2705478 C3157

SEACOR

June 2, 1993

RECE

Mr. Dennis Bock
Exxon Company U.S.A.
10655 NE 4th, Suite 418
Bellevue, Washington, 98004

SUBJECT: **GROUNDWATER SPARGING AND VAPOR EXTRACTION SYSTEM**
95% REVIEW CONSTRUCTION DOCUMENTS AND CONSTRUCTION MANAGEMENT FEE PROPOSAL
EXXON STATION 7-7106, 2724 84TH AVE., CLYDE HILL, WA
SEACOR JOB NO 00091-007-02

Dear Mr. Bock:

SEACOR is pleased to present construction documents for an air injection and vapor extraction system at Exxon station 7-7106 located at 2724 84th Avenue, Clyde Hill, Washington. Please review the documents and indicate your acceptance by executing the attached capital work release and returning one copy to SEACOR. Any changes initiated by Exxon will be incorporated into the final design package.

The final design package will be provided to at least two qualified subcontractors as a basis for bidding the installation and start-up of the system.

BACKGROUND

Total petroleum hydrocarbons (TPH) as gasoline, benzene, toluene, ethyl benzene and xylene have been found in monitoring wells at the site. Additionally, there is evidence to suggest that there may be volatile hydrocarbon constituents (VOCs) in groundwater beneath 84th Avenue, NE. The groundwater underlying the area lies approximately ten to eleven feet

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below the surface and flows to the northwest. Soils are generally sandy clays, with low permeabilities on the order of 10^{-5} to 10^{-9} cm/s. Well logs are attached.

SEACOR previously submitted a proposed remedial design to Exxon in November, 1991, and a revised design in June, 1992. Subsequently, the design was submitted to the Town of Clyde Hill for variance approval. SEACOR attended the Town of Clyde Hill Board of Variance meeting, seeking approval of the proposed remedial design. A remedial design and approach was approved by your board with design conditions and modifications in September, 1992. Conditions imposed by the Town of Clyde Hill are attached.

SEACOR, Mr. Dennis Bock and Mr. Dave Bertoch of Exxon then met with the Town of Clyde Hill in November, 1992 to discuss variance conditions, and Exxon's and BP's responsibilities during the cleanup action. Mr. Dennis Bock and SEACOR met with the Washington State Department of Ecology in December, 1992 to discuss the site and the conditions imposed by the Town. During the meeting it was Ecology's opinion that SEACOR and Exxon must comply with Ecology and the Town's requirements.

SEACOR has conducted quarterly monitoring at the site since the third quarter of 1991. Additionally, SEACOR installed a Keck Instruments, Inc., Model PRC-91 Product Recovery Canister in monitoring well MW-2 on September, 23, 1992. The passive recovery system has been monitored every three weeks since this time. A total of 13 gallons of free product has been recovered since its installation.

DESIGN

Assumptions

It is assumed that the site will be operational throughout the course of construction and future operation of the system. It is essential that the construction does not interfere with routine commercial operations. The construction may possibly dovetail with a soon to be scheduled upgrade of the dispenser system and installation of a vapor recovery system.

Design Rationale

SEACOR's original design included installation of a cut-off trench along the property line running north to south and across the northwest corner of the property, adjacent to the planter and sign. Groundwater was to be removed from the trench and treated by granular activated carbon (GAC) filtration prior to discharge via a permitted sewer discharge. The objectives of the system were to:

- Provide a positive hydraulic barrier to capture potentially impacted groundwater prior to migrating off site.

- Treat potentially impacted groundwater to progress toward site cleanup and closure.

No groundwater recovery wells were proposed at the time, as the soils are quite dense, and the recovery rates would be very low.

At the request of the Town of Clyde Hill, the revised design incorporates a vapor extraction and groundwater sparging system in the trench to avoid recovery and above-ground handling of potentially impacted groundwater. The remediation system, as recently revised, will operate by sparging, or blowing air through the potentially impacted groundwater in the gravel trench. Vapors are recovered via a perforated suction pipe overlying the groundwater in the trench. VOCs in will be sparged from the groundwater in the trench and transported to the surface with a suction blower. VOCs in the recovered vapor will be removed by passing vapors across two granular activated carbon beds prior to venting to the atmosphere. While it is anticipated that VOC emission rates will be low for this project, SEACOR has incorporated carbon filters in the system due to anticipated neighborhood concerns of VOC emissions in the surrounding residential area and a one pound per day discharge rate for VOCs that was imposed by the Town of Clyde Hill. SEACOR will monitor the equipment during start up to assure compliance with the conditions of the Notice of Construction that will be issued by the Puget Sound Air Pollution Control Agency (PSAPCA) and the Town of Clyde Hill.

An enclosed equipment compound will house the vapor extraction blower and groundwater sparging compressor. Noise reduction panels have been used on interior walls to minimize noise in the surrounding residential area. The specified air compressor has a special noise reduction package.

Major Equipment

The following major equipment is to be provided by Exxon and installed by SEACOR. The purchase cost, applicable sales tax and delivery to the site are not included in SEACOR's cost estimate.

Qty	Equipment	Model No.
1	Regenerative Blower	Rotron EN404W58L
1	40-Gallon Condensate Drop Out Tank	Rotron MS350B
2	Granular Activated Carbon Filter	Cameron TSU55 Radial
1	Air Compressor	Gast 7HDD-Q11TA-M700X
1	Air Pressure Regulator	Wilkerson Model #R26-04-00

Cost Estimate

The total estimated cost of [redacted] includes construction costs of [redacted] and construction management portion of [redacted] The construction management work is broken out into tasks as follows:

- Conduct bid walk-through and respond to bed questions as required.
- Evaluate bids and make recommendation for best bid.
- Apply for Puget Sound Air Pollution Control Agency Notice of Construction.

- Provide construction services management and monitoring for the duration of the project.

- Provide technical services for equipment start up and initial operation.

Air sampling costs are not included after equipment start-up. Costs for quarterly monitoring and future groundwater chemical analyses are not included in this estimate.

Please do not hesitate to call us should there be any questions or comments on this project.

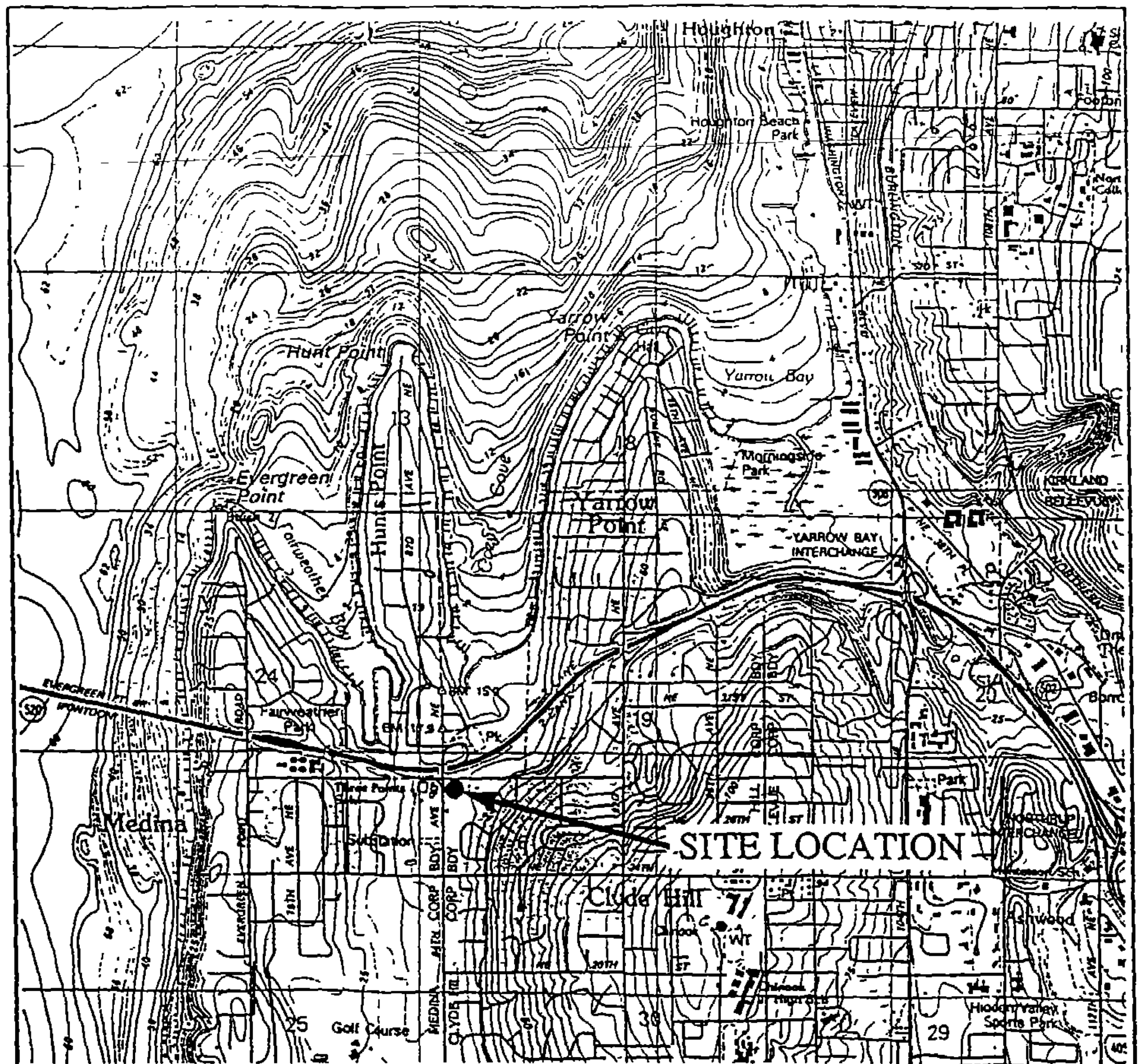
Very truly yours,

Science & Engineering Analysis Corporation

Peter A. Kahn
Project Manager

Gary E. Nagai
Associate Engineer

APPENDIX A
SITE LOCATION AND EXISTING MONITORING WELL LOCATIONS



REFERENCE: USGS 7.5 MINUTE QUADRANGLE, BELLEVUE NORTH, WASHINGTON, 1982.

WASHINGTON

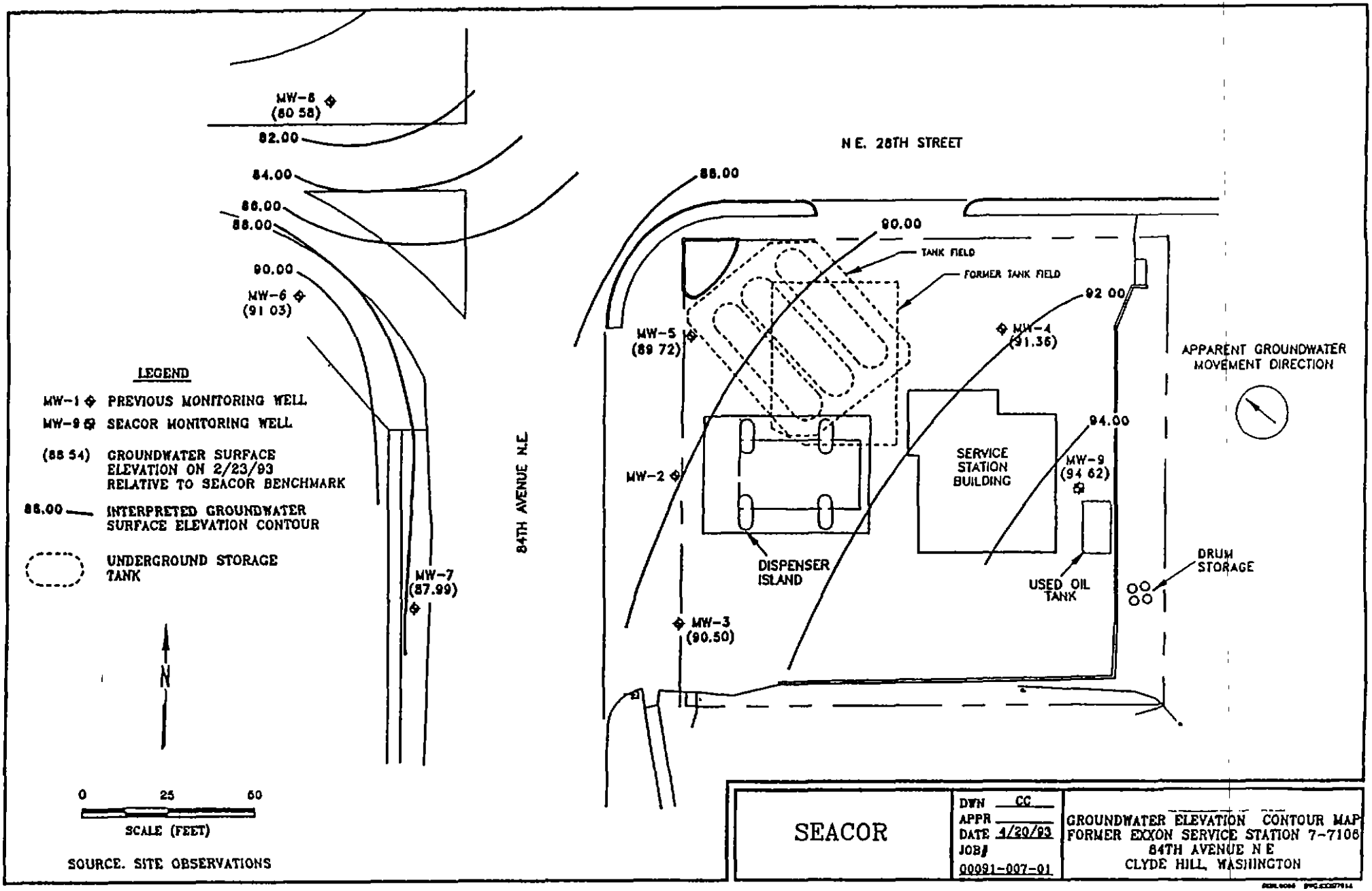
N

0 1/4 1/2 1

SCALE (MILES)

SEACOR	DWN JC APPR KVD DATE 3/92 JOB# 00091-032-01	SITE LOCATION MAP EXXON SERVICE STATION 7-7106 2724 - 84TH AVENUE BELLEVUE, WASHINGTON

DWG SX11BA3


MW-8
(80 58)
82.00
84.00
86.00
88.00
90.00
MW-6
(91 03)
MW-7
(87.99)
84TH AVENUE N.E.
N E. 28TH STREET
88.00
90.00
TANK FIELD
FORMER TANK FIELD
92 00
MW-5
(89 72)
MW-4
(91.36)
APPARENT GROUNDWATER
MOVEMENT DIRECTION
94.00
SERVICE
STATION
BUILDING
MW-2
MW-9
(94 62)
DISPENSER
ISLAND
USED OIL
TANK
DRUM
STORAGE
MW-3
(90.50)
LEGEND
MW-1 PREVIOUS MONITORING WELL
MW-9 SEACOR MONITORING WELL
(88 54) GROUNDWATER SURFACE ELEVATION ON 2/23/93 RELATIVE TO SEACOR BENCHMARK
88.00 INTERPRETED GROUNDWATER SURFACE ELEVATION CONTOUR
UNDERGROUND STORAGE TANK
N
0
25
50
SCALE (FEET)
SOURCE. SITE OBSERVATIONS
SEACOR
DWN CC
APPR
DATE 4/20/93
JOB#
00091-007-01
GROUNDWATER ELEVATION CONTOUR MAP
FORMER EXXON SERVICE STATION 7-7108
84TH AVENUE N E
CLYDE HILL, WASHINGTON

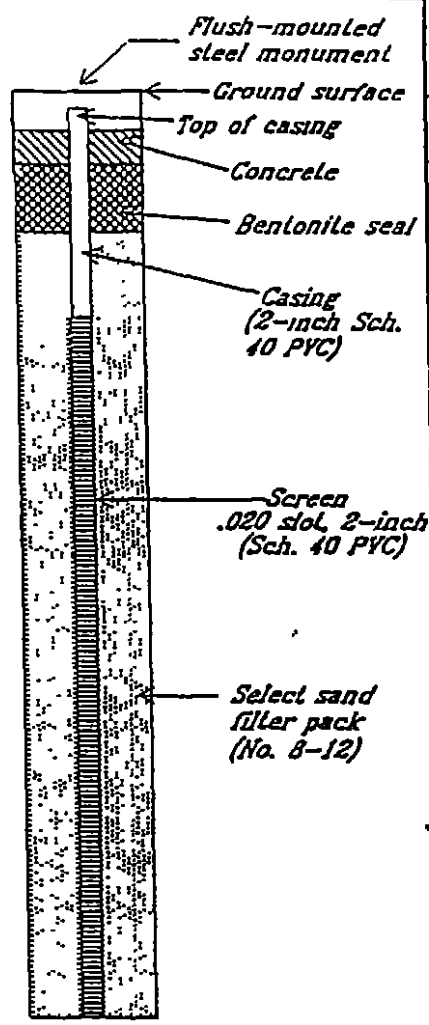
APPENDIX B
MONITORING WELL CONSTRUCTION DETAILS

PROJECT Clyde Hill Exxon W.O W-6340-1 WELL NO. B-1/MW-4

Elevation reference: *Assigned datum* Well completed: *9/21/90*
Ground surface elevation: *99.62* Casing elevation: *99.50*

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	HEAD SPACE	GROUND WATER
0	*2" AC* / *Tan sandy GRAVEL (Base course)*					
	- piece of AC in sampler *Medium dense, damp, brown gravelly SAND with some silt and AC (Fill)*		S-1	18	8	
5	*Medium dense, damp, grayish brown silty fine to medium SAND with some gravel and AC (Sloughed fill from above)*		S-2	14	8	
	Very stiff, moist, grayish green clayey SILT with occasional fine sand stringers, cobble in sampler tip (Native glacially consolidated silt)		S-3	24	8	11/14/90
10						9/21/90
			S-4	50/5"	9	
15			S-5	50/5"	12	
			S-6	50/6"	8	
	- increased gravel content					
20	*- wet*		S-7	50/6"	3	
	End of boring at 20.5 feet					
25						
30						

AS-BUILT DESIGN



TESTING

3

LEGEND

- Grab sample
- 2-inch O.D. split-spoon sample
- Sample not recovered
- Observered groundwater level (ATD = at time of drilling)
- 5 Chemical analysis (sample no. shown)

RZA
RITTENHOUSE-ZEMAN & ASSOCIATES, INC.
Geotechnical & Environmental Consultants
1400 140th Ave NE
Bellevue, Washington 98005

Drilling started: *9/21/90* Drilling completed: *9/21/90* Logged by: *CMF*

PROJECT Clyde Hill Exxon W.O. W-6340-1 WELL NO. B-2/MW-5

Elevation reference: *Assigned datum* Well completed: *9/21/90*
Ground surface elevation: *98.01* Casing elevation: *97.84*

AS-BUILT DESIGN

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	HEAD SPACE	GROUND WATER
0	2" AC Tan sandy GRAVEL (Base course)					
	Medium dense, moist, light brown silty fine to medium SAND (Fill?)		S-1	11	0.2	
5	Medium stiff, moist, brownish gray clayey SILT with occasional partings, slight aged gasoline-like odor (Native)		S-2	8	22.4	
	Stiff, moist, brownish gray clayey SILT with occ. 1/4" fine sand interbeds, sl. aged gasoline-like odor		S-3	12	338	
10			S-4	8	337	9/21/90 9/24/90
			S-5	50/4"	809	
15	Very dense, wet, gray silty fine SAND with some gravel and clay, gasoline-like odor		S-6	50/4"	94	
	- harder drilling action at 14 feet					
	- slight gasoline-like odor		S-7	50/6"	509	
20	- slight gasoline-like odor		S-8	50/5"	56	
	End of boring at 20.5 feet					
25						
30						

Flush-mounted steel monument
Ground surface
Top of casing
Concrete
Bentonite seal
Casing (2-inch Sch. 40 PVC)
Screen .020 slot, 2-inch (Sch. 40 PVC)
Select sand filter pack (No. 8-12)

TESTING

LEGEND

- Grab sample
- 2-inch O.D. split-spoon sample
- Sample not recovered
- Observered groundwater level (ATD = at time of drilling)
- Chemical analysis (sample no. shown)

RZA
RITTENHOUSE-ZEMAN & ASSOCIATES, INC.
Geotechnical & Environmental Consultants
1400 140th Ave NE
Bellevue, Washington 98005

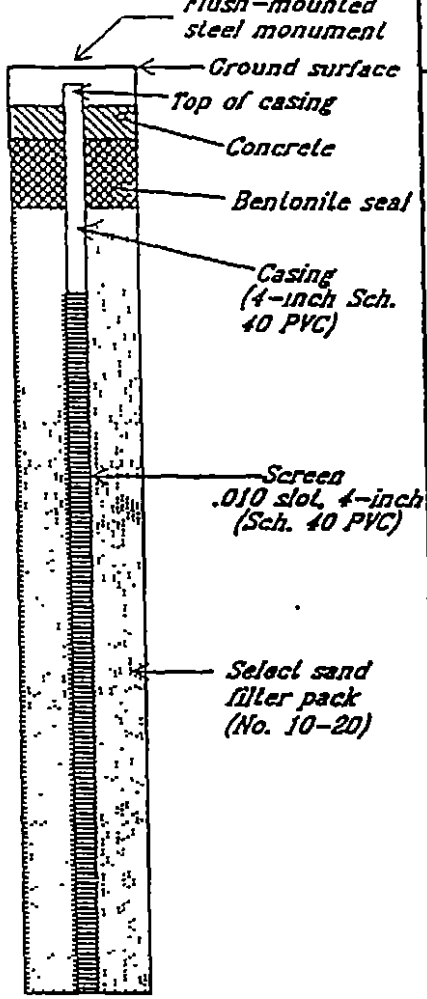
Drilling started: 9/21/90 Drilling completed: 9/21/90 Logged by: CJC

PROJECT Clyde Hill Exxon W.O W-6340-1 WELL NO. B-3/MW-6

Elevation reference: *Assigned datum* Well completed: *10/31/90*
Ground surface elevation: *97.62* Casing elevation: *97.43*

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	HEAD SPACE	GROUND WATER
0	*2" Asphalt*					
	Medium dense, damp, light brown medium to coarse SAND with a trace silt (Fill)					
	Stiff, moist, light brownish gray clayey SILT (Native glacially consolidated silt)		S-1	11	0	
5						
	Very stiff, moist, light brownish gray thinly bedded clayey SILT and fine SAND		S-2	21	0.1	11/13/90
10						11/13/90
	Medium dense, moist, brown very silty fine SAND		S-3	21	0.1	
	Very stiff, moist, gray clayey SILT with some fine sand					
15						
	Stiff, wet, gray fine sandy SILT with some clay		S-4	12	0	
20	*End of boring at 20.0 feet*					
25						
30						

AS-BUILT DESIGN



TESTING

LEGEND

- Grab sample
- 2-inch O.D. split-spoon sample
- Sample not recovered
- Observered groundwater level (ATD = at time of drilling)
- Chemical analysis (sample no. shown)

RZA
RITTENHOUSE-ZEMAN & ASSOCIATES, INC.
Geotechnical & Environmental Consultants
1400-140th Ave NE
Bellevue, Washington 98005

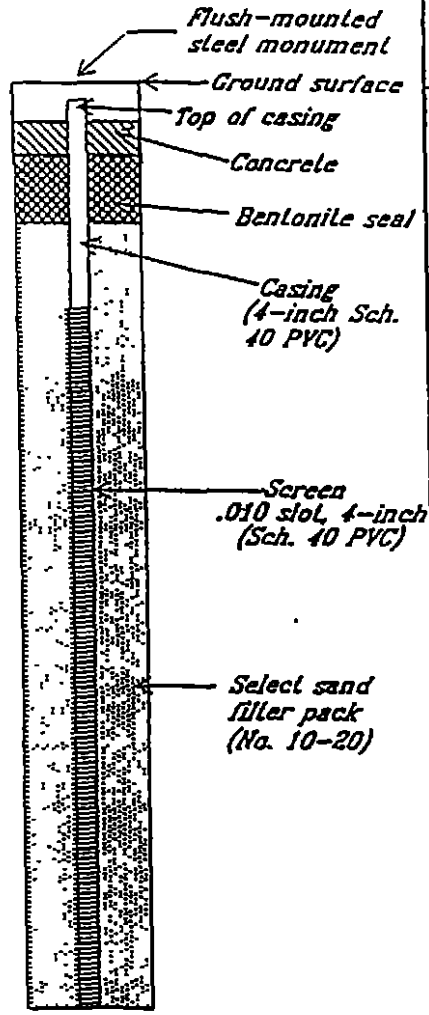
Drilling started: *10/31/90* Drilling completed: *10/31/90* Logged by: *CLC*

PROJECT Clyde Hill Exxon W.O W-6340-1 WELL NO. B-4/MW-7

Elevation reference: *Assigned datum* Well completed: *10/31/90*
Ground surface elevation: *98.48* Casing elevation: *98.14*

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	HEAD SPACE	GROUND WATER
0	*3" Sod*					
	Loose, wet, gray and brown silty fine to medium SAND with some gravel (Fill)					
			S-1	8	0	
5	*Very stiff, moist, light brownish gray thinnly bedded clayey SILT and fine SAND (Native glacially consolidated silt)*					
			S-2	20	0	▽ 11/13/90
10	*← seepage at 10' ATD*					▽ 11/20/90
	Very dense, saturated, gray fine to coarse SAND with some silt and gravel (Weathered glacial till?)		S-3	21	0.1	
15						
	Very dense, damp, gray silty fine to medium SAND (Glacial till)		S-4	50/6"	0.1	
20	*End of boring at 20.0 feet*					
25						
30						

AS-BUILT DESIGN



TESTING

△2

LEGEND

- Grab sample
- 2-inch O.D. split-spoon sample
- Sample not recovered
- ▽ AtD — Observered groundwater level (ATD = at time of drilling)
- △5 — Chemical analysis (sample no. shown)

RZA

RITTENHOUSE-ZEMAN & ASSOCIATES, INC.
Geotechnical & Environmental Consultants
1400 140th Ave NE
Bellevue, Washington 98005

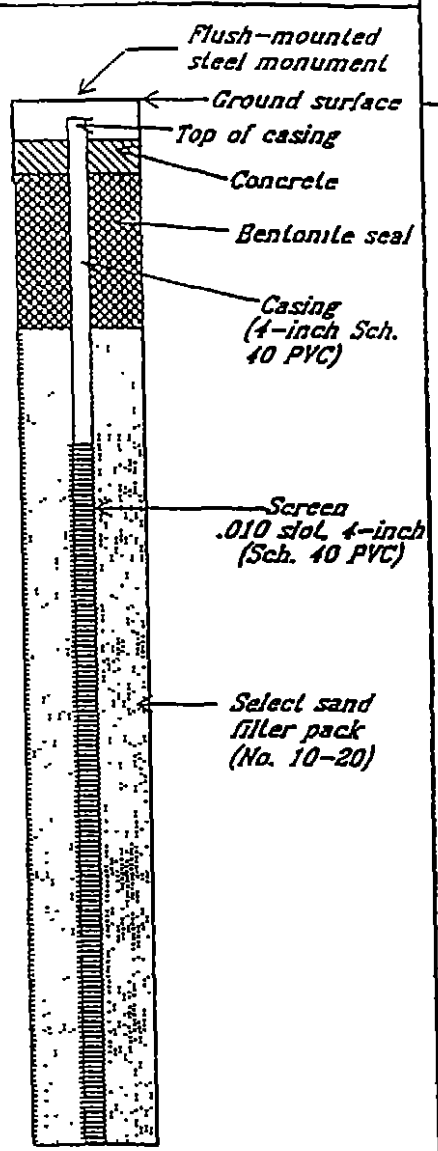
Drilling started: *10/31/90* Drilling completed: *10/31/90* Logged by: *CHC*

PROJECT Clyde Hill Exxon W O W-6340-1 WELL NO. B-5/MW-8

Elevation reference: *Assigned datum* Well completed: *10/31/90*
Ground surface elevation: *97.08* Casing elevation: *96.48*

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	HEAD SPACE	GROUND WATER
0	*Brown sandy GRAVEL (Fill)*					
	Medium dense, moist, brown fine to medium SAND (Fill)		S-1		1	
	– seepage at 4 feet					
5						
	Medium dense, moist, gray silty fine to medium SAND with a trace of gravel, strong aged gasoline-like odor		S-2	19	500	
	Medium dense, moist, gray thinly bedded fine SAND and clayey SILT					
10						
	Very stiff, moist, gray fine sandy SILT with some clay, some aged gasoline-like odor		S-3	68	4	
	Very dense, moist, gray fine to coarse SAND with some gravel					11/18/90
15						
			S-4	74	2	
20	*Very dense, saturated, light and dark (grayish) medium to coarse SAND with a trace of silt, 1" silt layer at 18.5 feet*					
	End of boring at 22.5 feet					
25						
30						

AS-BUILT DESIGN



TESTING

LEGEND

- Grab sample
- 2-inch O.D. split-spoon sample
- Sample not recovered
- Observered groundwater level (ATD = at time of drilling)
- Chemical analysis (sample no. shown)

RZA
RITTENHOUSE-ZEMAN & ASSOCIATES, INC.
Geotechnical & Environmental Consultants
1400 140th Ave NE
Bellevue, Washington 98005

Drilling started: *11/17/90* Drilling completed: *11/17/90* Logged by: *CLF*

SEACOR

BORING LOG

BORING MW-9
PAGE 1 of 1

PROJECT EXXON SERVICE STATION NO. 7-7106 LOCATION 2724 - 84TH AVENUE NE CLYDE HILL, WASHINGTON
SURFACE ELEVATION ——— CASING TOP ELEVATION** 100.73
START 1-23-92; 0830 FINISH 1-23-92, 1230
SAMPLER D. O'ROURKE MONITORING DEVICE PHOTOVAC MICROTIP
SUBCONTRACTOR AND EQUIPMENT LAYNE ENVIRONMENTAL SERVICES; CME-75; 8" HSA
COMMENTS SOIL SAMPLES COLLECTED USING A 3-INCH O.D. SPLIT SPOON SAMPLER LINED WITH BRASS SLEEVES

Penetration Results Blows 6"-6"-6"	Sample Depth Interval, feet	PID Reading (ppm)	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Boring Abandonment/ Well Construction Details
			0	Asphaltic Concrete		Well Head
				Crushed Aggregate Base		Concrete
		0		Gray Sandy GRAVEL dry, dense	GW	Bentonite Seal
2-6-16		0.6	5	Gray Brown Clayey SILT dry to moist, stiff	ML	PVC Casing (2 inch Blank)
				brown gray, moist		
4-11-13		0.8*	10	Brown Silty SAND wet, medium dense, fine- to medium-grained	SM	Filter Sand (Colorado Silica 10/20)
10-11-22		0	15	gray, with gravel		PVC Screen 2 inch (0.020 inch Slots)
40-50(4")			20	Gray Sandy SILT wet, hard, with fine sand	ML	Bottom Cap
			25	Boring terminated at 19.5 feet. Groundwater encountered at approximately 10 feet during drilling. Boring converted to a groundwater monitoring well on 1-23-92.		

** NOTE:
Casing Top Elevation relative to SEACOR TBM with an assumed elevation of 100 feet above MSL.

* Sample submitted for chemical analysis.

00091-032-01

APPENDIX C
WELL MONITORING AND ANALYTICAL DATA

TABLE 1
HISTORICAL WELL MONITORING DATA
Exxon Service Station 7-7106
2724 84th Avenue NW, Clyde Hill, Washington

WELL No.	DATE MONITORED	REFERENCE ELEVATION (feet)	DEPTH TO WATER (feet)	APPARENT PRODUCT THICKNESS (feet)	EQUIVALENT WATER LEVEL (feet)	REMARKS
MW-2	09/24/90	97 71	10.96	0 45	87 09	LPH
	11/19/90	97 71	9 69	0.25	88.21	LPH
	08/26/91	97 71	10.27	0.16	87.56	LPH
	08/30/91	97 71	9 87	0.09	87 91	LPH
	09/09/91	97 71	9 81	0.03	87 92	LPH
	09/18/91	97 71	10 14	0.33	87.82	LPH
	09/20/91	97 71	10 14	0.00	87.57	Odor and sheen
	10/04/91	97 71	10.36	0.02	87.37	LPH
	12/19/91	97 71	9 23	0.27	88.68	LPH
	02/10/92	98.29	7.82	0.25	90.66	LPH
	06/11/92	98.29	9 68	0.32	88.85	LPH
	09/29/92	98.29	10.72	0.41	87 88	LPH
MW-3	09/24/90	97.51	9.25	0.00	88.26	
	11/19/90	97.51	8.31	0.00	89 86	
	08/26/91	97.51	8.84	0.00	88.67	
	08/30/91	97.51	8.70	0.00	88.81	
	09/09/91	97.51	8.64	0.00	88.87	
	09/18/91	97.51	8.97	0.00	88.54	
	09/20/91	97.51	8.97	0.00	88.54	
	10/04/91	97.51	9 16	0.00	88.35	
	12/19/91	97.51	7 98	0.00	89.53	No odor or sheen
	02/10/92	98.15	6.83	0.00	91.32	No odor or sheen
	06/11/92	98.15	8.30	0.00	89.85	Odor, no sheen
	09/29/92	98.15	8.95	0.00	89.20	No odor or sheen
	01/06/93	98.15	7.33	0.00	90.82	No odor or sheen
	02/23/93	98.15	7.65	0.00	90.50	No odor or sheen
MW-4	09/24/90	99.50	11.01	0.00	88.49	
	11/19/90	99.50	9.68	0.00	90.62	
	08/26/91	99.50	11.01	0.00	88.49	
	08/30/91	99.50	10.25	0.00	89.25	
	09/09/91	99.50	10.63	0.00	88.87	
	09/18/91	99.50	10.62	0.00	88.88	
	09/20/91	99.50	10.62	0.00	88.88	
	10/04/91	99.50	11.01	0.00	88.49	
	12/19/91	99.50	9.29	0.00	90.21	No odor or sheen
	02/10/92	100.16	7.55	0.00	92.61	No odor or sheen
	06/11/92	100.16	9.77	0.00	90.39	No odor or sheen
	09/29/92	100.16	10.70	0.00	89 46	No odor or sheen
	01/06/93	100.16	7.94	0.00	92.22	No odor or sheen
	02/23/93	100.16	8.80	0.00	91.36	No odor or sheen

NOTES. Data collected on 09/24/90 and 11/19/90 are presented as reported by Rittenhouse-Zeman & Associates, Inc., "Phase I Environmental Investigation," January 28, 1991.

Reference Elevations for data collected prior to 1992 are relative to SEACOR temporary benchmark located at the west end of the dispenser island closest to station building, with an assigned elevation of +100.00 feet.

Reference Elevations for data collected after 1991 are relative to SEACOR temporary benchmark located at the north end of the eastern dispenser island, with an assigned elevation of +100.00 feet.

Equivalent Water Level = Reference Elevation - Depth to Water + (0.75 x Apparent Product Thickness). This equation assumes a product specific gravity of 0.75.

LPH = Liquid Phase Hydrocarbons

TABLE 1
HISTORICAL WELL MONITORING DATA
Exxon Service Station 7-7106
2724 84th Avenue NW, Clyde Hill, Washington

WELL No	DATE MONITORED	REFERENCE ELEVATION (feet)	DEPTH TO WATER (feet)	APPARENT PRODUCT THICKNESS (feet)	EQUIVALENT WATER LEVEL (feet)	REMARKS
MW-5	09/24/90	97 84	10.70	0.00	87 14	
	11/19/90	97 84	9 92	0 00	88.59	
	08/26/91	97 84	10 43	0.00	87 41	Odor, no sheen
	09/09/91	97 84	10 07	0.00	87 43	
	09/18/91	97 84	10.41	0 00	87 43	
	09/20/91	97 84	10.41	0.00	87 13	Odor and sheen
	10/04/91	97 84	10.71	0.00	88.44	
	12/19/91	97 84	9 40	0.00	89 96	Odor and sheen
	02/10/92	98.62	7.88	0.00	98.62	Odor and sheen
	06/11/92	98.62	9 60	0.00	89 02	Odor and sheen
	09/29/92	98.62	10.64	0.00	87.98	Odor and sheen
	01/06/93	98.62	8.27	0.00	90.35	Odor and sheen
	02/23/93	98.62	8.90	0.00	89 72	Odor and sheen
MW-6	11/19/90	97 43	8.01	0.00	89 99	
	08/26/91	97.43	9 92	0.00	87.51	
	08/30/91	97 43	8.57	0.00	88.86	
	09/09/91	97 43	8.33	0.00	89.10	
	09/18/91	97 43	9 44	0.00	87.99	
	09/20/91	97 43	9 44	0.00	87 99	
	10/04/91	97.43	11.78	0.00	85.65	
	12/19/91	97 43	7 11	0.00	90.32	No odor or sheen
	02/10/92	98.20	6.03	0.00	92.17	No odor or sheen
	06/11/92	98.20	8.42	0.00	89 78	Odor, no sheen
	09/29/92	98.20	12.70	0.00	85.50	No odor or sheen
	01/06/93	98.20	6.41	0.00	91.79	No odor or sheen
	02/23/93	98.20	7.17	0.00	91.03	No odor or sheen
MW-7	11/19/90	98.14	8.12	0.00	90.02	
	08/26/91	98.14	12.12	0.00	86.02	
	08/30/91	98.14	12.60	0.00	85.54	
	09/09/91	98.14	11.96	0.00	86.18	
	09/18/91	98.14	12.21	0.00	85.93	
	09/20/91	98.14	12.21	0.00	85.93	
	10/04/91	98.14	12.41	0.00	85.73	
	12/19/91	98.14	10.74	0.00	87 40	No odor or sheen
	02/10/92	98.93	9 14	0.00	89.79	No odor or sheen
	06/11/92	98.93	11.49	0.00	87.44	Odor, no sheen
	09/29/92	98.93	12.69	0.00	86.24	No odor or sheen
	01/06/93	98.93	10.25	0.00	88.68	No odor or sheen
	02/23/93	98.93	10.94	0.00	87.99	No odor or sheen

NOTES. Data collected on 09/24/90 and 11/19/90 are presented as reported by Rittenhouse-Zeman & Associates, Inc., "Phase I Environmental Investigation," January 28, 1991.

Reference Elevations for data collected prior to 1992 are relative to SEACOR temporary benchmark located at the west end of the dispenser island closest to station building, with an assigned elevation of +100.00 feet.

Reference Elevations for data collected after 1991 are relative to SEACOR temporary benchmark located at the north end of the eastern dispenser island, with an assigned elevation of +100.00 feet.

Equivalent Water Level = Reference Elevation - Depth to Water + (0.75 x Apparent Product Thickness). This equation assumes a product specific gravity of 0.75

LPH = Liquid Phase Hydrocarbons

TABLE 1
HISTORICAL WELL MONITORING DATA
Exxon Service Station 7-7106
2724 84th Avenue NW, Clyde Hill, Washington

WELL No.	DATE MONITORED	REFERENCE ELEVATION (feet)	DEPTH TO WATER (feet)	APPARENT PRODUCT THICKNESS (feet)	EQUIVALENT WATER LEVEL (feet)	REMARKS
MW-8	11/19/90	96 48	14 88	0.00	81.60	
	08/26/91	96.48	17.50	0 00	78.98	
	08/30/91	96 48	17 40	0 00	79 08	
	09/09/91	96 48	17 22	0 00	79 26	
	09/18/91	96.48	17.34	0.00	79 14	
	09/20/91	96.48	17.34	0.00	79 14	No odor or sheen
	10/04/91	96 48	17.36	0.00	79 12	
	12/19/91	96.48	17 77	0.00	78.71	Odor and sheen
	02/10/92	96.48	13.92	0.00	82.56	No odor or sheen
	06/11/92	96.48	16.73	0.00	79 75	Odor and sheen
	09/29/92	96.48	17 79	0.00	78.69	Odor, No sheen
	01/06/93	96.48	15 07	0 00	81 41	Odor, No sheen
	02/23/93	96 48	15 90	0.00	80.58	Odor, No sheen
MW-9	02/10/92	100.73	5 00	0.00	95 73	
	06/11/92	100.73	7.15	0.00	93.58	No odor or sheen
	09/29/92	100.73	7.40	0 00	93.33	Odor, No sheen
	01/06/93	100.73	5.32	0.00	95 41	No odor or sheen
	02/23/93	100.73	6.11	0.00	94.62	No odor or sheen

NOTES. Data collected on 09/24/90 and 11/19/90 are presented as reported by Rittenhouse-Zeman & Associates, Inc., "Phase I Environmental Investigation," January 28, 1991.

Reference Elevations for data collected prior to 1992 are relative to SEACOR temporary benchmark located at the west end of the dispenser island closest to station building, with an assigned elevation of +100.00 feet.

Reference Elevations for data collected after 1991 are relative to SEACOR temporary benchmark located at the north end of the eastern dispenser island, with an assigned elevation of +100.00 feet.

Equivalent Water Level = Reference Elevation - Depth to Water + (0.75 x Apparent Product Thickness). This equation assumes a product specific gravity of 0.75

LPH = Liquid Phase Hydrocarbons

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS
Exxon Service Station 7-7106
2724 84th Avenue NW, Clyde Hill, Washington

WELL No	DATE SAMPLED	TPHd (ug/l)	TPHg (ug/l)	BENZENE (ug/l)	TOLUENE (ug/l)	ETHYL BENZENE (ug/l)	XYLENES (ug/l)	TOTAL LEAD (ug/l)
MW-2	09/20/91	38	82,000	5,200	20,000	2,500	16,000	(100)
	12/20/91	4,600	93,000	6,100	21,000	2,400	13,000	72
MW-3	09/20/91	89	110	(0.50)	3 6	(0.50)	1.6	(100)
	12/19/91	(50)	(50)	(0.50)	(0.50)	(0.50)	(0.50)	(3)
	02/10/92	(50)	55	(0.5)	(0.5)	(0.5)	(0.5)	(3)
	06/11/92	(50)	140	2.0	2.7	3.0	5.6	4
	09/29/92	(50)	84	(0.5)	0.6	(0.5)	(0.5)	(3)
	01/06/93	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
	02/23/93	(50)	140	(0.5)	2.8	(0.5)	(0.5)	(3)
MW-4	09/20/91	130	(50)	(0.50)	(0.50)	(0.50)	(0.50)	(100)
	12/19/91	110	(50)	(0.50)	(0.50)	(0.50)	0.7	(3)
	02/10/92	(50)	(50)	(0.5)	1.4	(0.5)	3.9	(3)
	06/11/92	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	6
	09/29/92	64	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
	01/06/93	110	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
	02/23/93	80	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
MW-5	09/20/91	4,600	63,000	2,900	16,000	2,000	13,000	(100)
	12/19/91	3,900	60,000	4,000	11,000	1,700	9,200	13
	02/10/92	7,000	57,000	2,400	9,300	1,500	10,000	37
	06/11/92	9,500	220,000	4,000	11,000	4,400	20,000	21
	09/29/92	5,500	43,000	2,400	7,700	2,000	12,000	13
	01/06/93	2,400	35,000	1,500	3,800	1,000	6,800	16
	02/23/93	1,100	32,000	1,300	3,500	950	7,100	31
MW-6	09/20/91	55	(50)	(0.50)	0.7	(0.50)	2.1	(100)
	12/19/91	(50)	(50)	(0.50)	(0.50)	(0.50)	(0.50)	(3)
	02/10/92	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
	06/11/92	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	11
	09/29/92	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
	01/06/93	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
	02/23/93	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
MTCA Cleanup Level		1,000.0	1,000.0	5.0	40.0	30.0	20 0	5.0

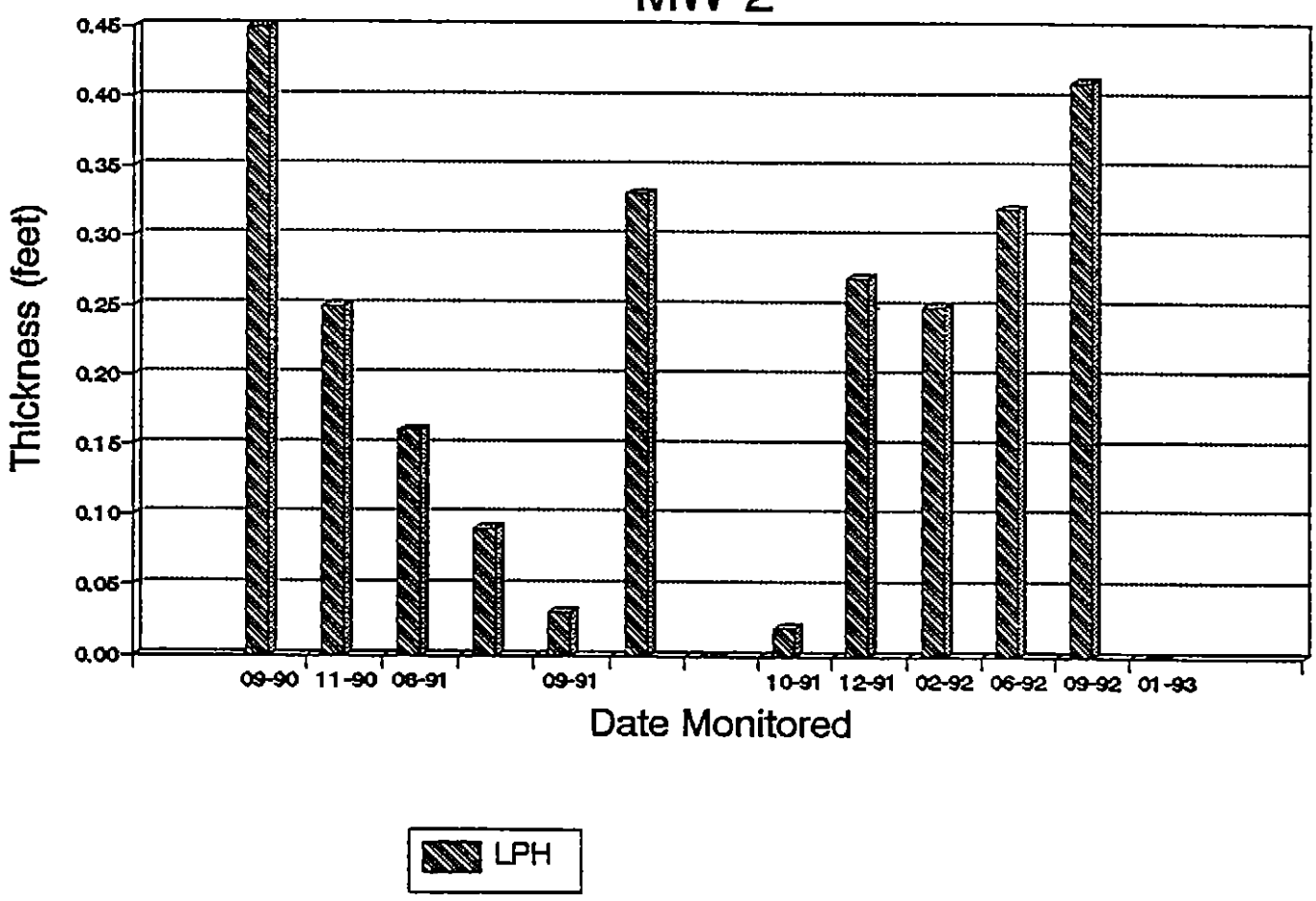
NOTES: TPHg = Total Petroleum Hydrocarbons as gasoline by EPA Method 8015 modified
TPHd = Total Petroleum Hydrocarbons as diesel by EPA Method 8015 modified
BTEX by EPA Method 8020
Lead by EPA Method 7421
ug/l = microgram per liter
( ) = constituent not detected above the enclosed analytical detection limit
– = constituent not analyzed
Model Toxics Control Act Method A groundwater cleanup levels from WAC 173-340-720(2)(a)(i), dated 1/28/91.
MTCA cleanup level for Total Petroleum Hydrocarbons is the total of TPH as gasoline, diesel and oil.

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS
Exxon Service Station 7-7106
2724 84th Avenue NW, Clyde Hill, Washington

WELL No.	DATE SAMPLED	TPHd (ug/l)	TPHg (ug/l)	BENZENE (ug/l)	TOLUENE (ug/l)	ETHYL BENZENE (ug/l)	XYLENES (ug/l)	TOTAL LEAD (ug/l)
MW-7	09/20/91	74	(50)	(0.50)	(0.50)	(0.50)	0.5	(100)
	12/19/91	(50)	(50)	(0.50)	0.6	(0.50)	(0.50)	(3)
	02/10/92	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
	06/11/92	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	4
	09/29/92	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
	01/06/93	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	3
	02/23/93	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
MW-8	09/20/91	86	590	1.5	1.6	1.4	3.2	(100)
	12/19/91	220	1,100	2.7	4.8	10	21	(3)
	02/10/92	230	1,800	5.3	19	17	8.5	(3)
	06/11/92	60	500	2.5	(0.5)	2.7	1.6	(3)
	09/29/92	(50)	(50)	(0.5)	(0.5)	(0.5)	(0.5)	(3)
	01/06/93	150	1,000	11	3.4	3.8	5 0	3
	02/23/93	180	1,900	3.3	2.4	5.1	2.1	(3)
MW-9	02/10/92	420	320	37	0.6	1.6	7 6	(3)
	06/11/92	140	130	12	(0.5)	0.8	0.7	13
	09/29/92	160	57	2.1	(0.5)	(0.5)	(0.5)	(3)
	01/06/93	200	140	22	0.7	2.7	3.6	3
	02/23/93	130	550	22	0.6	3.9	4.0	6
MTCA Cleanup Level		1,000.0	1,000.0	5.0	40.0	30.0	20.0	5.0

NOTES: TPHg = Total Petroleum Hydrocarbons as gasoline by EPA Method 8015 modified
TPHd = Total Petroleum Hydrocarbons as diesel by EPA Method 8015 modified
BTEX by EPA Method 8020
Lead by EPA Method 7421
ug/l = microgram per liter
( ) = constituent not detected above the enclosed analytical detection limit
– = constituent not analyzed
Model Toxics Control Act Method A groundwater cleanup levels from WAC 173-340-720(2)(a)(i), dated 1/28/91.
MTCA cleanup level for Total Petroleum Hydrocarbons is the total of TPH as gasoline, diesel and oil.

Exxon 7-7106
Liquid Phase Hydrocarbons
MW-2



APPENDIX D
TOWN OF CLYDE HILL RESTRICTIONS

residential neighborhood, and substantially offensive to those people living in the area due to its mass, height and illumination.

D. The Board is unable to find or conclude that the variances described in Section 4 above meet any of the criteria contained in CHMC Section 17.52.030(A), (B) or (C), and so should therefore be denied.

DECISION

Based upon the foregoing Findings and Conclusions, the Board:

1. Grants Variance No. 320(B)(1)(vi) allowing the construction of a temporary structure to house the air sparging unit for the ground water remediation operation, and Variance No. 320(C)(1) to allow the reduction in the number of 9' x 20' parking spaces from five to four on the property, all as shown on the plans, which are incorporated by reference, and only under the following conditions:

A. The well system for the groundwater remediation shall be redesigned to the satisfaction of the Town's consultant;

B. A pilot test of the vapor emissions shall be done as recommended by the Town's consultant, or, upon initial installation of the remediation system, in order to ensure that the no more than 1 (one) pound of hydrocarbon vapors are discharged from the system per day. The vapor emissions from the remedial operation shall be monitored at intervals in a manner to be determined by the Town,

and all monitoring records shall be submitted to the Town on a regular basis; and

C. The accessory structure housing the remediation system shall be immediately removed upon completion of the remediation operations, not to exceed three years from the date of commencement of such operations. This time period may be extended upon application to the Board of Adjustment and satisfactory proof of the need for additional time to complete the required site clean up.

D. Since the accessory structure eliminates a parking stall and variance 320(C)(2) is required for this reduction in the number of stalls, Variance 320(C)(2) will expire after completion of operations, or, no later than the time the accessory structure is removed;

E. The accessory structure and stack shall be designed to minimize visual impact to the satisfaction of the Town, shall be constructed to the dimensions as shown on the plans and located in the area shown on the plans;

F. The property shall be landscaped or screened in order to minimize the visual impact of the accessory stack and structure, to the satisfaction of the Town;

G. The noise from the remedial operations shall not exceed sound decibel levels set forth in state law, and the system shall operate only during daylight hours, or from 7 a.m. to 10 p.m. daily.

H. Storage or stockpiling of contaminated soil above ground on the property shall not exceed thirty (30) days;

I. The fees of the consultant retained by the Town to provide technical recommendations as required by this variance application shall be paid by the applicant.

2. Grants Variance 320(C)(1) allowing the reduction in the size of parking stalls on the property from 300 sq. ft. to 9' x 20'; (C)(3) to permit the parking spaces located in the side and front yards to be counted towards the required parking for the property, and (C)(4) allowing parking in the required front yard, all as shown on the plans, which are incorporated by reference, and only under the following conditions:

A. The property shall be landscaped to minimize the visual impacts of the parking, to the satisfaction of the Town, and such landscaping shall be perpetually maintained;

B. The use of the property as an auto service station shall remain as it currently exists, with three auto service station bays, and a convenience food area with espresso bar.

3. Grant Variance 320(A)(3) to permit the encroachment of the existing phone booths into the front yard setback not more than 24.5 feet and not more than 14.5 feet into the side yard setback; (A)(5) to permit the encroachment of the air and water dispenser by not more than 11 feet into the front yard setback and not more than 17 feet into the side yard setback; (B)(1) to permit the number of accessory buildings on site to increase from four to eleven, with

the addition of the phone booths (B)(1)(iii) and air/water dispenser (B)(1)(i) accessory structures, all as shown on the plans, which are incorporated herein by this reference.

4. Grant Variance 320(B)(1)(vii) to allow the three sign accessory structures for the buildings.

5. Grant Variance 320(A)(4) for the encroachment of the existing propane tank by not more than 18 feet into the side yard setback and (B)(1)(ii) to permit the tank as an accessory structure on the property, all as shown on the plans, which are incorporated herein by this reference, and provided that all applicable written approvals are obtained showing that all applicable fire code requirements are met.

6. Deny Variance 320(A)(1), (A)(2), (B)(1)(iv), (B)(1)(v) (B)(2) and (B)(3).

Any construction authorized under the variances granted above shall be completed in accordance with the plans and drawings submitted as part of this variance application. However, even if the proposed construction complies with such plans, in no case shall the additions deviate from the applicable code requirements to a greater extent than as set forth in this decision.

ADOPTED by the Board of Adjustment this ____ day of _____, 1992.

TOWN OF CLYDE HILL
BOARD OF ADJUSTMENT

By:_____
George Martin, Chairman