI and was beyond the limits of safe excavation as governed by OSHA. Because of this, the removal of samples from this location was not required

by DEQ. Benzene was non-detect in the native sand immediately above the watertable at GRI's sampling point 22.

TPH concentration at sampling point 22 was 250 ppm. Sampling point 25 was not analyzed for Benzene. However, a TPH level of 8.3 ppm was detected in sampling point 25, which was immediately adjacent to point 26.

TPH concentrations above the detection limit were found in only 17 of the 53 samples taken by GWA. All remaining samples were below the detection limit and are shown as ND in Exhibit A in the CAP. The DEQ matrix limit of 500 ppm for diesel does not apply since contact with the groundwater was involved. All samples with TPH concentrations above the detection limit, regardless of their low levels, are summarized in Table 1 of this final closure report.

SCHN00172152

TABLE 1
ROUND NO. 1, CLOSURE SAMPLES
BY
GEORGE D. WARD & ASSOCIATES

MAP SYMBOL	TPH CONCENTRATION (ppm)	LOCATION OF SAMPLING POINT
8	470.0	West sidewall @ 11' - saturated sand
10	23.0	West sidewall @ 11' - saturated sand
11	250.0	NE corner of excav. @ 11' - saturated sand
15	130.0	Center of excav. at north end @ 12' - saturated sand
20	< 4.0	Near GRI well #B-3 @ 12' - saturated sand
21	9.0	West sidewall @ 10' - saturated sand
22	250.0	West sidewall @ 12' - saturated sand
23	15.0	B-3 wetwell @ 12' - groundwater
24	11.0	East sidewall @ 11' - saturated sand at center
25	8.3	East sidewall @ 11' - saturated sand
27	64.0	SE corner of excav. @ 6' - native sand
28	< 5.0	SW corner scale slab @ 6' - native sand
29	< 5.0	Bottom of whse. ramp @ 11' - saturated sand
30	< 5.0	SW corner of whse. @ 11' - saturated sand
31	< 5.0	South end of excav. @ 11' - saturated sand
32	< 5.0	East sidewall east of fuel island @ 8' - native sand
33	19.0	North end of scale slab @ 8' - native sand

SCHN00172153

Field Observations

Included in the ROUND 1 assessment by GWA was a walk-over, surface inspection of all properties located beyond the full length of the western boundary of the Terminal Transfer property. Observations of importance were reported by GWA in a May 17, 1991 addendum to the original February 11, 1992 CAP.

Photos were taken of nearby releases, some of which had been reported by others to DEQ and others that had not yet been reported. They are as follows:

Observed Releases Previously Reported to DEQ by Others

1. Hill Investment Company property
2. Trumball Asphalt
3. A & R Trucking

Observed Releases Not Previously Reported to DEQ

1. Schnitzer Investment Corp. property
   (site of former Chase Bag Company)
2. Burlington Northern Railroad property
   (apparent waste oil dumpsite)

SCHN00172154

What appears to have been a former waste oil dump was observed on BNRR property at a point approximately 10 feet northeast of the northeast corner of the Hill Investment Company property. The dump site is approximately 40 feet from a former NABISCO truck maintenance shop still remaining on the Hill Investment site but no longer used for this purpose. It was reported to DEQ by GWA January 31, 1991. The dump site was reportedly used by personnel from the nearby truck maintenance facility on Hill Investment property. At the time the building was used solely for the purpose of maintaining and servicing a large fleet of trucks. (see Photo 10 on the following page and Figure 1).

Photos:

Photos of observed releases on property located west of the Terminal Transfer site follow. All photos of observed releases have been duplicated from the May 17, 1991 Addendum and the February 11, 1991 CAP. Also included is a photo taken during the installation of an 8' deep by 350' long impervious membrane extending several feet below the satic watertable surface along the west property line. The installation of the groundwater barrier was one of several requirements included in the sale agreement between Terminal Transfer, Inc. and the buyer of the property. The groundwater barrier was not a DEQ requirement but was insisted on by GRI on behalf of Prendergast and Associates, Inc.

SCHN00172155

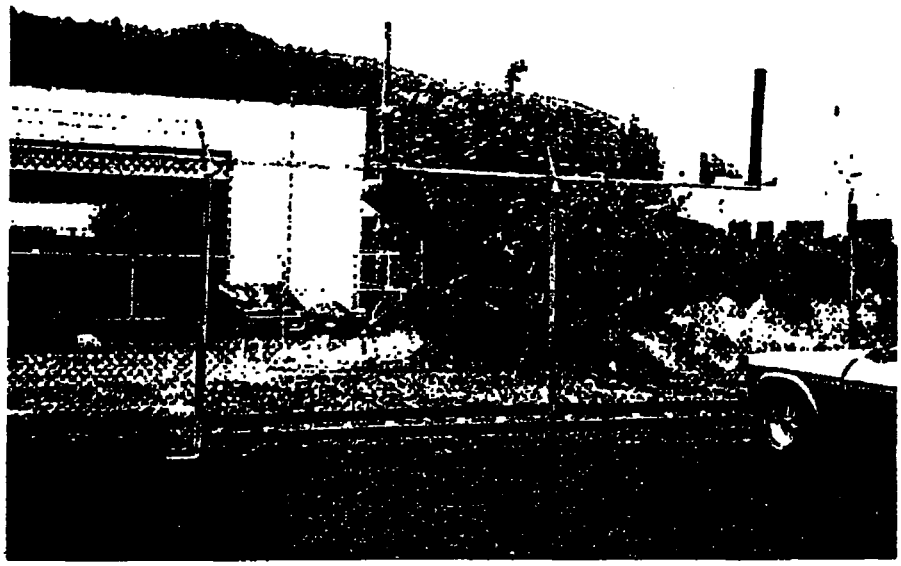

Photo 10 Looking west from Terminal Transfer property across rail spur toward Hill Investment Company property and former truck maintenance shop. Cyclone fence and pavement on Hill Investment Company property are new. Location of former waste oil dump is at base of small tree in center of photograph.

Photo by George Ward

SCHN00172156

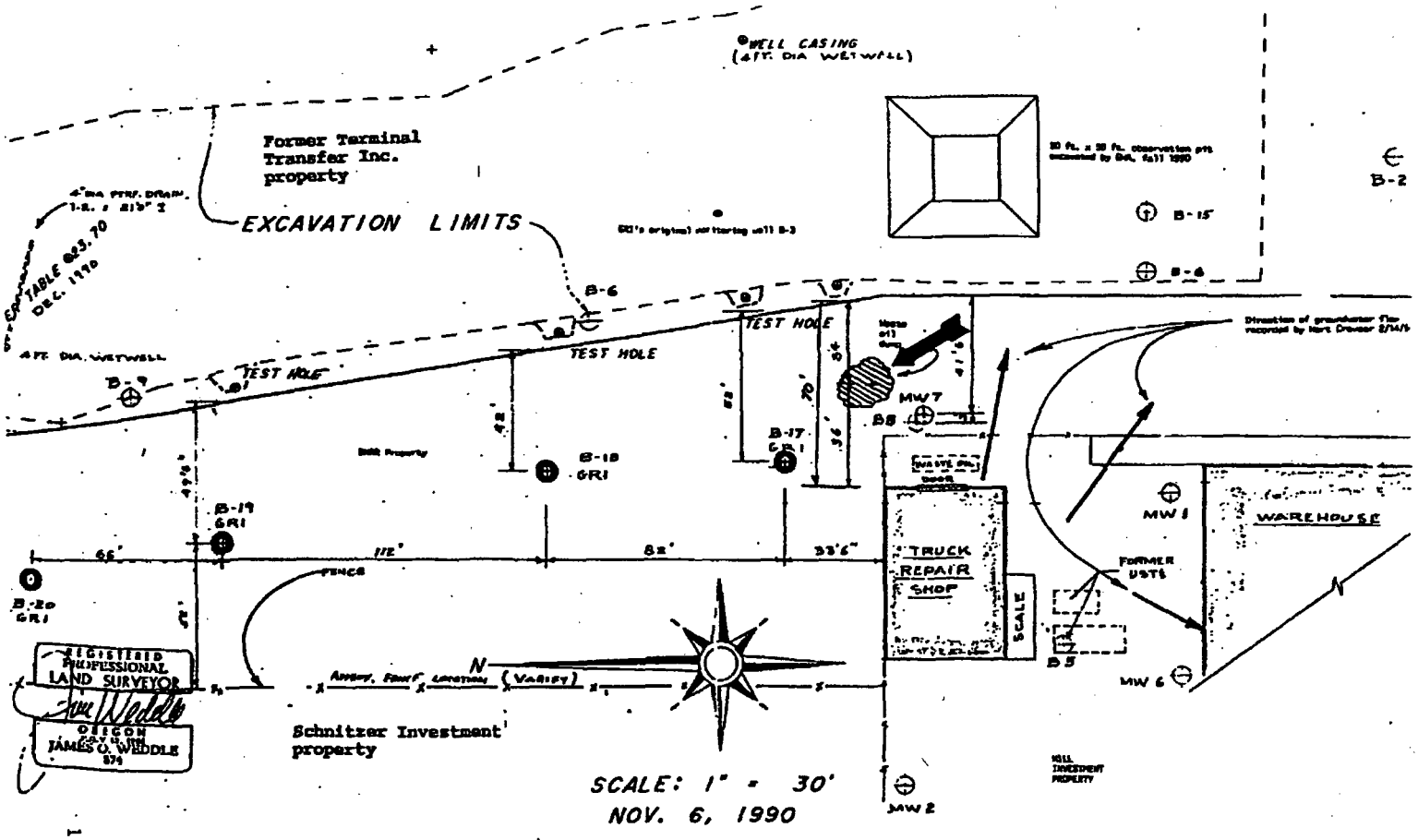

FIGURE 1

17A

SCHN00172157

DEQ Confirmation of Known Releases

The following is a summary of reports obtained from DEQ files. All included references to earlier petroleum releases known to have occurred on properties located west of the former Terminal Transfer, Inc. property.

1. Trumbull Asphalt Plant

   Summary report prepared June 19, 1990 by SRH Environmental Management for Owens/Corning Corporation.

2. Trumbull Asphalt Plant

   Undated report commissioned July 20, 1988 by Owens/Corning and completed by Hubert H. Willer, III, Hazardous Material Specialist with Crosby & Overton, Inc.

3. Trumbull Asphalt

   July 24, 1990 DEQ letter to David Crowle, with Owens/Corning (second page missing).

4. Trumbull Asphalt

   November 4, 1988 letter to DEQ's Loren Garner from Owens/Corning.

5. Trumbull Asphalt

   Remedial Investigation submitted to Owens/Corning August 28, 1989 by SRH Environmental Management.

6. Nabisco Warehouse Site (Round I)

   Soil and groundwater sampling report submitted October 11, 1990 to Ashland Chemical, Inc. by Riedel Environmental Services, Inc.

7. Nabisco Warehouse Site (Round II)

   Continuation of investigation described above submitted November 10, 1990.

SCHN00172158

8. **Hill Investment**

July 17, 1991 DEQ letter signed by Andree Pollock to John Chamberlain with Hill Investment.

9. **Terminal Transfer Site**

Page 50 taken from CAP prepared by George D. Ward & Associates. (Note that the basic drawing was obtained from a GRI report and updated by GWA to include reference to suspected sources of contamination west of TTI property.)

10. **Hill Investment**

Corrective Action Plan submitted June 24, 1991 by Hart Crowser to Hill Investment.

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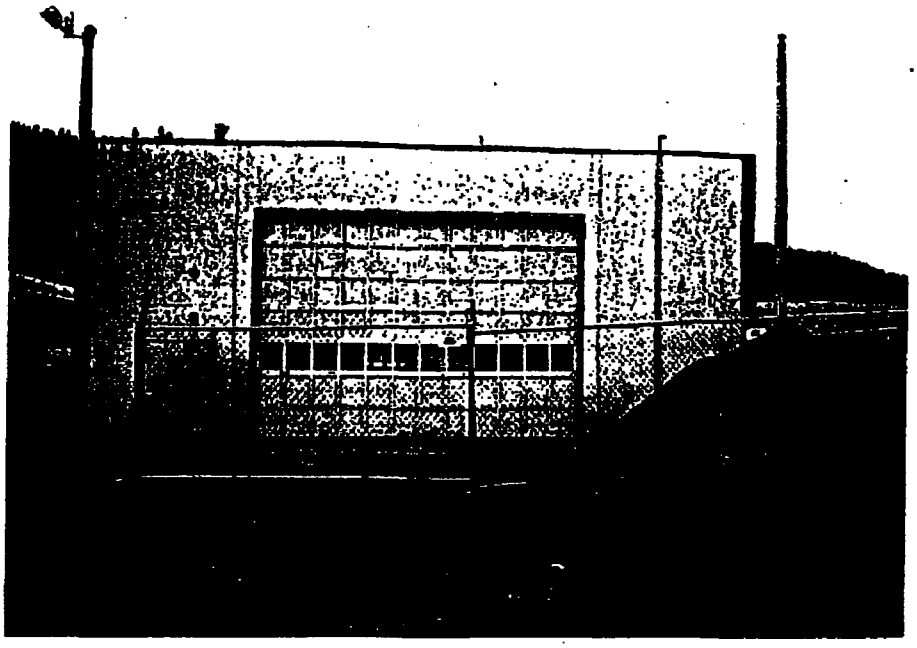


PHOTO 1: *Looking west from Terminal Transfer property toward previous Oregon-Washington Trucking Co. shop. Excavation in foreground represents area where waste oil tank was previously located.*

PHOTO 2: *Looking at static water table inside waste oil tank removal pit described in Photo 1. Note narrow band of dark petroleum-like accumulation around shoreline. Color is darker than diesel.*

Photos by GDW, 1/31/91

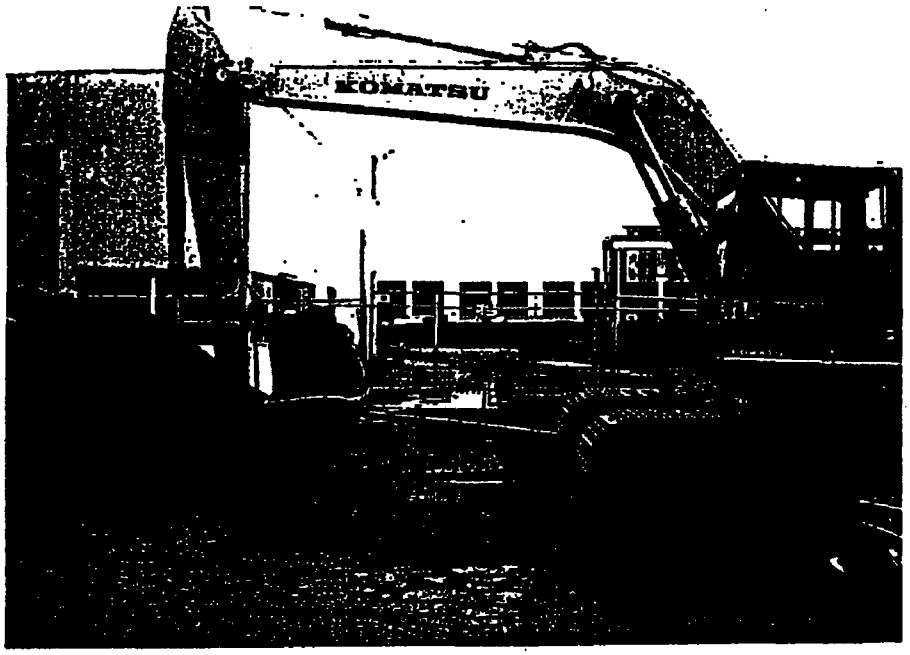


PHOTO 3: *Looking east from Nabisco property toward Terminal Transfer property in background. Pit in foreground is where two petroleum tanks were removed. Diesel and oil contamination in soil were found as high as 45,100 ppm by Riedel Environmental Services, Inc.*

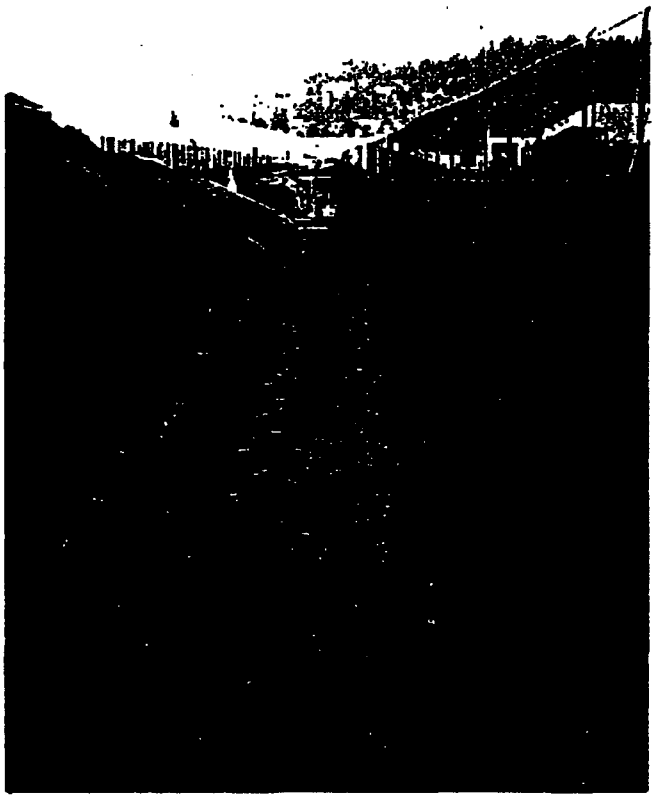


PHOTO 4: *View looking south along Terminal Transfer west property line. Shows installation of 350' long x 8' deep impervious membrane centered at the static water table. Purpose of the membrane was to prevent lateral migration of contaminants moving with the ground water.*

Photos by GDW, 2/15/91

PHOTO 1: *View looking east from Schnitzer Investment Corp. property. Terminal Transfer west property in background. Approximately fifty, 55-gallon drums marked with yellow "CAUTION" marker. Note petroleum-like leakage on asphalt pavement beneath drums. Surface plum extends to west property line shown in Photo 2.*

PHOTO 2: *View of west property line of Schnitzer Investment Corp. property line. Residuals from pool of petroleum-like substance leaked from cluster of 55-gall drums shown in Photo 1. Depth of pool appeared to have been 3 to 4 inches prior to its spilling over edge of pavement into porous dredge sand, subsoil.*

Photos by GDW, FEB. 1991

PHOTO 3: *View looking north through south fence of Schnitzer Investment Corp. property. Cluster in foreground shows approximately 35, badly weathered fiber drums surrounded by "CAUTION" marker. All contained granular chemicals. Manufacturer and code number of contents was recorded. Group of drums in background described in Photo 1.*

PHOTO 4: *View looking west through east fence of Schnitzer Investment Corp. property. Some drums were open top and contained what appeared to be granular chemicals and petroleum-like substance. Accumulation on loading dock near drums could not be identified.*

Photos by GDW, 2/15/91

PHOTO 5: *View looking west through east fence line of Schnitzer Investment Corp. property. Standpipe in foreground appears to be fill-pipe for underground oil storage tank. Note evidence of recent tank pumping activities. Entrance to Trumball Asphalt in background.*

PHOTO 6: *View looking west from 35th Ave. into entrance of Trumball Asphalt property. Note evidence of severe spillage of heavy oil down sidewall of high tank in foreground.*

Photos by GDW, 2/15/91

Confirmation of Petroleum Hydrocarbon Releases on Adjacent Properties:

Included in Attachment No. 2 are notices from DEQ to two property owners of sites located west of the former Terminal Transfer Inc. property confirming that releases of petroleum hydrocarbons are known to have occurred on each of the sites specified. Also included is notification that additional cleanup of the known contamination on each site may be required. DEQ Letters of Notification were sent to owners of the following properties.

Hill Investment/Nabisco Warehouse - October 23, 1992

Owens Corning Fiberglass/Trumbull Asphalt - January 20, 1993

Figure 1 and photos included earlier show the close relationship between the location of the suspected NABISCO waste oil dump and the area on the Terminal Transfer site where the maximum concentration of petroleum hydrocarbon contamination was found and removed during site mitigation in 1990 by GWA. Figure 1 and photos 1 and 2 show the former location of an underground waste oil storage tank immediately east of a known truck maintenance shop on the Hill Investment site. Photo No. 3 shows the location where diesel fuel tanks had previously been removed from the Hill Investment property by the Tom New Construction Company. Also visible in Figure 3 is the Hill Investment truck scale adjacent to the former truck shop.

In a March 4, 1991 letter to Hill Investment, DEQ acknowledged that following the removal of fuel tanks and a waste oil tank by the Tom New Construction Company, a substantial amount

SCHN00172165

of diesel contaminated soil remained in the vicinity of that firm's truck scales. Concentrations as high as 33,000 ppm total petroleum hydrocarbons were reported.

DEQ, without data to support it's opinion, named the Terminal Transfer property as a possible source of the diesel contamination found in the vicinity of Hill Investment's former waste oil tank. However, the letter also stated that the Hill Investment tanks were the most obvious source of the release and that DEQ would look to that firm to continue with investigation and cleanup unless it can definitively prove that the contamination originated from another source. (See Attachment No. 3.)

Following receipt of DEQ's March 4, 1991 directive, Hill Investment retained Hart Crowser, Inc., who then submitted its June 24, 1991 Corrective Action Plan that included provisions for quarterly groundwatering monitoring for a period of two years. Hart Crowser's quarterly reports submitted to DEQ included diagrams and conclusions that consistently verify the direction of groundwater flow to be in a southeast direction along the east side of the Hill Investment property toward the west side of the former Terminal Transfer site. The consistent southeast direction of groundwater movement over a 22 month period clearly demonstrates that Terminal Transfer, Inc. was therefore not responsible for contaminating properties located to the west as was previously suspected by others but denied by TTI in Recital D. of the June 3, 1991 Remediation Agreement and Release.

SCHN00172166

Copies of five Hart Crowser's quarterly, direction of groundwater flow diagrams are included in Attachment No. 1. Conclusions acknowledging the unchanging direction of groundwater movement are also included in each of Hart Crowser's quarterly reports.

Based on this new information, it is this firm's conclusion that DEQ should cease referring to the Terminal Transfer site as a possible source of diesel contamination found by others following a confirmed release discovered November 17, 1989 on the Hill Investment site. Secondly, Terminal Transfer should no longer be required to conduct groundwater monitoring activities beyond the western boundary of its former property.

In its March 4, 1991 letter to Hill Investment, DEQ acknowledges Mr. John Chamberlain's perceived opinion that the contamination found on Hill Investments property originated from offsite. However, a thorough review of equally persuasive data available at that time does not support Mr. Chamberlain's opinion concerning the probably source of diesel contamination known to exist on the Hill Investment site.

In its February 14, 1991 report to DEQ, the Tom New Const. Co. offered its conclusion "<u>that the contamination is caused by another source, as the water flow direction is coming from the North-Northeast as stated in Riedel's report</u>." The Tom New report failed to note that there are <u>two</u> Riedel reports. One report has the movement toward the southeast. The other describes it as moving toward the southwest as follows.

SCHN00172167

Riedel, ROUND 1 report October 11, 1990	Direction of groundwater flow is described on page 1 as flowing from the northwest to the southeast.
Riedel, ROUND 11 report November 10, 1990	Direction of groundwater flow is both described and shown on a diagram as flowing from the north - northeast to the south -southwest.

It can be assumed that both the Tom New Construction Co. in its Feb. 14, 1991 report to DEQ and Mr. Chamberlain in his communication with DEQ failed to reveal the above inconsistencies contained in Riedel's two reports concerning the probable direction of groundwater movement across the Hill Investment site.

A similar oversight appears to have been made by Hart Crowser in the preparation of its June 24, 1991 Corrective Action Plan submitted to DEQ. On page 2, the Hart Crowser CAP concludes incorrectly that the apparent direction of flow of groundwater on the Hill Investment site is to the southwest. Movement of the groundwater to the southwest is also shown graphically (but incorrectly) in Figure 5 of Hart Crowser's CAP.

However, in a footnote on Figure 5, Hart Crowser correctly states that its Base Map was prepared from Figure 2 of the November 10, 1990, report by Riedel Environmental Services Inc., entitled "Nabisco Warehouse Site, Soil and Groundwater Sampling, Round 11." In its preparation of Figure 5, Hart Crowser utilized groundwater elevations obtained from Riedels Nov. 10, 1990, Round 11 report. As noted previously, Riedels Round 11 report is the only one found by GWA

SCHN00172168

in it's extensive review of DEQ files that shows the groundwater movement to be in a southwesterly direction. The accuracy of Riedel's Round 11 report therefore appears subject to question.

Of the numerous reports available that attempt to describe the direction of flow of the groundwater system along the east side of the Hill Investment site, Riedel's, Nov. 10, 1990, Round 11 report is the only one that indicates the direction of movement to be in a southwest direction. All others clearly describe the direction to being from the northwest toward the east or the southeast. As evidenced in Attachment 1, the direction of groundwater flow in all subsequent Hart Crowser quarterly reports, (based on their own groundwater elevation measurements) is consistently in an east to southeast direction along the east side of the Hill Investment property.

From this it can be concluded that all groundwater elevations and the resulting groundwater contours shown on Hart Crowser's Fig. 5 are an exact duplication of identical information obtained from Riedel's Nov. 10, 1990 Round 11, Figure 2. While Hart Crowser gave full credit to its source of information used in the preparation of Fig. 5, it failed to include any reference to equally important information available in Riedel's Round 1 report that predicted the direction of flow to be in a northwest to southeast direction.

Based on this latest groundwater direction data, developed by Hart Crowser on behalf of Hill Investment Inc., it is GWA's conclusion that it is no longer appropriate to continue supporting Geotechnical Resources Inc. original and unsupported assumption that the Terminal Transfer Inc.

property was ever the source of petroleum hydrocarbon contamination found on either the Hill Investment property or any other property located westerly from the Terminal Transfer site. As a result, DEQ's early requirement that Terminal Transfer monitor groundwater off-site on properties owned by others westerly of the subject site appears to have been based on data that cannot be supported at this time. A continuation of off-site monitoring by TTI as originally demanded by DEQ therefore would appear to be no longer warranted.

OFF-SITE TREATMENT - NORTH MARINE DRIVE

A major portion of the DEQ approved mitigation plan implemented by GWA in mid-1990 included the massive excavation of more than 30,000 cu. yds. of sand over an area of approximately one acre in size. Of this total, approximately 15,000 cu. yds. was either found to be or suspected of being contaminated. This portion was stockpiled on an isolated portion of the TTI site and prepared for treatment.

The remaining 15,000 cu. yds. was sampled independently by both GWA and GRI and confirmed to be free of contamination following laboratory analysis of a substantial number of samples. Sand confirmed as being clean was stockpiled at a separate isolated site also located on the TTI property. It was used later to help fill the original mediation area. Photos 11 and 12 that follow show the depth and size of a portion of the one acre remediation area.

SCHN00172170

Photo 11 shows a trac-hoe with its bucket arm pointing directly toward the waste oil dump site located a short distance away from the northeast corner of the former truck maintenance shop located on the Hill Investment site. Photo 12 shows the soil washing method used to remove diesel from the exposed embankment directly east of the former diesel fuel tanks and waste oil tank which had not yet been removed from the Hill Investment site. The resulting, free product washed from the west embankment was later concentrated into a corner using an air blower followed by vacuum removal into a truck for DEQ approved, off-site disposal.

SCHN00172171

Photo 11 Mass excavation as used to remove 1 ft. thick layer of diesel contaminated sand along west boundary of TTI property. Waste oil dump behind shrubs to left of trac-hoe arm and bucket. MW B-3,5 in foreground.

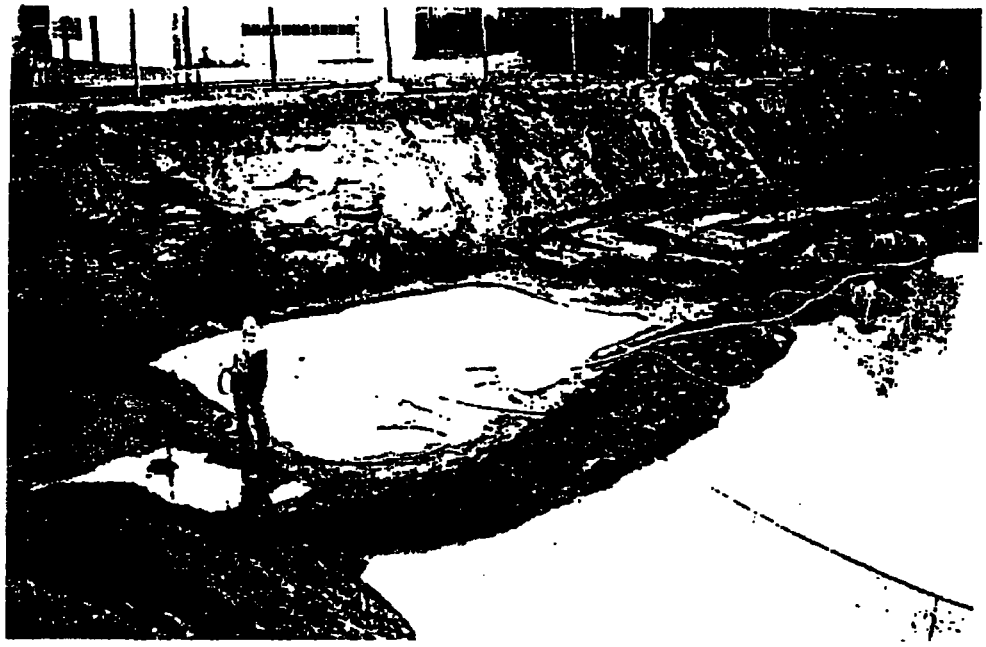


Photo 12 Method used to wash free product from surface of sand along west boundary of TTI property. Large orange hose leads from submersible pump used to depress level of groundwater while soil washing proceeds. Over-head door in background marks location of Hill Investment waste oil tank. Waste oil dump behind shrubs right of door.

Photos by George Ward

SCHN00172172

On Oct. 27, 1990 the on-site, microbiological treatment of the contaminated sand was started and continued until mid-January 1991. In late January, 1991, an addendum application was filed with DEQ authorizing the relocation of the entire 15,000 cu. yds. of partially treated sand from TTI's Yeon Ave. property to an off-site location on North Marine Drive also owned by Mr. Kathrens. The microbiological treatment process was then continued at the new location and was successfully completed by May of 1994.

On May 19, 1994 GWA informed DEQ that the off-site treatment of all 15,000 cu. yds. of contaminated sand removed from TTI's former N.W. Yeon Ave. property was now complete. Details of the treatment process, which include the results of 218 soil samples and the resulting laboratory analysis are included in a final, off-site treatment report completed by GWA and dated May 12, 1994.

The entire, off-site treatment report is attached as EXHIBIT A.

SOIL AND GROUNDWATER MONITORING

ROUND II

Prior to proceeding with Round II Groundwater Monitoring, GWA was instructed by DEQ to install a new series of groundwater monitoring wells. Of these, four of the new wells were required by DEI to be located off-site on property owned by the Burlington Northern Railroad.

As directed by council TTI, and thus GWA, were not able to comply with DEQ's instructions concerning the placing of monitoring well on property owned by others. Pendergrast and Associates, which by this time was being referred to as Yeon Street Partners (YSP), then directed GRI to install the required monitoring wells including those specified by DEQ to be located on BNRR property.

Because of the legal restraint placed on GWA, GRI proceeded to construct a total of 19 new groundwater monitoring wells. Of these, four were located off-site and 15 were located on the former TTI site. The locations of the new, DEQ required, monitoring wells are shown on Figure 2. It should be noted that these are all new well locations many of which were assigned the same numerical designation as wells previously constructed on TTI property by GRI in 1988. Caution is necessary when comparing the laboratory result of groundwater samples taken from wells with similar appearing numbers. None of the wells with matching numerical designations are in matching locations.

SCHN00172174

GRI's results of the ROUND II Groundwater Monitoring episode were submitted to DEQ Oct. 4, 1991. The following sections have been quoted from the above and made part of ROUND II of this Closure Report:

GRI's Acceptable levels of TPH Concentration:

"In general, based on the work outline above, the soil beneath the site meets the 500 mg/kg total petroleum hydrocarbon, diesel (TPH-D) cleanup standard established for the site by your department. (DEQ) However, TPH-D concentration above the standard established for the site were noted in soil samples from borings B-6, B-9, and B-15, along the western margin of the site. These elevated concentrations reflect the quality of the block of contaminated soil left in place along the western boundary of the property and beneath the Burlington Northern Railroad tracks. The soil east and west of this isolated block of contaminated soil shows no indications of petroleum contamination."

SCHN00172175

GRI's Acceptable Levels of Benzine Concentration

"In general, based on the work outlined above, the local groundwater quality does not appear to have been affected greatly by contaminants released from the Terminal Transfer site. Although total petroleum hydrocarbons (EPA 418.1), aromatic volatile organics (EPA 602), halogenated volatile organics (EPA 601), and polynuclear aromatic hydrocarbons (EPA 8310) were detected in the groundwater from some of the monitoring wells, the concentrations are relatively low and the spatial patterns of these contaminants do not coincide with any identified release of contaminants known to have originated on the Terminal Transfer property. Benzene, the groundwater contaminant of most immediate concern at sites which have been subjected to petroleum contamination, was detected in concentrations ranging from 0.9 to 390 $\mu g/l$ in monitoring wells installed in borings B-5, B-6, B-15, B-17, and B-18. These monitoring wells are surrounded by monitoring wells in which benzene was not detected, an indication that the source responsible for the contamination was of limited extent. The highest benzene concentration was noted in the monitoring well installed in boring B-17, located in the southern portion of the Burlington Northern property. This suggests that the

SCHN00172176

release of contaminants responsible for the elevated benzene levels in the groundwater may have occurred off site."

GRI's Findings Regarding Direction of Groundwater Movement

"Based on measurements of the static water levels in the monitoring wells, the direction of groundwater movement beneath the site is complex. The general trend appears to be from the northwest toward the southeast. The overall gradient is very low, on the order of 0.03 ft per 100 ft. This suggests that the potential for rapid, large-scale migration of contamination (either free product or contaminated groundwater) is low."

Note that GRI reversed its original opinion concerning this subject. GRI's findings now conclude that the direction of groundwater movement is from the northwest toward the southeast. The new direction now coincides with all 5 Hart Crowser reports included in attachment No. 1.

GRI's Conclusion

"Based on the generally good quality of the soil and groundwater, the limited potential for contaminant migration discussed above, and the

lack of users of the near-surface aquifer, we are of the opinion that no additional subsurface investigation is warranted."

Note in GRI's conclusion regarding Benzene that the highest concentration of Benzene was detected in monitoring well 17 located on BNRR property. The following site plan taken from the 4/91 Hart Crowser report has been modified to show the closeness between MW 17 and the suspected Hill Investment waste oil dump site also located on BNRR property but used by employees from the former truck maintenance shop noted on the site plan. (See Figure 3) GRI's monitoring well B-3, where diesel was first detected at the watertable by GRI in 1988, has also been superimposed on the Hart Crowser site plan to demonstrate that it too was down-gradient from the suspected waste oil dump.

Soil samples taken by GWA from the surface at the waste oil dumpsite and 20" below the surface on June 22, 1992 revealed TPH concentrations of 53,000 ppm and 9,400 ppm respectfully.

Copies of GRI's Table 1 through 3 showing the results of laboratory analysis of both soil and groundwater samples are included in Attachment No. 5. Also included in Attachment No. 5 is a copy of GRI's site plan showing contours of the local groundwater as measured Sept. 26, 1991.

SCHN00172178

SOIL AND GROUNDWATER MONITORING

ROUND III

GROUNDWATER SAMPLING

At the direction of Mr. Kathrens and on behalf of Terminal Transfer Inc. it was determined that Geotechnical Resources, Inc. would not conduct ROUND III soil and groundwater monitoring activities on TTI property. On May 11, 1992 Mr. Kathrens again assigned the task of continuing soil and groundwater monitoring activities on his behalf and in compliance with instructions from DEQ to George Ward & Associates.

Prior to proceeding with ROUND III field activities meetings were held with DEQ for the purpose of reviewing the results of GRI's ROUND II sampling. Based on the high quality of groundwater found in samples from 19 new monitoring wells included in GRI's, October 4, 1991 report it was mutually agreed between GWA and DEQ that the number of monitoring wells to be investigated in ROUND III could be reduced. Accordingly, the monitoring of wells B-11 through B-16 were not required by DEQ.

All wells sampled were 2 inches in diameter and each with a drilled depth of approximately 25 ft. The average depth to the static groundwater level was 12 ft. resulting in an average depth of water in all wells of approximately 13 ft. Therefore, the typical volume of water in each well

SCHN00172179

casings was approximately 2.36 gal. In order to assure purging of not less than three times the liquid volume of each well it was necessary to purge not less than 7.08 gal per well. A minimum of 8 gal. per well was thus established for purging purposes.

ROUND III groundwater samples were taken from the remaining wells June 22, 1922. All samples were then placed in an iced cooler using EPA protocol and delivered to the Oregon Analytical Laboratory for chemical analysis.

ANALYTICAL RESULTS

The laboratory results are summarized in Table 2 and Table 3. All chain of custody forms and the OAL results are included in Attachment No. 6. Results include hydrocarbon identification (HCID) by GC/FID and total petroleum hydrocarbons (TPH) in water by EPA 418.1.

Diesel was detected in wells B-6, B-8, B-9, and B-17. The locations of all 19 monitoring wells placed on TTI and BNRR property are shown in FIGURE 2.

The highest concentration of diesel detected in the groundwater was 640 ppm in well B-17. Note that prior to purging of B-17, a 1 5/8" thick film of oil was detected and removed from the surface of the static watertable in B-17. The film was detected by the use of a transparent bailing

SCHN00172180

tube lowered gently into the watertable. The thickness of the film was measured in the bailing tube and therefore may not represent the actual thickness of the film prior to disturbance caused by the bailing process.

Following the removal by bailing of all free product the well was properly purged and resampled using a clean bailing tube. The TPH concentration found in the well following purging was 640 ppm. The levels of TPH concentration found in the other wells where diesel was detected was 3.0 ppm, 3.0 ppm and 0.9 ppm which are all far below the level of concern. In well B-18 a very low level of what may have been weathered diesel was detected. However, the level was insufficient to positively identify according to the OAL lab report. In all the remaining wells sampled diesel was not detected.

OFF-SITE MONITORING

It is important to note the wells B-17 and B-18 are located on BNRR property and only a short distance from the waste oil dump site also located on BNRR property but reportedly used by employees from the former truck maintenance shop located on Hill Investment property. Wells B-6, B-8 and B-9 were drilled into the wedge of soil located below the UPRR spur and which was suspected of being contaminated. It's removal was not required by DEQ. Regardless of their location, the levels of TPH concentration in all suspect wells were all well below any level of concern.

SCHN00172181

SOIL SAMPLING

Two soil samples were taken from the former waste oil dump. The sample taken from the surface of the ground contained 53,000 ppm TPH and the sample obtained from a depth of 20" contained 9,400 ppm TPH.

The location of the former waste oil dump and well B-17 are shown on FIGURE 3. Note that both the waste oil dump and B-17 are located directly west and upgradiant from well B-3 on TTI property. This is where diesel contamination was first detected by GRI in late 1988. It is now known that the typical direction of groundwater movement in this location is from the area incompassing the waste oil dump and well B-17 directly toward TTI property and more specifically GRI's well, B-3.

By advice of council, deeper excavation into the waste oil dump site was forbidden because of exposure to liability claims from an off-site property owner.

SCHN00172182

TABLE 2

CHEMICAL ANALYSIS OF GROUNDWATER AND SOIL SAMPLES TAKEN BY GEORGE WARD & ASSOCIATES JUNE 22, 1992

SAMPLE DESIGNATION	DATE COLLECTED	BORING DESIGNATION	DEPTH BELOW SURFACE, FT	MATRIX	TPH-HCID (DIESEL)	TPH-HCID (GAS)	TPH, MG/KG	BENZENE MG/KG	TOLUENE MG/KG	XYLENES MG/KG	ETHYL-BENZENE, MG/KG	COMMENTS
05346	6/22/92	B-1	11	WATER	ND	ND	NA	NA	NA	NA	NA	
05347	6/22/92	B-2	11	WATER	ND	ND	NA	NA	NA	NA	NA	
05348	6/22/92	B-3	11	WATER	ND	ND	NA	NA	NA	NA	NA	
05349	6/22/92	B-4	11	WATER	ND	ND	NA	NA	NA	NA	NA	
05350	6/22/92	B-5	11	WATER	ND	ND	NA	NA	NA	NA	NA	
05351	6/22/92	B-6	11	WATER	DIESEL	ND	0.8	NA	NA	NA	NA	
NONE	—	B-7	—	—	—	—	—	—	—	—	—	NOT SAMPLED
05352	6/22/92	B-8	11	WATER	DIESEL	ND	3.0	NA	NA	NA	NA	
05353	6/22/92	B-9	11	WATER	DIESEL	ND	3.0	NA	NA	NA	NA	
05354	6/22/92	B-10	11	WATER	ND	ND	NA	—	—	—	—	
NONE	—	B-11	—	—	—	—	—	—	—	—	—	NOT SAMPLED
NONE	—	B-12	—	—	—	—	—	—	—	—	—	NOT SAMPLED
NONE	—	B-13	—	—	—	—	—	—	—	—	—	NOT SAMPLED
NONE	—	B-14	—	—	—	—	—	—	—	—	—	NOT SAMPLED
NONE	—	B-15	—	—	—	—	—	—	—	—	—	NOT SAMPLED
NONE	—	B-16	—	—	—	—	—	—	—	—	—	NOT DRILLED

HYDROCARBON IDENTIFICATION (HCID) BY GC/FID

TOTAL PETROLEUM HYDROCARBONS (TPH) IN WATER BY EPA 418.1

NA = NOT ANALYZED
ND = NOT DETECTED

TABLE CONTINUED ON NEXT PAGE

SCHN00172183

TABLE 2

CHEMICAL ANALYSIS OF GROUNDWATER AND SOIL SAMPLES TAKEN BY GEORGE WARD & ASSOCIATES JUNE 22, 1992

(CONTINUED)

SAMPLE DESIGNATION	DATE COLLECTED	BORING DESIGNATION	DEPTH BELOW SURFACE, FT	MATRIX	TPH-HCID (DIESEL)	TPH-HCID (GAS)	TPH, MG/KG	BENZENE MG/KG	TOLUENE MG/KG	XYLENES MG/KG	ETHYL-BENZENE, MG/KG	COMMENTS
05355	6/22/92	B-17	11	WATER	DIESEL	ND	640	NA	NA	NA	NA	SAMPLE TAKEN AFTER FLOATING OIL REMOVED AND WELL PURGED.
05356	6/22/92	B-18	11	WATER	ND *	ND	ND	NA	NA	NA	NA	VERY LOW LEVEL OF VERY WEATHERED DIESEL. INSUFFICIENT TO POSITIVELY IDENTIFY.
05357	6/22/92	B-19	11	WATER	ND	ND	ND	NA	NA	NA	NA	
05358	6/22/92	B-20	11	WATER	OIL	ND	0.9	NA	NA	NA	NA	
05359	6/22/92	B-17	11	OIL/ WATER	DIESEL	ND	NA	NA	NA	NA	NA	WEATHERED DIESEL REMOVED WHEN WELL PURGED. DEPTH OF FLOATING FILM = 1 5/8"
05360 & 05667	6/22/92	WASTE OIL DUMP BNRR PROP.	SURFACE	SOIL	OIL	ND	53,000	NA	NA	NA	NA	SOIL SAMPLE TAKEN FROM SURFACE OF WASTE OIL DUMP.
05361 & 05668	6/22/92	WASTE OIL DUMP BNRR PROP.	DEPTH = 20"	SOIL	OIL	ND	9,400	NA	NA	NA	NA	SOIL SAMPLE TAKEN FROM 20" BELOW SURFACE IN WASTE OIL DUMP

HYDROCARBON IDENTIFICATION (HCID) BY GC/FID

TOTAL PETROLEUM HYDROCARBONS (TPH) IN WATER BY EPA 418.1

NA = NOT ANALYZED
ND = NOT DETECTED

SCHN00172184

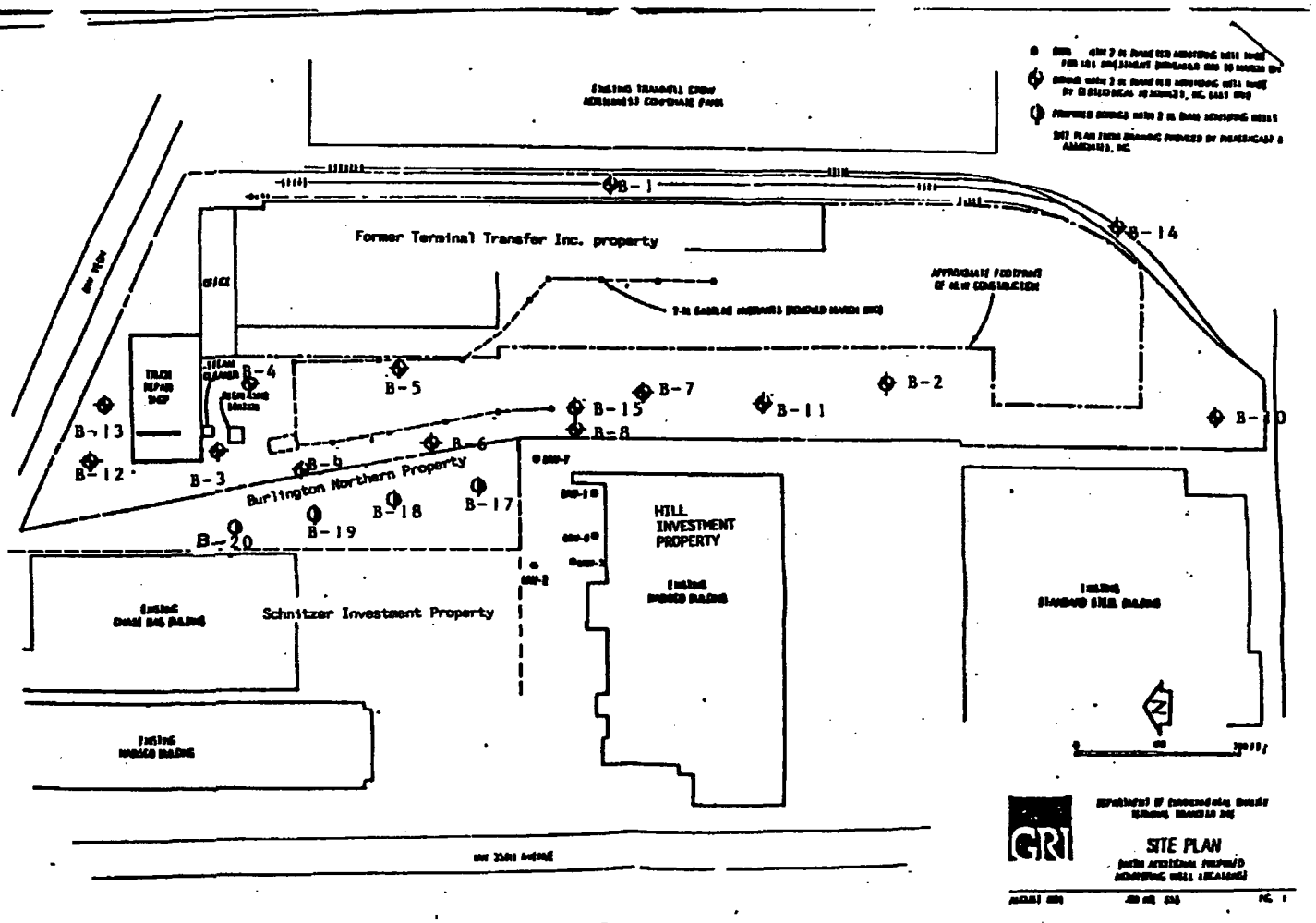


Figure 2

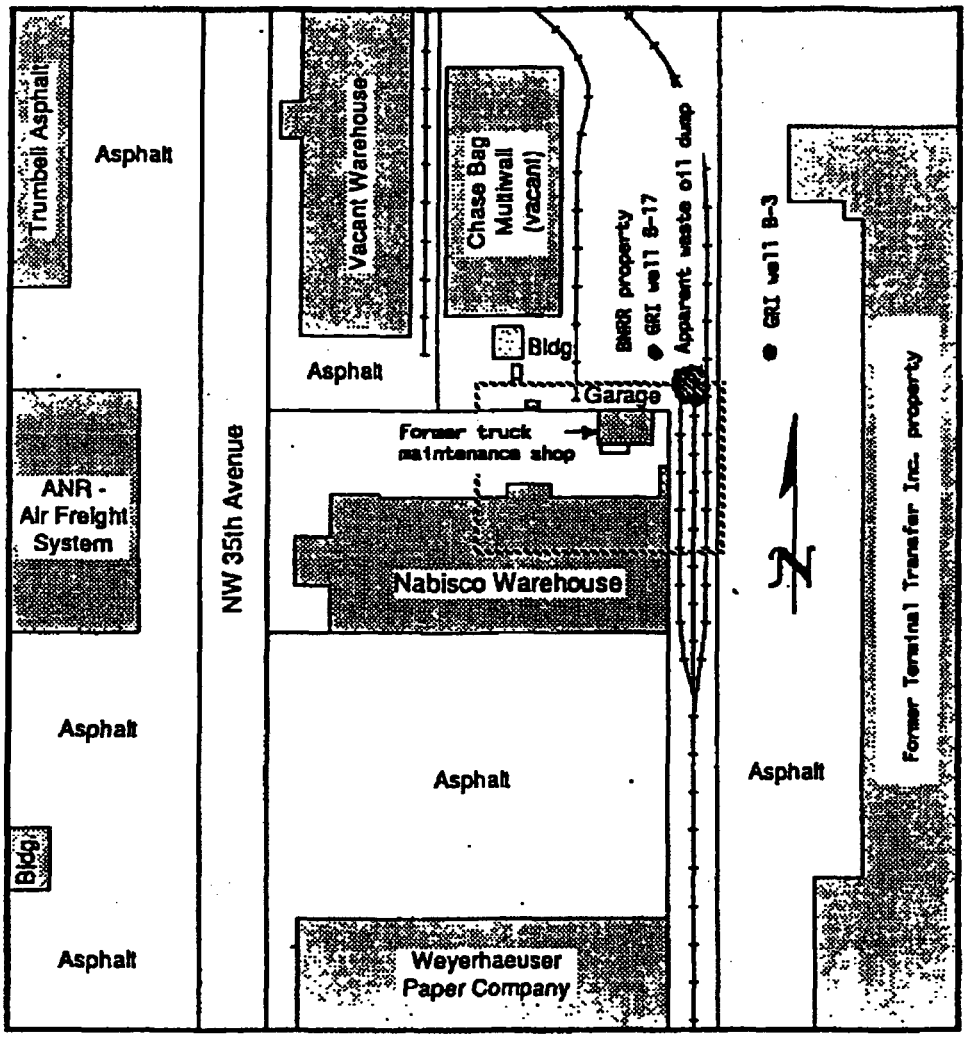
Note: B-16 Not Installed

Locations of monitoring wells determined by GRI & DEQ, August 19, 1991
Number of monitoring wells to be drilled on TTI Site = 15
Number of monitoring wells to be drlled on BNRR Site = 4

SCHN00172185

Site Vicinity Map

3322 NW 35th Avenue, Portland, Oregon



Note: Base Map prepared from visual reconnaissance of the vicinity by a Hart Crowser representative on April 9, 1991.

This 4/91 site plans has been modified to show the locations of monitoring wells B-3 & B-17 drilled by GRI, suspected waste oil dump and former truck maintenance shop on HILL INVESTMENT PROPERTY

0 200 400

Approx. Scale in Feet

Figure 3

HARTCROWSER

J-5115-02 4/91

SCHN00172186

GROUNDWATER FLOW DIRECTION AND GRADIENT

The elevation of each monitoring well as noted in GRI's Oct. 4, 1991 report was determined by a level survey tied to the finish floor elevation in the north wing of the former TTI building. Beginning August 7, 1992 periodic static water level measurements were made by GWA in each of the wells being monitored. The results are summarized in TABLE 7.

It was later found that GRI used the top of the cast iron monument covers as the basis for its groundwater elevation survey. It is GWA's opinion that the monument covers may not be sufficiently stable for use as an elevation references due to heavy truck traffic and soil subsidence. For this reason individual wellhead measurements were taken and their reference elevations then converted from the movement cover to the top of the actual well casing.

Static groundwater elevations recorded by GRI in four measurement episodes between 9/31/91 and 9/26/91 are also included in TABLE 7. Similar measurement recorded by GWA from 8/07/92 through 10/7/92 are included in the same table. Since different "top of well" measurement points were used by the two firms, corrections have been included in TABLE 7 that make all recorded elevations directly comparable.

The elevation of the static watertable in the area being monitored appears to be unusually stable. While small variations in elevations between well locations are apparant for any given time the differences are very small. The average groundwater elevation recorded during ROUND III was

SCHN00172187

approximately 0.6 ft. below the average elevation recorded by GRI during ROUND II. This difference does not appear to be unusual.

The average groundwater elevation during ROUND II was 24.508 ft. and during ROUND III it was 23.906. The average groundwater elevation for the entire period was 24.301 ft. This suggests that the potential for rapid migration of the watertable beneath the area under observation is extremely low.

CONCLUSION

Except for the high TPH concentrations found in surface soils near the former wast oil dump on BNRR property there were no TPH levels of concern found on TTI's former property. In general, based on findings from both ROUND I and ROUND II the entire TTI site appears to now be essentially free of petroleum hydrocarbon contamination at levels worthy of concern.

Because the gradient of the static watertable is very low, contamination, if any, remaining in the block of soil left in place along the western boundary of the property beneath the BNRR tracks no longer appears to pose a threat to properties located westerly of the subject site. In the event contamination may still exist along the west boundary, the eastward migration of the watertable would carry it onto the former TTI property at levels too low to be of concern.

SCHN00172188

It is recommended that DEQ direct the removal of petroleum contaminated soil found in the former waste oil dump by those found responsible for having placed it there. TTI is not responsible for removal of the former waste oil dump or should it be held responsible for its continued monitoring.

SCHN00172189

SOIL AND GROUNDWATER MONITORING

ROUND IV

During the fourth round of sampling only groundwater samples were collected and taken to the Oregon Analytical Laboratory for chemical analysis. EPA protocol was followed during the collection, recording, delivery and chemical analysis of all samples.

Field sampling occurred August 3 and August 7, 1992 at each of the monitoring wells summarized below. The analytical procedure used was (HCID) by GC/FID and BTEX by EPA 602/8020.

August 3, 1992	August 7, 1992
wells sampled	wells sampled
B-6	B-6
B-8	B-8
B-9	B-9
B-15	B-17
	B-18
	B-20

SCHN00172190

ANALYTICAL RESULTS

The laboratory results obtained from the Aug. 3, 1992 sampling revealed Benzene contaminations as follows:

Monitoring Well	Benzene (ppb)
B-6 (water)	210.0
B-8 (water)	7.0
B-15 (water)	6.0

Similar results for samples taken Aug. 7, 1992 are as follows:

	Benzene (ppb)
B-6 (water)	230.0
B-8 (water)	4.0
B-17 (water)	14.0

Monitoring wells not included in the above summary yielded results below the detection limit (ND) or were not included in the final round of sampling.

The lab results for all wells sampled Aug. 3 and Aug. 7, 1992 are summarized in TABLES 3, 4, 5, and 6. All chain of custody forms and the OAL chemical analysis results may be found in Attachment No. 7.

SCHN00172191

TABLE 3

CHEMICAL ANALYSIS OF GROUNDWATER AND SOIL SAMPLES TAKEN BY GEORGE WARD & ASSOCIATES AUGUST 3, 1992

SAMPLE DESIGNATION	DATE COLLECTED	BORING DESIGNATION	DEPTH BELOW SURFACE, FT	MATRIX	TPH-HCID (DIESEL)	TPH-HCID (GAS)	TPH, MG/KG	BENZENE PPB	TOLUENE PPB	XYLENES PPB	ETHYL-BENZENE, PPB	COMMENTS
06289	8/03/92	B-6	11	WATER	NA	NA	NA	210.	2.	7.	ND	
06290	8/03/92	B-8	11	WATER	NA	NA	NA	7.	ND	ND	ND	
06291	8/03/92	B-9	11	WATER	NA	NA	NA	ND	ND	ND	ND	
06292	8/03/92	B-15	11	WATER	DIESEL	ND	NA	6.	ND	ND	ND	

AROMATIC VOLATILE ORGANICS IN WATER BY EPA METHOD 502/8020

HYDROCARBON IDENTIFICATION (HCID) BY GC/FID

NA = NOT ANALYZED
ND = NOT DETECTED

SCHN00172192

TABLE 4

CHEMICAL ANALYSIS OF GROUNDWATER SAMPLES TAKEN BY GEORGE WARD & ASSOCIATES AUGUST 3, 1992

MATRIX	WATER	MATRIX BLANK		DETECTION LIMIT
SAMPLE ID: DK-TT-YSP	B-15			
OAL ID: 25-I583-	06292	MB0813B		
UNITS:	ppm	ppm		ppm
Naphthalene	0.3	ND		0.1
Acenaphthylene	0.1	ND		0.1
Acenaphthene	0.3	ND		0.1
Fluorene	0.6	ND		0.1
Phenanthrene	0.5	ND		0.1
Anthracene	0.2	ND		0.1
Fluoranthene	0.4	ND		0.1
Pyrene	0.7	ND		0.1
Benzo(a)anthracene	0.2	ND		0.1
Chrysene	0.2	ND		0.1
Benzo(b)fluoranthene	0.2	ND		0.1
Benzo(k)fluoranthene	0.2	ND		0.1
Benzo(a)pyrene	0.3	ND		0.1
Indeno(1,2,3-cd)pyrene	0.3	ND		0.1
Dibenz(a,h)anthracene	ND	ND		0.1
Benzo(g,h,i)perylene	0.3	ND		0.1
BASE/NEUTRAL SURROGATES:				
1,2-Dichlorobenzene-d4	89.%	90.%		
Nitrobenzene-d5	88.%	90.%		
2-Fluorobiphenyl	90.%	99.%		

EPA METHOD 8310 POLYNUCLEAR AROMATIC HYDROCARBONS
BY MODIFIED EPA METHOD 8270

NA = NOT ANALYZED
ND = NOT DETECTED

SCHN00172193

CHEMICAL ANALYSIS OF GROUNDWATER AND SOIL SAMPLES TAKEN BY GEORGE WARD & ASSOCIATES AUGUST 7, 1992

SAMPLE DESIGNATION	DATE COLLECTED	BORING DESIGNATION	DEPTH BELOW SURFACE, FT	MATRIX	TPH-HCID (DIESEL)	TPH-HCID (GAS)	TPH, MG/KG	BENZENE PPB	TOLUENE PPB	XYLENES PPB	ETHYL-BENZENE, PPB	COMMENTS
06293	8/07/92	B-6	11	WATER	DIESEL	ND	NA	230.	2.	6.	ND	
06294	8/07/92	B-8	11	WATER	DIESEL	ND	NA	4.	ND	ND	ND	
06295	8/07/92	B-9	11	WATER	DIESEL	ND	NA	ND	ND	ND	ND	
06296	8/07/92	B-17	11	WATER	DIESEL	ND	NA	14.	ND	ND	ND	3/8" Oil Film
06297	8/07/92	B-18	11	WATER	ND	ND	NA	ND	ND	ND	ND	
06298	8/07/92	B-20	11	WATER	ND	ND	NA	ND	ND	ND	ND	

HYDROCARBON IDENTIFICATION (HCID) BY GC/FID

BTEX BY EPA METHOD 602/8020

NA = NOT ANALYZED
ND = NOT DETECTED

TABLE 5

SCHN00172194

TABLE 6

CHEMICAL ANALYSIS OF GROUNDWATER SAMPLES TAKEN BY GEORGE WARD & ASSOCIATES AUGUST 7, 1992

MATRIX	WATER	WATER	WATER	WATER	WATER	WATER	DETECTION LIMIT
SAMPLE ID: DK-TT-YSP	B-6	B-8	B-9	B-17	B-18	B-20	—
DAL ID: 25-I583-	06293	06294	06295	06296	06297	06298	—
UNITS:	PPB	PPB	PPB	PPB	PPB	PPB	PPB
Naphthalene	0.2	0.6	0.6	0.6	0.2	ND	0.1
Acenaphthylene	ND	ND	0.2	0.4	ND	ND	0.1
Acenaphthene	0.6	0.5	1.1	4.5	0.1	ND	0.1
Fluorene	1.4	1.3	3.4	16.	ND	ND	0.1
Phenanthrene	1.8	1.2	4.1	35.	0.2	0.1	0.1
Anthracene	ND	0.2	0.3	1.4	ND	ND	0.1
Fluoranthene	0.1	0.1	0.6	2.3	0.3	0.2	0.1
Pyrene	0.2	0.3	1.1	5.2	0.5	0.3	0.1
Benzo(a)anthracene	ND	ND	0.3	1.0	0.2	0.1	0.1
Chrysene	ND	ND	0.3	1.4	0.2	0.1	0.1
Benzo(b)fluoranthene	ND	ND	0.2	0.7	0.1	ND	0.1
Benzo(k)fluoranthene	ND	ND	0.2	0.5	0.1	ND	0.1
Benzo(a)pyrene	ND	ND	0.3	1.0	0.2	0.1	0.1
Indeno(1,2,3-cd) pyrene	ND	ND	0.2	0.7	0.1	ND	0.1
Dibenz(a,h)anthracene	ND	ND	ND	0.1	ND	ND	0.1
Benzo(g,h,i)perylene	ND	ND	0.3	0.7	0.2	0.1	0.1
BASE/NEUTRAL SURROGATES:							
1,2-Dichlorobenzene-d4	31%	89%	86%	90%	80%	80%	—
Nitrobenzene-d5	28%	91%	85%	94%	80%	79%	—
2-Fluorobiphenyl	36%	89%	81%	74%	87%	88%	—

EPA METHOD 8310. POLYNUCLEAR AROMATIC HYDROCARBONS
BY MODIFIED EPA METHOD 8270

NA = NOT ANALYZED
ND = NOT DETECTED

The monitoring well that showed the highest concentration of Benzene in the final round of this soil and groundwater investigation is B-6. Figure 2 shows that well B-6 is close to and somewhat down gradient from the waste oil dump and B-17 both of which are located on BNRR property. Benzene levels in well B-6 were recorded at 210ppb and 230ppb following the Aug. 3 and Aug. 7, 1992 sampling.

In ROUND II, GRI reported that the highest concentration of Benzene it found was 390ppb in well B-17. FIGURE 2 shows the close relationship between B-6 and B-17. GRI's ROUND II report also notes that these wells are both surrounded by monitoring wells in which Benzene was not detected. Also as noted by GRI, this is an indication that the source responsible for the Benzene contamination was of limited extent.

There is now overwhelming evidence confirming that the source of Benzene contamination found on TTI property was located off-site and in a westerly direction from the subject site.

STATIC GROUNDWATER ELEVATIONS

Between ROUND II and ROUND IV, the elevations of the static watertable on the TTI site have been measured seven different times. Four of the measurements were conducted by GRI starting 7/31/91. The three remaining measurement episodes were conducted by GWA ending 10/7/92. The combined results of all seven measuring efforts are summarized in TABLE 7.

SCHN00172196

Following the above, Hart Crowser conducted five additional groundwater elevation measuring episodes with the most recent ending 9/2/93. Diagrams showing the direction of groundwater movement found by Hart Crowser may be found in attachment No. 1.

CONCLUSION

Information contained in TABLE 7 supports GRI's conclusion that the direction of groundwater movement beneath the TTI site and the property located west of it is complex. Slight inconsistencies in groundwater elevations between individual wells summarized in TABLE 7 verify this. Complicating the issue is the extremely low gradient throughout the area making it difficult to predict the direction of groundwater movement with absolute accuracy.

Because the overall gradient is very low the potential for rapid, large-scale migration of any remaining free product in the block of soil beneath the nearby railroad is low. The level of contamination in soil and groundwater on either side of the block of soil below the railroad is now also very low. The only exception to this is the apparent concentration of Benzene in the vicinity of the former waste oil dump and monitoring well B-17 located on BNRR property.

Since the subject site is located down-gradient from the most probably source of contamination, TTI should no longer be responsible for either monitoring of or mitigation of contamination issues located upgradient from its former property. Therefore it is this firm's conclusion that all TTI obligations contained in the June 3, 1991 DEQ, TTI, YSP Agreement have now been fulfilled. A continuation of the subsurface investigation of the subject site is no longer warranted.

WATER LEVEL MEASUREMENTS

WELL DESIGNATION	MONUMENT ELEVATION, FT.	STATIC WATER LEVEL ELEVATION, FT. BY GEOTECHNICAL RESOURCES, INC. FROM ROUND ONE REPORT 10/2/91				STATIC WATER LEVEL ELEVATIONS, FEET. BY GEORGE HARD & ASSOCIATES AUGUST THRU OCTOBER 1992			15 MONTH AVERAGE ELEVATION EACH WELL
		7/31/91	8/15/91	8/22/91	9/26/91	8/07/92	9/07/92	10/7/92	
B-1	36.3	24.7	24.50	24.49	24.30	NA	NA	23.78	24.354
B-2	35.5	24.4	24.33	24.33	24.33	NA	NA	23.77	24.233
B-3	37.0	24.8	24.63	24.56	24.42	NA	23.85	23.83	24.348
B-4	37.1	24.6	24.54	24.52	24.48	NA	23.80	NA	24.388
B-5	35.7	24.7	24.45	24.37	24.20	NA	23.71	23.71	24.190
B-6	34.8	24.7	24.51	24.49	24.43	24.19	23.78	23.78	24.269
B-7	35.7	24.7	24.37	24.37	24.24	NA	NA	NA	24.420
B-8	35.6	24.9	24.35	24.39	24.35	24.08	23.71	23.70	24.211
B-9	35.4	24.7	24.57	24.48	24.35	24.17	23.74	23.73	24.248
B-10	35.5	24.6	24.21	24.29	24.33	NA	NA	23.74	24.234
B-11	35.9	24.9	24.40	24.40	24.40	NA	NA	NA	24.525
B-12	37.2	24.9	24.74	24.58	24.37	NA	NA	23.94	24.506
B-13	37.2	25.0	24.66	24.62	24.49	NA	NA	NA	24.692
B-14	36.5	24.6	24.38	24.29	24.25	NA	NA	NA	24.380
B-15	35.6	24.8	24.39	24.37	24.35	NA	NA	23.77	24.336
B-16	—	—	—	—	—	—	—	—	—
B-17	35.4	N/A	N/A	N/A	24.32	24.07	23.74	23.73	23.965
B-18	34.4	N/A	N/A	N/A	24.19	23.69	23.68	23.75	23.828
B-19	35.0	N/A	N/A	N/A	24.34	24.59	23.80	NA	24.243
B-20	34.0	N/A	N/A	N/A	24.38	24.37	23.92	23.90	24.142
MW-1	33.4	N/A	N/A	N/A	24.57	NA	NA	NA	24.57
MW-2	34.5	N/A	N/A	N/A	24.50	NA	NA	NA	24.50
MW-6	33.0	N/A	N/A	N/A	24.25	NA	NA	NA	24.25
MW-7	34.1	N/A	N/A	N/A	24.23	N/A	N/A	N/A	24.23
AVERAGE PERIODIC ELEVATIONS		24.773	24.469	24.437	24.351	24.166	23.773	23.779	24.301 *

Wells designated "B" installed by Geotechnical Resources, Inc.
Wells designated "MW" installed by Hart-Crowser, Inc.
N/A = not available

TABL

* Average of all 15 month
Averages of 23 monitoring wells
from 7/31/91 to 10/7/92

SCHN00172198

SOIL AND GROUNDWATER MONITORING

ROUND V

The following information is a brief summary of groundwater elevation studies conducted on the Hill Investment site by Hart Crowser, Inc. for Mr. Ray Agostino. Although none of Hart Crowser's groundwater elevation measurements were taken from monitoring wells located on the former TTI property, the results obtained from wells located directly west of the former TTI site provide important and valuable information applicable to the direction of movement of the groundwater system beneath both sites.

Hart Crowser's investigation on behalf of Mr. Agostina started in November of 1990. Field measurements of the watertable were conducted on a quarterly basis until March, 1993. Groundwater monitoring is now being conducted on a semi-annual basis during the months of February and August, corresponding to the high and low water table conditions.

Five groundwater directional diagrams prepared by Hart Crowser were obtained from DEQ files. They may be found in Attachment No. 1 of this report. The only conclusion that can be reached by reviewing Hart Crowser's five diagrams is that the direction of movement of the groundwater system along Hill Investments east property line is toward the east or slightly toward the southeast which is directly toward the former TTI property's west boundary. The BNRR owns

SCHN00172199

a right-of-way that separates the two parcels. The distance between hill Investments east boundary and TTI's former west boundary is approximately 50 ft.

The following is quoted from a DEQ memo dated March 4, 1991.

> "Diesel contamination was discovered at the former Nabisco Warehouse, located at 3322 NW 35th in Portland, Oregon, on November 17, 1989. The contamination was due to a release from a regulated diesel fuel tank. Cleanup by removal was started at the site. However, due to site constraints, removal was finished without removing all of the contaminated soil. While significant groundwater impacts do no appear to have occurred, the concentrations of contamination remaining require additional investigation. Additional cleanup will likely be required on a portion of the property."

The memo was from Andree Pollock to Rick Silverman and Darby Bacon.

Dimensions included on FIGURE 1 show that the horizontal distance between the point of release on the Hill Investment site to the western property line of the former TTI site is approximately 100 ft. As indicated on all five Hart Crowser diagrams, the direction of groundwater movement at the point of release as it applies to Mr. Kathren's former property is slightly south of due east.

SCHN00172200

FIGURE 1 also shows that the 50 ft by 50 ft exploration pit excavated by GWA in late 1990 to two feet below the watertable is directly downgradient from the Hill Investment point of release noted in DEQ's March 4, 1991 memo. Nearly all of the free product removed from the exposed surface of the watertable was recovered from the bottom of the recovery pit. FIGURE 4 taken from GWA's Feb. 11, 1991. Corrective Action Plan shows how the GWA, 50 ft. x 50 ft. exploration pit was constructed in August of 1990. Note that the bottom of the pit was excavated to 2 ft. below the surrounding elevation of the static watertable.

Free product floating on the exposed surface of the watertable was initially recovered by the use of oil adsorbing pads designed and manufactured specifically for this purpose. All contaminated pads including a considerable quantity of oil absorbed in them were sealed in 55 gal. steel drums and disposed of by Spencer Environmental Services.

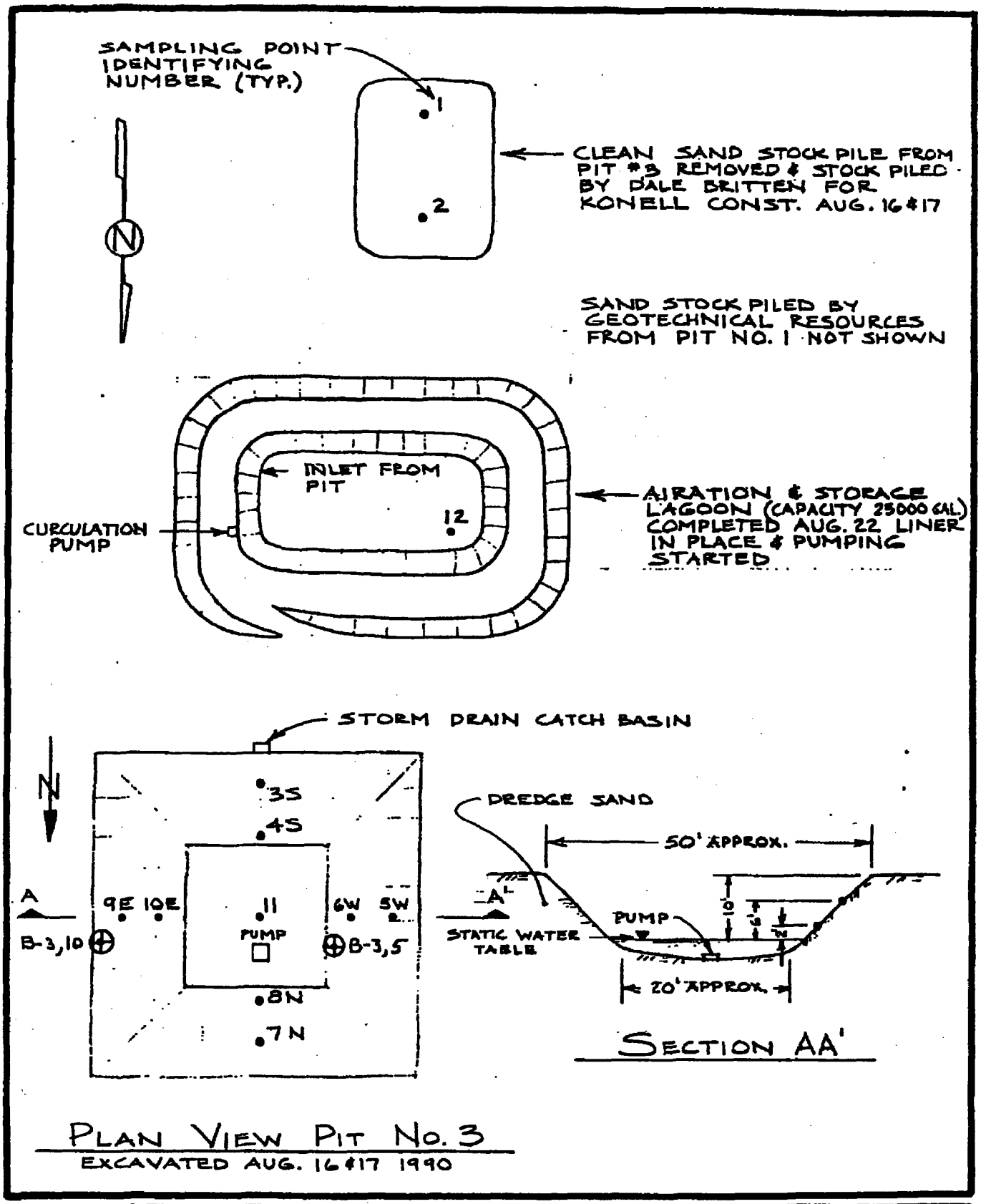
A submersible pump was used to depress the elevation of the water within the pit to approximately 2 ft. below the elevation of the static watertable in the surrounding sandy formation. This was done periodically followed by a recovery period during which additional free product was drawn into the pit. This process was repeated numerous times until it became apparent that improvements in the free product recovery systems were warranted.

The method used to improve the efficiency of free product recovery included the construction of an impervious, membrane lined lagoon on the asphalt pavement immediately south of the 50 ft. x 50 ft. exploration pit. Construction of the 40 ft. x 60 ft. x 3 1/2 ft deep lagoon was

achieved by placing the membrane liner inside a perimeter dike constructed from compacted sand.

The photos that follow show the sequence of events used to recover a diesel-like, free product from the static groundwater system surrounding the original, 50 ft x 50 ft exploration pit. GWA's Feb. 11, 1991 Corrective Action Plan notes that approximately 250 gallons of oil and water emulsion were recovered using the process shown by the photos.

SCHN00172202



NORTHWEST TESTING LABORATORIES, INC. PORTLAND, OREGON	SCALE: NONE DATE: 9-11-90 DRAWN BY: R.F. JOB NO:	GEORGE D. WARD & ASSOC.	SHEET 1 OF 1

SCHN00172203

PHOTO 7: View looking southeast over the 50 ft x 50 ft pit with 60 ft diameter, membrane lined decanting lagoon in background. Red hose leading up pit sidewall delivers contaminated groundwater from submersible pump in bottom of pit.

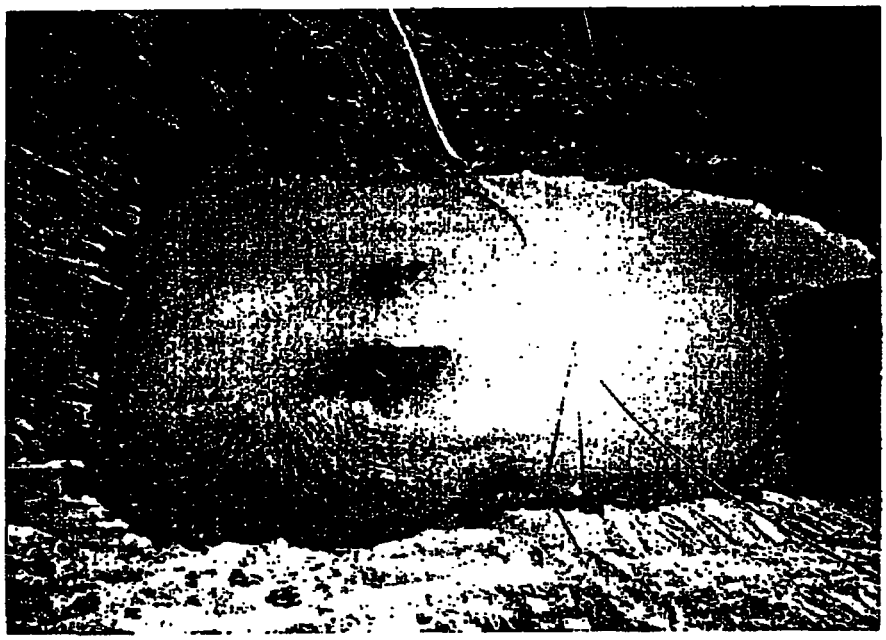


PHOTO 8: View looking into recovery pit after draw-down cycle and after recovery cycle when water elevation in pit has returned to normal. Note free product extracted from the surrounding sand formation after just one draw-down episode.

SCHN00172204

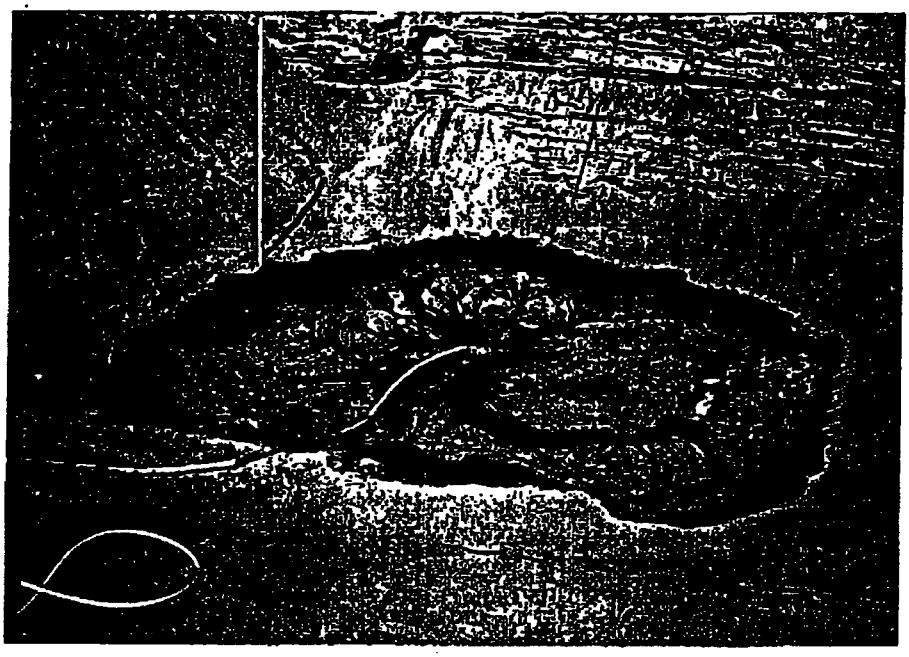


PHOTO 9: View looking into bottom of recover pit immediately after all water has been pumped from the pit into the decanting lagoon. Yellow appearance on pit bottom is thought to be the residues from an oil and water emulsion when first exposed to the atmosphere in the presence of sunlight.

PHOTO 10 Surface of water at western perimeter of wetted surface in recovery pit immediately following water levels return to normal elevation equal to elevation of surrounding static watertable. Note free product seeping into pit in a direction that is directly east of DEQ recorded release on Hill Investment property.

PHOTO 11: View looking west across 60 ft diameter decanting lagoon and 10 ft diameter decanting tank. Hill Investment property in background. Blue building is Hill Investments former truck maintenance shop. DEQ recorded free product release on left side of shop. Waste oil dump on right side of shop near small trees.

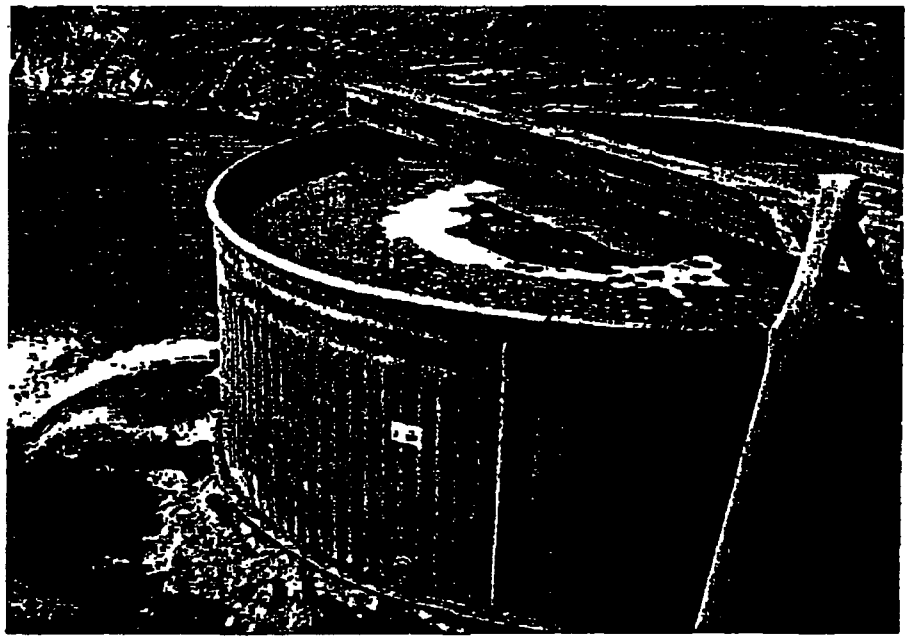


PHOTO 12: View of 10 ft diameter primary decanting tank in foreground and secondary decanting lagoon on left. Note water being released into lagoon from primary decanting tank. Vacuum skimmer used to remove free product which was sealed in 55 gal. steel drums and disposed by Spencer Environmental Services.

GROUNDWATER FLOW DIRECTION AND GRADIENT

In addition to the five Hart Crowser, groundwater directional diagrams included in Attachment No. 1, the same firm also concluded that the elevation of the surrounding watertable varied slightly between quarterly monitoring episodes but that it still maintained the same relative contour. The following is quoted from Hart Crowser's March 11, 1993 report to the Hill Investment Co.

> "Water levels measured during this quarter's sampling event were 0.40 to 0.46 inches lower in elevation than those measured during the previous quarter. Therefore, the water table was lower than it was previously, but still had the same relative contour. Specifically, the surface of the water table appears to form a low ridge which trends in a southerly direction acorss the eastern two thirds of the site. The resultant groundwater flow directions are to the southwest across the western side of the site, and to the east or southeast across the eastern side of the site (Figure 3). The flow gradient is estimated from the recent quarterly data to be about 0.02 ft/ft."

In general, the same description of groundwater movement along Hill Investment's east property line was included in each of Hart Crowser's reports to Hill Investment. Copies of Hart Crowser's reports containing the above information were also sent to DEQ.

SCHN00172207

SOIL WITH PETROLEUM HYDROCARBONS EAST OF GARAGE

The above title was taken from Hart Crowser's March 11, 1993 report to the Hill Investment Co. The garage it refers to is the former truck maintenance facility shown in FIGURE 3. The following is quoted from the same report.

> "Soil east of the garage was sampled from the waste oil tank excavation (Pit 2), boring B-8, and the re-excavation of Pit 2. Petroleum hydrocarbons from the excavation (Pit 2) were detected on the bottom and in the NW corner by EPA Method 418.1 and on the east side by Oregon Method TPH-D. The maximum observed TPH concentration was 45,100 ppm from boring B-8 at a depth of 9.5 feet. A soil sample obtained at 15-16.5 feet bgs during the drilling of monitoring well, MW-7, about 45 feet east of the garage, indicated 32 ppm TPH using EPA method 418.1."

In a July 18, 1991 Corrective Action Plan Review by DEQ concerning the Hill Investment site it was acknowledged that significant concentrations of diesel remained in the soil in the vicinity of the former wast oil tank located east of the former truck maintenance shop and next to the truck scales located immediately south of the same structure. DEQ reported a concentration of 33,000 ppm total petroelum hydrocarbon in the soils remaining in the tank removal excavations. However, DEQ also implied that the contamination appeard to be limited in extent.

As noted in FIGURE 1, each of the above points of high TPH concentrations are located immediately upgradient from the 50 ft X 50 ft exploration pit excavated by GWA in August 1990. The former waste oil dump with a TPH concentration in soil of 53,000 ppm is also located in the same general upgradient area.

CONCLUSION

Based on information provided to DEQ by the Hill Investment Company's consultant the direction of groundwater movement from the areas known to have had high concentrations of diesel contamination on the Hill Investment site is consistantly in an easterly direction directly toward the former Terminal Transfer Inc. property. This conclusion is supported by the appearance of a diesel-like, oily substance observed by GWA seeping into the 50 ft X 50 ft free product recovery pit along its west perimeter in late August, 1990. See photo No. 10.

Nothing in any of the Hart Crowser reports was found that supports GRI's original assumption that diesel contaminated groundwater, reportedly originating on the former TTI site, might be migrating in a westerly direction or that diesel contamination found on the Hill Investment site came from the former TTI property.

SCHN00172209

SOIL AND GROUNDWATER MONITORING

ROUND VI

In early October, 1992 DEQ determined that additional groundwater samples were required to be collected and analyzed from monitoring wells constructed previously in locations mutually agreed upon by DEQ and GRI. Locations of wells to be sampled in what is now referred to as ROUND VI were located on the former TTI property and on BNRR property.

As noted previously GWA, as directed by TTI's council, was prohibited from doing any form of construction work on off-site properties due to the lack of written authorization from off-site property owners. Construction activities prohibited included the drilling of monitoring wells and the excavation of deep exploration pits.

Since GRI was no longer authorized by TTI to conduct sampling activities on either site GWA was instructed by DEQ and authorized by TTI to both measure and take groundwater samples from the following, existing wells.

SCHN00172210

Wells specified by DEQ	Property Ownership	Date Sampled	Field Observations
B-1	TTI	10/7/92	Sample clear and clean looking
B-2	TTI	10/6/92	
B-3	TTI	10/7/92	First dip clear and clean
B-5	TTI	10/6/92	
B-6	TTI	10/6/92	
B-8	TTI	10/6/92	
B-9	TTI	10/6/92	
B-10	TTI	10/6/92	Sample clear and clean looking
B-12	TTI	10/7/92	
B-15	TTI	10/6/92	
B-17	BNRR	10/7/92	First dip-very little oil-almost a sheen
B-18	BNRR	10/7/92	Slight oil sheen in sample jar
B-20	BNRR	10/7/92	First dip silty but clean looking

NOTE: Four sample jars filled from each well sampled. Lab could then test for PAH or BTEX if HCID was positive.

Groundwater elevations were also measured at the same time as samples were taken. Elevation measurement results are summarized in TABLE 7.

SCHN00172211

TABLE 8
CHEMICAL ANALYSIS OF GROUNDWATER SAMPLES TAKEN BY GEORGE WARD & ASSOCIATES OCT. 6 & 7, 1992

Sample Designation	Date Collected	Time Collected	Depth Below Surface (Feet)	Boring Designation	Matrix	TPH-HCID Diesel Lab Notes		TPH	PAH
07203	10/7/92	1055	13.6	B-1	water	ND	—	NA	NA
07197	10/6/92	1340	12.4	B-2	water	ND	—	NA	NA
07204	10/7/92	1035	13.96	B-3	water	ND	—	NA	NA
07202	10/6/92	1455	13.14	B-5	water	ND	—	NA	NA
07200	10/6/92	1430	13.11	B-6	water	diesel	trace	NA	Following pages
07199	10/6/92	1415	13.23	B-8	water	diesel	trace	NA	Following pages
07201	10/6/92	1510	12.46	B-9	water	ND	—	NA	NA
07196	10/6/92	1310	12.37	B-10	water	ND	—	NA	NA
07205	10/7/92	1015	13.87	B-12	water	ND	—	NA	NA
07198	10/6/92	1410	12.3	B-15	water	diesel	trace	NA	Following pages
07208	10/7/92	0830	12.46	B-17	water	diesel	—	NA	Following pages
07207	10/7/92	0850	11.48	B-18	water	ND	NA	NA	NA
07206	10/7/92	0955	11.03	B-20	water	ND	NA	NA	NA

HYDROCARBON IDENTIFICATION (HCID) BY GC/FID
TOTAL PETROLEUM HYDROCARBONS (TPH) IN WATER BY EPA 418.1
NA = NOT ANALYZED
ND = NOT DETECTED

SCHN00172212

DEPT OF ENVIRONMENTAL QUALITY
EIVED

JUL 14 1995

NORTHWEST REGION

State of Oregon
Department of Environmental Quality

Memorandum

Date: July 13, 1995

To: Sheila Monroe
Northwest Region UST Cleanup Program

From: Michael A. Fernandez, Sr. Policy Analyst
Site Response and Technical Services Section

Subject: Terminal Transfer, Inc. (TTI) File Transfer

This site experienced releases of gasoline and diesel. It was originally transferred to the UST Cleanup Section in 1190 due to the presence of low levels of chlorinated solvents in groundwater samples. During the most recent groundwater monitoring event which occurred in July 1991, trichloroethylene (TCE) was detected in two wells at concentrations below the EPA drinking water standard of 5 ppb. Tetrachloroethylene was detected in one well at 6 ppb, 1 ppb in excess of the EPA drinking water standard. Benzene was detected in five wells at a maximum concentration of 390 ppb. Ethylbenzene, toluene, and xylenes were detected in several wells but at concentrations well below DEQ cleanup standards. Several PAHs were also detected in wells at concentrations slightly above DEQ cleanup standards. I've attached a copy of the data for your reference. I'll send the entire file to you next week.

In early 1990 approximately 12,000 cu.yds. of PCS were excavated in an effort to remove the source. The soils were subsequently transported off-site for treatment. The PCS treatment project was not properly managed resulting in a February 1995 NON. The RP was granted an extension due to a medical condition but has not yet submitted a written response. I prepared a draft follow-up NON with a shorter schedule for document submittal. I had intended to send this to the RP but you could refer the site to Enforcement Section for follow-up rather than issuing a second NON.

In addition to the PCS violations the RP has not complied with the conditions of the June 3, 1990 Remediation Agreement which was prepared as a means of allowing the property to be sold and creating a mechanism to pay for site cleanup. The agreement released the purchaser of the TTI property from liability for the tank releases at the site which occurred prior to the signing of the agreement and established an escrow account to fund cleanup at the site. You may want to consider enforcing the terms of this agreement. Kurt Burkholder participated in the writing of the agreement and would be a good resource should you decide to enforce its terms.

The RP has yet to pay cost recovery charges despite the fact that the escrow account may be tapped for this and other activities related to cleanup and monitoring at the site. Norm King is the contact in Waste Management and Cleanup Division for invoice status. You can reach Norm at 229-6941. I've recommended to Norm that we refer the site to DOJ for collection. Norm will contact Burkholder to discuss our potential courses of action.

Please call me at 229-6793 if you have any questions.

CAREY & MARKS
ATTORNEYS AT LAW

GORDON T. CAREY JR., P.C.
STEVEN G. MARKS, P.C.*

*ALSO LICENSED IN ALASKA

520 S.W. YAMHILL
414 PACIFIC BUILDING
PORTLAND, OR 97204-1383

TELEPHONE: 503-222-1415
FACSIMILE: 503-222-1923

December 14, 1995

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
DEC 18 1995
NORTHWEST REGION

Ms. Sheila Monroe
State of Oregon
Department of Environmental Quality
2020 S.W. Fourth Avenue, Suite 400
Portland, Oregon 97201-4987

Re: Terminal Transfer
Your File No. 26-89-013

Dear Sheila:

Please accept this letter as supplemental information which responds to several of this issues raised in your correspondence to Mr. Kathrens dated October 16, 1995, and which we trust you will consider in limiting the number of issues which remain outstanding to closure of the Terminal Transfer site.

TESTING OF MARINE DRIVE SITE

You have requested a sampling plan for the soil treatment area at Marine Drive. On behalf of Terminal Transfer, Soil Tech, Inc. submitted a sampling plan for the Marine Drive site in 1993. For your ease of reference, I am including the two pages of materials which set forth the sampling plan submitted by Soil Tech (sampling points for the east and west treatment areas are marked in yellow on the attachments).

TESTING TREATED SOILS REMOVED FROM THE SITE

Mr. Kathrens is still attempting to gather all the information which is responsive to your inquiries regarding the quantity and use of soil disposed at various locations after the removal of the soil from the Marine Drive treatment site. I hope to be able to provide you with all that information in the very near future.

In the interim, prior to confirmatory testing, we need agreement that Level 2 cleanup standards may be applied to this project, subject to appropriate placement of treated soils. I am enclosing the following materials in support of the argument that the Level 2 standard was utilized throughout this project and should continue to be applicable:

1. Memorandum authored by Bill Titus (GRI) from meeting

held with Michael Fernandez and George Ward on January 14, 1991;

2. Letter to Michael Fernandez from George Ward dated January 18, 1991 which, at page 2, thrice refers to 500 ppm standards;

3. Letter from Soil Tech, Inc. to Michael Fernandez dated June 3, 1992 which refers to the 500 ppm standard for treatment of soils at Marine Drive;

GROUNDWATER FLOW DIRECTION/MOST LIKELY SOURCE OF CONTAMINATION

A. Groundwater Flow Direction

There are two properties which are adjacent to, and westerly of Terminal Transfer's property. Both are hot spots for petroleum contamination. Attachment 5 to this letter contains an excerpt from SRH Environmental dated August 28, 1989. The report concerns the Trumbull Asphalt Plant. The report indicates that this site contains concentrations of petroleum contamination as high as 162,000 ppm. The report clearly states, at paragraph 6.2.1, the general flow of the upper ground water beneath the site is to the east, toward the Willamette River. The Terminal Transfer site is approximately 300 feet due east of the Trumbull site.

Attachment 6 is an excerpt from a report prepared by Riedel Environmental for Ashland Chemical on October 11, 1990, regarding the Nabisco/Hill Investment Property. Petroleum contamination in concentrations as high as 45,000 ppm were found at the Nabisco site. The report clearly states, at paragraph 1.1, that the ground water "tends to flow from the northwest to the southeast."

Attachment 7 to this letter contains groundwater flow charts prepared by Hart Crowser Environmental Services. Ground water data was collected September 26, 1991, March 31, 1992, June 29, 1992, and February 18, 1993. As the attachment clearly shows, data collected on each date establishes ground water flow direction to the east or southeast across the eastern side of the Nabisco site. Hart Crowser summarized its findings in a report which was received by DEQ on October 14, 1993. The summary, at page 2, repeats Hart Crowser's conclusion that the ground water flow has been consistently established as easterly or southeasterly across the eastern side of the site. (see Attachment 7).

There is no reliable scientific data to support a conclusion other than the ground water flow in this area is from the northwest to the southeast. Given the levels of contamination remaining at the Trumbull and Nabisco sites, if additional ground water testing reveals levels of contamination in the ground water below the Terminal Transfer site, this does not mean that the Terminal Transfer property is the source of the contamination. On a more probable than not basis, we respectfully submit that the source for the contamination lies directly west and north of the Terminal

Transfer site. Stated affirmatively, we believe that the evidence demonstrates that the contamination is coming from the Trumbull and Nabisco site (neither of which have been remediated).

Terminal Transfer has already excavated all contaminated soil which can be removed from its property. DEQ has previously stated, in writing, that further excavation will not be required. (see Attachment 8, March 18, 1991 letter from Michael Fernandez) Under these circumstances, and until the adjacent sites are remediated, no useful purpose is served by monitoring ground water at the site.

CONCLUSION

I will work diligently with Mr. Kathrens to assemble additional information regarding the location and use of treated soils from the Marine Drive site. In the interim, I am looking forward to meeting you on December 20, 1995 to discuss issues regarding the plan for analyzing the Marine Drive treatment site, discussion of the appropriate cleanup level for treated soils, and the general issue of the necessity and extent to which groundwater monitoring will be demanded by DEQ as a pre-condition to releasing funds held in escrow.

Best regards,

Steven G. Marks

SGM/sn
cc: Richard Kathrens
George Ward

ITEM #4

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED

DEC 16 1995

NORTHWEST REGION

Sampling of Native Soils Under Work Area.

After completion of decontamination of the 13,000 cu. yds of sand Soil Tech Inc. will take six samples from the West work area. And ten samples from the East work area. Samples will be drawn at about 6" below the top of the original ground level.
Type of Analysis will be HCID.
(see map attached sample points are marked in orange)
If we do not find Diesel contamination in the sixteen samples we will consider it done. If we do find Diesel contamination above 500 ppm we will evaluate the quantitaive ppm with you to determine about how we will finish up the decontamination of the sub soils.

EXHIBIT 1
PAGE 1 OF 2

SCHN00172218

GROUNDWATER MONITORING AND SAMPLING
DRAFT REPORT

FORMER TERMINAL TRANSFER INC. PROPERTY
3601 N.W. Yeon
Portland, Oregon

April 19, 1996

Prepared for:
George D. Ward & Associates

Prepared By
Clayton Environmental Consultants
Portland, Oregon

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED
APR 2 2 1996
NORTHWEST REGION

SCHN00172219

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

1.0 INTRODUCTION 1

1.1 BACKGROUND 1
1.2 PREVIOUS SITE WORK COMPLETED 2
1.3 GEOLOGY/GROUNDWATER 2

2.0 MONITORING WELL SAMPLING 3

2.1 FIELD SAMPLING METHODS 3
2.2 MONITORING WELL SURVEYING 3
2.3 GROUNDWATER HYDROCARBON CONTAMINATION 4

3.0 ANALYTICAL RESULTS 4

4.0 SUMMARY AND CONCLUSIONS 5

5.0 RECOMMENDATIONS 6

6.0 LIMITATIONS 7

Tables

Table 1: Groundwater Analytical Data

Figures

Figure 1: Site Location Map
Figure 2: Monitoring Well Locations, Groundwater Elevations and Groundwater TPH, PAH & Benzene Concentrations

List of Appendices

Appendix I: Groundwater Sampling Record
Appendix II: Chemical Analysis Results
Appendix III: Photographic Record

EXECUTIVE SUMMARY

On behalf of George D. Ward & Associates (GWA), Clayton Environmental Inc. (Clayton) conducted groundwater monitoring well sampling at the Terminal Transport Inc., facility (TTI). This sampling event was in response to a request by the DEQ to provide further information with regard to the groundwater quality of six wells; three of which were located on the former TTI site, and three wells located west of the site, on Burlington Northern Railroad property.

The TTI sampling event was completed in conjunction with a Hart Crowser Inc. (HCI) quarterly sampling event for the Hill Investment Company, whose property is located west of the subject site. These two sampling events were scheduled to occur concurrently so that wells at both sites could be subsequently surveyed to a City of Portland common datum. In turn this information would be used to obtain an accurate overview of the local groundwater gradient and current water quality for the wells sampled.

The following is a brief summary of the conclusion based upon current and past information obtained for this site:

1. The groundwater gradient is nearly flat and trends to the southwest, which agrees with the original findings presented by the Riedel Environmental Services' report of November 10, 1990. However, this trend is in disagreement with the subsequent findings reported by Hart Crowser and Geotechnical Resources, Inc.

2. Minor amounts of petroleum hydrocarbons were present in TTI's on site wells B-9, B-6, and B-8 all of which are located west of the impervious groundwater barrier and in a zone of contaminated soil allowed to remain inplace beneath the BNRR spur. This analytical trend is relatively unchanged since 1992.

3. Off site wells B-18 and B-20 located to the west of the TTI property were non detected for TPH. These results shows an improvement in the groundwater quality over time.

4. Off site well B-17 was found to have a measurable depth of approximately 1.1 feet of free product. This is substantially more product than has been previously measured for this well, is darker in color and has a distinctly different odor than previously reported.

5. The oily debris pile located on BNRR property 20 feet southeast of B-17 is still present. The existing fence that defines the common property line between Hill investment and BNRR was not present during the operation of the truck repair shop.

The following is a brief summary of the recommendations made by Clayton:

1. If continued groundwater monitoring and sampling should be required on the TTI property by the DEQ, it is recommended that it be completed on a yearly basis.

2. Additional investigation should be required by parties other than TTI in order to conclude the source of the free product present in B-17. Since the well and free product are located on Burlington Northern Railroad property, it is recommended that any additional investigative work be coordinated between Burlington Northern and the DEQ. This recommendation is based on information which suggest that the potential for a source other than TTI may be responsible for the current free product present in B-17 . Such as a nearly flat groundwater gradient, low migration rates, minimal levels of residual contaminantes on TTI's western margin, and the impervious barrier between the two properties.

Introduction

On behalf of George D. Ward & Associates (GWA), Clayton Environmental Inc. (Clayton) conducted groundwater monitoring well sampling at the Terminal Transport Inc., facility (TTI). This sampling event was in response to a request by the DEQ to provide further information with regard to the groundwater quality of six wells; three of which were located on the former TTI site, and three wells located west of the site, on Burlington Northern Railroad property.

The TTI sampling event was completed in conjunction with a Hart Crowser Inc. (HCI) quarterly sampling event for the Hill Investment Company, whose property is located west of the subject site. These two sampling events were scheduled to occur concurrently so that wells at both sites could be subsequently surveyed to a City of Portland common datum. In turn this information would be used to obtain an accurate overview of the local groundwater gradient and current water quality for the wells sampled.

1.1 Background

The Terminal Transport Inc. Facility is located in the NW 1/4 of Section 29, Township 1 North, Range 1 East, Multnomah County. The area is an industrial sector in northwest Portland, Oregon. Located just south of Yeon Street, the Terminal Transport Inc. site is bound by Burlington Northern Rail Yards on the north, TTI warehouse on the east, Weyerhaeuser Paper Company on the south and on the west is Hill Investment Company Warehouse (a former truck repair facility), and Schnitzer Investment Property (formerly the Chase Bag Co. And the Willard Storage Battery Co.)

The site is located in the ancestral basin of Guilds Lake which was drained and filled with dredge sand. The site is apparently above the 100 year flood plain according to the Army Corps of Engineers, Flood Insurance Maps. There is little topographic relief to the site and on average is only 30 feet above mean sea level.

Commercial activity in the general vicinity began in the early 1900's with the construction of the rail yards to the north and other related business. Prior to draining and filling in Guilds Lake, the area was the site of the 1905 Centennial Exposition celebrating the Lewis and Clark Expedition. In the 1940's the area was dominated by housing for the military industry. These were later torn down and the area was to some degree vacant until the early 1960's. The area experienced its largest growth during the late 1960's and 1970's dominated by light industry, warehouses and trucking terminals.

SCHN00172223

1.2 Previous Site Work Completed

Initial environmental work for this site began in December of 1988, by Geotechnical Resources Inc. (GRI) and later by GWA. Work at this site has been continues since the original site investigation and concluded with the excavation of 30,000 cubic yards of soil and the installation of numerous wells. Approximately 15,00 cubic yards of soil were removed for treatment off site. The remaining 15,000 cubic yards of soil were found to be uncontaminated and permission was received by the DEQ to use the material as backfill. Subsequent to backfilling the final excavation, an impermeable barrier was installed along the western perimeter of the TTI property. These previous activities are covered in detail by the GWA Reports dated May 17, 1991 and July 26, 1994, and the GRI Well Report dated October 4 1991.

Off-site work at Hill Investment Company site began with UST decommissioning by Tom New Construction Company, with additional investigative work completed by Riedel Environmental Services, Inc. (RES). Hart Crowser, Inc. HCI is currently providing consulting services for Hill Investment.

To date, both sites have documented that petroleum releases have occur in the past and that both removed the source through excavation leaving only minor amounts of impacted soil in place due to structural constraints.

1.3 Geology/Groundwater

Geologic materials encountered at the site include silty sands and minor organic material. The fill found throughout the study area consisted of medium brown sands. It is anticipated that these unconsolidated, interbedded silt and sand, deposits extend to a depth of nearly 100 feet below ground surface (bgs). Underlying this interbedded material is a unit of basaltic gravels, cobbles and boulders with minor silts and sands.

Groundwater at the site is shallow, with an average depth during the winter months of 7 to 10 feet bgs. During the summer months the water levels average 10 to 15 feet bgs. Surface infiltration, from precipitation events, appear to be the major factor in controlling shallow groundwater levels. Shallow groundwater levels did not seem to respond to the diurnal changes due to high or low river conditions.

Groundwater gradient has been somewhat of a controversy since the beginning of this project. The information gathered after Clayton's monitoring and sampling event and from the information supplied by the subsequent survey work completed by Jim Weddle & Associates, Inc. indicate that the gradient is almost flat with a slight southwesterly trend of 0.003 ft/ft or less. This information remains consistent with RES's inferred apparent flow direction and gradient, documented in the November 10, 1990 report prepared for Nabisco.

2.0 Monitoring Well Sampling

2.1 Field Sampling Methods

During groundwater sampling, protocol was strictly adhered to with respect to pump rates, pH, conductivity and temperature readings, and decontamination procedures. Each of these parameters are considered important when attempting to determine the true chemical nature of the groundwater. Water samples were collected only when the pH, conductivity and temperature had stabilized. Once the samples were obtained they were immediately placed on ice for transport to the laboratory.

The following standard operating procedures were used during the sampling of each of the six wells. Upon removal of the monument cover the well head was inspected. If water, due to run off was present in the vault, it was removed.. Once the vault was free of standing water, the locking cap was removed and a depth to water (DTW) and total depth (TD) was determined utilizing a Solinst water level meter. The volume of water present in the casing was then calculated, and the amount of water to be purge prior to sampling was estimated. The pH/Temperature meter and a Conductivity meter were calibrated and the two inch electric submersible pump inspected and decontaminated prior to being lowered into the well.

Once purging had begun, an initial set of pH, temperature and conductivity readings were taken. Then, once every few minutes (depending on the pump rates), another set of readings were collected until they stabilize to within 10 percent of the prior reading. Pump rates were set so that minimal draw down occurred in the well, thus limiting any cascading during recharge of the well. Upon completion of the purge process, the pump equipment was removed from the well.

To collect the groundwater samples, a disposable Teflon bailer was lowered into the well extracting enough water to fill two, 1-liter amber bottles and two 40-mil VOAs. All sample containers were laboratory prepared.

As soon as the samples were obtained, they were labeled with the date/time of collection, well number, and facility ID. The samples were then placed on ice for transport to the laboratory under strict chain of custody documentation.

2.2 Monitoring Well Surveying

Since the groundwater gradient was not completely understood, one of the primary objectives of this event was to confirm flow direction and gradient. To accomplish this, the six TTI groundwater monitoring wells (B-9, B-6, B-8, B-20, B18, and B-17) were monitored and an accurate well survey was completed.

The purpose of the monitoring well survey was to determine the location and elevation of the wells relative to a fixed point or datum for both the Hill Investment Property and TTI site. This information was then coupled with the depth to groundwater measurements gathered by both GWA and HCI and can be used to confirm the local groundwater gradient.

Surveying was accomplished using Jim Weddle & Associates, Inc. of Portland, Oregon.. All well points were measured vertically to a hundredth of a foot. The results of the surveying for the TTI site are presented in Figure 2, *Site Plan* along with the local direction and gradient of groundwater flow.

Elevations recently established by Weddle & Associates represent the top of casing elevations and not the monument covers as used previously by GRI. A bench mark tied to a City of Portland Datum was also established on the Hill Investment Property for similar use by HCI.

2.3 Groundwater Hydrocarbon Contamination

It was Clayton's' understanding that all six wells were anticipated to be free of hydrocarbon contamination. However, it was found that B-17 had been impacted significantly with at least 1.1 ft. of measurable free phase petroleum product. In addition, well B-8 had what appeared to be a very slight sheen when the well was sampled. All of the other wells were free of any visual or olfactory indications of petroleum hydrocarbons.

It is obvious that monitoring well B-17 is located within an as yet undefined plume area which currently has at least 1.1 feet of free phase diesel product floating on the water. This, coupled with information gathered during research activities conducted after the sampling event, confirms that free phase diesel has been present in this area for some time, but in quantities less than what is currently present. The source of this weathered diesel product can not be conclusively ascertained with the data currently available. And since the affected property belongs to the Burlington Northern Railroad, further investigation should be completed by BNRR in cooperation with the DEQ.

Dissolved hydrocarbon concentrations above DEQ guidelines currently exist along the western boundary of the TTI property. However, the levels of TPH found in the wells on site are representative of the soils in which they were drilled, since this western margin of the TTI site was not excavated in order to avoid endangering the BNRR spur

3.0 ANALYTICAL RESULTS

During the groundwater sampling event conducted on February 27, 1996 there were no obvious indications of petroleum impacts to the groundwater, with the exception of the 1.1 foot of free phase petroleum product encountered in well B-17 and a possible very slight sheen that was apparent in well B-8 at the time of sample collection.

Analytical results of samples showed that very minor amounts of petroleum were found in the wells located on site and that wells B-20 and B-18 to the west of the site were free of any petroleum contaminants. Analytical results of the product obtained from well B-17 showed it to consist of weathered diesel product.

Water samples were taken to Oregon Analytical Laboratories (OAL) in Beaverton, Oregon and analyzed for TPH, using EPA Method 418.1; BTEX, using EPA Method 8020; and PAHs, using EPA Method 8310. The Product sample was analyzed for THP-HCID and Solvents. Analytical results for this sampling event are presented in Table 1. and a copy of OAL's results and chromatograms can be found in Appendix II.

4.0 SUMMARY and CONCLUSIONS

At the conclusion of the groundwater sampling event, and the subsequent background investigation, Clayton has developed a good understanding of the site's subsurface soil, and shallow groundwater conditions.

The groundwater gradient for the site is nearly flat, with a slight trend towards the southwest. This nearly flat groundwater gradient, coupled with the numerous other LUST sites within the immediate area, posses a problematical question as to the origin of the free phase product present in B-17. In addition to this, current and past observations have indicated that substandard methods for waste disposal have occurred on the adjacent properties west of the TTI property. In particular it was noted at the time of sampling, that a debris pile (3-4 c.y.) containing oil and other automotive filters was located about 20 feet southeast of B-17. Material from this debris pile has been sampled in the past and analyzed for TPH. This pile was found to have significant levels of TPH present (53,000 ppm, collected 6/22/92) and has remained uncovered and undisturbed for years. It seems unlikely that this pile is the source for the product present in B-17. However, it does lead to suspect that other sources may be present in the immediate area near B-17.

Monitoring wells B-9 and B-6, which were both completed in an area left unexcavated during the initial cleanup activities, are located up gradient of well B-17. Current and past analytical results for these two wells show only minor levels of hydrocarbon contamination. However, based upon the current accepted groundwater gradient, these two wells would have been near to the suspected source. Therefore, there should be higher levels of residual contamination present in these two wells if this area was the source for the free product found in B-17. These observations and suppositions do not prove that TTI is not a source for the free product, but they do however indicate that there is a potential for an unidentified off site source for the free product.

The following is a brief summary of the conclusion based upon current and past information obtained for this site:

- The groundwater gradient is nearly flat and trends to the southwest, which agrees with the original findings presented by the Riedel Environmental Services' report of November 10, 1990 for the Nabisco Co.. However, this trend is in disagreement with the subsequent findings reported by Hart Crowser and Geotechnical Resources, Inc.

- Minor amounts of petroleum hydrocarbons were present in TTI's on site wells B-9, B-6, and B-8 all of which are located west of the impervious groundwater barrier and in a zone of contaminated soil allowed to remain inplace beneath the BNRR spur. This analytical trend is relatively unchanged since 1992.

- Off site wells B-18 and B-20 located to the west of the TTI property were non detected for TPH. These results shows an improvement in the groundwater quality over time.

- Off site well B-17 was found to have a measurable depth of approximately 1.1 feet of free product. This is substantially more product than has been previously measured for this well, is darker in color and has a distinctly different odor than previously reported.

- The oily debris pile located on BNRR property 20 feet southeast of B-17 is still present. The existing fence that defines the common property line between Hill investment and BNRR was not present during the operation of the truck repair shop.

5.0 RECOMMENDATIONS

Based on the data generated from the background investigation and current field observation, it is apparent that residual diesel contaminants are still present in the soil along the western margin of the TTI property and that groundwater in this area is above regulatory limits for petroleum hydrocarbons. However, the levels of contamination currently present in the on site wells has change little since 1992. Therefore, if continued monitoring and sampling should be required, it is recommended that it be completed on a yearly basis.

With respect to the free product present in B-17, Clayton feels that additional information is required before a final conclusion can be made as to the source. However probable, it does not seem likely that the source is TTI. In addition, since the well and free product are located on Burlington Northern Railroad property it is recommended that any additional investigative work be coordinated through them.

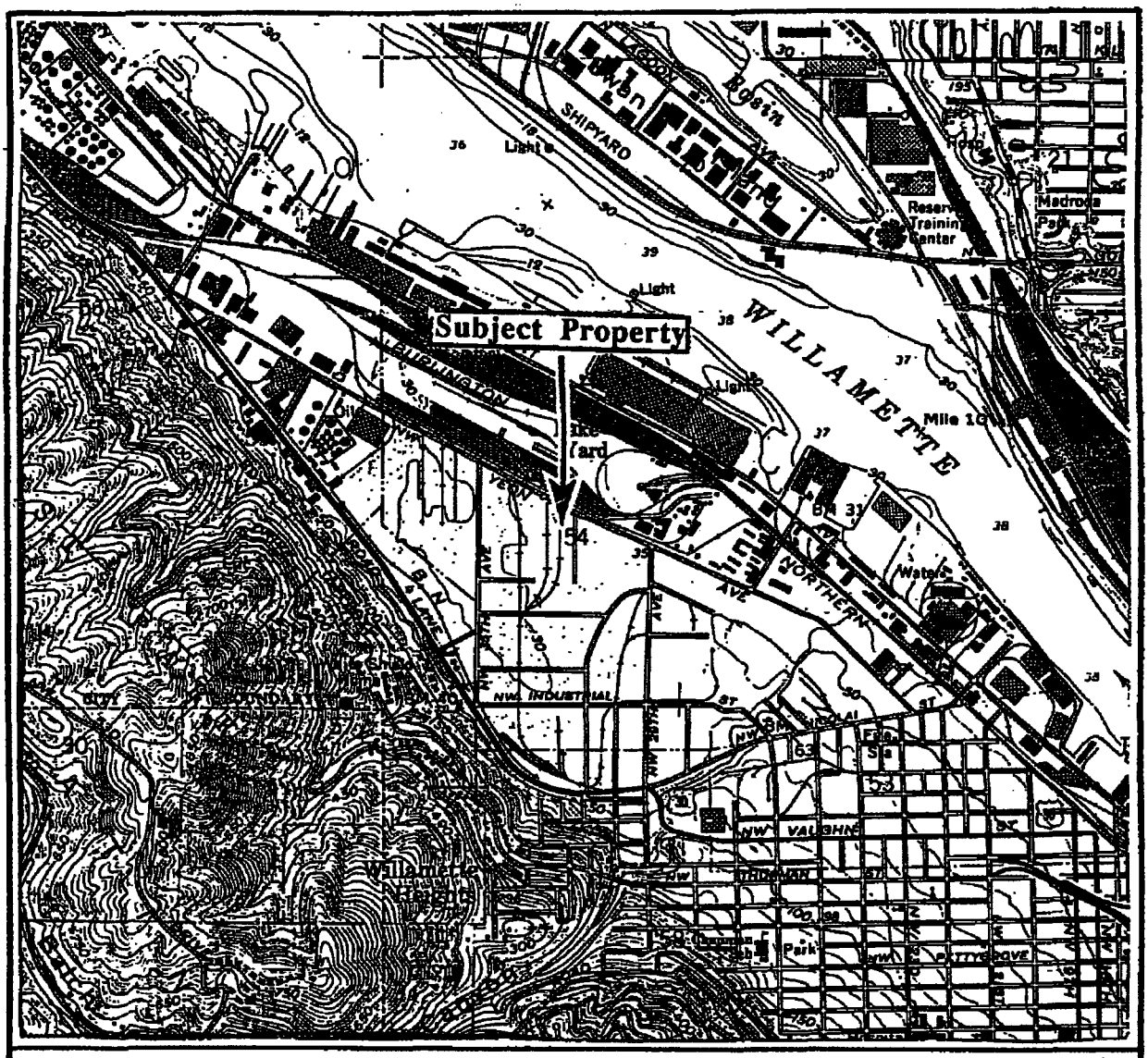
6.0 LIMITATIONS

The services documented in this report were performed in a manner consistent with generally accepted professional principles and practices. No other warranty, express or implied, is made. The services provided were consistent with the contractual agreement with our client. This report is solely for the use and information of our client unless otherwise noted.

Opinions contained in this report apply to conditions existing when the services were performed and are intended only for the client, and or his authorized agents. We are not responsible for any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

Clayton Environmental Consultants, Inc.

Brad J Harris
Geologist/Project Manager



Source: USGS 7.5' Portland, OR Quadrangle,

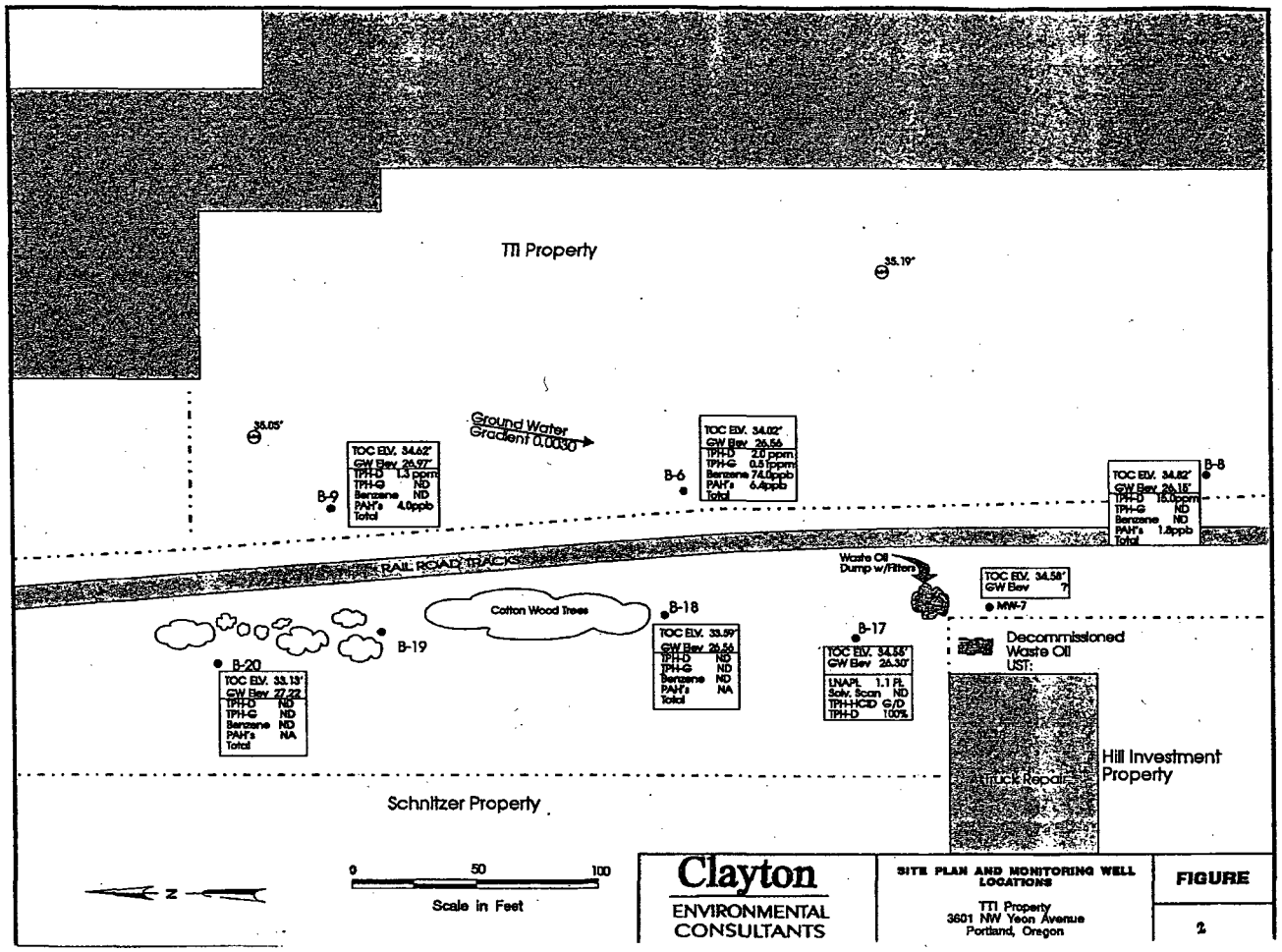
0 2000 4000

Scale in Feet

N

Clayton ENVIRONMENTAL CONSULTANTS	SITE LOCATION MAP Terminal Transport Inc. Property Sec. 29, T.1 N., R.1 E., W. M. Portland, Oregon	FIGURE 1

SCHN00172230



SCHN00172231

Appendix H

SCHN00172232

APPENDIX H

SIC Environmental Files

UST Tank Removal
at 3720 N.W. Yeon
September 1995–August 1996

SCHN00172234

LOREN D OBRIST EXCAVATING
17070 S.E. FOSTER ROAD
PORTLAND, OR 97236
(503) 661-9606

Schnitzer Steel
3200 N.W. Yeon Ave
Portland, OR 97210

September 26, 1995

ATTN: DON CARPENTER

RE: REMOVAL OF TANK AT 3720 N.W. YEON

On the 23th of August, 1996 Loren D Obrist Excavating excavated and removed the 12,000 gallon Bunker fuel underground storage tank located on the property at 3720 N.W. Yeon, Portland, OR. (see attached site plan)

The tank was cleaned by C.E.S., and all liquid wastes removed. The tank was ten excavated and removed to the yard of Loren D Obrist where it was diamantled, then taken to Schnitzer Steel Products to be scrapped. (see attached)

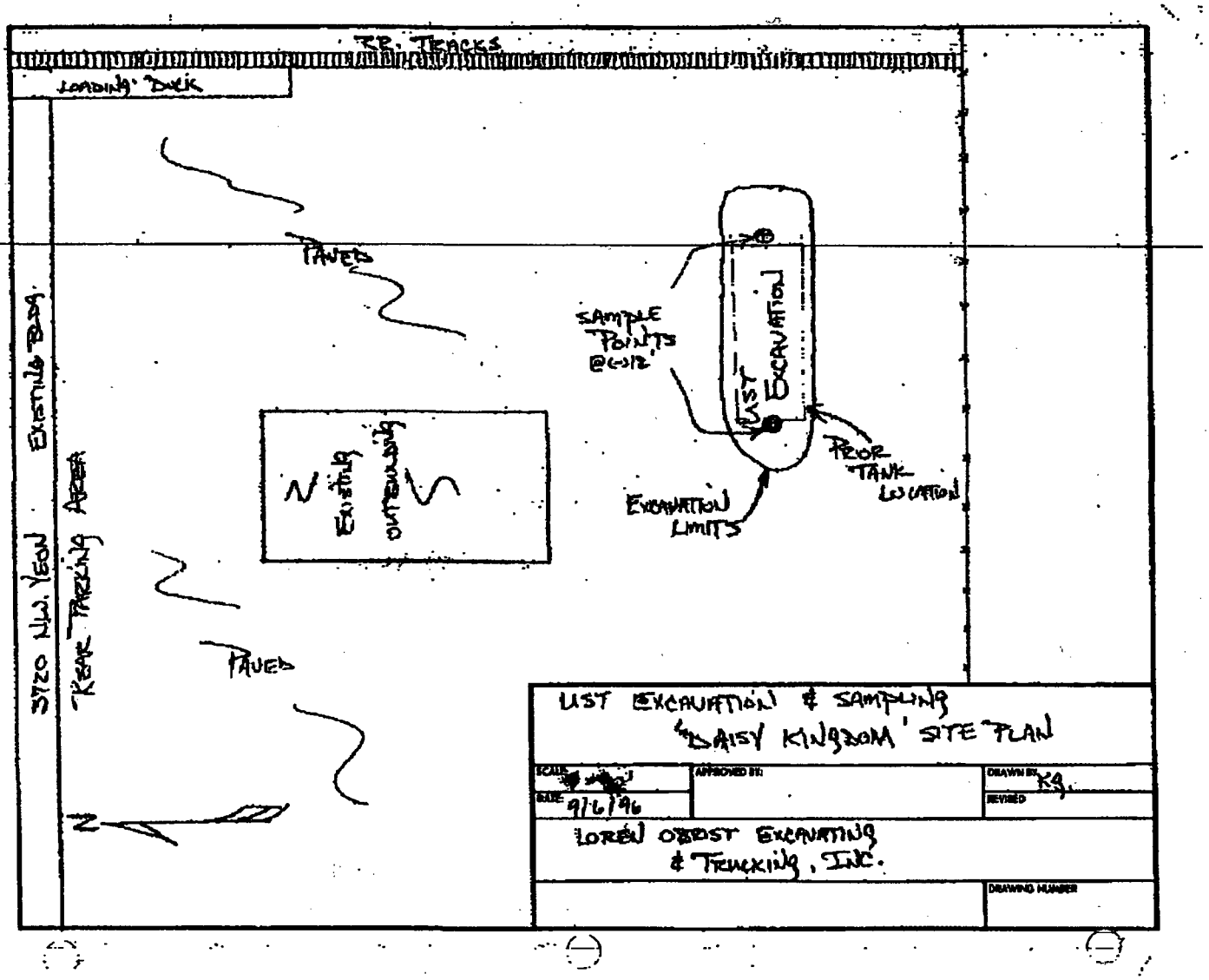
Heating fuel tanks, per 40 CFR 280.10 and 280.12 are not regulated and therefore do not require Oregon Dept. of Environmental Quality (ODEQ) Change in Service and Decommissioning Forms, but current ODEQ guidelines state that a minimum of 2 samples should be taken from the native soils below the ends of the tank and analyzed to determine whether those soils have been impacted by Petroleum products. The samples taken of the soils at -12' below the ends of this tank show no indication of any significant impact (see attached).

At this time the U.S.T. excavation has been backfilled to grade.

We thank you for using Loren D Obrist Excavating.

Sincerely,

Kevin Greenfield
Decommissioning Supervisor



SCHN00172236

Schnitzer Steel Products Co.
Junction of Columbia Blvd. & Lombard Ave
P.O. Box 10047, Portland, OR 97210
1-800-888-9771
Certified Public Scales

TICKET NO. 9608231036
Vendor Number 18382
Vendor Name SCHNITZER INVESTMENTS A
Date 23-AUG-96 Time 09:40

Weighmaster _____

	Lb
Inbound Gross	53080
Tare	40100
Net	12980

Commodity	Description	Net Lb
103-00	UNPREPARED	12980
COMMENTS:	LOREN OBRIST RED TRK	
		108037

12,000 Gallon Heating oil Tank from Daisy Kingdom

now Kevin Greenfield, ~~was~~
was (NW Compliance Services)

Report Number: 17288

Environmental Sciences, Inc.

Research, Laboratory, and Consulting Services

CHAIN OF CUSTODY

2415 SE 11th Ave • Portland, Oregon 97214 • (503) 231-9320 • FAX (503) 231-9344

PROJECT #	PROJECT NAME / SITE	STATE	PURCHASE ORDER #
—	Schlitzer / Yeon	OR	
COMPANY	REPORT ATTENTION	PHONE NUMBER	FAX NUMBER
Loren Obrist Excavating	Kevin	233-4514	
SAMPLES COLLECTED BY	DATE COLLECTED	TIME COLLECTED	SAMPLES CHILLED TO 4° C?
K. Greenfield	8/26/96	≈ 3:30 pm	

PRESERVATIVE USED? (HCl, etc.)

FIELD ID	MEDIA	CONTAINER	VOLUME ETC.	ANALYSIS REQUIRED	LAB ID
East end 1-12'	Soil	—	30 mL	HCID w/ Quan	27828
West end 1-12'	"	—	40 mL		27827

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
Kevin Greenfield	8/28/96 — 1:04 pm		
RELINQUISHED BY	DATE / TIME	RECEIVED BY LAB	DATE / TIME
		[signature]	8-28-96 1:04 pm
REMARKS		SHIPPED BY	

WyEast will return white copy to client with laboratory report and keep yellow copy for files. Client keeps pink copy.

SCHN00172238

DCT-01-1996 08:44 FROM LOREN OBRIST EXCAVATING TO 2352445 P.05

Wy'East Environmental Sciences, Inc.

LABORATORY REPORT

PROJECT NAME/SITE:	Schnitzer / Yeon	**REPORT NUMBER:**	17288
PROJECT NUMBER:		**REPORT DATE:**	8-29-96
EXTRACTION DATE:	8-28-96	**PAGES:**	1 of 1

OREGON DEQ TPH-HCID

Analyte: Petroleum Hydrocarbon Identification (Gasoline, Petroleum, Heavy Oil)

Field ID	Lab ID	Identification			Surrogate Recovery (%)
		Gasoline	Diesel	Heavy Oil	
East End (-) 12'	27828	ND	ND	ND	99
West End (-) 12'	27829	ND	ND	ND	93
BLANK	-	ND	ND	ND	-
Reporting Limits (mg/Kg)	-	20	50	50	-

Surrogate is Chlorooctane

ND = Not Detected (below reporting limit or detection limit)

2415 SE 11th Ave., Portland, Oregon 97214 Phone (503) 231-9320 FAX (503) 231-9344

CET Environmental
Services, Inc.
P.O. Box 83695, Portland, Oregon 97283
5315 N.W. St. Helens Road, Portland, Oregon 97210
Telephone (503) 227-6892 Fax: (503) 241-8759

August 29, 1996

Joann
Loren Obrist Excavating
17070 SE Foster Road
Portland, OR 97236

Dear Joann,

As per your request, I am submitting this letter to verify CET Environmental Services, Inc. tank cleaning project at Daisy Kingdom.

On August 22, 1996, CET dispatched a vacuum truck with operator, service truck and (1) Hazmat Tech to Daisy Kingdom, 3702 NW Yeon Avenue, Portland, OR to clean one (1) twelve thousand gallon bunker fuel underground storage tank. The tank was entered by Scott Griffin, sprayed with diesel, scraped and pumped out. Residual product was transported to Harbor Oil for recycle via CET vacuum truck. Tank was to be transported to scrap yard by Loren Obrist Excavating.

If you have further questions regarding this project, please feel free to give me a call.

Cordially,

Tom Lahti
Ops Mgr.
CET - Portland

Environmental Compliance Reviews of Lessee Operations at 3506 N.W. 35th and 3720 N.W. Yeon

January 1991

SCHN00172241

Environmental Management Solutions
1800 SW First Avenue
Suite 610
Portland, Oregon 97201
503-225-9060
FAX: 503-273-8612

January 14, 1991

Tom Zelenka
Schnitzer Investment Corporation
3200 NW Yeon
Portland, Oregon 97210

RE: Environmental Compliance Reviews of Lessee Operations at 3506 NW 35th and 3720 NW Yeon

Dear Mr. Zelenka:

I am pleased to submit the results of our environmental compliance reviews of lessee operations at 3506 NW 35th and 3720 NW Yeon.

In addition to environmental compliance reviews, our work included limited historic land use and regulatory agency records reviews for the subject properties and for selected adjacent properties.

Specifically, our review includes:

1) Regulatory agency records reviews for both lessees at their present location.

2) Visual inspection of the both facilities, and of immediately adjacent properties.

3) Regulatory agency records review of select adjacent properties that, based upon our observation and knowledge of the nature of their business, warrant a records review.

4) A limited historic land use review for the two properties, with particular reference to focus on whether a battery company once occupied the property at 3720 NW Yeon.

The attached report documents our findings in each of the above areas. I would be pleased to provide a briefing to you, at your convenience.

I appreciate the opportunity to be of assistance to Schnitzer Investment Corporation.

Sincerely,

Dan Saltzman

Dan Saltzman
President

enclosure

100% Recycled Paper

Environmental Management Solutions
1800 SW First Avenue
Suite 610
Portland, Oregon 97201
503-225-9060
FAX: 503-273-8612

ENVIRONMENTAL COMPLIANCE REVIEWS OF LESSEE OPERATIONS AT 3506 NW 35TH AND 3720 NW YEON FOR SCHNITZER INVESTMENT CORPORATION

JANUARY 14, 1991

100% Recycled Paper

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	1
INTRODUCTION	3
NABISCO (3506 NW 35TH)	4
CHASE BAG (3720 NW YEON)	7
ADJACENT LAND USES	12
CONCLUSIONS AND RECOMMENDATIONS	15
INFORMATION SOURCES	17
APPENDICES	

EXECUTIVE SUMMARY

Environmental Management Solutions conducted environmental compliance reviews of lessee operations at 3506 NW 35th and 3720 NW Yeon. EMS also conducted limited historic land use and regulatory agency records review for the subject properties and for selected adjacent properties.

The compliance review included regulatory agency records reviews for both lessees at their present location; visual inspection of the both facilities, and of immediately adjacent properties; regulatory agency records review of select adjacent properties; and a limited historic land use review for the two subject properties, with particular reference to focus on whether a battery company once occupied the property at 3720 NW Yeon.

Our review of agency records for adjacent properties to the east, west, and south indicate all have documented subsurface contamination, primarily related to petroleum hydrocarbons. Each property is involved in some stage of cleanup and remediation.

For the subject properties, specific findings and recommendations are:

Chase Bag

* The facility at 3720 NW Yeon was built in 1947 for the Willard Storage Battery Company.

* Chase Bag may have discharged industrial wastes through floor drains, sumps, etc. to an old Housing Authority sewer line built in World War II, and now designated a city storm sewer. Newer storm and sanitary sewer lines exist on NW 35th and on NW Yeon.

* To verify what may have gone into the Housing Authority sewer, and may still be on the property as sediment, we recommend that sediment samples be collected from floor drains and sumps in the building, especially ones that are clogged, which should be cleaned anyway.

* There is also a concern that drains and sumps not evident on the original blueprints (and plumbing permit map) for Willard Storage Battery Company could be modifications made by subsequent tenants, and may in fact be seepage pits, not connected to the existing drainage system. We would recommend that these suspect drains be examined to verify their connection to the drainage system.

* It would be prudent verify whether floor drains and other sanitary sewer outlets are, in fact, not connected to the

SCHN00172245

sanitary sewer. If dye testing or other means show that these outlets do in fact discharge to the Housing Authority sewer line, modifications to the drainage system should be made so the facility is in compliance with industrial wastewater discharge requirements.

* We recommend that surface soil samples be collected where the partially buried drainage pipe from the Terminal Transfer property enters the Chase Bag property.

* The old acid neutralization tank from the Willard Storage Battery Company should be filled with concrete, sand, or crushed rock, or otherwise made more secure.

* The spills on the main floor of the facility, and on the floors of the two outbuildings, suggests the floors should be pressure washed and/or steam cleaned.

* Upstairs from the main office area, we noted a small area of damaged wall board that could be cement asbestos wall board. In the main office area, we noted damaged ceiling tiles that may also contain asbestos.

* Because of the inherent environmental liabilities associated with a 12000 gallon fuel oil tank over 40 years old, consideration should be given to removing this tank.

Nabisco

* The Nabisco facility also appears to be connected to the old Housing Authority sewer line.

* Consideration should be given to connecting storm drains, roof drains, etc. to newer storm lines on NW 35th or NW Yeon. In doing so, the existing buried storm water detention system must also be considered and probably incorporated into the NW 35th or NW Yeon storm lines.

* The sewer manholes in the building should be evaluated for their condition, utility, and compliance with current building codes and city sewer access requirements.

SCHN00172246

INTRODUCTION

Environmental Management Solutions conducted environmental compliance reviews of lessee operations at 3506 NW 35th and 3720 NW Yeon. EMS also conducted limited historic land use and regulatory agency records review for the subject properties and for selected adjacent properties.

Specifically, our review includes:

1) Regulatory agency records reviews for both lessees at their present location.

2) Visual inspection of the both facilities, and of immediately adjacent properties.

3) Regulatory agency records review of select adjacent properties that, based upon our observation and knowledge of the nature of their business, warrant a records review.

4) A limited historic land use review for the two properties, with particular reference to focus on whether a battery company once occupied the property at 3720 NW Yeon.

5) A written report that covers both properties, and contains our findings and recommendations.

Our findings and recommendations are presented below.

SCHN00172247

NABISCO (3506 NW 35th Avenue)

Tenant History

Nabisco has leased the warehouse at 3506 NW 35th since approximately 1983. Its primary use appears to have been for storage/distribution of the company's products. Previous occupants include Pihl Transfer Company.

Building blueprints show the building to have a 5 inch concrete slab floor on top of compacted sand and gravel fill. Though no date is on the blueprints, other records reviewed suggest the building was built in the early 1960s.

Nabisco's office and additional warehouse space were located immediately south of this warehouse at 3322 NW 35th.

Regulatory Agency Records

The files on this Nabisco facility at the Oregon Occupational Safety & Health Administration (OR OSHA) contain two violations. A 1986 record concerns the lack of a written Hazards Communication Program for employees. Another record concerns signage and location of first aid supplies.

At the Department of Environmental Quality (DEQ), there is a Notification of Hazardous Waste Activity form on file. According to DEQ personnel, Nabisco sent this in response to a 1989 DEQ mailing to potential unregistered hazardous waste generators. The Nabisco response was received in January, 1990. The response lists the office address as 3322 NW 35th, which is next door to the 3506 NW 35th warehouse. This office address could cover both warehouses.

Nabisco responded that it is a small quantity generator of hazardous waste for products associated with cleaning. Substances listed include: waste concrete degreaser, waste ice melt, waste industrial cleaning, waste alkaline liquid (potassium hydroxide), waste dust control agent, and waste dust and cloth treatment.

It appears these materials were disposed of as a one time occurrence, part of an "inventory cleanout". There is no evidence on file that Nabisco has made regular disposal shipments of these substances.

There is no record of hazardous substance spills, leaking underground tanks, or other on-site sources of contamination. There have been no enforcement actions against Nabisco by DEQ.

The city of Portland has no record of issuing an industrial

SCHN00172248

wastewater discharge permit for this facility.

Site Inspection

A site inspection of the facility was conducted in late December, 1990. Nabisco had vacated the premises by the time of our inspection.

Photographs from the site inspection appear in Appendix F.

Our inspection found the facility to be very clean with no evidence of spills or staining on the warehouse floor. There were no indicators of spills along the exterior perimeter of the building, including the rail spur. There were no barrels, drums or other debris present.

Inside the warehouse are three sewer manholes on the warehouse floor. It is very unusual for access to a public sewer to be inside a building structure (see photo C). One concern is exposure to gas or sanitary waste.

Our interview of city of Portland Environmental Services personnel, and our review of city of Portland sewer maps, building plans and permits for the premises, indicate the manholes provide access to a former Housing Authority of Portland sanitary/storm sewer line constructed for World War II era housing in the Guild's Lake area. This line runs south of the subject properties, eventually emptying into the Willamette River.

A schematic drawing (see Appendix A), on file with the city of Portland Permit Center, shows the manholes inside the warehouse (then occupied by Pihl Transfer). A handwritten note on the drawing states:

"Storm connection approved as shown, 10-20-65"

As the Housing Authority sewer line was in place prior to the warehouse construction, access to this sewer line appears to have been incorporated into the building's design.

This former Housing Authority combined storm/sanitary sewer is now classified by the city of Portland as a storm sewer only. A note on the city's sewer map at this location states:

"Sewer to be used for drainage only"

In 1970, a separate sanitary sewer line was constructed underneath NW 35th. According to Portland Public Works Department records, sometime between 1971 and 1974, the building's sanitary waste outlets were connected to the NW 35th sanitary sewer line, with the former Housing Authority sewer serving as the collector of

SCHN00172249

storm drainage.

Appendix A contains the cover sheet of Nabisco's Notification of Hazardous Waste Activity; a copy of a city building microfiche record showing the sewer line running underneath the building; and a Public Works Department form showing the Nabisco facility connection to the NW 35th sanitary line and confirmatory dye test results.

SCHN00172250

CHASE BAG (3720 NW Yeon)

Tenant History

Blueprints and building permits indicate this building was originally constructed in 1947 for the Willard Storage Battery Company; a branch of a firm headquartered in Cleveland.

By 1960, Great Western Chemical Company occupied the building. Polk City Directories show Great Western occupied the premises through 1970. The only other tenant on record is Ace Hardware, which occupied the building for a few years in the mid-1970s.

According to Chase Bag personnel and Polk Directories, Chase Bag moved into the building on a sublease in 1978. Chase Bag has another facility on NW Nicolai Street. Chase is in the process of vacating the building at 3720 NW Yeon. Chase Bag is headquartered in Greenwich, Connecticut.

Regulatory Agency Records

We found no significant records at DEQ relating to enforcement actions, hazardous substance handling or disposal.

As with Nabisco, Chase Bag responded to DEQ's 1989 potential hazardous waste generator inquiry. Chase's response was that it does not generate hazardous waste at 3720 NW Yeon (see Appendix B). Its NW Nicolai facility is registered with DEQ/EPA as conditionally exempt generator (less than 100 kilograms of hazardous waste per month).

A March 14, 1988 letter from PEMCO (on behalf of Schnitzer Investment) to DEQ indicates PEMCO intended to remove a 1000 gallon and a 12000 underground fuel storage tank at Chase Bag (see Appendix B). We believe this notice in error, as the 12000 gallon fuel oil tank for the boiler is still in place and in use.

Oregon OSHA has files on both Chase Bag locations. The most significant safety violations relate to use of solvents and other hazardous substances at the NW Nicolai facility. In May and July of 1990, OSHA found significant employee solvent exposure during wipedown operations of printing presses, and inadequate hazards communication training.

It appears that in addition to the use of solvent-based inks, the other principal solvent used for wiping down the presses between runs is called "CB Wash #3". According to the Material Safety Data Sheet (MSDS), CB Wash #3 is composed of several solvents, including: acetone, isopropanol, benzene, toluene, and MIBK (see Appendix B).

SCHN00172251

The Oregon OSHA file on the NW Yeon facility appears to have originated in 1988, in response to complaints about roof leaks and water on the floor. No violations were cited by OSHA. The inspection report also provides a narrative description of equipment location; types of hazardous substances used, by location; and copies of some MSDSs for substances used at the facility. The report suggests that by 1988, Chase was no longer using solvent-based inks. This is consistent with information provided us by Chase personnel, though no precise date for this change in inks was provided. Older inks may have contained PCBs and heavy metals.

The city of Portland Bureau of Environmental Services issued an Industrial Wastewater Discharge Permit to the NW Nicolai facility in November, 1989. The permit establishes discharge limits into the sanitary sewer for oil/grease, pH, and heavy metals. No similar permit exists for the NW Yeon operation.

A November, 1990 letter from the city to Chase Packaging warns Chase that it has not complied with the quarterly and annual discharge reporting requirements of its permit at the NW Nicolai operation.

City of Portland building, plumbing, and heating permit and inspection records contain no records specific to Chase Bag at NW Yeon. However, a May, 1947 plumbing inspection permit for Willard Storage Battery indicates that the facility was originally connected to the former Housing Authority sanitary/storm sewer line. It also states the facility has 32 floor drains, five sumps, six area floor drains, a slop tank, among other items (see Appendix B).

A hand drawn map of the drainage and sewer connections was found on file with the plumbing records. The map appears to date to the 1960s, and may reflect changes to the original plumbing perhaps by Great Western Chemical. The map does not contain a date or corporate name on it. It appears to be the best map extant, as the set of blueprints provided to us by Schnitzer Investment are missing the blueprint with drainage details. The city of Portland permit center also does not have a drainage detail blueprint on its microfiche.

In 1971, Schnitzer Investment was requested by the city of Portland to connect its sanitary wastes outlets to the new sanitary line on NW 35th.

Department of Public Works records indicate that in early 1974, city personnel conducted dye tests at 3506 NW 35th (then occupied by Pihl Transfer) and 3720 NW Yeon (then occupied by Ace Hardware) to confirm connections had been made to the sanitary line on NW 35th.

However, our review of current Portland sewer maps and records, suggest that floor drains, sumps and other potential collectors of industrial and sanitary wastes at 3720 NW Yeon may not have been connected to the sanitary sewer. Rather, it appears that only the office area sanitary outlets at the north end were connected to the NW 35th sanitary line.

A February, 1974 "Note to File" by one of the Public Works inspectors who conducted the dye tests states, in part:

> "Dye tests...confirm all currently used sanitary facilities go...to the 35th Ave. San. sewer.
>
> However, there remains a large amount of plumbing used by Great Western...which is probably incorrectly connected. Especially, the rear restroom (on So. wall) is suspect.
>
> Ace may not be located here much longer. It is recommended that, at the time Ace vacates, a thorough investigation be made and separation be completed".

Further corroboration of incomplete sanitary sewer hook-ups is found on a facility layout map on file with the city Bureau of Environmental Services. On the map is a hand drawn circle around the office area only, with the note that this was the area the dye tests were conducted.

We found no subsequent records to indicate any modifications to the facility were made to ensure appropriate outlets were hooked up to the sanitary line.

Thus, it appears that industrial and sanitary wastes could be discharged into the former Housing Authority sewer line (which is now only a storm water line), in violation of city and state law.

Appendix B contains the Chase Bag Notification of Hazardous Waste Activity form sent DEQ; an excerpt from the MSDS for CB Wash #3; the PEMCO letter to DEQ concerning underground tank removal at Chase; the original Willard Storage Battery plumbing inspection/permit; a 1950 Sanborn map of Willard Storage Battery; Public Works Department records relating to sanitary sewer connections and confirmatory dye tests; and city sewer maps showing the old Housing Authority sewer line and newer sanitary and storm sewer lines on NW 35th and on NW Yeon.

Site Inspection

A site inspection of the facility was conducted in late December, 1990. We were accompanied by John Mikkelson, and two other employees of Chase Bag. At the time of our inspection, all

SCHN00172253

manufacturing equipment had been, or was in the process of being removed, or disassembled.

Photographs from the site inspection appear in Appendix F.

We observed several dozen sealed and open 55 gallon barrels of unknown contents on the rail spur loading dock, in the yard and in the wooden storage shed in back of the building. According to Mr. Mikkelson these barrels are to be disposed of by Riedel Environmental Services (photos E-H).

On the building's main floor, there were several locations where absorbent material had been spread over what appeared to be machine oil spills or water. There were also several locations where large, shallow pools of standing water had accumulated over floor drains (photos I-L).

In the boiler room, a fuel oil feed line appears to have a small leak as it enters the boiler. A 5 gallon bucket was placed underneath this leak. The boiler itself appears to be wrapped in what may be asbestos-containing material (photos M-Q).

We observed several appurtenances from the original use of the building by Willard Storage Battery Company. There are several trench vent/drains running east-west along the main building floor. They have been filled, or covered with asphaltic and Portland cement concrete. Some of the trench drains appear to still be hollow, and have just been capped to prevent runoff from the building floor from entering them (photo R).

East of the rail spur between Chase Bag and the former Terminal Transfer building is an acid neutralization concrete tank. According to the Willard Storage Company plumbing map, the tank appears to also be connected to the Housing Authority sewer line. At present, the tank is covered by wood planks (photo S).

We also observed on the east side of the building a partially buried corrugated pipe. The pipe originates on the former Terminal Transfer facility property, crosses the property line of Chase Bag, stopping just short of a manhole for the Chase Bag sewer line (photos T, U).

The storage shed, gasoline storage shed, and incinerator appear on the original Willard Storage blueprints. According to Chase personnel, the incinerator was not used by Chase. The incinerator appears to have a layer of ash, which may, because of heavy metals, pose a difficulty with respect to disposal (photo V).

In the office area, we noted a small area of damaged concrete (asbestos?) wall board upstairs, and damaged, aged (asbestos?) ceiling tiles downstairs.

SCHN00172254

The storage shed and gasoline storage shed floors are fouled. The concrete masonry wall in the storage shed appears damaged, and perhaps near collapse (photos X,Y).

SCHN00172255

ADJACENT LAND USES

Properties adjacent to the 3506 NW 35th and 3720 NW Yeon properties on the east, south and west have documented incidents of subsurface contamination.

TRUMBULL ASPHALT PLANT (3750 NW Yeon)

The Trumbull Asphalt plant, west of the subject properties, across NW 35th, has documented hydrocarbon contamination in the soil and groundwater. This contamination was first discovered in 1988, and is thought to be the result of a leaking fume line and spills, though the actual on-site source(s) of contamination has not been identified.

Six groundwater monitoring wells have been installed on-site. Soil and groundwater analysis of samples collected in June, 1989 show Total Petroleum Hydrocarbon (TPH) concentrations as high as 9350 parts per million (ppm) in the soil, and 14.8 ppm in shallow groundwater. Shallow groundwater flow direction (in June, 1989) was found to be in a southeasterly direction, moving at a rate of approximately 0.9 feet per day.

A June, 1990 "First Quarter Groundwater Monitoring" report concludes:

> "The overall results indicate that mild groundwater contamination remains at the site. TPH decreases in four of six wells may indicate that passive remediation is occurring at the site with the removal of the point sources of contamination. It is not clear at this time if amount of free product observed in two of the wells is significant enough to justify a recovery process."

A July, 1990 letter from DEQ to Owens-Corning Fiberglass (the facility owner) states:

> "We are concerned that the release was identified two years ago and that insufficient investigation and no significant cleanup has been conducted to date."

Appendix C contains the full text of the DEQ letter and selected figures showing groundwater flow direction and TPH concentration contours as determined from the June, 1989 field work.

SCHN00172256

NABISCO WAREHOUSE (3322 NW 35th)

In November, 1989, in the process of decommissioning underground diesel fuel tanks, it was determined that fuel had leaked resulting in petroleum hydrocarbon contamination of soil.

The tanks removed were located near a shop building and truck scale, just south of the Chase Bag facility yard.

A September, 1990 letter from the underground tank removal firm to DEQ indicates that DEQ allowed some contaminated soil, considerably above DEQ matrix cleanup levels, to remain in place in order not to undermine a truck scale and nearby water lines.

In this same letter, the tank removal firm indicates groundwater was not encountered during the excavation.

Appendix D contains the complete text of this letter and a drawing indicating where the underground tanks were located on this property.

TERMINAL TRANSFER (3601 NW Yeon)

In March, 1990, soil contamination due to gasoline and diesel fuel was revealed during removal of old fuel distribution lines and underground fuel storage tanks at this facility. The area that contained the underground storage tanks and associated fuel distribution lines is east/southeast, across a rail spur, from the Chase Bag facility.

According to the DEQ Environmental Cleanup Division person assigned this project, the present corrective action plan calls for contaminated soil to be removed to property in north Portland where bioremediation and aeration will be used to reduce its level of contamination.

According to the DEQ contact, the perimeter of soil contamination has been determined. Though the documentation has not yet been submitted to DEQ, the DEQ contact said it is within the Terminal Transfer property boundaries.

In the next two to three weeks, a groundwater monitoring plan will be submitted to DEQ for its approval. Monitoring wells are to be installed and quarterly monitoring of TPH and BTEX concentrations are to be analyzed. A minimum of three wells will be installed. If contamination is discovered in the groundwater, then additional wells at other off-site locations could be required by DEQ. A groundwater treatment program would also be developed. The first report to DEQ should be

SCHN00172257

submitted near the end of February.

Earlier groundwater monitoring in February, 1989, by the buyer's consultant, determined a shallow groundwater gradient across the property that suggests shallow groundwater flow is in a southeasterly direction.

Appendix E contains a figure on file at DEQ showing the groundwater level contour map for this property.

SCHN00172258

CONCLUSIONS & RECOMMENDATIONS

Chase Bag

Based upon our inspection and agency records review, it is puzzling that the NW Nicolai facility is a generator of hazardous waste and holds an industrial wastewater discharge permit, and the NW Yeon operation is neither. It appears that both facilities use substantially the same types of substances, ie. inks, cleaning solvents, petroleum products, etc. Oregon OSHA inspection reports for both facilities indicate as much, as did the Oregon OSHA inspector.

One reason for this difference may be that Chase Bag has discharged industrial wastes through floor drains, sumps, etc. to the Housing Authority sewer line that serves the building. City Environmental Services personnel are not very familiar with the existence of this old line. Another reason could be that substances considered hazardous are disposed of as solid waste.

To verify what may have gone into the Housing Authority sewer, and may still be on the property as sediment, we recommend that sediment samples be collected from floor drains and sumps in the building, especially ones that are clogged, which should be cleaned anyway. Samples should be analyzed for organic and aromatic chlorinated compounds (solvents), total metals, and total petroleum hydrocarbons.

There is also a concern that drains and sumps not evident on the original blueprints (and plumbing permit map) for Willard Storage could be modifications made by subsequent tenants, and may in fact be seepage pits, not connected to the existing drainage system (see photos 2 and 8). We would recommend that these suspect drains be examined to verify their connection to the drainage system. Sediment samples should also be collected and analyzed.

It would also be prudent verify whether floor drains and other sanitary sewer outlets are, in fact, not connected to the sanitary sewer. Evidence we examined suggests they are not. If dye testing or other means show that these outlets do in fact discharge to the Housing Authority sewer line, modifications to the drainage system should be made so the facility is in compliance with industrial wastewater discharge requirements.

Future tenants may be subject to industrial wastewater discharge regulations and permit requirements. To continue using an old sewer line that appears to discharge into the Willamette River would be a violation of local and state law, and also an open-ended liability for tenant and owner alike. City regulations on storm water control are being rewritten and will be more stringent than existing regulations. Newer storm lines exist on NW 35th and on

SCHN00172259

NW Yeon.

We also recommend that surface soil samples be collected where the partially buried drainage pipe from the Terminal Transfer property enters the Chase Bag property.

The old acid neutralization tank from the Willard Storage Battery Company should be filled with concrete, sand, or crushed rock, or otherwise made more secure than it presently appears to be (see photo S). If sediment exists in this tank, samples should be analyzed for heavy metals, and pH characteristics.

The spills on the main floor of the facility, and on the floors of the two outbuildings, suggests the floors should be pressure washed and/or steam cleaned.

Upstairs from the main office area, we noted a small area of damaged wall board that could be cement asbestos wall board. In the main office area, we noted damaged ceiling tiles that may also contain asbestos.

Because of the inherent environmental liabilities associated with a 12000 gallon fuel oil tank over 40 years old, consideration should be given to removing this tank. It may be a good time to switch to natural gas, perhaps installing a smaller auxiliary fuel oil tank as back-up for fuel-switching.

Consideration should also be given to verifying the asbestos content of the wrapping around the boiler and associated piping. If it is an asbestos-containing material, in a friable condition, then it should be removed or encapsulated.

Nabisco

The only concern we note with respect to the Nabisco facility is the fact that it also appears to be connected to the old Housing Authority sewer line.

Though it appears all appropriate sanitary outlets are connected to the NW 35th sanitary line, consideration should be given to connecting storm drains, roof drains, etc. to newer storm lines on NW 35th or NW Yeon. In doing so, the existing buried storm water detention system must also be considered and probably incorporated into the NW 35th or NW Yeon storm lines.

The sewer manholes in the building should be evaluated for their condition, utility, and compliance with current building codes and city sewer access requirements.

SCHN00172260

INFORMATION SOURCES

1) Persons/ Offices Contacted

Oregon Department of Environmental Quality (DEQ), Northwest Regional Office

Helen Buschert - DEQ, Hazardous & Solid Waste Division

Michael Fernandez - DEQ, Environmental Cleanup Division (Terminal Transfer)

Tom Caufield - City of Portland Bureau of Environmental Services

Don Shires - City of Portland Bureau of Environmental Services

Jim McCadden - City of Portland Industrial Waste Management Office

Jeff Jackson - Oregon OSHA, Portland Office

John Mikkelson - Chase Bag

City of Portland Building Plans & Permit Center

City of Portland Bureau of Buildings Plumbing and Heating Permits Records

City of Portland Fire Marshal's Office

2) Reports, Plans, or Other Documents Reviewed

DEQ Northwest Region leaking underground tank report files for Nabisco and Trumbull Asphalt

DEQ Environmental Cleanup Division files for Terminal Transfer

Oregon OSHA files on Chase Bag

Polk City Directories

Sanborn Insurance Maps

SCHN00172261

APPENDIX A:

NABISCO (3506 NW 35TH) COMPLIANCE REVIEW DOCUMENTATION

NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

NEIL GOLDSCHMIDT GOVERNOR

PLEASE REFER TO THE INSTRUCTIONS AND GUIDANCE DOCUMENT, SEVEN STEPS FOR IDENTIFYING HAZARDOUS WASTES, BEFORE COMPLETING THIS FORM. THE INFORMATION REQUESTED HERE IS REQUIRED BY OREGON ADMINISTRATIVE RULE 340-102-0 THIS FORM IS USED IN LIEU OF EPA NOTIFICATION FORM 8700-12 IN THE STATE OF OREGON.

OFFICIAL USE ONLY
DEQ 102-012-89
DATE RECEIVED

1. NAME OF SITE

NAME: Nabisco Brands, Inc.

☐ **2. DO NOT GENERATE HAZARDOUS WASTE** DELETE NAME FROM LIST
(CHECK BOX IF APPLICABLE) COMPLETE SECTION 5

3. DEQ/EPA IDENTIFICATION NUMBER

IF BUSINESS INSTALLATION HAS DEQ/EPA ID NUMBER

ENTER HERE (12 digit number) ORD115485989

RECEIVED
JAN 04 1990
Hazardous & Solid Waste Division
Department of Environmental Quality

4. REASON FOR NOTIFICATION

(MARK ONE BOX ONLY)
REQUEST IS TO

- ☒ 1. OBTAIN DEQ/EPA ID NUMBER
- ☐ 2. WITHDRAW DEQ/EPA ID NUMBER
- ☐ 3. CANCEL DEQ/EPA ID NUMBER
- ☐ 4. REACTIVATE DEQ/EPA ID NUMBER
- ☐ 5. UPDATE NOTIFICATION INFORMATION

5. SITE INFORMATION

A. PHYSICAL LOCATION OF SITE

STREET ADDRESS: 3322 N.W. 35th Avenue

COUNTY: Multnomah

CITY, STATE, ZIP: Portland OR 97210-1634

B. MAILING ADDRESS OF SITE

STREET/P.O. BOX: 3322 N.W. 35th Avenue

CITY, STATE, ZIP: Portland, OR 97210-1634

C. LEGAL OWNER OF SITE

NAME: Nabisco Brands, Inc.

ADDRESS: 100 DeForest Avenue

P.O. BOX:

CITY, STATE, ZIP: East Hanover, NJ 07936

D. CONTACT AT THE SITE

NAME: Tracy Black

TITLE: Warehouse Supervisor

TELEPHONE: 503 228 6216 (WITH AREA CODE)

E. STANDARD INDUSTRIAL CODE (SIC)

(REFER TO ENCLOSED SIC LISTING)

PRIMARY: 2050

SECONDARY:

RUSH 1-5-90
#2323
cc: EPA NWR

F. SITE CLASSIFICATION

(SEE INSTRUCTIONS FOR EXPLANATION)

IDENTIFY ONE CATEGORY FOR EACH "TYPE"

(MARK ONE BOX ON EACH LINE)

	PRIVATE	FEDERAL	STATE	COUNTY	DISTRICT	MUNICIPAL	INDIAN
OWNER TYPE	X						
OPERATOR TYPE	X						
PROPERTY TYPE	X						

SCHN00172263

6. TYPE OF HAZARDOUS WASTE ACTIVITY

(MARK ALL APPROPRIATE BOXES)

YES NO
☐ ☒ A. HAZARDOUS WASTE TRANSPORTERS (FOR TRANSPORTERS ONLY)
1. TYPE OF TRANSPORTER (MARK APPROPRIATE BOX(ES))
☐ a. FOR OWN WASTE ONLY
☐ b. FOR COMMERCIAL PURPOSES
2. MODE OF TRANSPORTATION
☐ a AIR ☐ b. RAIL ☐ c. HIGHWAY ☐ d. WATER ☐ e. OTHER

YES NO
☒ ☐ B. HAZARDOUS WASTE GENERATOR

YES NO
☐ ☒ C. HAZARDOUS WASTE TREATMENT (NOTE: PERMIT MAY BE REQUIRED)

YES NO
☐ ☒ D. HAZARDOUS WASTE STORAGE (NOTE: PERMIT MAY BE REQUIRED)

YES NO
☐ ☒ E. HAZARDOUS WASTE DISPOSAL (NOTE: PERMIT MAY BE REQUIRED.)

YES NO
☐ ☒ F. HAZARDOUS WASTE RECYCLER
☐ 1. On-site ☐ 2. Off-site

YES NO
☐ ☒ G. MARKET OR BURN HAZARDOUS WASTE FUELS
(MARK APPROPRIATE BOXES)
☐ 1. GENERATOR MARKETING TO BURNER

3. BURNER (INDICATE TYPE OF COMBUSTION DEVICE)
TYPE OF COMBUSTION DEVICE
(MARK ALL APPROPRIATE BOXES TO INDICATE TYPE OF COMBUSTION DEVICE(S) IN WHICH HAZARDOUS WASTE FUEL IS BURNED)
☐ a. UTILITY BOILER
☐ b. INDUSTRIAL BOILER
☐ c. INDUSTRIAL FURNACE
☐ d. OTHER (PLEASE SPECIFY) _____

YES NO
☐ ☒ H. USED OIL FUEL ACTIVITIES (MARK APPROPRIATE BOXES)
☐ 1. GENERATOR MARKETING TO BURNER
☐ 2. OTHER MARKETER OF OFF-SPECIFICATION USED OIL
☐ 3. SPECIFICATION USED OIL FUEL MARKETER WHO FIRST CLAIMS USED OIL MEETS SPECIFICATIONS
☐ 4. BURNER OF OFF-SPECIFICATION USED OIL
(INDICATE TYPE OF COMBUSTION DEVICE)
TYPE OF COMBUSTION DEVICE
(MARK ALL APPROPRIATE BOXES TO INDICATE TYPE OF COMBUSTION DEVICE(S) IN WHICH OFF-SPECIFICATIONS USED OIL IS BURNED)
☐ a. UTILITY BOILER
☐ b. INDUSTRIAL BOILER
☐ c. INDUSTRIAL FURNACE
☐ d. OTHER (PLEASE SPECIFY): _____

7. DESCRIPTION OF HAZARDOUS WASTE - WASTE CODE

See attached waste profile

A. LISTED HAZARDOUS WASTE (SEE 40 CFR 261.30-33) USE ADDITIONAL SHEETS IF NECESSARY

K	K	K	K	F	F	F	F
P	P	P	P	U	U	U	U

B. CHARACTERISTIC HAZARDOUS WASTE (SEE 40CFR 261.20-24)

☐ IGNITABLE (D001)
☐ CORROSIVE (D002)
☐ REACTIVE (D003)
☐ EPTOXIC (MARK SPECIFIC CONTAMINANTS BELOW:)

☐ D004	☐ D008	☐ D012	☐ D016
☐ D005	☐ D009	☐ D013	☐ D017
☐ D006	☐ D010	☐ D014	
☐ D007	☐ D011	☐ D015	

C. OTHER WASTES (STATE OR NON-REGULATED WASTES REQUIRING AN ID NUMBER - SEE INSTRUCTIONS)

☐ X001 ☐ X002 ☐ X☐☐☐ ☐ X☐☐☐ ☐ X☐☐☐ ☐ OTHER (PLEASE SPECIFY) _____
USE ADDITIONAL SHEETS IF NECESSARY

8. HAZARDOUS WASTE GENERATOR STATUS

(COMPLETE IF APPLICABLE)

(MARK ONE ONLY) DETERMINE MAXIMUM AMOUNT OF HAZARDOUS WASTE GENERATED IN ANY ONE CALENDAR MONTH

☐ FRG (Fully Regulated Generator)
- generate 2,200 or more pounds of hazardous waste
- generate 2,200 or more pounds of spill cleanup debris
- generate more than 2.2 pounds of acutely hazardous waste
- generate more than 220 pounds of spill cleanup debris containing an acutely hazardous waste
- accumulate, at any time, more than 2.2 pounds of acutely hazardous waste on-site

☒ SQG (Small Quantity Generator)
- generate more than 220 pounds and less than 2,200 pounds of hazardous waste
- generate more than 220 pounds and less than 2,200 pounds of spill cleanup debris containing hazardous waste
- accumulate, at any time, more than a total of 2,200 pounds of hazardous waste on-site

☐ CEG (Conditionally Exempt Generator)
- generate 220 pounds or less of hazardous waste
- generate 220 pounds or less of spill cleanup debris containing hazardous waste
- generate 2.2 pounds or less of acutely hazardous waste
- accumulate, at any time, up to 2,200 pounds of hazardous waste on-site

(NOTE: RESPONSE IS OPTIONAL FOR CONDITIONALLY EXEMPT GENERATORS)

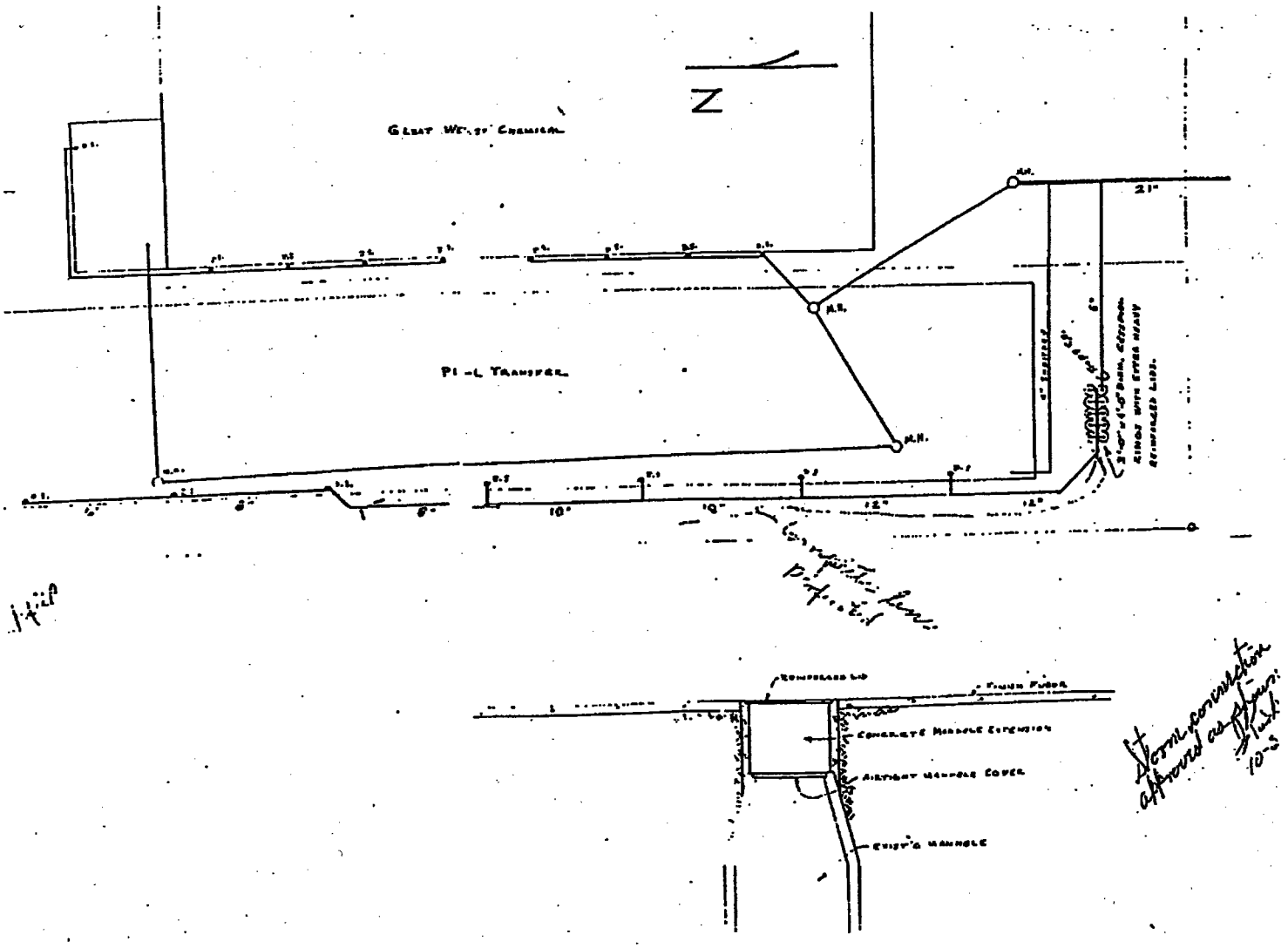
9. CERTIFICATION

SIGNATURE [signature]

Patrick J. Orlando	Vice President	12/28/89
NAME (please print or type)	OFFICIAL TITLE	DATE SIGNED

I certify that the information provided herein and appended hereto is true and accurate to the best of my knowledge, information and belief. Title 18 U > S > C > 1001 makes it a criminal offense for any person knowingly and willingly to make to any Agency or Department of the United States any false or fraudulent statements as to any matter within its jurisdiction.

SCHN00172264



SCHN00172265

2725

CITY OF PORTLAND, OREGON
DEPARTMENT OF PUBLIC WORKS
BUREAU OF DESIGN
SEWER BRANCH

Pmt. No.

Date 3-8-74

Location 3506 NW 35th

Between at NW YEON

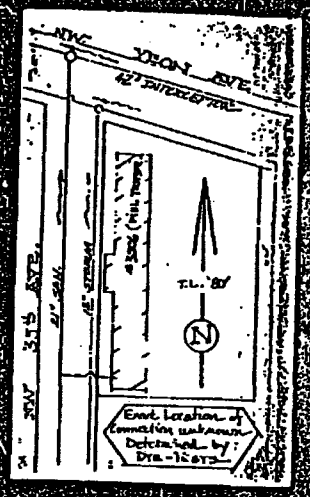
Addition IN 1E. SEC 28 Lot TL 80 Blk.

Applicant Waiver No ☐ Yes ☐ #

Remarks A SAN. CONNECTION TO THE NW 35th AVE. SAN. SEWER HAS BEEN CONFIRMED BY DYE-TESTS. SEE SKETCH ON REAR.

Inspected 3-8 1974 By DAN MILLER & JON STONE

Book Page New Repair



SCHN00172266

APPENDIX B:

CHASE BAG (3720 NW YEON) COMPLIANCE REVIEW DOCUMENTATION

NEIL GOLDSCHMIDT
GOVERNOR

NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

PLEASE REFER TO THE INSTRUCTIONS AND GUIDANCE DOCUMENT, SEVEN STEPS FOR IDENTIFYING HAZARDOUS WASTES, BEFORE COMPLETING THIS FORM. THE INFORMATION REQUESTED HERE IS REQUIRED BY OREGON ADMINISTRATIVE RULE 340-102-012. THIS FORM IS USED IN LIEU OF EPA NOTIFICATION FORM 8700-12 IN THE STATE OF OREGON.

OFFICIAL USE ONLY
DEQ 102-012-89
DATE RECEIVED

1. NAME OF SITE (PLEASE CORRECT INFORMATION IN SPACE PROVIDED)

NAME CHASE PACKAGING CORP

2. DO NOT GENERATE HAZARDOUS WASTE

☑ (CHECK BOX IF APPLICABLE) COMPLETE SECTION 5 — DELETE NAME FROM LIST

3. DEQ/EPA IDENTIFICATION NUMBER

IF BUSINESS INSTALLATION HAS DEQ/EPA ID NUMBER

ENTER HERE (12 digit number)

4. REASON FOR NOTIFICATION

(MARK ONE BOX ONLY)
REQUEST IS TO

- ☐ 1. OBTAIN DEQ/EPA ID NUMBER
- ☐ 2. WITHDRAW DEQ/EPA ID NUMBER
- ☐ 3. CANCEL DEQ/EPA ID NUMBER
- ☐ 4. REACTIVATE DEQ/EPA ID NUMBER
- ☐ 5. UPDATE NOTIFICATION INFORMATION

5. SITE INFORMATION (PLEASE CORRECT INFORMATION IN SPACE PROVIDED)

A. PHYSICAL LOCATION OF SITE

STREET ADDRESS 3720 NW YEON

COUNTY MULTNOMAH

CITY, STATE, ZIP PORTLAND OR 97210

B. MAILING ADDRESS OF SITE

STREET/P.O. BOX 3720 NW YEON

CITY, STATE, ZIP PORTLAND OR 97210

C. LEGAL OWNER OF SITE

NAME CHASE PACKAGING CORP

ST 2 GREENWICH PLAZA

P.O. BOX

CITY, STATE, ZIP GREENWICH CT 06836

D. CONTACT AT THE SITE

NAME M D MIKKELSON

TITLE GEN MGR

TELEPHONE 228-4366 (WITH AREA CODE)

E. STANDARD INDUSTRIAL CODE (SIC)

(REFER TO ENCLOSED SIC LISTING)

PRIMARY 2621

SECONDARY

F. SITE CLASSIFICATION

(SEE INSTRUCTIONS FOR EXPLANATION)

IDENTIFY ONE CATEGORY FOR EACH "TYPE"

(MARK ONE BOX ON EACH LINE.)

	PRIVATE	FEDERAL	STATE	COUNTY	DISTRICT	MUNICIPAL	INDIAN
OWNER TYPE							
OPERATOR TYPE							
PROPERTY TYPE							

SCHN00172268

(MARK ALL APPROPRIATE BOXES)

YES NO ☐ ☐ A. HAZARDOUS WASTE TRANSPORTERS (FOR TRANSPORTERS ONLY)
1. TYPE OF TRANSPORTER (MARK APPROPRIATE BOXES)
☐ a. FOR OWN WASTE ONLY
☐ b. FOR COMMERCIAL PURPOSES
2. MODE OF TRANSPORTATION
☐ a. AIR ☐ b. RAIL ☐ c. HIGHWAY ☐ d. WATER ☐ e. OTHER

YES NO ☐ ☐ B. HAZARDOUS WASTE GENERATOR

YES NO ☐ ☐ C. HAZARDOUS WASTE TREATMENT (NOTE PERMIT MAY BE REQUIRED)

YES NO ☐ ☐ D. HAZARDOUS WASTE STORAGE (NOTE PERMIT MAY BE REQUIRED)

YES NO ☐ ☐ E. HAZARDOUS WASTE DISPOSAL (NOTE PERMIT MAY BE REQUIRED)

YES NO ☐ ☐ F. HAZARDOUS WASTE RECYCLER
☐ 1. On-site ☐ 2. Off-site

YES NO ☐ ☐ G. MARKET OR BURN HAZARDOUS WASTE FUELS
(MARK APPROPRIATE BOXES)
☐ 1. GENERATOR MARKETING TO BURNER
3. BURNER (INDICATE TYPE OF COMBUSTION DEVICE)
TYPE OF COMBUSTION DEVICE
(MARK ALL APPROPRIATE BOXES TO INDICATE TYPE OF COMBUSTION DEVICE(S) IN WHICH HAZARDOUS WASTE FUEL IS BURNED)
☐ a. UTILITY BOILER
☐ b. INDUSTRIAL BOILER
☐ c. INDUSTRIAL FURNACE
☐ d. OTHER (PLEASE SPECIFY) _____

YES NO ☐ ☐ H. USED OIL FUEL ACTIVITIES (MARK APPROPRIATE BOXES)
☐ 1. GENERATOR MARKETING TO BURNER
☐ 2. OTHER MARKETER OF OFF-SPECIFICATION USED OIL
☐ 3. SPECIFICATION USED OIL FUEL MARKETER WHO FIRST CLAIMS USED OIL MEETS SPECIFICATIONS
☐ 4. BURNER OF OFF-SPECIFICATION USED OIL
(INDICATE TYPE OF COMBUSTION DEVICE)
TYPE OF COMBUSTION DEVICE
(MARK ALL APPROPRIATE BOXES TO INDICATE TYPE OF COMBUSTION DEVICE(S) IN WHICH OFF-SPECIFICATIONS USED OIL IS BURNED)
☐ a. UTILITY BOILER
☐ b. INDUSTRIAL BOILER
☐ c. INDUSTRIAL FURNACE
☐ d. OTHER (PLEASE SPECIFY): _____

7. DESCRIPTION OF HAZARDOUS WASTE - WASTE CODE

A. LISTED HAZARDOUS WASTE (SEE 40 CFR 261.30-33) USE ADDITIONAL SHEETS IF NECESSARY

K	K	K	K	F	F	F	F
P	P	P	P	U	U	U	U

B. CHARACTERISTIC HAZARDOUS WASTE (SEE 40CFR 261.20-24)

☐ IGNITABLE (D001)
☐ CORROSIVE (D002)
☐ REACTIVE (D003)
☐ EPTOXIC (MARK SPECIFIC CONTAMINANTS BELOW:)

☐ D004	☐ D008	☐ D012	☐ D016
☐ D005	☐ D009	☐ D013	☐ D017
☐ D006	☐ D010	☐ D014	
☐ D007	☐ D011	☐ D015	

C. OTHER WASTES (STATE OR NON-REGULATED WASTES REQUIRING AN ID NUMBER - SEE INSTRUCTIONS)

☐ X001 ☐ X002 ☐ X ☐ X ☐ X ☐ OTHER (PLEASE SPECIFY) _____
USE ADDITIONAL SHEETS IF NECESSARY

8. HAZARDOUS WASTE GENERATOR STATUS

(COMPLETE IF APPLICABLE)

(MARK ONE ONLY) DETERMINE MAXIMUM AMOUNT OF HAZARDOUS WASTE GENERATED IN ANY ONE CALENDAR MONTH

☐ FRG (Fully Regulated Generator)
- generate 2,200 or more pounds of hazardous waste
- generate 2,200 or more pounds of spill cleanup debris
- generate more than 2.2 pounds of acutely hazardous waste
- generate more than 220 pounds of spill cleanup debris containing an acutely hazardous waste
- accumulate, at any time, more than 2.2 pounds of acutely hazardous waste on-site

☐ SQG (Small Quantity Generator)
- generate more than 220 pounds and less than 2,200 pounds of hazardous waste
- generate more than 220 pounds and less than 2,200 pounds of spill cleanup debris containing hazardous waste
- accumulate, at any time, more than a total of 2,200 pounds of hazardous waste on-site

☐ CEG (Conditionally Exempt Generator)
- generate 220 pounds or less of hazardous waste
- generate 220 pounds or less of spill cleanup debris containing hazardous waste
- generate 2.2 pounds or less of acutely hazardous waste
- accumulate, at any time, up to 2,200 pounds of hazardous waste on-site

(NOTE: RESPONSE IS OPTIONAL FOR CONDITIONALLY EXEMPT GENERATORS)

9. CERTIFICATION

SIGNATURE John Mikkelsen

John Mikkelsen	Office Manager	4/28/93
NAME (please print or type)	OFFICIAL TITLE	DATE SIGNED

I certify that the information provided herein and appended hereto is true and accurate to the best of my knowledge, information and belief. Title 18 U > S > C > 1001 makes it a criminal offense for any person knowingly and willingly to make to any Agency or Department of the United States any false or fraudulent statements as to any matter within its jurisdiction.

25 C

CHEMCENTRAL
PORTLAND

CHEMCENTRAL/Portland 10821 N. Lombard St. P.O. Box 83158 Portland, Oregon 97283 (503) 286-5821

5-4-90

Oregon OSHA
9500 S.W. Barbur Blvd., Suite #200
Portland Oregon 97219

Attn: Mr. Jeff Jackson

Material Safety Data Sheets for the following products are attached to this letter:

CB# 3: VM&P
IPA
Acetone
MIBK
Toluene
Glycol Ether EB

The dissemination of this information to your employees may be required by law. This information is provided to you in hopes that the information contained on the Material Safety Data Sheet will be of value to you providing a safe work environment for your employee.

If you need additional Material Safety Data sheets, or further information concerning the safe handling of the materials you ordered, please contact your CHEMCENTRAL sales representative.

Very truly yours,

H. D. Hughes
General Manager

klg

PETROLEUM EQUIPMENT MAINTENANCE CO.

P.O. BOX 11569 • 2310 NE COLUMBIA BLVD.
PORTLAND, OREGON 97211-0566
(503) 288-7541

RECEIVED
MAR 15 1988

RECEIVED
MAR 16 1988
NORTHWEST REGION

March 14, 1988

DEQ
811 S.W. 6th Avenue
Portland, OR 97204

ATTN: Mr. Chuck Clinton

Dear Chuck:

I am writing you and your DEQ to notify you of the following tank removals for Schnitzer Investment Corporation, 3200 N.W. Yeon, Portland, Oregon:

1. Schnitzer Investment Corporation F 6306
   3200 N.W. Yeon O 56620
   Portland, Oregon

   which tanks?

   Removal of (1) 5,000 gallon and (1) 10,000 gallon fuel tanks.

2. Chase Bag F 6320
   3720 N.W. Yeon O 56620
   Portland, Oregon

   heating oil?

   Removal of (1) 1,000 gallon and (1) 12,000 gallon fuel tanks.

3. Hampel Enterprises F 6318
   2233 N.W. 23rd O 56620
   Portland, Oregon #1

   entered 5/10/88 mp

   Removal of (1) fuel tank, size unknown

4. Marine Ways F 6631
   8940 N. Bradford O 56620
   Portland, Oregon

   Removal of (2) fuel tanks, size unknown

Hazardous & Solid Waste Division
Dept. of Environmental Quality
RECEIVED
MAR 18 1987

only 1

5. Alaska Steel F 6321
   2750 S.W. Moody O 56620
   Portland, Oregon

   entered 5/10/88 mp

   Removal of (2) 3,000 gallon fuel tanks.

   #2 3,500

SCHN00172271

WILLARD STORAGE BATTERY CO. PLUMBING/SEWER CONNECTION REPORTS

FORM W-89 (11-1-45)

BUREAU OF BUILDINGS
REPORT OF PLUMBING INSPECTION

Date 10/7/46

Address 3720 N. W. Yeon Permit 182459

Lot Blk Add Guilds Lake Industrial Plot

Owner Willard Battery Co.

Contractor A. G. Rushlight & Co. ENTERED

Stories and class of building

Toilets 1 Floor Drains Beer Cab

Bath Tubs Rain Drains Refr. Drains

Bath Showers Fountains Urinals 1

Basins H. W. Tanks Catch Basins

Sinks Cesspool Water Service

Laundry Trays Dry Wells Connected to

Water Permits 175911 Sewer Permit

Other Plumbing Fixtures Bldg. permit 287044

Date of First Inspection Date of Final Inspection

Inspector. Inspector

Date of First Certificate Date of Final Certificate

FORM W-89 (10-1-46)

BUREAU OF BUILDINGS
REPORT OF PLUMBING INSPECTION

Address 3720 NW Yeon Date 5/14/47

Lot Blk Add SEE LARGE DRAWING Permit 187808

Owner Willard Storage Battery Co. ENTERED #13

Contractor Urban Plbg. & Htg. Co.

Stories and class of building 1 story new factory

Toilets 9 Floor Drains 32 Beer Cab

Bath Tubs Rain Drains 25 Refr. Drains

Bath Showers 10 Fountains 6 drnkg. Urinals 6

Basins 3 H. W. Tanks 2 Catch Basins

Sinks 4 Cesspool Water Service 1

Laundry Trays Dry Wells Conn. To Sewer

Water Permit 181619 Bldg. Pmt. Roll plan #13 Sewer Permit 62949

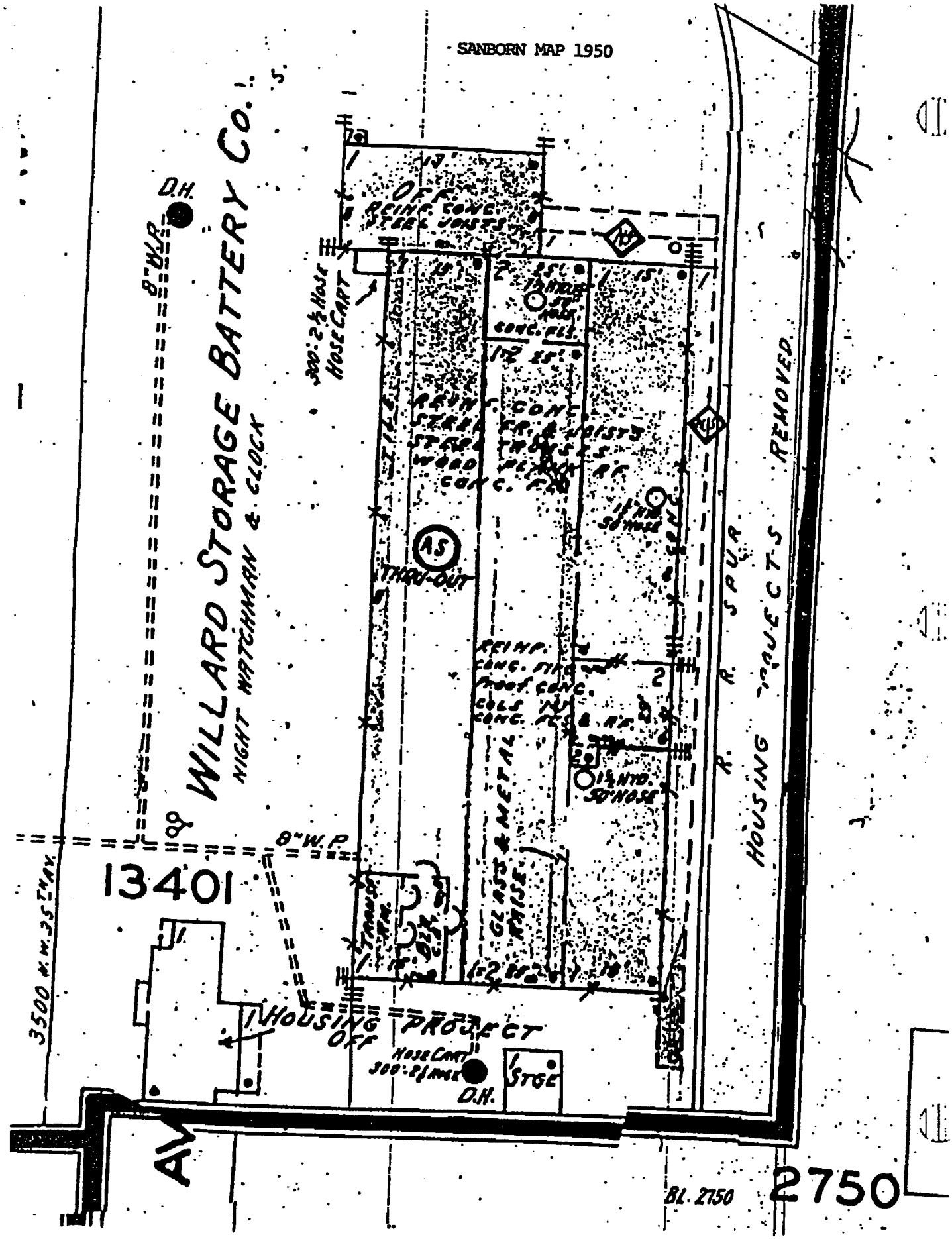
Remarks 6 area drns. 1 slop snk. 1 blr. blow off 1 foot bath 4 wash-up snks. 10 sprnkg. drns. 5 sumps. Connect to Hsg. Auth. Sewer

Date of First Inspection Date of Final Inspection

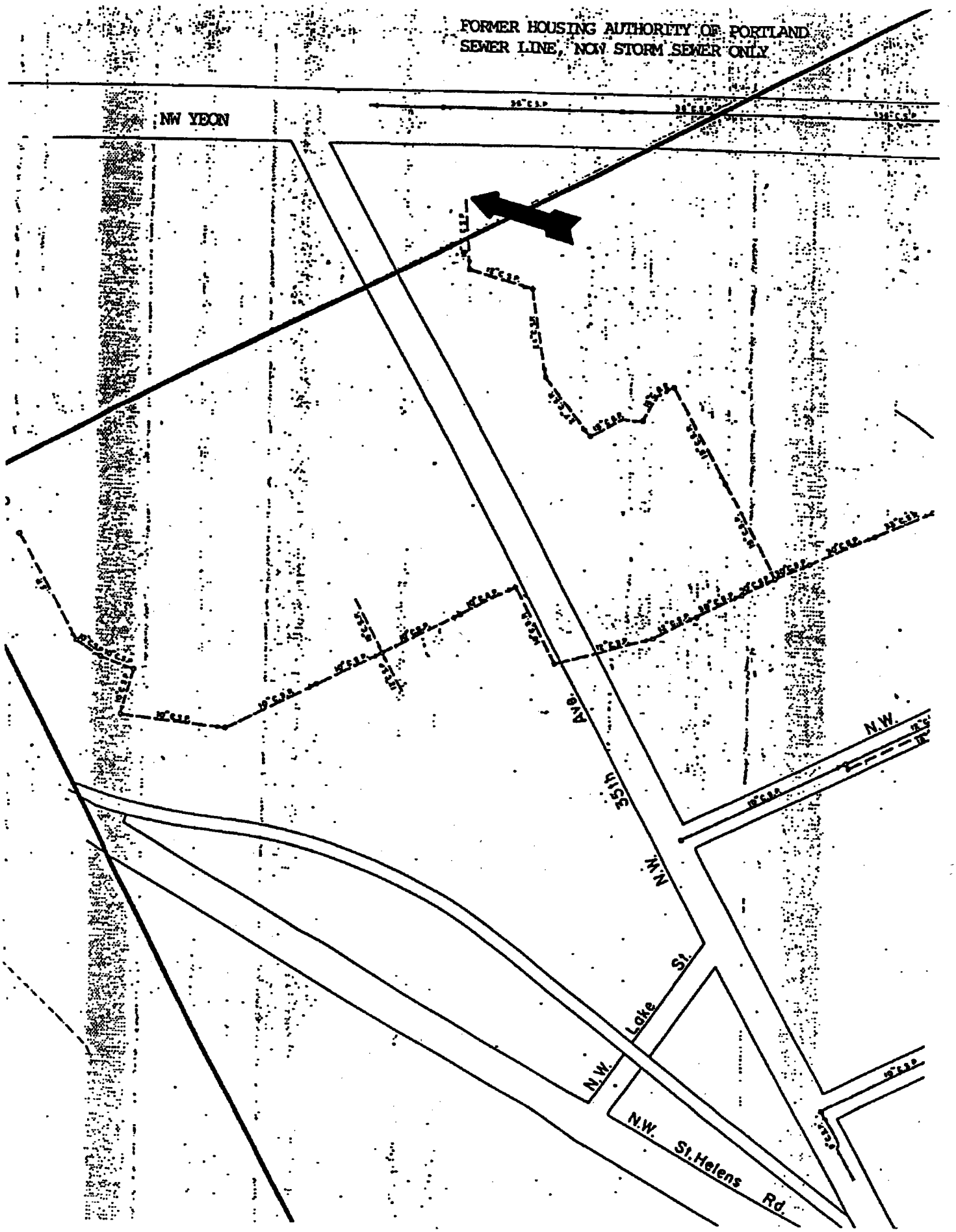
Inspector Inspector

SCHN00172272

SANBORN MAP 1950

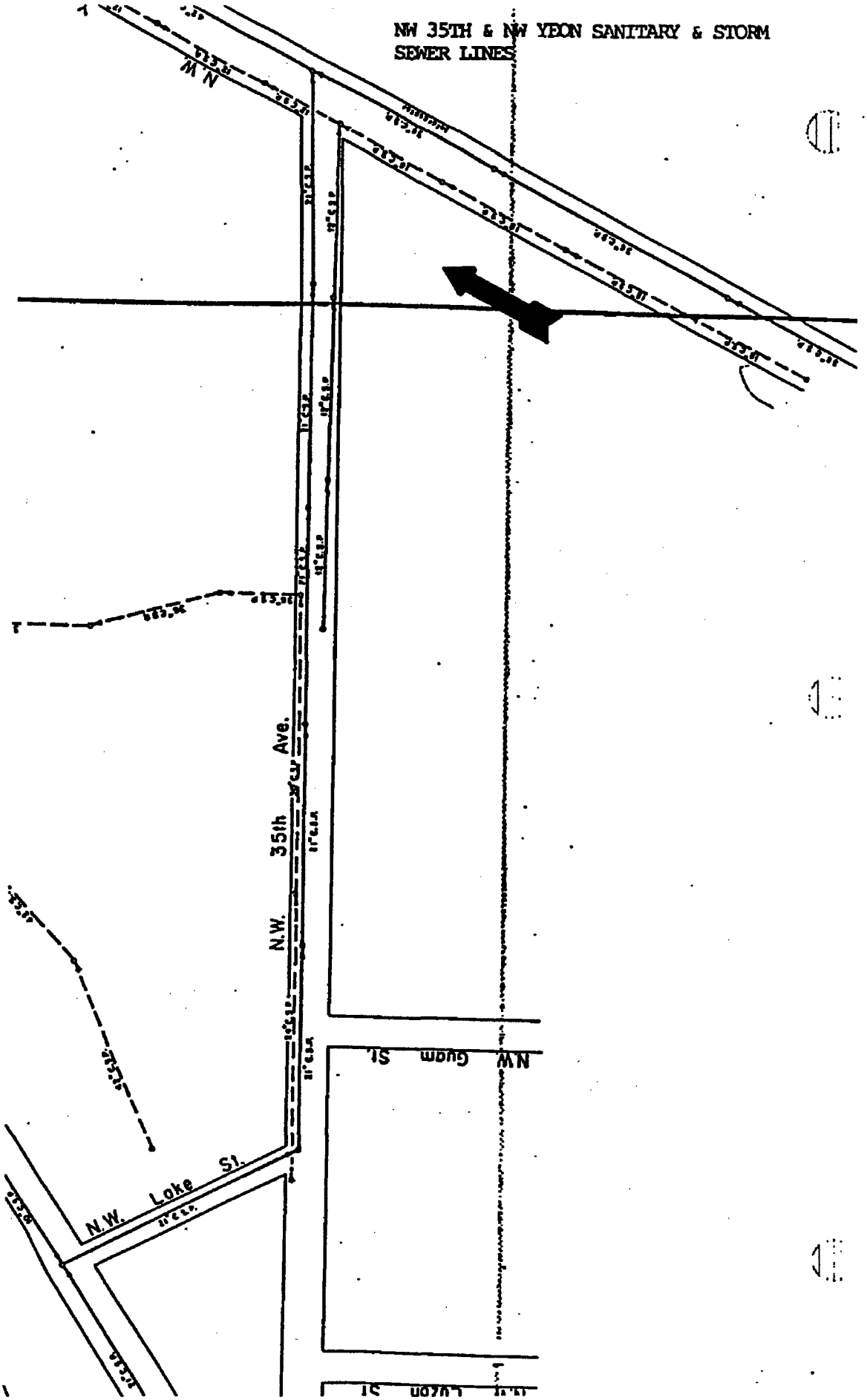


SCHN00172273

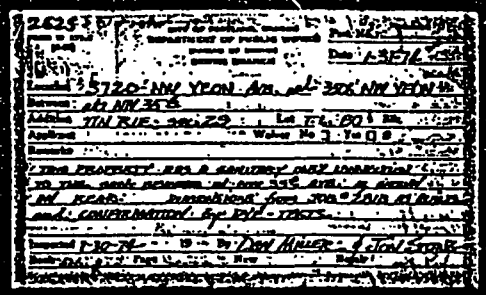


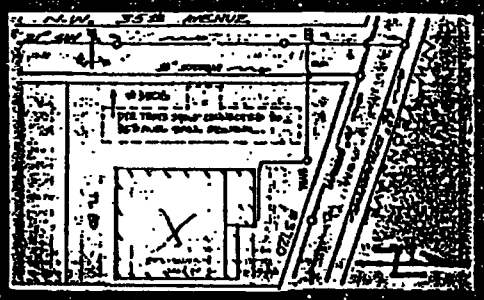
SCHN00172274

NW 35TH & NW YEON SANITARY & STORM SEWER LINES



SCHN00172275





SCHN00172276

2-21-74

NOTE TO FILE:

ACE HARDWARE (nee GREAT WESTERN CHEM. Co.) at #3720 NW YEON is provisionally separated.

Dye tests by DTM and JSS JAN 1974 confirm all currently used sanitary facilities go to a SMH in front of office and thence to the 35th Ave. San. sewer. No appreciable quantity of storm water enters the san. system: the flow through the Sump-MH was no greater during storm than during dry weather.

However, there remains a large amount of plumbing which was used by Great Western but not by ACE which is probably incorrectly connected. Especially the rear restroom (on So. wall) is suspect.

ACE MAY NOT BE LOCATED HERE MUCH LONGER.
IT IS RECOMMENDED THAT, at the time ACE vacates, a thorough investigation be made and SEPARATION be completed.

JON STOVE

#5506 NW 35th on same prop., but occupied by PIEHL TRANSFER is SEPARATED. DYE TESTS 3-8-74.

SCHN00172277

APPENDIX C:

TRUMBULL ASHPAHLT (3750 NW YEON)
EXCERPTS FROM DEQ NORTHWEST REGION FILE

Department of Environmental Quality

811 SW SIXTH AVENUE, PORTLAND, OREGON 97204-1390 PHONE (503) 229-5696

July 24, 1990

Mr. David Crowle
Owens/Corning Fiberglass
Environmental Affairs Department
Fiberglass Tower
Toledo, Ohio 43659

Re: UST-Multnomah County
Trumbull Asphalt Fume Line

Dear Mr. Crowle:

We have completed our review of the information that has been submitted to the Department to date concerning the contamination identified at the Trumbull Asphalt Plant in Portland, Oregon.

This information indicates that significant soil and groundwater contamination remain at the site. Up to 162,013 parts per million total petroleum hydrocarbons were identified in the soil at the site and free product was identified on the groundwater. Additional investigation and cleanup are necessary in order to mitigate the environmental hazards at the site.

Specifically, the following concerns must be met:

1: The investigation conducted by Crosby and Overton identified the highest concentrations of contamination in the south west portion of the property. Other than the soil gas study, no additional investigation has been conducted in this portion of the property. Although some questions have been raised in the past about possible offsite contamination impacting your facility, your facility is the most likely source of this contamination.

2: We concur that the soil gas study indicates that there may be two separate plumes on the property. However, no investigation has been conducted in the northern portion of the soil gas plume to identify the concentrations of contamination or potential source of this problem.

We are concerned that the release was identified two years ago and that insufficient investigation and no significant cleanup has been conducted to date. Additional investigation must be conducted as soon as possible to define the limits of the contamination both on and offsite. This will require notifying off site property owners of the problem. A copy of the sampling plan must be submitted to the Department for review prior to implementation.

The additional investigation must include soil and groundwater analyses for benzene, ethylbenzene, toluene, and xylenes. Also, groundwater elevations are required every time the monitoring wells are sampled.

Steps must also be initiated to identify possible cleanup solutions. A corrective action plan must be prepared and submitted to the Department for review.

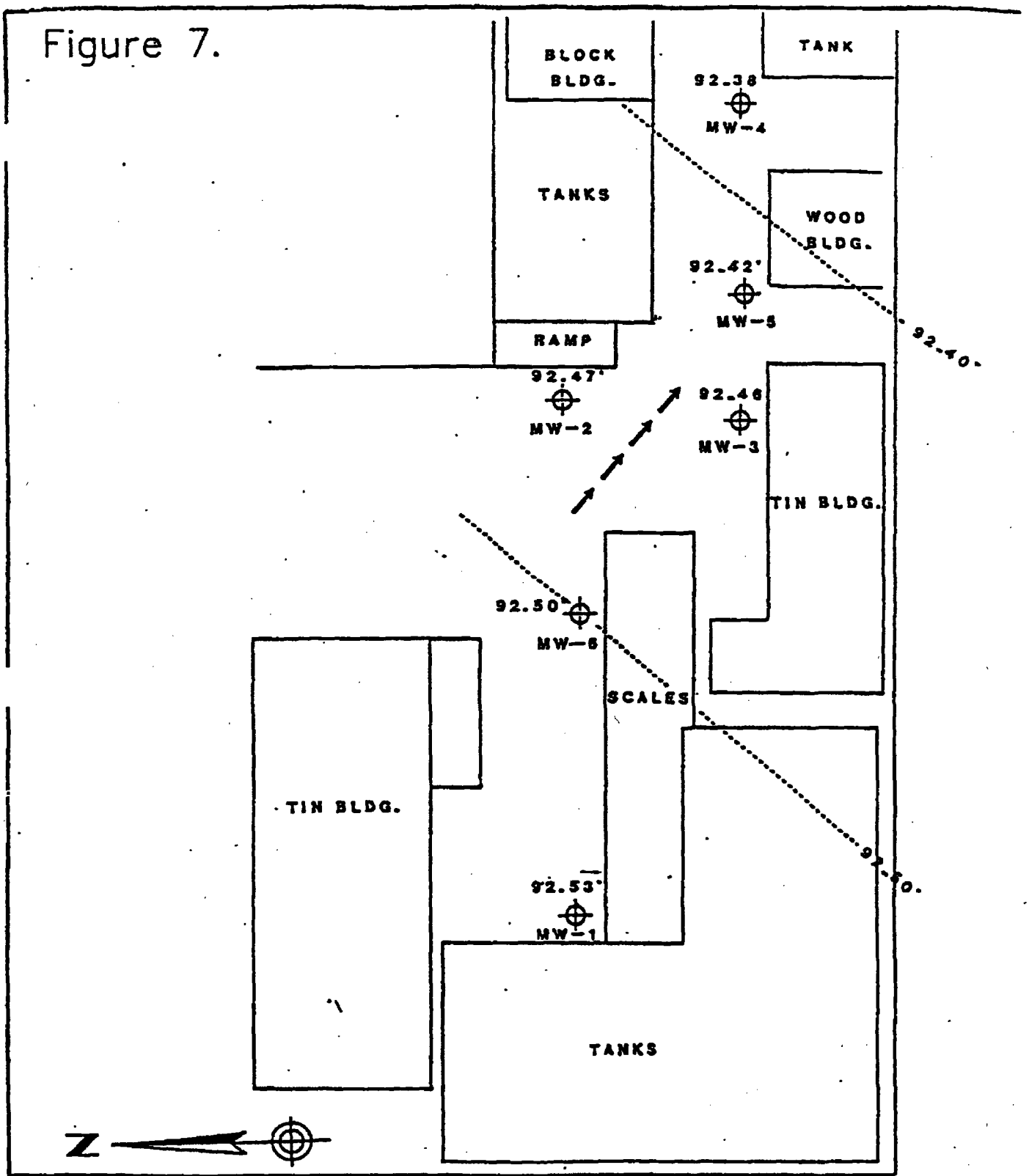
Please submit a letter by August 10, 1990, indicating when the additional investigation will be performed. If you have any questions regarding this matter, please contact me at (503) 229-6923.

Sincerely,

Andree Pollock
UST Cleanup Specialist
Northwest Region

cc: Environmental Cleanup Division, UST Cleanup Section

Figure 7.



LEGEND

⊕ = MONITORING WELL LOCATION

↗ = DIRECTION OF GROUNDWATER MOVEMENT

MW = MONITORING WELL NUMBER

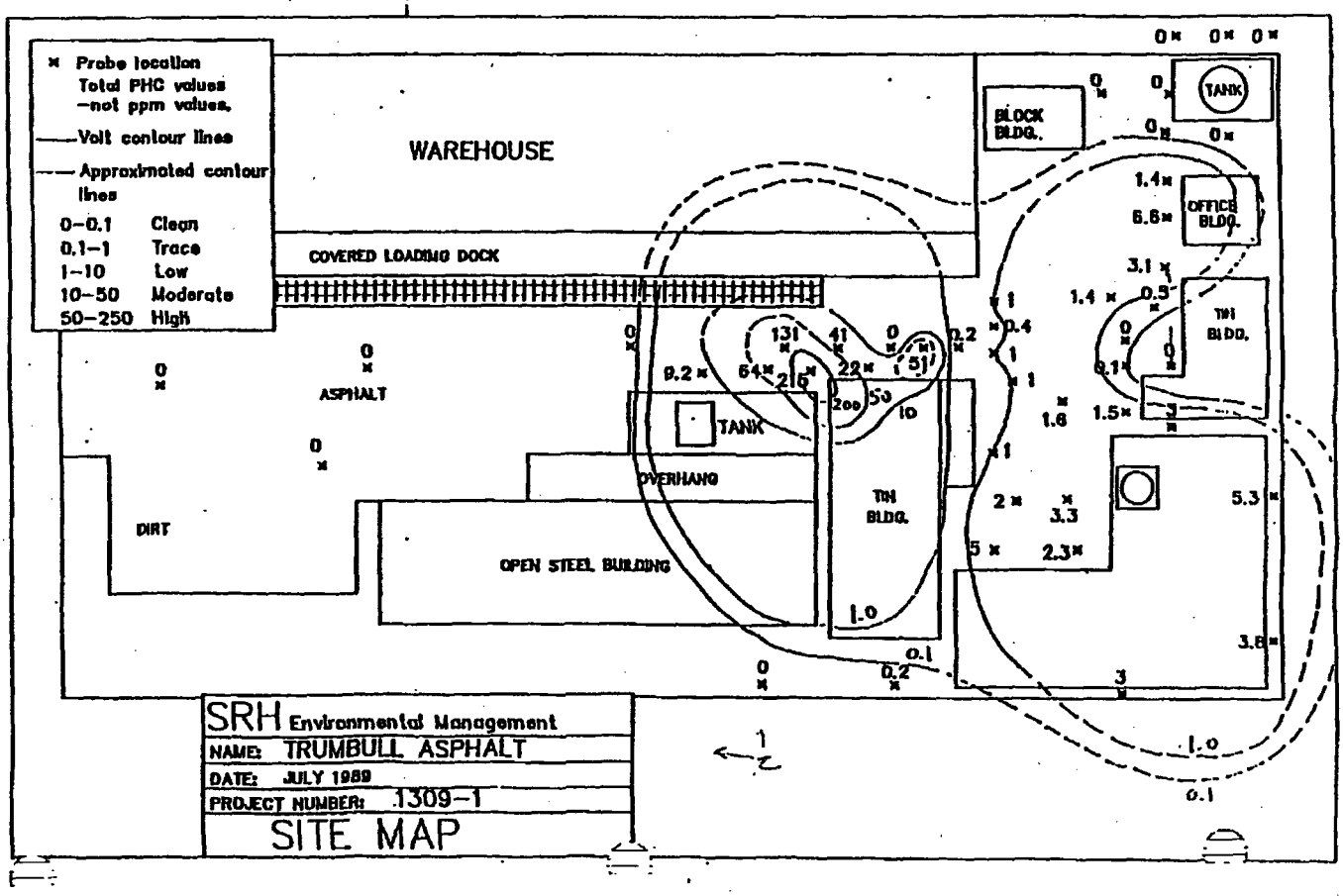
92.50' = GROUNDWATER ELEVATION (RELATIVE)

SRH ENVIRONMENTAL MANAGEMENT

SCALE 1"=30'	CHECKED BY	DRAWN BY
DATE		
SIZE	TRUMBULL ASPHALT GROUNDWATER ELEVATIONS AND MOVEMENT	DRAWING NO.

SCHN00172281

Figure 3. Soil Gas Contour Map



SCHN00172282

APPENDIX D:

NABISCO (3322 NW 35TH)
EXCERPTS FROM DEQ NORTHWEST REGION FILE

TOM NEW
CONSTRUCTION COMPANY
An Oregon Corporation

11053 S.E. Division
Portland, Oregon 97266

(503) 257-9292

Mailing Address:
P.O. Box 16061
Portland, Oregon 97216

Dept. of Environmental Quality
RECEIVED
SEP 17 1990
NORTHWEST REGION

September 13, 1990

D.E.Q.
811 S.W. 6th Avenue
Portland, OR 97204-1390

RE: Nabisco Warehouse/Hill Investment

Dear Andree Pollock:

In regards to your letter dated August 13, 1990, concerning the underground storage tank decommissioning and contaminated soil cleanup conducted at 3322 N.W. 35th Avenue in Portland, OR. The following measures have been met per your request.

1. On August 31, 1990 closure samples were core drilled and taken. The depth of the samples ranged from 7' to 13' (see enclosed copy). The samples range from 109 ppm to a trace (see enclosed map) which is below the matrix evaluation of 500 ppm at the site which is a level 2. As stated in the previous letter dated August 3, 1990 from Tom New Construction Company some contaminated soil had to be left due to the truck scale becoming undermined and the broken water lines. Closure sample B-5 taken on August 31, 1990 in that area shows 34,150 ppm. In order for that contaminated soil to have been removed, the water lines and truck scale would have had to be taken out. D.E.Q. visited the site and ok'd the hole to be backfilled due to the complications of the water lines and truck scale. Enclosed is a map and The Chain of Custody Report for the closure samples taken on August 31, 1990.

2. As stated previously in the letter dated August 3, 1990, during the excavation the water table was not encountered. The water in the hole was from the broken water lines, therefore no water samples were taken.

3. As stated in #1 above, the matrix evaluation done at the site came out to be a level 2.

4. Enclosed are copies of The Chain of Custody forms that were not included in the original report.

If you have any further questions regarding this project, please call

TOM NEW
CONSTRUCTION COMPANY
An Oregon Corporation

11053 S.E. Division
Portland, Oregon 97266

(503) 257-9292

Mailing Address:
P.O. Box 16061
Portland, Oregon 97216

Tom New or myself at (503) 257-9292.

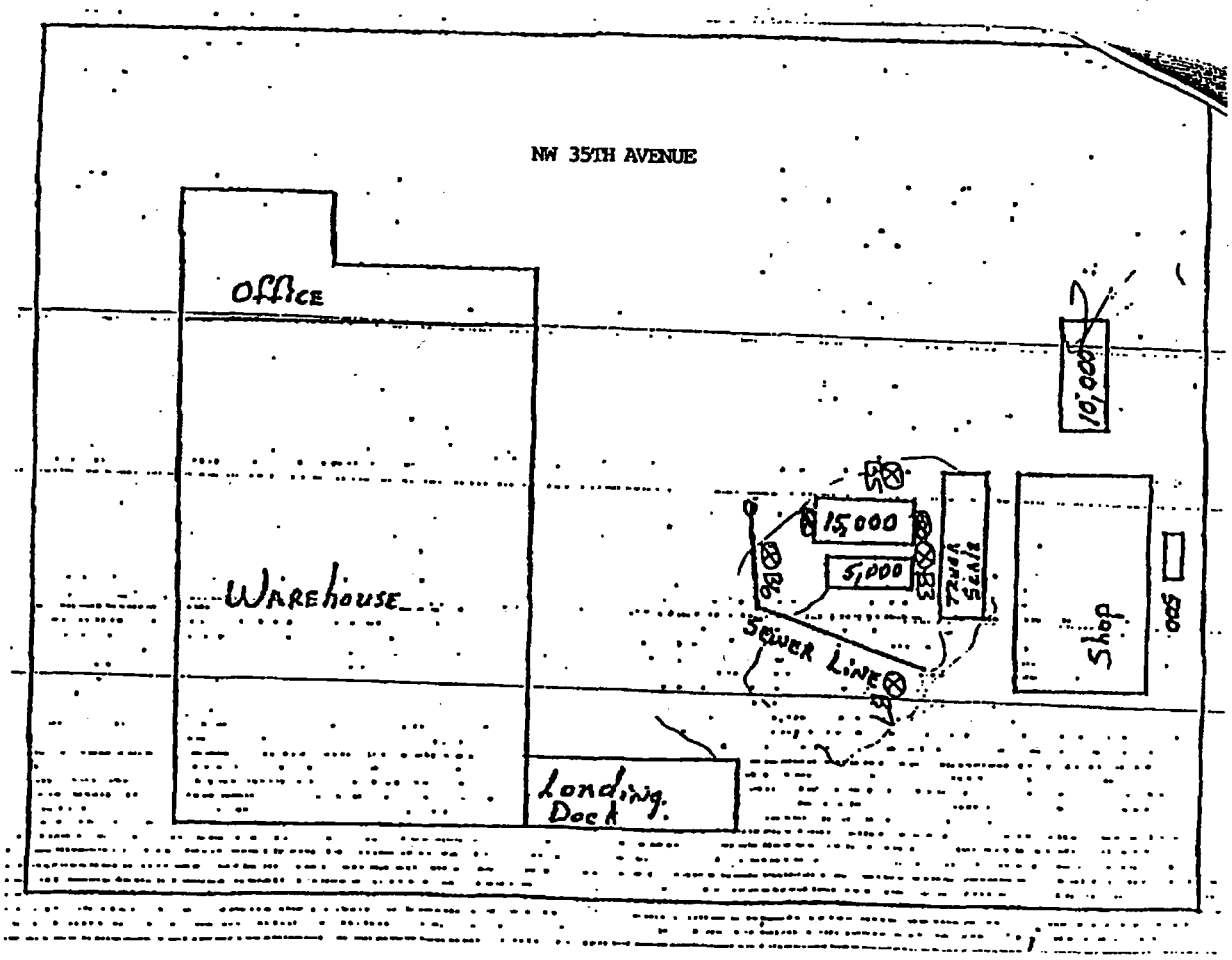
Sincerely,

Dean Haworth

cc Ernest Augustino
Jim Barnes - Norris and Stevens

Enclosures

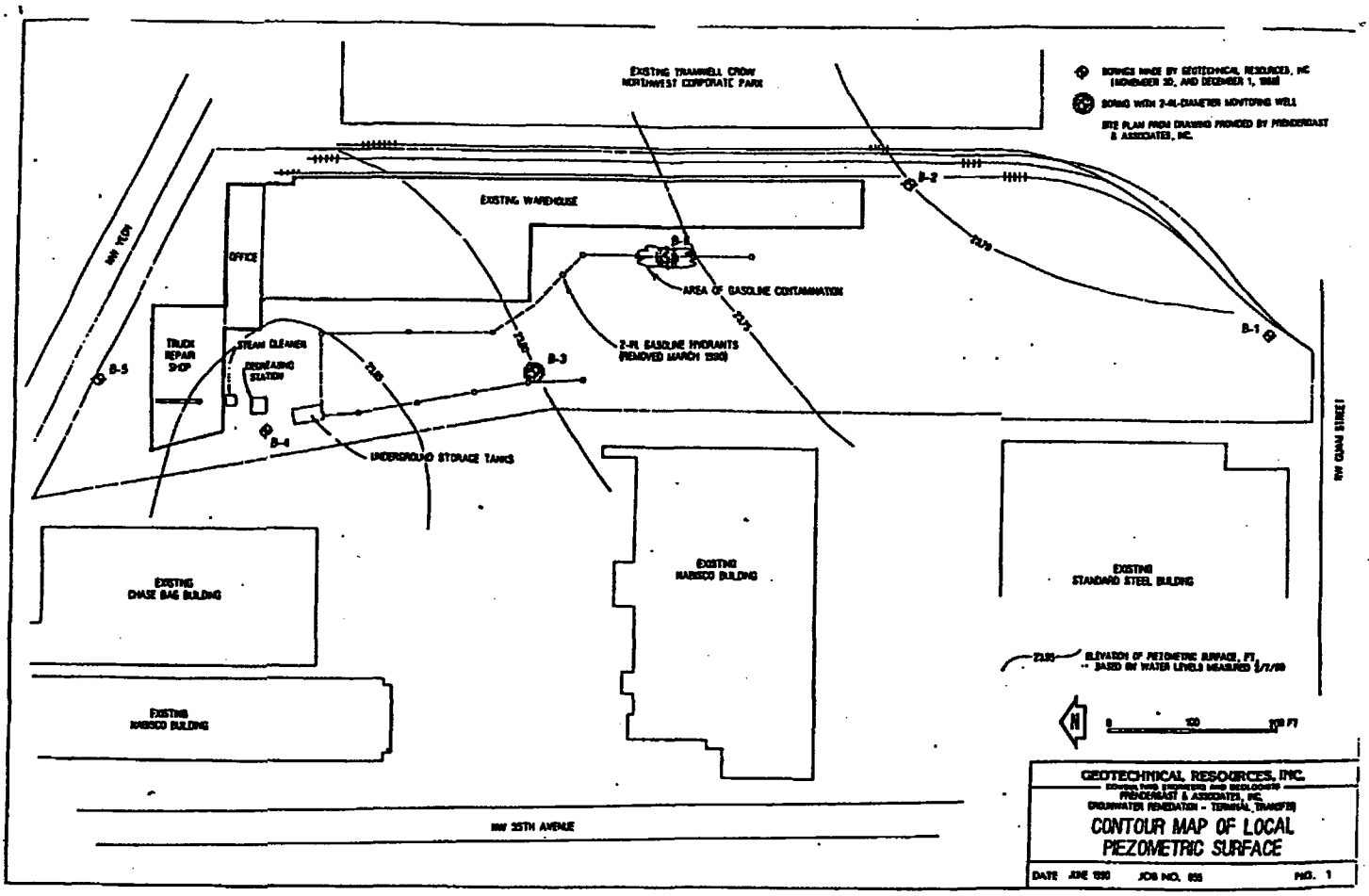
dh/DH



SCHN00172286

APPENDIX E:

TERMINAL TRANSFER (3601 NW YEON)
EXCERPTS FROM DEQ ENVIRONMENTAL CLEANUP DIVISION FILE



SCHN00172288

APPENDIX F

NABISCO AND CHASE BAG COMPLIANCE REVIEW
SITE INSPECTION PHOTOGRAPHS

GUIDE TO PHOTOGRAPHS IN APPENDIX F

NABISCO (3506 NW 35TH)

A. RAIL SPUR AREA BETWEEN NABISCO AND CHASE BAG
B. INTERIOR OF WAREHOUSE
C. SEWER MANHOLE ON FLOOR INSIDE WAREHOUSE

CHASE BAG (3720 NW YEON)

D. NORTH END OFFICE AREA OF CHASE BAG
E. BARRELS FOR DISPOSAL IN YARD AREA
F. BARRELS FOR DISPOSAL IN YARD AREA
G. BARRELS FOR DISPOSAL IN STORAGE SHED
H. BARRELS FOR DISPOSAL ON RAIL LOADING DOCK
I. DIASSEMBLY OF EQUIPMENT, CLEANUP ACTIVITIES
J. ABSORBENT MATERIAL ON FLOOR
K. CLOGGED FLOOR DRAIN
L. OIL SPILL ON FLOOR
M. BUCKET UNDER BOILER FEED LINE
N. BOILER IN SOUTHWEST CORNER OF BUILDING
O. ASSOCIATED PIPING
P. BOILER ROOM
Q. BOILER ROOM
R. PARTIALLY COVERED EAST/WEST TRENCH DRAIN
S. ACID NEUTRALIZATION TANK (WILLARD STORAGE BATTERY CO.)
T. PIPE FROM TERMINAL TRANSFER INTO CHASE BAG MANHOLE TO FORMER HOUSING AUTHORITY SEWER LINE
U. LOOKING AT TERMINAL TRANSFER IN PIPE DIRECTION
V. INSIDE OF INCINERATOR
X. STORAGE SHED FLOOR AND CEMENT MASONRY WALL
Y. STORAGE SHED CEMENT MASONRY WALL
Z. GENERAL PICTURE OF CHASE BAG MAIN BUILDING AREA

1. SLOP SINK(?) NEAR BOILER ROOM, DRAIN/SUMP UNDERNEATH
2. DRAIN/SUMP CLOSEUP, POSSIBLY NOT CONNECTED TO SEWERS
3. FORMER PRINTING PRESS OPERATION AREA, IN SOUTHWEST QUADRANT OF BUILDING
4. WILLARD STORAGE ACID MIXING AND STORAGE ROOM, UPSTAIRS ON EAST SIDE OF BUILDING
5. WILLARD STORAGE ACID MIXING AND STORAGE ROOM, UPSTAIRS ON EAST SIDE OF BUILDING
6. WILLARD STORAGE ACID MIXING AND STORAGE ROOM, UPSTAIRS ON EAST SIDE OF BUILDING

CHASE BAG GUIDE TO PHOTOGRAPHS (continued)

7. AREA UNDERNEATH RAIL LOADING DOCK ON EAST SIDE NEAR ACID NEUTRALIZATION TANK, POSSIBLE ENTRY WAY OF TRENCH DRAINS
8. DRAIN/SUMP UNDERNEATH RAIL LOADING DOCK ON EAST SIDE, POSSIBLY NOT CONNECTED TO SEWERS
9. ROOF AND FLOOR DRAINS ENTRY INTO HOUSING AUTHORITY SEWER(?), EXTERIOR SOUTHWEST CORNER OF BUILDING
10. FILL HOLE AND VENT FOR FUEL OIL TANK, OLD GAS STORAGE SHED IN BACKGROUND, LOOKING WEST
11. REPRESENTATIVE PRODUCT OF CHASE BAG

Appendix I

SCHN00172292

APPENDIX I

Environmental Site Assessment Field Checklist

SCHN00172293

Environmental Site Assessment
Field Checklist

Date: 8/12/96

Site Assessor(s): Darren Nakata, Aaron Leritz

General Information

Property Address: 3720 (Yeon); 3738 (Yeon); 3536 (35th Avenue)

County:

Current Owner:

Owner Contact Name:

Owner Address:

Owner Phone:

Current Occupant:	Daisy Kingdom	Emerson	Westport Supply
Occupant Contact Name:	Dan Johnson, VP	Jerome Peterson, Operations	Ernie Tucker
Occupant Phone:	299-2209	223-5667	226-9939

Assessor represents that to the best of the Assessors' knowledge the following statements and facts are true and correct, and that to the best of the Assessor's knowledge no material facts have been suppressed or misstated.

Name

Signature

Company

Date

1.0 General Site Setting

1.1 Identification and description of the *current* use(s) of the property

Note: Current use(s) of the property should be described as specifically as possible (for example, it is more useful to identify property use as hardware store rather than simply retail use). Any current uses likely to indicate the use, treatment, storage, disposal, or generation of hazardous substances/waste or petroleum products shall also be described in the report. Further, (1) the substances/wastes and products should be identified or indicated as unidentified, and (2) the approximate quantities involved, types of containers (if any) and storage conditions should be described. Possible uses include, but are by no means limited to, all of the following: gasoline station, motor vehicle repair facilities (with or without supplying gasoline for motor vehicles), dry cleaning plants, metal plating facilities, machine shops, wood refinishing or preserving facilities, chemical manufacturing facilities, plastic molding and/or extrusion facilities, commercial printing facilities, junkyard or landfill, agricultural or horticultural activities involving pesticides, and waste treatment, storage, disposal, processing, or recycling facilities.

Daisy Kingdom	Warehouse storage & distribution of limited repacking of fabrics 4 years, May 1992 occupied warehouse
Emerson	Wholesale distribution of wood flooring and wood floor accessories No manufacturing processes Schnitzer remodeled office for Emerson 3 years ago. Emerson moved in subsequent to remodeling activities
Westport Supply	Occupied since Nov. 93. Distributor dry cleaning chemicals and laundry supplies Buy from chemical manufacturers; distribute to dry cleaners and laundromats

1.2 Identification and description of the *past* use(s) of the property

Note: Past uses of the property visually or physically observed shall be identified. Past uses so identified shall also be described in the report if they are likely to have involved the use, treatment, storage, disposal, or generation of hazardous substances/waste or petroleum products.

Daisy Kingdom	Unknown usage prior to Daisy Kingdom
Emerson	Franz, Nabisco, former tenants
Westport Supply	Eastern Supply (Westport bought out Eastern Supply) formerly division of Van Waters & Rogers. Eastern Supply conducted same business as the Westport at the subject site.

1.3 Identification and description of the *current* use(s) of the adjoining properties

Note: Current uses of the adjoining property visually or physically observed shall be identified. Current uses so identified shall also be described if they are likely to indicate *recognized environmental conditions*.

Adjoining property north:

Owens Corning/Trumbull manufacturer of asphalt/tar paper and shingles
Port railroad yard

Adjoining property south:

Ashland Chemical Co. Distribution
Mt. Hood Beverage Co.
B&I Furnishing

Adjoining property east:

Port railroad yard
Yeon Avenue

Adjoining property west:

FTL IJB Trucking

1.4 Identification and description of the *past* use(s) of the adjoining properties

Note: Past uses of the property visually or physically observed shall be identified. Past uses so identified shall also be described if they are likely to indicate *recognized environmental conditions*.

Adjoining property to the north:

No knowledge gained from site recon

Adjoining property to the south:

No knowledge gained from site recon

Adjoining property to the east:

No knowledge gained from site recon

Adjoining property to the west:

No knowledge gained from site recon

1.5 Identification and description of current or past uses in the surrounding area

Note: To the extent that the general type of current or past uses (e.g. residential, commercial, industrial) of properties surrounding the property are visually or physically observed on the site visit or going to or from the property for the site visit, they shall be noted. Uses so identified shall also be described in the report if they are likely to indicate *recognized environmental conditions* in connection with the property.

Surrounding area to the north:

Similar to EJ and Yeon

Surrounding area to the south:

Similar to EJ and Yeon

Surrounding area to the east:

Similar to EJ and Yeon

Surrounding area to the west:

Similar to EJ and Yeon

1.6 Geologic, Hydrogeologic, Hydrologic, and Topographic Conditions

Note: The topographic conditions of the property shall be noted, as well as the general topography of the area surrounding the property that is visually or physically observed from the periphery of the property. If there are likely to be hazardous substances/waste or petroleum products on the property or nearby properties, topographic conditions should be analyzed in connection with geologic, hydrogeologic, hydrologic and topographic information obtained during records review and interviews to evaluate whether migration to, within, or from the property into soil or groundwater is likely to occur.

Daisy Kingdom	Interviewee no knowledge
Emerson	No knowledge
Westport Supply	No knowledge

The overall topography for the 35th & Yeon site is relatively flat. There is no visibly noticeable gradient changes at the site. An approximate 500 foot increased elevation change is located to the southwest, the Willamette River is located to the northeast. Inferred groundwater direction would be southwest to northeast. There was no visible evidence of geologic, hydrogeologic, and hydrologic condition.

The entire site is either covered by structures or is paved.

1.7 General Description of Property Structures

Note: The structures or other improvements present on the property shall be generally described (for example, number of buildings, number of stories each, approximate age of buildings, ancillary structures, etc.)

Daisy Kingdom	60,000 sq ft warehouse 150′ × 360′
Emerson	10% office, ≈20,000 sq ft
Westport Supply	10,000 sq ft bldg 10% for office

1.8 Roads

Note: Public thoroughfares adjoining the property shall be identified, and any roads, streets, and parking facilities on the property shall be described. In particular, roads or paths with no apparent outlet should be described in order to determine whether it was likely to have been used as an avenue for disposal of hazardous substances/waste or petroleum products.

Daisy Kingdom	35th Avenue
Emerson	NW Yeon Avenue
Westport Supply	35th Avenue

1.9 Potable Water Supply

Note: The source of potable water for the property shall be identified.

Daisy Kingdom	City of Portland
Emerson	City of Portland
Westport Supply	City of Portland

1.10 Sewage Disposal System

Note: The sewage disposal system for the property shall be identified. Inquiry should be made as to the age of the system.

Daisy Kingdom	City of Portland
Emerson	City of Portland
Westport Supply	City of Portland

2.0 Specific Visual or Physical Observations

2.1 Storage Tanks

Note: To the extent possible through visual or physical observation, above ground storage tanks, underground storage tanks, and vent pipes, fill pipes and access ways indicating underground storage tanks shall be identified.

Daisy Kingdom	None. Adjacent to Daisy Kingdom warehouse to the south; a UST vent pipe and fill pipe was observed
Emerson	None
Westport Supply	Propane tank for heister No other

2.2 Drums

Note: Drums as small as five gallons, or 19 liters (most drums hold 55 gallons, or 208 liters) should be described whether or not they are suspected of leaking, unless it is known that their contents are not hazardous substances or petroleum products.

Daisy Kingdom	None
Emerson	Approximately 100 to 200 5-gallon pails of adhesives and ignitable glues. 5 30-gallon drums; 30 22-gallon drums; 55 5-gallon pales
Westport Supply	Perchloroethene: Laundry detergent: 50 gallon Sulfuric acid: ≈ one to two 55-gallon drums Petroleum: ≈ four to five ≈55-gallon drums, Bleacher: ≈ five to ten 55-gallon drums

2.3 Hazardous Substance and Petroleum Products Containers

Note: All containers observed containing hazardous substances or petroleum that are or might be a *recognized environmental condition* shall be identified or indicated as unidentified, and the approximate quantities involved, types of containers, and storage conditions shall be described.

Daisy Kingdom	None
Emerson	None
Westport Supply	Petroleum solvent, petroleum distillates

2.4 Unidentified Substance Containers

Note: Any open or otherwise damaged containers observed containing unidentified substances, whether suspected of leaking or not, shall be identified, and the approximate quantities involved, types of containers, and storage conditions shall be described.

Daisy Kingdom	None
Emerson	None
Westport Supply	None

2.5 PCBs

Note: With the exception of fluorescent light ballasts, all electrical or hydraulic equipment known or likely to contain PCBs shall be described.

Daisy Kingdom	Suspect some fluorescent ballasts (changing out as burn-out) and transformers, transmission lines across street ≈10 PCB suspect pole mounted transformers on Trumbull/Owen Corning side of 35th Avenue
Emerson	
Westport Supply	None

2.6 Septic Systems

Note: Indications or on-site septic systems or cesspools shall be described.

Daisy Kingdom	None
Emerson	None
Westport Supply	None

2.7 Wells

Note: Dry wells, irrigation wells, injection wells, abandoned wells, production wells, and any other wells shall be described.

Daisy Kingdom	None
Emerson	None

Westport Supply	None

2.8 Pits, Ponds, or Lagoons

Note: To the extent possible through visual or physical observation, pits, ponds, or lagoons on or adjacent to the property shall be identified, particularly if they have been used in connection with waste disposal or waste treatment.

Daisy Kingdom	None
Emerson	None
Westport Supply	None

2.9 Pools of Liquid

Note: Standing surface water, pools, or sumps containing liquids likely to be hazardous substances or petroleum products shall be described to the extent possible through visual or physical observation.

Daisy Kingdom	None
Emerson	None
Westport Supply	None

2.10 Stained Soil or Pavement

Note: Areas of stained soil or pavement on the property shall be described.

Daisy Kingdom	None
Emerson	None
Westport Supply	None

2.11 Stressed Vegetation

Note: Areas of stressed vegetation, likely due to some cause other than insufficient water, shall be described.

Daisy Kingdom	None
Emerson	None
Westport Supply	None

2.12 Solid Waste Disposal Areas

Note: Areas that are apparently filled or graded by non-natural causes (or by fill of unknown origin), as well as mounds or depressions, suggesting trash or other solid waste disposal shall be described.

Daisy Kingdom	Dumpster outside
Emerson	Dumpsters inside warehouse
Westport Supply	Dumpster

2.13 Waste Water Discharge Areas

Note: Areas on or adjacent to the property where wastewater or other liquid, including stormwater, discharge into a drain, ditch, or stream shall be described.

Daisy Kingdom	None
Emerson	None
Westport Supply	None

2.14 Odors

Note: Strong, pungent, or noxious odors shall be described, and their sources shall be identified to the extent possible through visual or physical observation.

Daisy Kingdom	None
Emerson	None
Westport Supply	None

3.0 Interior Observations

3.1 Heating/Cooling

Note: The means of heating and cooling the buildings on the property, including the fuel source for heating and cooling (for example, heating oil, gas, electric, radiators from steam boiler fueled by gas, etc.), shall be identified.

Daisy Kingdom	Natural gas
Emerson	Natural gas
Westport Supply	Natural gas

3.2 Stains or Corrosion

Note: With the exception of water stains, all stains or corrosion on floors, walls, or ceilings shall be described

Daisy Kingdom	None
Emerson	None
Westport Supply	None

3.3 Drains and Sumps

Note: All floor drains and sumps shall be described.

Daisy Kingdom	None
Emerson	None
Westport Supply	None

Addendum to
Environmental Site Assessment
Field Checklist

A.0 Specific Visual or Physical Observations

A.1 Asbestos

Note: To the extent possible through visual or physical observation asbestos, including in roofing materials, shall be identified.

PSI

A.2 Lead Based Paint

PSI

A.3 Refrigerated Drinking Water Fountains

Note: The fountains are listed in the Federal Register as Drinking Water Coolers That Are Not Lead Free. In addition to the norm, the description should include list model number and manufacturer.

None

A.4 Lead in Drinking Water

Note: Lead in drinking water shall be identified or described through sampling of typical, residential drinking water.

Sample collected by Aaron

A.5 Groundwater Contamination from Past or Present Dry-Cleaning Operations

None

A.6 Above-Ground High Voltage Transmission Lines and Substations

Across the street on 38th, a low-voltage distribution line exists

A.7 Radon

PSI

A.8 Any Other Materials Stored or Generated On or Under the Property

Note: To the extent possible, and using professional judgment, materials identified will include those materials which would pose a hazard to health, safety or to the value of any of the property.

None

APPENDIX J

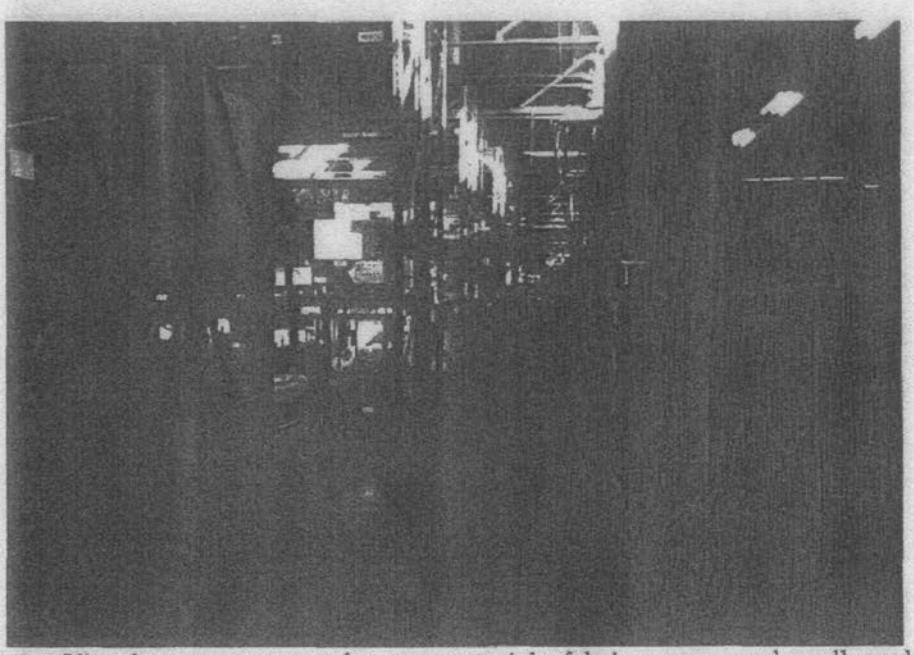
SCHN00172303

APPENDIX J

Site Reconnaissance Photographs

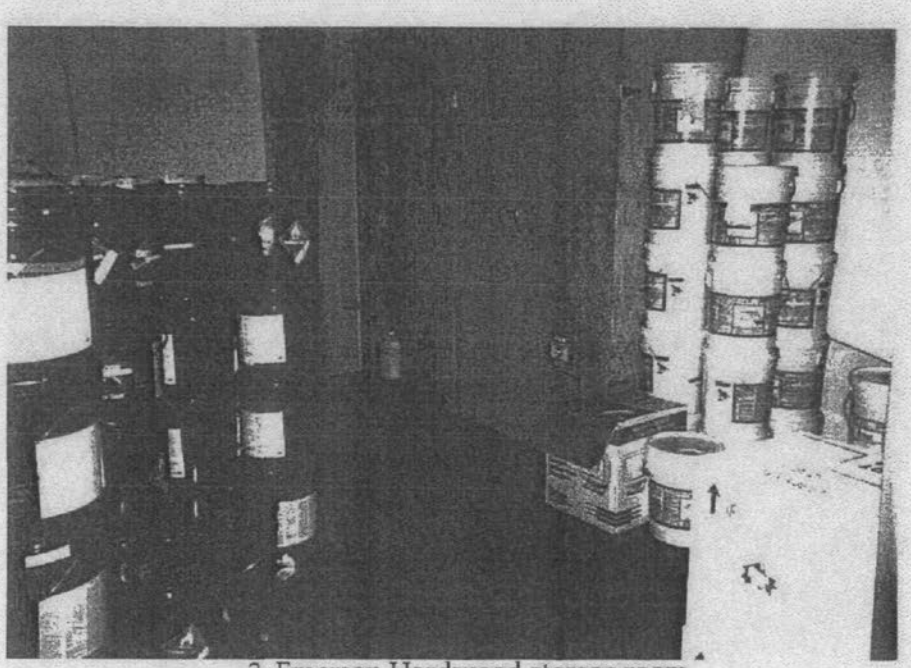
Photo Log

3506 N.W. 35th

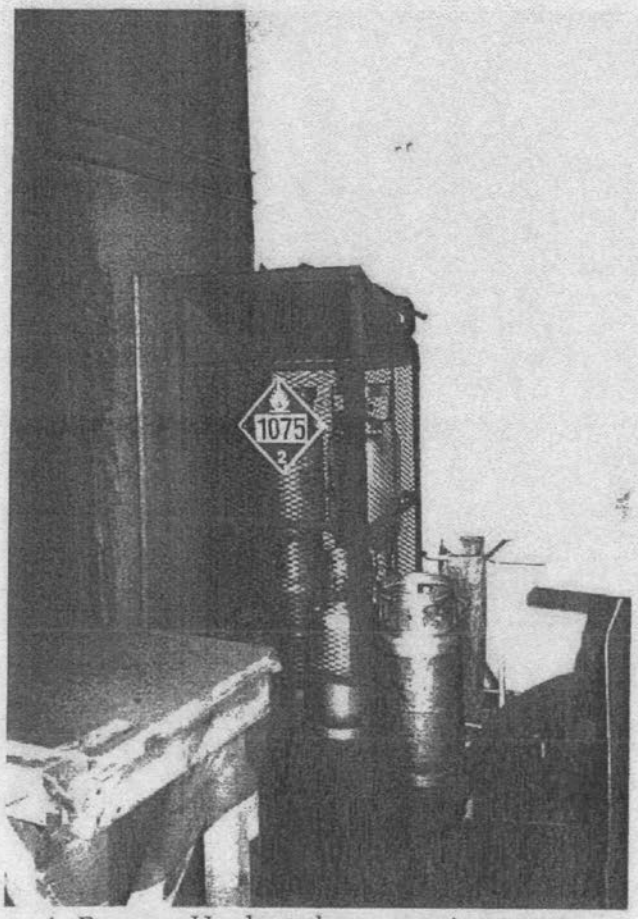


1. Daisy Kingdom storage area for raw materials; fabrics, paper and cardboard.

2. Emerson Hardwood storage of finishes wrapped for shipment on south side of building.

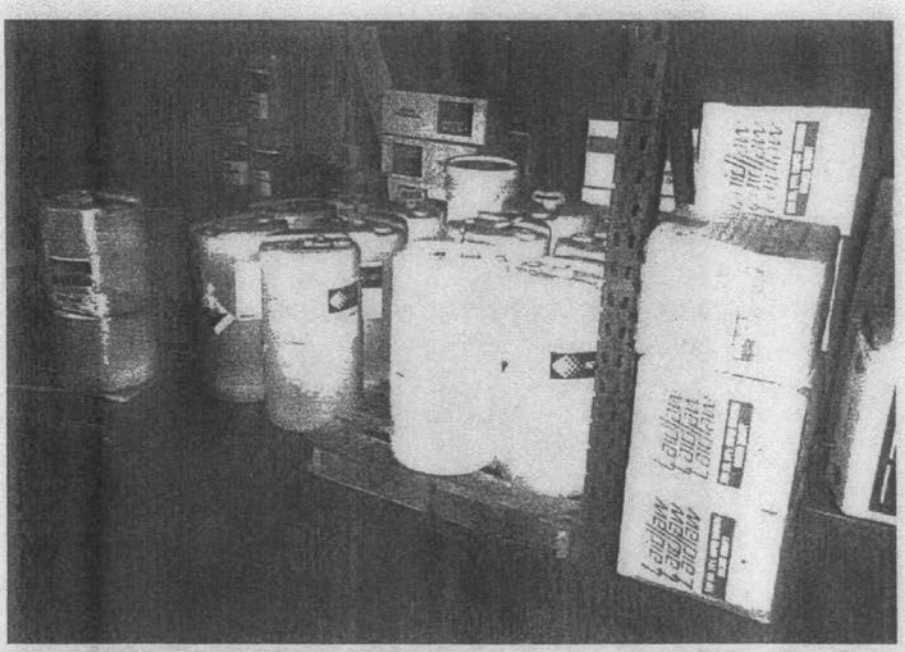


3. Emerson Hardwood storage room.

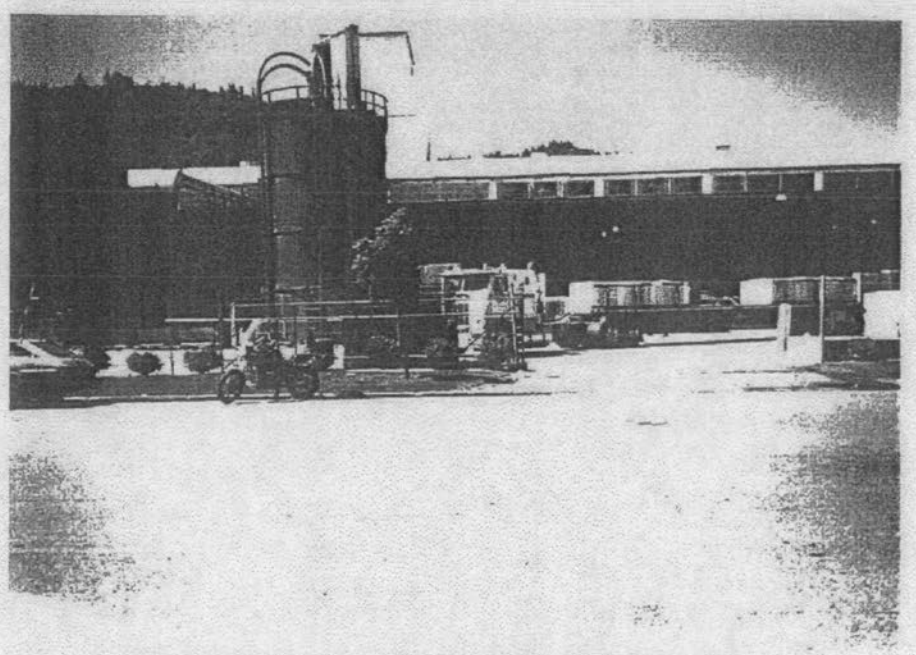


4. Emerson Hardwood propane storage area.

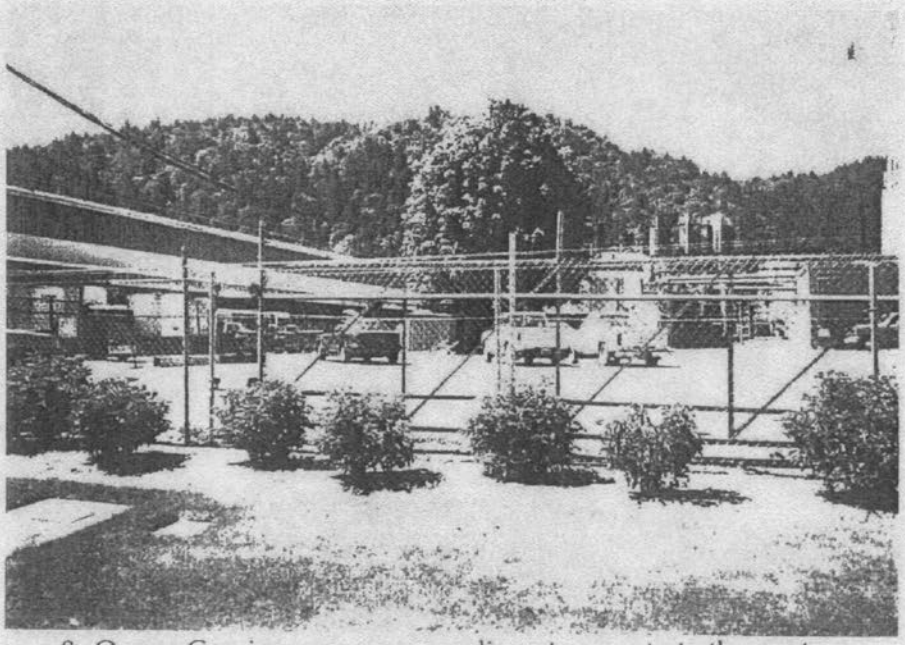
5. Pole mounted transformers to the west of 3506 N.W. 35th.



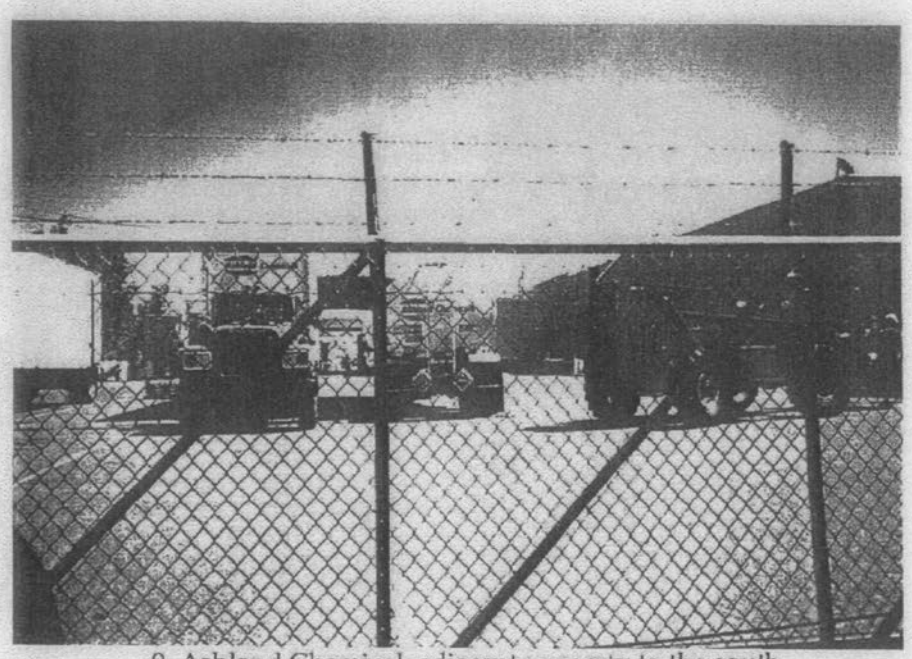
6. Westport Supply perchloroethylene storage area; 30 - and 55-gallon drums.



7. Owens Corning; adjacent property to the west.



8. Owens Corning process area; adjacent property to the west.



9. Ashland Chemical; adjacent property to the south.

10. Owens Corning to the west; Highway 30 on the right side of the photo to the north.

11. Rail yard; adjacent property to the north.

12. Mt. Hood Beverage warehouse; adjacent property to the east.

APPENDIX K

SCHN00172311

APPENDIX K

PSI Sampling Results

SCHN00172312

Environmental
Geotechnical
Construction
Consulting • Engineering • Testing

September 3, 1996

Mr. Aaron Leritz
CH2M HILL
825 NE Multnomah, Suite 1300
Portland, OR 97232

Re: Summary of Asbestos, Radon, and Lead Based Paint Surveys at
N.W. 35th and Yeon, Portland, OR.

Dear Mr. Leritz,

Asbestos, lead based paint, and radon inspection and testing was conducted at three sites at 35th & N.W. Yeon, in Portland, OR, on August 12, 1996. Businesses at the buildings surveyed were Emerson Hardwood, Westport, and Daisy Kingdom.

No asbestos samples were collected from Emerson Hardwood, or Westport. The recent date of office construction (1993) indicates that these offices would not be suspected of containing either asbestos containing building materials or lead based paint. Lead based paint swab tests were collected from two painted surfaces at the Emerson Hardwood warehouse, and from one painted surface in the Westport warehouse. No lead was detected in painted surfaces that were sampled. A visual inspection of the building indicated no other suspect materials.

Representative samples of suspect asbestos building materials were collected from pipe insulation and floor tiles in the Daisy Kingdom building. Pipe insulation and floor tiles both tested positive for asbestos. Lead based paint swab tests were collected from two painted surfaces at Daisy Kingdom. No lead in paint was detected.

Samples to detect radon gas were collected from Emerson Hardwood, Westport, and Daisy Kingdom. Radon results are given in picoCuries per Liter (pCi/L). The USEPA guidance concentration for radon is 4 pCi/L. None of the radon samples collected tested above 4 pCi/L.

If you have any questions regarding these results please call me at (503) 254-8418 ext. 239.

Sincerely

Dale Voeller, PSI
Environmental Services

Information To Build On

PSI • 12812 N.E. Marx Street • Portland, OR 97230 • Phone 503/254-8418 • Fax 503/252-5608

ASBESTOS SAMPLE LOCATION WORKSHEET

Asbestos Survey Results

Site Name/Address: 3508 NW 35th, Portland, Or - Daisy Kingdom

Inspector Dave Routtu **Office:** PSI Portland **Date:** 8/12/96

Sample #	Sample Type/Description	Sample Location	Condition	Result	Quantity
001	Pipe Insulation	Throughout	Good	60%	1,000 lf
002	Floor Tile	Men's room, Int'l shipping	Good	5%	4,000 sf
002A	Mastic (under floor tile)			3%	

Suspect Materials Not Sampled

Sample Type/Description	Sample Location	Condition

C:\MISC572\WKSHTS.XLS

LEAD BASED PAINT SAMPLE LOCATION WORKSHEET

Site Name/Address: 3506 NW 35th, Portland, OR - Emerson Hardwood, Daisy Kingdon, Westport

Inspector Dale Voeller **Office:** PSI Portland **Date:** 8/12/96

Sample #	Sample Type/Description	Sample Location	Condition	Result
1	Red/Brown Paint on Metal Post	Emerson Hardwood Warehouse	Good	N/D
2	Red/Brown Paint on Metal Post	Westport Warehouse	Good	N/D
3	Green Paint	Daisy Kingdom Interior	Good	N/D
4	White Paint	Daisy Kingdom Interior	Good	N/D

Suspect Materials Not Sampled

Sample Type/Description	Sample Location	Condition

C:\MSC572\WKSHTS.XLS

SCHN00172315

RADON
SAMPLE LOCATION
WORKSHEET

Site Name/Address: 3506 NW 35th, Portland, Or - Emerson Hardwood, Daisy Kingdom, Westport

Inspector Dave Routtu **Office:** PSI, Inc. PDX **Date:** 8/12/96

Results are in picoCuries per Liter (pCi/L)

Canister # /Result/Date			*Sample Location*	
621476	<0.2	8/12/96	Emerson Hardwood	Warehouse
621488	0.4	8/12/96	Emerson Hardwood	Jerome Peterson's Desk
566706	<0.2	8/12/96	Westport	Judy's Desk
621480	0.2	8/12/96	Westport	Warehouse shelf
566719	<0.2	8/12/96	Daisy Kingdom	Warehouse, SE end
566701	0.3	8/12/96	Daisy Kingdom	Vault in office area

USEPA guidance concentrations for radon is 4 pCi/L.

APPENDIX L

SCHN00172317

APPENDIX L

North Creek Analytical Results

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

Offices:
BOTHELL ▪ (206) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

Correspondence to: 18939 - 120th Ave. NE, #101, Bothell, WA 98011

August 20, 1996

CH2M Hill
825 N.E. Multnomah
Suite 1300
Portland, OR 97232

Attention: Darren Nakata

RE: JOB # 130341.NW.01
P.O.#
PROJECT - SCHNITZER NW MUTUAL

Enclosed are test results for your samples received in this lab on Aug. 12, 1996. For your reference, these analyses have been assigned our NCA # P608230.

Solid samples are reported on a dry weight basis except for Oregon DEQ Fuels Methods and where otherwise noted.

This report will be accompanied by a separate Quality Control Data Report, unless omitted by client request.

Please call if you have any questions.

Respectfully,

Philip Nerenberg
Laboratory Manager

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

Offices:
BOTHELL ■ (206) 481-9200 ■ FAX 485-2992
SPOKANE ■ (509) 924-9200 ■ FAX 924-9290
PORTLAND ■ (503) 643-9200 ■ FAX 644-2202

Correspondence to: 18939 - 120th Ave. NE, #101, Bothell, WA 98011

Total Metals per EPA 200.8

Results in mg/L (ppm)

Client: CH2M Hill
Project: SCHNITZER NW MUTUAL

NCA Project #: P608230
Matrix: water
Sampled: 08/12/96
Received: 08/12/96

Client ID	Lab ID	Analyte	Result	MRL	Date Prepared	Date Analyzed
NW-06-3720-01	P608230-1	Lead	ND	0.0020	08/14/96	08/14/96
NW-06-3738-01	P608230-2	Lead	0.0025	0.0020	08/14/96	08/14/96
NW-06-3536-01	P608230-3	Lead	0.0024	0.0020	08/14/96	08/14/96

MRL Method Reporting Level
ND None Detected at or above the method reporting level
* See Comment Section at end of report

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

Offices:
BOTHELL ■ (206) 481-9200 ■ FAX 485-2992
SPOKANE ■ (509) 924-9200 ■ FAX 924-9290
PORTLAND ■ (503) 643-9200 ■ FAX 644-2202

Correspondence to: 18939 - 120th Ave. NE, #101, Bothell, WA 98011

August 20, 1996

CH2M Hill
825 N.E. Multnomah
Suite 1300
Portland, OR 97232

Attention: Darren Nakata

Re: Quality Control Data
JOB # 130341.NW.01
P.O.#
PROJECT - SCHNITZER NW MUTUAL

NCA project number P608230.

Note: Surrogate Recoveries are included in the final report.

QUALITY CONTROL DEFINITIONS

METHOD BLANK RESULTS

The method blank is an analyte-free matrix which is carried through the same analytical process as the samples. It is used to document contamination that may result from the analytical process.

SURROGATE STANDARD

A surrogate standard (i.e., a chemical compound not expected to occur in an environmental sample) is added to each sample, blank, and matrix spike sample just prior to extraction or processing. The recovery of the surrogate standard is used to monitor for unusual matrix effects, gross sample processing errors, etc. Surrogate recovery is evaluated for acceptance by determining whether the measured concentration falls within accepted limits.

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

Offices:
BOTHELL ■ (206) 481-9200 ■ FAX 485-2992
SPOKANE ■ (509) 924-9200 ■ FAX 924-9290
PORTLAND ■ (503) 643-9200 ■ FAX 644-2202

Correspondence to: 18939 - 120th Ave. NE, #101, Bothell, WA 98011

Accuracy is measured by percent recovery as in:

$$\% \text{ Recovery} = \frac{\text{(Measured Concentration)}}{\text{(Actual Concentration)}} \times 100$$

Precision is measured using duplicate tests by relative percent difference.

$$\text{RPD} = \frac{\text{(Result of Test 1 - Result of Test 2)}}{\text{(Result of Test 1 + Result of Test 2)/2}} \times 100$$

If you should have any questions concerning this report, please contact me.

Sincerely,

Philip Nerenberg
Laboratory Manager

SCHN00172322

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

Offices:
BOTHELL ■ (206) 481-9200 ■ FAX 485-2992
SPOKANE ■ (509) 924-9200 ■ FAX 924-9290
PORTLAND ■ (503) 643-9200 ■ FAX 644-2202

Correspondence to: 18939 - 120th Ave. NE, #101, Bothell, WA 98011

BATCH QUALITY CONTROL RESULTS
Total Metals per EPA 200.8

Client: CH2M Hill
Project: SCHNITZER NW MUTUAL

NCA Project #: P608230
Received: 08/12/96

METHOD BLANK
Batch # QW96281a
Results in mg/L (ppm)

Compound	Result	MRL
Lead	ND	0.0020
Date Prepared	08/14/95	
Date Analyzed	08/14/96	

DUPLICATE
Batch # QW96281a **Duplicate ID P608242-5b**
Results in mg/L (ppm)

Compound	Sample Conc	Dup Conc	RPD	QC Limit RPD
Lead (ap)	0.0022	ND	-	20

(ap) RPD is not reported for sample concentrations less than 5 times the MRL.

MATRIX SPIKE
Batch # QW96281a **Spike ID P608242-5b**
Results in mg/L (ppm)

Compound	Spike Added	Sample Conc	MS Conc	MS % Rec	QC Limit % Rec
Lead	0.10	0.0022	0.0941	92	70-130

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

Offices:
BOTHELL ■ (206) 481-9200 ■ FAX 485-2992
SPOKANE ■ (509) 924-9200 ■ FAX 924-9290
PORTLAND ■ (503) 643-9200 ■ FAX 644-2202

Correspondence to: 18939 - 120th Ave. NE, #101, Bothell, WA 98011

BATCH QUALITY CONTROL RESULTS
Total Metals per EPA 200.8

Client: CH2M Hill
Project: SCHNITZER NW MUTUAL

NCA Project #: P608230
Received: 08/12/96

LABORATORY CONTROL SAMPLE
Batch # QW96281a
Results in mg/L (ppm)

Compound	True	Found	% Rec	QC Limit % Rec
Lead	0.10	0.0946	95	85-115

SCHN00172324

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 (206) 48 FAX 485-2992
East 11115 Montgomery, Suite B, Spokane, WA 99206-4779 (509) 924-9200 FAX 924-9290
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 (503) 643-9200 FAX 644-2202

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

CHAIN OF CUSTODY REPORT

Work Order # R608230

REPORT TO: CH2M HILL
ATTENTION: DARREN NAKATA
ADDRESS: 825 NE MULTNOMAH, SUITE 1300
PORTLAND, OR 97232-2146
PHONE: 235-5022 X 4768 FAX: 235-2445
PROJECT NAME: SCHNITZER NW MUTUAL
PROJECT NUMBER: 130341.NW.01
SAMPLED BY: AARON LERITZ

INVOICE TO: CH2M HILL
ATTENTION: BETTY HUFFMAN
ADDRESS: SAME
P.O. NUMBER: NCA QUOTE #:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: 10 (Standard) | 7 | 5 | 4 | X | 2 | 1 | Same Day
Fuels & Hydrocarbon Analyses: 5 (Standard) | 3-4 | 2 | 1 | Same Day
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

Analyses Requested: Lead

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NCA SAMPLE ID (Laboratory Use Only)	Lead	MATRIX (W, S, A, O)	# OF CONTAINERS	COMMENTS
1. NW-06-3720-01	8/12/96 9:50am	-1	X	W	1	
2. NW-06-3738-01	8/12/96 11am	2	X	W	1	
3. NW-06-3536-01	8/12/96	3	X	W	1	
4.						
5.						
6.						
7.						
8.						
9.						
10.						

RELINQUISHED BY: [signature] DATE: 8/12/96
PRINT NAME: DARREN NAKATA FIRM: CH2M HILL TIME: 2:10pm

RECEIVED BY: Betty Huffman DATE: 8/12/96
PRINT NAME: Betty HUFFMAN FIRM: CH2M Hill TIME: 2:11pm

RELINQUISHED BY: Betty Huffman DATE: 8/12/96
PRINT NAME: BETTY HUFFMAN FIRM: CH2M Hill TIME: 2:45p

RECEIVED BY: [signature] DATE: 8/12/96
PRINT NAME: Bob Fabshole FIRM: NCA TIME: 1445

ADDITIONAL REMARKS: Kit Stanley NCA 8-12-96

PAGE 1 OF 10

SCHN00172325

APPENDIX M

SCHN00172326

APPENDIX N

SCHN00172330

AFFIDAVIT

STATE OF OREGON)
) ss.
County of Multnomah)

I, KENNETH M. NOVACK, being first duly sworn, on oath depose and say:

1. I am president of Schnitzer Investment Corp., an Oregon corporation.

2. On June 3, 1976, Schnitzer Docks, Inc., an Oregon corporation, was merged into Schnitzer Investment Corp. Schnitzer Investment Corp. was the surviving corporation of the merger.

3. The Warfage License Agreement dated July 26, 1963, recorded May 8, 1964, in Book 38, page 28, Film Records of Multnomah County, between Schnitzer Docks, Inc., an Oregon corporation, as Licensor, and Schnitzer Steel Products Co., as Licensee, has terminated, and Schnitzer Steel Products Co. has no further right or interest by reason of said Warfage License Agreement.

3. The Lease, dated September 23, 1963, recorded May 8, 1964, in Book 38, page 31, Deed Records of Multnomah County, between Schnitzer Docks, Inc., an Oregon corporation, as Lessor, and Schnitzer Steel Products Co., as Lessee, has terminated, and Schnitzer Steel Products Co. has no further right or interest under or by reason of said Lease.

4. By reason of the merger of Schnitzer Docks, Inc. into Schnitzer Investment Corp., the Lease dated September 3, 1963, recorded May 8, 1964, in Book 38, page 34, Deed Records of Multnomah County, between Schnitzer Investment Corp., as Lessor, and Schnitzer Docks, Inc., as Lessee, terminated.

March 27, 1980.

KENNETH M. NOVACK

On this 27th day of March, 1980, personally appeared before me KENNETH M. NOVACK and acknowledged that he executed the foregoing as his voluntary act and deed.

Before me:

H Blair Berman
Notary Public for Oregon
My commission expires: 11/13/83

SCHN00172367

AFFIDAVIT

STATE OF OREGON)
) ss.
County of Multnomah)

I, LEONARD SCHNITZER, being first duly sworn, on oath depose and say:

1. I am president of Schnitzer Steel Products Co., an Oregon corporation.

2. The Warfage License Agreement dated July 26, 1963, recorded May 8, 1964, in Book 38, page 28, Film Records of Multnomah County, between Schnitzer Docks, Inc., an Oregon corporation, as Licensor, and Schnitzer Steel Products Co., as Licensee, has terminated, and Schnitzer Steel Products Co. has no further right or interest by reason of said Warfage License Agreement.

3. The Lease, dated September 23, 1963, recorded May 8, 1964, in Book 38, page 31, Deed Records of Multnomah County, between Schnitzer Docks, Inc., an Oregon corporation, as Lessor, and Schnitzer Steel Products Co., as Lessee, has terminated, and Schnitzer Steel Products Co. has no further right or interest under or by reason of said Lease.

Narch 27, 1980.

LEONARD SCHNITZER

On this 27th day of March, 1980, personally appeared before me LEONARD SCHNITZER and acknowledged that he executed the foregoing as his voluntary act and deed.

Before me:

Notary Public for Oregon
My commission expires: 11/13/83

OREGON **RELEASE OF MORTGAGE**

KNOW ALL MEN BY THESE PRESENTS: That

THE MUTUAL BENEFIT LIFE INSURANCE COMPANY does hereby acknowledge and declare that that certain mortgage made by Schnitzer Investment Corp., an Oregon corporation and Schnitzer Docks, Inc., and Oregon corporation

to The Mutual Benefit Life Insurance Company, a corporation

dated the 8th day of May, 19 64, as security for the payment of the sum of Seven Hundred Thousand And No/100ths Dollars which mortgage is recorded on Page 249, of ~~Volume~~ BOOK 41 of Mortgages, records of Multnomah County, Oregon, in the office of the Auditor of said County, which said mortgage and the debt secured thereby were assigned by the said

SCHNIZER DOCKS, INC.

to THE MUTUAL BENEFIT LIFE INSURANCE COMPANY under an assignment dated the 8th day of May, 19 64, and recorded on Page 41, of Volume 263 of Morgages, records of Multnomah County, Oregon, has been fully satisfied and paid in full.

IN WITNESS WHEREOF, THE MUTUAL BENEFIT LIFE INSURANCE COMPANY has caused this instrument to be executed by its duly authorized officer and its corporate seal to be hereunto affixed, this 28th day of May, 19 80.

THE MUTUAL BENEFIT LIFE INSURANCE COMPANY

By Robert G. Haag Second Vice President

By Robert J. Roebling Assistant Secretary

STATE OF NEW JERSEY

County of Essex

On this 28th day of May, 19 80, before me, the undersigned, a Notary Public in and for the State of New Jersey, duly commissioned and sworn, personally appeared

Robert G. Haag and Robert J. Roebling

to me known to be the Second Vice President and Assistant Secretary, respectively, of THE MUTUAL BENEFIT LIFE INSURANCE COMPANY, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

Witness my hand and official seal hereto affixed the day and year first above written.

Diane Cervone

Notary Public in and for the State of New Jersey residing at

MLS 415 (5/78)
FORM HI-40

DIANE CERVONE
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires Feb. 22, 1984

ss. ss.

SCHN00172374

LOT BOOK SEARCH

Mr. Louis Schnitzer
Pacific Building
Portland, Oregon

Date February 20, 1962

Order No. 311666

We hereby certify that we have searched our Tract Indices as to the following described property:

(See attached page)

and as of February 20, 1962 at 8 o'clock A. M.:

We find that the last deed of record runs to SCHNITZER INVESTMENT COMPANY, an Oregon corporation.

We also find the following apparent incumbrances appearing of record within ten years prior to the date of this search:

(See attached page)

We have also searched our General Index for judgments and state and federal tax liens against the above named grantees and find the following:

None.

We also find the following unpaid taxes and city liens:

None.

This is not a title report, since no examination has been made of the title to the above described property. Our search for apparent incumbrances was limited to our Tract Indices, and therefore above listings do not include additional matters which might have been disclosed by an examination of the record title. We assume no liability in connection with this Lot Book Search and will not be responsible for errors or omissions therein.

TITLE AND TRUST COMPANY

By A. M. Hamack

DMP:cp

OREGON LAND TITLE ASSOCIATION
STANDARD LOT BOOK SEARCH
F. 241 THE IVY PRESS 109528 9M 2-61

DESCRIPTION:

TRACT I: Lots 1, 2, 3, 4, 5, 6, 7 and 8, Block 138, COUCH'S ADDITION TO THE CITY OF PORTLAND, in the City of Portland, County of Multnomah and State of Oregon.

TRACT II: The following described property in the City of Portland, County of Multnomah and State of Oregon.

Parcel I: A tract of land in the Peter Guild Donation Land Claim and in Section 29, Township 1 North, Range 1 East of the Willamette Meridian, described as follows: Beginning at a stone monument in Nicolai Street on the line between the Peter Guild D.L.C. and the Wm. Blackistone D.L.C. at the most easterly corner of Tract E of the subdivision of the Estate of Peter Guild and being 2523.08 feet North 80° 00' 10" East from the northwest corner of the Wm. Blackistone D.L.C.; thence North 47° 00' West along the boundary of Tract E 1458.53 feet; thence along the Southerly boundary of Tract G North 63° 15' 30" West 1515.34 feet; thence North 29° 48' 30" East 48.42 feet to a point on the Northerly line of N.W. Yeon Avenue and being the true point of beginning of the tract to be herein conveyed; thence north 29° 48' 30" East 713.98 feet more or less to the southwesterly line of the tract deeded by Morris Schnitzer to the Northern Pacific Terminal Company of Oregon, by deed recorded in Book 747, page 98, Deed Records; thence Southeasterly along the said line of said Northern Pacific Terminal Company of Oregon Tract 458.70 feet more or less to a point in the Northwesterly line of N. W. 26th Avenue; thence South 29° 48' 30" West 265.61 feet more or less to the Northerly line of the tract deed by Morris Schnitzer to Industrial Air-Products Co., by deed recorded in Book 1131, page 416, Deed Records; thence along the said Northerly line of said Industrial Air-Products Co. tract North 60° 11' 30" West 255 feet; thence South 29° 48' 30" West 339.54 feet more or less to a point in the Northerly line of N. W. Yeon Avenue; thence North 66° 08' West along said Northerly line of N. W. Yeon Avenue, 194.26 feet more or less to the point of beginning.

Parcel II: A tract of land in the Peter Guild Donation Land Claim and in Section 29, Township 1 North, Range 1 East of the Willamette Meridian, in the City of Portland, County of Multnomah and State of Oregon, more particularly described as follows:

Beginning at the intersection of the Northeasterly line of Northwest Yeon Avenue with the division line between the north and south halves of said Peter Guild Donation Land Claim; thence south 66° 08' East along the northeasterly line of said N. W. Yeon Avenue to the point of intersection with the easterly line extended southerly of that property conveyed to

Hercules Powder Company, a corporation, by deed recorded November 17, 1936 in Book 364, page 380, Deed Records; thence south 66° 08' east along said northeasterly line of said N. W. Yeon Avenue, 110 feet to a point, which point is the true point of beginning of the tract to be herein conveyed; thence south 66° 08' east along said northeasterly line of said N. W. Yeon Avenue, 311.20 feet, more or less, to the northwesterly line of a certain tract conveyed to McMarr Stores, Inc., by deed recorded in Book 145, page 480, Deed Records; thence north 29° 48' 30" east along the said line of the McMarr Stores, Inc. tract 714.12 feet, more or less, to the southwesterly line of the tract deeded by Oregon Terminals, Inc. to the Northern Pacific Terminal Company, by deed recorded in Book 1018, page 401, Deed Records; thence northwesterly along the said line of said Northern Pacific Terminal Tract 410 feet, more or less to the line of a certain tract conveyed to Nicholas Versteeg by deed recorded in Book 50, page 220, Deed Records; thence south 32° 15' 45" west along said line 507.83 feet; thence south 27° 43' 45" west 45.69 feet to the northeasterly line of a certain tract conveyed by Morris Schnitzer to Lombard Boot & Reliner Mfg. Co. by deed recorded in Book 1122, page 404, Deed Records; thence south 66° 08' east along said line 110 feet, more or less, to the northeasterly corner of the aforesaid tract conveyed by Morris Schnitzer to Lombard Boot & Reliner Mfg. Co.; thence south 27° 43' 45" west along the easterly line of said Lombard Boot & Reliner Mfg. Co. tract 275 feet, more or less, to the point of beginning.

Parcel III: A tract of land in the Peter Guild Donation Land Claim and in Section 29, Township 1 North, Range 1 East of the Willamette Meridian, in the City of Portland, County of Multnomah and State of Oregon, more particularly described as follows:

Beginning at the intersection of the northeasterly line of N. W. Yeon Avenue with the division line between the north and south halves of said Peter Guild Donation Land Claim; thence south 66° 08' east along the northeasterly line of said N. W. Yeon Avenue to the point of intersection with the easterly line extended southerly of that property conveyed to Hercules Powder Company, a corporation, by deed recorded November 17, 1936 in Book 364, page 380, Deed Records; thence south 66° 08' east along the northeasterly line of said N.W. Yeon Avenue, 110 feet to a point; thence north 27° 43' 45" east 275 feet to a point; thence north 66° 08' west and parallel with the northeasterly line of said N. W. Yeon Avenue, 110 feet, more or less, to the easterly line of the said Hercules Powder Company tract; thence south along the easterly line of the said Hercules Powder tract to the division line between the north and south halves of said Peter Guild Donation Land Claim; thence north 89° 10' 30" westalong said division line 1.16 feet to the point of beginning.

Parcel IV: A tract of land in Sections 20 and 29, Township 1 North, Range 1 East of the Willamette Meridian, described as follows:

Beginning at an angle point in the Southwesterly line of N. W. Front Avenue, which point is 47.37 feet South and 4667.19 feet East from the Northwest corner of said Section 29; thence North 55° 35' West along said line of N.W. Front Avenue 114.24 feet; thence southerly 290.73 feet on the arc of a curve to the left having a radius of 277.94 feet and initial tangent bearing south 23° 08' west, to the northeasterly line of the Northern Pacific Railway's right of way; thence south 48° 44' east along said right of way line 181.08 feet; thence Northerly 278.93 feet on the arc of a curve to the right having a radius of 312.9 feet and initial tangent bearing North 26° 42' 30" west to the Southwesterly line of N. W. Front Avenue; thence North 48° 46' West 92.24 feet to the place of beginning; ALSO a tract of land in Sections 20 and 29, Township 1 North, Range 1 East of the Willamette Meridian, described as follows:

Beginning at a point in the Southwesterly line of N.W. Front Avenue North 55° 35' West 214.80 feet from an angle point therein, said point of beginning being also 74.00 feet North and 4489.96 feet East from the Northwest corner of said Section 29; thence South 55° 35' East 22.53 feet; thence Southerly 135.18 feet on the arc of a curve to the right having a radius of 277.94 feet and initial tangent bearing South 23° 45' East; thence Southerly 149.41 feet on the arc of a curve to the left having a radius of 297.94 feet and tangent to the last mentioned curve to the Northeasterly line of the Northern Pacific Railway's right of way; thence Northwesterly along said right of way line 213.96 feet; thence North 32° 15' East 180.91 feet to the place of beginning, in the City of Portland, County of Multnomah and State of Oregon.

Parcel V: A tract of land in the Peter Guild Donation Land Claim, and in Sections 20 and 29, Township 1 North of Range 1 East of the Willamette Meridian, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point in the southwesterly line of N.W. Front Avenue, formerly North Front Street, as dedicated by plat recorded February 27, 1929, page 39 of Plat Book 1133 of said Multnomah County, said point being south 0° 04' 45" west 169.82 feet and south 62° 25' 30" east 3492.48 feet from the one-quarter section corner on the west side of said Section 20; running thence south 62° 25' 30" east along the southwesterly line of N. W. Front Avenue 893.60 feet; thence southeasterly 238.82 feet on the arc of a curve to the right having a radius of 2000.0 feet and tangent to the last mentioned course; thence

south 55° 35' east 478.72 feet to the northwesterly line of a certain tract of land formerly owned by Oregon Terminals; thence south 32° 15' 45" west along said line of Oregon Terminals tract 181.28 feet to the northeasterly line of Northern Pacific Railway Co's, right of way; thence northwesterly along said northeasterly line of Northern Pacific Railway Co's. right of way to the place of beginning;

EXCEPTING HOWEVER, the portion of said property conveyed by Schnitzer Steel Products Co., an Oregon corporation, as Grantor, to Waterway Terminals Company, an Oregon corporation, as Grantee, recorded May 10, 1961 in Book 2061, page 221, Deed Records thereof, and subject to the reservations and rights reserved to the Grantor in the deed last mentioned.

Parcel VI: A parcel of land situate in and being all that part of Section 20, Township 1 North, Range 1 East of the Willamette Meridian, in the City of Portland, County of Multnomah and State of Oregon, bounded and described as follows:

Commencing at the intersection of the northeasterly line of N. W. Front Avenue with the west line of said Section 20; thence north 0° 05' 08" east along the west line of said Section 20 a distance of 287.83 feet to the northeast corner of the Levi Potter Donation Land Claim; thence North 29° 49' East a distance of 565.45 feet, more or less, to a point in the Harbor Line on the west side of the Willamette River; thence south 60° 11' East along said Harbor Line a distance of 1450 feet to the true point of beginning of this description; thence continuing south 60° 11' east along said Harbor Line a distance of 1363.57 feet; thence south 29° 49' west a distance of 712.7 feet, more or less, to a point in the northeasterly line of N. W. Front Avenue that is south 62° 25' 55" east 2672.75 feet from the west line of said Section 20; thence north 62° 25' 22" west along said northeasterly line of N. W. Front Avenue a distance of 1364.9 feet, more or less, to a point in a line bearing south 29° 49' west from the true point of beginning of this description; thence north 29° 49' east a distance of 764.45 feet, more or less, to the true point of beginning.

APPARENT INCUMBRANCES:

1. Mortgage, including the terms and provisions thereof, executed by (b) (6) [redacted], his wife, (b) (6) [redacted], his wife, (b) (6) [redacted], his wife, (b) (6) [redacted], his wife, to Portland Art Association, an Oregon corporation, dated April 29, 1959, recorded April 30, 1959 in Book 2021, page 62, Mortgage Records, given to secure the payment of a note for $60,000.00, with interest thereon. (Also indexed in Chattels)

Note: We find no other property in the name of Schnitzer Steel Products Company, the Grantor in that certain deed from Schnitzer Steel Products Co., an Oregon corporation, to Schnitzer Investment Corp., an Oregon corporation, dated January 2, 1962, recorded February 13, 1962 in Book 2102, page 242, Deed Records.

2. Reservation of Mineral Rights unto Union Pacific Railroad Company as disclosed in Deed recorded January 2, 1962 in Book 2102, page 246, Deed Records.

3. Slope easement as created by Agreement between Union Pacific Railroad Company, a Utah corporation, and Crown Zellerbach Corporation, a Nevada corporation, dated May 8, 1956, recorded July 18, 1956 in Book 1828, page 323, Deed Records. (Affects Parcel VI)

4. The Right, title and interest of the State of Oregon in and to so much of the aforesaid premises that lie below the line of ordinary low water of the Willamette River.

STATE OF OREGON)
) ss
COUNTY OF MULTNOMAH)

I, Leonard Schnitzer, the undersigned Secretary of INDUSTRIAL AIR PRODUCTS CO., an Oregon corporation, do hereby certify that Exhibit A attached hereto is a true and complete copy of a resolution adopted by the Board of Directors of said corporation at ameeting duly called and held on January 2, 1962, a quorum being present and acting throughout said meeting, and that the said resolution is in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of said INDUSTRIAL AIR PRODUCTS CO. this day of March, 1962.

Leonard Schnitzer, Secretary

(Corporate Seal)

RESOLVED: That the lease in the form now presented to this meeting wherein Industrial Air Products Co., an Oregon corporation, is the Lessee and Schnitzer Investment Corp., an Oregon corporation, is the Lessor, be and the same is hereby ratified and approved and that the action of the president and secretary of Industrial Air Products Co. in executing the aforesaid lease on the 20th day of November, 1961, be and the same is hereby ratified and approved.

"Exhibit A"

SCHN00172446

STATE OF OREGON)
) ss
COUNTY OF MULTNOMAH)

I, Leonard Schnitzer, the undersigned Secretary of SCHNITZER INVESTMENT CORP., an Oregon corporation, do hereby certify that Exhibit A attached hereto is a true and complete copy of a resolution adopted by the Board of Directors of said corporation at a meeting duly called and held on January 2, 1962, a quorum being present and acting throughout said meeting, and that the said resolution is in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of said SCHNITZER INVESTMENT CORP. this day of March, 1962.

Leonard Schnitzer, Secretary

(Corporate Seal)

RESOLVED: That the lease in the form now presented to this meeting between Schnitzer Investment Corp., an Oregon corporation, as Lessor and Industrial Air Products Co., an Oregon corporation, as Lessee, be and the same is hereby ratified and approved and that the action of the president and secretary of Schnitzer Investment Corp. in executing the aforesaid lease on the 20th day of November, 1961, in the form attached hereto is hereby approved and ratified.

PHASE I & II ENVIRONMENTAL SITE ASSESSMENT TRUCKING FACILITY 4285 NW YEON AVENUE 4245 NW YEON AVENUE PORTLAND, OREGON

KLEINFELDER

An employee owned company

SCHN00173230

KLEINFELDER
An employee owned company

PHASE I & II ENVIRONMENTAL SITE ASSESSMENT TRUCKING FACILITY 4285 NW YEON AVENUE 4245 NW YEON AVENUE PORTLAND, OREGON

Kleinfelder Project No.: 60508-A01 & C01

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KLEINFELDER 15050 SW Koll Parkway, Suite L, Beaverton, OR 97006-6028 (503) 644-9447 (503) 643-1905 fax

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