

PHONE 285-2400  
CABLE ADDRESS: TIMOIL  
(FAX) 206-283-8036

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# TIME OIL CO.

2737 WEST COMMODORE WAY  
P.O. BOX 24447

SEATTLE, WA 98199-1233  
SEATTLE, WA 98124-0447

October 30, 2000

Mr. Chung Yee  
Washington State Department of Ecology  
Central Region  
15 West Yakima Avenue  
Yakima, WA 98902-3387



RE: Transmittal of:  
Monitoring and Recovery Well Installation Report,  
Installation Report – Bioslurping System Construction, and  
Operation & Maintenance Report

Time Oil Co. Property 01-068; Valley View Market  
107 W. Lincoln Avenue; Sunnyside, Washington

*UST# 4108  
Valley View Gas Mart*

Dear Mr. Yee,

Please find enclosed herewith copies of the above referenced reports produced for Time Oil Co. by Brown & Caldwell. The following paragraphs present a short discussion of the installation of additional monitoring and recovery wells, construction activities undertaken to install the site's new soil and groundwater remediation system, a summary of the system's initial operating period, and our plans for future work. Please refer to the enclosed reports for more detailed descriptions of the work.

**Additional Well Installation:**

Nine additional environmental wells were installed at the site in early May 2000. These wells were installed in preparation for the commencement of active remediation. Two-inch diameter monitoring wells MW-17 and MW-18 were installed to total depths of approximately 30 feet below ground surface (bgs) near the downgradient end of the affected groundwater plume to provide a more suitable monitoring network in this area. Four-inch diameter recovery wells RW-1 through RW-7 were installed to total depths of approximately 35 feet bgs in the central axis of the affected groundwater plume to provide additional extraction wells for remedial activities.

Soil samples were collected near the groundwater interface in each well boring. Recovered soil samples were analyzed for gasoline range petroleum hydrocarbons (GRPH) by the WTPH-G method and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA test method 8021B. Target analytes were not detected in soil samples collected from well borings MW-17 and RW-5. Concentrations of target analytes below State of Washington Model Toxics Control Act (MTCA) Method A Cleanup Levels – Soil (Soil Cleanup Levels), were detected in the soil samples collected from well borings MW-18 and RW-4. Soil samples collected from well borings RW-1, RW-2, RW-3, RW-6 and RW-7 contained target analytes at concentrations exceeding Soil Cleanup Levels.

Groundwater samples were collected from the new wells for the first time during the May 2000 groundwater monitoring event. Please refer to the previously submitted May and July 2000 groundwater

monitoring reports for complete results of groundwater monitoring activities. Installation of the new wells is discussed in detail in the enclosed report entitled "Monitoring and Recovery Well Installation Report," dated October 13, 2000.

**Remediation System Installation:**

A dual-phase extraction soil and groundwater remediation system was installed at the site between May and July 2000. Construction activities to install additional recovery wells, subsurface remedial utilities, and a remediation compound were completed in May 2000. Installation of extraction and treatment equipment within the remediation compound, and connection of extraction wells to subsurface conveyance piping, was completed in July 2000. Remedial system operation began on a full time basis in early August 2000. The remediation system utilizes a high vacuum liquid ring extraction pump to simultaneously extract soil vapor, contaminated groundwater, and free phase product from ten extraction wells located in the central axis of the affected groundwater plume. Wells MW-4, MW-5, MW-9, and RW-1 through RW-7 are connected to the liquid ring pump with 1-inch diameter extraction tubes, subsurface PVC piping, and a control manifold.

Extracted media are separated and treated by equipment located within a treatment compound installed on the adjacent Washington Hills Cellars property at 111 East Lincoln Avenue. Free phase product is recovered in an oil-water separator then routed to a 250-gallon product storage tank. Recovered groundwater is treated through a low profile tray stripper and activated carbon vessel then discharged to the City of Sunnyside sanitary sewer system under permits issued by the City of Sunnyside and the Washington State Department of Ecology – Central Region (Ecology). Hydrocarbon vapors recovered from the extraction wells and generated by the tray stripper are treated through a natural gas fired catalytic oxidizer under a permit issued by the Yakima Regional Clean Air Authority (YRCAA).

Detailed descriptions of the remediation system configuration, installation procedures, permit requirements, and as-built drawings are presented in the enclosed report entitled "Installation Report – Bioslurping System Construction," dated October 2000.

**Remediation System Operation & Maintenance:**

Installation of the soil and groundwater remediation system was completed on July 10, 2000. The system was operated intermittently between July 10 and August 4, 2000 in order to perform check-out testing, adjust and balance various operating parameters, install and test additional system components, and prepare for full-time system operation. Full time operation of the remediation system commenced on August 8, 2000. The system is maintained operational as much as possible; however, maintenance related shut down periods ranging from a few hours to several days have been experienced. Such shut down periods are common with complex remediation systems. We estimate that the system operated approximately 60.5 days between July and October 2000.

Untreated vapor samples were collected on twelve occasions between July 11 and September 27, 2000. Untreated vapor samples are collected from the catalytic oxidizer's influent line downstream from the junction of the effluent lines running from the liquid ring pump and the tray stripper. Thus, the untreated vapor samples contain hydrocarbons removed from both soil and groundwater. Hydrocarbon concentrations in the untreated vapor samples were used to estimate the amount of hydrocarbons removed from soil and groundwater beneath the site. Our consultant's calculations indicate that approximately 1,550 pounds of hydrocarbons have been recovered to date. The current hydrocarbon removal rate, based on the September 27, 2000 analytical results, is approximately 8 pounds per day.

In order to verify compliance with treated air and water discharge permit requirements, treated water and vapor samples have been collected on several occasions since system operation began. Analytical results from the treated air and water discharge streams indicate compliance with permit requirements. Separate letter reports documenting results of treated water and air sample analytical testing conducted to verify

discharge permit compliance are submitted to the City of Sunnyside, Ecology (Water Quality Division), and the YRCAA per schedules listed in the site's permits.

Detailed descriptions of operation & maintenance activities are presented in the enclosed report entitled "Operation & Maintenance Report," dated October 13, 2000.

**Future Work:**

Quarterly groundwater monitoring and remediation system operation & maintenance will continue throughout 2000 and 2001. Groundwater monitoring will be conducted on a January, April, July, and October schedule. Results of a groundwater monitoring event conducted in October 2000 will be presented in a forthcoming report. Preliminary results from the October 2000 groundwater monitoring event indicated significant reductions in free product thicknesses and groundwater contaminant concentrations beneath the site. The next groundwater monitoring event is scheduled for January 2001. Beginning in early 2001, groundwater monitoring and operation & maintenance activities will be discussed in combined reports.

If you have any questions or comments concerning this letter, the reports, or the information contained within either, please call me at (206) 286-6457.

Sincerely,  
TIME OIL CO.



Scott B. Sloan, R.G.  
Geologist

Encl: "Monitoring and Recovery Well Installation Report", October 13, 2000  
"Installation Report – Bioslurping System Construction", October 2000  
"Operation & Maintenance Report", October 13, 2000

cc: Mr. John Probst - Washington Hills Cellars  
Mr. Mark Engdahl – Brown & Caldwell (w/o enclosure)

Wells Fargo Center  
Suite 500  
999 Third Avenue  
Seattle, WA 98104-4012

Tel: (206) 624-0100  
Fax: (206) 749-2200



October 13, 2000

Mr. Scott Sloan  
Time Oil Company  
2737 West Commodore Way  
Seattle, Washington 98199-1233

*Valley View Coors Mart*

Re: Monitoring and Recovery Well Installation Report  
May 2000  
Time Oil Co. Property No. 01-068  
107 West Lincoln Avenue  
Sunnyside, Washington

*OST#4108*

15-19046/006



Environmental Engineering & Consulting

Mr. Sloan:

Brown & Caldwell is pleased to present the analytical results of our soil samples collected during the installation of monitoring and recovery wells at 107 West Lincoln Avenue (subject site) and the Washington Hills Cellars property located east of the subject site across First Street (Figure 1). On May 1 and 2, 2000, an experienced Brown & Caldwell geologist was on site to log and observe the installation of two monitoring wells (MW-17 and MW-18) and seven recovery wells (RW-1 through RW-7) and collect soil samples at the soil/groundwater interface from each well boring. Figure 2 illustrates well locations. The results of our findings are presented in this letter report. This report has been prepared for Time Oil Company (TOC) under our contract dated April, 2000.

On May 1<sup>st</sup> and 2<sup>nd</sup>, 2000, two two-inch groundwater monitoring wells, MW-17 and MW-18 were installed on the WHC property to depths of 30 feet below ground surface (bgs) and seven four-inch groundwater recovery wells, RW-1 through RW-7, were installed to depths of 35 feet bgs for the bioslurp remedial system. Of the seven recovery wells, RW-2 through RW-5 were installed on the WHC property, RW-6 and RW-7 were installed in First Street, and RW-1 was installed on the subject site. All wells were drilled by Environmental West of Spokane, Washington. Well As-builts are attached as Attachment A.

One soil sample was collected from each well at the soil/groundwater interface and submitted to North Creek Analytical of Bothell, Washington for laboratory analysis of Total Petroleum Hydrocarbons - Gasoline Range (TPH-G) by Washington Department of Ecology Method WTPH-G, and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) by EPA Method 8020A. Table 1 shows concentrations of TPH-G and BTEX for soil samples submitted for analytical testing. Analytical test certificates are presented as Attachment B.

Mr. Scott Sloan  
Time Oil Property No. 01-068  
Well Installation Report

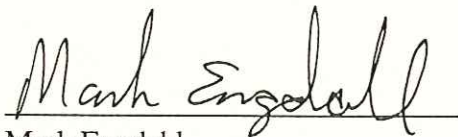
Detectable levels of TPH-G were observed in soil samples collected from recovery wells RW-1, RW-2, RW-3, RW-6, and RW-7. No concentrations of TPH-G were observed in soil samples collected from wells RW-4, RW-5, MW-17, and MW-18. Soil concentrations in RW-1 and RW-6 exceeded MTCA Method A cleanup levels for TPH-G.

Detectable levels of BTEX constituents were observed in all soil samples except sample MW-17 and RW-5. The soil sample collected from MW-18 was below detection limits for all analytes except total xylenes, (0.115 mg/kg). Soil samples collected from recovery wells RW-1, RW-2, RW-3, RW-6, and RW-7 exceeded MTCA Method A cleanup levels for benzene. Soil from RW-1 exceeded MTCA Method A cleanup levels for all analytes sampled, and recovery well, RW-6 exceeded MTCA Method A cleanup levels for total xylenes at a concentration of 29.8 mg/kg.

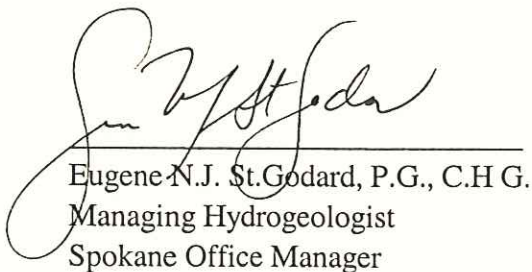
Soil cuttings generated during drilling activities were containerized, labeled, and stored on-site in 30, 55-gallon drums. On May 5, 2000, REMTech of Spokane, Washington arrived on site to load and haul the soil cuttings to their facility in Spokane, Washington for incineration. Notification of treatment of soil cuttings is presented in Attachment C.

We appreciate the opportunity to be of continued service to TOC. Should you have any questions regarding this letter report or other aspects of this project, please do not hesitate to call us at your earliest convenience.

Respectfully submitted,  
Brown and Caldwell

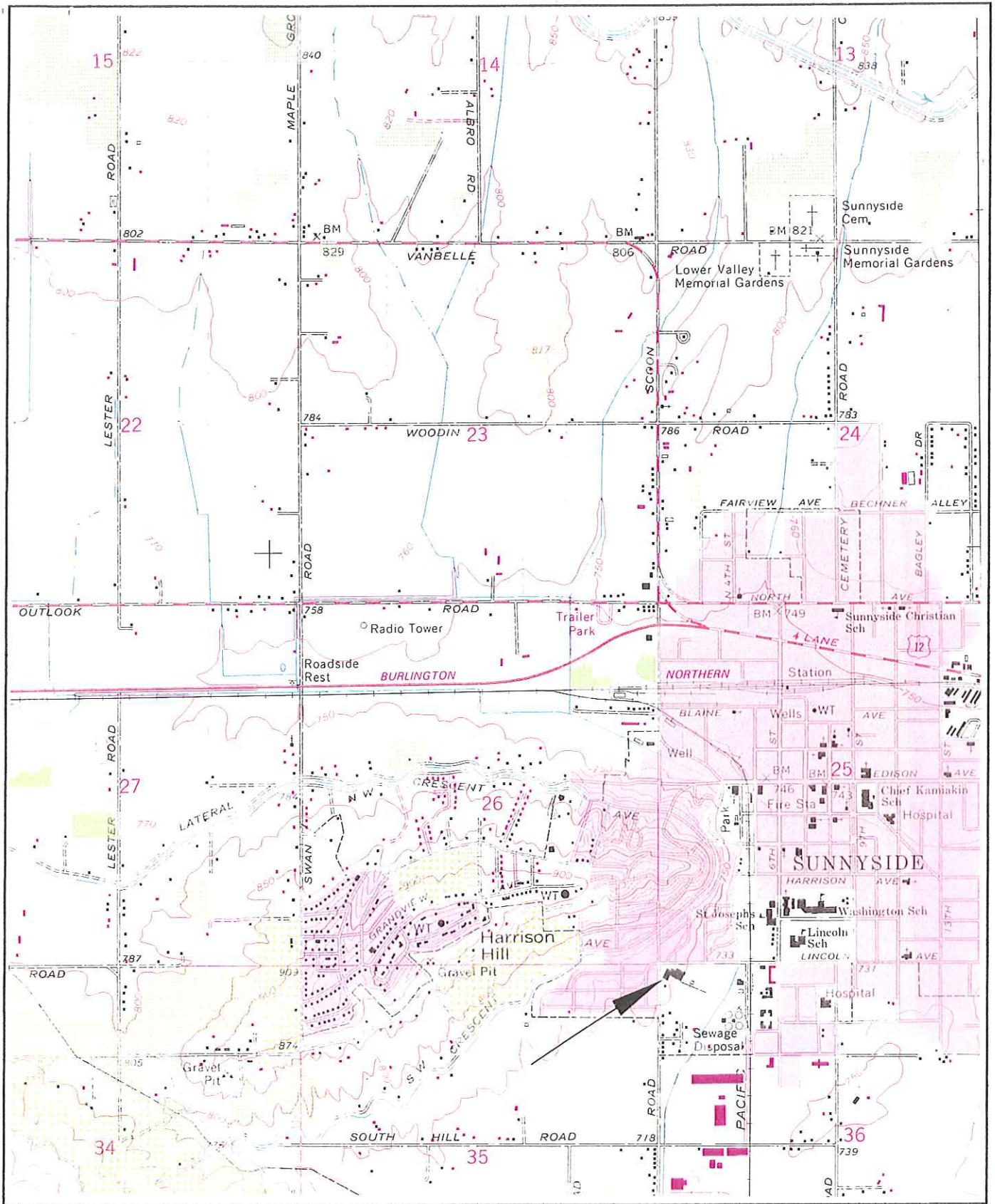


Mark Engdahl  
Geologist



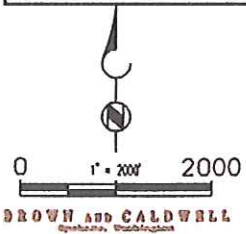
Eugene N.J. St. Godard, P.G., C.H.G.  
Managing Hydrogeologist  
Spokane Office Manager

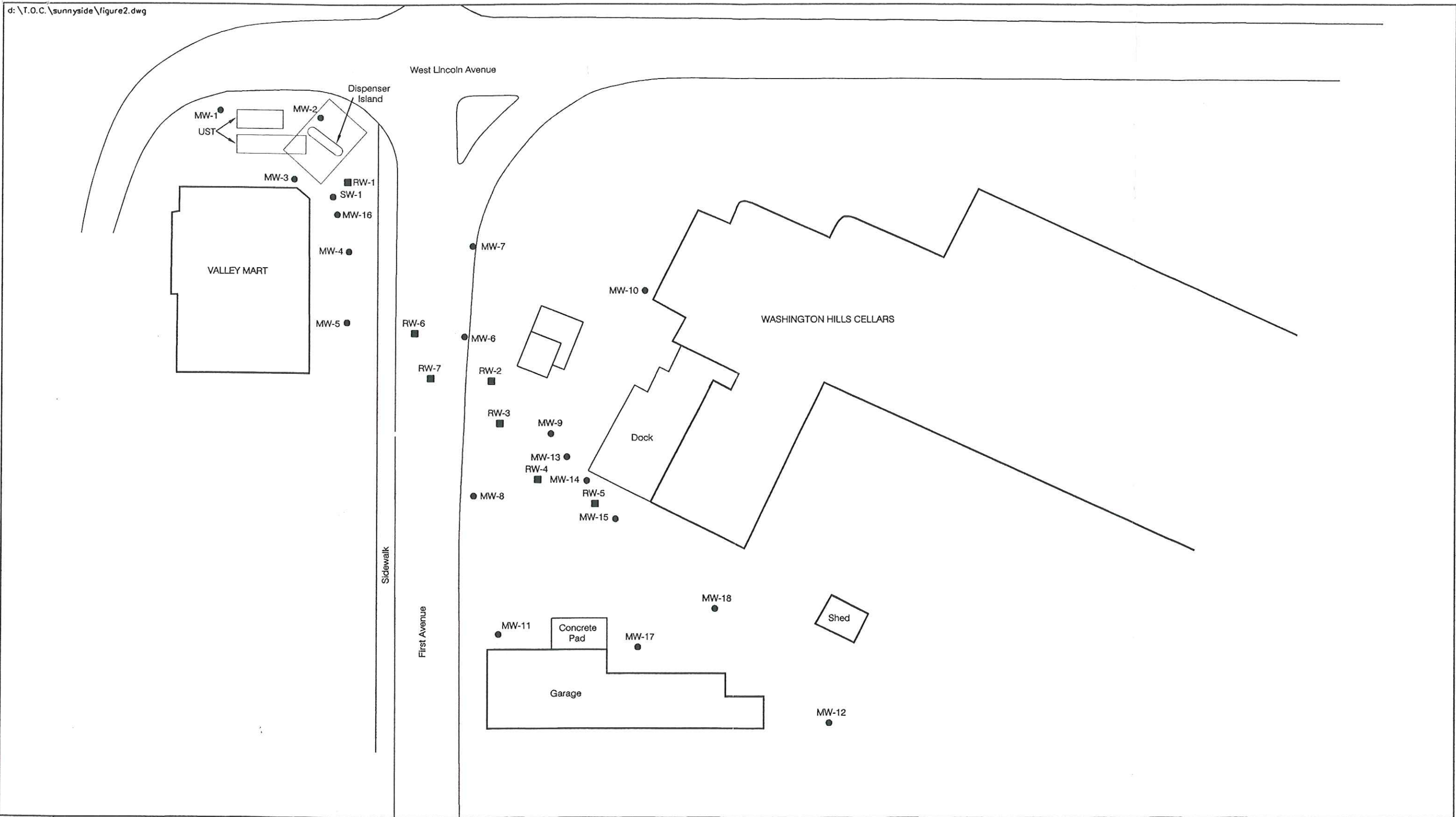
Enclosures: Figure 1: Site Vicinity Map  
Figure 2: Site Plan  
Table 1: Summary of Drilling Soil Samples Analytical Results  
Attachment A: Well As-Built Drawings  
Attachment B: Analytical Test Certificates  
Attachment C: Notification of soil destruction - RemTech



From 7.5 Minute - Sunnyside Quadrangle

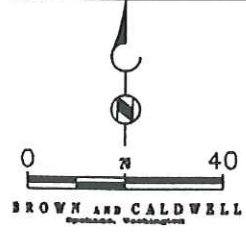
Site Vicinity Map  
 Time Oil Facility 01-068  
 Sunnyside, Washington  
 FIGURE 1





October 2000

- Monitoring Well (MW)
- Recovery Well (RW)



Site Plan  
 Time Oil Facility 01-068  
 Sunnyside, Washington  
 FIGURE 2

**TABLE 1**  
**Drilling Soil Samples**  
**Time Oil Property # 01-068**  
**Sunnyside, Wa**

Well ID	DATE	Sample Depth (feet)	TWD (feet)	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Total Xylenes mg/kg	TPH-G mg/kg	LAB
MW-17	05/01/00	17-19	30	<0.0500	<0.0500	<0.0500	<0.100	<5.00	NCA
MW-18	05/01/00	17-19	30	<0.0500	<0.0500	<0.0500	0.115	<5.00	NCA
RW-1	05/01/00	17-19	35	<12.5	126	72.4	529	4380	NCA
RW-2	05/02/00	18-20	35	6.19	9.25	0.904	5.82	52.6	NCA
RW-3	05/01/00	18-20	35	3.78	8.79	0.564	8.43	85.6	NCA
RW-4	05/01/00	18-20	35	0.436	0.367	<0.0500	0.397	<5.00	NCA
RW-5	05/01/00	18-20	35	<0.0500	<0.0500	<0.0500	<0.100	<5.00	NCA
RW-6	05/02/00	18-20	35	7.70	25.0	5.23	29.8	260	NCA
RW-7	05/02/00	18-20	35	3.73	4.57	0.123	1.94	17.2	NCA
MTCA Method A CCL's for Soil				0.5	40.0	20.0	20.0	100.0	



*APPENDIX A*  
**WELL AS-BUILT DRAWINGS**

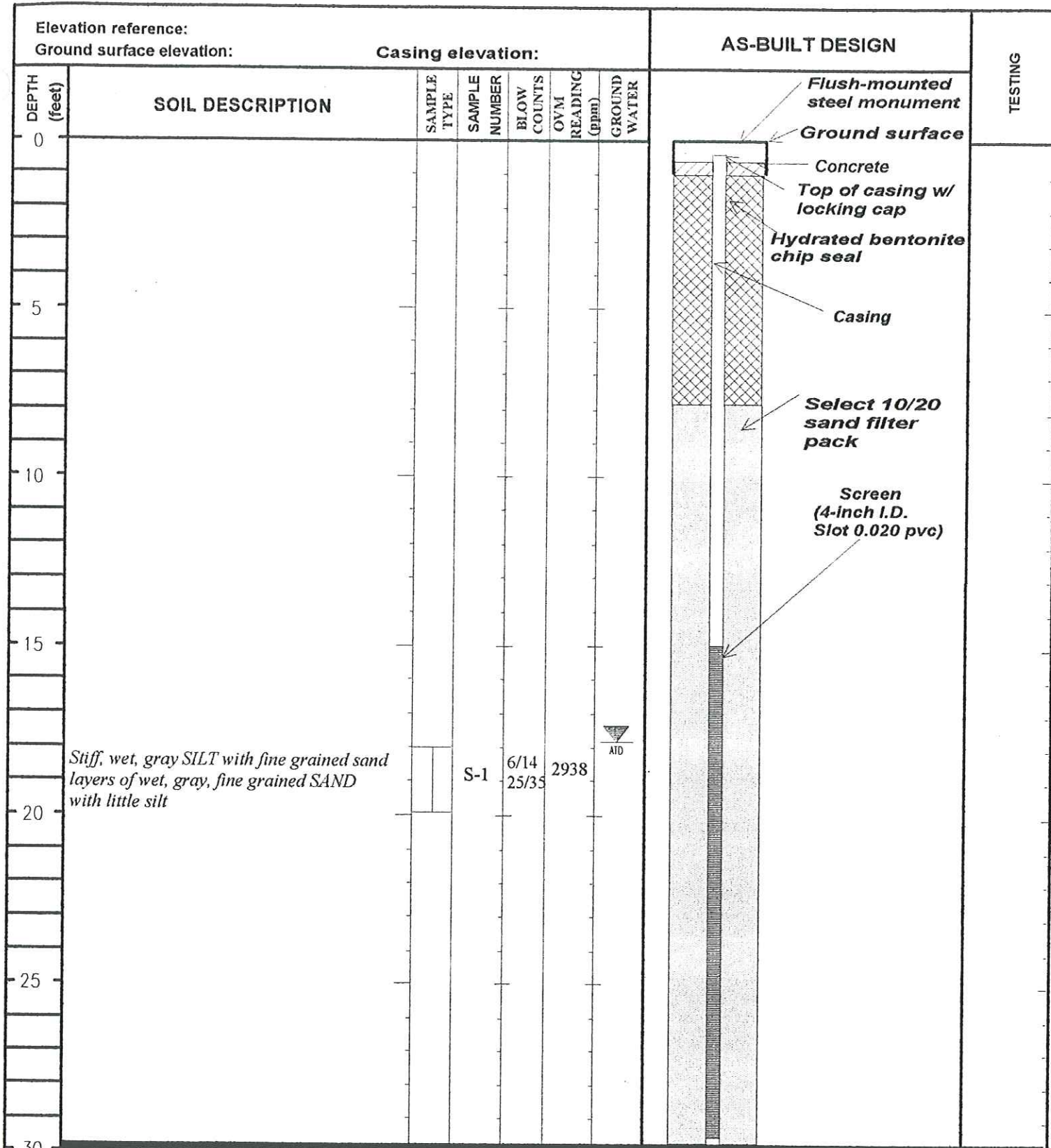
Elevation reference: Ground surface elevation:		Casing elevation:						AS-BUILT DESIGN		TESTING
DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING (ppm)	GROUND WATER	AS-BUILT DESIGN			
0										
5										
10										
15										
18	<i>Medium stiff, saturated, gray, SILT with fine sand</i>		S-1	8/18 18/28	1930					
20	<i>Mdium stiff, saturated, gray, fine SAND with silt</i>									
25										
30										

Well terminated at approxiamtely 35 feet

**LEGEND**

**BROWN AND CALDWELL**  
Environmental Consulting

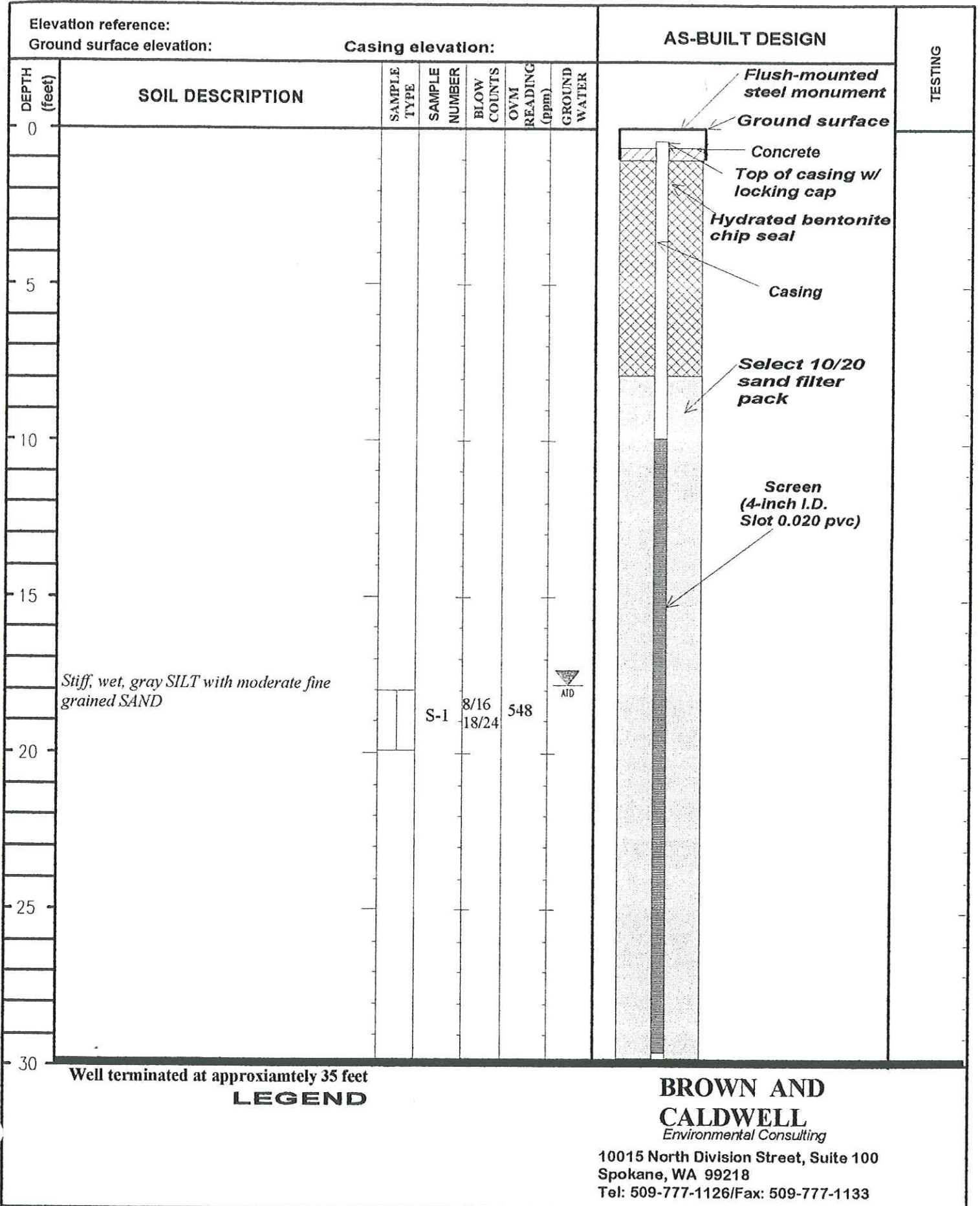
10015 North Division Street, Suite 100  
Spokane, WA 99218  
Tel: 509-777-1126/Fax: 509-777-1133



Well terminated at approxiamtely 30 feet  
**LEGEND**

**BROWN AND CALDWELL**  
Environmental Consulting

10015 North Division Street, Suite 100  
Spokane, WA 99218  
Tel: 509-777-1126/Fax: 509-777-1133



**LEGEND**

**BROWN AND CALDWELL**  
Environmental Consulting

10015 North Division Street, Suite 100  
Spokane, WA 99218  
Tel: 509-777-1126/Fax: 509-777-1133

Elevation reference:

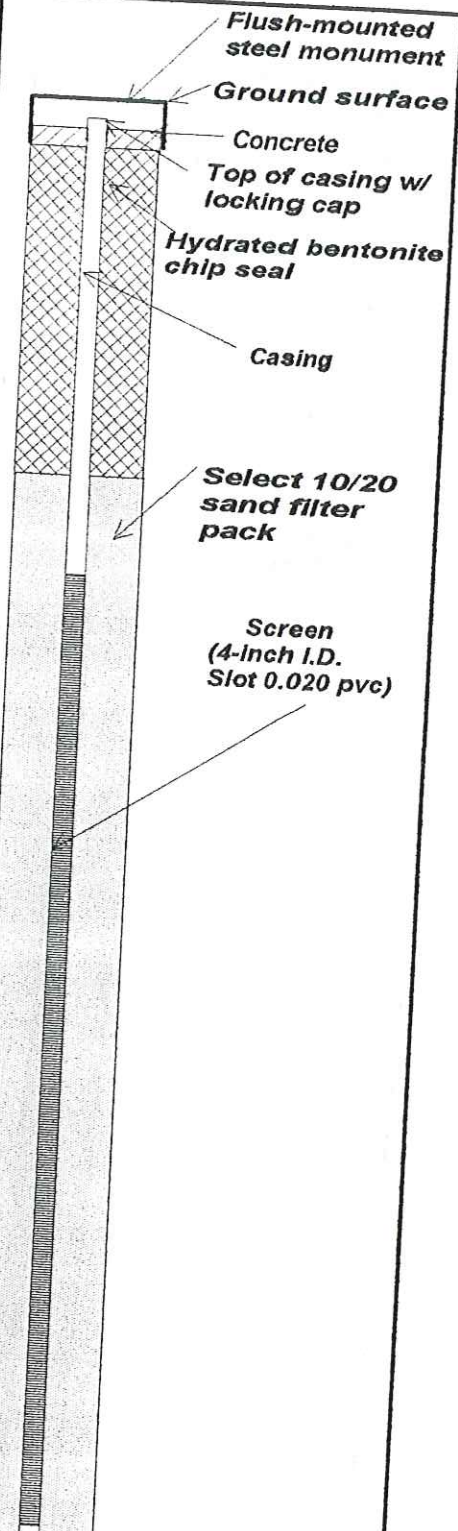
Ground surface elevation:

Casing elevation:

AS-BUILT DESIGN

TESTING

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING (ppm)	GROUND WATER
0						
5						
10						
15						
20	Stiff, wet, gray SILT with fine grained SAND	S-1	10/16 28/32	3.4		
25						
30						



Well terminated at approxiamtely 35 feet

**LEGEND**

**BROWN AND CALDWELL**  
Environmental Consulting

10015 North Division Street, Suite 100  
Spokane, WA 99218  
Tel: 509-777-1126/Fax: 509-777-1133

Drilling started: 1 May 2000

Drilling completed: 1 May 2000

Logged by: ME

*APPENDIX B*  
**ANALYTICAL TEST CERTIFICATES**



Seattle 18939 120th Avenue NE, Suite 101, Bothell, WA 98011-9508  
 425.420.9200 fax 425.420.9210  
 Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776  
 509.924.9200 fax 509.924.9290  
 Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132  
 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

Brown & Caldwell - Spokane 10015 N Division St Suite 100 Spokane WA, 99218	Project: Time Oil-Sunnyside Project Number: N/A Project Manager: Gene St. Goddard	<b>Reported:</b> 05/11/00 14:24
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**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-17	B0E0088-01	Soil	05/01/00 09:30	05/04/00 09:40
MW-18	B0E0088-02	Soil	05/01/00 10:50	05/04/00 09:40
RW-5	B0E0088-03	Soil	05/01/00 12:35	05/04/00 09:40
RW-4	B0E0088-04	Soil	05/01/00 14:45	05/04/00 09:40
RW-3	B0E0088-05	Soil	05/01/00 16:40	05/04/00 09:40
RW-2	B0E0088-06	Soil	05/02/00 07:45	05/04/00 09:40
RW-6	B0E0088-07	Soil	05/02/00 12:05	05/04/00 09:40
RW-7	B0E0088-08	Soil	05/02/00 09:30	05/04/00 09:40

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.*

Amar Gill, Project Manager

**North Creek Analytical, Inc.  
Environmental Laboratory Network**



Seattle 18939 120th Avenue NE, Suite 101, Bothell, WA 98011-9508  
 425 420 9200 fax 425 420 9210  
 Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776  
 509 924 9200 fax 509 924 9290  
 Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132  
 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

Brown & Caldwell - Spokane 10015 N Division St Suite 100 Spokane WA, 99218	Project: Time Oil-Sunnyside Project Number: N/A Project Manager: Gene St. Goddard	Reported: 05/11/00 14:24
----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------	-----------------------------

**Gasoline Range Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MW-17 (B0E0088-01) Soil</b> Sampled: 05/01/00 09:30 Received: 05/04/00 09:40									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	0E05023	05/05/00	05/08/00	WTPH-G/8021B	
Benzene	ND	0.0500	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	73.8 %	50-150			"	"	"	"	
Surrogate: 4-BFB (PID)	84.8 %	50-150			"	"	"	"	
<b>MW-18 (B0E0088-02) Soil</b> Sampled: 05/01/00 10:50 Received: 05/04/00 09:40									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	0E05023	05/05/00	05/10/00	WTPH-G/8021B	
Benzene	ND	0.0500	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	<b>0.115</b>	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	71.3 %	50-150			"	"	"	"	
Surrogate: 4-BFB (PID)	83.3 %	50-150			"	"	"	"	
<b>RW-5 (B0E0088-03) Soil</b> Sampled: 05/01/00 12:35 Received: 05/04/00 09:40									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	0E05023	05/05/00	05/08/00	WTPH-G/8021B	
Benzene	ND	0.0500	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	74.7 %	50-150			"	"	"	"	
Surrogate: 4-BFB (PID)	86.6 %	50-150			"	"	"	"	

North Creek Analytical - Bothell

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Amar Gill, Project Manager





Seattle 18939 120th Avenue NE, Suite 101, Bothell, WA 98011-9508  
 425.420.9200 fax 425.420.9210  
 Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776  
 509.924.9200 fax 509.924.9290  
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Brown & Caldwell - Spokane  
 10015 N Division St Suite 100  
 Spokane WA, 99218

Project: Time Oil-Sunnyside  
 Project Number: N/A  
 Project Manager: Gene St. Goddard

Reported:  
 05/11/00 14:24

**Gasoline Range Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>RW-4 (B0E0088-04) Soil</b> Sampled: 05/01/00 14:45 Received: 05/04/00 09:40									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	0E05023	05/05/00	05/08/00	WTPH-G/8021B	
Benzene	0.436	0.0500	"	"	"	"	"	"	"
Toluene	0.367	0.0500	"	"	"	"	"	"	"
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	"
Xylenes (total)	0.397	0.100	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	76.7 %	50-150			"	"	"	"	"
Surrogate: 4-BFB (PID)	88.4 %	50-150			"	"	"	"	"
<b>RW-3 (B0E0088-05) Soil</b> Sampled: 05/01/00 16:40 Received: 05/04/00 09:40									
Gasoline Range Hydrocarbons	85.6	25.0	mg/kg dry	5	0E05023	05/05/00	05/09/00	WTPH-G/8021B	
Benzene	3.78	0.250	"	"	"	"	"	"	"
Toluene	8.79	0.250	"	"	"	"	"	"	"
Ethylbenzene	0.564	0.250	"	"	"	"	"	"	"
Xylenes (total)	8.43	0.500	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	86.6 %	50-150			"	"	"	"	"
Surrogate: 4-BFB (PID)	89.6 %	50-150			"	"	"	"	"
<b>RW-2 (B0E0088-06) Soil</b> Sampled: 05/02/00 07:45 Received: 05/04/00 09:40									
Gasoline Range Hydrocarbons	52.6	20.0	mg/kg dry	4	0E05023	05/05/00	05/09/00	WTPH-G/8021B	
Benzene	6.19	0.200	"	"	"	"	"	"	"
Toluene	9.25	0.200	"	"	"	"	"	"	"
Ethylbenzene	0.904	0.200	"	"	"	"	"	"	"
Xylenes (total)	5.82	0.400	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	75.6 %	50-150			"	"	"	"	"
Surrogate: 4-BFB (PID)	88.8 %	50-150			"	"	"	"	"

North Creek Analytical - Bothell

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 Antar Gill, Project Manager

North Creek Analytical, Inc.  
 Environmental Laboratory Network



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Brown & Caldwell - Spokane 10015 N Division St Suite 100 Spokane WA, 99218	Project: Time Oil-Sunnyside Project Number: N/A Project Manager: Gene St. Goddard	Reported: 05/11/00 14:24
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**Gasoline Range Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>RW-6 (B0E0088-07) Soil</b> Sampled: 05/02/00 12:05 Received: 05/04/00 09:40									
Gasoline Range Hydrocarbons	260	50.0	mg/kg dry	10	0E05023	05/05/00	05/09/00	WTPH-G/8021B	
Benzene	7.70	0.500	"	"	"	"	"	"	"
Toluene	25.0	0.500	"	"	"	"	"	"	"
Ethylbenzene	5.23	0.500	"	"	"	"	"	"	"
Xylenes (total)	29.8	1.00	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	114 %	50-150			"	"	"	"	"
Surrogate: 4-BFB (PID)	120 %	50-150			"	"	"	"	"
<b>RW-7 (B0E0088-08) Soil</b> Sampled: 05/02/00 09:30 Received: 05/04/00 09:40									
Gasoline Range Hydrocarbons	17.2	10.0	mg/kg dry	2	0E05023	05/05/00	05/09/00	WTPH-G/8021B	
Benzene	3.73	0.100	"	"	"	"	"	"	"
Toluene	4.57	0.100	"	"	"	"	"	"	"
Ethylbenzene	0.123	0.100	"	"	"	"	"	"	"
Xylenes (total)	1.94	0.200	"	"	"	"	"	"	"
Surrogate: 4-BFB (FID)	70.4 %	50-150			"	"	"	"	"
Surrogate: 4-BFB (PID)	90.6 %	50-150			"	"	"	"	"

North Creek Analytical - Bothell

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Brown & Caldwell - Spokane 10015 N Division St Suite 100 Spokane WA, 99218	Project: Time Oil-Sunnyside Project Number: N/A Project Manager: Gene St. Goddard	Reported: 05/11/00 14:24
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**Physical Parameters by APHA/ASTM/EPA Methods  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-17 (B0E0088-01) Soil	Sampled: 05/01/00 09:30 Received: 05/04/00 09:40								
Dry Weight	77.0	1.00	%	1	0E08002	05/08/00	05/09/00	BSOPSPL003R07	
MW-18 (B0E0088-02) Soil	Sampled: 05/01/00 10:50 Received: 05/04/00 09:40								
Dry Weight	79.6	1.00	%	1	0E08002	05/08/00	05/09/00	BSOPSPL003R07	
RW-5 (B0E0088-03) Soil	Sampled: 05/01/00 12:35 Received: 05/04/00 09:40								
Dry Weight	76.8	1.00	%	1	0E08002	05/08/00	05/09/00	BSOPSPL003R07	
RW-4 (B0E0088-04) Soil	Sampled: 05/01/00 14:45 Received: 05/04/00 09:40								
Dry Weight	70.2	1.00	%	1	0E08002	05/08/00	05/09/00	BSOPSPL003R07	
RW-3 (B0E0088-05) Soil	Sampled: 05/01/00 16:40 Received: 05/04/00 09:40								
Dry Weight	74.7	1.00	%	1	0E08002	05/08/00	05/09/00	BSOPSPL003R07	
RW-2 (B0E0088-06) Soil	Sampled: 05/02/00 07:45 Received: 05/04/00 09:40								
Dry Weight	79.8	1.00	%	1	0E08002	05/08/00	05/09/00	BSOPSPL003R07	
RW-6 (B0E0088-07) Soil	Sampled: 05/02/00 12:05 Received: 05/04/00 09:40								
Dry Weight	74.4	1.00	%	1	0E08002	05/08/00	05/09/00	BSOPSPL003R07	
RW-7 (B0E0088-08) Soil	Sampled: 05/02/00 09:30 Received: 05/04/00 09:40								
Dry Weight	77.9	1.00	%	1	0E08002	05/08/00	05/09/00	BSOPSPL003R07	

North Creek Analytical - Bothell

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Brown & Caldwell - Spokane 10015 N Division St Suite 100 Spokane WA, 99218	Project: Time Oil-Sunnyside Project Number: N/A Project Manager: Gene St. Goddard	Reported: 05/11/00 14:24
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**Gasoline Range Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B - Quality Control**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 0E05023: Prepared 05/05/00 Using EPA 5030B (MeOH)**

**Blank (0E05023-BLK1)**

Gasoline Range Hydrocarbons	ND	5.00	mg/kg wet							
Benzene	ND	0.0500	"							
Toluene	ND	0.0500	"							
Ethylbenzene	ND	0.0500	"							
Xylenes (total)	ND	0.100	"							
<i>Surrogate: 4-BFB (FID)</i>	<i>3.01</i>		"	<i>4.00</i>		<i>75.2</i>	<i>50-150</i>			
<i>Surrogate: 4-BFB (PID)</i>	<i>4.04</i>		"	<i>4.00</i>		<i>101</i>	<i>50-150</i>			

**LCS (0E05023-BS1)**

Gasoline Range Hydrocarbons	22.9	5.00	mg/kg wet	25.0		91.6	70-130			
<i>Surrogate: 4-BFB (FID)</i>	<i>3.42</i>		"	<i>4.00</i>		<i>85.5</i>	<i>50-150</i>			

**Duplicate (0E05023-DUP1)**

**Source: B0E0068-05**

Gasoline Range Hydrocarbons	137	20.0	mg/kg dry		110			21.9	50	
<i>Surrogate: 4-BFB (FID)</i>	<i>4.22</i>		"	<i>4.72</i>		<i>89.4</i>	<i>50-150</i>			

**Duplicate (0E05023-DUP2)**

**Source: B0E0088-04**

Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry		ND			18.7	50	
<i>Surrogate: 4-BFB (FID)</i>	<i>4.02</i>		"	<i>5.70</i>		<i>70.5</i>	<i>50-150</i>			

**Matrix Spike (0E05023-MS1)**

**Source: B0E0068-01**

Benzene	0.598	0.0500	mg/kg dry	0.570	ND	104	60-140			
Toluene	0.614	0.0500	"	0.570	ND	106	60-140			
Ethylbenzene	0.607	0.0500	"	0.570	ND	106	60-140			
Xylenes (total)	1.87	0.100	"	1.71	ND	108	60-140			
<i>Surrogate: 4-BFB (PID)</i>	<i>4.08</i>		"	<i>4.56</i>		<i>89.5</i>	<i>50-150</i>			

**Matrix Spike Dup (0E05023-MSD1)**

**Source: B0E0068-01**

Benzene	0.615	0.0500	mg/kg dry	0.570	ND	107	60-140	2.80	20	
Toluene	0.610	0.0500	"	0.570	ND	106	60-140	0.654	20	
Ethylbenzene	0.617	0.0500	"	0.570	ND	108	60-140	1.63	20	
Xylenes (total)	1.82	0.100	"	1.71	ND	106	60-140	2.71	20	
<i>Surrogate: 4-BFB (PID)</i>	<i>4.13</i>		"	<i>4.56</i>		<i>90.6</i>	<i>50-150</i>			

North Creek Analytical - Bothell

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Brown & Caldwell - Spokane  
 10015 N Division St Suite 100  
 Spokane WA, 99218

Project: Time Oil-Sunnyside  
 Project Number: N/A  
 Project Manager: Gene St. Goddard

**Reported:**  
 05/11/00 14:24

**Physical Parameters by APHA/ASTM/EPA Methods - Quality Control**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 0E08002: Prepared 05/08/00 Using Dry Weight</b>										
<b>Blank (0E08002-BLK1)</b>										
Dry Weight	100	1.00	%							
<b>Blank (0E08002-BLK2)</b>										
Dry Weight	100	1.00	%							
<b>Blank (0E08002-BLK3)</b>										
Dry Weight	100	1.00	%							
<b>Blank (0E08002-BLK4)</b>										
Dry Weight	99.8	1.00	%							
<b>Blank (0E08002-BLK5)</b>										
Dry Weight	100	1.00	%							

North Creek Analytical - Bothell

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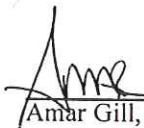
Brown & Caldwell - Spokane 10015 N Division St Suite 100 Spokane WA, 99218	Project: Time Oil-Sunnyside Project Number: N/A Project Manager: Gene St. Goddard	<b>Reported:</b> 05/11/00 14:24
----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------	------------------------------------

**Notes and Definitions**

- 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
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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# CHAIN OF CUSTODY REPORT

Work Order #: **BOED0888**

CLIENT: Brown and Caldwell  
 REPORT TO: Gene S. Godard  
 ADDRESS: 10015 N. Division St, Ste. 100  
Spokane, WA 99218  
 PHONE: 509-777-1126 FAX:  
 PROJECT NAME:

INVOICE TO: Scott Sloan  
Time Oil Co.

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

OTHER:  Please Specify

\*Turnaround Requests less than standard may incur Rush Charges.

PROJECT NUMBER: SAMPLED BY:	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES										MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA W/ ID			
			1	2	3	4	5	6	7	8	9	10					11	12	13
1.	MW-17	5/1/00 0930	X													S	2	BOE088-01	16
2.	MW-18	1050																	17
3.	RW-5	1235																	18
4.	RW-4	1445																	19
5.	RW-3	1640																	20
6.	RW-2	5/2/00 - 0745																	21
7.	RW-6	- 1205																	22
8.	RW-7	- 0930																	23
9.																			
10.																			
11.																			
12.																			
13.																			
14.																			
15.																			

RELINQUISHED BY: Murt Engdahl DATE: 5/2/00  
 PRINT NAME: Murt Engdahl FIRM: Brown & Caldwell TIME:  
 RELINQUISHED BY: Scott Sloan DATE: 5/2/00  
 PRINT NAME: Scott Sloan FIRM: Time Oil Co. TIME:

RECEIVED BY: K. Barlow DATE: 5/12/00  
 PRINT NAME: K. Barlow FIRM: N/A TIME:  
 RECEIVED BY: Scott Sloan DATE: 5/12/00  
 PRINT NAME: Scott Sloan FIRM: Time Oil Co. TIME:



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Brown & Caldwell - Spokane 10015 N Division St Suite 100 Spokane WA, 99218	Project: Time Oil-Sunnyside Project Number: N/A Project Manager: Gene St. Goddard	<b>Reported:</b> 05/11/00 17:55
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**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
RW-1	B0E0091-01	Soil	05/02/00 15:30	05/05/00 09:10





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Brown & Caldwell - Spokane 10015 N Division St Suite 100 Spokane WA, 99218	Project: Time Oil-Sunnyside Project Number: N/A Project Manager: Gene St. Goddard	Reported: 05/11/00 17:55
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**Gasoline Range Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RW-1 (B0E0091-01) Soil Sampled: 05/02/00 15:30 Received: 05/05/00 09:10									
Gasoline Range Hydrocarbons	4380	250	mg/kg dry	50	0E05023	05/05/00	05/09/00	WTPH-G/8021B	
Benzene	ND	12.5	"	"	"	"	"	"	R-03
Toluene	126	2.50	"	"	"	"	"	"	
Ethylbenzene	72.4	2.50	"	"	"	"	"	"	
Xylenes (total)	529	5.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	648 %	50-150			"	"	"	"	S-06
Surrogate: 4-BFB (PID)	319 %	50-150			"	"	"	"	S-06

North Creek Analytical - Bothell

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Brown & Caldwell - Spokane 10015 N Division St Suite 100 Spokane WA, 99218	Project: Time Oil-Sunnyside Project Number: N/A Project Manager: Gene St. Goddard	Reported: 05/11/00 17:55
----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------	-----------------------------

**Physical Parameters by APHA/ASTM/EPA Methods  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Limit							
RW-1 (B0E0091-01) Soil Sampled: 05/02/00 15:30 Received: 05/05/00 09:10										
Dry Weight	79.2	1.00		%	1	0E08002	05/08/00	05/09/00	BSOPSPL003R07	

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Brown & Caldwell - Spokane 10015 N Division St Suite 100 Spokane WA, 99218	Project: Time Oil-Sunnyside Project Number: N/A Project Manager: Gene St. Goddard	Reported: 05/11/00 17:55
----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------	-----------------------------

**Gasoline Range Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B - Quality Control**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 0E05023: Prepared 05/05/00 Using EPA 5030B (MeOH)</b>										
<b>Blank (0E05023-BLK1)</b>										
Gasoline Range Hydrocarbons	ND	5.00	mg/kg wet							
Benzene	ND	0.0500	"							
Toluene	ND	0.0500	"							
Ethylbenzene	ND	0.0500	"							
Xylenes (total)	ND	0.100	"							
Surrogate: 4-BFB (FID)	3.01		"	4.00		75.2	50-150			
Surrogate: 4-BFB (PID)	4.04		"	4.00		101	50-150			
<b>LCS (0E05023-BS1)</b>										
Gasoline Range Hydrocarbons	22.9	5.00	mg/kg wet	25.0		91.6	70-130			
Surrogate: 4-BFB (FID)	3.42		"	4.00		85.5	50-150			
<b>Duplicate (0E05023-DUP1) Source: B0E0068-05</b>										
Gasoline Range Hydrocarbons	137	20.0	mg/kg dry		110			21.9	50	
Surrogate: 4-BFB (FID)	4.22		"	4.72		89.4	50-150			
<b>Duplicate (0E05023-DUP2) Source: B0E0088-04</b>										
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry		ND			18.7	50	
Surrogate: 4-BFB (FID)	4.02		"	5.70		70.5	50-150			
<b>Matrix Spike (0E05023-MS1) Source: B0E0068-01</b>										
Benzene	0.598	0.0500	mg/kg dry	0.570	ND	104	60-140			
Toluene	0.614	0.0500	"	0.570	ND	106	60-140			
Ethylbenzene	0.607	0.0500	"	0.570	ND	106	60-140			
Xylenes (total)	1.87	0.100	"	1.71	ND	108	60-140			
Surrogate: 4-BFB (PID)	4.08		"	4.56		89.5	50-150			
<b>Matrix Spike Dup (0E05023-MSD1) Source: B0E0068-01</b>										
Benzene	0.615	0.0500	mg/kg dry	0.570	ND	107	60-140	2.80	20	
Toluene	0.610	0.0500	"	0.570	ND	106	60-140	0.654	20	
Ethylbenzene	0.617	0.0500	"	0.570	ND	108	60-140	1.63	20	
Xylenes (total)	1.82	0.100	"	1.71	ND	106	60-140	2.71	20	
Surrogate: 4-BFB (PID)	4.13		"	4.56		90.6	50-150			

North Creek Analytical - Bothell

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Brown & Caldwell - Spokane  
10015 N Division St Suite 100  
Spokane WA, 99218

Project: Time Oil-Sunnyside  
Project Number: N/A  
Project Manager: Gene St. Goddard

**Reported:**  
05/11/00 17:55

### Notes and Definitions

- R-03 The reporting limit for this analyte has been raised to account for interference from coeluting organic compounds present in the sample.
- S-06 The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interferences.
- 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
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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 East 11115 Montgomery, Suite B, Spokane, WA 98206-4776  
 9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132  
 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

(425) 420-9200 FAX 924-9290  
 (509) 924-9200 FAX 906-9210  
 (541) 383-9310 FAX 382-7888

# CHAIN OF CUSTODY REPORT

Work Order #: **BOE0091** **BOE0093**

INVOICE TO: **Scott Sloan**  
**Time Oil Co.**

CLIENT: **Brown & Caldwell**  
 REPORT TO: **Gene St. Godard**  
 ADDRESS: **10015 N. Division St Ste 100**  
**Spokane, WA 99218**  
 PHONE: **509-227-1126** FAX: **777-1133**  
 PROJECT NAME: **Sunnyside**

PROJECT NUMBER: **574-9**

SAMPLED BY: **Mark Engdahl**

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME
1. RW-1	5/2/00 1530
2. RW-2	5/4/00 0735
3. RW-5	0715
4. RW-6	1030
5. RW-7	1025

## REQUESTED ANALYSES

MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA W/ ID
S	2	BOE 0091	-01
W	3	BOE 0093	-01
↓	↓	↓	02
↓	↓	↓	03
↓	↓	↓	04
↓	↓	↓	05

TURNAROUND REQUEST in Business Days\*

Organic & Inorganic Analyses  
 7  5  4  3  2  1  <1

Petroleum Hydrocarbon Analyses  
 5  4  3  2  1  <1

STD.  OTHER  Please Specify

\*Turnaround Requests less than standard may incur Rush Charges

RELINQUISHED BY: **Mark Engdahl** DATE: **5/4/00**  
 PRINT NAME: **Mark Engdahl** FIRM: **Brown & Caldwell** TIME: **11:20**  
 RECEIVED BY: **Cathy Nichols** DATE: **5/5/00**  
 PRINT NAME: **Cathy Nichols** FIRM: **NCA** TIME: **09:10**

*APPENDIX C*  
**NOTIFICATION OF SOIL DESTRUCITON - REMTECH**



# REMTECH

GENERAL CONSTRUCTION &  
ENVIRONMENTAL REMEDIATION

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8 August, 2000

Gene St. Goddard  
Brown & Caldwell  
10015 N. Division, Suite 100  
Spokane, WA 99218

RE: Soil Treatment

Mr. St. Goddard:

Remtech received 29 55-gallon drum of Petroleum Contaminated Soil on 17 May 2000. Remtech transported this material to Remtech for your client Time Oil Company.

Our Low Temperature Thermal Desorption plant has been in operation since early June of this year. This material has been successfully treated as of today's date.

Please feel free to contact me if you have any further questions or concerns.

Sincerely,

Donald B. Airey  
Senior Project Manager