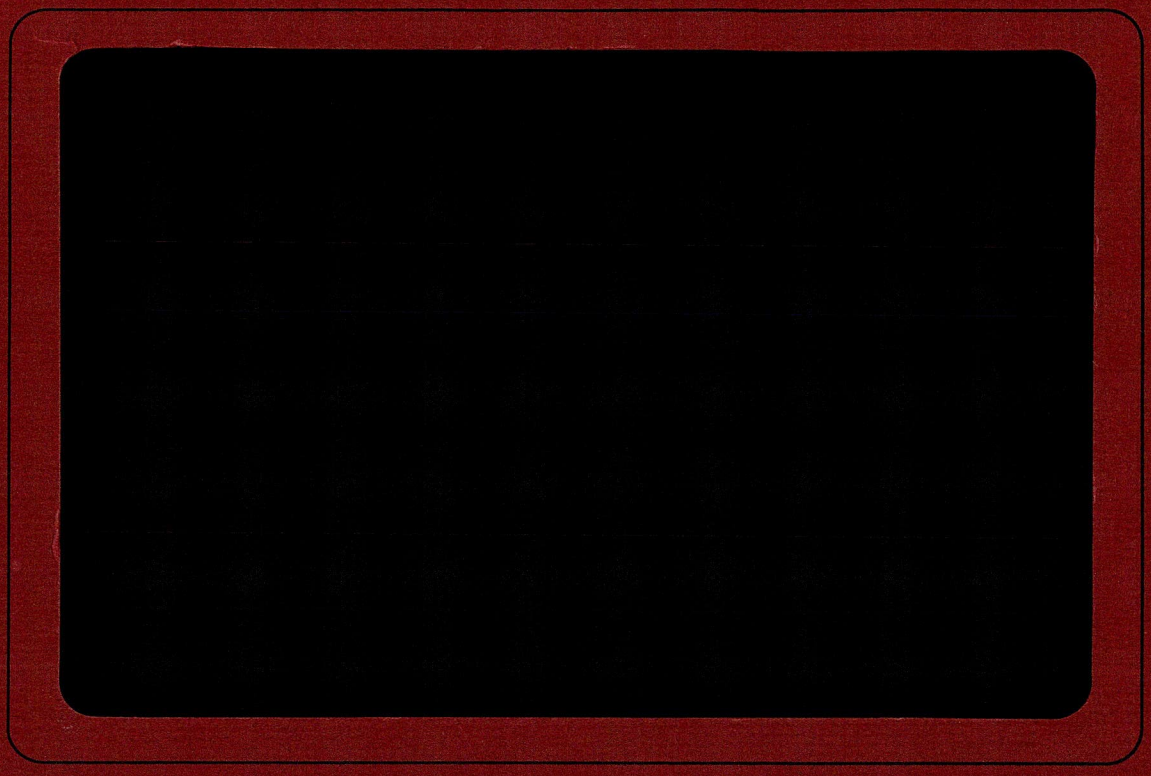

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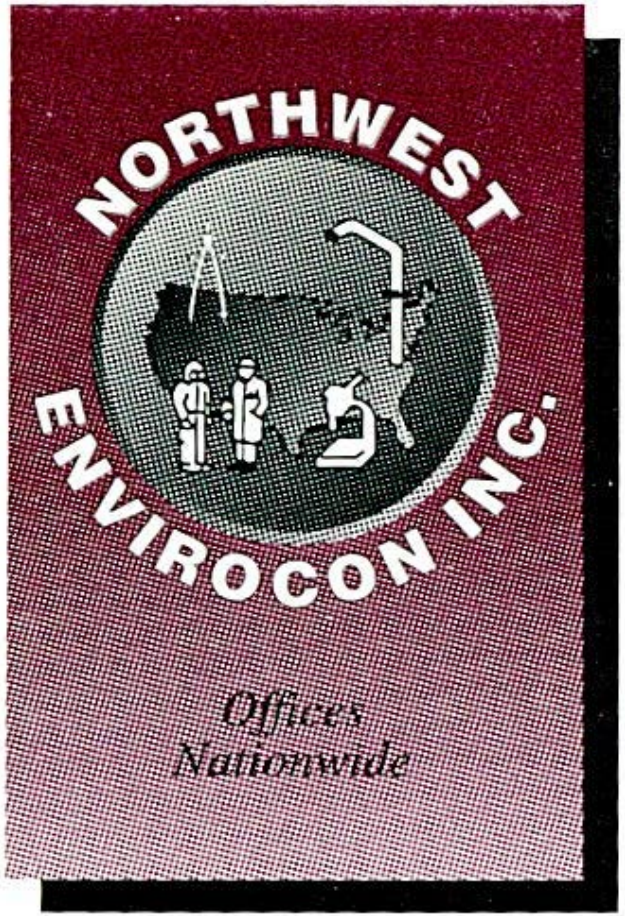

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Jeff Jackman
SENIOR ENVIRONMENTAL ASSESSOR

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(800) 395-0852
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03-93-008

QUARTERLY GROUND WATER MONITORING REPORT

Delco Company (formerly Flying J)
17873 SE McLoughlin Boulevard
Milwaukie, Oregon 97267

Project Number 16122

Prepared for:
Devinder Dhillon
14 Longleaf Drive
Hamilton Square, New Jersey

December 19, 1994

Prepared by:
Laure Brown, CHMM

Northwest Envirocon, Inc.
7410 Delaware Lane
Vancouver, Washington 98664
(206) 699-4015

TABLE OF CONTENTS

1.0 INTRODUCTION

This report is to summarize the second quarter ground water sampling event that took place on October 27, 1994 at the Milwaukie Fuel Stop/Delco facility (formerly Flying J) in Milwaukie, Oregon. This site is located at 17873 McLoughlin Boulevard, as shown in Figure 1. Ground water was sampled on October 27, 1994 from each of six (6) monitoring wells on the site. Analytical results indicated that the benzene concentration in monitoring wells (MW) 1 through 5 exceeds the Oregon Cleanup Level of 5 parts per billion (ppb). The ethylbenzene concentration in MW-3 and MW-4 exceeds the Oregon Cleanup Level of 700 ppb. MW-3 also exceeds the allowable limit of 10,000 ppb total xylenes and 1,000 ppb toluene.

Free product was observed in MW-3 during the first quarter sampling in July 1994. Manual removal of free product from MW-3 was conducted on a weekly basis from July 19, 1994 to November 11, 1994. Since the week of October 2, 1994, a measurable amount of free product has not been observed, only residue on the bailer. Beginning the week of November 6, 1994 free product has been checked on a bi-weekly basis. Free product has not been observed in the other five (5) monitoring wells.

1.1 Objective

The purpose of this investigation was to ascertain the environmental impact of a petroleum hydrocarbon plume to the ground water at the Delco (formerly Flying J) gasoline station in Milwaukie, Oregon.

1.2 Background

In May of 1993, Delta Environmental in Bellevue, Washington conducted a Phase I Environmental Assessment of the Flying J (now Delco) gasoline station in Milwaukie, Oregon. Conclusions based on the results of the Phase I indicated the likelihood the facility may have had an unauthorized release and a Phase II preliminary site characterization was initiated. Geotech Exploration drilled five soil borings in prearranged locations within the property's boundaries. The borings did not penetrate the soil/groundwater interface. Soil samples were collected from each of the borings and analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), total petroleum hydrocarbons (TPH) and total petroleum hydrocarbons as gasoline (TPH-G). Concentrations of BTEX and TPH were found in the soil samples in levels high enough to warrant additional drilling on the site. All five borings were subsequently abandoned with concrete after the investigation was concluded.

In June of 1993, Geotech Explorations and Delta Environmental drilled six monitoring wells on site to evaluate the potential environmental impact to ground water. According to the Delta Environmental Phase III report, the wells on the site are constructed of flush-jointed, 2-inch diameter, schedule 40 PVC pipe, fitted with 10-foot long, 0.020-inch factory slotted well screens. In each well, the screen was set at a depth which intersected the groundwater surface observed at the time of the drilling, and was surrounded by a washed silica sand filter pack to a level at least one foot above the top of the screened interval. The remaining borehole was filled with bentonite, and the well was completed with a concrete seal and a flush-mounted locking steel protective well box at the ground surface.

The results of the sampling conducted in June 1993 indicated that soils from borings MW-1 through MW-5 contained concentrations of benzene, toluene, ethylbenzene and xylenes (BTEX), total petroleum hydrocarbons (TPH) and total petroleum hydrocarbons as gasoline (TPH-G). Benzene and TPH were above Oregon Cleanup Levels in borings MW-1 through MW-5. Ground

water was sampled and analyzed from each of the six wells for BTEX, TPH, and TPH-G. Laboratory analysis of the water samples obtained indicated that MW-1 through MW-5 contained concentrations of benzene and TPH which exceeded Oregon cleanup levels. MW-6 however, showed concentrations of benzene and TPH below Oregon cleanup requirements.

Since the completion of Delta Environmental Phase III in June 1993, the ground water on this site had not been sampled until July 1994 when Northwest Envirocon, Inc. was retained by Mr. Devinder Dhillon to sample the ground water from each of the six monitoring wells previously drilled by Geotech Explorations.

2.0 GROUND WATER MONITORING ACTIVITIES

2.1. Groundwater Sampling Methods

To ensure representative ground water samples were obtained, on October 27, 1994 Northwest Envirocon field technicians purged approximately five well volumes from each of the monitoring wells using a Graco® Husky 715 pump. The purged water from each well was collected and stored in individual 55-gallon drums on the site until laboratory analytical results determined the proper disposal method. Static water level measurements were taken using a Slope® Water Level Indicator accurate to 0.01 feet. Water samples were collected using a disposable bailer for each well.

The six wells on site are fast recharging wells, and each well was allowed to recharge to at least 80 percent of its original volume prior to sampling. The ground water was then sampled using a new, pre-wrapped Voss® single sample disposable bailer and a new set of latex gloves for each well. Nylon twine was replaced between each sampling event to decrease the risk of cross-contamination. Water was discharged from a single check valve on the bottom of the bailer into two (2) 40 milliliter glass VOA vials which were supplied by Wy'East Laboratory. The samples were collected with no headspace in the vials. The water sample vials were labeled and stored in a cooler with ice packs and transported to Wy'East Laboratory in Portland with the appropriate chain-of-custody. All six wells were analyzed for EPA method 8020 (BTEX). Copies of the chain-of-custody and laboratory results are contained in Table 1.

Static water level measurements were recorded at each well with a Slope® Water Level Indicator. The levels obtained from each well are indicated below.

Table 2: Groundwater Elevations

Monitoring Well	Depth to ground water	
	July 19, 1994	October 27, 1994
MW-1	7.21 feet	7.45 feet
MW-2	9.01 feet	9.20 feet
MW-3	6.28 feet	6.45 feet
MW-4	6.75 feet	6.97 feet
MW-5	7.95 feet	8.20 feet
MW-6	7.52 feet	7.70 feet

Based on the ground water measurements, the inferred ground water flow direction for the second quarter is to the north-northeast. A groundwater contour map is contained in Figure 2.

2.2 Ground Water Analysis and Results

Northwest Envirocon conducted the second quarterly ground water sampling on October 27, 1994. A total of twelve 40-milliliter VOA vials (two from each well) were analyzed by Wy'East Laboratory for BTEX. The results were compared to the Oregon UST Cleanup Levels [340-122-242(4)]. Laboratory analysis revealed that five of six monitoring wells exceed the Oregon cleanup level of 5 parts per billion (ppb) benzene, one well exceeds the 1,000 ppb cleanup level for toluene, one well exceeds the cleanup level of 10,000 ppb xylenes, and two wells exceed the cleanup level of 700 ppb ethylbenzene. The laboratory did not detect any constituents of BTEX in the sample taken from MW-6. The chart below identifies the wells that exceed Oregon Cleanup Levels.

Oregon Cleanup Levels [340-122-242(4)]

	Benzene	Toluene	Ethylbenzene	Xylenes
	5 ppb	1,000 ppb	700 ppb	10,000 ppb

Laboratory Analytical Results for BTEX

MW-1	729 ppb*	16 ppb	269 ppb	145 ppb
MW-2	53 ppb*	ND	4 ppb	4 ppb
MW-3	18,400 ppb*	17,400 ppb*	3,200 ppb*	20,200 ppb*
MW-4	8,400 ppb*	161 ppb	5,320 ppb*	4,724 ppb
MW-5	141 ppb*	ND	28 ppb	35 ppb
MW-6	ND	ND	ND	ND

* Exceeds Oregon Cleanup Levels

MW 3 to the east of the UST basin was the only well that exceeded cleanup levels for **all** BTEX constituents. In addition to MW-3, MW-4 was the only other well that exceeded cleanup levels for more than one constituent (benzene and ethylbenzene). MW 6 was the only well that had non-detect results for all BTEX constituents. The overall BTEX concentration in MW-3 increased considerably in comparison with the first quarter sampling event. The overall BTEX concentration in MW-6 decreased overall. The concentration of xylenes in MW-4 and MW-5 decreased in comparison with the first sampling event. A copy of the laboratory results and chain-of-custody can be found in Table 1.

3.0 FREE PRODUCT RECOVERY

Free product was observed during the first quarter ground water sampling in MW-3, east of the diesel fuel pump. Free product has been manually removed on a weekly basis since July 19, 1994 and has not been observed in the other five monitoring wells. The bailed free product and ground water from MW-3 is stored in a 55-gallon drum on the site. The chart in Table 3 summarizes free product recovery activities.

TPH-HCID analysis was conducted on MW-3 and MW-4 in November 1994. This analysis indicated that these wells are contaminated with gasoline. NDE Environmental conducted line and leak detector tests on the three gasoline tanks at Delco on September 3, 1994. The results indicated that the leak detector on the premium unleaded tank failed. This detector was repaired at the time of the tank tightness test conducted by NDE on December 17, 1994. All three gasoline tanks and the diesel tank passed the inspection.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The results of this sampling event indicate an overall increase in BTEX concentration in MW-3, and an overall decrease (to non-detect) in MW6 since the last sampling event in July 1994. MW-3 and MW-4 (closest to the UST basin) were the only two wells to exceed Oregon cleanup levels for more than one constituent. Since five of six monitoring wells on the site detected benzene above Oregon cleanup levels, we recommend the installation of additional monitoring wells on neighboring properties to further delineate the extent of the plume, and the installation of a groundwater cleanup system.

5.0 LIMITATIONS

This Assessment has been performed in accordance with generally accepted environmental practices and procedures, as of the date of the Report. All services have been performed employing that degree of care and skill ordinarily exercised under similar circumstances by reputable environmental technologists practicing in this, or similar localities. No other warranty or guarantee, expressed or implied, is made or offered.

The conclusions and recommendations stated in this Report are based upon observations made by employees of Northwest Envirocon, Inc. and also upon information provided by others. We have no reason to suspect or believe that the information provided is inaccurate. However, we cannot be held responsible for the accuracy of the information provided to us by others.

6.0 APPENDICES

FIGURES

1. Topographic Map

2. Ground Water Contour Map

TABLES

1. Laboratory Results and Chain of Custody

2. Ground Water Elevations

3. Free Product Recovery Chart

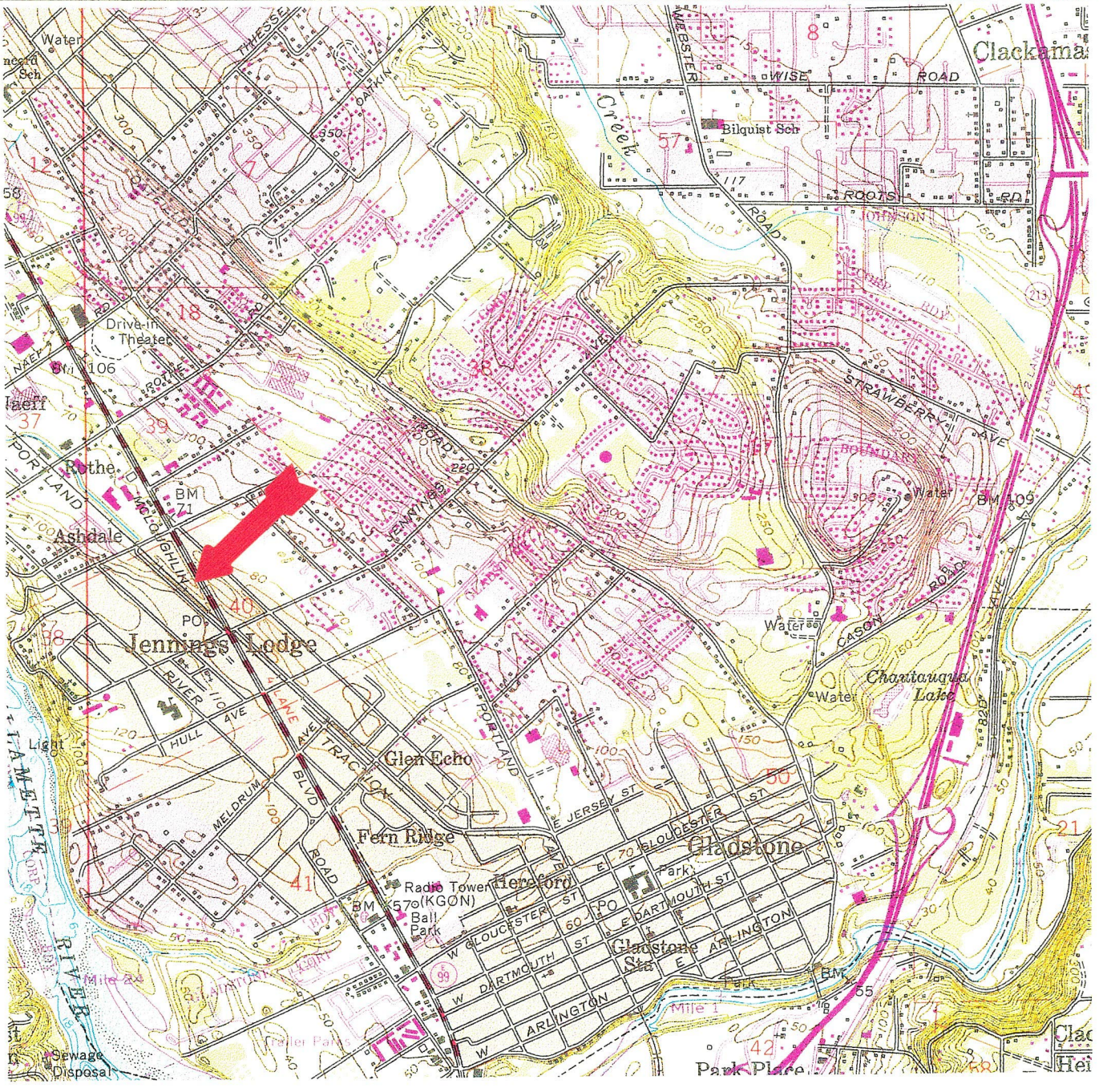
FIGURES

FIGURE 1

TOPOGRAPHIC MAP

FIGURE 2

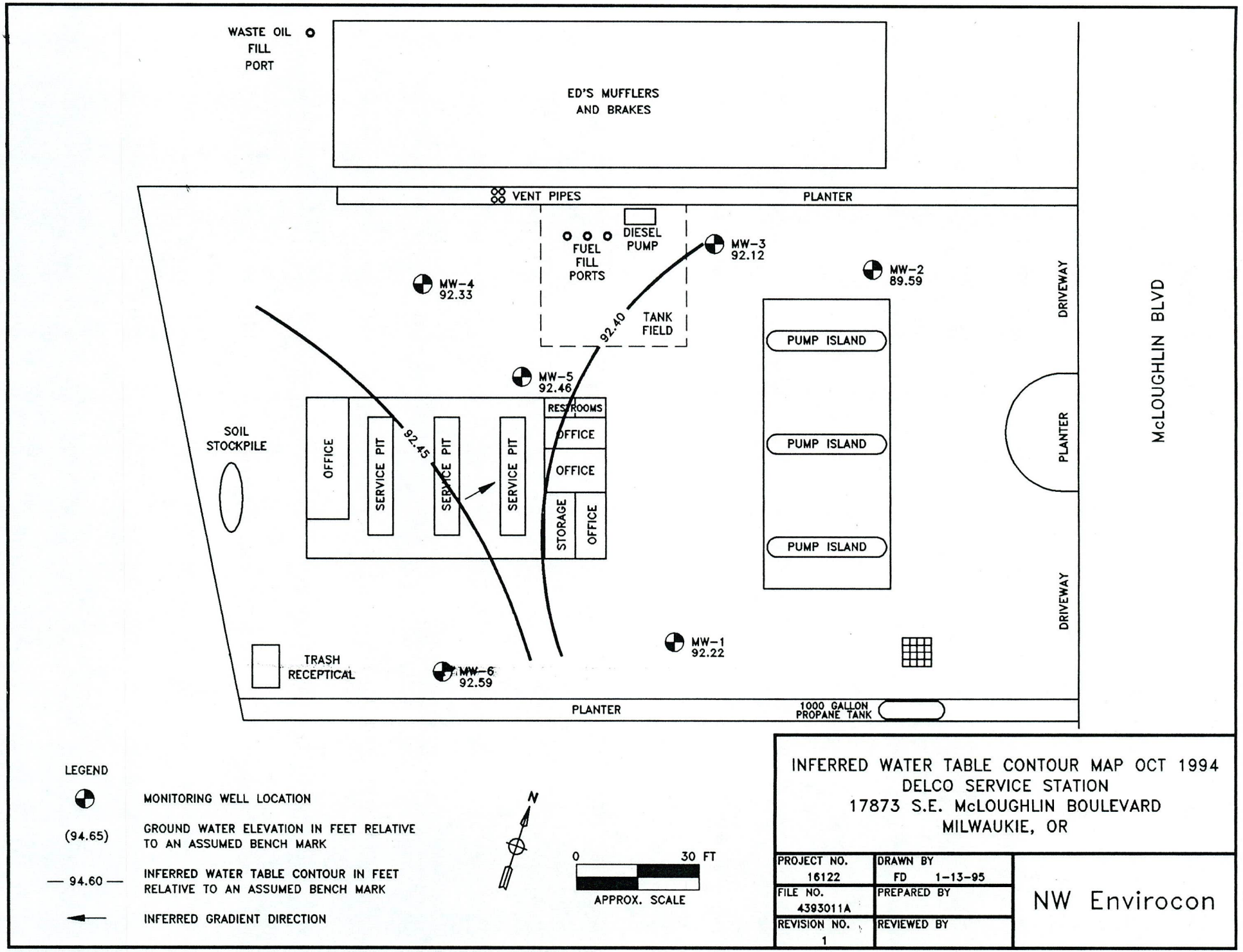
GROUND WATER CONTOUR MAP



Northwest Envirocon, Inc.
Environmental Consulting

USGS 7.5 Minute Topographic Map
Gladstone, Oregon Quadrangle
17873 SE McLoughlin Blvd.
Milwaukie, Oregon

JOB NUMBER	DATE
16122	December 18, 1994



INFERRED WATER TABLE CONTOUR MAP OCT 1994
DELCO SERVICE STATION
17873 S.E. McLOUGHLIN BOULEVARD
MILWAUKIE, OR

PROJECT NO. 16122	DRAWN BY FD 1-13-95
FILE NO. 4393011A	PREPARED BY
REVISION NO. 1	REVIEWED BY

NW Envirocon

TABLES

TABLE 1

LABORATORY RESULTS AND CHAIN OF CUSTODY

LABORATORY REPORT

Northwest Envirocon
7410 Deleware Lane
Vancouver WA 98664

PROJECT NAME/SITE: Milwaukee Fuel Stop
PROJECT NUMBER: 16122
EXTRACTION DATE: 10-27-94
REPORT NUMBER: 13757
REPORT DATE: 10-28-94

EPA 8020
Analyte: BTEX for water (Benzene, Toluene, Ethylbenzene, Xylenes)

Field ID	Lab ID	Identification & Quantification µg/L (ppb)				Surrogate Recovery (%)
		Benzene	Toluene	Ethyl-Benzene	Xylenes	
MW 1 (2)	17407	**729**	**16**	**269**	**145**	115
MW 2 (2)	17408	**53**	**ND**	**4**	**4**	102
MW 3 (2)	17409	**18400**	**17400**	**3200**	**20200**	62
MW 4 (2)	17410	**8400**	**161**	**5320**	**4724**	118
MW 5 (2)	17411	**141**	**ND**	**28**	**35**	93
MW 6 (2)	17412	**ND**	**ND**	**ND**	**ND**	96
BLANK	-	ND	ND	ND	ND	-
Quantification Limits	-	2	2	2	2	-

Surrogate is p-Bromofluorobenzene
ND = Not Detected (below reporting limit or detection limit)

013757

Wy'East
Environmental Sciences, Inc.

Research and Laboratory Services

CHAIN OF CUSTODY

2415 SE 11th Ave. • Portland, Oregon 97214 • (503) 231-9320 • FAX (503) 231-9344

PROJECT # 16122	PROJECT NAME / SITE Milwaukie Fuel Stop	STATE Oregon	PURCHASE ORDER #
COMPANY ~~Delco~~ NW ENVIRON	REPORT ATTENTION Laure Brown	PHONE NUMBER 230-0702	FAX NUMBER (206) 699-5223
SAMPLES COLLECTED BY Laure Brown	DATE COLLECTED 10-27-94	TIME COLLECTED 9am to 12pm	SAMPLES CHILLED TO 4° C? Yes
PRESERVATIVE USED? (HCl, etc.) NO			

FIELD ID	MEDIA	CONTAINER	ANALYSIS REQUIRED	LAB ID
MW1 (2)	water	VOA vial	BTEX	17407
MW2 (2)	"	"	↓	17408
MW3 (2)	"	"		17409
MW4 (2)	"	"		17410
MW5 (2)	"	"		17411
MW6 (2)	"	"		17412

RELINQUISHED BY Laure Brown	DATE / TIME 10-27 3:00	RELINQUISHED BY	DATE / TIME
RELINQUISHED BY	DATE / TIME	RECEIVED BY LAB C Baugh	DATE / TIME 10/27/94 3:00 pm
REMARKS		SHIPPED BY	

Wy'East will return white copy to client with laboratory report and keep yellow copy for files. Client keeps pink copy.

LABORATORY REPORT

Northwest Envirocon
7410 Deleware Lane
Vancouver WA 98664

PROJECT NAME/SITE: Delco Milwaukee
PROJECT NUMBER: 16122
EXTRACTION DATE: 11-21-94
REPORT NUMBER: 13855
REPORT DATE: 11-22-94

OREGON DEQ TPH-HCID

Analyte: Petroleum Hydrocarbon Identification (Gasoline, Diesel, Heavy Oil)

Field ID	Lab ID	Identification			Surrogate Recovery (%)
		Gasoline	Diesel	Heavy Oil	
MW 3	17796	**Detected**	**ND**	**ND**	*
MW 4	17797	**Detected**	**ND**	**ND**	96
BLANK	-	ND	ND	ND	-
Reporting Limits (mg/Kg)	-	20	50	50	-

Surrogate is Cholorooctane
ND = Not Detected (below reporting limit or detection limit)

Wy'East
Environmental Sciences, Inc.

3855

Research, Laboratory, and Consulting Services

CHAIN OF CUSTODY

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PROJECT # 16122	PROJECT NAME / SITE Del Co Milwaukie	STATE OR	PURCHASE ORDER #
COMPANY NW Environcon	REPORT ATTENTION Laure Brown	PHONE NUMBER (503) 230-0702	FAX NUMBER 206-699-5223
SAMPLES COLLECTED BY L. Brown	DATE COLLECTED 11-21-94	TIME COLLECTED 3:30 pm	SAMPLES CHILLED TO 4° C? Yes
PRESERVATIVE USED? (HCl, etc.) NO			

FIELD ID	MEDIA	CONTAINER	ANALYSIS REQUIRED	LAB ID
MW 3	water	1 Litre glass	TPH – HCID	17796
MW4	"	" " "	TPH – HCID	17797

RELINQUISHED BY Laure Brown	DATE / TIME 11-21-94 4:30	RECEIVED BY	DATE / TIME
RELINQUISHED BY	DATE / TIME	RECEIVED BY LAB C Baugh	DATE / TIME 11/21/94 4:30 pm
REMARKS		SHIPPED BY	

Wy'East will return white copy to client with laboratory report and keep yellow copy for files. Client keeps pink copy.

TABLE 2

GROUND WATER ELEVATIONS

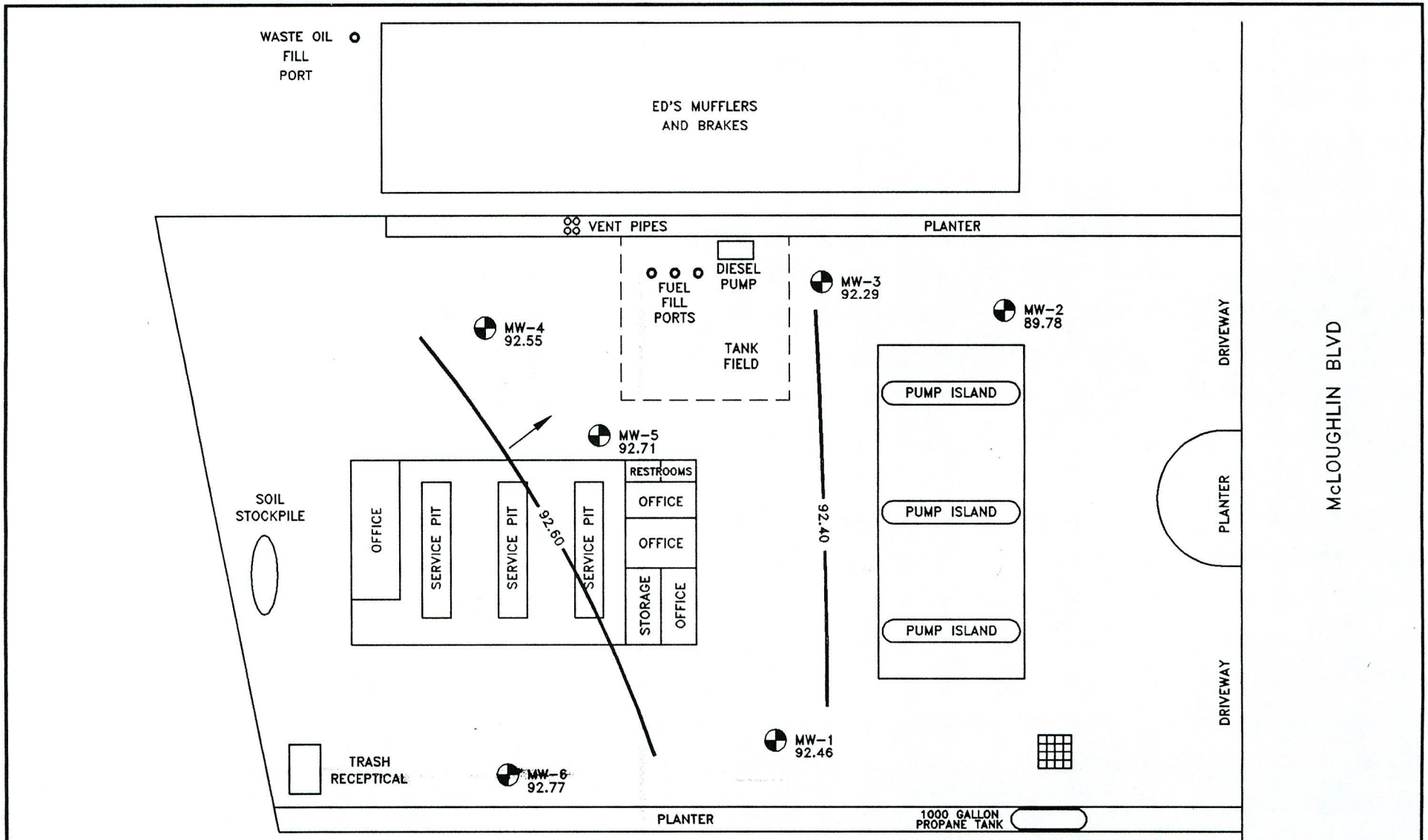
Table 2
Ground Water Elevation Summary

October 27, 1994

Well #	Top of riser elevation	measured depth to ground water (in feet)	Product layer	Ground water elevation
MW-1	**99.67**	**7.45**	**none**	**92.22**
MW-2	**98.79**	**9.20**	**none**	**89.59**
MW-3	**98.57**	**6.45**	**residue**	**92.12**
MW-4	**99.30**	**6.97**	**none**	**92.33**
MW-5	**100.66**	**8.20**	**none**	**92.46**
MW-6	**100.29**	**7.70**	**none**	**92.59**

TABLE 3

FREE PRODUCT RECOVERY CHART



LEGEND

- MONITORING WELL LOCATION
- (94.65) GROUND WATER ELEVATION IN FEET RELATIVE TO AN ASSUMED BENCH MARK
- — 94.60 — INFERRED WATER TABLE CONTOUR IN FEET RELATIVE TO AN ASSUMED BENCH MARK
- INFERRED GRADIENT DIRECTION

N

0 30 FT

APPROX. SCALE

INFERRED WATER TABLE CONTOUR MAP JUL 1994
DELCO SERVICE STATION
17873 S.E. McLOUGHLIN BOULEVARD
MILWAUKIE, OR

PROJECT NO. 16122	DRAWN BY FD 1-13-95
FILE NO. 4393011A	PREPARED BY
REVISION NO. 1	REVIEWED BY

NW Envirocon

FREE PRODUCT RECOVERY CHART

DATE	WELL #	LAYER THICKNESS	# OF BAILER VOLUMES REMOVED	NOTES
7/19/94	3	1 inch	4	smells like gasoline
7/24/94	3	1/2" to 3/4"	4	dark brown - black
7/31/94	3	1/2" to 3/4"	5	
8/7/94	3	1/2"	5	
8/14/94	3	1/2"	6	
8/28/94	3	1/2"	6	
9/4/94	3	1/4"	6	
9/11/94	3	less than 1/4"	6	
9/18/94	3	less than 1/4"	6	
9/25/94	3	less than 1/4"	8	
10/2/94	3	residue	6	no measurable layer of product. Residue on bailer
10/9/94	3	residue	5	(same)
10/16/94	3	residue	5	(same)
10/23/94	3	residue	3	(same)
10/30/94	3	residue	3	(same)
11/6/94	3	residue	2	(same)
11/20/94	3	residue	2	(same)
12/4/94	3	residue	2	(same)
12/18/94	3	residue	2	(same)

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