Environmental Management Services, Inc.

42809 236th Avenue SE, Enumclaw, Washington 98022
Telephone (360) 825-8560 / Fax (360) 825-8640

RELEASE # 421552
BEAR CREEK CC
WOODINVILLE
UST # 2461

July 17, 1999

Ms. Stacie Doran
American Golf Corporation
Bear Creek Country Club
13737 202nd Avenue NE
Woodinville, WA 98072

RE: Groundwater Monitoring Results – June 1999
Former UST Location
Bear Creek Country Club, Woodinville, WA

Dear Ms. Doran:

Environmental Management Services (EMS) has conducted monitoring of six groundwater monitoring wells in the vicinity of two former underground storage tanks (USTs) at the above-referenced location (the site). This letter report presents the results of the groundwater monitoring event.

Site Description

The site is located at the Bear Creek Country Club in Woodinville, Washington (Figure 1). Bear Creek Country Club is a private golf course, located in an area of residential land use. The nearest surface water is Bear Creek, located approximately 1,500 feet west of the site.

The site is located west of the maintenance building along the southern edge of the country club. The site is bounded by an access road to the south, the maintenance building to the east, and the golf course to the north and west (Figure 2). An aboveground fuel storage tank (AST) is located west of the maintenance building, in the approximate location of the former dispenser island. The area between the AST and the building is paved with asphalt and concrete. The area west of the AST is covered with grass and other vegetation. The site slopes toward the west and drainage swales are located northwest of the AST and along the access road.

Background

In March 1997, two 1,000-gallon USTs, used to store gasoline and diesel fuel, along with product piping and dispensers, were removed by PSCI Environmental, of Bothell, Washington. Soil samples collected following removal indicated that one sample from the UST excavation slightly exceeded Model Toxics Control Act (MTCA) Method A Soil Cleanup Levels. However, a sample collected from beneath the dispenser contained 4,200 parts per million (ppm) of diesel (TPH-D). Further soil sampling was conducted toward the west and TPH-D was identified in 11 additional samples extending approximately 130 feet southwest of the former dispensers. The samples were collected at depths ranging from 5 to 9 feet below ground surface (bgs).

12/4/01 ✓

In May 1997, Global Environmental, of Seattle, Washington (Global), excavated approximately 35 tons of contaminated soil from the area of the former dispenser for off-site treatment and disposal. A monitoring point (MP-1) was installed during backfilling of the excavation. Three groundwater monitoring wells (MW-1 through MW-3) were also installed downgradient of the former dispenser to facilitate testing of cleanup alternatives. Groundwater was encountered at depths of approximately three to four feet bgs.

Global installed and operated a soil remediation system consisting of bio-venting with extensive de-watering to increase the amount of soil exposed to treatment. Subsequent groundwater monitoring indicated that diesel-range hydrocarbons were present in samples from MW-2 and MW-3 at concentrations exceeding MTCA Method A Groundwater Cleanup Levels.

EMS conducted initial groundwater monitoring during May 1998. Monitoring results indicated that diesel-range hydrocarbons were present at concentrations above MTCA Method A Cleanup Levels in wells MW-1, MW-2, MW-3 and monitoring point MP-1. During October 1998, EMS installed and sampled three additional monitoring wells at the site (MW-4 through MW-6) to delineate the extent of groundwater impacts at the site. None of the additional wells contained hydrocarbon concentrations above Method A Cleanup Levels.

Purpose and Scope of Work

The purpose of this investigation was to characterize the magnitude and extent of diesel-range hydrocarbon impacts to groundwater at the site. To meet this objective the following scope of work was performed:

- Measured groundwater depth in each of the six monitoring wells and one monitoring point,
- Collected groundwater samples from wells MW-1, MW-2, and MW-3,
- Submitted the samples for laboratory analysis for diesel-range hydrocarbons, and
- Prepared this report.

Groundwater Monitoring

Groundwater levels were measured in each of the wells on June 29, 1999. Prior to sampling, depth to water was measured from the measuring points at the top of each PVC well casing using a Solinst water level indicator. The water level indicator was decontaminated prior to each use. Depth to water ranged from 0.99 to 4.82 feet. Consistent with the surface topography, the groundwater elevations slope toward the west. The depth to water measurements and groundwater elevations are presented on Table 1. Historic groundwater monitoring data is presented on Table 2.

Groundwater Sampling and Analysis

Prior to sampling, each well was purged by removing a minimum of three well casing volumes of water or until the well pumped dry. Each of the wells pumped dry before three volumes could be removed. Following recharge, samples were collected using a peristaltic pump and disposable tubing. The samples were contained in laboratory-supplied glass jars and were properly labeled, sealed, and placed in a cooler with ice. The samples were transported under standard chain-of-custody protocol to North Creek Analytical of Bothell, Washington for laboratory analysis.

The samples were analyzed for diesel-range hydrocarbons (TPH-D) by Washington State Department of Ecology Method WTPH-D. The laboratory results indicated that TPH-D was present in the sample from MW-3 at a concentration of 0.689 ppm. Neither of the other samples contained detectable concentrations of diesel-range hydrocarbons. The groundwater analytical results are presented on Table 3. The historical analytical results are presented on Table 4. The laboratory results are attached.

Summary

Groundwater monitoring was conducted at six monitoring wells at the site. Depth to water ranged from 0.99 to 4.82 feet with an overall groundwater flow direction toward the west. Only one of the three samples collected contained a detectable concentration of diesel-range hydrocarbons. None of the samples exceeded the MTCA Method A Groundwater Cleanup Level of 1 ppm. These are the lowest groundwater concentrations measured to date at the site and may be related to high groundwater levels associated with the very wet spring. The next groundwater monitoring event is scheduled for September 1999.

Limitations

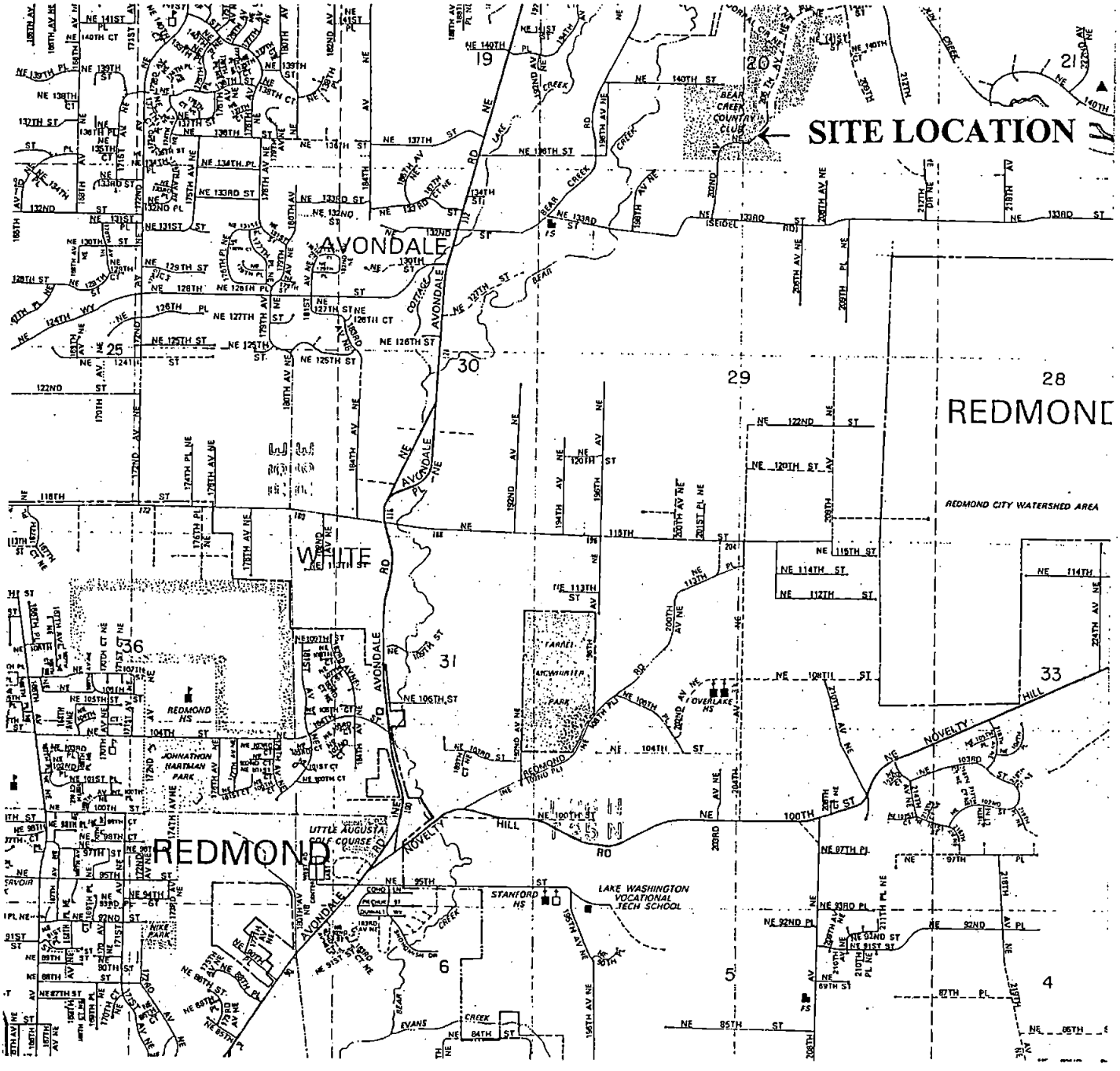
Services provided by EMS have been conducted in a manner consistent with the care and skill ordinarily exercised by members of the consulting industry in this area. No other representation, expressed or implied, is intended in this report.

EMS appreciates the opportunity to provide American Golf Corporation with consulting services. If you have any questions or require additional information, please do not hesitate to call me at (360) 825-8560.

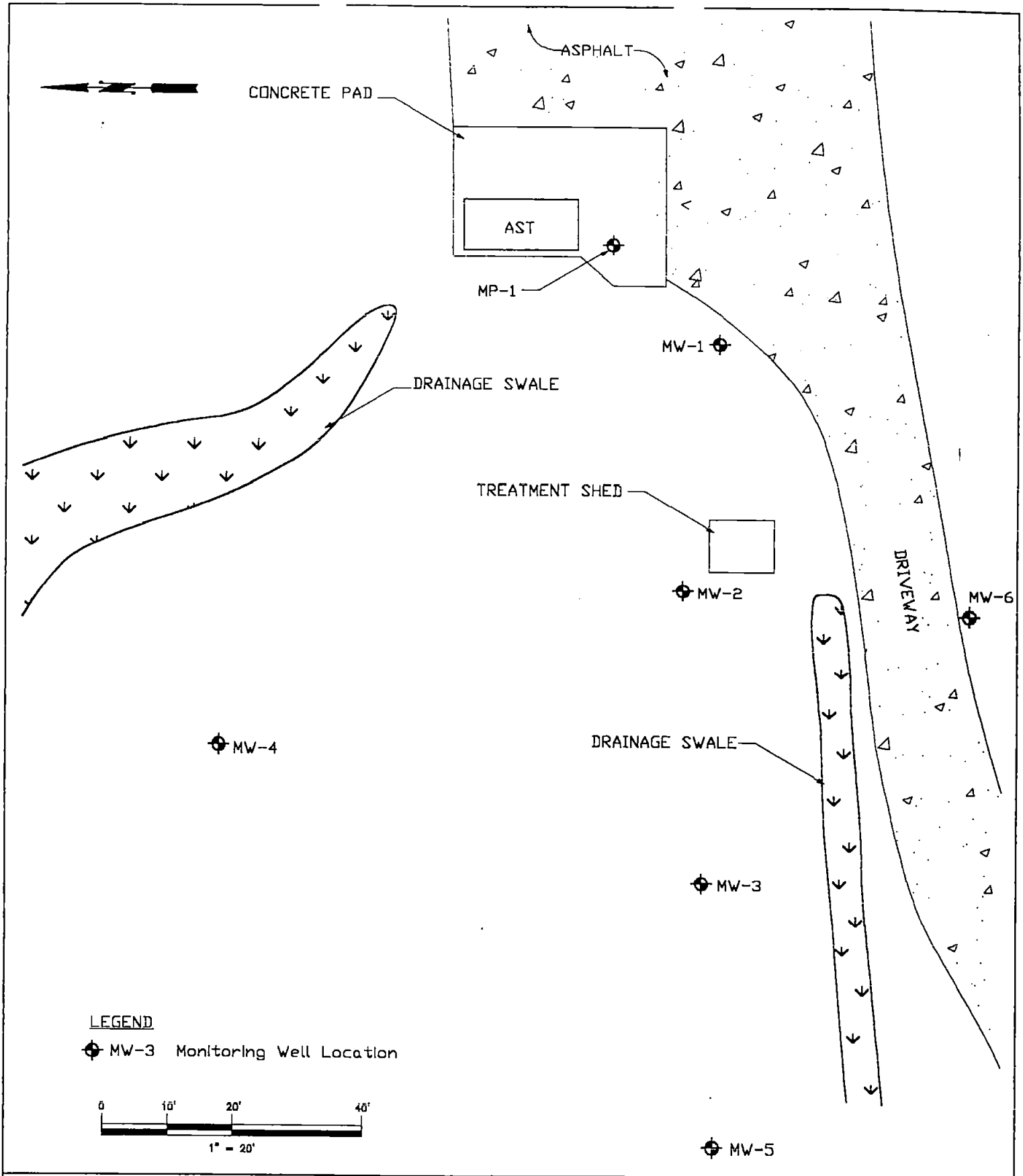
Sincerely

Chris L. Jones
Environmental Management Services, Inc.

Attachments



Environmental Management Services, Inc.	DESIGNED BY: CJ DRAWN BY: JB DATE: June 1998 JOB No.:	FIGURE 1 BEAR CREEK COUNTRY CLUB WOODINVILLE, WA VICINITY MAP
42809 – 236th Avenue S.E. *Enumclaw, Washington 98022*		



Environmental Management Services, Inc. *42809 – 236th Avenue S.E.* *Enumclaw, Washington 98022*	DESIGNED BY: CJ DRAWN BY: JB DATE: November 1998 JOB No.:	FIGURE 2 BEAR CREEK COUNTRY CLUB WOODINVILLE, WA SITE MAP

Table 1
Groundwater Monitoring Data

Bear Creek Country Club
Woodinville, Washington
June 29, 1999

Well Number	Top of Casing Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
MP-1	99.18	4.82	94.36
MW-1	98.58	4.39	94.19
MW-2	95.74	2.03	93.71
MW-3	92.32	0.99	91.33
MW-4	95.11	1.37	93.74
MW-5	91.66	2.25	89.41
MW-6	94.21	2.13	92.08

Note:
Top of Casing Elevations relative to a temporary benchmark with an assigned elevation of 100 feet above mean sea level.

Table 2
Historic Groundwater Monitoring Data

Bear Creek Country Club
Woodinville, Washington

Well Number	Top of Casing Elevation (ft)	Date	Depth to Water (ft)	Groundwater Elevation (ft)	Elevation Change
MP-1	99.18	5/14/98	5.17	94.01	-
		3/22/99	4.25	94.93	0.92
		6/29/99	4.82	94.36	-0.57
MW-1	98.58	5/14/98	5.53	93.05	-
		3/22/99	4.21	94.37	1.32
		6/29/99	4.39	94.19	-0.18
MW-2	95.74	5/14/98	4.11	91.63	-
		3/22/99	1.64	94.1	2.47
		6/29/99	2.03	93.71	-0.39
MW-3	92.32	5/14/98	2.21	90.11	-
		3/22/99	0.86	91.46	1.35
		6/29/99	0.99	91.33	-0.13
MW-4	95.11	3/22/99	1.00	94.11	-
		6/29/99	1.37	93.74	-0.37
MW-5	91.66	3/22/99	1.62	90.04	-
		6/29/99	2.25	89.41	-0.63
MW-6	94.21	3/22/99	1.76	92.45	-
		6/29/99	2.13	92.08	-0.37

Note:
Top of Casing Elevations relative to a temporary benchmark with an assigned elevation of 100 feet above mean sea level.

Table 3
Groundwater Analytical Results

Bear Creek Country Club
Woodinville, Washington
June 29, 1999

Well Number	TPH-Diesel
MW-1	<0.250
MW-2	<0.250
MW-3	0.689
MW-4	NA
MW-5	NA
MW-6	NA
MTCA Method "A" Cleanup Level	1.0

Notes:
Analyses by Ecology Method WTPH-D
TPH-Diesel = Diesel-range Total Petroleum Hydrocarbons
All results in milligrams per liter (mg/L) or parts per million
< = Not detected at the referenced method reporting limit
NA = Not Analyzed

Table 4
Historical Groundwater Analytical Results

Bear Creek Country Club
Woodinville, Washington

Well Number	Date	TPH-Diesel	TPH - Oil
MP-1	5/14/98	20.8	<8.25
MW-1	5/14/98	**5.33**	**1.23**
	3/22/99	0.402	NA
	6/29/99	<0.250	NA
MW-2	5/14/98	**1.11**	<0.750
	3/22/99	**1.03**	NA
	6/29/99	<0.250	NA
MW-3	5/14/98	**4.03**	<0.750
	3/22/99	0.613	NA
	6/29/99	0.689	NA
MW-4	10/13/98	<0.250	NA
	3/22/99	<0.250	NA
MW-5	10/13/98	<0.250	NA
	3/22/99	<0.250	NA
MW-6	10/13/98	0.323	NA
	3/22/99	<0.250	NA
MTCA Method "A" Cleanup Level		1.0	1.0

Notes:
May 14, 1998 analyses by Ecology Method WTPH-D Extended
All other analyses by Ecology Method WTPH-D
TPH-Diesel = Diesel-range Total Petroleum Hydrocarbons
TPH-Oil = Oil-range Total Petroleum Hydrocarbons
All results in milligrams per liter (mg/L) or parts per million
< = Not detected at the referenced method reporting limit
October 13, 1998 samples were grab samples collected during well installation
Bolded values exceed MTCA Method "A" Cleanup Levels
NA = Not Analyzed

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503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

Environmental Management Services	Project:	Bear Creek CC	Sampled:	6/29/99
42809 236th Avenue SE	Project Number:	Not Provided	Received:	6/29/99
Enumclaw, WA 98022	Project Manager:	Chris Jones	Reported:	7/8/99 12:56

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
MW-1	B906719-01	Water	6/29/99
MW-2	B906719-02	Water	6/29/99
MW-3	B906719-03	Water	6/29/99

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

North Creek Analytical, Inc.
Environmental Laboratory Network

Steve Davis, Project Manager

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Diesel Hydrocarbons (C12-C24) by WTPH-D
North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
MW-1			B906719-01				Water	
Diesel Range Hydrocarbons	0790053	7/2/99	7/7/99		0.250	ND	mg/l	
Surrogate: 2-FBP	"	"	"	*50.0-150*		*54.0*	%	
MW-2			B906719-02				Water	
Diesel Range Hydrocarbons	0790053	7/2/99	7/2/99		0.250	ND	mg/l	
Surrogate: 2-FBP	"	"	"	*50.0-150*		*97.1*	%	
MW-3			B906719-03				Water	
Diesel Range Hydrocarbons	0790053	7/2/99	7/7/99		0.250	**0.689**	mg/l	
Surrogate: 2-FBP	"	"	"	*50.0-150*		*82.0*	%	

North Creek Analytical - Bothell

**Refer to end of report for text of notes and definitions.*

Steve Davis, Project Manager

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42809 236th Avenue SE	Project Number:	Not Provided	Received:	6/29/99
Enumclaw, WA 98022	Project Manager:	Chris Jones	Reported:	7/8/99 12:56

Diesel Hydrocarbons (C12-C24) by WTPH-D/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0790053	**Date Prepared: 7/2/99**					**Extraction Method: EPA 3510C/600 Series**				
Blank	**0790053-BLK1**									
Diesel Range Hydrocarbons	7/7/99			**ND**	mg/l	**0.250**				
Surrogate: 2-FBP	"	*0.325*		*0.321*	"	*50.0-150*	*98.8*			
LCS	**0790053-BS1**									
Diesel Range Hydrocarbons	7/2/99	2.00		1.40	mg/l	60.0-140	70.0			
Surrogate: 2-FBP	"	*0.325*		*0.353*	"	*50.0-150*	*109*			
Duplicate	**0790053-DUP1**		**B906646-09**							
Diesel Range Hydrocarbons	7/7/99		0.360	0.463	mg/l			44.0	**25.0**	
Surrogate: 2-FBP	"	*0.650*		*0.359*	"	*50.0-150*	*55.2*			

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**Refer to end of report for text of notes and definitions.*

Steve Davis, Project Manager

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Enumclaw, WA 98022	Project Manager:	Chris Jones	Reported: 7/8/99 12:56

Notes and Definitions

#	Note
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
Recov.	Recovery
RPD	Relative Percent Difference

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Steve Davis, Project Manager

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: B906719

CLIENT: Environmental Management Services, Inc
REPORT TO: EMS
ADDRESS: 42809 236th Ave SE
Enumclaw, WA 98022
PHONE: 360 825 8560 FAX: 360 825 8450

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: Bear Creek C.C.
PROJECT NUMBER:
SAMPLED BY: Chris Jones

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: STD. | 5 | 4 | 3 | 2 | 1 | <1

STD. OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES: WTPH-D	MATRIX (W, S, O)	# OF CONT.	COMMENTS	LAB ID
1.	MW-1	6/29/99 / 10:00	X	W	1		B906719-01
2.	MW-2	6/29/99 / 9:45	X	W	1		-02
3.	MW-3	6/29/99 / 9:30	X	W	1		-03
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							

RELINQUISHED BY: Chris Jones — DATE: 6/29/99 — TIME: 10:50
PRINT NAME: Chris Jones — FIRM: EMS

RECEIVED BY: S. Wideen — DATE: 6/29/99 — TIME: 1050
PRINT NAME: S. Wideen — FIRM: NCA

RELINQUISHED BY: — DATE: — TIME:
PRINT NAME: — FIRM:

RECEIVED BY: — DATE: — TIME:
PRINT NAME: — FIRM:

ADDITIONAL REMARKS: W/O

TEMP: 15.6

COC REV 3/99

PAGE OF