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BRIDGEWATER GROUP, INC.

Phase II Remedial Investigation Results
Burgard Industrial Park

TO: Alicia Voss/DEQ

COPY: Mat Cusma/Schnitzer

FROM: Ross Rieke/Bridgewater Group

DATE: May 30, 2003

This memorandum presents the results of the Phase II Remedial Investigation (RI) at the Burgard Industrial Park in Portland, Oregon (Figure 1 and Figure 2). The Phase II RI work was performed in accordance with the February 7, 2003, Phase II RI Work Plan which was approved by the Oregon Department of Environmental Quality (DEQ) in a letter dated February 25, 2003. The purpose of the Phase II work was to:

- Delineate the extent of subsurface soil with PAHs, PCBs, petroleum hydrocarbons, and metals along the river bank north and south of MW-2.
- Confirm that VOCs are not migrating through shallow groundwater to the Willamette River or the slip from the area around MW-1.

The results of the Phase II work confirm that there are no current pathways of contaminants from the Burgard Industrial Park site to the Willamette River through either the soil or groundwater pathways.

Soil and Groundwater Conditions

Four push probes were advanced in the northwest portion of the Schnitzer Steel/International Terminal area. Figure 3 shows the locations of the Phase II RI push probes. Push probes PP-7, PP-8, and PP-9 were advanced to a depth of 30 feet below the ground surface. Push probe PP-6 was advanced to a depth of 25 feet where it met refusal. Logs for the push probe explorations are presented in Appendix A.

Subsurface conditions encountered in the push probes along the top of the river bank (PP-6 and PP-8) consisted of about 20 feet of silty sand and sand fill over silty clay and clayey sand alluvium. Conditions encountered in the push probe near the slip edge (PP-7) noted a similar fill depth but with the underlying alluvium consisting of silty sand. A shallower depth of fill (about 14.5 feet) was noted in PP-9 located further from the river or slip shorelines. Groundwater was encountered in the push probes at depths of about 16 to 20 feet below the ground surface.

Chemical Analysis Results

Soil Sample Analyses

Soil samples were collected from depths ranging from 6 to 18 feet in push probes PP-6 and PP-8. The soil samples were analyzed for petroleum hydrocarbons, PCBs, and selected metals. Because petroleum hydrocarbons were detected in the soil sample from a depth of 14 feet in PP-6, that sample was also analyzed for polycyclic aromatic hydrocarbons (PAHs)

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using EPA Method 8270. Tables 1, 2, 3, and 4 present the results of the chemical analysis of the soil samples for petroleum hydrocarbons, PAHs, PCBs, and metals, respectively. A copy of the North Creek Analytical laboratory report is provided in Appendix B.

Petroleum hydrocarbons were detected in one soil sample; PP-6 at 14 feet. The measured diesel and oil concentrations are less than DEQ soil matrix and applicable draft Generic Risk Based Concentrations (RBCs). Pyrene was the only PAH detected in the PP-6 soil sample and it was detected at a concentration less than the most conservative sediment screening concentration. Although the PAH analysis on sample PP-06-14 was performed 3 days past the EPA recommended hold time, this minor variance is not anticipated to materially affect the analysis results.

PCBs were detected in soil samples from depths of 6 feet and 14 feet in push probe PP-8 at concentrations of 0.232 mg/kg and 0.0939 mg/kg, respectively. PCBs were not detected in soil samples from depths of 10 feet and 18 feet in the same push probe. The measured PCB concentrations are similar in magnitude and depth to the Phase I RI soil sample collected from MW-2, about 100 feet north of the PP-8 location.

The metal concentrations in the soil samples are within typical background concentrations except for the soil sample from a depth of 10 feet in PP-8 where lead was detected at a concentration of 87.7 mg/kg and the soil sample from a depth of 14 feet in PP-6 where lead was detected at a concentration of 425 mg/kg and copper was measured at a concentration of 53.3 mg/kg. Lead and copper concentrations in soil samples from above and below these samples in their respective push probes are within typical background concentrations.

Groundwater Samples Analyses

Groundwater samples were collected from all four push probes and analyzed for volatile organic compounds (VOCs) using EPA Method 8260. Table 5 presents the measured VOC concentrations.

VOCs were detected only in the groundwater sample from PP-6, located about 100 feet north of MW-2. Cis-1,2-dichloroethene and trichloroethene were detected at concentrations of less than 2 ug/l, significantly less than the concentrations detected in MW 2 during the Phase I RI and subsequent groundwater monitoring. Both of the detected concentrations are well less than the DEQ Level II ecological risk assessment Screening Level Value (SLV) and the EPA Ambient Water Quality Criteria. No other VOCs were detected.

Conclusions

The results of the Phase II work confirm that there are no current contaminant pathways from the Burgard Industrial Park site to the Willamette River through either the soil or groundwater pathways. In particular:

- Soil with low levels of PCBs, PAHs, and metals are limited to deep soil in the area around MW-2 and MW-3 and are not in direct contact with nearby surface waters or site surface water runoff (this area is paved with concrete and asphalt pavement). The armored nature of the site shoreline prevents any migration of this deep soil to the river.
- Groundwater with contaminant concentrations greater than EPA ambient water quality criteria or DEQ surface water Screening Level Values (SLVs) is limited to the immediate vicinity of MW-1. VOC concentrations in groundwater samples collected from six sampling locations around MW-1 (including between MW-1 and the Willamette River and the between MW-1 and the slip) are less than the EPA and DEQ criteria. Thus,

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contaminants at concentrations greater than conservative screening levels are not migrating to the river through the groundwater.

Please call if you have any questions.

TABLES

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Table 1
Chemical Concentrations in Phase II RI Soil Samples
Petroleum Hydrocarbons
Burgard Industrial Park
All results in mg/kg

Sample	Location	Date	Sample Depth (ft)	Gasoline	Diesel	Heavy oil
PP06-06	Shoreline, north end of site	4/15/2003	6.0	20 U	50 U	100 U
PP06-10	Shoreline, north end of site	4/15/2003	10.0	20 U	50 U	100 U
PP06-14	Shoreline, north end of site	4/15/2003	14.0	20 U	42.6	198
PP06-17	Shoreline, north end of site	4/15/2003	17.0	20 U	50 U	100 U
PP08-06	Shoreline, north end of site	4/15/2003	6.0	20 U	50 U	100 U
PP08-10	Shoreline, north end of site	4/15/2003	10.0	20 U	50 U	100 U
PP08-14	Shoreline, north end of site	4/15/2003	14.0	20 U	50 U	100 U
PP08-18	Shoreline, north end of site	4/15/2003	18.0	20 U	50 U	100 U

U - Not detected at noted reporting limit

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Table 2
Chemical Concentrations in Phase II RI Soil Samples
PAHs
Burgard Industrial Park
All results in mg/kg

Sample	Location	Date	Sample Depth (ft)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	LPAHs	HPAHs	Total PAHs
PP06-14	Shoreline, north end of site	4/15/2003	14.0	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.031	0.03 U	0.031	0.031
DEQ Sediment Screening Level Value (Toxicity)				0.29	0.16	0.057	0.032	0.032			0.027	0.057	0.033	0.111	0.077	0.017	0.176	0.042	0.053	0.08	0.193	1.61
DEQ Sediment Screening Level Value (Bioaccum)								0.1														
McDonald Consensus TECs						0.057	0.108	0.15				0.166	0.033	0.423	0.077		0.176	0.204	0.195			1.61
McDonald Consensus PECs						0.845	1.05	1.45				1.29		2.23	0.536		0.561	1.17	1.52			22.8
NOAA SQRT TEL							0.032	0.032				0.057		0.111				0.042	0.053			
EPA PRG (industrial)				38000		1E+05	2.9	0.29	2.9		29	290	0.29	30000	33000	2.9	190		54000			

U - Not detected at noted reporting limit
"-" - Not analyzed

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Table 3
Chemical Concentrations in Phase II RI Soil Samples
PCBs
Burgard Industrial Park
All results in mg/kg

Sample	Location	Date	Sample Depth (ft)	PCBs
PP06-06	Shoreline, north end of site	4/15/2003	6.0	0.067 U
PP06-10	Shoreline, north end of site	4/15/2003	10.0	0.067 U
PP06-14	Shoreline, north end of site	4/15/2003	14.0	0.067 U
PP06-17	Shoreline, north end of site	4/15/2003	17.0	0.067 U
PP08-06	Shoreline, north end of site	4/15/2003	6.0	0.232
PP08-10	Shoreline, north end of site	4/15/2003	10.0	0.067 U
PP08-14	Shoreline, north end of site	4/15/2003	14.0	0.0939
PP08-18	Shoreline, north end of site	4/15/2003	18.0	0.067 U

DEQ Sediment Screening Level Value (Toxicity)	0.034
DEQ Sediment Screening Level Value (Bioaccum)	
McDonald Consensus TECs	0.0598
McDonald Consensus PECs	0.676
NOAA SQRT TEL	0.0341
EPA PRG (industrial)	1
DEQ Generic Remedy (industrial)	7.5

U - Not detected at noted reporting limit
"-" - Not analyzed

Table 4
Chemical Concentrations in Phase II RI Soil Samples
Metals
Burgard Industrial Park
All results in mg/kg

Sample	Location	Date	Sample Depth (ft)	Arsenic	Cadmium	Copper	Lead	Zinc
PP06-06	Shoreline, north end of site	4/15/2003	6.0	2.46	0.342 U	20.2	5.86	55.3
PP06-10	Shoreline, north end of site	4/15/2003	10.0	2.09	0.41 U	16.8	3.69	52.4
PP06-14	Shoreline, north end of site	4/15/2003	14.0	3.55	0.323 U	53.3	425	157
PP06-17	Shoreline, north end of site	4/15/2003	17.0	2.32	2.21 U	17.4	5.19	52.4
PP08-06	Shoreline, north end of site	4/15/2003	6.0	2.18	0.431 U	19.5	19.5	106
PP08-10	Shoreline, north end of site	4/15/2003	10.0	2.74	0.388 U	32.5	87.7	129
PP08-14	Shoreline, north end of site	4/15/2003	14.0	1.94	0.357 U	14.1	5.04	43.4
PP08-18	Shoreline, north end of site	4/15/2003	18.0	1.96	0.347 U	14.3	5.43	44

Clark County background values	6	1	34	17	96
Portland Harbor Sediment Baseline Value	5 U	0.6	60	30	118
DEQ Sediment Screening Level Value (Toxicity)	6	0.6	36	35	123
DEQ Sediment Screening Level Value (Bioaccum)	4	0.003	10	128	3
McDonald Consensus TECs	9.79	0.99	31.6	35.8	121
McDonald Consensus PECs	33	4.98	149	128	459
NOAA SQRT TEL	5.9	0.596	35.7	35	123
EPA PRG (industrial)	2.7	810	76000	750	10000

U - Not detected at noted reporting limit
"-" - Not analyzed

Table 5
Concentrations in Phase II RI Groundwater Samples
Volatile Organic Compounds
Burgard Industrial Park
All results in ug/l

Probe/ Well	Location	Date	cis-1,2,-Dichloroethe	Tetrachlorethene	1,1,1-Trichloroethan	Trichloroethene	Vinyl Chloride
PP06	Shoreline, north end of site	4/15/2003	1.69	1 U	1 U	1.36	1 U
PP07	Former NW Oil Tanks	4/15/2003	1 U	1 U	1 U	1 U	1 U
PP08	Shoreline, north end of site	4/15/2003	1 U	1 U	1 U	1 U	1 U
PP09	Former NW Oil Tanks	4/15/2003	1 U	1 U	1 U	1 U	1 U
EPA Ambient Water Quality Criteria				8.85		81	525
DEQ Level II Surface Water SLV				240	11	21.9	1300

U - Not detected at noted reporting limit
"-" - Not analyzed
All VOCs not shown in table are not detected.

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FIGURES

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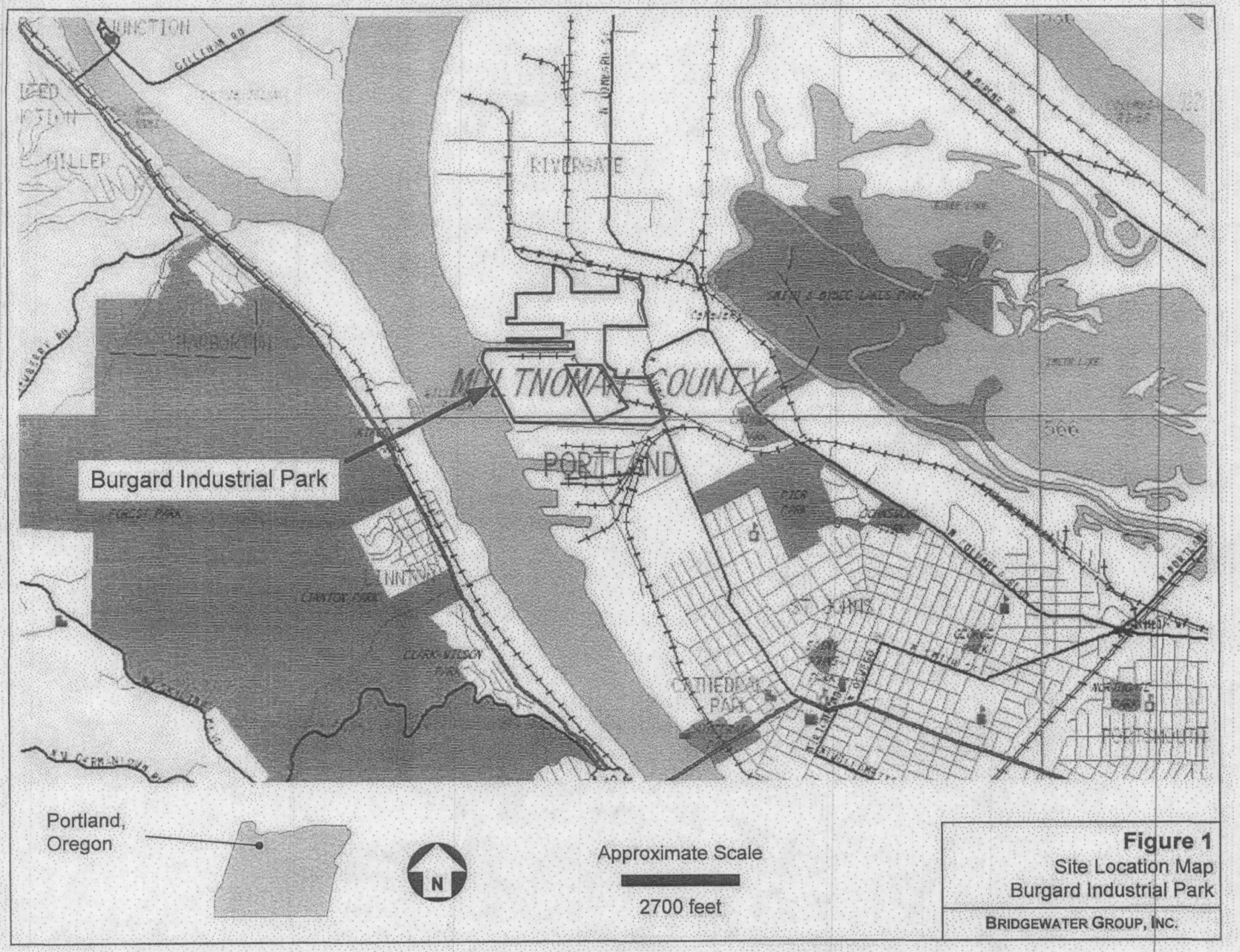

Figure 1
Site Location Map
Burgard Industrial Park

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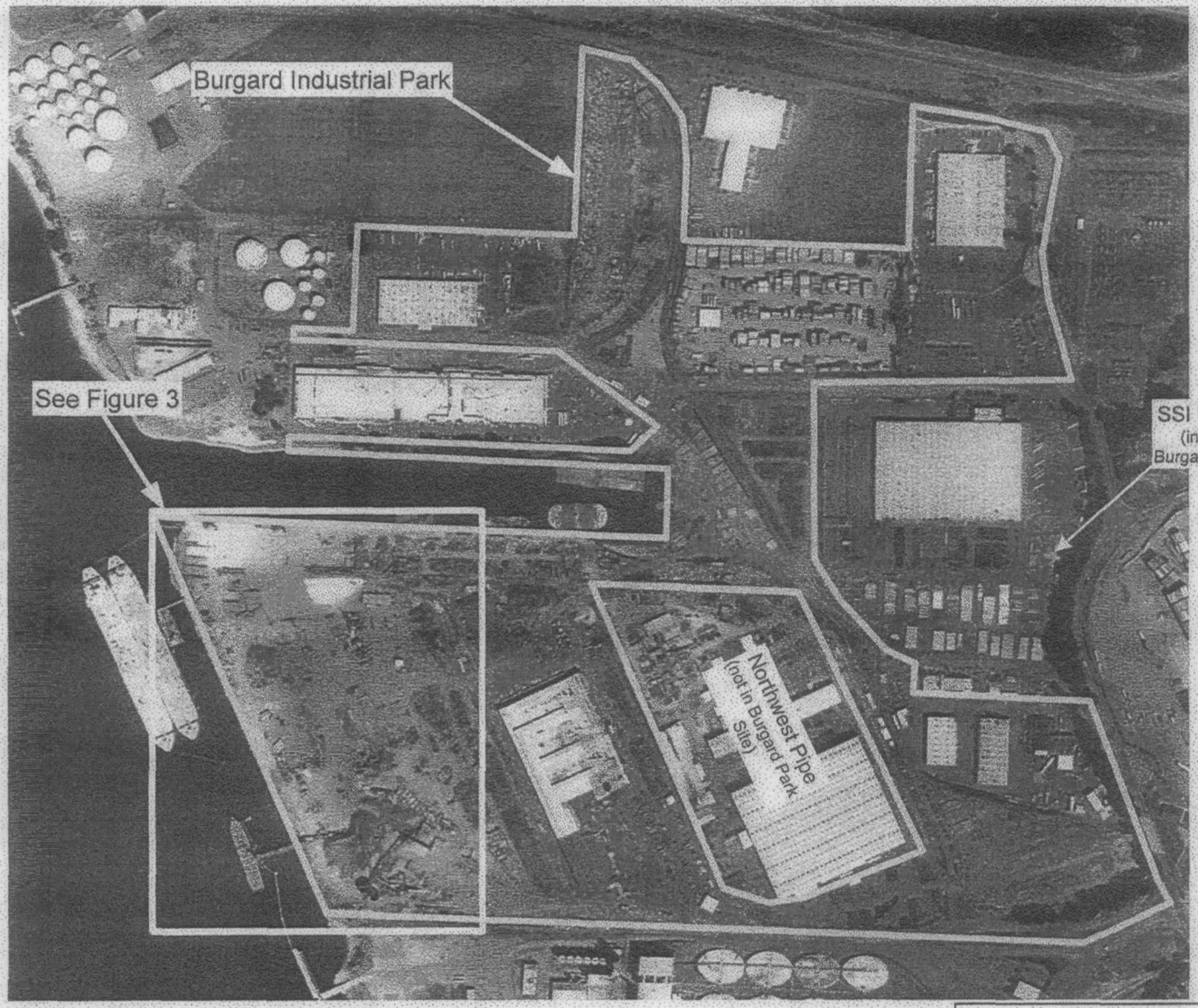

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Approximate Scale

600 Feet

Figure 2
July 2002 Aerial Photograph
Burgard Industrial Park

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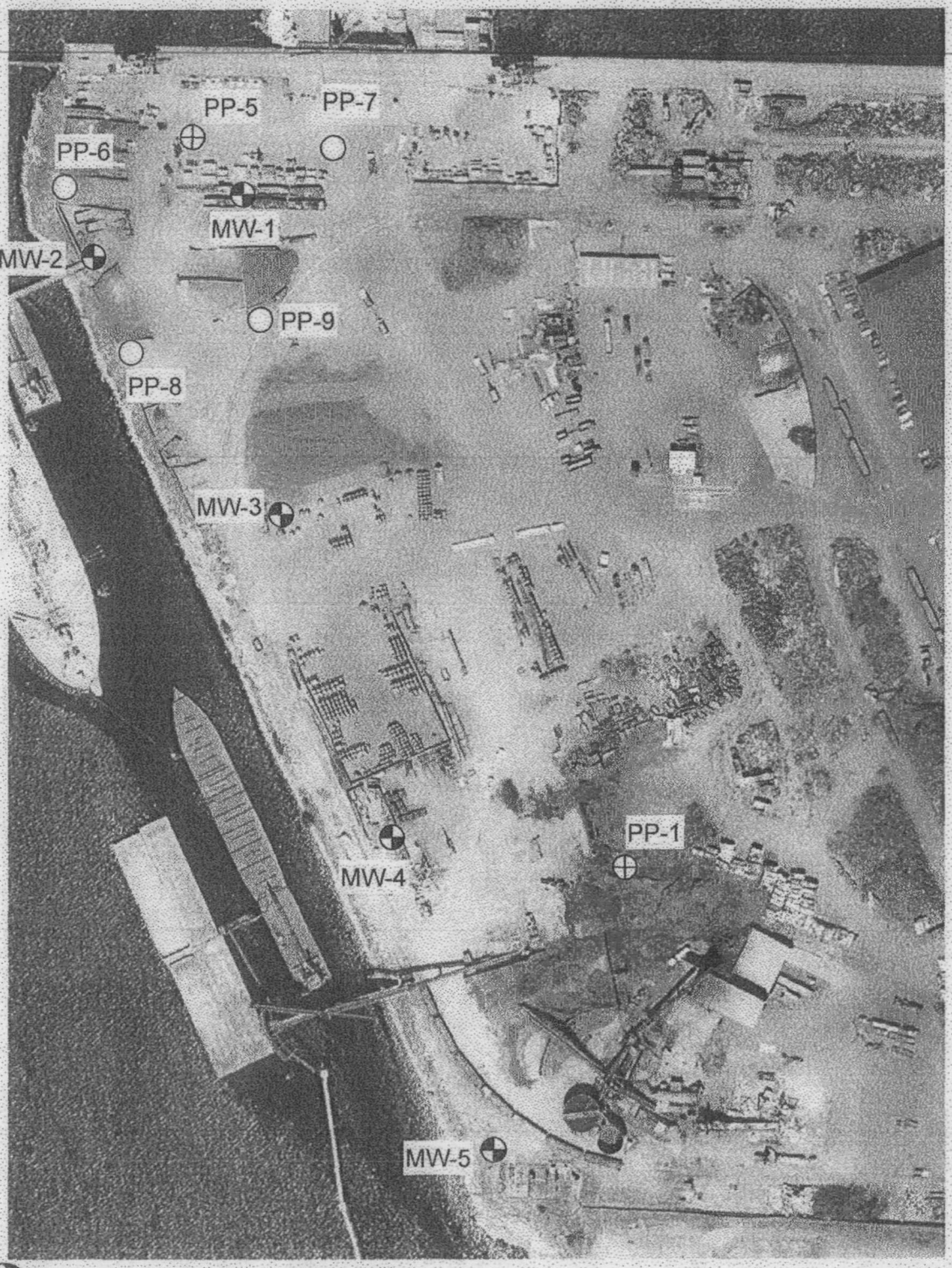

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Approximate Scale

220 feet

Monitoring Well

Phase I Push Probe

Phase II Push Probe

Figure 3
Monitoring Well and Push Probe
Locations - SSI Area
Burgard Industrial Park

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APPENDIX A

SCHN00205170

Tetra Tech, Inc
6100 219th Street SW Suite 550
Mountlake Terrace, WA 98043

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME: Schnitzer Steel Ind./ Burgard RI
PROJECT #: 11907-01
LOGGED BY: John Virgin
DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe – direct push
HOLE DIA.: 1.75-inch

BORING NO.: PP-06
START DATE: 4/15/03
END DATE: 4/15/03
TOTAL DEPTH: 25 feet
SHEET 1 OF 1

FIELD LOCATION: North of MW-2.

WATER LEVEL DATA			
DEPTH	18.85		
TIME	13:36		
DATE	04/15/03		
BORING DEPTH	25 feet		

DEPTH IN FEET	WELL OR PIEZOMETER DETAILS	SAMPLING METHOD	SAMPLE NUMBER	BLOW COUNTS (per 6")	DEPTH SAMPLED/ RECOVERY	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
0		DP					**0 to 0.5 feet: ASPHALT.**
2			PP-06-4				**0.5 to 1.5 feet: SANDY GRAVEL (GW),** dark yellowish brown, medium to fine, angular to sub-rounded, 40 percent medium sand, damp, no noticeable odor (FILL).
4		DP					**1.5 to 17.5 feet: SILTY SAND (SP),** dark brown, fine, 20 percent silt, 5 percent fine, rounded gravel in lenses 4 to 6-inches thick, 10 percent clay, damp (FILL).
6			PP-06-6				
8							
10		DP	PP-06-10				
12			PP-06-14				
14		DP					WL ATD = 17.5 feet below ground surface (bgs).
16	▽		PP-06-18				Encountered and drilled through 8-inch diameter log at 17.5 feet
18							**18 to 25 feet: SILTY CLAY (CH),** greenish black, high plasticity, 20 percent silt, 15 percent wood chips to one-half inch long, increasing fine sand with depth, wet, loose, no noticeable odor (ALLUVIUM).
20		DP					
22			PP-06-22				
24							Total depth drilled = 25 feet; refusal encountered.
26							
28							
30							

Water Sample GW-PP-06-030415 collected at 13:40; temporary screen interval from 18-22 feet.

Soil Screening Results (Photoionization Detector)

PP-06-4	17
PP-06-6	12
PP-06-10	16
PP-06-14	44
PP-06-18	13
PP-06-22	0

Remarks: DP = 1.75-inch diameter, 5-foot long drive sample with acrylate liner. WL ATD = water level measured at time of drilling.

Tetra Tech, Inc
6100 219th Street SW Suite 550
Mountlake Terrace, WA 98043

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME: Schnitzer Steel Ind./ Burgard RI PROJECT #: 11907-01
LOGGED BY: John Virgin
DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe – direct push
HOLE DIA.: 1.75-inch

BORING NO.: PP-07
START DATE: 4/15/03
END DATE: 4/15/03
TOTAL DEPTH: 30 feet
SHEET 1 OF 1

WATER LEVEL DATA			
DEPTH	16.36		
TIME	12:15		
DATE	04/15/03		
BORING DEPTH	30 feet		

FIELD LOCATION: Former Northwest Oil tanks area, northeast of MW-2. Approximately 100 feet west of west end retaining wall, 69 feet north of northernmost railroad track.

DEPTH IN FEET	WELL OR PIEZOMETER DETAILS	SAMPLING METHOD	SAMPLE NUMBER	BLOW COUNTS (per 6")	DEPTH SAMPLED/ RECOVERY	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
0		DP					**0 to 0.5 feet: ASPHALT.**
2			PP-07-4				**0.5 to 1 feet: SANDY GRAVEL (GW),** light bluish gray, medium to fine, angular to sub-rounded, 40 percent medium sand, damp, no noticeable odor (FILL).
4		DP					**1 to 19 feet: SILTY SAND (SP),** dark brown, fine, 20 percent silt, 5 percent fine, rounded gravel, trace clay, damp (FILL).
6			PP-07-6				
8							
10		DP	PP-07-10				
12			PP-07-14				
14		DP					
16							WL ATD = 18.5 feet below ground surface (bgs).
18	∇		PP-09-18				
20		DP					**19 to 30 feet: SILTY SAND (SP),** greenish black alternating with dark brown, fine, 30 percent silt, 10 to 30 percent plastic clay, wet, no noticeable odor (ALLUVIUM).
22			PP-09-22				
24		DP					
26							
28							
30							Total depth drilled = 30 feet.

Water Sample GW-PP-07-030415 collected at 12:20; temporary screen interval from 20-24 feet.

Soil Screening Results (Photoionization Detector)

PP-07-4	14
PP-07-6	33
PP-07-10	42
PP-07-14	30
PP-07-18	0
PP-07-22	0

Remarks: DP = 1.75-inch diameter, 5-foot long drive sample with acrylate liner. WL ATD = water level measured at time of drilling.

Tetra Tech, Inc
6100 219th Street SW Suite 550
Mountlake Terrace, WA 98043

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME: Schnitzer Steel Ind./ Burgard RI PROJECT #: 11907-01
LOGGED BY: John Virgin
DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe – direct push
HOLE DIA.: 1.75-inch

BORING NO.: PP-08
START DATE: 4/15/03
END DATE: 4/15/03
TOTAL DEPTH: 30 feet
SHEET 1 OF 1

WATER LEVEL DATA			
DEPTH	16.28		
TIME	09:55		
DATE	04/15/03		
BORING DEPTH	30 feet		

FIELD LOCATION: Former Northwest Oil tanks area, south of MW-2.

DEPTH IN FEET	WELL OR PIEZOMETER DETAILS	SAMPLING METHOD	SAMPLE NUMBER	BLOW COUNTS (per 6")	DEPTH SAMPLED/ RECOVERY	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
0		DP					**0 to 0.5 feet: ASPHALT.**
2			PP-08-4				**0.5 to 1.3 feet: SANDY GRAVEL (GW),** light bluish gray, medium to fine, angular to sub-rounded, 40 percent medium sand, damp, no noticeable odor (FILL).
4		DP					**1.3 to 3 feet: SILTY SAND (SM),** greenish black, very fine to fine, 30 percent silt, 15 percent clay, damp, no noticeable odor (FILL).
6			PP-08-6				**3 to 3.5 feet: SILTY GRAVEL (GW),** bluish gray, fine, angular, 30 percent silt, dry (FILL).
8							**3.5 to 23 feet: SILTY SAND (SM),** dark yellowish brown, fine to very fine, 10 percent silt, trace clay, damp. Silt increasing with depth to 30 percent, clay increase to 10 percent. Occasional fine rounded gravel. Wet at 19.5 feet. (FILL)
10		DP	PP-08-10				
12			PP-08-14				
14		DP					
16							
18	▽		PP-08-18				WL ATD = 19.5 feet below ground surface (bgs).
20		DP					
22			PP-08-22				
24		DP					**23 to 30 feet: SILTY SAND with CLAY (SM-OH),** gray at 25 feet, very fine to fine, 30 percent silt, 30 percent high plasticity clay, 0.5 to 8-inch interbeds of silty, high plasticity clay below 23 feet bgs, wet, no noticeable odor (ALLUVIUM).
26							
28							
30							Total depth drilled = 30 feet.

Water Sample GW-PP-08-030415 collected at 09:40; temporary screen interval from 20-24 feet.

Soil Screening Results (Photoionization Detector)

PP-08-4	0
PP-08-6	6.6
PP-08-10	12
PP-08-14	4.4
PP-08-18	0
PP-08-22	0

Remarks: DP = 1.75-inch diameter, 5-foot long drive sample with acrylate liner. WL ATD = water level measured at time of drilling.

Tetra Tech, Inc
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Mountlake Terrace, WA 98043

LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME: Schnitzer Steel Ind./ Burgard RI
PROJECT #: 11907-01
LOGGED BY: John Virgin
DRILLING CONTRACTOR: GeoTech Explorations
DRILLING METHOD: Geoprobe - direct push
HOLE DIA.: 1.75-inch

BORING NO.: PP-09
START DATE: 4/15/03
END DATE: 4/15/03
TOTAL DEPTH: 30 feet
SHEET 1 OF 1

WATER LEVEL DATA			
DEPTH	15.89		
TIME	11:00		
DATE	04/15/03		
BORING DEPTH	30 feet		

FIELD LOCATION: Former Northwest Oil tanks area, southeast of MW-2.

DEPTH IN FEET	WELL OR PIEZOMETER DETAILS	SAMPLING METHOD	SAMPLE NUMBER	BLOW COUNTS (per 6")	DEPTH SAMPLED/ RECOVERY	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
0		DP					**0 to 0.5 feet: ASPHALT.**
2			PP-09-4				**0.5 to 8 feet: SAND (SP),** dark brown, fine, 10 percent silt, trace clay, damp (FILL).
4		DP					
6			PP-09-6				
8							**8 to 14.5 feet: SAND (SP),** greenish black, very fine, 5 percent silt, damp. Silt increasing with depth to 30 percent, clay increase to 10 percent, damp. (FILL)
10		DP	PP-09-10				
12			PP-09-14				
14		DP					**14.5 to 21.5feet: SANDY CLAY (CH),** greenish black, high plasticity, 10 to 30 percent very fine sand, one-half to 2-inch long wood and bark debris in layers up to 4-inches thick, loose, wet at 19.5 feet. (ALLUVIUM)
16							
18	∇		PP-09-18				WL ATD = 19.5 feet below ground surface (bgs).
20		DP					**21.5 to 30 feet: CLAYEY SAND (SC),** greenish black, very fine to fine, 20 to 40 percent high plasticity clay, 10 to 30 percent silt, wet, no noticeable odor (ALLUVIUM).
22			PP-09-22				
24		DP					
26							
28							
30							Total depth drilled = 30 feet.

Water Sample GW-PP-09-030415 collected at 11:05; temporary screen interval from 20-24 feet.

Soil Screening Results (Photoionization Detector)

PP-09-4	16
PP-09-6	12
PP-09-10	22
PP-09-14	0
PP-09-18	0
PP-09-22	0

Remarks: DP = 1.75-inch diameter, 5-foot long drive sample with acrylate liner. WL ATD = water level measured at time of drilling.

APPENDIX B

SCHN00205175

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
PP-06-06	P3D0520-01	Soil	04/15/03 12:50	04/16/03 12:25
PP-06-10	P3D0520-02	Soil	04/15/03 13:00	04/16/03 12:25
PP-06-14	P3D0520-03	Soil	04/15/03 13:01	04/16/03 12:25
PP-06-17	P3D0520-04	Soil	04/15/03 13:15	04/16/03 12:25
PP-08-06	P3D0520-05	Soil	04/15/03 09:00	04/16/03 12:25
PP-08-10	P3D0520-06	Soil	04/15/03 09:08	04/16/03 12:25
PP-08-14	P3D0520-07	Soil	04/15/03 09:10	04/16/03 12:25
PP-08-18	P3D0520-08	Soil	04/15/03 09:15	04/16/03 12:25
GW-PP-06-030415	P3D0520-09	Water	04/15/03 13:40	04/16/03 12:25
GW-PP-07-030415	P3D0520-10	Water	04/15/03 12:15	04/16/03 12:25
GW-PP-08-030415	P3D0520-11	Water	04/15/03 09:45	04/16/03 12:25
GW-PP-09-030415	P3D0520-12	Water	04/15/03 11:05	04/16/03 12:25

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Hydrocarbon Identification per NW-TPH Methodology

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PP-06-06 (P3D0520-01) Soil					Sampled: 04/15/03	Received: 04/16/03			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/17/03	04/17/03	3040643	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*93.0 %*	*50-150*							
PP-06-10 (P3D0520-02) Soil					Sampled: 04/15/03	Received: 04/16/03			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/17/03	04/17/03	3040643	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*90.4 %*	*50-150*							
PP-06-14 (P3D0520-03) Soil					Sampled: 04/15/03	Received: 04/16/03			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/17/03	04/17/03	3040643	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	**DET**	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*99.1 %*	*50-150*							
PP-06-17 (P3D0520-04) Soil					Sampled: 04/15/03	Received: 04/16/03			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/17/03	04/17/03	3040643	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*94.6 %*	*50-150*							
PP-08-06 (P3D0520-05) Soil					Sampled: 04/15/03	Received: 04/16/03			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/17/03	04/17/03	3040643	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*114 %*	*50-150*							

North Creek Analytical - Portland

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Hydrocarbon Identification per NW-TPH Methodology

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PP-08-10 (P3D0520-06) Soil					Sampled: 04/15/03	Received: 04/16/03			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/17/03	04/17/03	3040643	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*90.1 %*	*50-150*							
PP-08-14 (P3D0520-07) Soil					Sampled: 04/15/03	Received: 04/16/03			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/17/03	04/17/03	3040643	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*95.2 %*	*50-150*							
PP-08-18 (P3D0520-08) Soil					Sampled: 04/15/03	Received: 04/16/03			
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	NWTPH HCID	04/17/03	04/17/03	3040643	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*97.3 %*	*50-150*							

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method with Acid/Silica Gel Cleanup

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PP-06-14 (P3D0520-03) Soil					Sampled: 04/15/03 Received: 04/16/03				
Diesel Range Organics	**42.6**	25.0	mg/kg dry	1	NWTPH-Dx	04/21/03	04/22/03	3040712	A-01
Heavy Oil Range Hydrocarbons	**198**	50.0	"	"	"	"	"	"	
Surr: 1-Chlorooctadecane	*124 %*	*50-150*							

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Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PP-06-06 (P3D0520-01) Soil					Sampled: 04/15/03	Received: 04/16/03			
Arsenic	**2.46**	0.342	mg/kg dry	1	EPA 6020	04/17/03	04/17/03	3040623	
Cadmium	ND	0.342	"	"	"	"	04/17/03	"	
Copper	**20.2**	1.37	"	"	"	"	"	"	
Lead	**5.86**	0.342	"	"	"	"	"	"	
Zinc	**55.3**	1.37	"	"	"	"	"	"	
PP-06-10 (P3D0520-02) Soil					Sampled: 04/15/03	Received: 04/16/03			
Arsenic	**2.09**	0.410	mg/kg dry	1	EPA 6020	04/17/03	04/17/03	3040623	
Cadmium	ND	0.410	"	"	"	"	04/17/03	"	
Copper	**16.8**	1.64	"	"	"	"	"	"	
Lead	**3.69**	0.410	"	"	"	"	"	"	
Zinc	**52.4**	1.64	"	"	"	"	"	"	
PP-06-14 (P3D0520-03) Soil					Sampled: 04/15/03	Received: 04/16/03			
Arsenic	**3.55**	0.323	mg/kg dry	1	EPA 6020	04/17/03	04/17/03	3040623	
Cadmium	ND	0.323	"	"	"	"	04/17/03	"	
Copper	**53.3**	1.29	"	"	"	"	"	"	
Lead	**425**	1.98	"	6.14	"	"	04/17/03	"	
Zinc	**157**	1.29	"	1	"	"	04/17/03	"	
PP-06-17 (P3D0520-04) Soil					Sampled: 04/15/03	Received: 04/16/03			
Arsenic	**2.32**	0.362	mg/kg dry	1	EPA 6020	04/17/03	04/17/03	3040623	
Cadmium	ND	2.21	"	6.11	"	"	04/17/03	"	R-03
Copper	**17.4**	1.45	"	1	"	"	"	"	
Lead	**5.19**	0.362	"	"	"	"	"	"	
Zinc	**52.4**	1.45	"	"	"	"	"	"	

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

SCHN00205180

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PP-08-06 (P3D0520-05) Soil					Sampled: 04/15/03	Received: 04/16/03			
Arsenic	**2.18**	0.431	mg/kg dry	1	EPA 6020	04/17/03	04/17/03	3040623	
Cadmium	ND	0.431	"	"	"	"	04/17/03	"	
Copper	**24.8**	1.72	"	"	"	"	"	"	
Lead	**19.5**	0.431	"	"	"	"	"	"	
Zinc	**106**	1.72	"	"	"	"	"	"	
PP-08-10 (P3D0520-06) Soil					Sampled: 04/15/03	Received: 04/16/03			
Arsenic	**2.74**	0.388	mg/kg dry	1	EPA 6020	04/17/03	04/17/03	3040623	
Cadmium	ND	0.388	"	"	"	"	04/17/03	"	
Copper	**32.5**	1.55	"	"	"	"	"	"	
Lead	**87.7**	0.388	"	"	"	"	"	"	
Zinc	**129**	1.55	"	"	"	"	"	"	
PP-08-14 (P3D0520-07) Soil					Sampled: 04/15/03	Received: 04/16/03			
Arsenic	**1.94**	0.357	mg/kg dry	1	EPA 6020	04/17/03	04/17/03	3040623	
Cadmium	ND	0.357	"	"	"	"	04/17/03	"	
Copper	**14.1**	1.43	"	"	"	"	"	"	
Lead	**5.04**	0.357	"	"	"	"	"	"	
Zinc	**43.4**	1.43	"	"	"	"	"	"	
PP-08-18 (P3D0520-08) Soil					Sampled: 04/15/03	Received: 04/16/03			
Arsenic	**1.96**	0.347	mg/kg dry	1	EPA 6020	04/17/03	04/17/03	3040623	
Cadmium	ND	0.347	"	"	"	"	04/17/03	"	
Copper	**14.3**	1.39	"	"	"	"	"	"	
Lead	**5.43**	0.347	"	"	"	"	"	"	
Zinc	**44.0**	1.39	"	"	"	"	"	"	

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Polychlorinated Biphenyls per EPA Method 8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PP-06-06 (P3D0520-01) Soil					Sampled: 04/15/03	Received: 04/16/03			
Aroclor 1016	ND	67.0	ug/kg dry	1	EPA 8082	04/21/03	04/23/03	3040744	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*90.0 %*	*36-140*							
Surr: Decachlorobiphenyl	*95.8 %*	*16-149*							
PP-06-10 (P3D0520-02) Soil					Sampled: 04/15/03	Received: 04/16/03			
Aroclor 1016	ND	67.0	ug/kg dry	1	EPA 8082	04/21/03	04/23/03	3040744	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*89.0 %*	*36-140*							
Surr: Decachlorobiphenyl	*96.2 %*	*16-149*							
PP-06-14 (P3D0520-03) Soil					Sampled: 04/15/03	Received: 04/16/03			
Aroclor 1016	ND	67.0	ug/kg dry	1	EPA 8082	04/21/03	04/24/03	3040744	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*86.6 %*	*36-140*							
Surr: Decachlorobiphenyl	*84.6 %*	*16-149*							

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Polychlorinated Biphenyls per EPA Method 8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PP-06-17 (P3D0520-04) Soil					Sampled: 04/15/03 Received: 04/16/03				
Aroclor 1016	ND	67.0	ug/kg dry	1	EPA 8082	04/21/03	04/23/03	3040744	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*93.1 %*	*36-140*							
Surr: Decachlorobiphenyl	*97.2 %*	*16-149*							
PP-08-06 (P3D0520-05) Soil					Sampled: 04/15/03 Received: 04/16/03				
Aroclor 1016	ND	67.0	ug/kg dry	1	EPA 8082	04/21/03	04/26/03	3040744	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	**232**	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*78.6 %*	*36-140*							
Surr: Decachlorobiphenyl	*94.6 %*	*16-149*							
PP-08-10 (P3D0520-06) Soil					Sampled: 04/15/03 Received: 04/16/03				
Aroclor 1016	ND	67.0	ug/kg dry	1	EPA 8082	04/21/03	04/26/03	3040744	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	134	"	2	"	"	"	"	R-03
Aroclor 1260	ND	67.0	"	1	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*66.2 %*	*36-140*							
Surr: Decachlorobiphenyl	*92.4 %*	*16-149*							

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Polychlorinated Biphenyls per EPA Method 8082

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PP-08-14 (P3D0520-07) Soil					Sampled: 04/15/03	Received: 04/16/03			
Aroclor 1016	ND	67.0	ug/kg dry	1	EPA 8082	04/21/03	04/26/03	3040744	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	**93.9**	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*84.4 %*	*36-140*							
Surr: Decachlorobiphenyl	*92.9 %*	*16-149*							
PP-08-18 (P3D0520-08) Soil					Sampled: 04/15/03	Received: 04/16/03			
Aroclor 1016	ND	67.0	ug/kg dry	1	EPA 8082	04/21/03	04/24/03	3040744	
Aroclor 1221	ND	134	"	"	"	"	"	"	
Aroclor 1232	ND	67.0	"	"	"	"	"	"	
Aroclor 1242	ND	67.0	"	"	"	"	"	"	
Aroclor 1248	ND	67.0	"	"	"	"	"	"	
Aroclor 1254	ND	67.0	"	"	"	"	"	"	
Aroclor 1260	ND	67.0	"	"	"	"	"	"	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*93.5 %*	*36-140*							
Surr: Decachlorobiphenyl	*103 %*	*16-149*							

North Creek Analytical - Portland

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Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
GW-PP-06-030415 (P3D0520-09) Water					Sampled: 04/15/03	Received: 04/16/03			
Acetone	ND	25.0	ug/l	1	EPA 8260B	04/18/03	04/18/03	3040686	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**1.69**	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	*Project Number:* none	***Reported:***
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
GW-PP-06-030415 (P3D0520-09) Water					Sampled: 04/15/03	Received: 04/16/03			
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	04/18/03	04/18/03	3040686	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	**1.36**	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	*101 %*	*84.5-124*							
Surr: 1,2-DCA-d4	*105 %*	*77.9-123*							
Surr: Dibromofluoromethane	*102 %*	*83.5-119*							
Surr: Toluene-d8	*98.5 %*	*84.1-116*							

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
GW-PP-07-030415 (P3D0520-10) Water					Sampled: 04/15/03	Received: 04/16/03			
Acetone	ND	25.0	ug/l	1	EPA 8260B	04/18/03	04/18/03	3040686	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

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

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
GW-PP-07-030415 (P3D0520-10) Water					Sampled: 04/15/03 Received: 04/16/03				
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	04/18/03	04/18/03	3040686	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	*99.5 %*	*84.5-124*							
Surr: 1,2-DCA-d4	*102 %*	*77.9-123*							
Surr: Dibromofluoromethane	*98.5 %*	*83.5-119*							
Surr: Toluene-d8	*96.5 %*	*84.1-116*							

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
GW-PP-08-030415 (P3D0520-11) Water					Sampled: 04/15/03	Received: 04/16/03			
Acetone	ND	25.0	ug/l	1	EPA 8260B	04/18/03	04/18/03	3040686	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
GW-PP-08-030415 (P3D0520-11) Water					Sampled: 04/15/03	Received: 04/16/03			
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	04/18/03	04/18/03	3040686	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	*98.0 %*	*84.5-124*							
Surr: 1,2-DCA-d4	*105 %*	*77.9-123*							
Surr: Dibromofluoromethane	*101 %*	*83.5-119*							
Surr: Toluene-d8	*98.0 %*	*84.1-116*							

North Creek Analytical - Portland

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
GW-PP-09-030415 (P3D0520-12) Water					Sampled: 04/15/03	Received: 04/16/03			
Acetone	ND	25.0	ug/l	1	EPA 8260B	04/18/03	04/18/03	3040686	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	"	

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
GW-PP-09-030415 (P3D0520-12) Water					Sampled: 04/15/03	Received: 04/16/03			
Hexachlorobutadiene	ND	2.00	ug/l	1	EPA 8260B	04/18/03	04/18/03	3040686	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	*99.5 %*	*84.5-124*							
Surr: 1,2-DCA-d4	*104 %*	*77.9-123*							
Surr: Dibromofluoromethane	*102 %*	*83.5-119*							
Surr: Toluene-d8	*96.5 %*	*84.1-116*							

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Polynuclear Aromatic Compounds per EPA 8270M-SIM
North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PP-06-14 (P3D0520-03) Soil					Sampled: 04/15/03	Received: 04/16/03			**O-07, R-05**
Acenaphthene	ND	26.8	ug/kg dry	2	EPA 8270m	05/02/03	05/05/03	3050083	
Acenaphthylene	ND	26.8	"	"	"	"	"	"	
Anthracene	ND	26.8	"	"	"	"	"	"	
Benzo (a) anthracene	ND	26.8	"	"	"	"	"	"	
Benzo (a) pyrene	ND	26.8	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	26.8	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	26.8	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	26.8	"	"	"	"	"	"	
Chrysene	ND	26.8	"	"	"	"	"	"	
Dibenzo (a,h) anthracene	ND	26.8	"	"	"	"	"	"	
Fluoranthene	ND	26.8	"	"	"	"	"	"	
Fluorene	ND	26.8	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	26.8	"	"	"	"	"	"	
Naphthalene	ND	26.8	"	"	"	"	"	"	
Phenanthrene	ND	26.8	"	"	"	"	"	"	
Pyrene	**31.0**	26.8	"	"	"	"	"	"	
Surr: Fluorene-d10	*52.0 %*	*40-150*							
Surr: Pyrene-d10	*56.3 %*	*40-150*							
Surr: Benzo (a) pyrene-d12	*52.9 %*	*40-150*							

North Creek Analytical - Portland

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Percent Dry Weight (Solids) per Standard Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
PP-06-06 (P3D0520-01) Soil					Sampled: 04/15/03	Received: 04/16/03			
% Solids	83.3	1.00	% by Weight	1	NCA SOP	04/21/03	04/22/03	3040736	
PP-06-10 (P3D0520-02) Soil					Sampled: 04/15/03	Received: 04/16/03			
% Solids	83.3	1.00	% by Weight	1	NCA SOP	04/21/03	04/22/03	3040736	
PP-06-14 (P3D0520-03) Soil					Sampled: 04/15/03	Received: 04/16/03			
% Solids	83.9	1.00	% by Weight	1	NCA SOP	04/21/03	04/22/03	3040736	
PP-06-17 (P3D0520-04) Soil					Sampled: 04/15/03	Received: 04/16/03			
% Solids	85.5	1.00	% by Weight	1	NCA SOP	04/21/03	04/22/03	3040736	
PP-08-06 (P3D0520-05) Soil					Sampled: 04/15/03	Received: 04/16/03			
% Solids	86.2	1.00	% by Weight	1	NCA SOP	04/21/03	04/22/03	3040736	
PP-08-10 (P3D0520-06) Soil					Sampled: 04/15/03	Received: 04/16/03			
% Solids	90.7	1.00	% by Weight	1	NCA SOP	04/21/03	04/22/03	3040736	
PP-08-14 (P3D0520-07) Soil					Sampled: 04/15/03	Received: 04/16/03			
% Solids	91.2	1.00	% by Weight	1	NCA SOP	04/21/03	04/22/03	3040736	
PP-08-18 (P3D0520-08) Soil					Sampled: 04/15/03	Received: 04/16/03			
% Solids	86.7	1.00	% by Weight	1	NCA SOP	04/21/03	04/22/03	3040736	

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Hydrocarbon Identification per NW-TPH Methodology - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040643 - TPH-HCID Extraction										
Blank (3040643-BLK1)				Prepared & Analyzed: 04/17/03						
Gasoline Range Hydrocarbons	ND	20.0	mg/kg							
Diesel Range Hydrocarbons	ND	50.0	"							
Heavy Oil Range Hydrocarbons	ND	100	"							
Surr: 1-Chlorooctadecane	*DET*		"	*9.60*		*96.0*	*50-150*			
Duplicate (3040643-DUP1)		**Source: P3D0520-01**		Prepared & Analyzed: 04/17/03						
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry		ND				50	
Diesel Range Hydrocarbons	ND	50.0	"		ND				50	
Heavy Oil Range Hydrocarbons	ND	100	"		ND				50	
Surr: 1-Chlorooctadecane	*DET*		"	*11.5*		*93.9*	*50-150*			
Duplicate (3040643-DUP2)		**Source: P3D0520-02**		Prepared & Analyzed: 04/17/03						
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry		ND				50	
Diesel Range Hydrocarbons	ND	50.0	"		ND				50	
Heavy Oil Range Hydrocarbons	ND	100	"		ND				50	
Surr: 1-Chlorooctadecane	*DET*		"	*11.5*		*90.4*	*50-150*			

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Diesel and Heavy Range Hydrocarbons per NWTPH-Dx Method with Acid/Silica Gel Cleanup - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040712 - EPA 3550 Fuels										
Blank (3040712-BLK1)				Prepared & Analyzed: 04/21/03						
Diesel Range Organics	ND	25.0	mg/kg							
Heavy Oil Range Hydrocarbons	ND	50.0	"							
Surr: 1-Chlorooctadecane	*5.15*		"	*4.80*		*107*	*50-150*			
LCS (3040712-BS1)				Prepared & Analyzed: 04/21/03						
Diesel Range Organics	113	25.0	mg/kg	125		90.4	50-150			
Heavy Oil Range Hydrocarbons	72.0	50.0	"	75.0		96.0	50-150			
Surr: 1-Chlorooctadecane	*5.14*		"	*4.80*		*107*	*50-150*			
Duplicate (3040712-DUP1)		**Source: P3D0352-01**		Prepared & Analyzed: 04/21/03						
Diesel Range Organics	75.8	25.0	mg/kg dry		60.3			22.8	50	
Heavy Oil Range Hydrocarbons	270	50.0	"		252			6.90	50	
Surr: 1-Chlorooctadecane	*5.19*		"	*5.27*		*98.5*	*50-150*			
Duplicate (3040712-DUP2)		**Source: P3D0388-06**		Prepared & Analyzed: 04/21/03						
Diesel Range Organics	ND	25.0	mg/kg dry		ND				50	
Heavy Oil Range Hydrocarbons	ND	50.0	"		ND				50	
Surr: 1-Chlorooctadecane	*6.05*		"	*6.40*		*94.5*	*50-150*			

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Total Metals per EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040623 - EPA 3050										
Blank (3040623-BLK1)				Prepared & Analyzed: 04/17/03						
Zinc	ND	1.80	mg/kg							
Blank (3040623-BLK2)				Prepared & Analyzed: 04/17/03						
Arsenic	ND	0.500	mg/kg							
Cadmium	ND	0.500	"							
Copper	ND	2.00	"							
Lead	ND	0.500	"							
Zinc	ND	2.00	"							
LCS (3040623-BS1)				Prepared & Analyzed: 04/17/03						
Copper	10.2	2.00	mg/kg	9.62		106	80-120			
Zinc	10.4	2.00	"	9.62		108	80-120			
LCS (3040623-BS2)				Prepared & Analyzed: 04/17/03						
Arsenic	9.69	0.500	mg/kg	10.0		96.9	80-120			
Cadmium	10.2	0.500	"	10.0		102	80-120			
Copper	10.5	2.00	"	10.0		105	80-120			
Lead	10.3	0.500	"	10.0		103	80-120			
Zinc	10.1	2.00	"	10.0		101	80-120			
Duplicate (3040623-DUP1)		**Source: P3D0526-01**		Prepared & Analyzed: 04/17/03						
Arsenic	4.26	0.420	mg/kg dry		4.31			1.17	40	
Cadmium	ND	0.420	"		ND				40	
Copper	15.7	1.68	"		15.8			0.635	40	
Lead	8.67	0.420	"		9.09			4.73	40	
Zinc	61.5	1.68	"		64.3			4.45	40	
Matrix Spike (3040623-MS1)		**Source: P3D0526-01**		Prepared & Analyzed: 04/17/03						
Arsenic	12.0	0.340	mg/kg dry	8.22	4.31	93.6	75-125			
Cadmium	7.72	0.340	"	8.22	ND	93.9	75-125			
Copper	23.8	1.36	"	8.22	15.8	97.3	75-125			
Lead	17.6	0.340	"	8.22	9.09	104	75-125			
Zinc	69.9	1.36	"	8.22	64.3	68.1	75-125			Q-19

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Total Metals per EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040623 - EPA 3050										
Matrix Spike (3040623-MS2)		**Source: P3D0526-02**		Prepared & Analyzed: 04/17/03						
Arsenic	11.6	0.368	mg/kg dry	8.98	3.68	88.2	75-125			
Cadmium	8.67	0.368	"	8.98	ND	96.5	75-125			
Copper	22.7	1.47	"	8.98	15.4	81.3	75-125			
Lead	21.1	0.368	"	8.98	10.6	117	75-125			
Zinc	78.3	1.47	"	8.98	68.0	115	75-125			

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Polychlorinated Biphenyls per EPA Method 8082 - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040744 - EPA 3550										
Blank (3040744-BLK1)				Prepared: 04/21/03	Analyzed: 04/26/03					
Aroclor 1016	ND	67.0	ug/kg							
Aroclor 1221	ND	134	"							
Aroclor 1232	ND	67.0	"							
Aroclor 1242	ND	67.0	"							
Aroclor 1248	ND	67.0	"							
Aroclor 1254	ND	67.0	"							
Aroclor 1260	ND	67.0	"							
Surr: 2,4,5,6-Tetrachloro-m-xylene	*28.0*		"	*33.3*		*84.1*	*36-140*			
Surr: Decachlorobiphenyl	*31.3*		"	*33.3*		*94.0*	*16-149*			
LCS (3040744-BS1)				Prepared: 04/21/03	Analyzed: 04/26/03					
Aroclor 1016	296	67.0	ug/kg	333		88.9	57-135			
Aroclor 1260	305	67.0	"	333		91.6	60-135			
Surr: 2,4,5,6-Tetrachloro-m-xylene	*29.5*		"	*33.3*		*88.6*	*36-140*			
Surr: Decachlorobiphenyl	*33.4*		"	*33.3*		*100*	*16-149*			
Matrix Spike (3040744-MS1)		Source: P3D0520-08		Prepared: 04/21/03	Analyzed: 04/26/03					
Aroclor 1016	333	67.0	ug/kg dry	384	ND	86.7	37-145			
Aroclor 1260	323	67.0	"	384	ND	84.1	25-144			
Surr: 2,4,5,6-Tetrachloro-m-xylene	*32.3*		"	*38.4*		*84.1*	*36-140*			
Surr: Decachlorobiphenyl	*34.8*		"	*38.4*		*90.6*	*16-149*			
Matrix Spike Dup (3040744-MSD1)		Source: P3D0520-08		Prepared: 04/21/03	Analyzed: 04/26/03					
Aroclor 1016	341	67.0	ug/kg dry	384	ND	88.8	37-145	2.37	26	
Aroclor 1260	344	67.0	"	384	ND	89.6	25-144	6.30	30	
Surr: 2,4,5,6-Tetrachloro-m-xylene	*32.9*		"	*38.4*		*85.7*	*36-140*			
Surr: Decachlorobiphenyl	*37.3*		"	*38.4*		*97.1*	*16-149*			

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040686 - EPA 5030B										
Blank (3040686-BLK1)				Prepared & Analyzed: 04/18/03						
Acetone	ND	25.0	ug/l							
Benzene	ND	1.00	"							
Bromobenzene	ND	1.00	"							
Bromochloromethane	ND	1.00	"							
Bromodichloromethane	ND	1.00	"							
Bromoform	ND	1.00	"							
Bromomethane	ND	5.00	"							
2-Butanone	ND	10.0	"							
n-Butylbenzene	ND	5.00	"							
sec-Butylbenzene	ND	1.00	"							
tert-Butylbenzene	ND	1.00	"							
Carbon disulfide	ND	10.0	"							
Carbon tetrachloride	ND	1.00	"							
Chlorobenzene	ND	1.00	"							
Chloroethane	ND	1.00	"							
Chloroform	ND	1.00	"							
Chloromethane	ND	5.00	"							
2-Chlorotoluene	ND	1.00	"							
4-Chlorotoluene	ND	1.00	"							
1,2-Dibromo-3-chloropropane	ND	5.00	"							
Dibromochloromethane	ND	1.00	"							
1,2-Dibromoethane	ND	1.00	"							
Dibromomethane	ND	1.00	"							
1,2-Dichlorobenzene	ND	1.00	"							
1,3-Dichlorobenzene	ND	1.00	"							
1,4-Dichlorobenzene	ND	1.00	"							
Dichlorodifluoromethane	ND	5.00	"							
1,1-Dichloroethane	ND	1.00	"							
1,2-Dichloroethane	ND	1.00	"							
1,1-Dichloroethene	ND	1.00	"							
cis-1,2-Dichloroethene	ND	1.00	"							
trans-1,2-Dichloroethene	ND	1.00	"							
1,2-Dichloropropane	ND	1.00	"							
1,3-Dichloropropane	ND	1.00	"							
2,2-Dichloropropane	ND	1.00	"							
1,1-Dichloropropene	ND	1.00	"							

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040686 - EPA 5030B										
Blank (3040686-BLK1)				Prepared & Analyzed: 04/18/03						
cis-1,3-Dichloropropene	ND	1.00	ug/l							
trans-1,3-Dichloropropene	ND	1.00	"							
Ethylbenzene	ND	1.00	"							
Hexachlorobutadiene	ND	2.00	"							
2-Hexanone	ND	10.0	"							
Isopropylbenzene	ND	2.00	"							
p-Isopropyltoluene	ND	2.00	"							
4-Methyl-2-pentanone	ND	5.00	"							
Methyl tert-butyl ether	ND	1.00	"							
Methylene chloride	ND	5.00	"							
Naphthalene	ND	2.00	"							
n-Propylbenzene	ND	1.00	"							
Styrene	ND	1.00	"							
1,1,1,2-Tetrachloroethane	ND	1.00	"							
1,1,2,2-Tetrachloroethane	ND	1.00	"							
Tetrachloroethene	ND	1.00	"							
Toluene	ND	1.00	"							
1,2,3-Trichlorobenzene	ND	1.00	"							
1,2,4-Trichlorobenzene	ND	1.00	"							
1,1,1-Trichloroethane	ND	1.00	"							
1,1,2-Trichloroethane	ND	1.00	"							
Trichloroethene	ND	1.00	"							
Trichlorofluoromethane	ND	1.00	"							
1,2,3-Trichloropropane	ND	1.00	"							
1,2,4-Trimethylbenzene	ND	1.00	"							
1,3,5-Trimethylbenzene	ND	1.00	"							
Vinyl chloride	ND	1.00	"							
o-Xylene	ND	1.00	"							
m,p-Xylene	ND	2.00	"							
Surr: 4-BFB	*21.2*		"	*20.0*		*106*	*84.5-124*			
Surr: 1,2-DCA-d4	*21.7*		"	*20.0*		*108*	*77.9-123*			
Surr: Dibromofluoromethane	*20.6*		"	*20.0*		*103*	*83.5-119*			
Surr: Toluene-d8	*20.3*		"	*20.0*		*102*	*84.1-116*			

North Creek Analytical - Portland

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040686 - EPA 5030B										
LCS (3040686-BS1)				Prepared & Analyzed: 04/18/03						
Benzene	20.8	1.00	ug/l	20.0		104	80-120			
Chlorobenzene	21.2	1.00	"	20.0		106	80-120			
1,1-Dichloroethene	20.7	1.00	"	20.0		104	80-120			
Toluene	21.2	1.00	"	20.0		106	80-120			
Trichloroethene	22.9	1.00	"	20.0		114	80-124			
Surr: 4-BFB	*20.0*		"	*20.0*		*100*	*84.5-124*			
Surr: 1,2-DCA-d4	*20.7*		"	*20.0*		*104*	*77.9-123*			
Surr: Dibromofluoromethane	*19.8*		"	*20.0*		*99.0*	*83.5-119*			
Surr: Toluene-d8	*20.3*		"	*20.0*		*102*	*84.1-116*			
Matrix Spike (3040686-MS1)		**Source: P3D0520-09**		Prepared & Analyzed: 04/18/03						
Benzene	20.5	1.00	ug/l	20.0	ND	102	80-124			
Chlorobenzene	20.2	1.00	"	20.0	ND	101	72.9-134			
1,1-Dichloroethene	20.1	1.00	"	20.0	ND	100	79.3-127			
Toluene	20.5	1.00	"	20.0	ND	102	79.7-131			
Trichloroethene	20.5	1.00	"	20.0	1.36	95.7	68.4-130			
Surr: 4-BFB	*20.3*		"	*20.0*		*102*	*84.5-124*			
Surr: 1,2-DCA-d4	*20.4*		"	*20.0*		*102*	*77.9-123*			
Surr: Dibromofluoromethane	*20.5*		"	*20.0*		*102*	*83.5-119*			
Surr: Toluene-d8	*20.6*		"	*20.0*		*103*	*84.1-116*			
Matrix Spike Dup (3040686-MSD1)		**Source: P3D0520-09**		Prepared & Analyzed: 04/18/03						
Benzene	20.6	1.00	ug/l	20.0	ND	103	80-124	0.487	25	
Chlorobenzene	19.9	1.00	"	20.0	ND	99.5	72.9-134	1.50	25	
1,1-Dichloroethene	20.5	1.00	"	20.0	ND	102	79.3-127	1.97	25	
Toluene	20.4	1.00	"	20.0	ND	102	79.7-131	0.489	25	
Trichloroethene	21.0	1.00	"	20.0	1.36	98.2	68.4-130	2.41	25	
Surr: 4-BFB	*20.8*		"	*20.0*		*104*	*84.5-124*			
Surr: 1,2-DCA-d4	*21.0*		"	*20.0*		*105*	*77.9-123*			
Surr: Dibromofluoromethane	*20.8*		"	*20.0*		*104*	*83.5-119*			
Surr: Toluene-d8	*20.6*		"	*20.0*		*103*	*84.1-116*			

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Polynuclear Aromatic Compounds per EPA 8270M-SIM - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3050083 - EPA 3550										
Blank (3050083-BLK1)				Prepared: 05/02/03 Analyzed: 05/05/03						
Acenaphthene	ND	13.4	ug/kg							
Acenaphthylene	ND	13.4	"							
Anthracene	ND	13.4	"							
Benzo (a) anthracene	ND	13.4	"							
Benzo (a) pyrene	ND	13.4	"							
Benzo (b) fluoranthene	ND	13.4	"							
Benzo (ghi) perylene	ND	13.4	"							
Benzo (k) fluoranthene	ND	13.4	"							
Chrysene	ND	13.4	"							
Dibenzo (a,h) anthracene	ND	13.4	"							
Fluoranthene	ND	13.4	"							
Fluorene	ND	13.4	"							
Indeno (1,2,3-cd) pyrene	ND	13.4	"							
Naphthalene	ND	13.4	"							
Phenanthrene	ND	13.4	"							
Pyrene	ND	13.4	"							
Surr: Fluorene-d10	*66.2*		"	*83.3*		*79.5*	*40-150*			
Surr: Pyrene-d10	*77.7*		"	*83.3*		*93.3*	*40-150*			
Surr: Benzo (a) pyrene-d12	*71.2*		"	*83.3*		*85.5*	*40-150*			
LCS (3050083-BS1)				Prepared: 05/02/03 Analyzed: 05/05/03						
Acenaphthene	117	13.4	ug/kg	167		70.1	33-139			
Benzo (a) pyrene	119	13.4	"	167		71.3	45-149			
Pyrene	132	13.4	"	167		79.0	39-138			
Surr: Fluorene-d10	*67.8*		"	*83.3*		*81.4*	*40-150*			
Surr: Pyrene-d10	*76.2*		"	*83.3*		*91.5*	*40-150*			
Surr: Benzo (a) pyrene-d12	*70.0*		"	*83.3*		*84.0*	*40-150*			

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Polynuclear Aromatic Compounds per EPA 8270M-SIM - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3050083 - EPA 3550										
Matrix Spike (3050083-MS1)		**Source: P3D0520-03**		Prepared: 05/02/03	Analyzed: 05/06/03					**R-05**
Acenaphthene	127	53.6	ug/kg dry	199	ND	63.8	33-139			
Benzo (a) pyrene	121	53.6	"	199	17.9	51.8	45-149			
Pyrene	183	53.6	"	199	31.0	76.4	39-138			
Surr: Fluorene-d10	*74.7*		"	*99.3*		*75.2*	*40-150*			
Surr: Pyrene-d10	*76.8*		"	*99.3*		*77.3*	*40-150*			
Surr: Benzo (a) pyrene-d12	*61.2*		"	*99.3*		*61.6*	*40-150*			
Matrix Spike Dup (3050083-MSD1)		**Source: P3D0520-03**		Prepared: 05/02/03	Analyzed: 05/06/03					**R-05**
Acenaphthene	103	53.6	ug/kg dry	199	ND	51.8	33-139	20.9	60	
Benzo (a) pyrene	120	53.6	"	199	17.9	51.3	45-149	0.830	60	
Pyrene	145	53.6	"	199	31.0	57.3	39-138	23.2	60	
Surr: Fluorene-d10	*64.1*		"	*99.3*		*64.6*	*40-150*			
Surr: Pyrene-d10	*60.2*		"	*99.3*		*60.6*	*40-150*			
Surr: Benzo (a) pyrene-d12	*57.1*		"	*99.3*		*57.5*	*40-150*			

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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

Bridgewater Group	Project: Schnitzer	
4500 Kruse Way Suite 110	Project Number: none	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	05/08/03 12:41

Percent Dry Weight (Solids) per Standard Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3040736 - Dry Weight										
Duplicate (3040736-DUP1)		**Source: P3D0520-01**		Prepared: 04/21/03 Analyzed: 04/22/03						
% Solids	83.1	1.00	% by Weight		83.3			0.240	20	
Duplicate (3040736-DUP2)		**Source: P3D0520-02**		Prepared: 04/21/03 Analyzed: 04/22/03						
% Solids	83.4	1.00	% by Weight		83.3			0.120	20	
Duplicate (3040736-DUP3)		**Source: P3D0652-05**		Prepared: 04/21/03 Analyzed: 04/22/03						
% Solids	76.8	1.00	% by Weight		76.6			0.261	20	

North Creek Analytical - Portland

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.

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

Notes and Definitions

A-01	Detected hydrocarbons are mainly due to overlap from the heavy/oil range; however, there is a trace of weathered diesel detected.
O-07	This sample was extracted outside the EPA recommended holding time.
Q-19	The spike recovery for this QC sample is outside of established control limits due to a non-homogeneous matrix in the native sample.
R-03	The reporting limit for this analyte was raised due to matrix interference.
R-05	Reporting limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte, and/or matrix interference.
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. MRLs are adjusted if %Solids are less than 50%.
wet	Sample results reported on a wet weight basis (as received)
RPD	Relative Percent Difference

BRIDGEWATER GROUP, INC.

Groundwater Monitoring Results Summary
Burgard Industrial Park

TO: Alicia Voss/DEQ

COPY: Mat Cusma/Schnitzer

FROM: Ross Rieke/Bridgewater Group

DATE: July 14, 2004

This memorandum presents a summary of the groundwater monitoring performed over the past year at the Burgard Industrial Park in Portland, Oregon (Figures 1 through 5). The groundwater monitoring was performed in accordance with the March 17, 2003, *Revised Groundwater Monitoring Plan* prepared for the Burgard site and as modified in a September 22, 2003 email from you.

The groundwater monitoring plan notes that a one year summary report will present the following:

- Comparison of the groundwater flow directions and gradients noted in the Phase I RI and those noted in the groundwater monitoring events.
- Comparison of the groundwater contaminant concentrations noted in the Phase I RI and those noted in the groundwater monitoring events

This summary report presents these comparisons.

Groundwater Flow Directions and Gradients

The consistency of the groundwater flow directions and gradients was assessed by comparing the relative groundwater elevations in the site monitoring wells over the various monitoring events. Table 1 presents the groundwater elevations measured in the Site monitoring wells. Figure 6 presents a hydrograph of the groundwater elevations measured in the wells. Figure 6 notes the following:

- The water levels in the wells respond consistently with changes in the river elevation. The water level responses in MW-5 and MW-2 show the greatest connection with the river which is consistent with their being closest to the river. The water levels in MW-7 are less affected by the river level as MW-7 is located relatively distant from river.
- Although the water levels in MW-6 are consistently higher than those in the other site wells, the water levels in MW-6 show a similar connection to the river levels. The higher groundwater elevations in MW-6 are likely associated with presence of silty clay at a depth of about 15 feet at MW-6. Similar fine-grain soil was observed elsewhere only in MW-1 and at a significantly greater depth (i.e., 23 feet).
- There are consistently relatively low gradients between the wells located along the river. This general lack of gradient is consistent with an overall general groundwater flow perpendicular with the river.

SCHN00205207

- Water flows from the river to the Site during periods of high river levels (see March 2003 and December 2003 monitoring events). This suggests that the groundwater in the wells near the shore may reflect, to some degree, water quality in the river.
- Water flows from the Site to the river during periods of moderate to low river levels (see May 2003, June 2003, September 2003, and March 2004 monitoring events).

In general, the groundwater levels measured during the RI and during the monitoring period were consistent with the current conceptual site groundwater flow model.

Groundwater Contaminant Concentrations

The consistency of the groundwater contaminant concentrations between the RI and monitoring period was assessed by considering the concentrations of trichloroethene (TCE), tetrachloroethene (PCE), and dissolved arsenic in the groundwater samples. TCE and PCE were the only organic contaminants routinely detected and whose concentrations approached or exceeded the most conservative surface water quality criteria (DEQ SLVs or EPA Ambient Water Quality Criteria). Likewise, arsenic was the only dissolved metal that was routinely detected and whose concentrations exceeded the most conservative surface water quality criteria. Analyses of the concentrations of these three contaminants provided an assessment of the overall consistency of the groundwater contaminant concentrations at the Site over the monitoring period.

Table 2 presents a summary of the volatile organic compound (VOC) concentrations in the groundwater samples. Table 3 presents the dissolved metal concentrations in the groundwater samples. Figures 7, 8, and 9 show the time-concentration plots for PCE, TCE, and arsenic, respectively. As shown in the figures, the concentrations of these three contaminants are either stable or have decreased over the monitoring period.

Conclusions and Recommendations

Based on the consistency of the relative groundwater elevations in the groundwater monitoring wells and the low and consistent concentrations of the few contaminants detected in the groundwater, additional groundwater monitoring at this time is not necessary. Additional groundwater monitoring may be appropriate in the future depending on the findings of the Portland Harbor remedial investigation process. In particular, if, during the Portland Harbor remedial investigation, TCE, PCE or arsenic are identified as a risk driver in the overall Portland Harbor and that the TCE, PCE or arsenic concentrations present in the Site groundwater could potentially be contributing to unacceptable risk in the Portland Harbor, potential additional groundwater monitoring will be discussed with DEQ.

Please call if you have any questions.

SCHN00205208

Tables

SCHN00205209

Table 1
Groundwater Elevations in Monitoring Wells
Burgard Industrial Park

Monitoring Well	Top of Casing Elevation (ft)	Date	Depth (ft)	GW Elev (ft) COP Datum
MW-01	28.02	1/27/2002	18.05	10.0
		3/23/2003	18.53	9.5
		4/15/2003	18.21	9.8
		4/28/2003	17.79	10.2
		6/20/2003	17.73	10.3
		9/21/2003[3]	22.20	5.8
		12/14/2003	20.34	7.7
		2/5/2004	18.19	9.8
		3/18/2004	19.61	8.4
MW-02	27.39	1/27/2002	16.46	10.9
		3/23/2003	16.63	10.8
		4/15/2003	17.36	10.0
		4/28/2003	17.15	10.2
		6/20/2003	17.83	9.6
		9/21/2003[3]	22.80	4.6
		12/14/2003	17.99	9.4
		2/5/2004	17.18	10.2
		3/18/2004	20.12	7.3
MW-03	27.27	1/27/2002	17.65	9.6
		3/23/2003	17.59	9.7
		4/15/2003	nm	nm
		4/28/2003	16.91	10.4
		6/20/2003	16.75	10.5
		9/21/2003	20.67	6.6
		12/14/2003	19.47	7.8
		2/5/2004	17.19	10.1
		3/18/2004	19.03	8.2
MW-04	28.03	1/27/2002	16.99	11.0
		3/23/2003	nm	nm
	27.93	4/15/2003	17.93	10.0
		4/28/2003	17.52	10.4
		6/20/2003	18.17	9.8
		9/21/2003[3]	22.82	5.1
		12/14/2003	18.25	9.7
		2/5/2004	17.37	10.6
		3/18/2004	20.75	7.2
MW-05	28.34	1/27/2002	17.47	10.9
		3/23/2003	17.83	10.5
		4/15/2003	18.68	9.7
		4/28/2003	17.35	11.0
		6/20/2003	19.22	9.1
		9/21/2003[3]	24.22	4.1
		12/14/2003	19.03	9.3
		2/5/2004	18.38	10.0
		3/18/2004	21.52	6.8
MW-06	28.31	1/27/2002	11.89	16.4
		3/23/2003	12.37	15.9
		4/15/2003	12.13	16.2
		4/28/2003	12.31	16.0
		6/20/2003	12.80	15.5
		9/21/2003[3]	17.51	10.8
		12/14/2003	13.21	15.1
		2/5/2004	12.20	16.1
		3/18/2004	12.48	15.8
MW-07	35.47	1/27/2002	25.77	9.7
		3/23/2003	25.41	10.1
		4/15/2003	24.98	10.5
		4/28/2003	24.62	10.9
		6/20/2003	24.24	11.2
		9/21/2003	27.01	8.5
		12/14/2003	26.81	8.7
		2/5/2004	25.12	10.4
		3/18/2004	25.28	10.2

		Gauge[1] (ft)	COP Datum[2] (ft)
Willamette River	1/27/2002	8.75	11.68
	3/23/2003	7.95	10.88
	4/15/2003	7.00	9.93
	4/28/2003	6.40	9.33
	6/20/2003	5.80	8.73
	9/21/2003	0.55	3.48
	12/14/2003	7.70	10.63
	2/5/2004	6.40	9.33
	3/18/2004	3.46	6.39

1 - Willamette River gauge at Morrison Bridge
2 - COP Datum = Morrison St. Bridge Guage + 2.93
3 - September 21, 2003 data suspect due to little water in well and lack of recovery after purging.

SCHN00205210

Table 2
Concentrations in Groundwater Samples
Volatile Organic Compounds
Burgard Industrial Park
All results in ug/l

Probe/ Well	Location	Date	cis-1,2,-Dichloroethene	Tetrachlorethene	1,1,1-Trichloroethane	Trichloroethene	Vinyl Chloride
MW01	Former NW Oil Tanks	1/28/2002	9.13	32.7	1 U	4.5	1.23
		3/23/2003	14.3	23.2	1 U	20.1	1.18
		12/14/2003	32.8	14.5	1 U	6.74	1 U
MW02	Shoreline, north end of site	1/28/2002	2.78	6.68	1 U	8.06	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	1.97	7.76	1 U	8.90	1 U
		12/14/2003	1.9	5.75	1 U	7.51	1 U
MW03	Shoreline, middle of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	-	-	-	-	-
		4/28/2003	-	-	-	-	-
		9/21/2003	-	-	-	-	-
MW04	Shoreline, middle of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		4/15/2003	-	-	-	-	-
		12/14/2003	-	-	-	-	-
MW05	Shoreline, south end of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	-	-	-	-	-
		12/14/2003	-	-	-	-	-
MW06	Outfall 1 plug area	1/28/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
MW07	Southeast area	1/28/2002	1 U	1.91	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	1 U	1 U	1 U	1.27	1 U
		9/21/2003	1 U	1.1	1 U	1 U	1 U
PP02	WMW compressor	12/18/2001	1 U	1 U	1 U	1 U	1 U
PP03	Boydston oil storage area	12/18/2001	1 U	1 U	1 U	1 U	1 U
PP04	PBM wash pad	12/18/2001	1 U	1 U	1.23	1 U	1 U
PP05	Former NW Oil Tanks	12/18/2001	1 U	1 U	1 U	1 U	1 U
PP06	Shoreline, north end of site	4/15/2003	1.69	1 U	1 U	1.36	1 U
PP07	Former NW Oil Tanks	4/15/2003	1 U	1 U	1 U	1 U	1 U
PP08	Shoreline, north end of site	4/15/2003	1 U	1 U	1 U	1 U	1 U
PP09	Former NW Oil Tanks	4/15/2003	1 U	1 U	1 U	1 U	1 U
PW01	UST Pad	1/28/2002	1 U	1 U	1 U	1 U	1 U
PW03	PBM wash pad	1/28/2002	1 U	1.67	1 U	1.7	1 U
PW06	Southwest corner of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
EPA Ambient Water Quality Criteria				8.85		81	525
DEQ Level II Surface Water SLV				240	11	21.9	1300

U - Not detected at noted reporting limit
"-" - Not analyzed
All VOCs not shown in table are not detected.

SCHN00205211

Table 3
Concentrations in Groundwater Samples
Dissolved Metals
Burgard Industrial Park
All results in ug/l

Probe/ Well	Location	Date	Dissolved Antimony	Dissolved Arsenic	Dissolved Barium	Dissolved Cadmium	Dissolved Chromium	Dissolved Copper	Dissolved Lead	Dissolved Mercury	Dissolved Nickel	Dissolved Selenium	Dissolved Silver	Dissolved Thallium	Dissolved Zinc
MW01	Former NW Oil Tanks	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		3/23/2003	-	1 U	46.4	-	-	-	-	-	-	-	-	-	-
		12/14/2003	-	5.01	-	-	1 U	-	-	-	-	-	-	-	-
MW02	Shoreline, north end of site	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	6.3	-	-	1.1	-	-	-	-	-	-	-	-
		3/23/2003	-	1.0 U	27.4	-	1.0 U	-	1.0 U	-	-	-	-	-	-
		12/14/2003	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	Shoreline, middle of site	1/27/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	37.7	-	-	1.0 U	-	-	0.2 U	-	-	-	-	-
		3/23/2003	-	32.8	113	-	1.0 U	1.06	1.0 U	0.2 U	-	-	-	-	-
		4/28/2003	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/21/2003	-	38.9	-	-	1.0 U	2.0 U	1.0 U	0.2 U	-	-	-	-	-
MW04	Shoreline, middle of site	1/27/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	11.4	-	-	1.0 U	-	-	-	-	-	-	-	-
		4/15/2003	-	6.29	77.6	-	-	-	-	0.2 U	-	-	-	-	-
		12/14/2003	-	3.34	-	-	-	-	-	-	-	-	-	-	-
MW05	Shoreline, south end of site	1/27/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		3/23/2003	-	-	10.1	-	1.0 U	-	-	-	-	-	-	-	-
		12/14/2003	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	Outfall 1 plug area	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	-	-	-	1.0 U	-	-	-	-	-	-	-	-
MW07	Southeast area	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	6.1	-	-	1.0 U	-	-	-	-	-	-	-	-
		3/23/2003	-	1.64	65.3	-	1.0 U	1.61	1.0 U	-	-	-	-	-	-
		9/21/2003	-	1.97	-	-	2.05	2.0 U	-	-	-	-	-	-	-
EPA Ambient Water Quality Criteria			4300	0.14			1300		0.05	4600	69000				
DEQ Level II Surface Water SLV			1600	150	2.2	0.21	9	2.5	0.77	52	120	0.12	40	120	

U - Not detected at noted reporting limit
"-" - Not analyzed

SCHN00205212

FIGURES

SCHN00205213

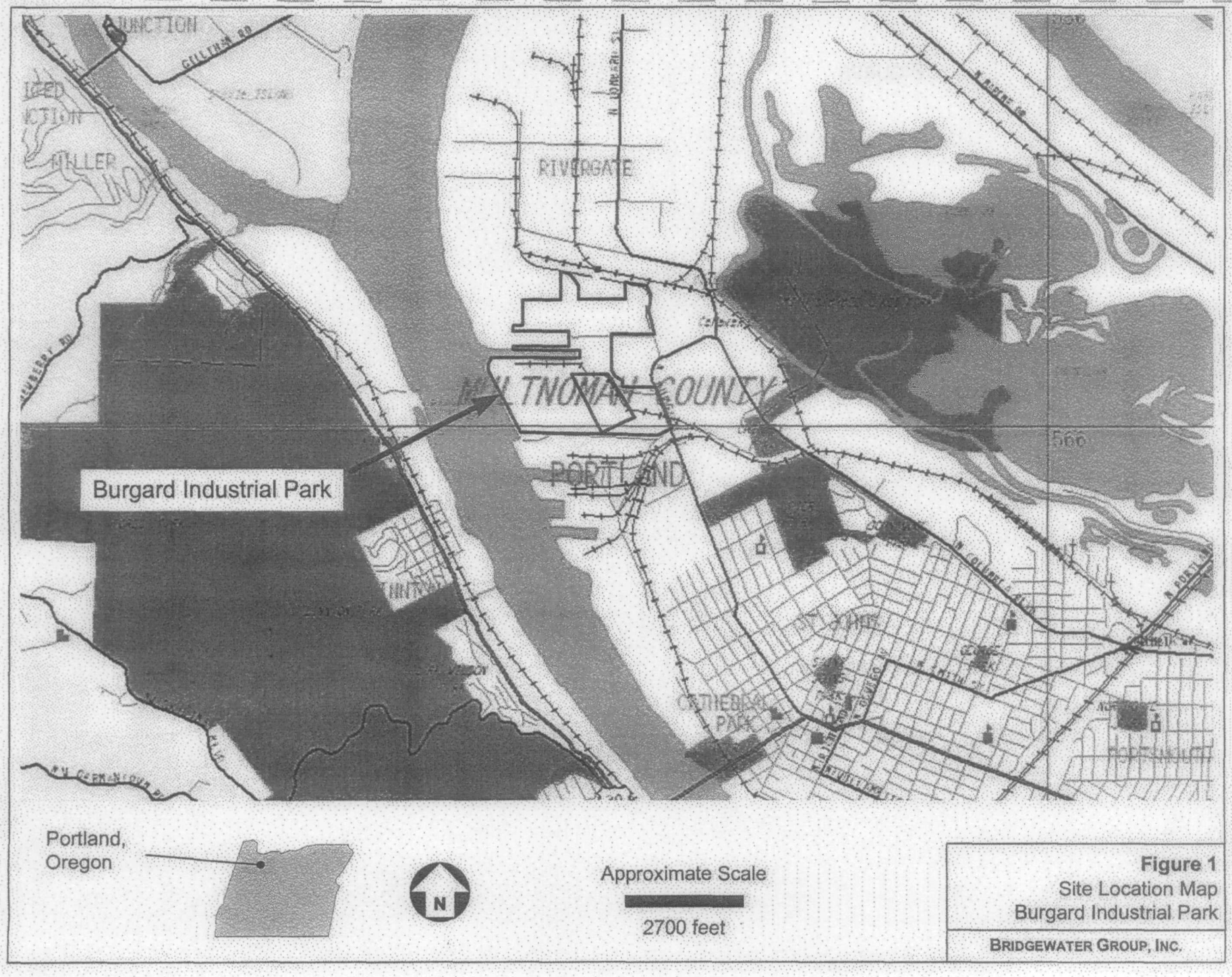
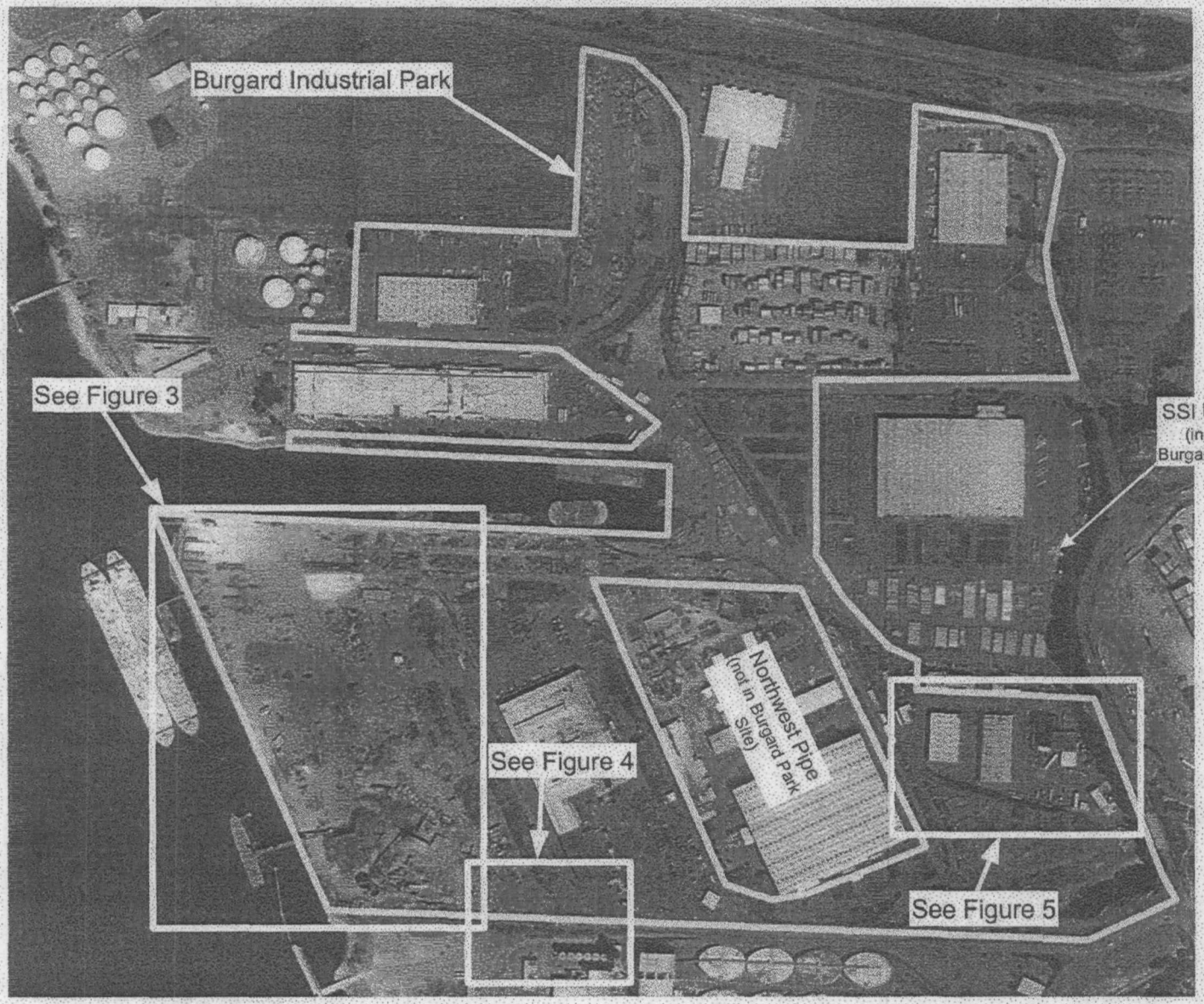


Figure 1
Site Location Map
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

SCHN00205214



N

Approximate Scale

600 Feet

Figure 2
July 2002 Aerial Photograph
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

SCHN00205215

N

Approximate Scale

220 feet

Monitoring Well

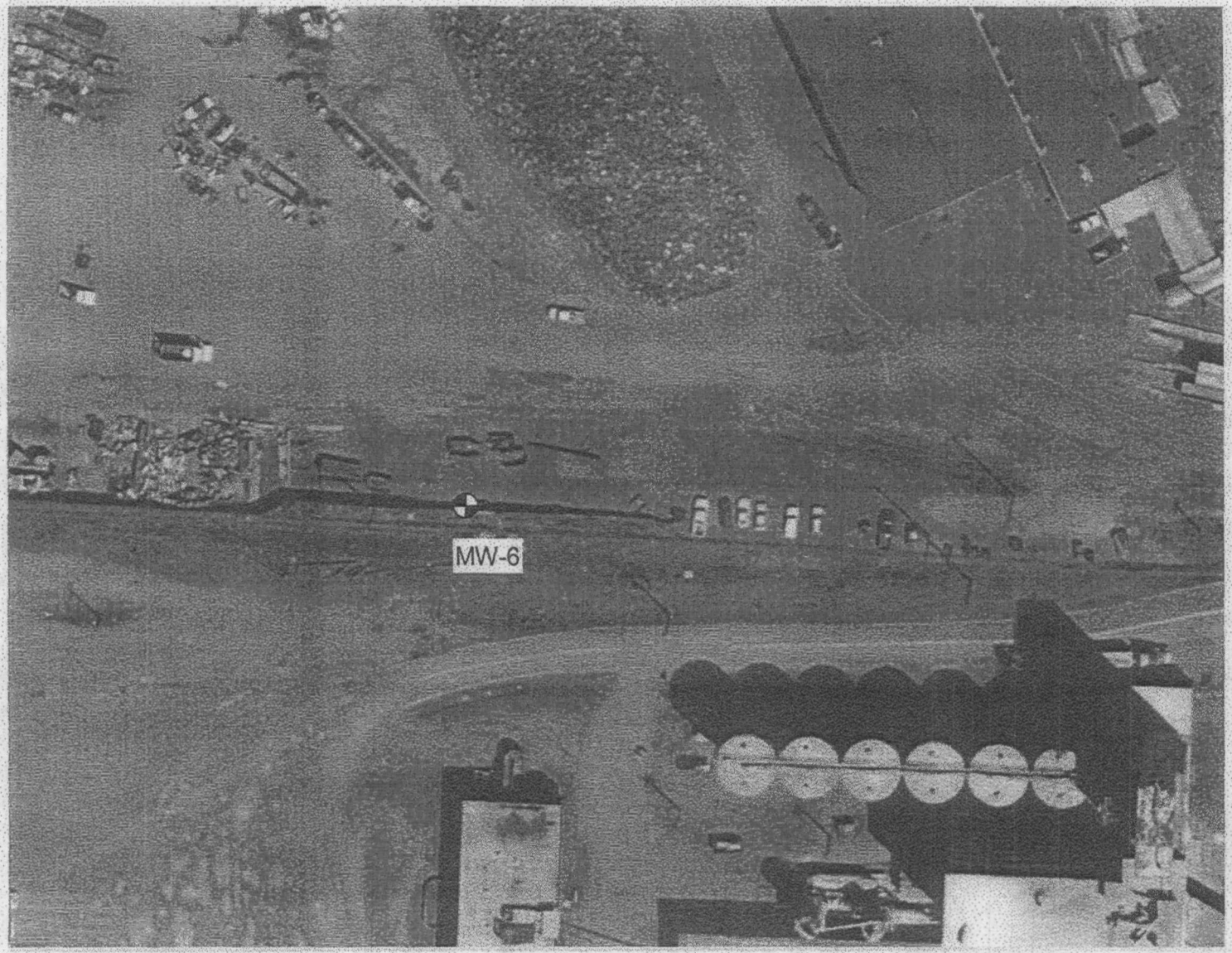
Phase I Push Probe

Phase II Push Probe

Figure 3
Western Area
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

SCHN00205216



Approximate Scale

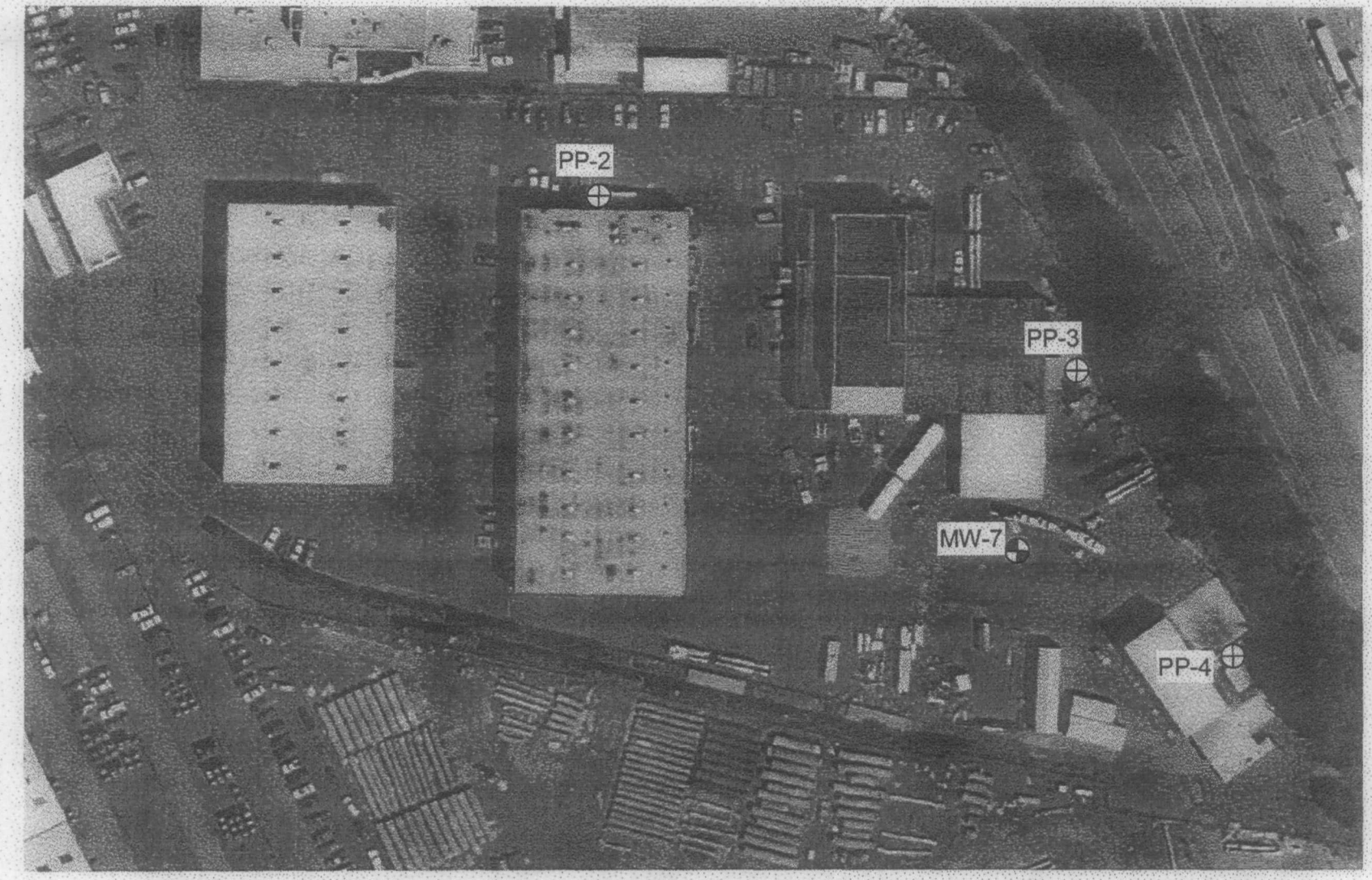
80 feet

Monitoring Well

Figure 4
South Area
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

SCHN00205217



N

Approximate Scale

100 feet

Monitoring Well

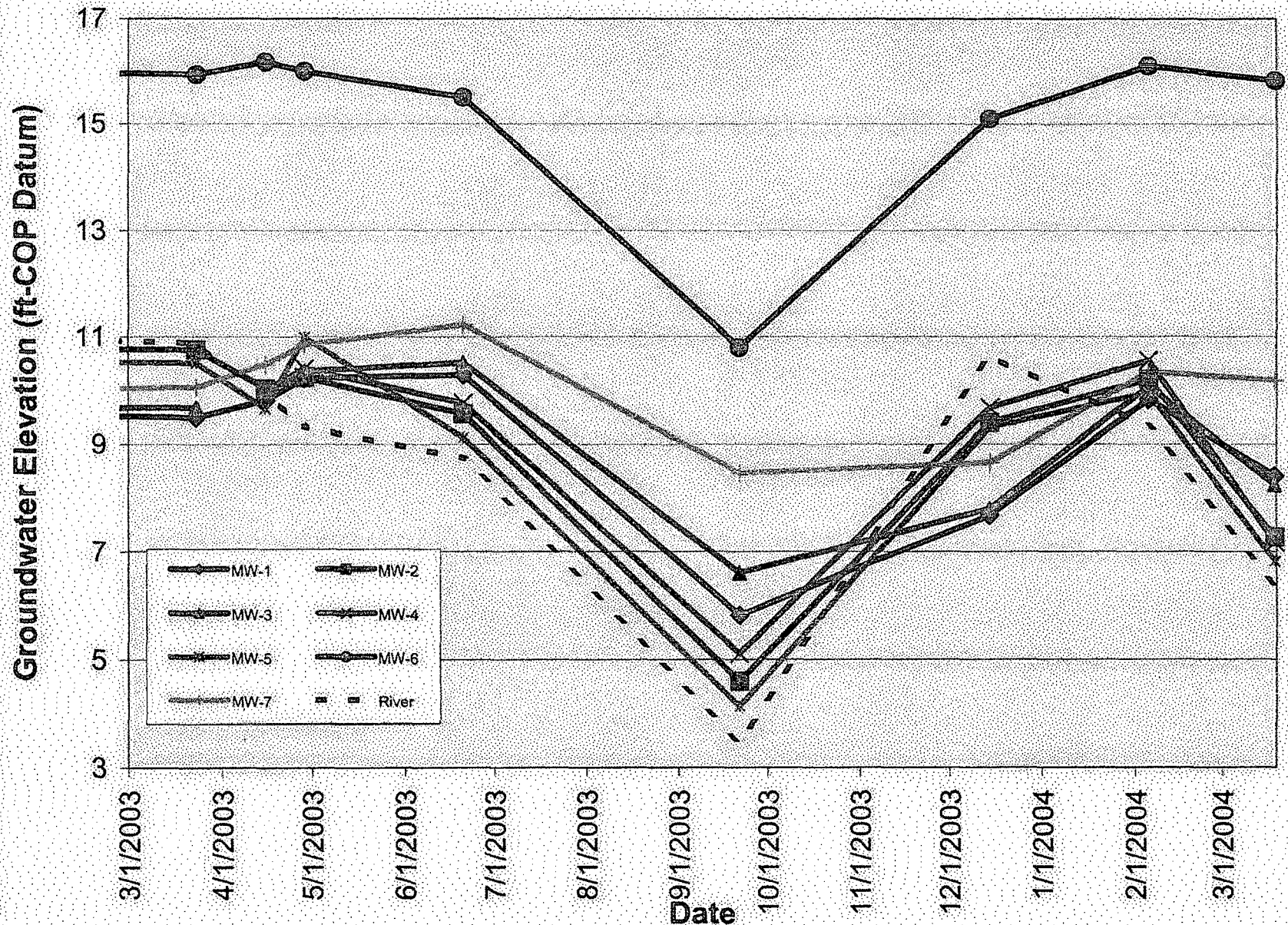
Push Probe

Figure 5
Southeast Area
Burgard Industrial Park

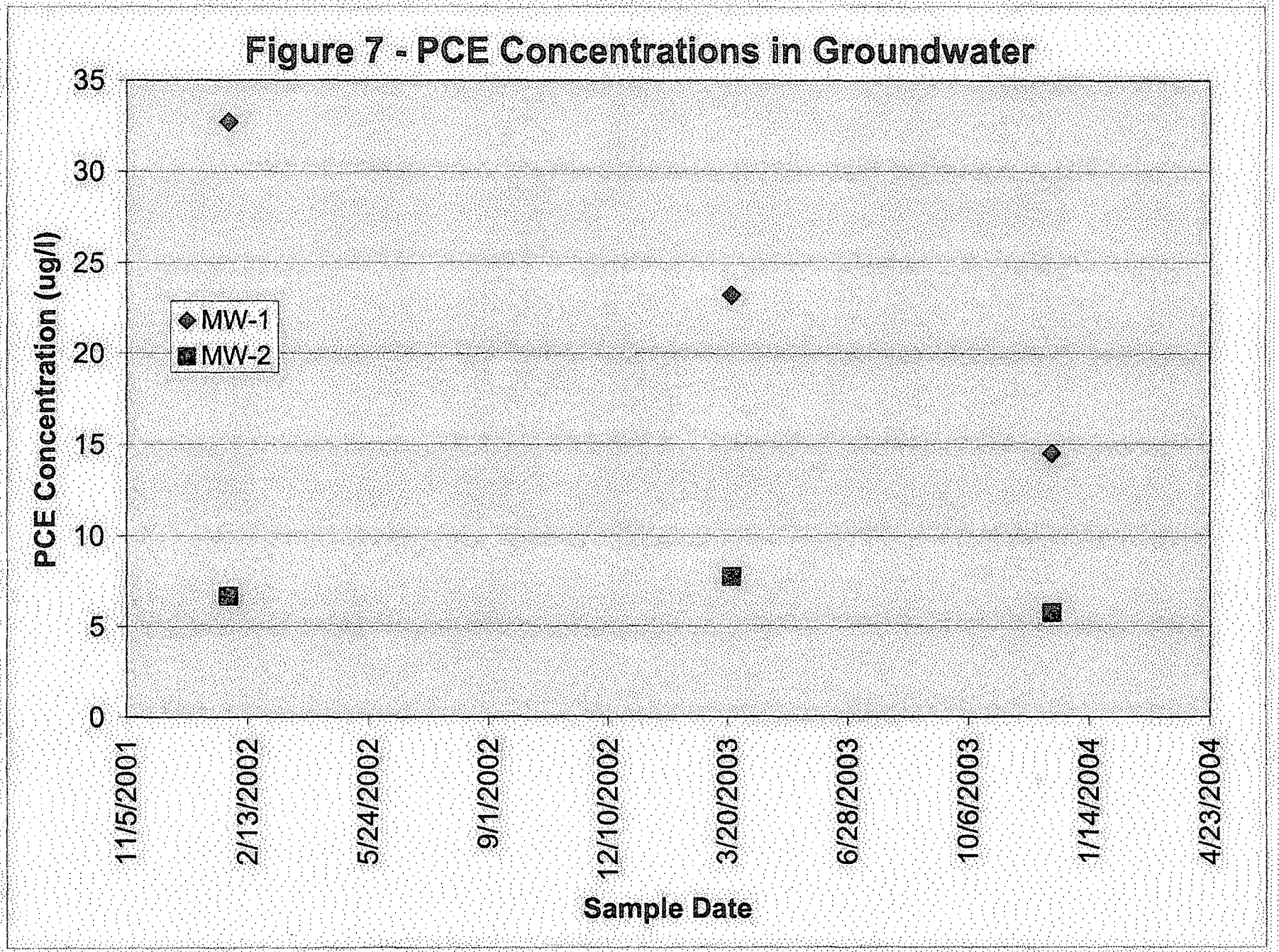
BRIDGEWATER GROUP, INC.

SCHN00205218

Figure 6 - Burgard Industrial Park Groundwater Elevations



SCHN00205219



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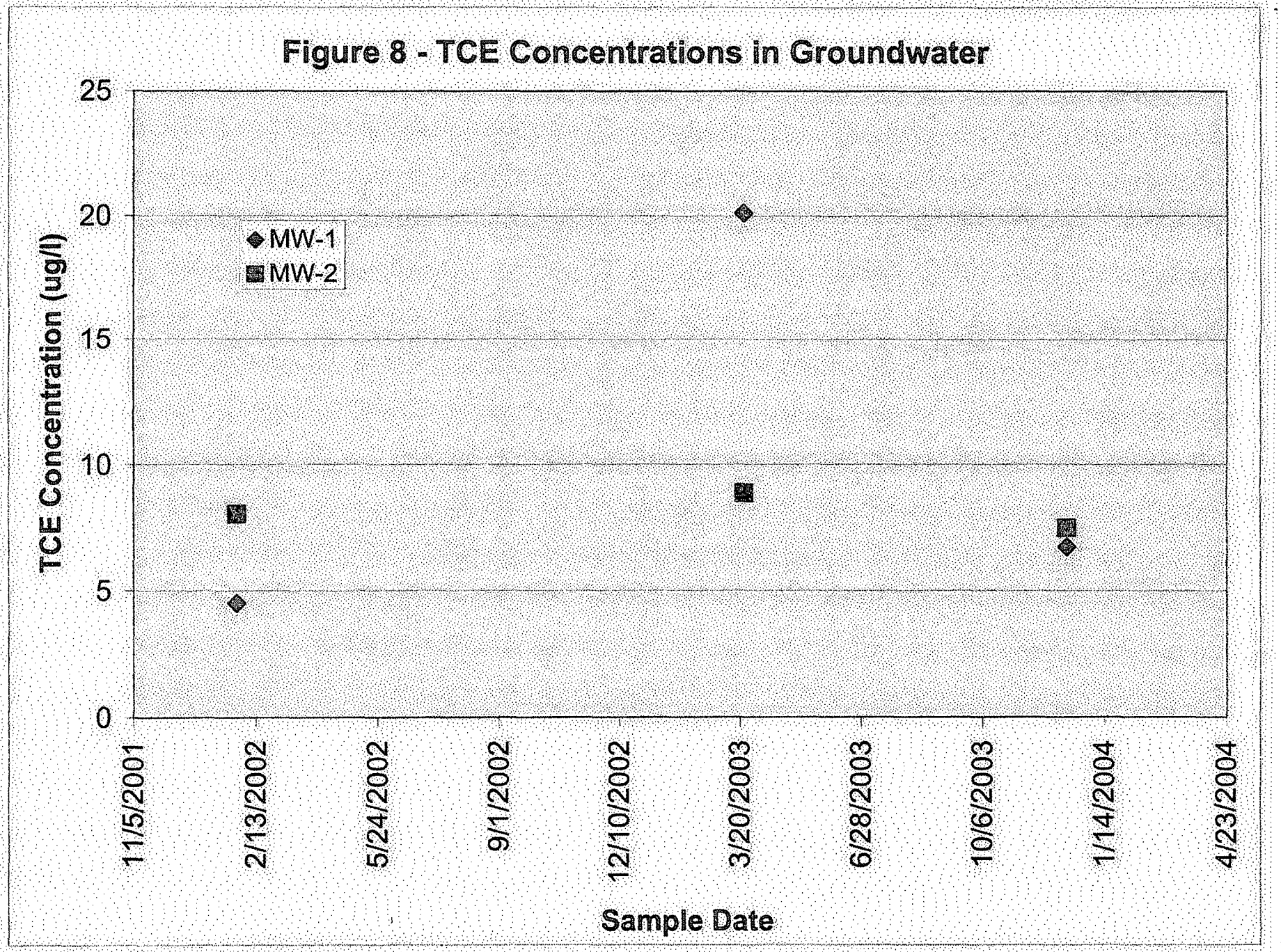
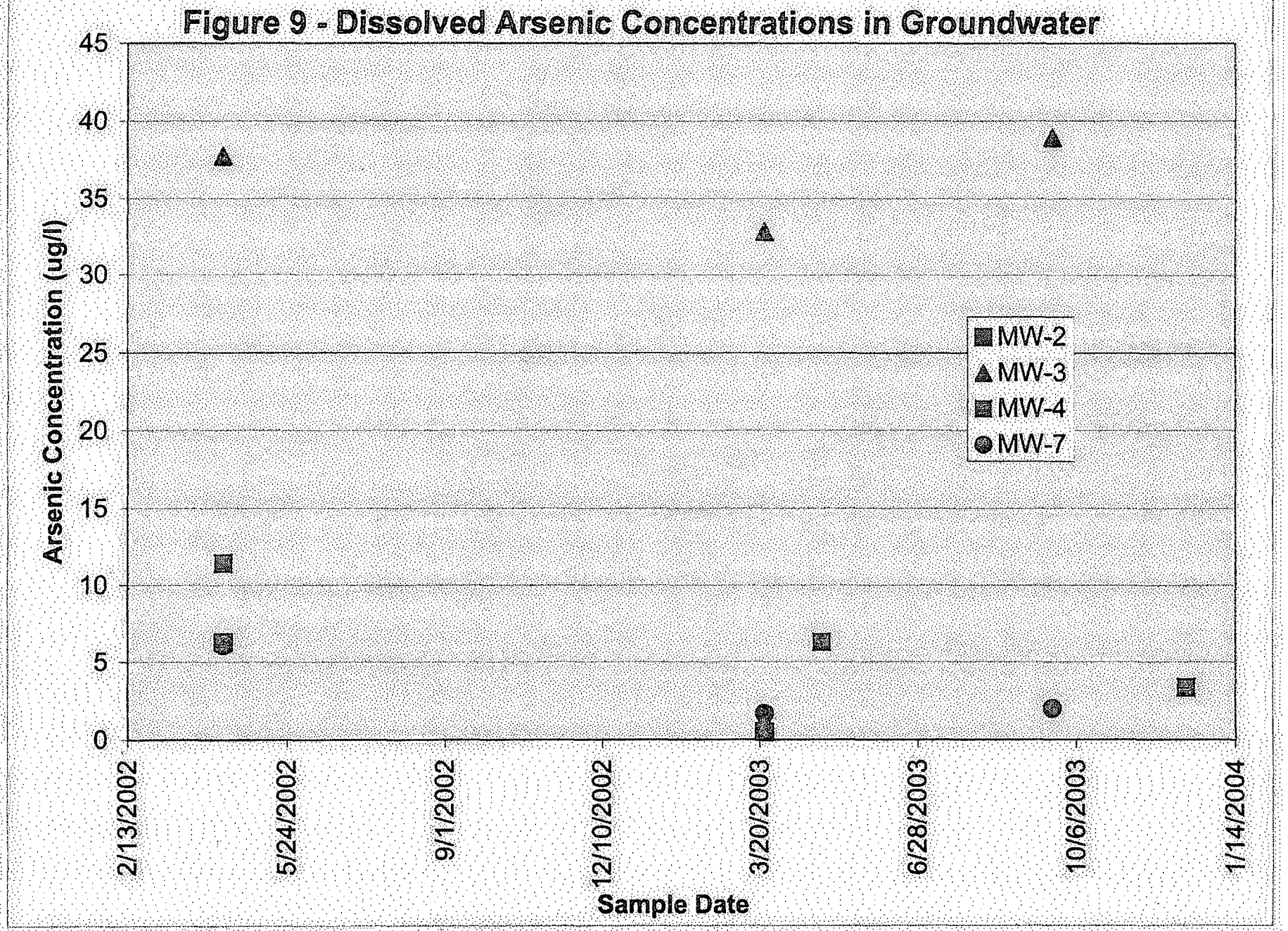


SCHN00205221



SCHN00205222

INTERNATIONAL TERMINALS SLIP (BERTHS 1, 2, AND 3) MAINTENANCE DREDGING BIOLOGICAL ASSESSMENT

Portland, Oregon

Prepared for
Parsons Brinckerhoff

July 8, 2003

MGS Environmental, Inc.
Environmental Logic

SCHN00205359

US Army Corps of Engineers
Portland District

JOINT PERMIT APPLICATION FORM

THIS APPLICATION WILL MEET THE REQUIREMENTS OF BOTH AGENCIES

AGENCIES WILL ASSIGN NUMBERS

Corps Action ID Number _____ Oregon Division of State Lands Number _____

SEND ONE SIGNED COPY OF YOUR APPLICATION TO EACH AGENCY

District Engineer	State of Oregon
ATTN: CENWP-OP-GP	Division of State Lands
P.O. Box 2946	775 Summer Street N.E.
Portland, OR 97208-2946	Salem, OR 97310
503-808-4373	503-378-3805

1. APPLICANT NAME: Schnitzer Steel Industries, Inc.
Address: PO Box 10047
Portland, OR 97296-0047
Attn: Jim Jakubiak

Business Phone #: (503) 224-9900
Home Phone #: N/A
FAX #: (503) 286-6948

[ ] Co-Applicant [x] Authorized Agent [ ] Contractor

Name: Jerald Ramsden
Address: Parsons Brinckerhoff Quade & Douglas, Inc.
400 SW 6th Ave., Suite 802
Portland, OR 97204

Business Phone #: (503) 274-8772
Home Phone #: N/A
FAX #: (503) 274-1412

Property Owner *(if different than applicant)*
Name: Schnitzer Investment Corporation
Address: P.O. Box 10047
Portland, OR 97296-0047

Business Phone #: (503) 224-9900
Home Phone #: N/A
FAX #: N/A

2. PROJECT LOCATION

Street, road or other descriptive location
International Terminals
12005 N. Burgard Rd.

Legal Description

Quarter	Section	Township	Range
SW	35	[2] North [ ] South	[ ] East [1] West

In or Near (City or Town) Portland County Multnomah Tax Map # 2N1W35 Tax Lot # 500
Waterway Willamette River River Mile 3.6 Latitude 45° 36' 41" N Longitude 122° 46' 42" W

Is consent to enter property granted to the Corps and the Division of State Lands? [x] Yes [ ] No

3. PROPOSED PROJECT INFORMATION

Activity Type: [ ] Fill [x] Excavation (removal) [ ] In-Water Structure [ ] Maintain/Repair an Existing Structure

Brief Description: Maintenance dredging to provide safe navigation access to and berthing within the International Terminals slip (Berths 1, 2 and 3)

Fill will involve N/A cubic yards annually and/or _____ cubic yards for the total project
_____ cubic yards in a wetland or below the ordinary high water or high tide line

Fill will be: [ ] Riprap [ ] Rock [ ] Gravel [ ] Sand [ ] Silt [ ] Clay [ ] Organics [ ] Other _____

Fill Impact Area is _____ Acres; _____ length; _____ width; _____ depth

Removal will involve 25,000 every other year on average cubic yards annually and/or 127,000 (i.e. 77,000 initially and 50,000 thereafter) cubic yards for the total project
127,000 cubic yards below the ordinary high water or high tide line

SCHN00205360

Removal will be: [ ] Riprap [ ] Rock [ ] Gravel [x] Sand [x] Silt [ ] Clay [ ] Organics [ ] Other _____

Removal Impact Area is 9.6 first year, 6.0 thereafter Acres; 2250 ft length; 120 ft typical (270 ft max.) width; Varies: max between -42 ft CRD and –24 ft CRD depth

Is the Disposal area: Upland? [x] Yes [ ] No Wetland/Waterway? [ ] Yes [x] No

	Yes	No
Are you aware of any Endangered Species on the project site?	x	
Are you aware of any Cultural Resources on the project site?		x
Is the project site near a Wild and Scenic River?		x

If Yes, please explain in the project description (on page 2, block 4).

4. PROPOSED PROJECT PURPOSE AND DESCRIPTION

Project Purpose and Need: Presented in attached supplemental sheets.

Project Description: Presented in attached supplemental sheets.

How many project drawing sheets are included with this application? 3

NOTE: A complete application must include drawings and a location map submitted on separate 8-1/2 x 11 sheets.

Will any material, construction debris, runoff, etc. enter a wetland or waterway? [ ] Yes [x] No

If yes, describe the type of discharge (above) and show the discharge location on the site plan.

Estimated Start Date August 15, 2003 Estimated Completion Date August 14, 2008

5. PROJECT IMPACTS AND ALTERNATIVES

Describe alternative sites and project designs that were considered to avoid impacts to the waterway or wetland.

Presented in attached supplemental sheets.

Describe what measures you will use (before and after construction) to minimize impacts to the waterway or wetland.

Presented in attached supplemental sheets.

NOTE: If necessary, use additional sheets.

6. ADDITIONAL INFORMATION

Adjoining Property Owners and Their Addresses and Phone Numbers.

Port of Portland
121 NW Everett
Portland, OR 97209
(503) 944-7000

Northwest Terminal Company
P.O. Box 99007
Seattle, WA 98199-0007

Has the proposed activity or any related activity received the attention of the Corps of Engineers or the State of Oregon in the past, e.g., wetland delineation, violation, permit, lease request, etc.? [x] Yes [ ] No

If yes, what identification number(s) were assigned by the respective agencies?

Corps # 199100099 State of Oregon# 1055

7. **CITY/COUNTY PLANNING DEPARTMENT AFFIDAVIT** (to be completed by local planning official)

☐ This project is not regulated by the local comprehensive plan and zoning ordinance.

☐ This project has been reviewed and is consistent with the local comprehensive plan and zoning ordinance.

☐ This project has been reviewed and is **not** consistent with the local comprehensive plan and zoning ordinance.

☐ Consistency of this project with the local planning ordinance cannot be determined until the following local approval(s) are obtained:

- ☐ Conditional Use Approval
- ☐ Development Permit
- ☐ Plan Amendment
- ☐ Zone Change
- ☐ Other _____

An application ☐ has ☐ has not been made for local approvals checked above.

Signature (of local planning official)	Title	City/County	Date

8. **COASTAL ZONE CERTIFICATION**

If the proposed activity described in your permit application is within the Oregon coastal zone, the following certification is required before your application can be processed. A public notice will be issued with the certification statement which will be forwarded to the Oregon Department of Land Conservation and Development (DLCD) for its concurrence or objection. For additional information on the Oregon Coastal Zone Management Program, contact the department at 1175 Court Street N.E., Salem, Oregon 97310 or call 503-373-0050.

Certification Statement

I certify that, to the best of my knowledge and belief, the proposed activity described in this application complies with the approved Oregon Coastal Zone Management Program and will be completed in a manner consistent with the program.

Print/Type Name	Title
Applicant Signature	Date

9. **SIGNATURE FOR JOINT APPLICATION (REQUIRED)**

Application is hereby made for the activities described herein. I certify that I am familiar with the information contained in the application, and, to the best of my knowledge and belief, this information is true, complete, and accurate. I further certify that I possess the authority including the necessary requisite property interests to undertake the proposed activities. I understand that the granting of other permits by local, county, state or federal agencies does not release me from the requirements of obtaining the permits requested before commencing the project. I understand that local permits may be required before the state removal-fill permit is issued. I understand that payment of the required state processing fee does not guarantee permit issuance.

Print/Type Name (coapplicant)	Title
Applicant Signature (coapplicant)	Date

I certify that I may act as the duly authorized agent of the applicant.

Print/Type Name	Title
Authorized Agent Signature)	Date

SUPPLEMENTAL WETLAND IMPACT INFORMATION*
(FOR WETLAND FILLS ONLY)

Site Conditions of impact area

Impact area is: [ ] Ocean [ ] Estuary [X] River [ ] Lake [ ] Stream [ ] Freshwater Wetland

Note: Estuarian Resource Replacement is required by state law for projects involving intertidal or tidal marsh alterations. A separate Wetlands Resource Compensation Plan may be appended to the application.

Has a wetland delineation been completed for this site? [ ] Yes [X] No

If yes, by whom:

Describe the existing physical and biological character of the wetland/waterway site by area and type of resource (use separate sheets and photos, if necessary).

Presented in the attached Biological Assessment

Resource Replacement Mitigation
Describe measures to be taken to replace unavoidably impacted wetland resources.

No wetland resources are affected by the proposed work. Therefore, no mitigation is proposed.

* Because this information is not necessary for a complete application, you may submit this sheet and other environmental information after submitting your application.

SUPPLEMENTAL DATA

Joint Application for Maintenance Dredging
International Terminals Slip (Berths 1, 2 and 3), Portland, Oregon

4. PROPOSED PROJECT PURPOSE AND DESCRIPTION

Project Purpose and Need

The project purpose is to maintain safe navigation access and berthing for the dock facilities at the International Terminals slip (as shown in Sketch 1 of 3, attached) by conducting periodic maintenance dredging as needed. The slip and associated berths are an existing facility and have been maintained under previous maintenance dredging permits (U.S. Army Corps of Engineers Section 10/404 Permit #199100099 and Oregon Division of State Lands Removal-Fill Permit No. 1055).

The docks and berths at the International Terminals slip currently support metal recycling operations as well as barge and ship dismantling operations. The facility is also used to import bulk cargo such as manganese, pig iron, steel coils and steel slabs. The slip contains three berths and 1,680 feet of docking facilities. The site was originally developed in the early 1940's for military ship construction. Over the past three decades, the site has been primarily used to support metal recycling and vessel dismantling operations.

Due to shoaling at the mouth of the slip and within the berths, there is a critical and urgent need to maintain these facilities. In the fall of 2002 an incoming ship was required to dock and offload several thousand tons of cargo prior to arrival at the International Terminals slip. Subsequent to that event, a meeting was held with the Columbia River Pilots (Pilots) to determine the minimum acceptable conditions needed for safe navigation access and berthing in the slip given the draft, length and width of vessels that will use this facility over the next five years. A letter summarizing the Pilots' suggestions from these meetings is attached to this application. The proposed dredge prism shown in the attached sketches was developed based on the suggestions from the Pilots in addition to other engineering considerations such as slope stability.

Project Description

The project involves dredging the area to a maximum depth of –42 ft Columbia River Datum (CRD), -38 ft CRD or –24 ft CRD depending on location within the slip as shown in Sketches 2 and 3 of 3, attached. The proposed dredge footprint covers an area of approximately 9.6 acres with a maximum length of 2250 ft and maximum width of 270 ft. The proposed dredge footprint lies entirely within the previously permitted dredge area shown in Sketch 2 of 3 by the dashed-dot line. The initial dredge volume associated with the proposed dredge prism is 77,000 cy. Authorization for an additional 50,000 cy is requested for the remainder of the permit duration (i.e. 25,000 cy every other year on average in years two through five, based on a five year permit). Dredging will be by clamshell bucket with transport to approved upland facilities and/or locations by barge, truck and/or rail.

SCHN00205365

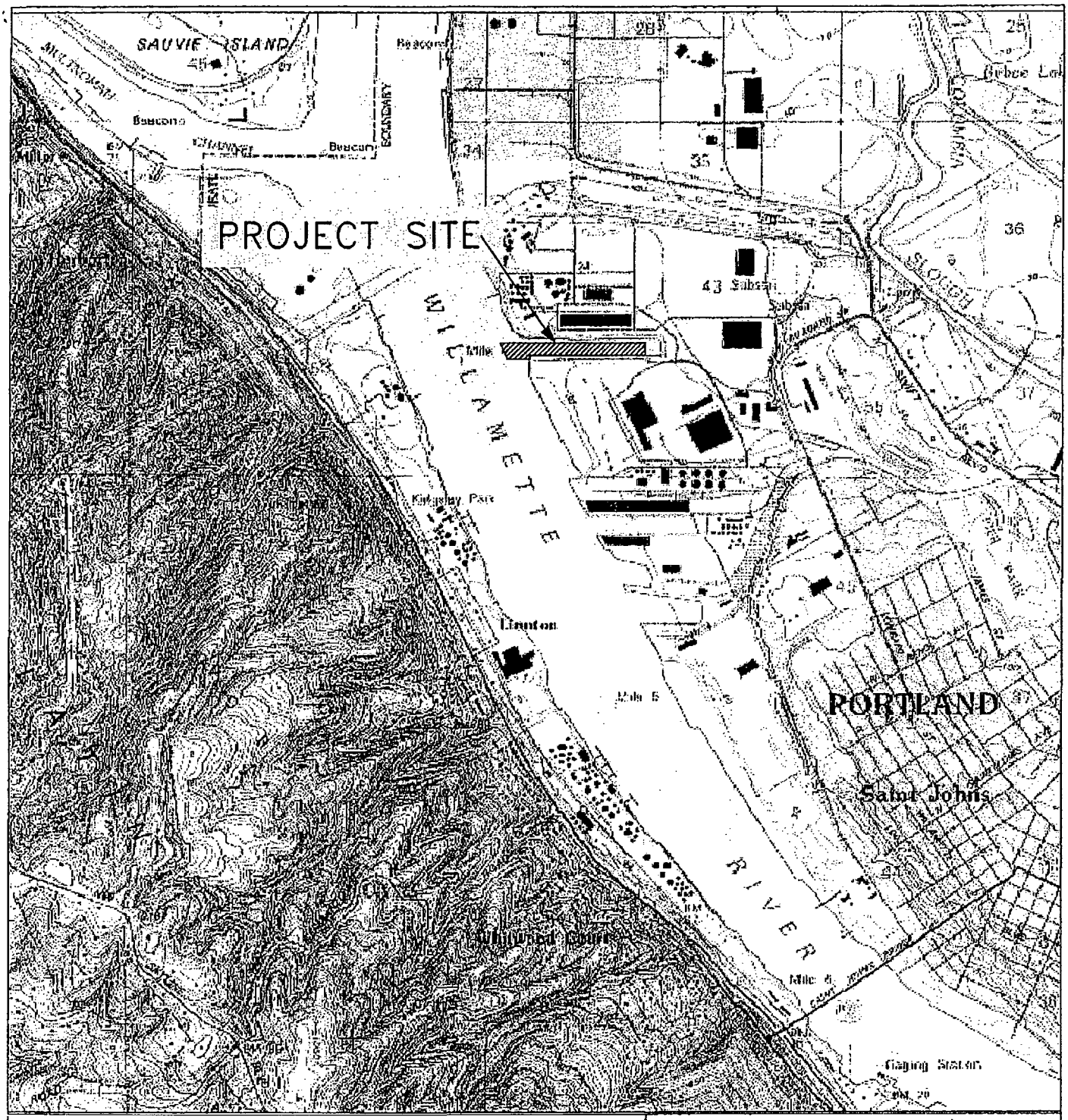
Recent sediment sampling results are attached to this application and have been utilized in development of the Biological Assessment.

5. PROJECT IMPACTS AND ALTERNATIVES

Describe alternative sites and project designs that were considered to avoid impacts to the waterway or wetland.
No alternatives were considered for maintenance dredging in the existing entrance channel and berths since this slip is an existing and previously permitted facility. As outlined in the attached letter from the Pilots, the proposed dredge prism is the minimum needed to provide safe navigation access and berthing. The proposed dredge prism covers less area than authorized in previous permits. The site is designated for marine industrial use by the Lower Willamette River Management Plan, which recognizes the important need to protect and fully utilize the limited areas of Portland Harbor so designated.

Describe what measures you will use (before and after construction) to minimize impacts to the waterway or wetland.
Construction will be conducted during an allowable fish-related inwater work period, although the emergency need and permitting time frame may require extension of the regularly scheduled Oct. 31 and/or Jan. 31 closure to allow completion of the project. Best management practices will be utilized during maintenance dredging as outlined in the Programmatic Biological Opinion (National Marine Fisheries Service dated June 14, 2002 that covers maintenance dredging of existing port terminals) and the Corps of Engineers Nationwide Permit (that includes maintenance dredging) to protect water quality and benthic resources. The proposed dredging will provide one foot of advanced maintenance (already accounted for in the maximum proposed dredge depths) to reduce to the extent practicable the frequency of maintenance dredging events.

SCHN00205366



NOTE 1. LOCATION MAP OBTAINED FROM US GEOLOGICAL SURVEY QUAD SHEET FOR LINNTON, OR

Scale In Feet
0 1000 2000

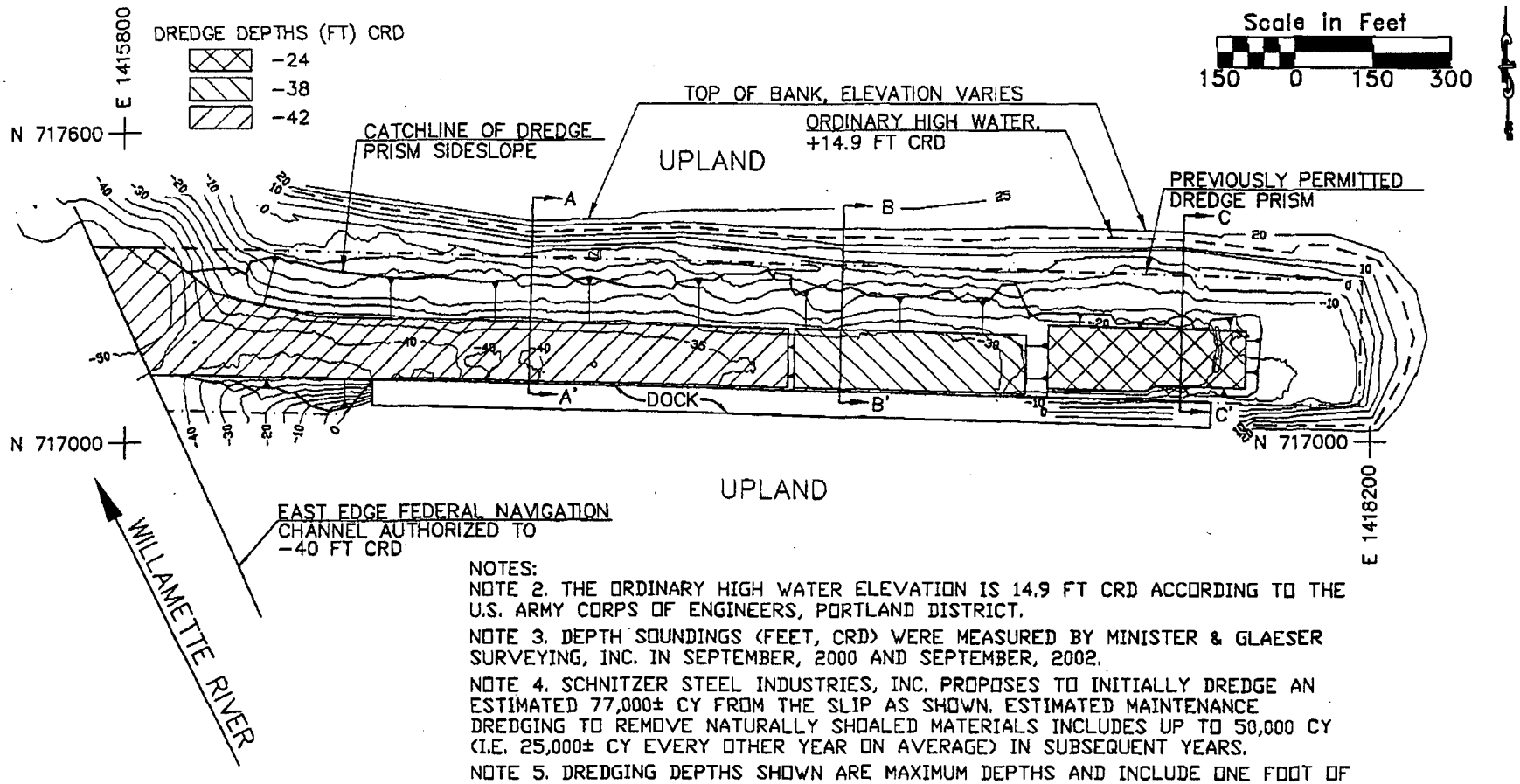
PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES
VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6
ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 41" N
LONGITUDE: 122° 46' 42" W

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 3.6
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
SHEET 1 OF 3 DATE: 5/29/03

SCHN00205367



NOTES:

NOTE 2. THE ORDINARY HIGH WATER ELEVATION IS 14.9 FT CRD ACCORDING TO THE U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT.

NOTE 3. DEPTH SOUNDINGS (FEET, CRD) WERE MEASURED BY MINISTER & GLAESER SURVEYING, INC. IN SEPTEMBER, 2000 AND SEPTEMBER, 2002.

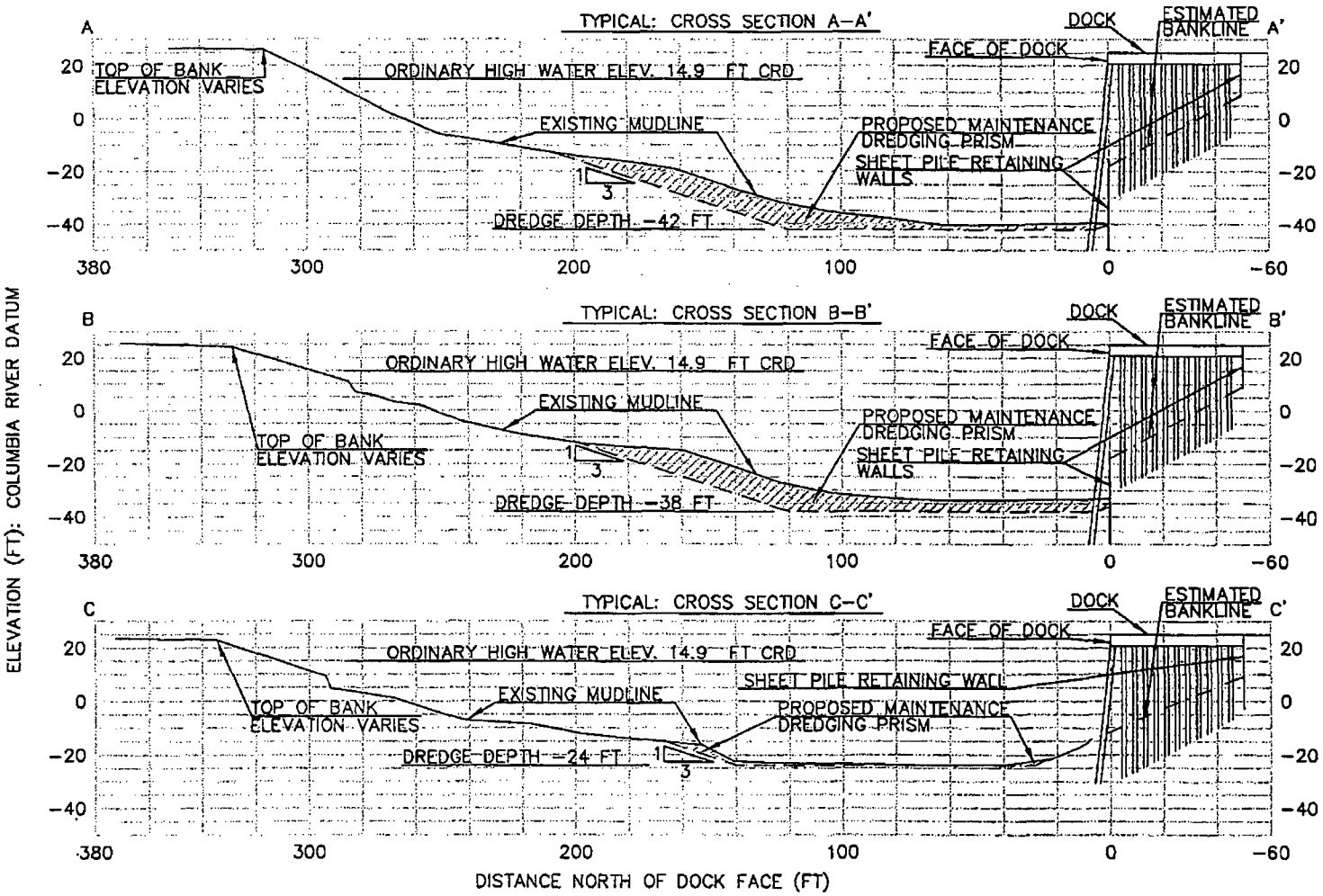
NOTE 4. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO INITIALLY DREDGE AN ESTIMATED 77,000± CY FROM THE SLIP AS SHOWN. ESTIMATED MAINTENANCE DREDGING TO REMOVE NATURALLY SHOALED MATERIALS INCLUDES UP TO 50,000 CY (I.E. 25,000± CY EVERY OTHER YEAR ON AVERAGE) IN SUBSEQUENT YEARS.

NOTE 5. DREDGING DEPTHS SHOWN ARE MAXIMUM DEPTHS AND INCLUDE ONE FOOT OF ADVANCED MAINTENANCE AND ONE FOOT OF ALLOWABLE OVERDEPTH DUE TO DREDGING INACCURACY.

NOTE 6. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO DREDGE THE MATERIAL USING A CLAMSHELL BUCKET OPERATED FROM A FLOATING CRANE. DREDGED MATERIAL WILL BE PLACED IN APPROVED UPLAND LOCATIONS.

	PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6 ADJACENT PROPERTY OWNERS: 1. NORTHWEST TERMINAL COMPANY 2. PORT OF PORTLAND	LATITUDE: 45° 36' 41" N LONGITUDE: 122° 46' 42" W HORIZONTAL DATUM: OREGON STATE PLANE COORDINATE SYSTEM, NORTH ZONE (NAD-27), U.S. SURVEY FEET	PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS IN: WILLAMETTE RIVER AT: RIVER MILE 3.6 COUNTY OF: MULTNOMAH APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC. SHEET 2 OF 3 DATE: 5/29/03

SCHN00205368



PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES

VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6

ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 41" N
LONGITUDE: 122° 46' 42" W

SCALE: AS SHOWN

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 3.6
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.

SHEET 3 OF 3 DATE: 5/29/03

SCHN00205369

COLUMBIA RIVER PILOTS
13225 N. LOMBARD
PORTLAND, OREGON 97203
503-289-9922
FAX 503-289-9955

PARSONS BRINCKERHOFF

MAR 06 2003

5582

January 8, 2003

Jerald D. Ramsden
PB Ports & Marine
400 SW 6th Ave., Suite 802
Portland OR 97204

Dear Jerry,

A few weeks ago we met to discuss navigation safety for vessel operations as it relates to maintenance dredging at the International Terminals slip. To recap our thoughts on the subject:

> The berth should be maintained to a minimum depth of forty (40) feet (at zero gauge) for a distance of eight hundred (800) feet long and one hundred twenty to one hundred forty (140) feet wide.
>
> There are some pilings in the Willamette River just off the upstream corner of the slip. We suggest the project owner consider removal of these piling which would make it possible for tugs to maneuver in this area when assisting a ship into or out of the berth.
>
> Ideally a ship entering the dock from downstream should be able to approach the dock from an oblique angle, cutting across the downstream entrance to the slip. The entrance to the berth (the area between the start of the berth and the Willamette River) should be dredged to allow this. A vessel attempting to enter the berth should not have to position itself perpendicular to the river and in a straight line with the berth in order to enter the berth.

If you have any questions do not hesitate to call me at 503-289-9924.

Very truly yours,

Lonny Rodgers

Capt. Lonny Rodgers
Treasurer

\\Server3\Manager\COLRIP\PILOTING\Tdock_1.doc

SCHN00205370

INTERNATIONAL TERMINALS (BERTHS 1, 2, AND 3)
MAINTENANCE DREDGING
BIOLOGICAL ASSESSMENT
Portland, Oregon

Prepared for

Parsons Brinckerhoff

400 SW Sixth Street, Suite 802
Portland, OR 97204

Prepared by

MCS Environmental, Inc.

6505 – 216th Street SW, Suite 100
Mountlake Terrace, WA 98043

July 8, 2003
34088-001

SCHN00205371

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SCHN00205374

International Terminals (Berths 1, 2, and 3) Maintenance Dredging

1.0 INTRODUCTION

Section 7 of the Endangered Species Act (ESA) requires that actions of federal agencies to ensure that any action carried out by the agency is "not likely to jeopardize the continued existence of any [listed] species or result in the destruction or adverse modification of habitat of such species...." Issuance of a federal permit is an agency action pursuant to Section 7. falls under this requirement.

Schnitzer Steel Industries, Inc. (SSI) is applying for a permit from the US Army Corps of Engineers (Corps) to conduct maintenance dredging of Berths 1, 2, and 3 of the International Terminals slip. This requires a Section 10/404 permit from the Corps, which qualifies as an action by a federal agency for purposes of and therefore must comply with Section 7 of the ESA. Pursuant to Section 7, the Corps is required to produce a biological evaluation (BE) of the potential effect of issuing the permit on listed species or their critical habitat. To help the Corps evaluate the potential effects of the proposed project on listed species, MCS Environmental, Inc. (MCS) has prepared this Biological Assessment (BA) on the behalf of SSI.

To determine if listed species or their critical habitat are in the vicinity of the proposed project, MCS consulted the National Marine Fisheries Service (NMFS), Northwest Region <http://www.nwr.noaa.gov/esalist.htm> and sent a written request to the US Fish and Wildlife Service (USFWS). Based on information from the NMFS Website and a response from USFWS (McMaster, K., USFWS, pers. com., June 12, 2003; Appendix A), the following listed species may occur in the project area and are therefore addressed in this BE:

- Lower Columbia River chinook salmon (*Oncorhynchus tshawytscha*), listed as threatened in 1999.
- Upper Willamette River chinook salmon (*O. tshawytscha*), listed as threatened in 1999.
- Columbia River run chum salmon (*O. keta*), listed as threatened in 1999.
- Lower Columbia River steelhead trout (*O. mykiss*), listed as threatened in 1998.
- Upper Willamette River steelhead trout (*O. mykiss*), listed as threatened in 1999.
- Bald eagle (*Haliaeetus leucocephalus*), listed as threatened in 1978.
- Water howellia (*Howellia aquatilis*), listed as threatened in 1994.

SCHN00205375

This BA also addresses southwestern Washington–Columbia River coastal cutthroat trout (*O. clarki clarki*), a species proposed for listing and Lower Columbia River–Southwest Washington coho salmon (*O. kisutch*), a candidate for listing. Should cutthroat trout or coho salmon become listed during the life of the proposed project, this BA could be used to aid the Corps during any subsequent Section 7 consultation with NMFS related to these species.

Golden paintbrush (*Castilleja levisecta*), Willamette daisy (*Erigeron decumbens* var. *decumbens*), Bradshaw's lomatium (*Lomatium bradshawii*), Kincaid's lupine (*Lupinus sulphureus* var. *kincaidii*), and Nelson's checker-mallow (*Sidalcea nelsoniana*) are species listed as threatened or endangered but are not addressed in this BA because the habitats required by these species are not within the action area (Federal Register Vol. 58, No. 28; Vol. 62, No. 112; and Vol. 65, No. 16).

2.0 PROJECT DESCRIPTION

2.1 PROJECT AND ACTION AREAS

The "project area" is defined as Berths 1, 2, and 3 of International Terminals slip on the Willamette River at Section 35, Township 2N, Range 1W (Figure 1). Photographs of the project area are in Appendix B.

The "action area" for fish resources is defined as the International Terminals slip, from the head of the slip to its mouth. The "action area" for avian species is defined as a one-mile radius around the project area.

2.2 PROPOSED ACTION DESCRIPTION

SSI proposes to conduct maintenance dredging of Berths 1, 2, and 3 at the International Terminals slip to maintain safe navigation access and berthing for the dock facilities by conducting periodic maintenance dredging as needed. The slip and associated berths have been maintained under previous maintenance dredging permits (US Army Corps of Engineers Section 10/404 Permit #199100099 and Oregon Division of State Lands Removal–Fill Permit No. 1055). The site is designated for marine industrial use by the Lower Willamette River Management Plan, which recognizes the need to protect and fully use the limited areas of Portland Harbor so designated. Over the past three decades, the site has been primarily used to support metal recycling and vessel dismantling operations.

Shoaling at the mouth of the slip and within the berths has created a critical and urgent need to maintain these facilities. In the fall of 2002 an incoming ship was required to dock and offload several thousand tons of cargo before docking at the International Terminals slip. Afterwards, a meeting was held with the Columbia River Pilots (Pilots) to determine the minimum acceptable

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conditions needed for safe navigation access and berthing in the slip, given the draft, length and width of vessels that will use this facility over the next five years. The proposed dredge prism is based on suggestions from the Pilots (Appendix C) and engineering considerations such as slope stability (Figures 2 and 3).

The project involves dredging the area to a maximum depth of –42 feet Columbia River Datum (CRD), -38 feet CRD, or –24 feet CRD depending on location within the slip (Figures 2 and 3). The proposed dredge footprint covers about 9.6 acres with a maximum length of 2,250 feet and maximum width of 270 feet. The proposed dredge footprint lies entirely within the previously permitted dredge area and covers less area than authorized in previous permits. The initial dredge volume associated with the proposed dredge prism is 77,000 cubic yards (cy). Over the remainder of the permit duration SSI proposes to dredge another 50,000 cy as needed for ongoing maintenance (e.g. 25,000 cy every other year on average in years two through five as shown in Table 1). Dredging will be by clamshell bucket, with transport to approved upland facilities or locations by barge, truck or rail. Factors such as bucket impact, penetration, withdrawal, and dewatering have been identified as contributing to the resuspension of sediment during clamshell dredge operation (e.g., Hayes et al. 1988). Most of the dewatering will occur as the clamshell excavates and transfers the individual load, which occurs with all dredging operations. The material will have high water content, and some release is expected. The rate at which suspended sediments settle back to the bottom is generally exponential with rapid declines within 200 to 400 feet (Collins 1995). Because of this rapid resettlement, it is anticipated that the area experiencing higher turbidity levels would be relatively small.

The proposed action (i.e. maintenance dredging of an existing facility using a clamshell bucket) and site conditions (see Section 3.0) are consistent with the conditions specified in the *Programmatic Biological Assessment for Categories of Activities Requiring Department of the Army Permits* (Corps 2000b) and NMFS biological opinion of the programmatic BA (NMFS 2002).

2.3 CONSERVATION MEASURES

Construction would occur during times when chinook and chum salmon and steelhead trout are least likely to be present in the action area. All in-water work is scheduled for the in-water work window for the Willamette River (from July 1 through October 1 and December 1 through January 31). However, the urgency of the initial dredge and the permitting time frame may require some work during the regularly scheduled closure to allow completion of the initial dredge. Some construction may occur during the bald-eagle wintering season (October 31 – February 31).

In addition to timing in-water work to avoid the juvenile migration period, SSI proposes to use best management practices during maintenance dredging as outlined in NMFS (2002) and the Corps Nationwide Permit for maintenance dredging to protect water quality and benthic resources. The

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proposed dredging will provide one foot of advanced maintenance (already accounted for in the maximum proposed dredge depths) to minimize maintenance dredging events.

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3.0 EXISTING ENVIRONMENTAL CONDITIONS AND EFFECTS OF THE ACTION

This section discusses existing environmental conditions and any temporary and permanent effects of project activities (Section 2.2), as well as the net effects of those activities (Table 2). It discusses only those environmental attributes and associated components of habitat quality that are important to the listed species addressed, and that are likely to be affected by the project in some way.

3.1 GENERAL

3.1.1 Existing Conditions

Approximately half of the Lower Willamette River flows through forested areas, one third through agricultural areas, and five percent through urban areas, such as Portland. The International Terminals slip is located at river mile (RM) 3.5 in Portland. Land use surrounding the site is primarily industrial, and riverbanks have been heavily modified with riprap or bulkheads. Berths 1 through 3 are located in the International Terminals slip adjacent to the Burgard Yard. The docks and berths at the slip currently support metal recycling and barge and ship dismantling. The site was originally developed in the early 1940's for military ship construction. These berths are also used to import bulk cargo such as manganese, pig iron, steel coils, and steel slabs. The slip contains three berths and 1,680 feet of docks.

3.1.2 Effects of the Action

The proposed project will not result in increased boat traffic or associated noise.

A clamshell dredge will be used for the proposed project. Increased noise from dredging may cause salmonids, other fish species, and bald eagles to avoid the area during construction. Clamshell buckets are not expected to entrain juvenile, sub–adult, or adult salmonids, but may entrain demersal fish and epibenthic invertebrates.

Results of studies on the effects of waterborne sound on fish behavior have been ambiguous and do not allow for prediction of responses (Popper and Carlson 1998). The level at which fish can detect sound depends upon the level of background noise. Sound must be at least 10 dB more intense than background noise to avoid being masked by ambient noise at the same or nearby frequencies (Tavolga 1971). Popper and Carlson (1998) note that the effects of noise depend greatly on the flow field in which the noise occurs. The level of ambient or background noise can drastically reduce a fish's ability to detect other sounds. Wind and precipitation at the surface, water turbulence, animal sounds, human activity and many other factors create significant levels of underwater noise (ICES 1994, Richardson et al. 1995, and H. Cleator, pers. com. as cited in Stewart 2001). Since most

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background noise is within the hearing range of fishes, the noise generated by background conditions and river flows adjacent to the project area will probably modify the reaction of fish to noise generated by the project

Above-water noise and movement of machinery at the site are much more likely to frighten away fish predators such as kingfishers, herons, grebes, and mergansers, than in–water noise is to frighten fish into areas where they might be more vulnerable to predators such as native char, cutthroat trout, and juvenile coho salmon.

The proposed maintenance dredging will allow present operations to continue, and noise generated will not differ much from existing operations at this site and many other sites along the Willamette River. Because the primary noise sources will be about 50 feet from shore, smaller juvenile salmonids moving along the shoreline would likely remain nearshore, rather than moving offshore toward the noise. Fish traveling downstream in the channel would avoid moving barges and tugs by moving away from the vessel path and diving deeper. Because of expected low densities of potential fish predators on juvenile salmonids in mid–channel, this short-term avoidance behavior is unlikely to result in increased predation losses.

3.2 WATER QUALITY AND STORMWATER

3.2.1 Existing Conditions

Urbanization has reduced water quality in the area via direct inputs of municipal and industrial discharges and indirect inputs from agricultural, silvicultural, urban, and industrial land. The Willamette River is currently on the 1998 Oregon Department of Environmental Quality (ODEQ) 303d list as impaired for temperature, bacteria, biological criteria, and toxics. However, ODEQ has been monitoring water quality in the Lower Willamette basin since 1986 with special intensive studies in the Tualatin and Lower Willamette subbasins in 1986-1990. These studies show that water quality in the Lower Willamette Basin has improved significantly (Cude 2003).

3.2.2 Effects of the Action

Because the proposed maintenance dredging will not increase impervious surfaces, stormwater runoff will not increase. The proposed maintenance dredging will not increase boat traffic, so the chance of water quality degradation from pollution from boats will not increase.

The proposed maintenance dredging will cause temporary and localized impacts on water quality in the vicinity of active dredging. Turbidity will increase slightly in a limited mixing zone downstream of active work areas. Elevated turbidity plumes that may occur in localized areas near active dredging should be dissipated relatively rapidly by tidal and river currents (e.g., FSI et al. 1999). In–

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water work will be conducted during periods when few if any juvenile anadromous fish will be present.

Juvenile salmon have been shown to avoid areas of high turbidities (e.g., Servizi 1988), although they may seek out areas of moderate turbidity (10 to 80 nephelometric turbidity units [NTU]), presumably as cover against predation (Cyrus and Blaber 1987a, 1987b). Feeding efficiency of juveniles is also impaired by turbidities over 70 NTU, well below sub-lethal stress levels (Bisson and Bilby 1982). Reduced preference by adult salmon homing to spawning areas has been demonstrated where turbidities exceed 30 NTU (20 mg/L suspended sediments). However, chinook salmon exposed to 650 mg/L of suspended volcanic ash were still able to find their natal water (Whitman et al. 1982). Based on these data, it is unlikely that the locally elevated turbidities generated by the proposed action would directly affect juvenile or adult salmonids that may be present.

Short-term effects from increased turbidity are expected during dredging, but these effects from sediment resuspension should be only temporary. Dredging is not expected to result in any long-term adverse changes in levels of chemical contamination, temperature, or dissolved oxygen. Therefore, the net effects of dredging will be to maintain water quality in the project area.

3.3 FLOW AND CURRENT PATTERNS

3.3.1 Existing Conditions

Flows in the Willamette River are controlled by 13 impoundments on several of its larger tributaries and by the Willamette Falls at RM 26.5. Below the falls, the Willamette River is tidally influenced by the Pacific Ocean a hundred miles to the west as well as flow conditions in the Columbia River (Corps 2000a). The width of the Willamette River at the project site is approximately 1,700 feet wide during typical river flows with maximum depths of approximately –50 feet CRD in the vicinity of the International Terminals slip.

3.3.2 Effects of the Action

The proposed maintenance dredging is not expected to alter flow or current patterns of the river since most of the dredging is located within the slip and proposed changes in the bathymetry near the slip mouth are minor in relation to the cross sectional area of the river at this location.

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3.4 SEDIMENTS, SUBSTRATE, AND BATHEMETRY

3.4.1 Existing Conditions

Currently the depth of the project area ranges from –10 to –40 feet CRD. Dredging will remove 77,000 cy of sediment in the first year of the permit, followed by an additional 25,000 cy every other year on average during the remainder of the permit duration. The sediments exposed by dredging are expected to be similar to surficial sediments present throughout the project area.

MCS collected five sediment cores in the slip during March 2003 and Floyd Snider McCarthy, Inc. evaluated them using the analyte list suggested in the Dredged Material Evaluation Framework (DMEF) (Corps 1998). Data were compared to the DMEF values, probable effects concentration (PEC) values for freshwater sediment quality developed by MacDonald et al. (2000) and Ingersoll et al. (2000), and Portland Harbor Area-Wide Sediment baseline values (ODEQ 1999).

Only one surface sample exceeded DMEF screening levels. Samples considered representative of the post-dredge surface contained few detectable chemical constuents. When detectable concentrations of chemicals occurred, they were substantially less than screening levels. No samples exceed the PEC values, and all exceedances are within the Portland Harbor Area-Wide Sediment baseline values (FSMI 2003).

3.4.2 Effects of the Action

Maintenance dredging in the project area should maintain sediment quality. Dredging will not affect sedimentation sources or rates. Because most of the sediments in the slip do not contain contaminants above DMEF screening levels, as shown by the recent sampling, resuspension of sediments is not expected to release contaminants into the water column.

Shallow water habitat (< 20 feet in water depth) provides food resources and migration routes for juvenile salmonids (Simenstad et al. 1999). Salmonid habitat may suffer a minor net decline in function due to the deepening. The proposed dredging will create steeper slopes along the edge of the dredge area and deepen the dredge area. However, 79% percent of the initial dredge prism lies below an existing mudline elevation of –20 feet CRD. In subsequent years of the permit it is expected that almost all the dredging will occur below existing mudline elevations of –20 feet CRD. Other than approximately 2.0 acres of dredging area in the first year of the permit all the remainder of the proposed dredging is expected to be at depths below –20 feet CRD (i.e. the lower limit of shallow water habitat). The contribution of epibenthic prey to salmonids from the area to be dredged should be limited by the depths within the proposed dredge prism. The adjacent Willamette River channel and associated shallow-water areas are much larger than the area being dredged, so no adverse impact is anticipated on salmonids foraging on benthic invertebrates in the spring following

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dredging. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period. Because of the limited area of dredging in depths preferred by foraging salmonids and the rapid recolonization of benthic and epibenthic biota, the proposed dredging is not expected to have any short- or long-term direct effects on the juvenile salmonid foraging habitat.

No known spawning habitat exists within the action area, therefore any potential temporary suspension of sediments is not expected to embed spawning gravels.

3.5 SHORELINE CONDITIONS

3.5.1 Existing Conditions

Historically the Willamette Falls was an impassible fish barrier to many salmonids until fish ladders were constructed in the early 1900s. The International Terminals slip does not hinder fish access in the Willamette River. Few refuge areas, such as off-channel areas, backwater areas, or sloughs, remain in the Willamette River. The International Terminals slip functions somewhat like a slough and could provide refuge for salmonids during periods of high flow in the river, although no studies have documented this.

Riparian vegetation has been greatly altered in the Lower Willamette River Basin. Little to no riparian vegetation exists in the action area along the eastern shore of the Willamette River or in the International Terminals slip. However, riparian vegetation covers a large area along the western shore of the Willamette across from the slip at Forest Park. Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), Oregon white ash (*Franxinus latifolia*), red alder (*Alnus rubra*), and willow (*Salix* spp.) are typical trees species along the Willamette River. Typical shrub species include Himalayan blackberry (*Rubus discolor*) and Scotch broom (*Cytisus scoparius*).

3.5.2 Effects of the Action

Temporary increases in noise or turbidity from dredging activities may prevent access and refuge for salmonids and other species in the immediate vicinity of the work areas (see Sections 3.1 and 3.2).

The proposed dredging in the first year will occur below –5 feet CRD and therefore will not affect the shoreline or riparian habitat.

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3.6 ACCESS AND REFUGIA

3.6.1 Existing Conditions

The International Terminals slip could provide refuge for salmonids during periods of high flow.

3.6.2 Effects of the Action

Temporary increases in noise or turbidity from dredging may prevent access and refuge for salmonids and other species in the immediate vicinity of the work areas during the period of dredging activity (see Sections 3.1 and 3.2).

3.7 BIOTA CONDITIONS

3.7.1 Existing Conditions

Benthic and epibenthic organisms in the Lower Willamette River basin include oligochaetes, mysid shrimp, amphipods, chironomid larvae, crayfish, and mollusks (Sanborn 1973 and FES 1995). Fish species include salmonids, largescale sucker (*Catostomus macrocheilus*), northern pikeminnow (*Ptychocheilus oregonesis*), perch (*Cymatogaster aggregate*), peamouth (*Mylocheilus caurinus*), sculpin (Cottidae), bluegill (*Lepomis macrochirus*), threespine stickleback (*Gasterosteus aculeatus*), and sturgeon (*Acipenser* spp.) (FES 1999).

3.7.2 Effects of the Action

Dredging will eliminate nonmobile benthos over approximately 9.6 acres of the bottom in the project area, temporarily reducing abundance and diversity. The newly exposed bottom should be quickly recolonized by infauna and epifauna (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995; Wilson and Romberg 1995). Diversity and health of the benthic assemblage recolonizing the dredged area should recover quickly and be similar to those of the subtidal benthic community now present. Areas adjacent to the project site will provide local larval sources for recolonization. Because of the prolonged period of planktonic larval development (several days to weeks) for most benthic species, currents will likely carry most larvae into the project area from plankton spawning outside of it.

By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period. The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated

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shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates.

Repeated disturbance from current use of the action area reduces ecological diversity. Proposed dredging will not increase this disturbance and therefore is not expected to have short-term direct effects on ecological diversity in the project area.

Avian species that now use the action area or that fly over it during dredging may modify their use of the area, moving away from construction activity.

Proposed dredging will not have short-term direct effects on aquatic vegetation within the project area because there are no known macroalgae beds there.

Proposed dredging will not have short-term direct effects on the pelagic prey in the project area because it will not degrade water quality enough to affect pelagic assemblages.

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4.0 EVALUATION OF EFFECTS ON LISTED SPECIES

This section discusses life histories of listed species and the use of the action area. It evaluates temporary and permanent, direct and indirect effects on listed species from project activities (Section 2.2) and includes the effects determination. Detailed life histories are discussed in Corps 2000b. This section discusses only attributes of listed species that are likely to be affected by the project in some way.

An analysis of effects on Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery and Conservation Act is described in Appendix D.

4.1 LOWER COLUMBIA AND UPPER WILLAMETTE CHINOOK

4.1.1 Life History and Critical Habitat

Chinook salmon prefer to spawn and rear in the mainstem of rivers and larger streams. Although water temperatures determine the incubation period, fry typically hatch in about eight weeks. After emergence, juvenile chinook salmon migrate to saltwater during their first year (Corps 2000b).

Critical habitat is currently being reconsidered for Lower Columbia and Upper Willamette chinook. On April 30, 2002, the US District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical-habitat designation for these and 17 other evolutionary significant units (ESUs) (NMFS 2000). Critical habitat consists of the water, substrate, and adjacent riparian zone of accessible estuarine and riverine reaches.

4.1.2 Use of the Action Area

Most chinook in the project area are likely to be migrating juveniles and adults. Juvenile chinook feed on benthic and epibenthic organisms in shallow nearshore areas. Adult chinook typically feed on other fish such as whitefish, sculpin and other trout. Therefore, adult chinook in the action area would likely be feeding on fish in the deeper water of the action area rather than the benthic and epibenthic organisms that are primary prey for juveniles.

4.1.3 Effects of the Action

No direct mortality of chinook is expected from any aspect of project construction, which will occur when few, if any, juvenile salmonids are present. Adult and juvenile chinook can avoid any proposed project conditions that would result in direct impacts (e.g. entrainment in the bucket) on them. Dredging will likely increase turbidity in the immediate vicinity. This impact will be only

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temporary and the suspended sediment will dissipate quickly. Dredging will temporarily eliminate benthic organisms, an important food source for juvenile chinook. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995; Wilson and Romberg 1995). The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates. Seventy nine percent of the area to be dredged in the first year of the permit is below -20 feet CRD, deeper than migrating juveniles prefer (Simenstad et al. 1999). In subsequent years of the permit all maintenance dredging is anticipated to be below -20 feet CRD.

4.1.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project may affect, but is not likely to adversely affect chinook.

4.2 COLUMBIA RIVER CHUM SALMON

4.2.1 Life History and Critical Habitat

Chum salmon prefer to spawn at the head of the tidewater. Although the incubation period is determined by water temperatures, fry hatch in two weeks to four months. After emerging from the gravel, fry migrate immediately to marine waters, limiting their freshwater life history to a few days. Rearing and development to adulthood occur in the marine environment (Corps 2000b).

Critical habitat is currently under development for Columbia River chum following the NMFS consent decree withdrawing critical habitat designation for this and 18 other ESUs (NMFS 2000).

4.2.2 Use of the Action Area

Like chinook salmon, the majority of chum that occur within the project area are likely to be migrating juveniles and adults. Therefore, chum in the action area may be feeding on epibenthic organisms in the action areas as well as on organisms in water deeper than the action area.

4.2.3 Effects of the Action

The effects of the proposed action on chum would be similar to those described for chinook. However, unlike juvenile chinook, juvenile chum may not feed while migrating to saltwater.

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Therefore, the impacts on epibenthic prey from construction may affect chum even less than the other listed salmonids.

4.2.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project may affect, but is not likely to adversely affect chum salmon.

4.3 LOWER COLUMBIA RIVER AND UPPER WILLAMETTE STEELHEAD TROUT

4.3.1 Life History and Critical Habitat

Steelhead trout spawn in tributaries of small and large rivers in late winter through spring. Juveniles migrate to the ocean after rearing in large rivers for one to four years. Steelhead spend one to three years in the ocean before returning to their natal streams to spawn. Unlike most anadromous salmonids, steelhead trout may return to their natal streams several times to spawn before they die (Corps 2000b).

Critical habitat has not been designated for coastal cutthroat steelhead trout (NMFS 2000).

4.3.2 Use of the Action Area

Juveniles, sub–adult, or adult steelhead trout may occur within the project area. Adult and sub-adult steelhead trout are typically piscivores, feeding on other fish such as whitefish, sculpin and other trout. Therefore, the adult and sub–adult steelhead trout in the action area would likely be feeding in the deeper water of the action area on fish rather than the insects that are primary prey for juveniles.

4.3.3 Effects of the Action

No direct mortality of steelhead trout is expected from any aspect of project construction, which will occur when few, if any, juvenile salmonids are present. Adult and juvenile steelhead trout can avoid any proposed project conditions that would result in direct impacts (e.g. entrainment in the bucket) on them. Dredging will likely increase turbidity temporarily in the immediate vicinity. Suspended sediment will dissipate quickly.

Dredging will eliminate benthic organisms, an important food source for juvenile steelhead trout. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995;

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Wilson and Romberg 1995). The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates. Seventy nine percent of the area to be dredged is below -20 feet CRD, deeper than foraging juveniles prefer (Simenstad et al 1999). In subsequent years of the permit all maintenance dredging is anticipated to be below –20 feet CRD.

4.3.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project may affect, but is not likely to adversely affect steelhead trout.

4.4 BALD EAGLE

4.4.1 Life History and Critical Habitat

In Oregon, bald eagle breeding territories are mainly located in coniferous, uneven-aged stands with old-growth components. A variety of habitat characteristics influence territory size and configuration, including availability and location of perch trees for foraging, quality of foraging habitat, and distance of nests from waters supporting adequate food supplies. Bald eagles typically build nests in old-growth trees, which are generally used in successive years. Courtship and nest-building begin in January and February. Egg laying begins in March or early April, and eaglets hatch in mid-April or early May. They fledge in mid-July and often remain in the vicinity of the nest for another month (Rodrick and Milner 1991; Corps 2000b).

Eagles often depend on dead or weakened prey, and their diet may vary locally and seasonally. During the breeding season they eat anadromous and warmwater fishes, small mammals, carrion, small waterfowl, and seabirds. Various carrion, including spawned-out salmon, are important food sources during fall and winter (Rodrick and Milner 1991).

Critical habitat has not been designated for bald eagles.

4.4.2 Use of the Action Area

A species list obtained from the USFWS indicates that bald eagles may occur in the vicinity of the proposed project. No bald eagle nests are located in the action area. The closest nests are more than three 3 miles north and northwest of it (Dorsey, G., pers. comm., June 5, 2003).

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The availability of suitable nest trees is often a limiting factor in the establishment of eagle territories (Carroll and Pentec 1992). Although there are no large trees in the action area for the bald eagles to roost or nest in, bald eagles occasionally fly over the area and may rest or perch on nearby pilings or cottonwood trees.

4.4.3 Effects of the Action

Construction could occur during the nesting season. However, since it would be more than 3 miles from the closest bald eagle nests, construction would not directly disrupt eagle nesting and rearing of young. No communal night roosts or perch trees are near the site, so wintering bald eagles would not be affected by construction that may occur during the wintering season. Foraging bald eagles may be displaced by the noise of heavy equipment, but the availability of prey would not be significantly disrupted by the proposed maintenance work. Given the surrounding urbanization and industrialization, eagles using the area are likely accustomed to high levels of human activity in the action area.

4.4.4 Effect Determination

Dredging will not affect nesting or wintering habitat or behaviors, and only minor disruptions to foraging may occur, so the proposed project may affect, but is not likely to adversely affect the bald eagle.

4.5 WATER HOWELLIA

4.5.1 Life History and Critical Habitat

Water howellia has historically occurred over a large area of the Pacific Northwest. Water howellia occurs in vernal ponds and shallow water edges of larger ponds, oxboughs, sloughs, or other slow-moving water bodies with fine sediment.

Critical habitat has not been designated for water howellia (Corps 2000b).

4.5.2 Use of the Action Area

There are no records of water howellia occurring in the action area and there is no habitat capable of supporting it there. Shallow–water areas in the action area are covered with riprap and do not contain the fine sediment preferred by water howellia. Additionally, boat traffic is likely to create sufficient wave action in the area to prevent establishment of water howellia, even if suitable substrate existed between riprap boulders.

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4.5.3 Effects of the Action

Because water howellia is not known to exist in the action area and the action area does not contain habitat suitable for water howellia, dredging activities will not affect water howellia.

4.5.4 Effect Determination

Dredging activities will not affect potential water howellia habitat, as dredging will occur in water deeper than water howellia can tolerate. In addition, there is no suitable water howellia habitat in the action area. Thus the proposed project will have no effect on water howellia

4.6 COASTAL CUTTHROAT TROUT

4.6.1 Life History and Critical Habitat

Coastal cutthroat trout spawn in small tributaries of small and large rivers in late winter through spring. Juveniles migrate downstream between March and June and may make several freshwater migrations before migrating to the ocean. Most coastal cutthroat trout are 2 to 3 years old before migrating to the ocean. Coastal cutthroat trout spend less than one year in the ocean before migrating back to their natal streams to spawn. Unlike most anadromous salmonids, coastal cutthroat trout do not die after spawning (Corps 2000b).

Critical habitat has not been designated for coastal cutthroat trout (NMFS 2000).

4.6.2 Use of the Action Area

Most coastal cutthroat trout in the project area are likely to be adults and sub–adults from nearby basins. Adult and sub–adult coastal cutthroat trout typically feed on other fish such as whitefish, sculpin, and other trout. Therefore, the adult and sub–adult coastal cutthroat trout in the action area would likely be feeding in the deeper water of the action area on fish rather than the organisms that serve as primary prey for juveniles.

4.6.3 Effects of the Action

No direct effect on coastal cutthroat trout is expected to result from any aspect of project construction, which will occur when few, if any, juvenile salmonids are present. Adult salmonids can avoid any conditions that would result in direct impacts (e.g. entrainment in the bucket) on them. Dredging will likely increase turbidity temporarily in the immediate vicinity. Suspended sediment will dissipate quickly.

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Dredging will eliminate benthic organisms, an important food source for juvenile coastal cutthroat trout. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995; Wilson and Romberg 1995). The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates. Additionally, seventy nine percent of the area to be dredged is below -20 feet CRD, which is deeper than foraging juveniles prefer (Simenstad et al. 1999). In subsequent years of the permit all maintenance dredging is anticipated to be below -20 feet CRD.

4.6.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project will not jeopardize coastal cutthroat trout. Should coastal cutthroat trout become listed the proposed project may affect, but is not likely to adversely affect, cutthroat trout or their habitat.

4.7 LOWER COLUMBIA RIVER COHO SALMON

4.7.1 Life History and Critical Habitat

Coho spawn in small tributaries of small or large rivers in late winter through spring. Juveniles migrate downstream between April and August. Juvenile coho may spend anywhere from a few weeks to two years in freshwater before migrating to the ocean. Coho spend one to two years in the ocean before migrating back to their natal streams to spawn (Corps 2000b).

Critical habitat has not been designated for Lower Columbia River coho salmon.

4.7.2 Use of the Action Area

Most coho in the project area are likely to be adults and sub–adults from nearby basins. Adult and sub–adult coho typically feed on other fish such as whitefish, sculpin, and other trout. By the time adult coho reach the Willamette River, they probably are not feeding. Sub–adult coho in the action area would likely be feeding in the deeper water of the action area on fish rather than the benthic and epibenthic organisms that serve as primary prey for juveniles.

SCHN00205392

4.7.3 Effects of the Action

The effects of the proposed action on coho would be similar to those described for chinook. Impacts on epibenthic prey from construction could have less impact on coho than other salmonid species because coho found in the action area are likely to be less dependant on epibenthic prey than chinook.

4.7.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project will not jeopardize coho salmon. If coho are listed, the proposed project may affect, but is not likely to adversely affect, coho salmon or their habitat.

SCHN00205393

5.0 INTERRELATED, INTERDEPENDENT, AND CUMULATIVE EFFECTS

Cumulative effects are those effects of future state or private activities, not involving activities of other federal agencies that are reasonably certain to occur within the area of the federal action subject to consultation (50 CFR 402.02 Definitions). Future federal actions unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA. Interdependent effects are defined as actions with no independent utility apart from the proposed action. Interrelated effects include those that are part of a larger action and depend on the larger action for justification.

No interdependent or cumulative effects are known to occur that may adversely affect a listed, proposed, or candidate species within the action area. An interrelated action of the proposed action may be the occasional disturbance of the substrate from prop wash of tugs as they bring in barges or during the hauling out of barges or other vessels. Prop wash could result in small, temporary increases in turbidity. The periodic disturbance of the substrate caused by the prop wash could reduce the suitability of the substrate for colonization by benthic macroinvertebrates utilized as food by juvenile salmonids. However, these effects of prop wash being localized and temporary would have little affect on the growth or survival of juvenile salmonids.

SCHN00205394

6.0 SUMMARY

Construction activities would temporarily increase noise and turbidity, possibly causing listed species to avoid the immediate work area. Best management practices would be used to reduce these impacts. Thus, the proposed action:

- **may affect, but is not likely to adversely affect** chinook salmon,
- **may affect, but is not likely to adversely affect** chum salmon,
- **may affect, but is not likely to adversely affect** steelhead trout,
- **may affect, but is not likely to adversely affect** bald eagles, and
- will have **no effect** on water howellia.

SCHN00205395

7.0 REFERENCES

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SCHN00205397

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SCHN00205399

TABLES

Table 1 Proposed Maintenance-Dredging Schedule

	Permit Schedule (Year)					
	Year 0 (2003)	Year 1 (2004)	Year 2 (2005)	Year 3 (2006)	Year 4 (2007)	Year 5 (2008)
Volume (cy)	77,000	0	25,000	0	25,000	0

34088\001\Berths 1, 2, and 3 tables

Table 2 Environmental Baseline and Net Effects of the Action on the Pathways and Salmon Habitat Indicators in the Willamette River

Pathway	Indicators	Environmental Baseline	Effects of Action[1]	Comments
Construction Disturbances	Noise		Maintain	Temporary increase in noise levels during active dredging
	Entrainment	Properly Functioning	Maintain	No effect
	Stranding	Properly Functioning	Maintain	No effect
Water Quality and Stormwater	Turbidity	At Risk	Maintain	Small, temporary increases in turbidity
	Chemical contamination/nutrients	At Risk	Maintain	Resuspension of sediments may temporarily release nutrients into water column
	Temperature	Not Properly Functioning	Maintain	No effect
	Dissolved oxygen	Not Properly Functioning	Maintain	No effect
	Stormwater quality/quantity	Not Properly Functioning	Maintain	No effect
Sediment	Sedimentation sources/rates	Not Properly Functioning	Maintain	No effect
	Sediment quality	Not Properly Functioning	Maintain	
Habitat Conditions	Fish access	Properly Functioning	Maintain	No effect
	Refugia	Not Properly Functioning	Maintain	No effect
	Depth	Not Properly Functioning	Maintain	No effect
	Substrate	Not Properly Functioning	Maintain	No effect
	Slope	Not Properly Functioning	Maintain	Dredging will create steeper slopes below the nearshore habitat preferred by juvenile salmonids
	Shoreline	Not Properly Functioning	Maintain	No effect
	Riparian conditions	Not Properly Functioning	Maintain	No effect
	Flow and hydrology/ current patterns	Not Properly Functioning	Maintain	No effect
	Overwater structures	Not Properly Functioning	Maintain	No effect
	Disturbance	Not Properly Functioning	Maintain	No effect

(Continued).

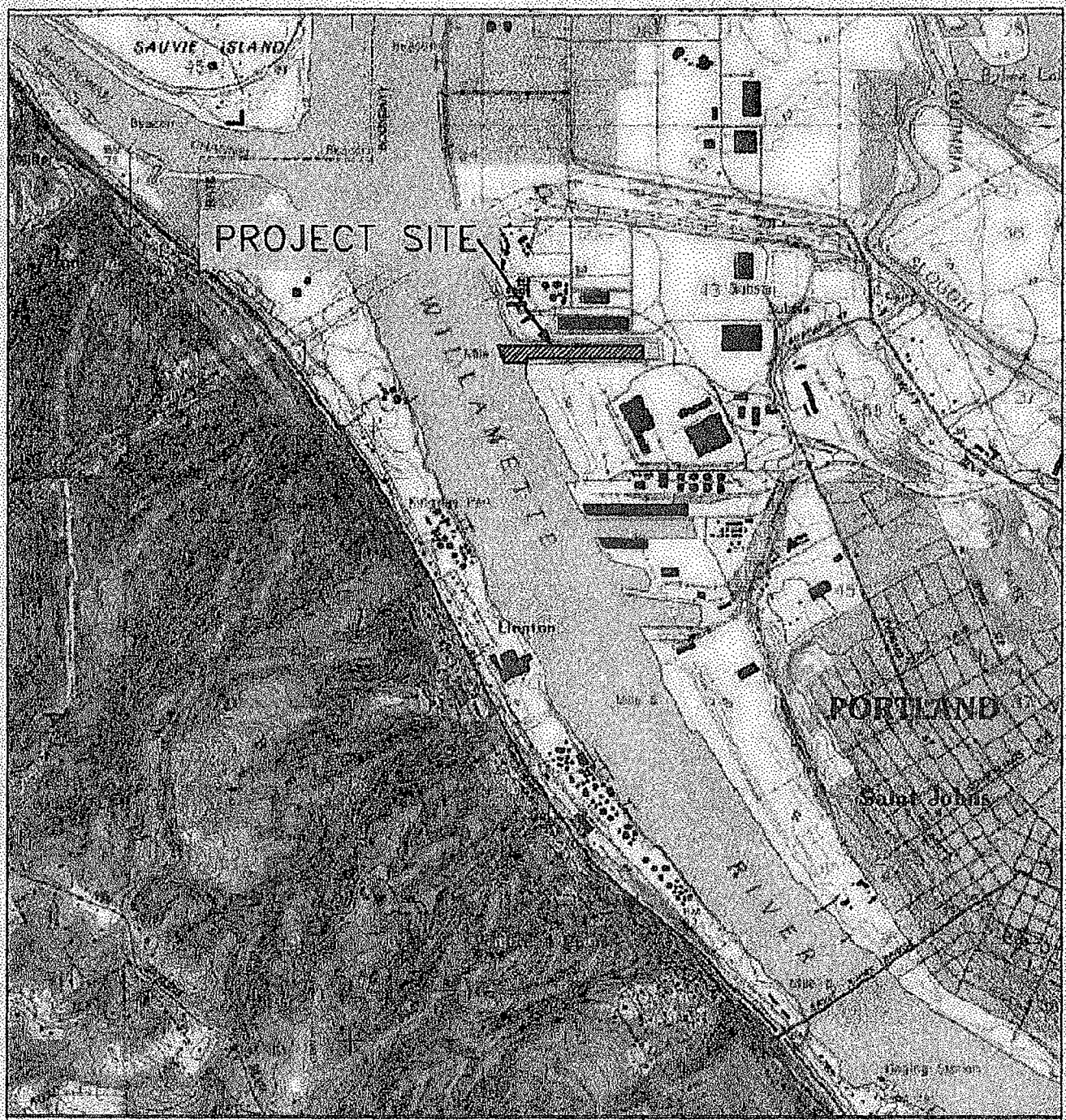
Table 2 Environmental Baseline and Net Effects of the Action on the Pathways and Salmon Habitat Indicators in the Willamette River

Pathway	Indicators	Environmental Baseline	Effects of Action[1]	Comments
Biota	Prey—epibenthic and pelagic zooplankton	Not Properly Functioning	Maintain	Dredging will result in short-term loss of epibenthic prey organisms. Dredge timing and rapid recolonization is expected to result in not affecting juvenile salmonids
	Infauna	Not Properly Functioning	Maintain	Dredging will result in short-term loss of benthic prey organisms. Dredge timing and rapid recolonization is expected to result in not affecting juvenile salmonids
	Prey—forage fish	Not Properly Functioning	Maintain	No effect
	Aquatic vegetation	Not Properly Functioning	Maintain	No effect
	Nonindigenous species	Not Properly Functioning	Maintain	No effect
	Ecological diversity	Not Properly Functioning	Maintain	No effect

[1] Improve indicates the action will contribute to long-term improvement over existing conditions of the indicator. Maintain indicates the action will maintain existing long-term conditions. Degrade indicated the action will contribute to long-term degradation over existing conditions of the indicator.

34088\001\Berths 1, 2, and 3 tables

FIGURES



NOTE 1. LOCATION MAP OBTAINED FROM US GEOLOGICAL SURVEY QUAD SHEET FOR LINNTON, OR

Scale in Feet
0 1000 2000

PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES
VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6
ADJACENT PROPERTY OWNERS:
1. TIME OIL COMPANY
2. PORT OF PORTLAND

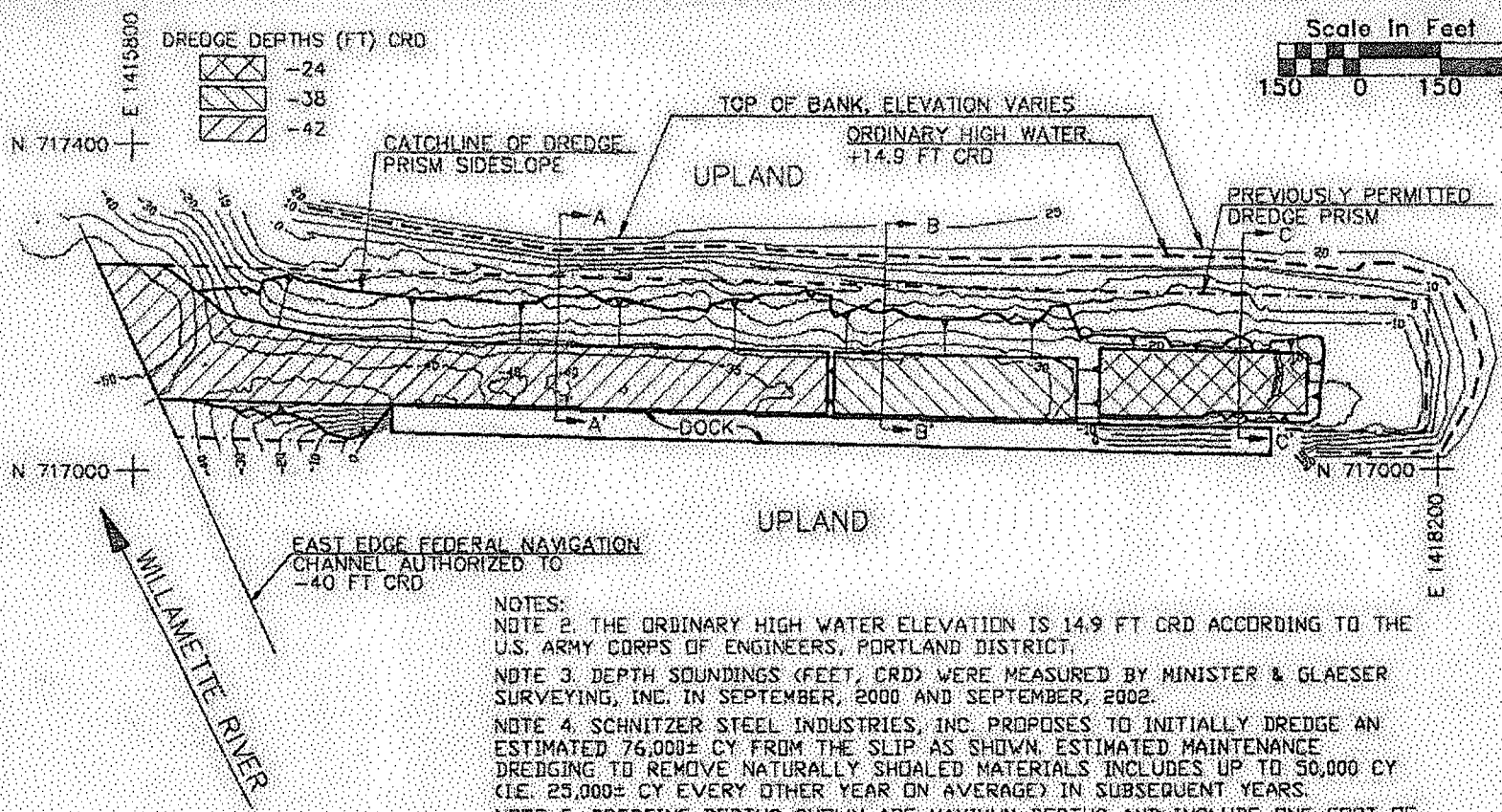
LATITUDE: 45° 36' 41" N
LONGITUDE: 122° 46' 42" W

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 3.6
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
DATE: 2/28/03

Figure 1 Site Vicinity

SCHN00205405



NOTES:

NOTE 2. THE ORDINARY HIGH WATER ELEVATION IS 14.9 FT CRD ACCORDING TO THE U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT.

NOTE 3. DEPTH SOUNDINGS (FEET, CRD) WERE MEASURED BY MINISTER & GLAESER SURVEYING, INC. IN SEPTEMBER, 2000 AND SEPTEMBER, 2002.

NOTE 4. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO INITIALLY DREDGE AN ESTIMATED 76,000± CY FROM THE SLIP AS SHOWN. ESTIMATED MAINTENANCE DREDGING TO REMOVE NATURALLY SHOALED MATERIALS INCLUDES UP TO 50,000 CY (I.E. 25,000± CY EVERY OTHER YEAR ON AVERAGE) IN SUBSEQUENT YEARS.

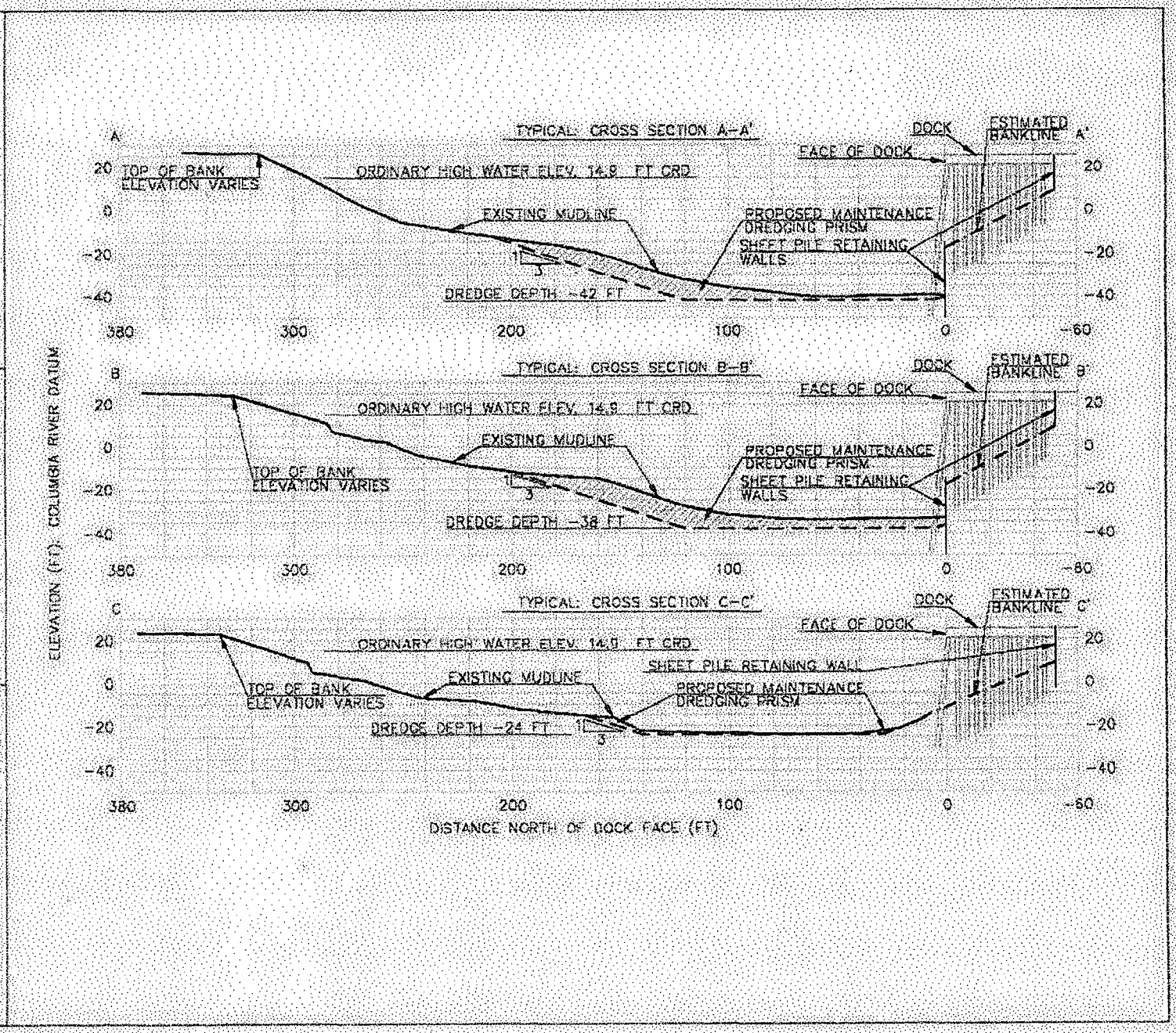
NOTE 5. DREDGING DEPTHS SHOWN ARE MAXIMUM DEPTHS AND INCLUDE ONE FOOT OF ADVANCED MAINTENANCE AND ONE FOOT OF ALLOWABLE OVERDEPTH DUE TO DREDGING INACCURACY.

NOTE 6. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO DREDGE THE MATERIAL USING A CLAMSHELL BUCKET OPERATED FROM A FLOATING CRANE. DREDGED MATERIAL WILL BE PLACED IN APPROVED UPLAND LOCATIONS.

	PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6 ADJACENT PROPERTY OWNERS: 1. TIME OIL COMPANY 2. PORT OF PORTLAND	LATITUDE: 45° 36' 41" N LONGITUDE: 122° 46' 42" W HORIZONTAL DATUM: OREGON STATE PLANE COORDINATE SYSTEM, NORTH ZONE (NAD-27), U.S. SURVEY FEET	PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS IN: WILLAMETTE RIVER AT: RIVER MILE 3.6 COUNTY OF: MULTNOMAH APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC. DATE: 2/28/03

Figure 2 Proposed Dredge Prism

SCHN00205406



PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES

VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6

ADJACENT PROPERTY OWNERS:
1. TIME OIL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 41" N
LONGITUDE: 122° 46' 42" W

SCALE: AS SHOWN

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT RIVER MILE 3.6
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
DATE: 2/28/03

Figure 3 Cross-Section of Dredge Prism

SCHN002205407

APPENDIX A
AGENCY LETTERS

Protected Resources

NOAA Fisheries National Marine Fisheries Service

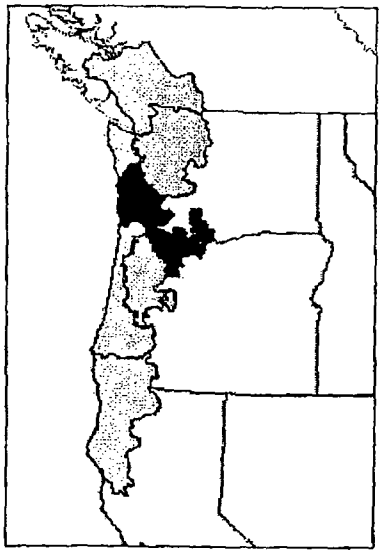
COASTAL CUTTHROAT TROUT*

Oncorhynchus clarki clarki

SOUTHWESTERN WASHINGTON/ COLUMBIA RIVER ESU PROPOSED THREATENED

April 1999

**U.S. Fish and Wildlife Service now has jurisdiction over Coastal Cutthroat Trout.*



ESU* STATUS AND DESCRIPTION: Proposed for listing as a threatened species on April 5, 1999. The ESU includes populations of coastal cutthroat trout in the Columbia River and its tributaries downstream from the Klickitat River in Washington and Fiffteenmile Creek in Oregon (inclusive) and the Willamette River and its tributaries downstream from Willamette Falls. The ESU also includes coastal cutthroat trout populations in Washington coastal drainages from the Columbia River to Grays Harbor (inclusive). Major river basins containing spawning and rearing habitat for this ESU comprise approximately 12,136 square miles in Oregon and Washington. The following counties lie partially or wholly within these basins: Oregon - Clackamas, Clatsop, Columbia, Hood River, Marion, Multnomah, Wasco, and Washington; Washington - Clark, Cowlitz, Grays Harbor, Jefferson, Klickitat, Lewis, Mason, Pacific, Skamania, Thurston, Wahkiakum, and Yakima.

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status - None proposed at this time.
Description - not applicable.

PROTECTIVE REGULATIONS: None proposed at this time.

ESU MAPS AND DATA:

- View Detailed Southwestern Washington/Columbia River Cutthroat Trout ESU Map (Adobe Acrobat PDF format)§
- View Range Map for all Coastal Cutthroat ESUs

SCHN00205409

- Download coastal cutthroat trout ESU data in Arc/Info export and shape file format
- Download E-sized plot files of coastal cutthroat trout listings in RTL file format for large format plotters

STATUS REVIEW:
NOAA Technnical Memorandum NMFS-NWFSC-37, January 1999
Status Review of Coastal Cutthroat Trout from Washington, Oregon, and California. (3.5 M)

FEDERAL REGISTER NOTICES:
View Federal Register Notices for Coastal Cutthroat Trout §

§You will need Adobe Acrobat Reader in order to view and print the detailed ESU map file and the Federal Register Notices. This program is available for free at the following link. Get Acrobat Reader

Protected Resources

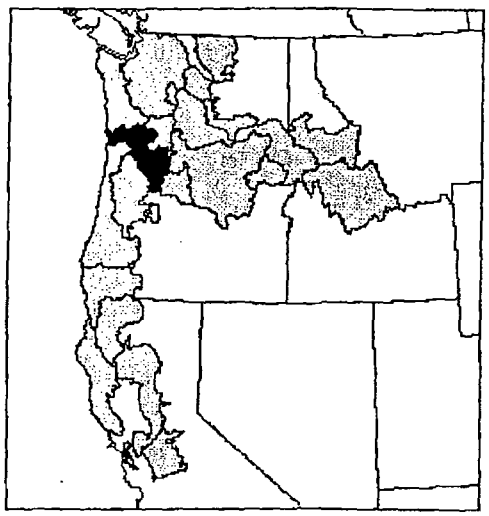
NOAA Fisheries National Marine Fisheries Service

CHINOOK SALMON

Oncorhynchus tshawytscha

LOWER COLUMBIA RIVER ESU
LISTED THREATENED

March 1999



ESU* STATUS AND DESCRIPTION: Listed as a threatened species on March 24, 1999. The ESU includes all naturally spawned populations of chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run chinook salmon in the Clackamas River.

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status - Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical habitat designation for this and 18 other ESUs.

PROTECTIVE REGULATIONS: On July 10, 2000, NMFS published a final rule that identifies several exceptions to the Endangered Species Act's Section 9 take prohibitions.

ESU MAPS AND DATA:

- View Detailed Lower Columbia River Chinook ESU Map (Adobe Acrobat PDF format)§
- View Range Map for all Chinook ESUs
- Download Chinook salmon ESU data in Arc/Info export and shape file format
- Download E-sized plot files of West Coast chinook salmon listings in RTL file format for large format plotters

STATUS REVIEWS:
NOAA Technical Memorandum NMFS-NWFSC-35, February 1998
Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California

SCHN00205411

STATUS REVIEW UPDATE MEMOS:
Conclusions Regarding the Updated Status of Puget Sound, Lower Columbia River, Upper Willamette River, and Upper Columbia River Spring-run ESUs of West Coast Chinook Salmon, 12/23/98 (4.1 mb pdf)
Evaluation of the Status of Chinook and Chum Salmon and Steelhead and Steelhead Hatchery Populations for ESUs Identified in Final Listing Determinations, 3/4/99 (5.8 mb pdf)

FEDERAL REGISTER NOTICES:
View Federal Register Notices for Chinook Salmon §

§You will need Adobe Acrobat Reader in order to view and print the detailed ESU map file and the Federal Register Notices. This program is available for free at the following link. Get Acrobat Reader

SCHN00205412

Protected Resources

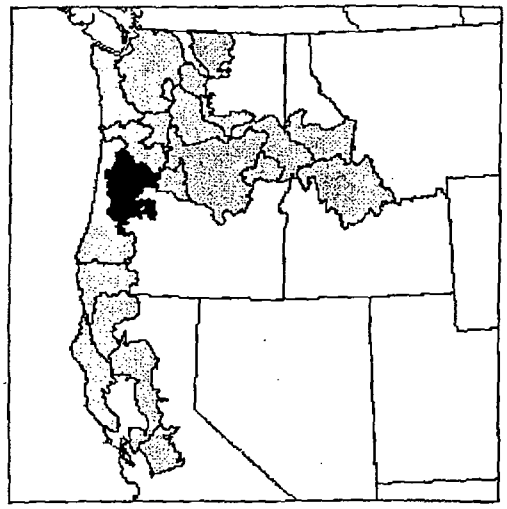
NOAA Fisheries National Marine Fisheries Service

CHINOOK SALMON

Oncorhynchus tshawytscha

UPPER WILLAMETTE RIVER ESU
LISTED THREATENED

March 1999



ESU* STATUS AND DESCRIPTION: Listed as a threatened species on March 24, 1999. The ESU includes all naturally spawned populations of spring-run chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon.

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status - Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical habitat designation for this and 18 other ESUs.

PROTECTIVE REGULATIONS: On July 10, 2000, NMFS published a final rule that identifies several exceptions to the Endangered Species Act's Section 9 take prohibitions.

ESU MAPS AND DATA:

- View Detailed Upper Willamette River Chinook ESU Map (Adobe Acrobat PDF format)§
- View Range Map for all Chinook ESUs
- Download Chinook salmon ESU data in Arc/Info export and shape file format
- Download E-sized plot files of West Coast chinook salmon listings in RTL file format for large format plotters

STATUS REVIEWS:
NOAA Technical Memorandum NMFS-NWFSC-35, February 1998
Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California

STATUS REVIEW UPDATE MEMOS:
Conclusions Regarding the Updated Status of Puget Sound, Lower Columbia River, Upper Willamette River, and Upper Columbia River Spring-run ESUs of West Coast Chinook Salmon, 12/23/98 (4.1 mb

SCHN00205413

pdf)
Evaluation of the Status of Chinook and Chum Salmon and Steelhead and Steelhead Hatchery Populations for ESUs Identified in Final Listing Determinations, 3/4/99 (5.8 mb pdf)

FEDERAL REGISTER NOTICES:
View Federal Register Notices for Chinook Salmon §

§You will need Adobe Acrobat Reader in order to view and print the detailed ESU map file and the Federal Register Notices. This program is available for free at the following link. Get Acrobat Reader

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Updated May 2, 2003

SCHN00205414

Protected Resources

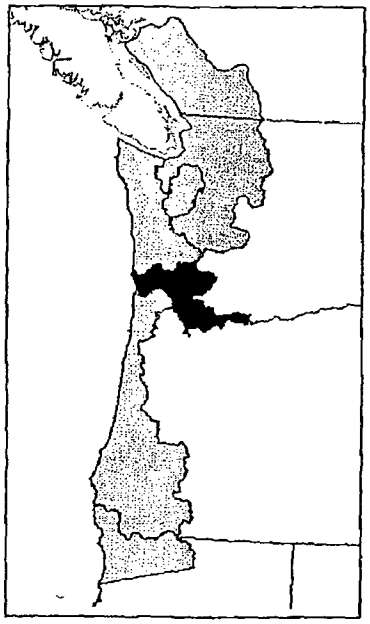
NOAA Fisheries National Marine Fisheries Service

CHUM SALMON

Oncorhynchus keta

COLUMBIA RIVER ESU
LISTED THREATENED

March 1999



ESU* STATUS AND DESCRIPTION: Listed as a threatened species on March 25, 1999. The ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon.

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status - Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical habitat designation for this and 18 other ESUs.

PROTECTIVE REGULATIONS: On July 10, 2000, NMFS published a final rule that identifies several exceptions to the Endangered Species Act's Section 9 take prohibitions.

ESU MAPS AND DATA:

- View Detailed Columbia River Chum ESU Map (346K pdf) §
- View Range Map for all Chum ESUs
- Download Chum salmon ESU data in Arc/Info export and shape file format.
- Download E-sized plot files of West Coast chum salmon listings in RTL file format for large format plotters.

STATUS REVIEWS:
NOAA Technical Memorandum NMFS-NWFSC-32, December 1997
Status Review of Chum Salmon from Washington, Oregon, and California

STATUS REVIEW UPDATE MEMOS:
Conclusions Regarding the Updated Status of the Columbia River Chum Salmon ESU and Hood Canal Summer-run Chum Salmon ESU, 2/12/99 (2.1 mb pdf)

SCHN00205415

Evaluation of the Status of Chinook and Chum Salmon and Steelhead and Steelhead Hatchery Populations for ESUs Identified in Final Listing Determinations, 3/4/99 (5.8 mb pdf)

FEDERAL REGISTER NOTICES:
View Federal Register Notices for Chum Salmon§

§You will need Adobe Acrobat Reader in order to view and print the detailed ESU map file and the Federal Register Notices. This program is available for free at the following link. Get Acrobat Reader

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Updated May 29, 2002

SCHN00205416

Protected Resources

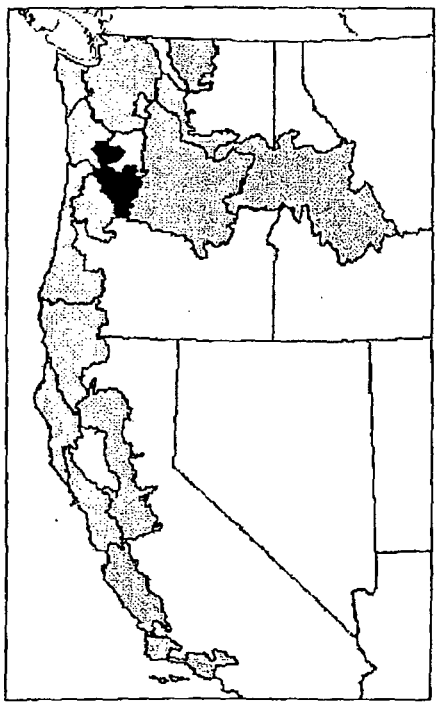
NOAA Fisheries National Marine Fisheries Service

STEELHEAD

Oncorhynchus mykiss

LOWER COLUMBIA RIVER ESU
LISTED THREATENED

March 1998



ESU* STATUS AND DESCRIPTION: Listed as a threatened species on March 19, 1998. The ESU includes all naturally spawned populations of steelhead (and their progeny) in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive) and the Willamette and Hood Rivers, Oregon (inclusive). Excluded are steelhead in the upper Willamette River Basin above Willamette Falls and steelhead from the Little and Big White Salmon Rivers in Washington.

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status - Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical habitat designation for this and 18 other ESUs.

PROTECTIVE REGULATIONS: On July 10, 2000, NMFS published a final rule that identifies several exceptions to the Endangered Species Act's Section 9 take prohibitions.

ESU MAPS AND DATA:

- View Detailed Lower Columbia River Steelhead ESU Map (Adobe Acrobat PDF format)§
- View Range Map for all Steelhead ESUs
- Download steelhead ESU data in Arc/Info export and shape file format
- Download E-sized plot files of West Coast steeelhead listings in RTL file format for large format plotters

STATUS REVIEW:
NOAA Technical Memorandum NMFS-NWFSC-27, August 1996
Status Review of West Coast Steelhead from Washington, Oregon, and California

SCHN00205417

STATUS REVIEW UPDATE MEMOS:
Scientific Disagreements Regarding Steelhead Status under the ESA, 7/18/97 (0.8 mb pdf)
Update for Deferred and Candidate ESUs of West Coast Steelhead, 12/18/97 (4.8 mb pdf)
Update for Deferred ESUs of West Coast Steelhead, Hatchery Populations, 1/13/98 (2.3 mb pdf)

FEDERAL REGISTER NOTICES:
View Federal Register Notices for Steelhead§

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SCHN00205418

Protected Resources

NOAA Fisheries National Marine Fisheries Service

STEELHEAD

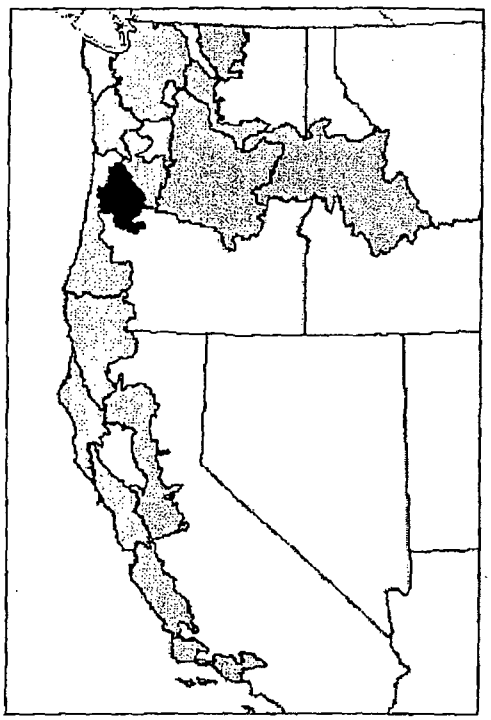
Oncorhynchus mykiss

UPPER WILLAMETTE RIVER ESU
LISTED THREATENED

March 1999

ESU* STATUS AND DESCRIPTION: Listed as a threatened species on March 25, 1999. The ESU includes all naturally spawned populations of winter-run steelhead in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River, inclusive.

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*



CRITICAL HABITAT:
Current Status - Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical habitat designation for this and 18 other ESUs.

PROTECTIVE REGULATIONS: On July 10, 2000, NMFS published a final rule that identifies several exceptions to the Endangered Species Act's Section 9 take prohibitions.

ESU MAPS AND DATA:

- View Detailed Upper Willamette River Steelhead ESU Map (Adobe Acrobat PDF format)§
- View Range Map for all Steelhead ESUs
- Download steelhead ESU data in Arc/Info export and shape file format
- Download E-sized plot files of West Coast steelhead listings in RTL file format for large format plotters

STATUS REVIEW:
NOAA Technical Memorandum NMFS-NWFSC-27, August 1996
Status Review of West Coast Steelhead from Washington, Oregon, and California

STATUS REVIEW UPDATE MEMOS:
Update for Deferred and Candidate ESUs of West Coast Steelhead, 12/18/97 (4.8 mb pdf)

SCHN00205419

Protected Resources

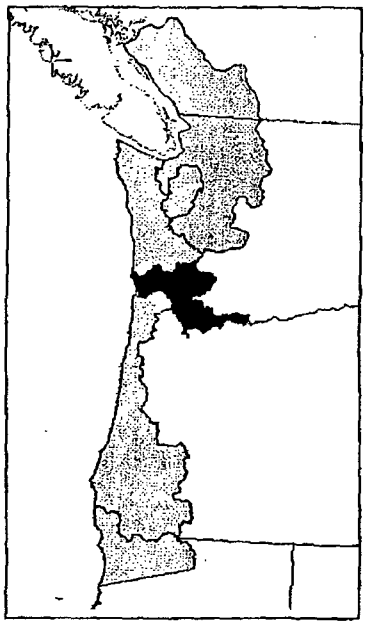
NOAA Fisheries National Marine Fisheries Service

CHUM SALMON

Oncorhynchus keta

COLUMBIA RIVER ESU LISTED THREATENED

March 1999



ESU* STATUS AND DESCRIPTION: Listed as a threatened species on March 25, 1999. The ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon.

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status - Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical habitat designation for this and 18 other ESUs.

PROTECTIVE REGULATIONS: On July 10, 2000, NMFS published a final rule that identifies several exceptions to the Endangered Species Act's Section 9 take prohibitions.

ESU MAPS AND DATA:

- View Detailed Columbia River Chum ESU Map (346K pdf) §
- View Range Map for all Chum ESUs
- Download Chum salmon ESU data in Arc/Info export and shape file format.
- Download E-sized plot files of West Coast chum salmon listings in RTL file format for large format plotters.

STATUS REVIEWS:
NOAA Technical Memorandum NMFS-NWFSC-32, December 1997
Status Review of Chum Salmon from Washington, Oregon, and California

STATUS REVIEW UPDATE MEMOS:
Conclusions Regarding the Updated Status of the Columbia River Chum Salmon ESU and Hood Canal Summer-run Chum Salmon ESU, 2/12/99 (2.1 mb pdf)

SCHN00205420

Evaluation of the Status of Chinook and Chum Salmon and Steelhead and Steelhead Hatchery Populations for ESUs Identified in Final Listing Determinations, 3/4/99 (5.8 mb pdf)

FEDERAL REGISTER NOTICES:
View Federal Register Notices for Chum Salmon§

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Protected Resources

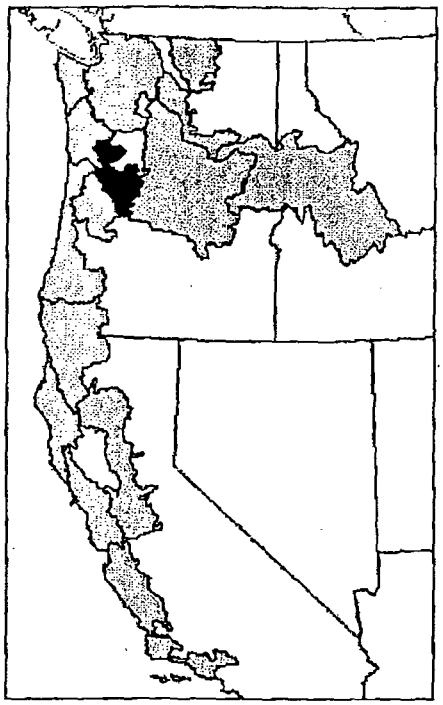
NOAA Fisheries National Marine Fisheries Service

STEELHEAD

Oncorhynchus mykiss

LOWER COLUMBIA RIVER ESU
LISTED THREATENED

March 1998



ESU* STATUS AND DESCRIPTION: Listed as a threatened species on March 19, 1998. The ESU includes all naturally spawned populations of steelhead (and their progeny) in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive) and the Willamette and Hood Rivers, Oregon (inclusive). Excluded are steelhead in the upper Willamette River Basin above Willamette Falls and steelhead from the Little and Big White Salmon Rivers in Washington.

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status - Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical habitat designation for this and 18 other ESUs.

PROTECTIVE REGULATIONS: On July 10, 2000, NMFS published a final rule that identifies several exceptions to the Endangered Species Act's Section 9 take prohibitions.

ESU MAPS AND DATA:

- View Detailed Lower Columbia River Steelhead ESU Map (Adobe Acrobat PDF format)§
- View Range Map for all Steelhead ESUs
- Download steelhead ESU data in Arc/Info export and shape file format
- Download E-sized plot files of West Coast steeelhead listings in RTL file format for large format plotters

STATUS REVIEW:
NOAA Technical Memorandum NMFS-NWFSC-27, August 1996
Status Review of West Coast Steelhead from Washington, Oregon, and California

SCHN00205422

STATUS REVIEW UPDATE MEMOS:
Scientific Disagreements Regarding Steelhead Status under the ESA, 7/18/97 (0.8 mb pdf)
Update for Deferred and Candidate ESUs of West Coast Steelhead, 12/18/97 (4.8 mb pdf)
Update for Deferred ESUs of West Coast Steelhead, Hatchery Populations, 1/13/98 (2.3 mb pdf)

FEDERAL REGISTER NOTICES:
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SCHN00205423

Protected Resources

NOAA Fisheries National Marine Fisheries Service

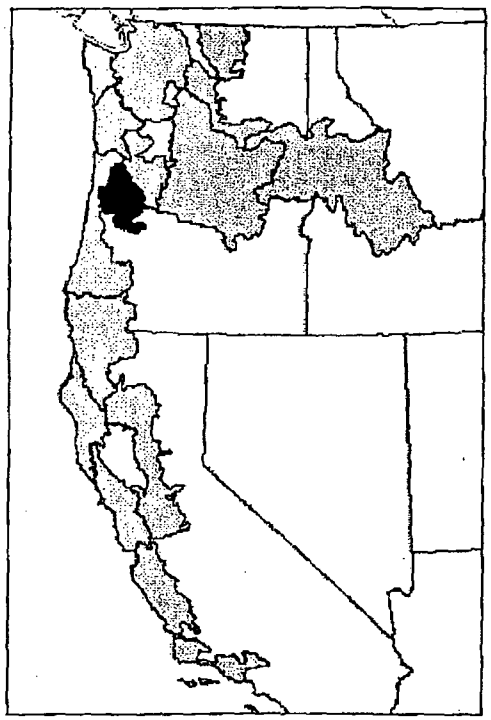
STEELHEAD

Oncorhynchus mykiss

UPPER WILLAMETTE RIVER ESU
LISTED THREATENED

March 1999

ESU* STATUS AND DESCRIPTION: Listed as a threatened species on March 25, 1999. The ESU includes all naturally spawned populations of winter-run steelhead in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River, inclusive.



** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status - Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical habitat designation for this and 18 other ESUs.

PROTECTIVE REGULATIONS: On July 10, 2000, NMFS published a final rule that identifies several exceptions to the Endangered Species Act's Section 9 take prohibitions.

ESU MAPS AND DATA:

- View Detailed Upper Willamette River Steelhead ESU Map (Adobe Acrobat PDF format)§
- View Range Map for all Steelhead ESUs
- Download steelhead ESU data in Arc/Info export and shape file format
- Download E-sized plot files of West Coast steelhead listings in RTL file format for large format plotters

STATUS REVIEW:
NOAA Technical Memorandum NMFS-NWFSC-27, August 1996
Status Review of West Coast Steelhead from Washington, Oregon, and California

STATUS REVIEW UPDATE MEMOS:
Update for Deferred and Candidate ESUs of West Coast Steelhead, 12/18/97 (4.8 mb pdf)

SCHN00205424

Updated Review of the Status of Upper Willamette River and Middle Columbia River ESUs of Steelhead, 1/12/99 (3.2 mb pdf)
Evaluation of the Status of Chinook and Chum Salmon and Steelhead and Steelhead Hatchery Populations for ESUs Identified in Final Listing Determinations, 3/4/99 (5.8 mb pdf)

FEDERAL REGISTER NOTICES:
View Federal Register Notices for Steelhead§

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SCHN00205425

Protected Resources

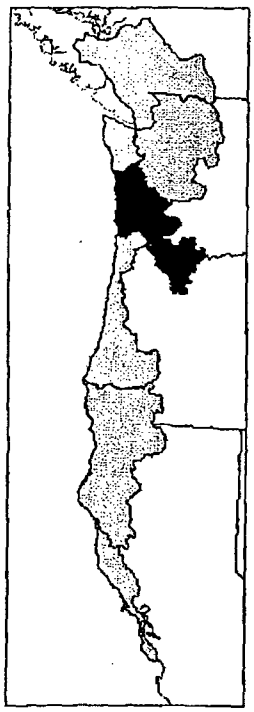
NOAA Fisheries National Marine Fisheries Service

COHO SALMON

Oncorhynchus kisutch

LOWER COLUMBIA RIVER/ SOUTHWEST WASHINGTON ESU CANDIDATE

July 1995



ESU* STATUS AND DESCRIPTION: On July 25, 1995, NMFS determined that listing was not warranted for this ESU. However, the ESU is designated as a candidate for listing due to concerns over specific risk factors. The ESU includes all naturally spawned populations of coho salmon from Columbia River tributaries below the Klickitat River on the Washington side and below the Deschutes River on the Oregon side (including the Willamette River as far upriver as Willamette Falls), as well as coastal drainages in southwest Washington between the Columbia River and Point Grenville. Major river basins containing spawning and rearing habitat for this ESU comprise approximately 10,418 square miles in Oregon and Washington. The following counties lie partially or wholly within these basins: Oregon - Clackamas, Clatsop, Columbia, Hood River, Marion, Multnomah, Wasco, and Washington; Washington - Clark, Cowlitz, Grays Harbor, Jefferson, Klickitat, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum.

** An Evolutionarily Significant Unit or "ESU" is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.*

CRITICAL HABITAT:
Current Status - not applicable.
Description - not applicable.

PROTECTIVE REGULATIONS: not applicable.

ESU MAPS AND DATA:

- View Detailed Lower Columbia River/SW Washington Coho ESU Map (Adobe Acrobat PDF format)§
- View Range Map for all Coho ESUs
- Download coho salmon ESU data in Arc/Info export and shape file format
- Download E-sized plot files of West Coast coho salmon listings in RTL file format for large format plotters

SCHN00205426

STATUS REVIEWS:

NOAA Technical Memorandum NMFS-F/NWC-202, June 1991
Status Review for Lower Columbia River Coho Salmon

NOAA Technical Memorandum NMFS-NWFSC-24, September 1995
Status Review of Coho Salmon from Washington, Oregon, and California

STATUS REVIEW UPDATE MEMOS:
Conclusions regarding the updated status of west coast coho salmon, 12/20/96 (6 mb pdf)

FEDERAL REGISTER NOTICES:
View Federal Register Notices for Coho Salmon§

§You will need Adobe Acrobat Reader in order to view and print the detailed ESU map file and the Federal Register Notices. This program is available for free at the following link. Get Acrobat Reader

SCHN00205427

34088-001

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish and Wildlife Office
2600 S.E. 98th Avenue, Suite 100
Portland, Oregon 97266
(503) 231-6179 FAX: (503) 231-6195

JUN 20 2003

Reply To: 8330.04501(03)
File Name: Sp0450.wpd
TS Number: 03-3842

June 12, 2003

Kerrie McArthur
MCS Environmental, Inc.
6505 216th Street SW, Suite 100
Mountlake Terrace, WA 98043

Subject: Willamette River Maintenance Dredging Project
USFWS Reference # (1-7-03-SP-0450)

Dear Ms. McArthur:

This is in response to your letter, dated May 30, 2003, requesting information on listed and proposed endangered and threatened species that may be present within the area of the Willamette River Maintenance Dredging Project in Multnomah County. The U.S. Fish and Wildlife Service (Service) received your correspondence on May 30, 2003.

We have attached a list (Attachment A) of threatened and endangered species that may occur within the area of the Willamette River Maintenance Dredging Project. The list fulfills the requirement of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). U.S. Army Corps of Engineers (COE) requirements under the Act are outlined in Attachment B.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems on which they depend may be conserved. Under section 7(a)(1) and 7(a)(2) of the Act and pursuant to 50 CFR 402 *et seq.*, COE is required to utilize their authorities to carry out programs which further species conservation and to determine whether projects may affect threatened and endangered species, and/or critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) which are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (NEPA) (42 U.S.C. 4332 (2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species. Recommended contents of a Biological Assessment are described in Attachment B, as well as 50 CFR 402.12.

If COE determines, based on the Biological Assessment or evaluation, that threatened and endangered species and/or critical habitat may be affected by the project, COE is required to consult with the Service following the requirements of 50 CFR 402 which implement the Act.

Printed on 100% chlorine free/60% post-consumer content paper

Attachment A includes a list of candidate species under review for listing. The list reflects changes to the candidate species list published June 13, 2002, in the Federal Register (Vol. 67, No. 114, 40657) and the addition of "species of concern." Candidate species have no protection under the Act but are included for consideration as it is possible candidates could be listed prior to project completion. Species of concern are those taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

If a proposed project may affect only candidate species or species of concern, COE is not required to perform a Biological Assessment or evaluation or consult with the Service. However, the Service recommends addressing potential impacts to these species in order to prevent future conflicts. Therefore, if early evaluation of the project indicates that it is likely to adversely impact a candidate species or species of concern, COE may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. The Service encourages COE to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact Stacy Sroufe at (503) 231-6179. All correspondence should include the above referenced file number. For questions regarding salmon and steelhead trout, please contact National Marine Fisheries Service, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232, (503) 230-5400.

Sincerely,

Sandy Rasmussen

for Kemper M. McMaster
State Supervisor

Attachments
1-7-03-SP-0450

cc: OFWO-ES
ODFW (nongame)

ATTACHMENT A

FEDERALLY LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES, CANDIDATE SPECIES AND SPECIES OF CONCERN THAT MAY OCCUR WITHIN THE AREA OF THE WILLAMETTE RIVER MAINTENANCE DREDGING PROJECT 1-7-03-SP-0450

LISTED SPECIES[1]

Birds		
Bald eagle[2]	*Haliaeetus leucocephalus*	T
Fish		
Steelhead (Upper Willamette River)[3]	*Oncorhynchus mykiss*	**T
Steelhead (Lower Columbia River)[4]	*Oncorhynchus mykiss*	**T
Chinook salmon (Lower Columbia River)[5]	*Oncorhynchus tshawytscha*	**T
Chinook salmon (Upper Willamette River)[5]	*Oncorhynchus tshawytscha*	**T
Plants		
Golden paintbrush[6]	*Castilleja levisecta*	T
Willamette daisy[7]	*Erigeron decumbens* var. *decumbens*	E
Howellia	*Howellia aquatilis*	T
Bradshaw's lomatium	*Lomatium bradshawii*	E
Kincaid's lupine[7]	*Lupinus sulphureus* var. *kincaidii*	T
Nelson's checker-mallow	*Sidalcea nelsoniana*	T

PROPOSED SPECIES

None

CANDIDATE SPECIES[8]

Birds		
Yellow-billed cuckoo[9]	*Coccyzus americanus*	
Streaked horned lark	*Eremophila alpestris strigata*	
Amphibians and Reptiles		
Oregon spotted frog	*Rana pretiosa*	
Fish		
Coho salmon (Lower Columbia River)[10]	*Oncorhynchus kisutch*	**CF

SPECIES OF CONCERN

Mammals	
Pacific western big-eared bat	*Corynorhinus (=Plecotus) townsendii townsendii*
Silver-haired bat	*Lasionycteris noctivagans*
Long-eared myotis (bat)	*Myotis evotis*
Fringed myotis (bat)	*Myotis thysanodes*
Long-legged myotis (bat)	*Myotis volans*
Yuma myotis (bat)	*Myotis yumanensis*
Camas pocket gopher	*Thomomys bulbivorus*

<u>Birds</u>	
Tricolored blackbird	*Agelaius tricolor*
Olive-sided flycatcher	*Contopus cooperi (=borealis)*
Yellow-breasted chat	*Icteria virens*
Lewis' woodpecker	*Melanerpes lewis*
Oregon vesper sparrow	*Pooecetes gramineus affinis*
Purple martin	*Progne subis*
<u>Amphibians and Reptiles</u>	
Northwestern pond turtle	*Emys (=Clemmys) marmorata marmorata*
Northern red-legged frog	*Rana aurora aurora*
<u>Fish</u>	
Green sturgeon	*Acipenser medirostris*
River lamprey	*Lampetra ayresi*
Pacific lamprey	*Lampetra tridentata*
Coastal cutthroat trout (Upper Willamette)	*Oncorhynchus clarki clarki*
<u>Invertebrates</u>	
California floater (mussel)	*Anodonta californiensis*
Columbia pebblesnail	*Fluminicola fuscus*
<u>Plants</u>	
White top aster	*Aster curtus*
Pale larkspur	*Delphinium leucophaeum*
Peacock larkspur	*Delphinium pavonaceum*

(E) - Listed Endangered	*(T) - Listed Threatened*	*(CH) - Critical Habitat has been designated for this species*
(PE) - Proposed Endangered	*(PT) - Proposed Threatened*	*(PCH) - Critical Habitat has been proposed for this species*
(S) - Suspected	*(D) - Documented*	

Species of Concern - Taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

(CF) - Candidate: National Marine Fisheries Service designation for any species being considered by the Secretary for listing for endangered or threatened species, but not yet the subject of a proposed rule.

*** Consultation with National Marine Fisheries Service may be required.*

[1] *U. S. Department of Interior, Fish and Wildlife Service, October 31, 2000, <u>Endangered and Threatened Wildlife and Plants</u>, 50 CFR 17.11 and 17.12*

[2] *Federal Register Vol. 60, No. 133, July 12, 1995 - Final Rule - Bald Eagle*

[3] *Federal Register Vol. 64, No. 57, March 25, 1999, Final Rule - Middle Columbia and Upper Willamette River Steelhead*

[4] *Federal Register Vol. 63, No. 53, March 19, 1998, Final Rule-West Coast Steelhead*

[5] *Federal Register Vol. 64, No. 56, March 24, 1999, Final Rule - West Coast Chinook Salmon*

[6] *Federal Register Vol. 62, No. 112, June 11, 1997, Final Rule-Castilleja levisecta*

[7] *Federal Register Vol. 65, No. 16, January 25, 2000, Final Rule-Erigeron decumbens var. decumbens, Lupinus sulphureus ssp. kincaidii and Fender's blue butterfly*

[8] *Federal Register Vol. 67, No. 114, June 13, 2002, Notice of Review - Candidate or Proposed Animals and Plants*

[9] *Federal Register Vol. 66, No. 143, July 25, 2001, 12-Month Finding for a Petition To List the Yellow-billed Cuckoo*

[10] *Federal Register Vol. 62, No. 87, May 6, 1997, Final Rule-Coho Salmon*

ATTACHMENT B

FEDERAL AGENCIES RESPONSIBILITIES UNDER SECTION 7(a) and (c)
OF THE ENDANGERED SPECIES ACT

SECTION 7(a)-Consultation/Conference

Requires:

1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of Critical Habitat. The process is initiated by the Federal agency after they have determined if their action may affect (adversely or beneficially) a listed species; and

3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed Critical Habitat.

SECTION 7(c)-Biological Assessment for Major Construction Projects[1]

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for construction projects only. The purpose of the BA is to identify proposed and/or listed species which are/is likely to be affected by a construction project. The process is initiated by a Federal agency in requesting a list of proposed and listed threatened and endangered species (list attached). The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may be taken; however, no construction may begin.

To complete the BA, your agency or its designee should: (1) conduct an on-site inspection of the area to be affected by the proposal which may include a detailed survey of the area to determine if the species is present and whether suitable habitat exists for either expanding the existing population or for potential reintroduction of the species; (2) review literature and scientific data to determine species distribution, habitat needs, and other biological requirements; (3) interview experts including those within FWS, National Marine Fisheries Service, State conservation departments, universities, and others who may have data not yet published in scientific literature; (4) review and analyze the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; (5) analyze alternative actions that may provide conservation measures and (6) prepare a report documenting the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed species will be affected. Upon completion, the report should be forwarded to our Portland Office.

---

[1] A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332. (2)c). On projects other that construction, it is suggested that a biological evaluation similar to the biological assessment be undertaken to conserve species influenced by the Endangered Species Act.

APPENDIX B
SITE PHOTOGRAPHS

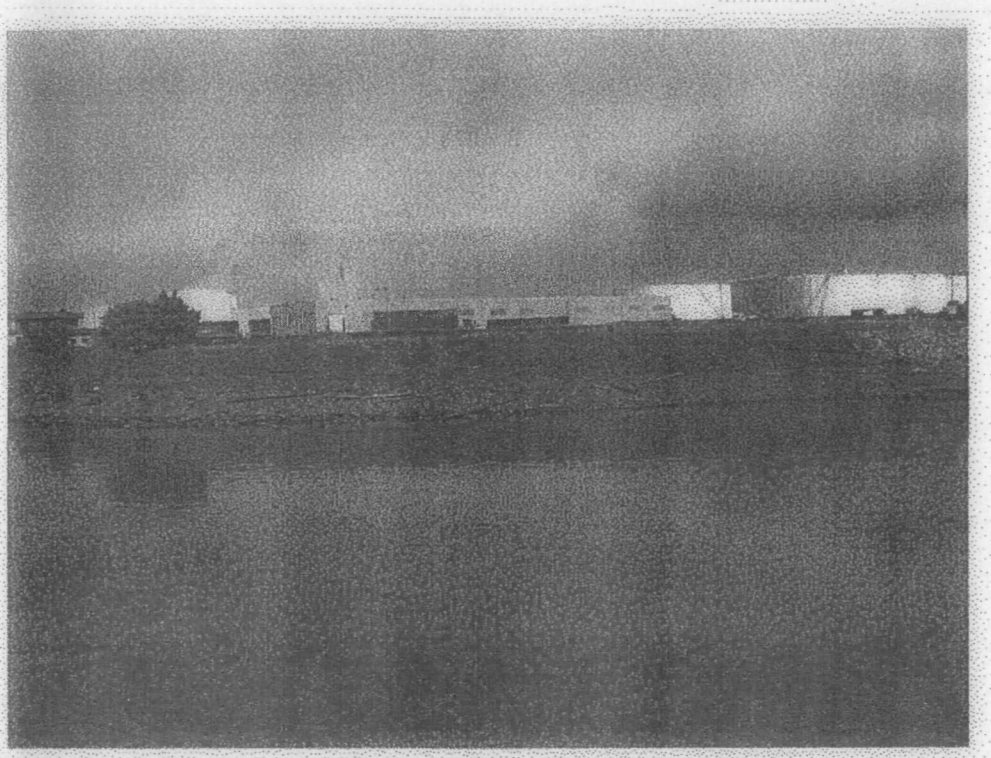


Photo 1 View: North - At Junction of River and West End of Slip

Photo 2 View: North - Riverbank from West End of Slip

Photo 3 View: East – From West End of Slip

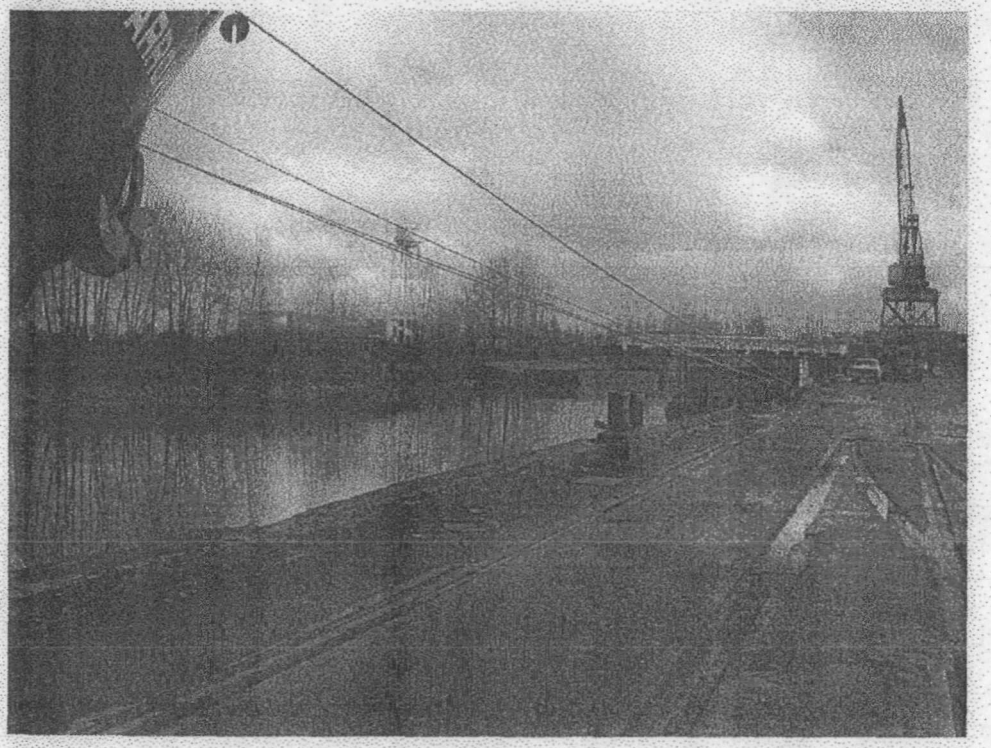


Photo 4 View: East - From Middle of Dock

Photo 5 View: East - Barge Adjacent to Outfall 18

APPENDIX C
ESSENTIAL FISH HABITAT ASSESSMENT

COLUMBIA RIVER PILOTS
13225 N. LOMBARD
PORTLAND, OREGON 97203
503-289-9922
FAX 503-288-9955

PARSONS BRINCKERHOFF

MAR 06 2003

5582

January 8, 2003

Jerald D. Ramsden
PB Ports & Marine
400 SW 6th Ave., Suite 802
Portland OR 97204

Dear Jerry,

A few weeks ago we met to discuss navigation safety for vessel operations as it relates to maintenance dredging at the International Terminals slip. To recap our thoughts on the subject:

> The berth should be maintained to a minimum depth of forty (40) feet (at zero gauge) for a distance of eight hundred (800) feet long and one hundred twenty to one hundred forty (140) feet wide.
>
> There are some pilings in the Willamette River just off the upstream corner of the slip. We suggest the project owner consider removal of these piling which would make it possible for tugs to maneuver in this area when assisting a ship into or out of the berth.
>
> Ideally a ship entering the dock from downstream should be able to approach the dock from an oblique angle, cutting across the downstream entrance to the slip. The entrance to the berth (the area between the start of the berth and the Willamette River) should be dredged to allow this. A vessel attempting to enter the berth should not have to position itself perpendicular to the river and in a straight line with the berth in order to enter the berth.

If you have any questions do not hesitate to call me at 503-289-9924.

Very truly yours,

Lonny Rodgers

Capt. Lonny Rodgers
Treasurer

\\Server2\Manager\COLRIP\PILOTING\Tdock_1.doc

APPENDIX D
ESSENTIAL FISH HABITAT ASSESSMENT

ASSESSMENT OF ESSENTIAL FISH HABITAT FOR THE INTERNATIONAL TERMINALS SLIP (BERTHS 1, 2, AND 3) MAINTENANCE DREDGING PROJECT

ACTION AGENCY

US Army Corps of Engineers, Portland District

LOCATION

In the International Terminals slip within Willamette River, Portland, Oregon

PROJECT NAME

International Terminals Slip (Berths 1, 2, and 3) Maintenance Dredging

ESSENTIAL FISH HABITAT BACKGROUND

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires federal agencies to consult with the National Marine Fisheries Service (NMFS) on activities that may adversely affect Essential Fish Habitat (EFH). EFH is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. "Waters" include aquatic areas—and their associated physical, chemical, and biological properties—that are used by fish, and may include aquatic areas historically used by fish, where appropriate. "Substrates" include sediment, hard bottom, structures underlying the waters, and associated biological communities (NMFS 1999).

The objective of this EFH assessment is to determine whether or not the proposed action "may adversely affect" designated EFH for relevant federally managed commercial fisheries species within the proposed action area. It also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects on designated EFH resulting from the proposed action.

IDENTIFICATION OF EFH

Fish species that have designated EFH in the Willamette River are listed in Table 1. Some or all of these species may occur in the project area. Refer to the relevant EFH designations (Casillas et al. 1998; PFMC 1998a, 1998b, 1999) for life history stages of these species that may occur in the project vicinity. Assessment of the impacts on these species' EFH from the proposed project is based on this information.

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DETAILED DESCRIPTION OF THE PROPOSED PROJECT

SSI proposes to conduct maintenance dredging of Berths 1, 2, and 3 at the International Terminals slip to maintain safe navigation access and berthing for the docks by periodic maintenance dredging as needed. The project involves dredging the area to a maximum depth of –42 feet Columbia River Datum (CRD), -38 feet CRD, or –24 feet CRD, depending on location within the slip (Figures 2 and 3). The proposed dredge footprint covers about 9.6 acres, with a maximum length of 2,250 feet and maximum width of 270 feet. The proposed dredge footprint lies entirely within the previously permitted dredge area and covers less area than authorized in previous permits. The initial dredge volume associated with the proposed dredge prism is 77,000 cy. SSI proposes to dredge another 50,000 cy as needed for ongoing maintenance (e.g., 25,000 cy every other year on average in years two through five). Dredging will be by clamshell bucket, with transport to approved upland facilities or locations by barge, truck or rail.

POTENTIAL ADVERSE EFFECTS OF PROPOSED PROJECT

The International Terminals slip maintenance dredging potentially could adversely affect EFH for groundfish, coastal pelagic, and salmonid species by temporarily altering subtidal habitat. Dredging would potentially adversely affect EFH by creating temporary increases in turbidity and would temporarily eliminate nonmobile benthic and epibenthic food sources within the dredge footprint.

Coastal pelagic species are not expected to occur in the action area. Few, if any species of groundfish are in the action area. Salmonid species, particularly juveniles may occur in the project area at any time of the year. However, direct adverse effects on these species are not expected because in–water construction would be timed to avoid periods when large numbers of juvenile salmon are present.

Construction is not expected to adversely affect spawning, rearing, and feeding habitat for salmonids using the Willamette River.

The project actions described above have the potential to adversely affect the EFH of managed species, but these effects should be very localized and not reduce the overall value of the EFH to these managed species. Following completion of the project, the disturbed areas would be recolonized and the benthic and epibenthic communities should return to conditions similar to those before project construction.

CONSERVATION MEASURES

Potential adverse effects of the proposed project would be avoided and minimized by implementing the conservation measures specified in the BA (see Section 2.3) as follows:

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- Performing in-water work only when juvenile salmonids are not likely to be present.
- Use of best management practices during maintenance dredging as outlined in NMFS (2002) and the Corps Nationwide Permit;
- Providing one foot of advance maintenance (already accounted for in the maximum proposed dredge depths) to reduce to the extent practicable the frequency of maintenance dredging.

CONCLUSION

As described above, the proposed activities may result in temporary, localized adverse impacts on certain EFH parameters. Implementing the above conservation measures will reduce or eliminate this temporary impact. Therefore, we conclude that the proposed project **may effect, not likely to adversely affect** designated groundfish, coastal pelagic, and salmonid EFH. However, we anticipate that implementing the above-listed conservation measures and other considerations outlined in Sections 2.0 and 3.0 of the BA will avoid, minimize, or otherwise offset potential adverse effects on designated groundfish and salmonid EFH in the proposed action area. Therefore, we conclude that, with the implementation of these measures, the proposed activities are not likely to adversely affect any identified EFH in the area.

SCHN00205442

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Table 1 Species of Fish with Designated EFH in the Action Area[1]

Groundfish Species	shortspine thornyhead, *Sebastolobus alascanus*
spiny dogfish, *Squalus acanthias*	cabezon, *Scorpaenichthys marmoratus*
big skate, *Raja binoculata*	lingcod, *Ophiodon elongatus*
California skate, *R. inornata*	kelp greenling, *Hexagrammos decagrammus*
longnose skate, *R. rhina*	sablefish, *Anoplopoma fimbria*
spotted ratfish, *Hydrolagus colliei*	jack mackerel, *Trachurus symmetricus*
Pacific cod, *Gadus macrocephalus*	Pacific sanddab, *Citharichthys sordidus*
Pacific hake, *Merluccius productus*	butter sole, *Pleuronectes isolepis*
black rockfish, *Sebastes melanops*	curlfin sole, *Pleuronichthys decurrens*
bocaccio, *S. paucispinis*	Dover sole, *Microstomus pacificus*
brown rockfish, *S. auriculatus*	English sole, *Pleuronectes vetulus*
canary rockfish, *S. pinniger*	flathead sole, *Hippoglossoides elassodon*
China rockfish, *S. nebulosus*	petrale sole, *Eopsetta jordani*
copper rockfish, *S. caurinus*	rex sole, *Errex zachirus*
darkblotched rockfish, *S. crameri*	rock sole, *Pleuronectes bilineata*
greenstriped rockfish, *S. elongatus*	sand sole, *Psettichthys melanostictus*
Pacific ocean perch, *S. alutus*	starry flounder, *Platichthys stellatus*
quillback rockfish, *S. maliger*	arrowtooth flounder, *Atheresthes stomias*
redbanded rockfish, *S. babcocki*	
redstripe rockfish, *S. proriger*	**Coastal Pelagic Species**
rosethorn rockfish, *S. helvomaculatus*	northern anchovy, *Engraulis mordax*
rosy rockfish, *S. rosaceus*	Pacific sardine, *Sardinops sagax*
rougheye rockfish, *S. aleutianus*	chub mackerel, *Scomber japonicus*
sharpchin rockfish, *S. zacentrus*	market squid, *Loligo opalescens*
splitnose rockfish, *S. diploproa*	
stripetail rockfish, *S. saxicola*	**Salmonid Species**
tiger rockfish, *S. nigrocinctus*	chinook salmon, *Oncorhynchus tshawytscha*
vermilion rockfish, *S. miniatus*	coho salmon, *O. kisutch*
yelloweye rockfish, *S. ruberrimus*	
yellowtail rockfish, *S. flavidus*	

34088\001\Schnitzer Slips 1-3 EFH\Table

[1] Highlighted species are known to occur in the Willamette River (Farr and Ward 1992) and may occur in the action area.

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BRIDGEWATER GROUP, INC.

September/December 2003 Groundwater Monitoring Results
Burgard Industrial Park

TO: Alicia Voss/DEQ

COPY: Mat Cusma/Schnitzer

FROM: Ross Rieke/Bridgewater Group

DATE: February 2, 2004

This memorandum presents the results of the groundwater monitoring performed in September and December 2003 at the Burgard Industrial Park in Portland, Oregon (Figure 1 and Figure 2). The groundwater monitoring was performed in accordance with the March 17, 2003, *Revised Groundwater Monitoring Plan* prepared for the Burgard site. As specified in the groundwater monitoring plan, water levels were measured in all seven groundwater monitoring wells on the Burgard site and groundwater samples were collected from six of the monitoring wells (MW-1 through MW-5 and MW-7).

Based on the groundwater monitoring plan and a September 22, 2003 email with you, the recent groundwater monitoring program consisted of following:

- Groundwater samples collected from MW-1, MW-2, MW-3, MW-4, MW-5, and MW-7 were analyzed for volatile organic compounds and total arsenic, chromium, copper, lead, and mercury.
- Analysis for dissolved arsenic on groundwater samples from MW-1, MW-3, MW-4, and MW-7.
- Analysis for dissolved chromium and copper on groundwater samples from MW-3 and MW-7.
- Analysis for dissolved chromium on the groundwater sample from MW-1.
- Analysis for dissolved lead and mercury on the groundwater sample from MW-3.

Figures 3 and 4 show the groundwater monitoring well locations.

Groundwater Elevations

Depths to groundwater were initially measured in the groundwater monitoring wells on the Burgard site on September 22, 2003. Groundwater was present in MW-3 and MW-7 during the September measuring event. After waiting for groundwater levels to rise during wet weather conditions, depth to groundwater was measured in all of the site wells on December 14, 2003. Table 1 presents the measured depths to water and the corresponding groundwater elevations. Table 1 also shows the Willamette River stage elevation during the times of the groundwater elevation measurements. The groundwater elevations are consistent with a general groundwater flow toward the river. Given the greater river elevation

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relative to the near-shore groundwater monitoring wells, some flow from the river toward the near-shore wells likely occurred during the monitoring period.

Chemical Analysis of Groundwater Samples

The groundwater samples were collected on September 21, 2003 from MW-3 and MW-7 and submitted to North Creek Analytical for chemical analysis. Groundwater samples were collected from MW-1, MW-2, MW-4, and MW-5 on December 14, 2003 and submitted to North Creek Analytical for chemical analysis.

The results of the chemical analysis are presented in reports from North Creek Analytical dated October 29, 2003, and January 21, 2004. Review of the laboratory quality assurance and quality control (QA/QC) data, including holding times, surrogate recoveries, method blanks, laboratory duplicates, matrix spikes, and matrix spike duplicates, noted the data was of acceptable quality.

Table 2 presents the results for all VOCs that have been detected at the Burgard site. Consistent with results from previous monitoring events, all detected VOCs were at concentrations below the EPA ambient water quality criteria except the PCE concentration detected in the sample from MW-1. The PCE concentration in the groundwater sample collected from MW-2, which is located down gradient from MW-1 and adjacent to the Willamette River, is less than the EPA ambient water quality criteria.

Table 3 and Table 4 present the results for total and dissolved metals, respectively. The measured arsenic concentrations are consistent with those measured in the previous sampling rounds in MW-2, MW-3, MW-4, MW-5, and MW-7. Arsenic was detected at a concentration of 9.68 ug/l in the groundwater sample from MW-1. Arsenic was detected at a concentration of 1.04 ug/l in the groundwater sample from MW-1 in the March 2003 sampling event. Chromium, copper, lead, and mercury were not detected in unfiltered samples from river shoreline wells MW-2, MW-4, and MW-5. None of these metals were detected in filtered samples collected from wells MW-1 and MW-3.

Groundwater Monitoring Schedule

In accordance with the DEQ-approved groundwater monitoring plan, the groundwater elevations will be measured in all seven groundwater monitoring wells in early February 2004. Once this round of groundwater elevation measurements is performed, the groundwater monitoring program described in the March 17, 2003 memorandum will be complete. We will then prepare a summary report discussing the monitoring criteria described in the March 17, 2003 memorandum.

TABLES

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Table 1
Groundwater Elevations in Monitoring Wells
Burgard Industrial Park

Monitoring Well	Date	Depth (ft)	GW Elev (ft) COP Datum
MW-01	1/27/2002	18.05	10.0
	3/23/2003	18.53	9.5
	4/15/2003	18.21	9.8
	4/28/2003	17.79	10.2
	6/20/2003	17.73	10.3
	12/14/2003	20.34	7.7
MW-02	1/27/2002	16.46	10.9
	3/23/2003	16.63	10.8
	4/15/2003	17.36	10.0
	4/28/2003	17.15	10.2
	6/20/2003	17.83	9.6
	12/14/2003	17.99	9.4
MW-03	1/27/2002	17.65	9.6
	3/23/2003	17.59	9.7
	4/15/2003	nm	nm
	4/28/2003	16.91	10.4
	6/20/2003	16.75	10.5
	12/14/2003	19.47	7.8
MW-04	1/27/2002	16.99	11.0
	3/23/2003	nm	nm
	4/15/2003	17.93	10.0
	4/28/2003	17.52	10.4
	6/20/2003	18.17	9.8
	12/14/2003	18.25	9.7
MW-05	1/27/2002	17.47	10.9
	3/23/2003	17.83	10.5
	4/15/2003	18.68	9.7
	4/28/2003	17.35	11.0
	6/20/2003	19.22	9.1
	12/14/2003	19.03	9.3
MW-06	1/27/2002	11.89	16.4
	3/23/2003	12.37	15.9
	4/15/2003	12.13	16.2
	4/28/2003	12.31	16.0
	6/20/2003	12.80	15.5
	12/14/2003	13.21	15.1
MW-07	1/27/2002	25.77	9.7
	3/23/2003	25.41	10.1
	4/15/2003	24.98	10.5
	4/28/2003	24.62	10.9
	6/20/2003	24.24	11.2
	12/14/2003	26.81	8.7

		Gauge[1] (ft)	COP Datum[2] (ft)
Willamette River	1/27/2002	8.75	11.68
	3/23/2003	7.95	10.88
	4/15/2003	7.00	9.93
	4/28/2003	6.40	9.33
	6/20/2003	5.80	8.73
	12/14/2003	7.70	10.63

1 - Willamette River gauge at Morrison Bridge
2 - COP Datum = Morrison St. Bridge Guage + 2.93

Table 2
Concentrations in Groundwater Samples
Volatile Organic Compounds
Burgard Industrial Park
All results in ug/l

Probe/ Well	Location	Date	cis-1,2,-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	Trichloroethene	Vinyl Chloride
MW01	Former NW Oil Tanks	1/28/2002	9.13	32.7	1 U	4.5	1.23
		3/23/2003	14.3	23.2	1 U	20.1	1.18
		12/14/2003	32.8	14.5	1 U	6.74	1 U
MW02	Shoreline, north end of site	1/28/2002	2.78	6.68	1 U	8.06	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	1.97	7.76	1 U	8.90	1 U
		12/14/2003	1.9	5.75	1 U	7.51	1 U
MW03	Shoreline, middle of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	-	-	-	-	-
		4/28/2003	-	-	-	-	-
		9/21/2003	-	-	-	-	-
MW04	Shoreline, middle of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		4/15/2003	-	-	-	-	-
		12/14/2003	-	-	-	-	-
MW05	Shoreline, south end of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	-	-	-	-	-
		12/14/2003	-	-	-	-	-
MW06	Outfall 1 plug area	1/28/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
MW07	Southeast area	1/28/2002	1 U	1.91	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	1 U	1 U	1 U	1.27	1 U
		9/21/2003	1 U	1.1	1 U	1 U	1 U
PP02	WMW compressor	12/18/2001	1 U	1 U	1 U	1 U	1 U
PP03	Boydston oil storage area	12/18/2001	1 U	1 U	1 U	1 U	1 U
PP04	PBM wash pad	12/18/2001	1 U	1 U	1.23	1 U	1 U
PP05	Former NW Oil Tanks	12/18/2001	1 U	1 U	1 U	1 U	1 U
PP06	Shoreline, north end of site	4/15/2003	1.69	1 U	1 U	1.36	1 U
PP07	Former NW Oil Tanks	4/15/2003	1 U	1 U	1 U	1 U	1 U
PP08	Shoreline, north end of site	4/15/2003	1 U	1 U	1 U	1 U	1 U
PP09	Former NW Oil Tanks	4/15/2003	1 U	1 U	1 U	1 U	1 U
PW01	UST Pad	1/28/2002	1 U	1 U	1 U	1 U	1 U
PW03	PBM wash pad	1/28/2002	1 U	1.67	1 U	1.7	1 U
PW06	Southwest corner of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
EPA Ambient Water Quality Criteria				8.85		81	525
DEQ Level II Surface Water SLV				240	11	21.9	1300

U - Not detected at noted reporting limit
"-" - Not analyzed
All VOCs not shown in table are not detected.

Table 3
Concentrations in Groundwater Samples
Total Metals
Burgard Industrial Park
All results in ug/l

Probe/ Well	Location	Date	Total Antimony	Total Arsenic	Total Barium	Total Cadmium	Total Chromium	Total Copper	Total Lead	Ttotal Mercury	Total Nickel	Total Zinc
MW01	Former NW Oil Tanks	1/28/2002	-	-	-	-	-	-	-	-	-	-
		3/23/2003	1.0 U	1.04	41.2	1.0 U	1.0 U	2.0 U	1.0 U	0.2 U	6.82	5.0 U
		12/14/2003	-	9.68	-	-	1.36	2.0 U	1.0 U	0.2 U	-	-
MW02	Shoreline, north end of site	1/28/2002	1.0 U	1.07	23.3	1.0 U	1.96	2.0 U	1.0 U	0.2 U	2.0 U	10.6
		4/14/2002	-	-	-	-	-	-	-	-	-	-
		3/23/2003	1.0 U	1.58	37.8	1.0 U	1.43	3.66	3.57	0.2 U	2.0 U	29.5
		12/14/2003	-	1.0 U	-	-	1.0 U	2.0 U	1.0 U	0.2 U	-	-
MW03	Shoreline, middle of site	1/27/2002	1.0 U	30.8	148	1.0 U	1.61	2.0 U	1.0 U	0.20	5.78	7.1
		4/14/2002	-	-	-	-	-	-	-	-	-	-
		3/23/2003	1.0 U	41.1	159	1.0 U	10.3	24.6	12.2	0.23	13.6	46.6
		4/28/2003	-	-	-	-	-	-	-	-	-	-
		9/21/2003	-	44.5	-	-	27.7	36	22.1	0.24	-	-
MW04	Shoreline, middle of site	1/27/2002	1.0 U	1.92	47.2	1.0 U	1.30	2.0 U	1.0 U	0.2 U	12.3	5.2
		4/14/2002	-	-	-	-	-	-	-	-	-	-
		4/15/2003	1.0 U	8.64	77.6	1.0 U	1.0 U	2.0 U	1.0 U	0.23	10.6	6.22
		12/14/2003	-	2.66	-	-	1.0 U	2.0 U	1.0 U	0.2 U	-	-
MW05	Shoreline, south end of site	1/27/2002	1.0 U	1.0 U	13.0	1.0 U	1.57	2.3	1.0 U	0.2 U	2.3	11.2
		4/14/2002	-	-	-	-	-	-	-	-	-	-
		3/23/2003	1.0 U	1.0 U	9.61	1.0 U	1.0 U	2.0 U	1.0 U	0.2 U	2.0 U	5.0 U
		12/14/2003	-	1.0 U	-	-	1.0 U	2.0 U	1.0 U	0.2 U	-	-
MW06	Outfall 1 plug area	1/28/2002	1.0 U	1.0 U	33.1	1.0 U	1.61	2.0 U	1.0 U	0.2 U	8.6	8.8
		4/14/2002	-	-	-	-	-	-	-	-	-	-
MW07	Southeast area	1/28/2002	1.0 U	1.20	64.7	1.0 U	1.83	2.0 U	1.0 U	0.2 U	4.9	5.0 U
		4/14/2002	-	-	-	-	-	-	-	-	-	-
		3/23/2003	1.0 U	3.18	106	1.0 U	5.33	9.24	3.53	0.2 U	6.42	20.8
		9/21/2003	-	4.43	-	-	10.8	13.3	0.46	0.2 U	-	-
EPA Ambient Water Quality Criteria			4300	0.14				1300		0.05	4600	69000
DEQ Level II Surface Water SLV			1600	150		2.2	0.21	9	2.5	0.77	52	120

U - Not detected at noted reporting limit
"-" - Not analyzed

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Table 4
Concentrations in Groundwater Samples
Dissolved Metals
Burgard Industrial Park
All results in ug/l

Probe/ Well	Location	Date	Dissolved Antimony	Dissolved Arsenic	Dissolved Barium	Dissolved Cadmium	Dissolved Chromium	Dissolved Copper	Dissolved Lead	Dissolved Mercury	Dissolved Nickel	Dissolved Selenium	Dissolved Silver	Dissolved Thallium	Dissolved Zinc
MW01	Former NW Oil Tanks	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		3/23/2003	-	1 U	46.4	-	-	-	-	-	-	-	-	-	-
		12/14/2003	-	5.01	-	-	1 U	-	-	-	-	-	-	-	-
MW02	Shoreline, north end of site	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	6.3	-	-	1.1	-	-	-	-	-	-	-	-
		3/23/2003	-	1.0 U	27.4	-	1.0 U	-	1.0 U	-	-	-	-	-	-
		12/14/2003	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	Shoreline, middle of site	1/27/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	37.7	-	-	1.0 U	-	-	0.2 U	-	-	-	-	-
		3/23/2003	-	32.8	113	-	1.0 U	1.06	1.0 U	0.2 U	-	-	-	-	-
		4/28/2003	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/21/2003	-	38.9	-	-	1.0 U	2.0 U	1.0 U	0.2 U	-	-	-	-	-
MW04	Shoreline, middle of site	1/27/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	11.4	-	-	1.0 U	-	-	-	-	-	-	-	-
		4/15/2003	-	6.29	77.6	-	-	-	-	0.2 U	-	-	-	-	-
		12/14/2003	-	3.34	-	-	-	-	-	-	-	-	-	-	-
MW05	Shoreline, south end of site	1/27/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	-	-	-	1.0 U	-	-	-	-	-	-	-	-
		3/23/2003	-	-	10.1	-	-	-	-	-	-	-	-	-	-
		12/14/2003	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	Outfall 1 plug area	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	-	-	-	1.0 U	-	-	-	-	-	-	-	-
MW07	Southeast area	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	6.1	-	-	1.0 U	-	-	-	-	-	-	-	-
		3/23/2003	-	1.64	65.3	-	1.0 U	1.61	1.0 U	-	-	-	-	-	-
		9/21/2003	-	1.97	-	-	2.05	2.0 U	-	-	-	-	-	-	-
EPA Ambient Water Quality Criteria			4300	0.14				1300		0.05	4600	69000			
DEQ Level II Surface Water SLV			1600	150		2.2	0.21	9	2.5	0.77	52	120	0.12	40	120

U - Not detected at noted reporting limit
"-" - Not analyzed

SCHN00205630

FIGURES

SCHN00205631

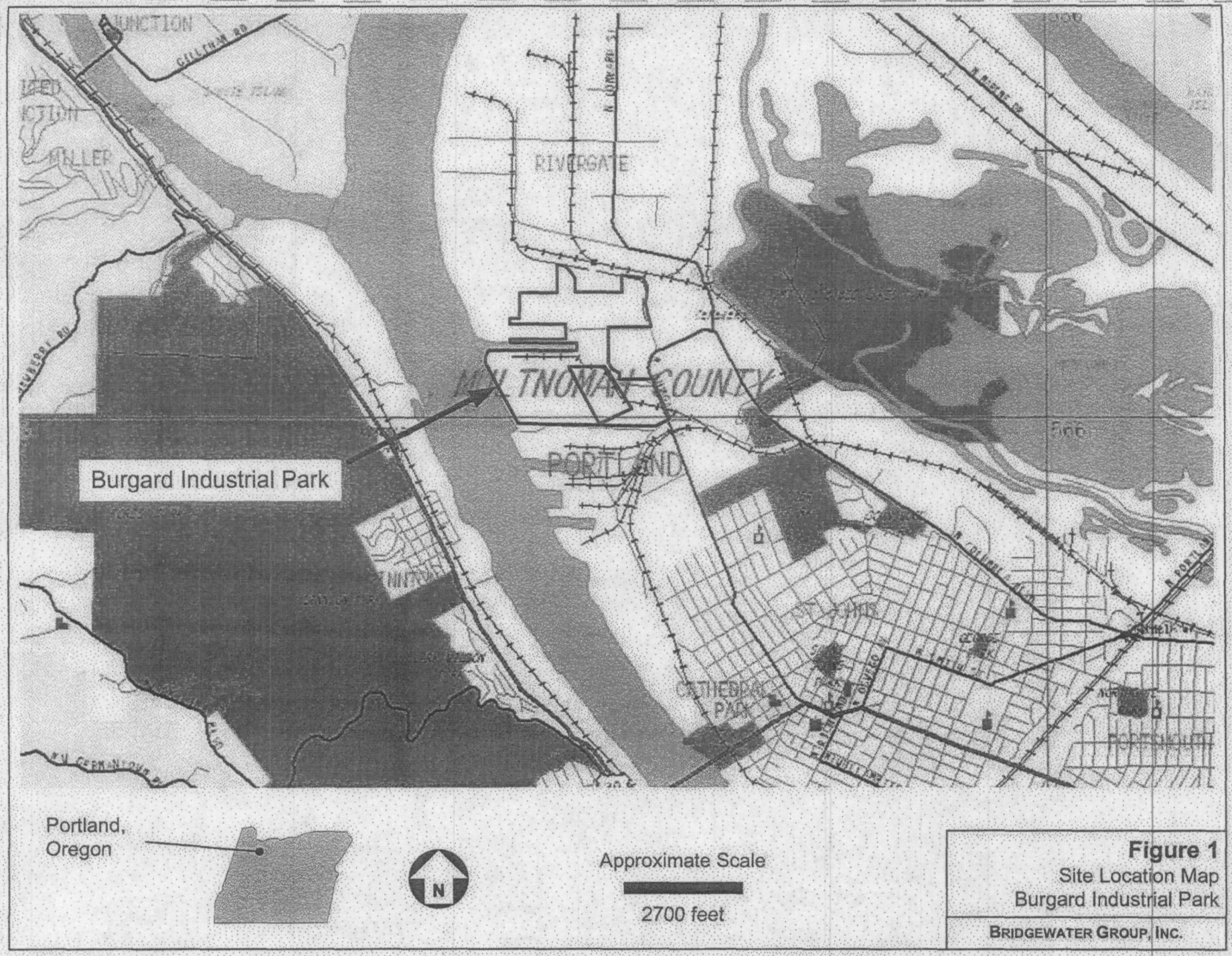
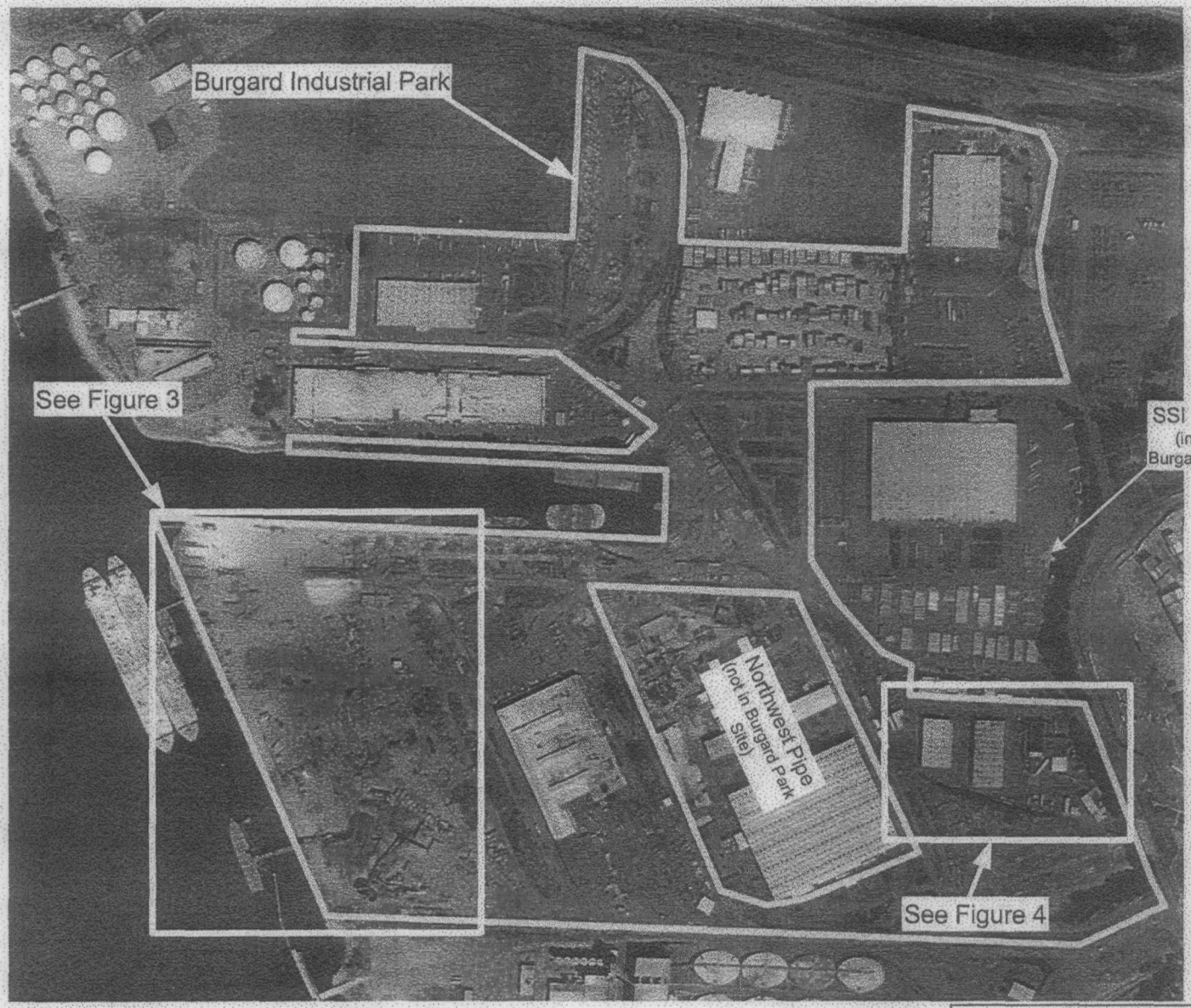


Figure 1
Site Location Map
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

SCHN00205632



N

Approximate Scale

600 Feet

Figure 2
July 2002 Aerial Photograph
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

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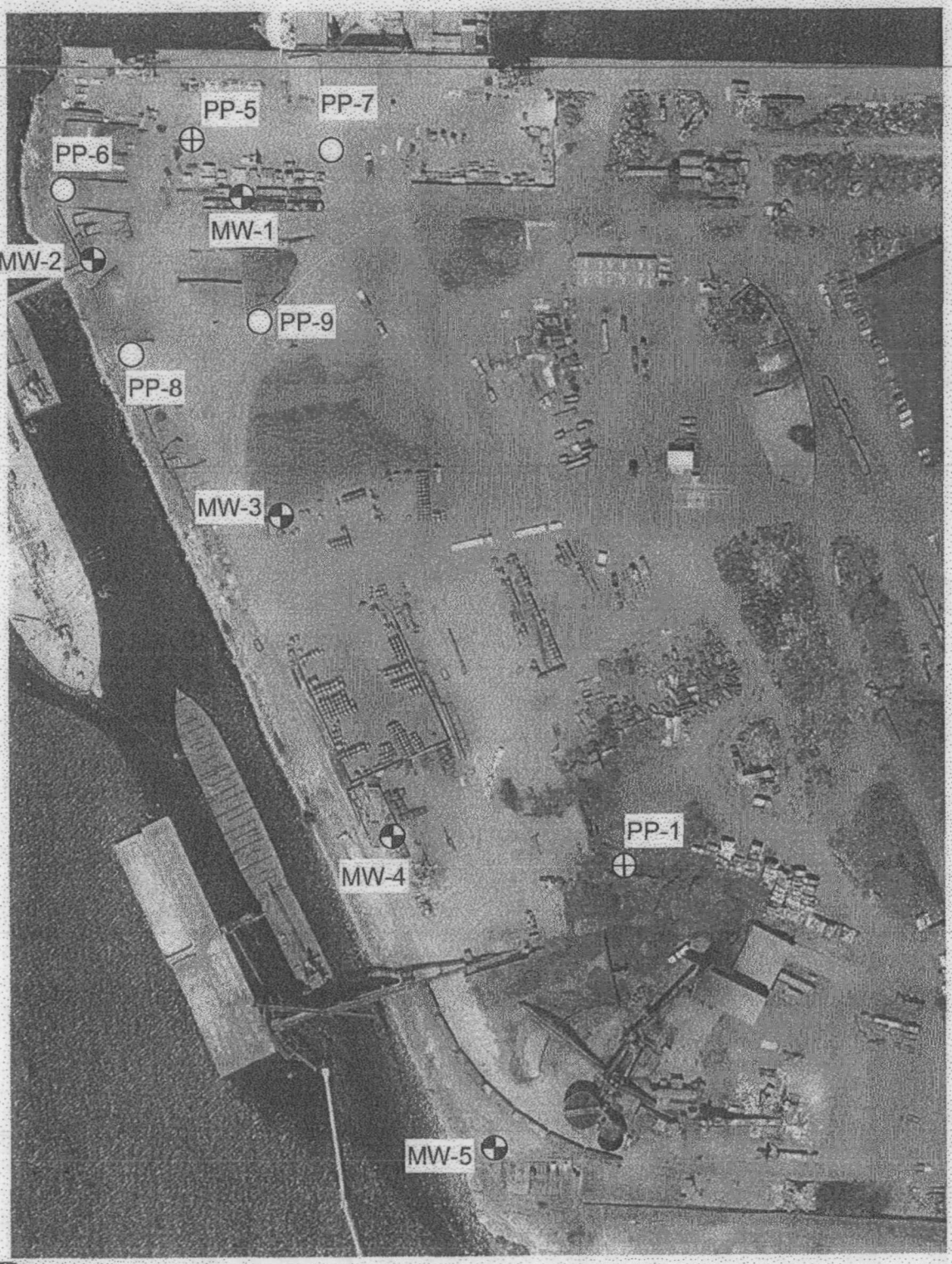


N

Approximate Scale

220 feet

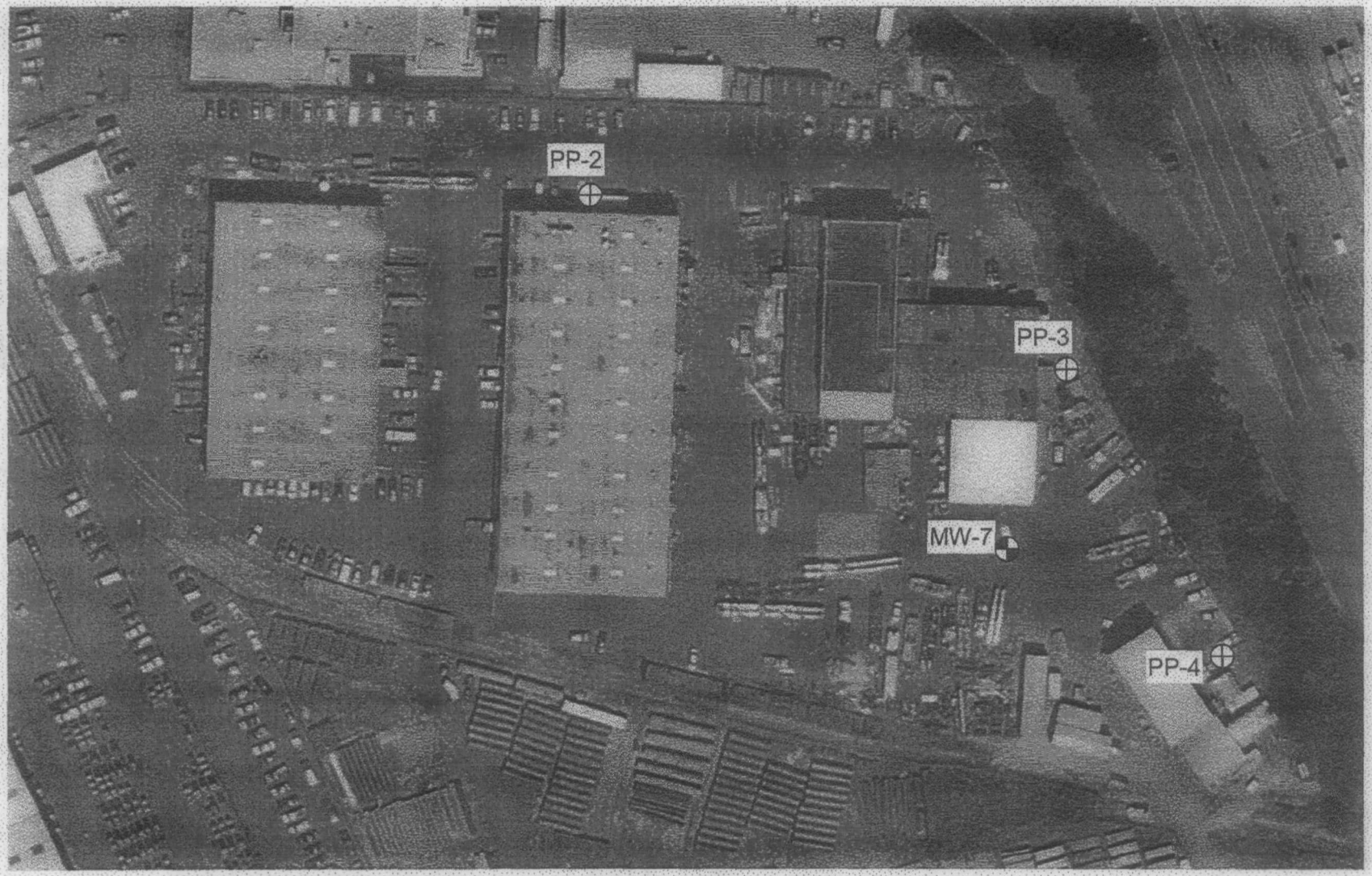
Monitoring Well

Phase I Push Probe

Phase II Push Probe

Figure 3
Monitoring Well and Push Probe Locations - SSI Area
Burgard Industrial Park

BRIDGEWATER GROUP, INC.



N

Approximate Scale

100 feet

Monitoring Well

Push Probe

Figure 4
Monitoring Well and Push Probe Locations - SE Area
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

SCHN00205635

APPENDIX A

SCHN00205636

Appendix A – Analytical Laboratory Reports

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29 October, 2003

Ross Rieke
Bridgewater Group
4500 Kruse Way Suite 110
Lake Oswego, OR 97035

RE: Burgard

Enclosed are the results of analyses for samples received by the laboratory on 09/22/03 15:10. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Philip Nerenberg
Laboratory Manager

Work Orders included in this report:
P3I0805

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	10/29/03 18:11

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-03	P3I0805-01	Water	09/21/03 12:00	09/22/03 15:10
MW-07	P3I0805-02	Water	09/21/03 12:00	09/22/03 15:10

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	10/29/03 18:11

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-03 (P3I0805-01) Water					Sampled: 09/21/03	Received: 09/22/03			
Arsenic	**0.0445**	0.00100	mg/l	1	EPA 6020	10/01/03	10/02/03	3100035	
Chromium	**0.0277**	0.00100	"	"	"	"	"	"	
Copper	**0.0360**	0.00200	"	"	"	"	"	"	
Lead	**0.0221**	0.00100	"	"	"	"	"	"	
Mercury	**0.000236**	0.000200	"	"	EPA 7470A	10/01/03	10/01/03	3100024	
MW-07 (P3I0805-02) Water					Sampled: 09/21/03	Received: 09/22/03			
Arsenic	**0.00443**	0.00100	mg/l	1	EPA 6020	10/01/03	10/02/03	3100035	
Chromium	**0.0108**	0.00100	"	"	"	"	"	"	
Copper	**0.0133**	0.00200	"	"	"	"	"	"	
Lead	**0.00464**	0.00100	"	"	"	"	"	"	
Mercury	ND	0.000200	"	"	EPA 7470A	10/01/03	10/01/03	3100024	

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Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	10/29/03 18:11

Dissolved Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-03 (P310805-01) Water					Sampled: 09/21/03 Received: 09/22/03				
Arsenic	**0.0389**	0.00100	mg/l	1	EPA 6020	10/08/03	10/10/03	3100299	
Chromium	ND	0.00100	"	"	"	"	"	"	
Copper	ND	0.00200	"	"	"	"	"	"	
Lead	ND	0.00100	"	"	"	"	"	"	
Mercury	ND	0.000200	"	"	EPA 7470A	10/15/03	10/15/03	3100546	
MW-07 (P310805-02) Water					Sampled: 09/21/03 Received: 09/22/03				
Arsenic	**0.00197**	0.00100	mg/l	1	EPA 6020	10/08/03	10/10/03	3100299	
Chromium	**0.00205**	0.00100	"	"	"	"	"	"	
Copper	ND	0.00200	"	"	"	"	"	"	

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	10/29/03 18:11

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-07 (P310805-02) Water					Sampled: 09/21/03	Received: 09/22/03			
Acetone	ND	25.0	ug/l	1	EPA 8260B	09/25/03	09/25/03	3091108	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	10/29/03 18:11

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-07 (P3I0805-02) Water					Sampled: 09/21/03 Received: 09/22/03				
trans-1,3-Dichloropropene	ND	1.00	ug/l	1	EPA 8260B	09/25/03	09/25/03	3091108	
Ethylbenzene	ND	1.00	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.00	"	"	"	"	"	"	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	**1.10**	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	*94.0 %*	*80-120*							
Surr: 1,2-DCA-d4	*99.5 %*	*77-135*							
Surr: Dibromofluoromethane	*101 %*	*80-122*							
Surr: Toluene-d8	*98.0 %*	*80-120*							

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	10/29/03 18:11

Total Metals per EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3100024 - EPA 7470										
Blank (3100024-BLK1)				Prepared & Analyzed: 10/01/03						
Mercury	ND	0.000200	mg/l							
LCS (3100024-BS1)				Prepared & Analyzed: 10/01/03						
Mercury	0.00474	0.000200	mg/l	0.00500		94.8	85-115			
Duplicate (3100024-DUP1)		Source: P3I0805-01		Prepared & Analyzed: 10/01/03						
Mercury	0.000441	0.000200	mg/l		0.000236			60.6	20	Q-06
Matrix Spike (3100024-MS1)		Source: P3I0805-01		Prepared & Analyzed: 10/01/03						
Mercury	0.00518	0.000200	mg/l	0.00500	0.000236	98.9	75-125			
Matrix Spike (3100024-MS2)		Source: P3I0805-02		Prepared & Analyzed: 10/01/03						
Mercury	0.00487	0.000200	mg/l	0.00500	ND	97.4	75-125			
Batch 3100035 - EPA 200/3005										
Blank (3100035-BLK1)				Prepared: 10/01/03 Analyzed: 10/02/03						
Arsenic	ND	0.00100	mg/l							
Chromium	ND	0.00100	"							
Copper	ND	0.00200	"							
Lead	ND	0.00100	"							
LCS (3100035-BS1)				Prepared: 10/01/03 Analyzed: 10/02/03						
Arsenic	0.0975	0.00100	mg/l	0.100		97.5	80-120			
Chromium	0.103	0.00100	"	0.100		103	80-120			
Copper	0.103	0.00200	"	0.100		103	80-120			
Lead	0.0973	0.00100	"	0.100		97.3	80-120			

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	10/29/03 18:11

Total Metals per EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3100035 - EPA 200/3005										
Duplicate (3100035-DUP1)		**Source: P3I0831-01**		Prepared: 10/01/03 Analyzed: 10/02/03						
Arsenic	0.00433	0.00100	mg/l		0.00395			9.18	20	
Chromium	ND	0.00100	"		ND				20	
Copper	0.00603	0.00200	"		0.00597			1.00	20	
Lead	ND	0.00100	"		ND				20	
Matrix Spike (3100035-MS1)		**Source: P3I0831-01**		Prepared: 10/01/03 Analyzed: 10/02/03						
Arsenic	0.110	0.00100	mg/l	0.100	0.00395	106	75-125			
Chromium	0.110	0.00100	"	0.100	ND	110	75-125			
Copper	0.113	0.00200	"	0.100	0.00597	107	75-125			
Lead	0.0986	0.00100	"	0.100	ND	98.6	75-125			
Matrix Spike (3100035-MS2)		**Source: P3I0831-02**		Prepared: 10/01/03 Analyzed: 10/02/03						
Arsenic	0.109	0.00100	mg/l	0.100	0.00671	102	75-125			
Chromium	0.107	0.00100	"	0.100	0.00115	106	75-125			
Copper	0.112	0.00200	"	0.100	0.00913	103	75-125			
Lead	0.0969	0.00100	"	0.100	0.000100	96.8	75-125			

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	10/29/03 18:11

Dissolved Metals per EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3100299 - EPA 200/3005 Diss										
Blank (3100299-BLK1)				Prepared: 10/08/03 Analyzed: 10/09/03						
Arsenic	ND	0.00100	mg/l							
Chromium	ND	0.00100	"							
Copper	ND	0.00200	"							
Lead	ND	0.00100	"							
LCS (3100299-BS1)				Prepared: 10/08/03 Analyzed: 10/09/03						
Arsenic	0.0975	0.00100	mg/l	0.100		97.5	80-120			
Chromium	0.102	0.00100	"	0.100		102	80-120			
Copper	0.100	0.00200	"	0.100		100	80-120			
Lead	0.0944	0.00100	"	0.100		94.4	80-120			
Duplicate (3100299-DUP1)		Source: P3J0186-05		Prepared: 10/08/03 Analyzed: 10/09/03						
Arsenic	ND	0.00100	mg/l		ND				20	
Chromium	ND	0.00100	"		ND				20	
Copper	ND	0.00200	"		0.000270				20	
Lead	ND	0.00100	"		ND				20	
Matrix Spike (3100299-MS1)		Source: P3J0186-05		Prepared: 10/08/03 Analyzed: 10/09/03						
Arsenic	0.0992	0.00100	mg/l	0.100	ND	99.2	75-125			
Chromium	0.103	0.00100	"	0.100	ND	103	75-125			
Copper	0.100	0.00200	"	0.100	0.000270	99.7	75-125			
Lead	0.101	0.00100	"	0.100	ND	101	75-125			
Matrix Spike (3100299-MS2)		Source: P3J0186-06		Prepared: 10/08/03 Analyzed: 10/09/03						
Arsenic	0.0969	0.00100	mg/l	0.100	ND	96.9	75-125			
Chromium	0.101	0.00100	"	0.100	ND	101	75-125			
Copper	0.0980	0.00200	"	0.100	0.000530	97.5	75-125			
Lead	0.0986	0.00100	"	0.100	ND	98.6	75-125			

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	10/29/03 18:11

Dissolved Metals per EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3100546 - EPA 7470A										
Blank (3100546-BLK1)				Prepared & Analyzed: 10/15/03						
Mercury	ND	0.000200	mg/l							
LCS (3100546-BS1)				Prepared & Analyzed: 10/15/03						
Mercury	0.00495	0.000200	mg/l	0.00500		99.0	85-115			
Duplicate (3100546-DUP1)		Source: P3I0805-01		Prepared & Analyzed: 10/15/03						
Mercury	0.000264	0.000200	mg/l		0.000084			103	20	Q-06
Matrix Spike (3100546-MS1)		Source: P3I0805-01		Prepared & Analyzed: 10/15/03						
Mercury	0.00511	0.000200	mg/l	0.00500	0.000084	101	75-125			

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	10/29/03 18:11

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3091108 - EPA 5030B										
Blank (3091108-BLK1)				Prepared & Analyzed: 09/25/03						
Acetone	ND	25.0	ug/l							
Benzene	ND	1.00	"							
Bromobenzene	ND	1.00	"							
Bromochloromethane	ND	1.00	"							
Bromodichloromethane	ND	1.00	"							
Bromoform	ND	1.00	"							
Bromomethane	ND	5.00	"							
2-Butanone	ND	10.0	"							
n-Butylbenzene	ND	5.00	"							
sec-Butylbenzene	ND	1.00	"							
tert-Butylbenzene	ND	1.00	"							
Carbon disulfide	ND	10.0	"							
Carbon tetrachloride	ND	1.00	"							
Chlorobenzene	ND	1.00	"							
Chloroethane	ND	1.00	"							
Chloroform	ND	1.00	"							
Chloromethane	ND	5.00	"							
2-Chlorotoluene	ND	1.00	"							
4-Chlorotoluene	ND	1.00	"							
1,2-Dibromo-3-chloropropane	ND	5.00	"							
Dibromochloromethane	ND	1.00	"							
1,2-Dibromoethane	ND	1.00	"							
Dibromomethane	ND	1.00	"							
1,2-Dichlorobenzene	ND	1.00	"							
1,3-Dichlorobenzene	ND	1.00	"							
1,4-Dichlorobenzene	ND	1.00	"							
Dichlorodifluoromethane	ND	5.00	"							
1,1-Dichloroethane	ND	1.00	"							
1,2-Dichloroethane	ND	1.00	"							
1,1-Dichloroethene	ND	1.00	"							
cis-1,2-Dichloroethene	ND	1.00	"							
trans-1,2-Dichloroethene	ND	1.00	"							
1,2-Dichloropropane	ND	1.00	"							
1,3-Dichloropropane	ND	1.00	"							
2,2-Dichloropropane	ND	1.00	"							
1,1-Dichloropropene	ND	1.00	"							

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	10/29/03 18:11

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3091108 - EPA 5030B										
Blank (3091108-BLK1)				Prepared & Analyzed: 09/25/03						
cis-1,3-Dichloropropene	ND	1.00	ug/l							
trans-1,3-Dichloropropene	ND	1.00	"							
Ethylbenzene	ND	1.00	"							
Hexachlorobutadiene	ND	2.00	"							
2-Hexanone	ND	10.0	"							
Isopropylbenzene	ND	2.00	"							
p-Isopropyltoluene	ND	2.00	"							
4-Methyl-2-pentanone	ND	5.00	"							
Methyl tert-butyl ether	ND	1.00	"							
Methylene chloride	ND	5.00	"							
Naphthalene	ND	2.00	"							
n-Propylbenzene	ND	1.00	"							
Styrene	ND	1.00	"							
1,1,1,2-Tetrachloroethane	ND	1.00	"							
1,1,2,2-Tetrachloroethane	ND	1.00	"							
Tetrachloroethene	ND	1.00	"							
Toluene	ND	1.00	"							
1,2,3-Trichlorobenzene	ND	1.00	"							
1,2,4-Trichlorobenzene	ND	1.00	"							
1,1,1-Trichloroethane	ND	1.00	"							
1,1,2-Trichloroethane	ND	1.00	"							
Trichloroethene	ND	1.00	"							
Trichlorofluoromethane	ND	1.00	"							
1,2,3-Trichloropropane	ND	1.00	"							
1,2,4-Trimethylbenzene	ND	1.00	"							
1,3,5-Trimethylbenzene	ND	1.00	"							
Vinyl chloride	ND	1.00	"							
o-Xylene	ND	1.00	"							
m,p-Xylene	ND	2.00	"							
Surr: 4-BFB	*19.0*		"	*20.0*		*95.0*	*80-120*			
Surr: 1,2-DCA-d4	*19.4*		"	*20.0*		*97.0*	*77-135*			
Surr: Dibromofluoromethane	*19.4*		"	*20.0*		*97.0*	*80-122*			
Surr: Toluene-d8	*19.6*		"	*20.0*		*98.0*	*80-120*			

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	10/29/03 18:11

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3091108 - EPA 5030B										
LCS (3091108-BS1)				Prepared & Analyzed: 09/25/03						
Benzene	20.9	1.00	ug/l	20.0		104	80-120			
Chlorobenzene	19.9	1.00	"	20.0		99.5	80-120			
1,1-Dichloroethene	21.2	1.00	"	20.0		106	80-120			
Toluene	20.6	1.00	"	20.0		103	80-120			
Trichloroethene	22.5	1.00	"	20.0		112	80-124			
Surr: 4-BFB	*20.6*		"	*20.0*		*103*	*80-120*			
Surr: 1,2-DCA-d4	*19.0*		"	*20.0*		*95.0*	*77-135*			
Surr: Dibromofluoromethane	*19.6*		"	*20.0*		*98.0*	*80-122*			
Surr: Toluene-d8	*19.9*		"	*20.0*		*99.5*	*80-120*			
Matrix Spike (3091108-MS1)		**Source: P3I0805-02**		Prepared & Analyzed: 09/25/03						
Benzene	21.5	1.00	ug/l	20.0	ND	108	80-124			
Chlorobenzene	20.4	1.00	"	20.0	ND	102	72.9-134			
1,1-Dichloroethene	21.5	1.00	"	20.0	ND	108	79.3-127			
Toluene	20.8	1.00	"	20.0	ND	104	79.7-131			
Trichloroethene	20.8	1.00	"	20.0	0.460	102	68.4-130			
Surr: 4-BFB	*20.8*		"	*20.0*		*104*	*80-120*			
Surr: 1,2-DCA-d4	*19.4*		"	*20.0*		*97.0*	*77-135*			
Surr: Dibromofluoromethane	*20.1*		"	*20.0*		*100*	*80-122*			
Surr: Toluene-d8	*20.4*		"	*20.0*		*102*	*80-120*			
Matrix Spike Dup (3091108-MSD1)		**Source: P3I0805-02**		Prepared & Analyzed: 09/25/03						
Benzene	21.3	1.00	ug/l	20.0	ND	106	80-124	0.935	25	
Chlorobenzene	20.1	1.00	"	20.0	ND	100	72.9-134	1.48	25	
1,1-Dichloroethene	21.3	1.00	"	20.0	ND	106	79.3-127	0.935	25	
Toluene	20.5	1.00	"	20.0	ND	102	79.7-131	1.45	25	
Trichloroethene	20.5	1.00	"	20.0	0.460	100	68.4-130	1.45	25	
Surr: 4-BFB	*20.3*		"	*20.0*		*102*	*80-120*			
Surr: 1,2-DCA-d4	*19.0*		"	*20.0*		*95.0*	*77-135*			
Surr: Dibromofluoromethane	*19.7*		"	*20.0*		*98.5*	*80-122*			
Surr: Toluene-d8	*19.4*		"	*20.0*		*97.0*	*80-120*			

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	10/29/03 18:11

Notes and Definitions

Q-06	Analyses are not controlled on RPD values from sample concentrations less than 5 times the reporting limit.
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. MRLs are adjusted if %Solids are less than 50%.
wet	Sample results reported on a wet weight basis (as received)
RPD	Relative Percent Difference

North Creek Analytical - Portland

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21 January, 2004

Ross Rieke
Bridgewater Group
4500 Kruse Way Suite 110
Lake Oswego, OR 97035

RE: Burgard

Enclosed are the results of analyses for samples received by the laboratory on 12/19/03 10:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Philip Nerenberg
Laboratory Manager

Work Orders included in this report:
P3L0693

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	01/21/04 15:06

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-01	P3L0693-01	Water	12/14/03 11:10	12/19/03 10:40
MW-02	P3L0693-02	Water	12/14/03 12:07	12/19/03 10:40
MW-04	P3L0693-04	Water	12/14/03 14:03	12/19/03 10:40
MW-05	P3L0693-05	Water	12/14/03 15:00	12/19/03 10:40

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	01/21/04 15:06

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-01 (P3L0693-01) Water					Sampled: 12/14/03	Received: 12/19/03			
Arsenic	**0.00968**	0.00100	mg/l	1	EPA 6020	01/05/04	01/10/04	4010092	
Chromium	**0.00136**	0.00100	"	"	"	"	"	"	
Copper	ND	0.00200	"	"	"	"	"	"	
Lead	ND	0.00100	"	"	"	"	01/11/04	"	
Mercury	ND	0.000200	"	"	EPA 7470A	01/04/04	01/04/04	4010042	
MW-02 (P3L0693-02) Water					Sampled: 12/14/03	Received: 12/19/03			
Arsenic	ND	0.00100	mg/l	1	EPA 6020	01/05/04	01/11/04	4010092	
Chromium	ND	0.00100	"	"	"	"	"	"	
Copper	ND	0.00200	"	"	"	"	"	"	
Lead	ND	0.00100	"	"	"	"	01/11/04	"	
Mercury	ND	0.000200	"	"	EPA 7470A	01/04/04	01/04/04	4010042	
MW-04 (P3L0693-04) Water					Sampled: 12/14/03	Received: 12/19/03			
Arsenic	**0.00266**	0.00100	mg/l	1	EPA 6020	01/05/04	01/11/04	4010092	
Chromium	ND	0.00100	"	"	"	"	"	"	
Copper	ND	0.00200	"	"	"	"	"	"	
Lead	ND	0.00100	"	"	"	"	01/11/04	"	
Mercury	ND	0.000200	"	"	EPA 7470A	01/04/04	01/04/04	4010042	
MW-05 (P3L0693-05) Water					Sampled: 12/14/03	Received: 12/19/03			
Arsenic	ND	0.00100	mg/l	1	EPA 6020	01/05/04	01/11/04	4010092	
Chromium	ND	0.00100	"	"	"	"	"	"	
Copper	ND	0.00200	"	"	"	"	"	"	
Lead	ND	0.00100	"	"	"	"	01/11/04	"	
Mercury	ND	0.000200	"	"	EPA 7470A	01/04/04	01/04/04	4010042	

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	01/21/04 15:06

Dissolved Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-01 (P3L0693-01) Water					Sampled: 12/14/03	Received: 12/19/03			
Arsenic	**0.00501**	0.00100	mg/l	1	EPA 6020	01/16/04	01/20/04	4010429	
Chromium	ND	0.00100	"	"	"	"	"	"	
MW-04 (P3L0693-04) Water					Sampled: 12/14/03	Received: 12/19/03			
Arsenic	**0.00334**	0.00100	mg/l	1	EPA 6020	01/16/04	01/20/04	4010429	

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	01/21/04 15:06

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-01 (P3L0693-01) Water					Sampled: 12/14/03 Received: 12/19/03				
Acetone	ND	25.0	ug/l	1	EPA 8260B	12/24/03	12/24/03	3120939	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**32.8**	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	01/21/04 15:06

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-01 (P3L0693-01) Water					Sampled: 12/14/03 Received: 12/19/03				
trans-1,3-Dichloropropene	ND	1.00	ug/l	1	EPA 8260B	12/24/03	12/24/03	3120939	
Ethylbenzene	ND	1.00	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.00	"	"	"	"	"	"	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	**14.5**	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	**6.74**	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	*89.5 %*	*75-120*							
Surr: 1,2-DCA-d4	*108 %*	*77-129*							
Surr: Dibromofluoromethane	*108 %*	*80-121*							
Surr: Toluene-d8	*106 %*	*80-120*							

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	01/21/04 15:06

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-02 (P3L0693-02) Water					Sampled: 12/14/03	Received: 12/19/03			
Acetone	ND	25.0	ug/l	1	EPA 8260B	12/24/03	12/24/03	3120939	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	5.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	10.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**1.90**	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	01/21/04 15:06

Volatile Organic Compounds per EPA Method 8260B

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
MW-02 (P3L0693-02) Water					Sampled: 12/14/03	Received: 12/19/03			
trans-1,3-Dichloropropene	ND	1.00	ug/l	1	EPA 8260B	12/24/03	12/24/03	3120939	
Ethylbenzene	ND	1.00	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2.00	"	"	"	"	"	"	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	2.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	2.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	**5.75**	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	**7.51**	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surr: 4-BFB	*88.5 %*	*75-120*							
Surr: 1,2-DCA-d4	*112 %*	*77-129*							
Surr: Dibromofluoromethane	*112 %*	*80-121*							
Surr: Toluene-d8	*108 %*	*80-120*							

North Creek Analytical - Portland

Philip Nerenberg

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	01/21/04 15:06

Total Metals per EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4010042 - EPA 7470										
Blank (4010042-BLK1)				Prepared & Analyzed: 01/04/04						
Mercury	ND	0.000200	mg/l							
LCS (4010042-BS1)				Prepared & Analyzed: 01/04/04						
Mercury	0.00493	0.000200	mg/l	0.00500		98.6	85-115			
Duplicate (4010042-DUP1)		Source: P3L0623-01		Prepared & Analyzed: 01/04/04						
Mercury	0.0000640	0.000200	mg/l		0.000122			62.4	20	Q-06
Matrix Spike (4010042-MS1)		Source: P3L0623-01		Prepared & Analyzed: 01/04/04						
Mercury	0.00477	0.000200	mg/l	0.00500	0.000122	93.0	75-125			
Matrix Spike (4010042-MS2)		Source: P3L0623-02		Prepared & Analyzed: 01/04/04						
Mercury	0.00509	0.000200	mg/l	0.00500	0.000451	92.8	75-125			
Batch 4010092 - EPA 200/3005										
Blank (4010092-BLK1)				Prepared: 01/05/04 Analyzed: 01/10/04						
Arsenic	ND	0.00100	mg/l							
Chromium	ND	0.00100	"							
Copper	ND	0.00200	"							
Lead	ND	0.00100	"							
LCS (4010092-BS1)				Prepared: 01/05/04 Analyzed: 01/10/04						
Arsenic	0.105	0.00100	mg/l	0.100		105	80-120			
Chromium	0.107	0.00100	"	0.100		107	80-120			
Copper	0.107	0.00200	"	0.100		107	80-120			
Lead	0.109	0.00100	"	0.100		109	80-120			

North Creek Analytical - Portland

Philip Nerenberg

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	01/21/04 15:06

Total Metals per EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4010092 - EPA 200/3005										
Duplicate (4010092-DUP1)		**Source: P3L0693-01**		Prepared: 01/05/04 Analyzed: 01/11/04						
Arsenic	0.00929	0.00100	mg/l		0.00968			4.11	20	
Chromium	ND	0.00100	"		0.00136				20	
Copper	0.000980	0.00200	"		0.00115			16.0	20	
Lead	0.0000900	0.00100	"		0.000100			10.5	20	
Matrix Spike (4010092-MS1)		**Source: P3L0693-01**		Prepared: 01/05/04 Analyzed: 01/11/04						
Arsenic	0.123	0.00100	mg/l	0.100	0.00968	113	75-125			
Chromium	0.107	0.00100	"	0.100	0.00136	106	75-125			
Copper	0.0999	0.00200	"	0.100	0.00115	98.8	75-125			
Lead	0.101	0.00100	"	0.100	0.000100	101	75-125			
Matrix Spike (4010092-MS2)		**Source: P3L0693-02**		Prepared: 01/05/04 Analyzed: 01/11/04						
Arsenic	0.112	0.00100	mg/l	0.100	ND	112	75-125			
Chromium	0.105	0.00100	"	0.100	ND	105	75-125			
Copper	0.103	0.00200	"	0.100	0.00152	101	75-125			
Lead	0.101	0.00100	"	0.100	0.000250	101	75-125			

North Creek Analytical - Portland

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	01/21/04 15:06

Dissolved Metals per EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4010429 - EPA 200/3005 Diss										
Blank (4010429-BLK1)				Prepared: 01/16/04	Analyzed: 01/20/04					
Arsenic	ND	0.00100	mg/l							
Chromium	ND	0.00100	"							
LCS (4010429-BS1)				Prepared: 01/16/04	Analyzed: 01/20/04					
Arsenic	0.0963	0.00100	mg/l	0.100		96.3	80-120			
Chromium	0.101	0.00100	"	0.100		101	80-120			
Duplicate (4010429-DUP1)		Source: P4A0165-01		Prepared: 01/16/04	Analyzed: 01/20/04					
Arsenic	0.0859	0.00100	mg/l		0.0843			1.88	20	
Chromium	ND	0.00100	"		0.000820				20	
Matrix Spike (4010429-MS1)		Source: P4A0165-01		Prepared: 01/16/04	Analyzed: 01/20/04					
Arsenic	0.190	0.00100	mg/l	0.100	0.0843	106	75-125			
Chromium	0.107	0.00100	"	0.100	0.000820	106	75-125			
Matrix Spike (4010429-MS2)		Source: P4A0165-02		Prepared: 01/16/04	Analyzed: 01/20/04					
Arsenic	0.116	0.00100	mg/l	0.100	0.00672	109	75-125			
Chromium	0.112	0.00100	"	0.100	ND	112	75-125			

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	01/21/04 15:06

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3120939 - EPA 5030B										
Blank (3120939-BLK1)				Prepared & Analyzed: 12/24/03						
Acetone	ND	25.0	ug/l							
Benzene	ND	1.00	"							
Bromobenzene	ND	1.00	"							
Bromochloromethane	ND	1.00	"							
Bromodichloromethane	ND	1.00	"							
Bromoform	ND	1.00	"							
Bromomethane	ND	5.00	"							
2-Butanone	ND	10.0	"							
n-Butylbenzene	ND	5.00	"							
sec-Butylbenzene	ND	1.00	"							
tert-Butylbenzene	ND	1.00	"							
Carbon disulfide	ND	10.0	"							
Carbon tetrachloride	ND	1.00	"							
Chlorobenzene	ND	1.00	"							
Chloroethane	ND	1.00	"							
Chloroform	ND	1.00	"							
Chloromethane	ND	5.00	"							
2-Chlorotoluene	ND	1.00	"							
4-Chlorotoluene	ND	1.00	"							
1,2-Dibromo-3-chloropropane	ND	5.00	"							
Dibromochloromethane	ND	1.00	"							
1,2-Dibromoethane	ND	1.00	"							
Dibromomethane	ND	1.00	"							
1,2-Dichlorobenzene	ND	1.00	"							
1,3-Dichlorobenzene	ND	1.00	"							
1,4-Dichlorobenzene	ND	1.00	"							
Dichlorodifluoromethane	ND	5.00	"							
1,1-Dichloroethane	ND	1.00	"							
1,2-Dichloroethane	ND	1.00	"							
1,1-Dichloroethene	ND	1.00	"							
cis-1,2-Dichloroethene	ND	1.00	"							
trans-1,2-Dichloroethene	ND	1.00	"							
1,2-Dichloropropane	ND	1.00	"							
1,3-Dichloropropane	ND	1.00	"							
2,2-Dichloropropane	ND	1.00	"							
1,1-Dichloropropene	ND	1.00	"							

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	01/21/04 15:06

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3120939 - EPA 5030B										
Blank (3120939-BLK1)				Prepared & Analyzed: 12/24/03						
cis-1,3-Dichloropropene	ND	1.00	ug/l							
trans-1,3-Dichloropropene	ND	1.00	"							
Ethylbenzene	ND	1.00	"							
Hexachlorobutadiene	ND	2.00	"							
2-Hexanone	ND	10.0	"							
Isopropylbenzene	ND	2.00	"							
p-Isopropyltoluene	ND	2.00	"							
4-Methyl-2-pentanone	ND	5.00	"							
Methyl tert-butyl ether	ND	1.00	"							
Methylene chloride	ND	5.00	"							
Naphthalene	ND	2.00	"							
n-Propylbenzene	ND	1.00	"							
Styrene	ND	1.00	"							
1,1,1,2-Tetrachloroethane	ND	1.00	"							
1,1,2,2-Tetrachloroethane	ND	1.00	"							
Tetrachloroethene	ND	1.00	"							
Toluene	ND	1.00	"							
1,2,3-Trichlorobenzene	ND	1.00	"							
1,2,4-Trichlorobenzene	ND	1.00	"							
1,1,1-Trichloroethane	ND	1.00	"							
1,1,2-Trichloroethane	ND	1.00	"							
Trichloroethene	ND	1.00	"							
Trichlorofluoromethane	ND	1.00	"							
1,2,3-Trichloropropane	ND	1.00	"							
1,2,4-Trimethylbenzene	ND	1.00	"							
1,3,5-Trimethylbenzene	ND	1.00	"							
Vinyl chloride	ND	1.00	"							
o-Xylene	ND	1.00	"							
m,p-Xylene	ND	2.00	"							
Surr: 4-BFB	*18.4*		"	*20.0*		*92.0*	*75-120*			
Surr: 1,2-DCA-d4	*20.9*		"	*20.0*		*104*	*77-129*			
Surr: Dibromofluoromethane	*21.3*		"	*20.0*		*106*	*80-121*			
Surr: Toluene-d8	*21.6*		"	*20.0*		*108*	*80-120*			

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Burgard	
4500 Kruse Way Suite 110	Project Number: SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager: Ross Rieke	01/21/04 15:06

Volatile Organic Compounds per EPA Method 8260B - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 3120939 - EPA 5030B										
LCS (3120939-BS1)				Prepared & Analyzed: 12/24/03						
Benzene	21.0	1.00	ug/l	20.0		105	80-120			
Chlorobenzene	20.9	1.00	"	20.0		104	80-124			
1,1-Dichloroethene	20.1	1.00	"	20.0		100	78-120			
Toluene	22.2	1.00	"	20.0		111	80-124			
Trichloroethene	20.8	1.00	"	20.0		104	80-132			
Surr: 4-BFB	*18.4*		"	*20.0*		*92.0*	*75-120*			
Surr: 1,2-DCA-d4	*20.0*		"	*20.0*		*100*	*77-129*			
Surr: Dibromofluoromethane	*20.5*		"	*20.0*		*102*	*80-121*			
Surr: Toluene-d8	*21.0*		"	*20.0*		*105*	*80-120*			
Matrix Spike (3120939-MS1)		Source: P3L0719-03		Prepared & Analyzed: 12/24/03						
Benzene	21.9	1.00	ug/l	20.0	ND	110	80-124			
Chlorobenzene	21.6	1.00	"	20.0	ND	108	72.9-134			
1,1-Dichloroethene	20.4	1.00	"	20.0	ND	102	79.3-127			
Toluene	19.4	1.00	"	20.0	ND	97.0	79.7-131			
Trichloroethene	21.6	1.00	"	20.0	ND	108	68.4-130			
Surr: 4-BFB	*19.6*		"	*20.0*		*98.0*	*75-120*			
Surr: 1,2-DCA-d4	*21.2*		"	*20.0*		*106*	*77-129*			
Surr: Dibromofluoromethane	*22.1*		"	*20.0*		*110*	*80-121*			
Surr: Toluene-d8	*20.9*		"	*20.0*		*104*	*80-120*			
Matrix Spike Dup (3120939-MSD1)		Source: P3L0719-03		Prepared & Analyzed: 12/24/03						
Benzene	21.8	1.00	ug/l	20.0	ND	109	80-124	0.458	25	
Chlorobenzene	21.8	1.00	"	20.0	ND	109	72.9-134	0.922	25	
1,1-Dichloroethene	19.9	1.00	"	20.0	ND	99.5	79.3-127	2.48	25	
Toluene	18.5	1.00	"	20.0	ND	92.5	79.7-131	4.75	25	
Trichloroethene	21.5	1.00	"	20.0	ND	108	68.4-130	0.464	25	
Surr: 4-BFB	*18.8*		"	*20.0*		*94.0*	*75-120*			
Surr: 1,2-DCA-d4	*21.0*		"	*20.0*		*105*	*77-129*			
Surr: Dibromofluoromethane	*21.4*		"	*20.0*		*107*	*80-121*			
Surr: Toluene-d8	*20.2*		"	*20.0*		*101*	*80-120*			

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project:	Burgard	
4500 Kruse Way Suite 110	Project Number:	SS1-001-21	**Reported:**
Lake Oswego, OR 97035	Project Manager:	Ross Rieke	01/21/04 15:06

Notes and Definitions

Q-06	Analyses are not controlled on RPD values from sample concentrations less than 5 times the reporting limit.
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. MRLs are adjusted if %Solids are less than 50%.
wet	Sample results reported on a wet weight basis (as received)
RPD	Relative Percent Difference

North Creek Analytical - Portland

Philip Nerenberg

Philip Nerenberg, Laboratory Manager

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3209 Denali St, Anchorage, AK 99503-4030 907-334-9200 FAX 334-9210

CHAIN OF CUSTODY REPORT

Work Order #: ~~B3L0487~~ B3L0693

CLIENT: Sagewater Group Inc
REPORT TO: Ross Rieke
ADDRESS: 4500 SW Kruse Way Suite 110 Lake Oswego, OR 97035
PHONE: 503-675-5252 FAX: 503-675-1960

INVOICE TO:

P.O. NUMBER:

PROJECT NAME: Burgard
PROJECT NUMBER:
SAMPLED BY: Ross Robinson (Tetra Tech, Inc)

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: HNO3 HCl

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	Metals	VOC	SVOCs	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1	MW-01	12/14/03 11:10	X	X		GW	5		01
2	MW-02	12/14/03 12:07	X	X		GW	5		02
3	MW-03	12/14/03 12:53	X		X	GW	4		03
4	MW-04	12/14/03 14:03	X			GW	2		04
5	MW-05	12/14/03 15:00	X			GW	2		05
6	MW-07	12/14/03 10:20	X	X		GW	5		06
7									
8									
9									
10									

RELEASED BY: PRINT NAME: Ross Robinson FIRM: Tetra Tech, Inc DATE: 12/15/03 TIME: 11:00
RECEIVED BY: Jenny Stalter PRINT NAME: Jenny Stalter FIRM: NCA DATE: 12-15-03 TIME: 11:00
RELEASED BY: Colette Weaver PRINT NAME: Colette Weaver FIRM: NCA DATE: 12/18/03 TIME: [illegible]
RECEIVED BY: [signature] PRINT NAME: [signature] FIRM: NCA - Portland DATE: 12-19-03 TIME: 10:40

ADDITIONAL REMARKS:

TEMP: W/C 3.6 4.2

PAGE 1 OF 1

COC REV 1/03

SCHN00205667

BRIDGEWATER GROUP, INC.

Groundwater Monitoring Results Summary
Burgard Industrial Park

TO: Alicia Voss/DEQ

COPY: Mat Cusma/Schnitzer

FROM: Ross Rieke/Bridgewater Group

DATE: July 14, 2004

This memorandum presents a summary of the groundwater monitoring performed over the past year at the Burgard Industrial Park in Portland, Oregon (Figures 1 through 5). The groundwater monitoring was performed in accordance with the March 17, 2003, *Revised Groundwater Monitoring Plan* prepared for the Burgard site and as modified in a September 22, 2003 email from you.

The groundwater monitoring plan notes that a one year summary report will present the following:

- Comparison of the groundwater flow directions and gradients noted in the Phase I RI and those noted in the groundwater monitoring events.
- Comparison of the groundwater contaminant concentrations noted in the Phase I RI and those noted in the groundwater monitoring events

This summary report presents these comparisons.

Groundwater Flow Directions and Gradients

The consistency of the groundwater flow directions and gradients was assessed by comparing the relative groundwater elevations in the site monitoring wells over the various monitoring events. Table 1 presents the groundwater elevations measured in the Site monitoring wells. Figure 6 presents a hydrograph of the groundwater elevations measured in the wells. Figure 6 notes the following:

- The water levels in the wells respond consistently with changes in the river elevation. The water level responses in MW-5 and MW-2 show the greatest connection with the river which is consistent with their being closest to the river. The water levels in MW-7 are less affected by the river level as MW-7 is located relatively distant from river.
- Although the water levels in MW-6 are consistently higher than those in the other site wells, the water levels in MW-6 show a similar connection to the river levels. The higher groundwater elevations in MW-6 are likely associated with presence of silty clay at a depth of about 15 feet at MW-6. Similar fine-grain soil was observed elsewhere only in MW-1 and at a significantly greater depth (i.e., 23 feet).
- There are consistently relatively low gradients between the wells located along the river. This general lack of gradient is consistent with an overall general groundwater flow perpendicular with the river.

SCHN00205668

- Water flows from the river to the Site during periods of high river levels (see March 2003 and December 2003 monitoring events). This suggests that the groundwater in the wells near the shore may reflect, to some degree, water quality in the river.
- Water flows from the Site to the river during periods of moderate to low river levels (see May 2003, June 2003, September 2003, and March 2004 monitoring events).

In general, the groundwater levels measured during the RI and during the monitoring period were consistent with the current conceptual site groundwater flow model.

Groundwater Contaminant Concentrations

The consistency of the groundwater contaminant concentrations between the RI and monitoring period was assessed by considering the concentrations of trichloroethene (TCE), tetrachloroethene (PCE), and dissolved arsenic in the groundwater samples. TCE and PCE were the only organic contaminants routinely detected and whose concentrations approached or exceeded the most conservative surface water quality criteria (DEQ SLVs or EPA Ambient Water Quality Criteria). Likewise, arsenic was the only dissolved metal that was routinely detected and whose concentrations exceeded the most conservative surface water quality criteria. Analyses of the concentrations of these three contaminants provided an assessment of the overall consistency of the groundwater contaminant concentrations at the Site over the monitoring period.

Table 2 presents a summary of the volatile organic compound (VOC) concentrations in the groundwater samples. Table 3 presents the dissolved metal concentrations in the groundwater samples. Figures 7, 8, and 9 show the time-concentration plots for PCE, TCE, and arsenic, respectively. As shown in the figures, the concentrations of these three contaminants are either stable or have decreased over the monitoring period.

Conclusions and Recommendations

Based on the consistency of the relative groundwater elevations in the groundwater monitoring wells and the low and consistent concentrations of the few contaminants detected in the groundwater, additional groundwater monitoring at this time is not necessary. Additional groundwater monitoring may be appropriate in the future depending on the findings of the Portland Harbor remedial investigation process. In particular, if, during the Portland Harbor remedial investigation, TCE, PCE or arsenic are identified as a risk driver in the overall Portland Harbor and that the TCE, PCE or arsenic concentrations present in the Site groundwater could potentially be contributing to unacceptable risk in the Portland Harbor, potential additional groundwater monitoring will be discussed with DEQ.

Please call if you have any questions.

SCHN00205669

TABLES

SCHN00205670

Table 1
Groundwater Elevations in Monitoring Wells
Burgard Industrial Park

Monitoring Well	Top of Casing Elevation (ft)	Date	Depth (ft)	GW Elev (ft) COP Datum
MW-01	28.02	1/27/2002	18.05	10.0
		3/23/2003	18.53	9.5
		4/15/2003	18.21	9.8
		4/28/2003	17.79	10.2
		6/20/2003	17.73	10.3
		9/21/2003[3]	22.20	5.8
		12/14/2003	20.34	7.7
		2/5/2004	18.19	9.8
		3/18/2004	19.61	8.4
MW-02	27.39	1/27/2002	16.46	10.9
		3/23/2003	16.63	10.8
		4/15/2003	17.36	10.0
		4/28/2003	17.15	10.2
		6/20/2003	17.83	9.6
		9/21/2003[3]	22.80	4.6
		12/14/2003	17.99	9.4
		2/5/2004	17.18	10.2
		3/18/2004	20.12	7.3
MW-03	27.27	1/27/2002	17.65	9.6
		3/23/2003	17.59	9.7
		4/15/2003	nm	nm
		4/28/2003	16.91	10.4
		6/20/2003	16.75	10.5
		9/21/2003	20.67	6.6
		12/14/2003	19.47	7.8
		2/5/2004	17.19	10.1
		3/18/2004	19.03	8.2
MW-04	28.03	1/27/2002	16.99	11.0
		3/23/2003	nm	nm
	27.93	4/15/2003	17.93	10.0
		4/28/2003	17.52	10.4
		6/20/2003	18.17	9.8
		9/21/2003[3]	22.82	5.1
		12/14/2003	18.25	9.7
		2/5/2004	17.37	10.6
		3/18/2004	20.75	7.2
MW-05	28.34	1/27/2002	17.47	10.9
		3/23/2003	17.83	10.5
		4/15/2003	18.68	9.7
		4/28/2003	17.35	11.0
		6/20/2003	19.22	9.1
		9/21/2003[3]	24.22	4.1
		12/14/2003	19.03	9.3
		2/5/2004	18.38	10.0
		3/18/2004	21.52	6.8
MW-06	28.31	1/27/2002	11.89	16.4
		3/23/2003	12.37	15.9
		4/15/2003	12.13	16.2
		4/28/2003	12.31	16.0
		6/20/2003	12.80	15.5
		9/21/2003[3]	17.51	10.8
		12/14/2003	13.21	15.1
		2/5/2004	12.20	16.1
		3/18/2004	12.48	15.8
MW-07	35.47	1/27/2002	25.77	9.7
		3/23/2003	25.41	10.1
		4/15/2003	24.98	10.5
		4/28/2003	24.62	10.9
		6/20/2003	24.24	11.2
		9/21/2003	27.01	8.5
		12/14/2003	26.81	8.7
		2/5/2004	25.12	10.4
		3/18/2004	25.28	10.2

		Gauge[1] (ft)	COP Datum[2] (ft)
Willamette River	1/27/2002	8.75	11.68
	3/23/2003	7.95	10.88
	4/15/2003	7.00	9.93
	4/28/2003	6.40	9.33
	6/20/2003	5.80	8.73
	9/21/2003	0.55	3.48
	12/14/2003	7.70	10.63
	2/5/2004	6.40	9.33
	3/18/2004	3.46	6.39

1 - Willamette River gauge at Morrison Bridge
2 - COP Datum = Morrison St. Bridge Guage + 2.93
3 - September 21, 2003 data suspect due to little water in well and lack of recovery after purging.

SCHN00205671

Table 2
Concentrations in Groundwater Samples
Volatile Organic Compounds
Burgard Industrial Park
All results in ug/l

Probe/ Well	Location	Date	cis-1,2,-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	Trichloroethene	Vinyl Chloride
MW01	Former NW Oil Tanks	1/28/2002	9.13	32.7	1 U	4.5	1.23
		3/23/2003	14.3	23.2	1 U	20.1	1.18
		12/14/2003	32.8	14.5	1 U	6.74	1 U
MW02	Shoreline, north end of site	1/28/2002	2.78	6.68	1 U	8.06	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	1.97	7.76	1 U	8.90	1 U
		12/14/2003	1.9	5.75	1 U	7.51	1 U
MW03	Shoreline, middle of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	-	-	-	-	-
		4/28/2003	-	-	-	-	-
		9/21/2003	-	-	-	-	-
MW04	Shoreline, middle of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		4/15/2003	-	-	-	-	-
		12/14/2003	-	-	-	-	-
MW05	Shoreline, south end of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	-	-	-	-	-
		12/14/2003	-	-	-	-	-
MW06	Outfall 1 plug area	1/28/2002	1 U	1 U	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
MW07	Southeast area	1/28/2002	1 U	1.91	1 U	1 U	1 U
		4/14/2002	-	-	-	-	-
		3/23/2003	1 U	1 U	1 U	1.27	1 U
		9/21/2003	1 U	1.1	1 U	1 U	1 U
PP02	WMW compressor	12/18/2001	1 U	1 U	1 U	1 U	1 U
PP03	Boydston oil storage area	12/18/2001	1 U	1 U	1 U	1 U	1 U
PP04	PBM wash pad	12/18/2001	1 U	1 U	1.23	1 U	1 U
PP05	Former NW Oil Tanks	12/18/2001	1 U	1 U	1 U	1 U	1 U
PP06	Shoreline, north end of site	4/15/2003	1.69	1 U	1 U	1.36	1 U
PP07	Former NW Oil Tanks	4/15/2003	1 U	1 U	1 U	1 U	1 U
PP08	Shoreline, north end of site	4/15/2003	1 U	1 U	1 U	1 U	1 U
PP09	Former NW Oil Tanks	4/15/2003	1 U	1 U	1 U	1 U	1 U
PW01	UST Pad	1/28/2002	1 U	1 U	1 U	1 U	1 U
PW03	PBM wash pad	1/28/2002	1 U	1.67	1 U	1.7	1 U
PW06	Southwest corner of site	1/27/2002	1 U	1 U	1 U	1 U	1 U
EPA Ambient Water Quality Criteria				8.85		81	525
DEQ Level II Surface Water SLV				240	11	21.9	1300

U - Not detected at noted reporting limit
"-" - Not analyzed
All VOCs not shown in table are not detected.

Table 3
Concentrations in Groundwater Samples
Dissolved Metals
Burgard Industrial Park
All results in ug/l

Probe/ Well	Location	Date	Dissolved Antimony	Dissolved Arsenic	Dissolved Barium	Dissolved Cadmium	Dissolved Chromium	Dissolved Copper	Dissolved Lead	Dissolved Mercury	Dissolved Nickel	Dissolved Selenium	Dissolved Silver	Dissolved Thallium	Dissolved Zinc
MW01	Former NW Oil Tanks	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		3/23/2003	-	1 U	46.4	-	-	-	-	-	-	-	-	-	-
		12/14/2003	-	5.01	-	-	1 U	-	-	-	-	-	-	-	-
MW02	Shoreline, north end of site	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	6.3	-	-	1.1	-	-	-	-	-	-	-	-
		3/23/2003	-	1.0 U	27.4	-	1.0 U	-	1.0 U	-	-	-	-	-	-
		12/14/2003	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	Shoreline, middle of site	1/27/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	37.7	-	-	1.0 U	-	-	0.2 U	-	-	-	-	-
		3/23/2003	-	32.8	113	-	1.0 U	1.06	1.0 U	0.2 U	-	-	-	-	-
		4/28/2003	-	-	-	-	-	-	-	-	-	-	-	-	-
		9/21/2003	-	38.9	-	-	1.0 U	2.0 U	1.0 U	0.2 U	-	-	-	-	-
MW04	Shoreline, middle of site	1/27/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	11.4	-	-	1.0 U	-	-	-	-	-	-	-	-
		4/15/2003	-	6.29	77.6	-	-	-	-	0.2 U	-	-	-	-	-
		12/14/2003	-	3.34	-	-	-	-	-	-	-	-	-	-	-
MW05	Shoreline, south end of site	1/27/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	-	-	-	1.0 U	-	-	-	-	-	-	-	-
		3/23/2003	-	-	10.1	-	-	-	-	-	-	-	-	-	-
		12/14/2003	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	Outfall 1 plug area	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	-	-	-	1.0 U	-	-	-	-	-	-	-	-
MW07	Southeast area	1/28/2002	-	-	-	-	-	-	-	-	-	-	-	-	-
		4/14/2002	-	6.1	-	-	1.0 U	-	-	-	-	-	-	-	-
		3/23/2003	-	1.64	65.3	-	1.0 U	1.61	1.0 U	-	-	-	-	-	-
		9/21/2003	-	1.97	-	-	2.05	2.0 U	-	-	-	-	-	-	-
EPA Ambient Water Quality Criteria			4300	0.14				1300		0.05	4600	69000			
DEQ Level II Surface Water SLV			1600	150		2.2	0.21	9	2.5	0.77	52	120	0.12	40	120

U - Not detected at noted reporting limit
"-" - Not analyzed

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FIGURES

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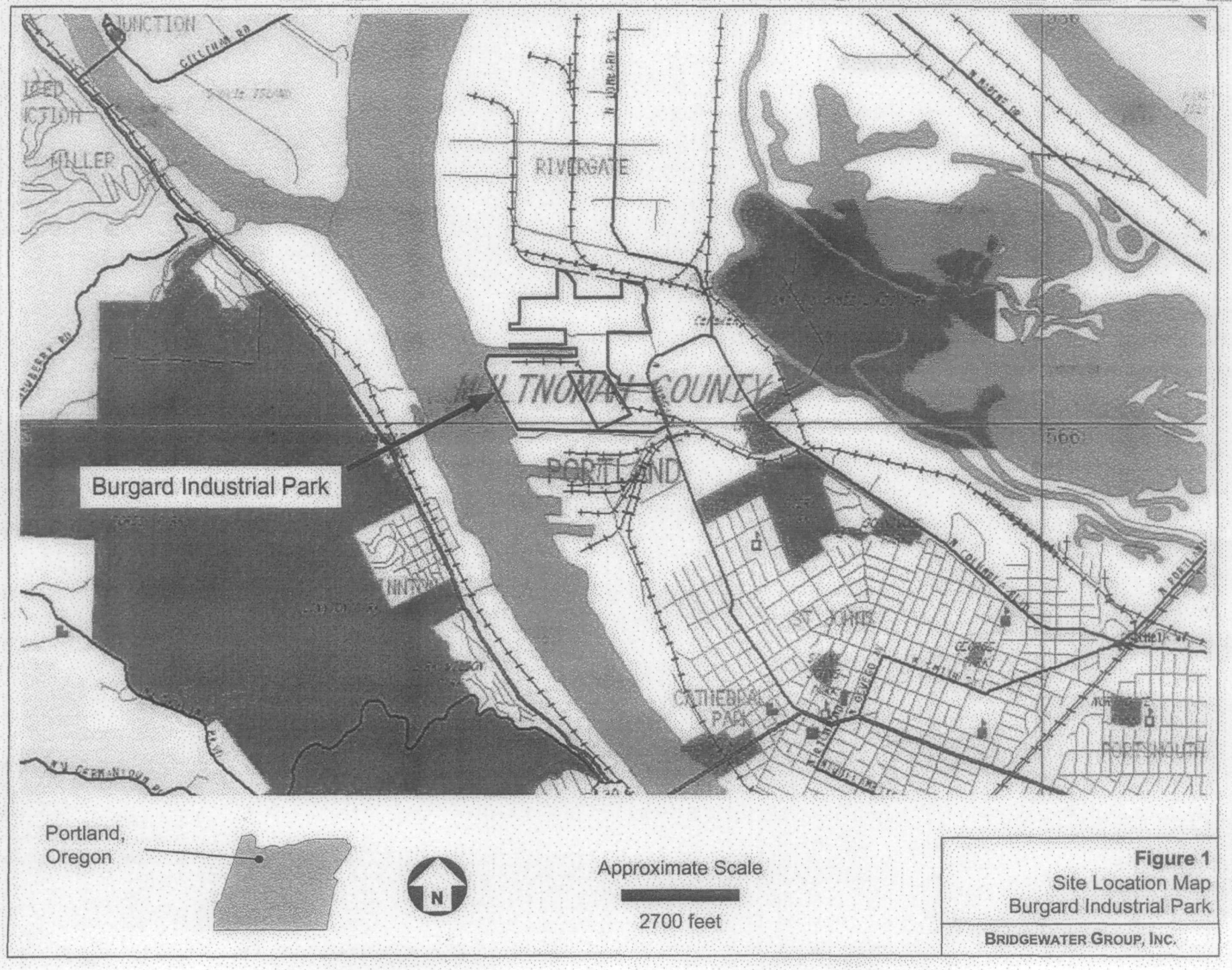

Figure 1
Site Location Map
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

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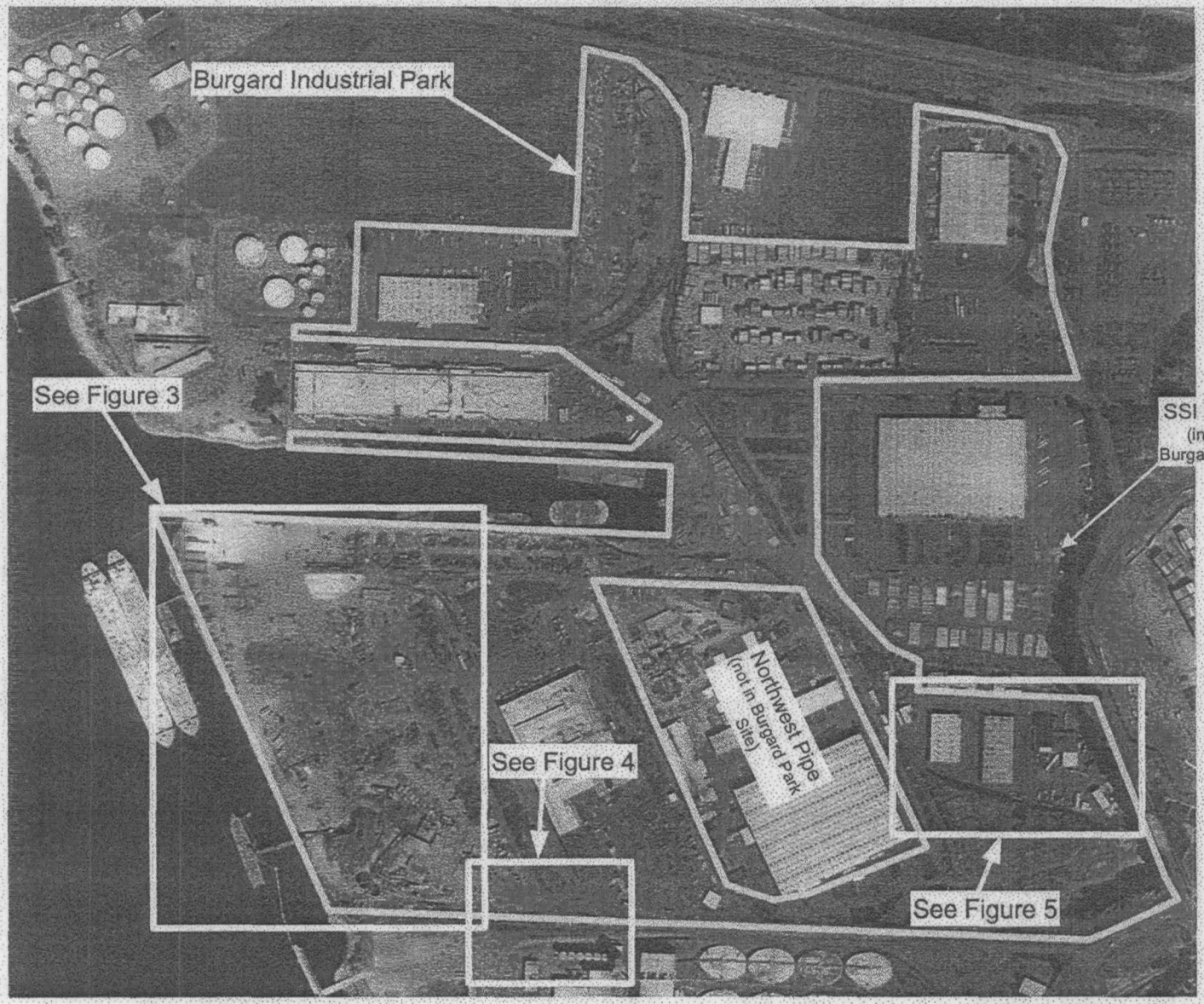

N

Approximate Scale

600 Feet

Figure 2
July 2002 Aerial Photograph
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

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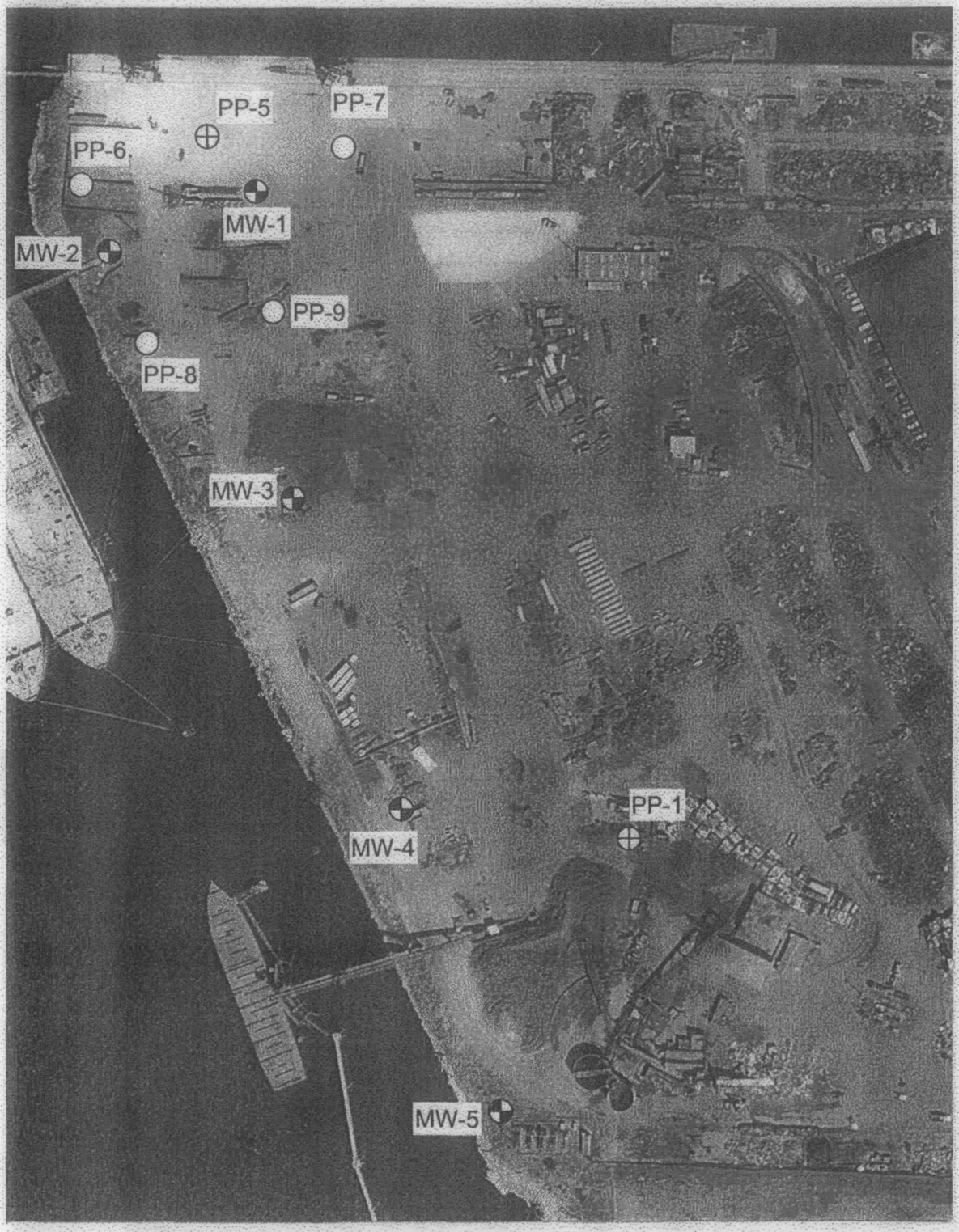

N

Approximate Scale

220 feet

Monitoring Well

Phase I Push Probe

Phase II Push Probe

Figure 3
Western Area
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

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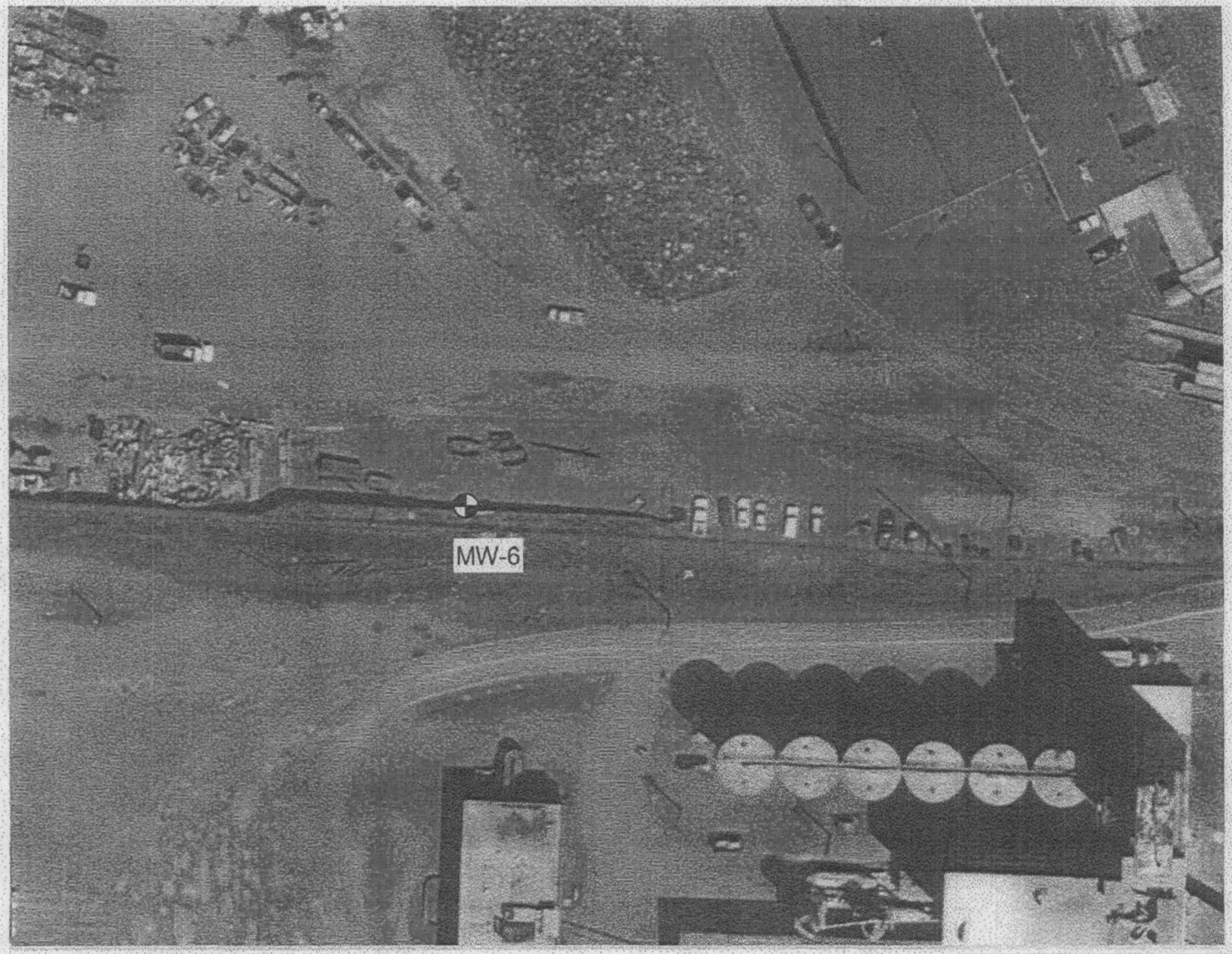

Approximate Scale

80 feet

Monitoring Well

Figure 4
South Area
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

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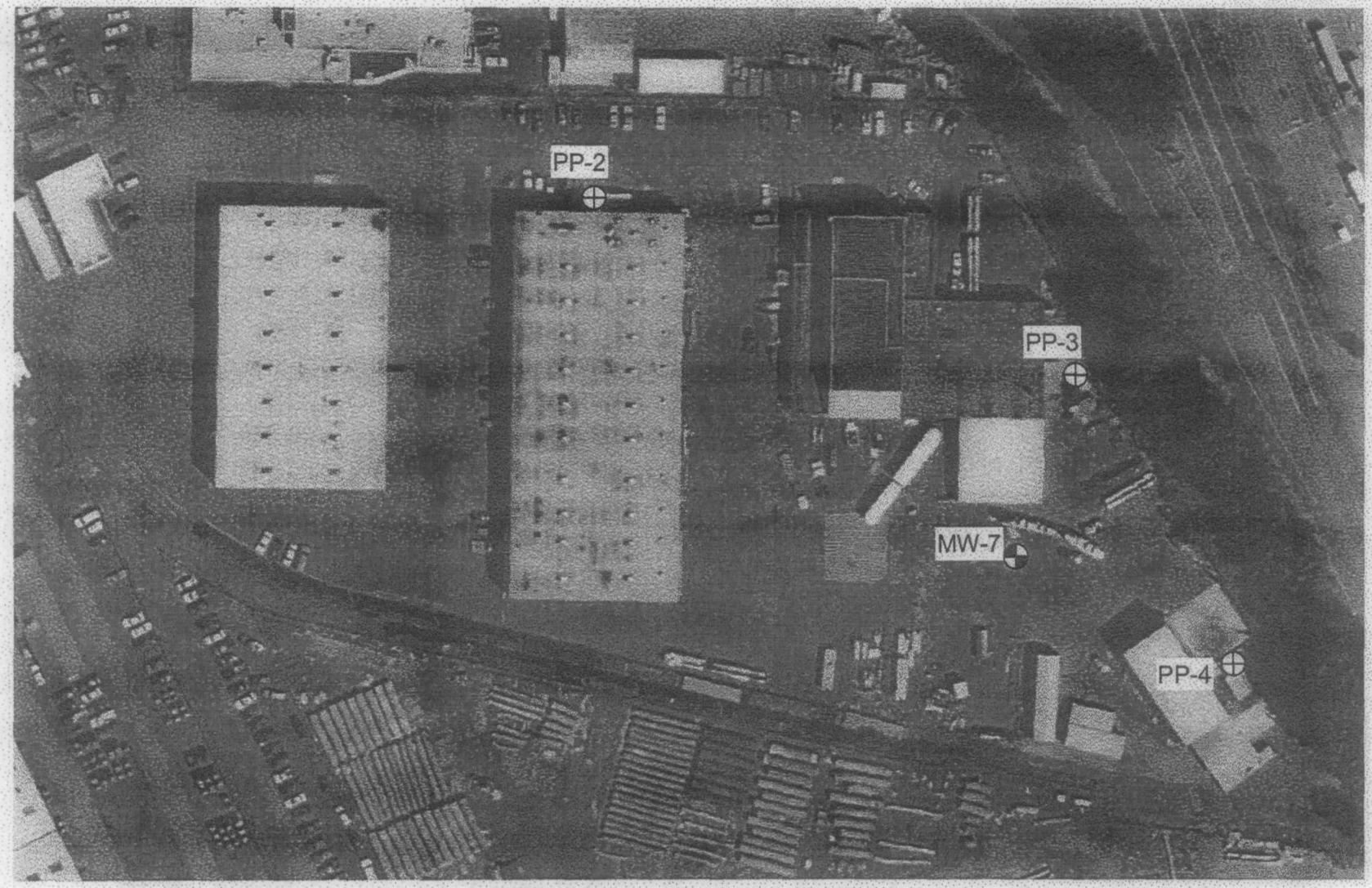

N

Approximate Scale

100 feet

Monitoring Well

Push Probe

Figure 5
Southeast Area
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

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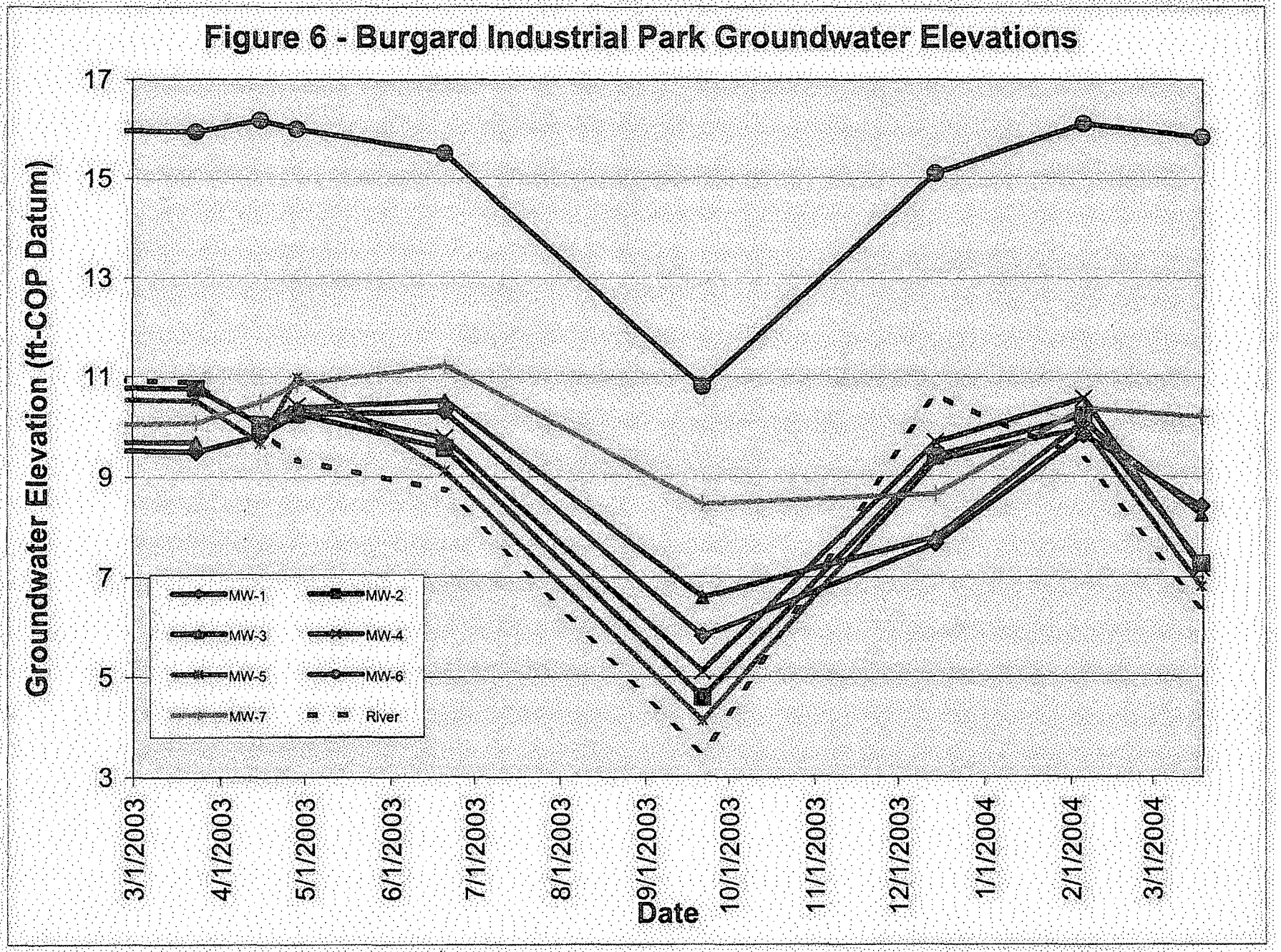

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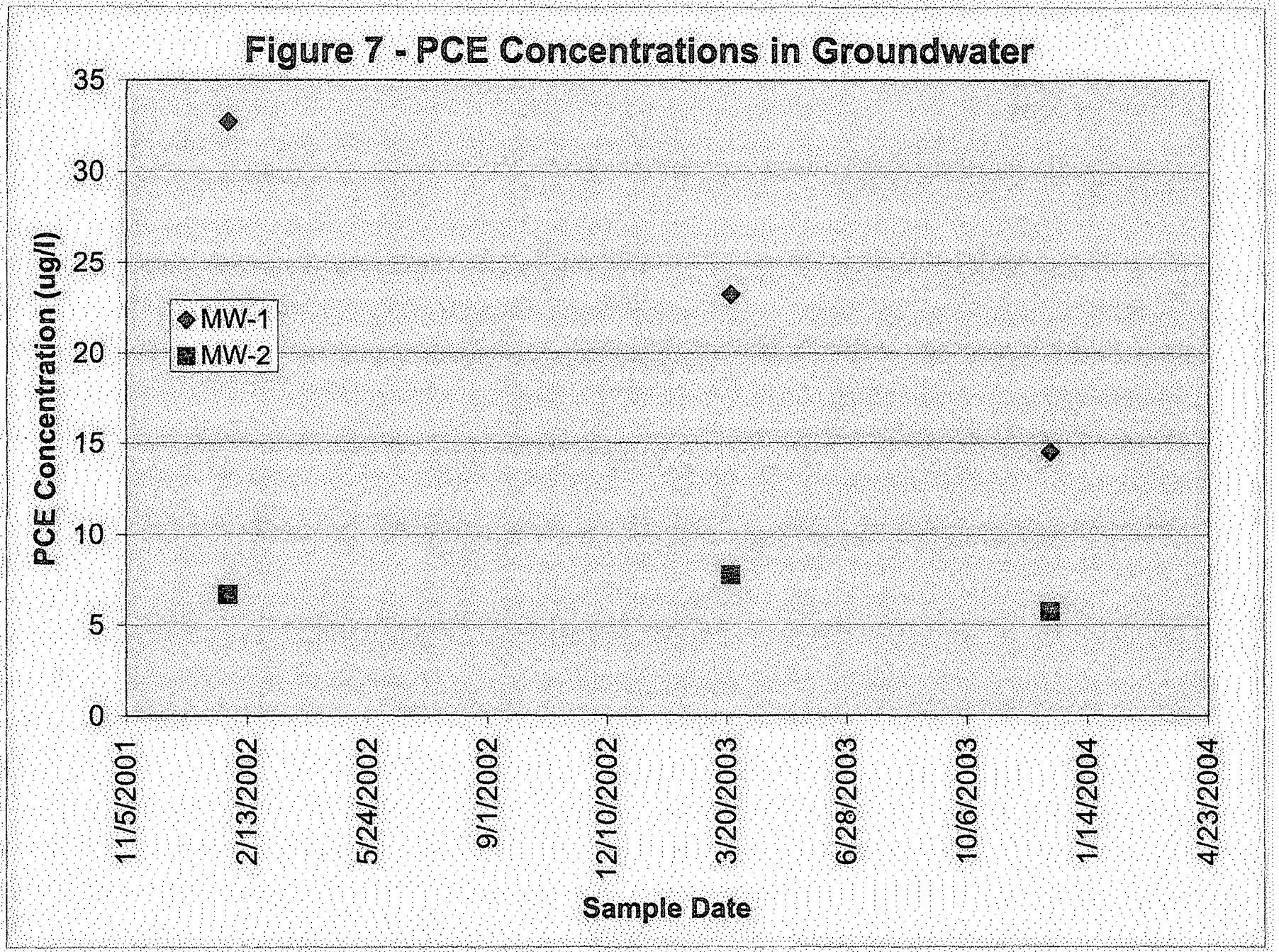

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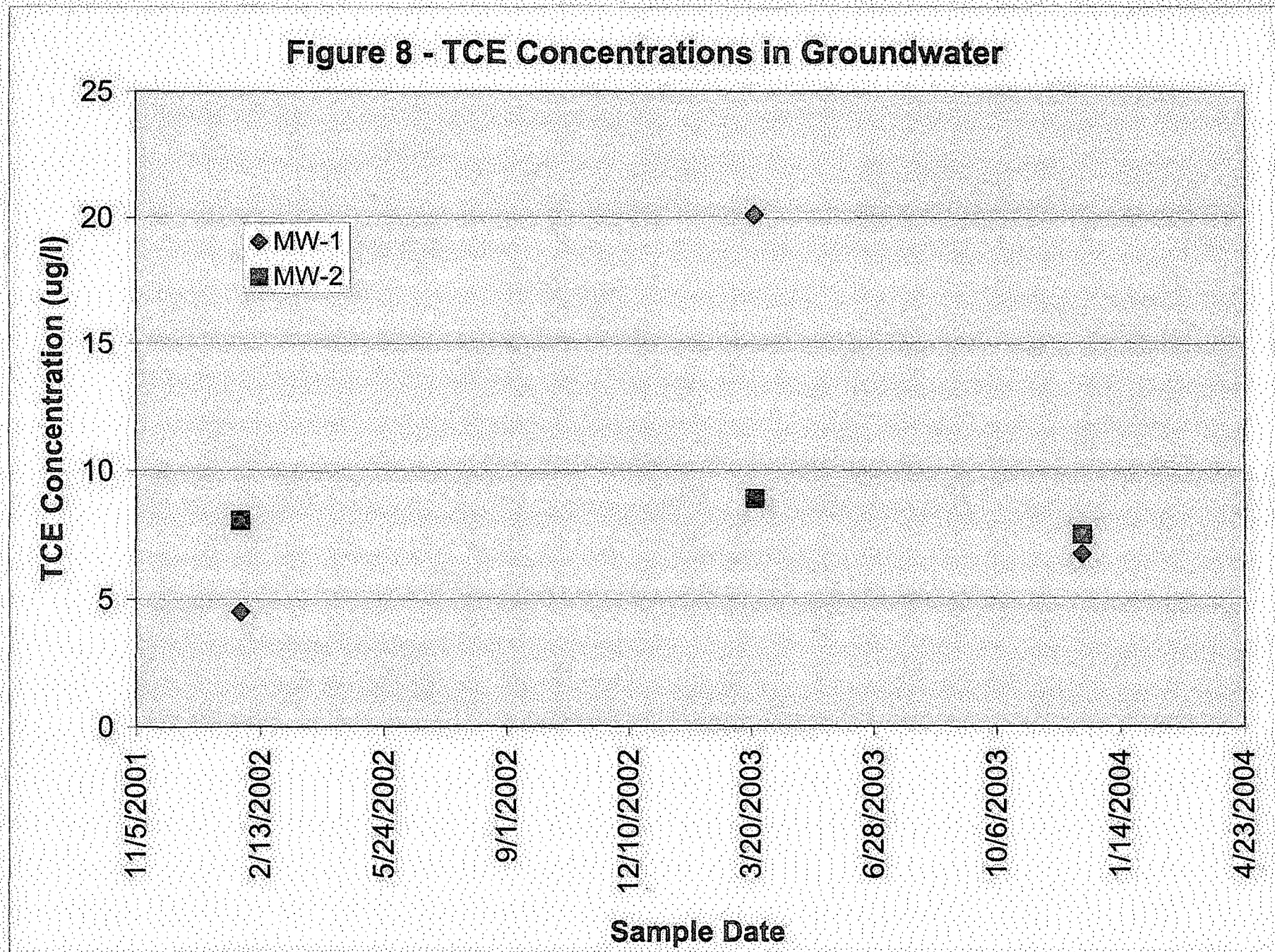

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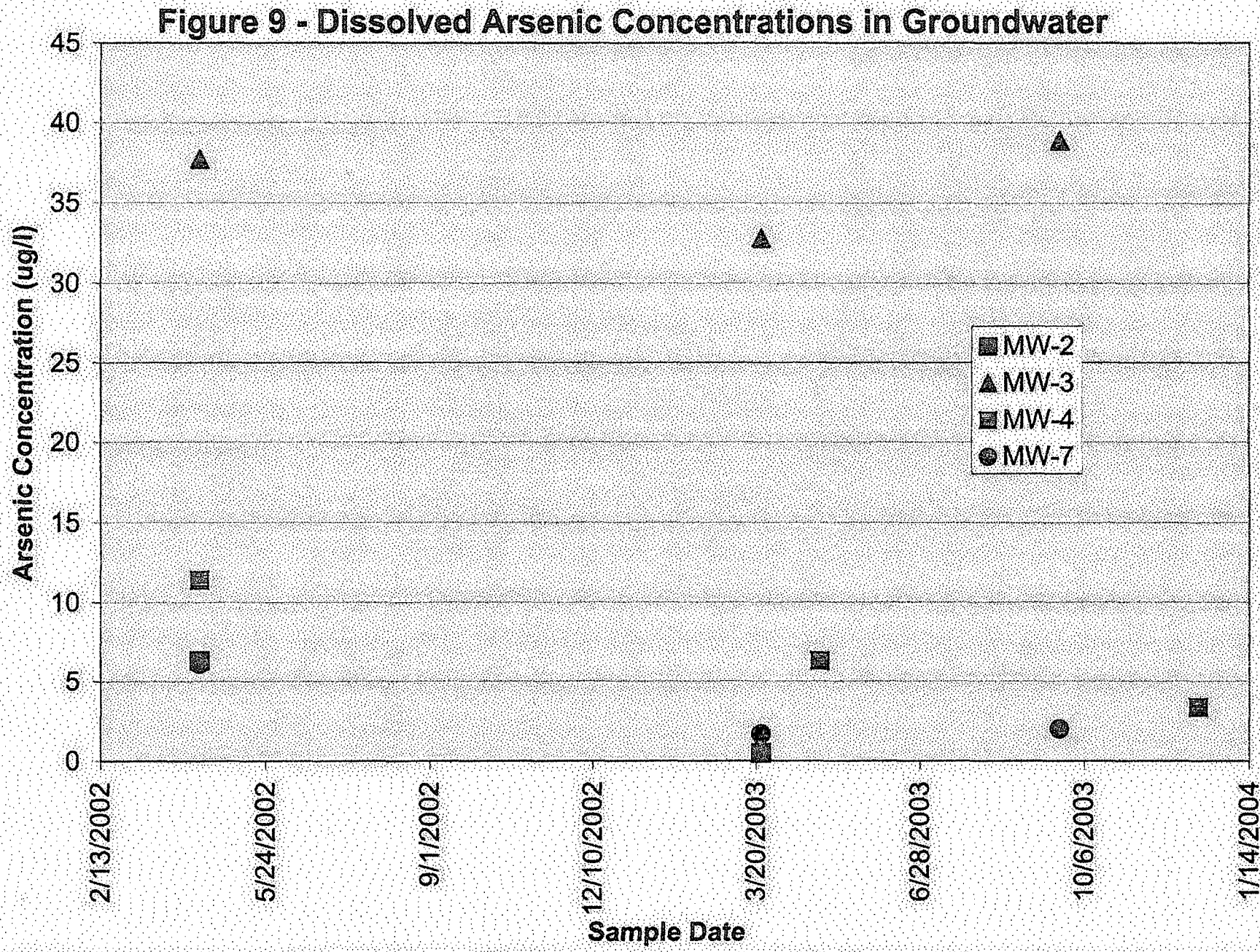

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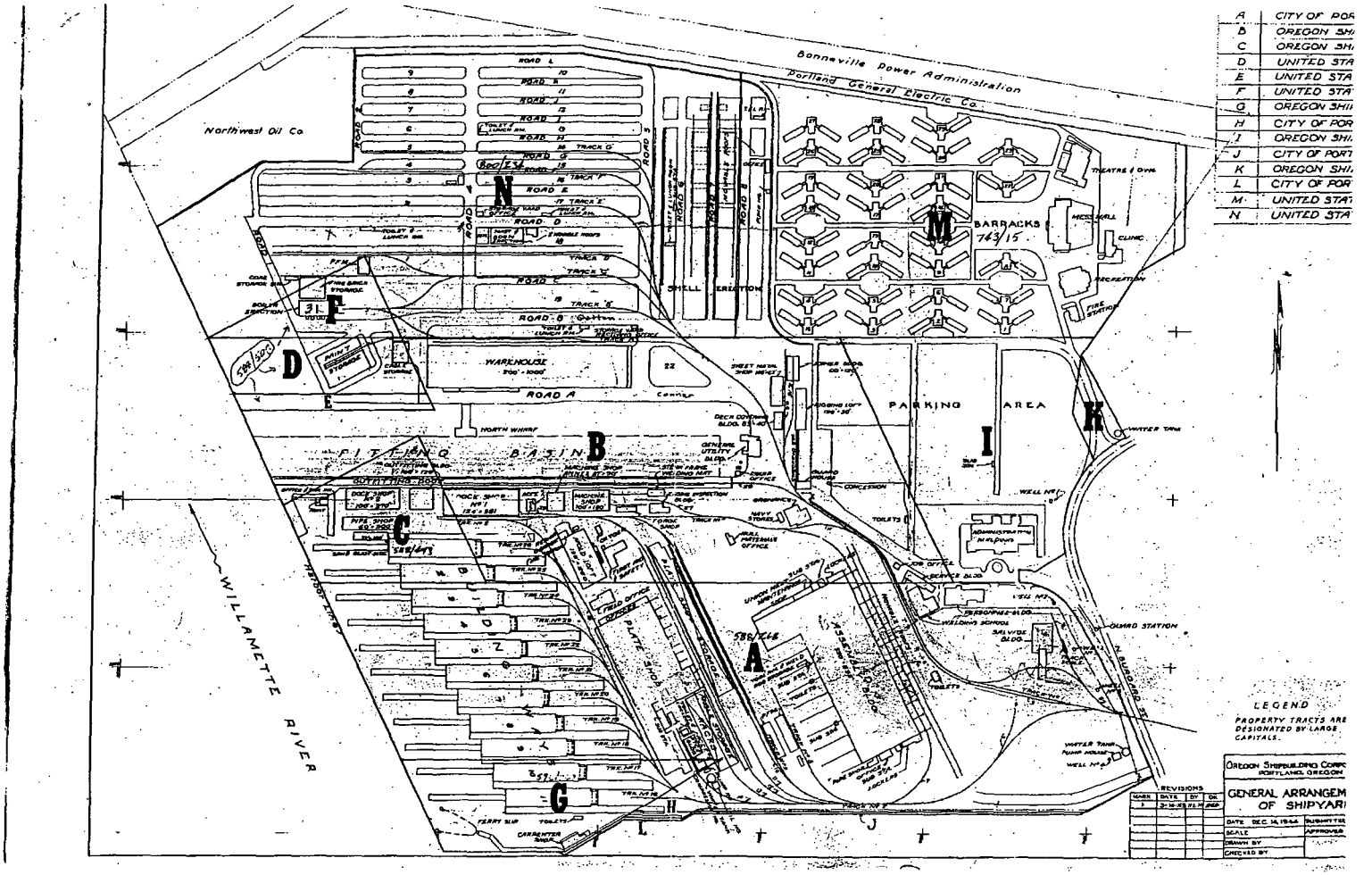

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Morgan

Environmental Site Assessment for Morgan CFS 9445 North Burgard Way Portland, Oregon

Prepared for

Schnitzer Investment Corp.
The Northwestern Mutual Life Insurance Company

OCTOBER 8, 1996

Prepared by

CH2M HILL

SCHN00205986

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Purpose and Scope of Environmental Site Assessment

Purpose of Environmental Site Assessment

This report presents the results of the environmental site assessment performed for the Schnitzer Investment Corp. (SIC) Morgan CFS (subject property) site located at 9445 North Burgard Way in Portland, Oregon (Figure 1). This report has been prepared for SIC and The Northwestern Mutual Life Insurance Company (Northwestern) for the consideration of the proposed loan between SIC and Northwestern (NML Investment No. C-331972). This subject property is referred to as Property No. 4 in the Northwestern loan application.

Scope of Environmental Site Assessment

The scope of the environmental assessment is based on the requirements of the Northwestern Environmental Report Letter of Understanding (ERLU) and the Standard Practice for Environmental Site Assessment: Phase I Environmental Assessment Process. Both of these documents are presented in the Appendix A. The primary elements of the scope of work for the environmental assessment are the following:

- Assess and review the site history and property ownership
- Perform a regulatory agency database search
- Review regulatory agency files
- Perform a reconnaissance of the site and surrounding area

This report presents the results of the above tasks and discusses the anticipated nature and extent of environmental concerns associated with the subject property based on the task findings. CH2M HILL performed the environmental assessment by identifying potential past or current activities on or near the subject properties that may have led to the release of hazardous substances or hazardous materials onto the subject properties (as used herein, the term *hazardous substance* includes hazardous materials).

It was beyond the scope of services for this environmental assessment to identify concerns associated with the offsite management of solid or hazardous substances and wastes originating from the subject property and being managed at the time of this environmental site assessment more than 1 mile from the subject property, unless these instances were discovered incidentally during the performance of this scope of work.

Limitations of Environmental Site Assessment

This environmental site assessment has been performed and this report has been prepared for the exclusive use of SIC and Northwestern for specific application to the subject property described herein. As such, it is reasonable for Northwestern to rely upon the extent, character, and conclusions of this report. The services provided by CH2M HILL have been rendered in a manner consistent with the level of skill and care ordinarily exercised by members of the profession currently practicing under similar conditions.

CH2M HILL has relied upon the information provided by several sources who were not contracted by CH2M HILL. Reasonable and appropriate attempts were made to verify the information provided by these sources. CH2M HILL cannot guarantee the accuracy of the

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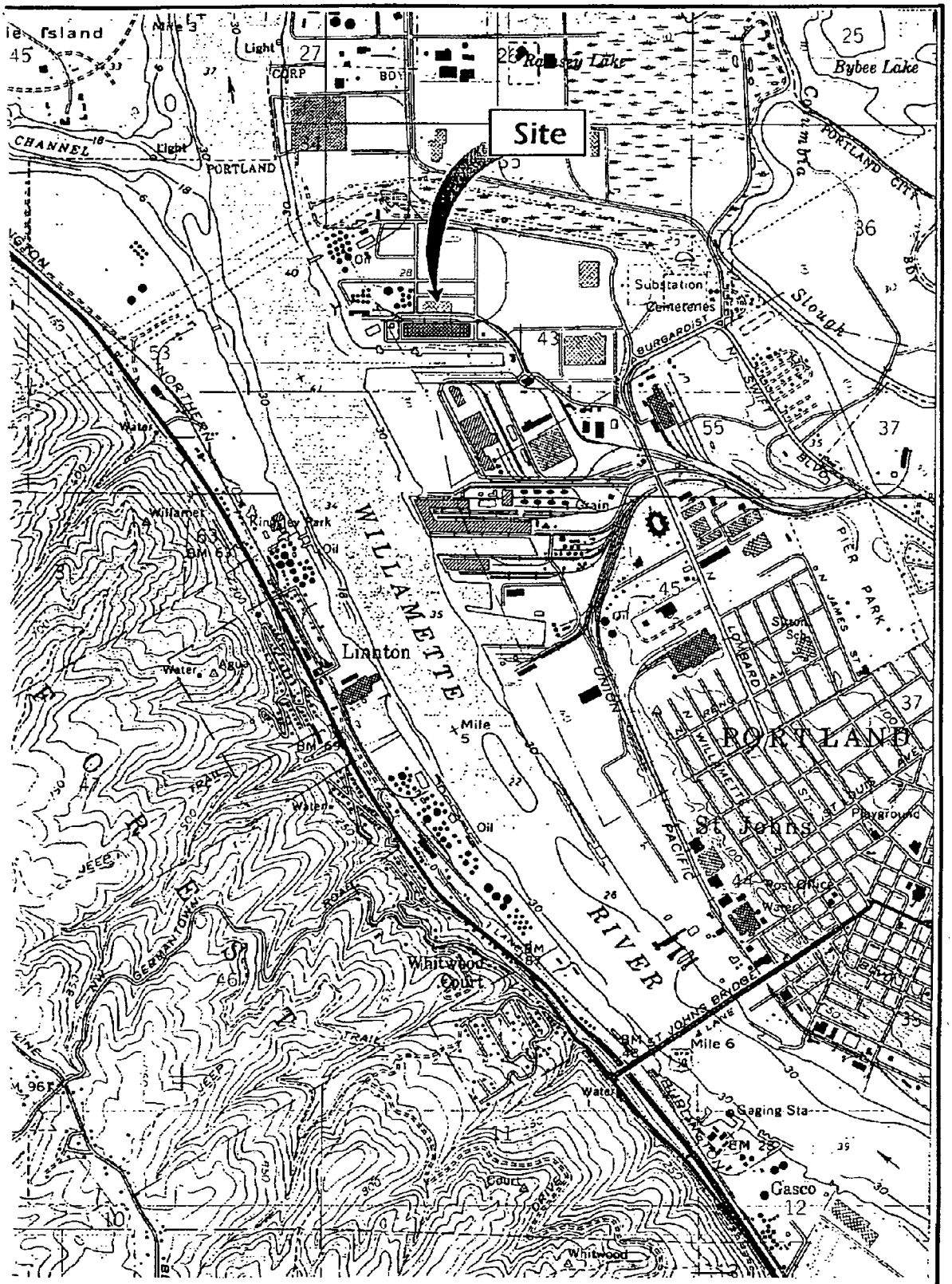

FIGURE 1

Site Location Map

MORGAN CFS BUILDING
9445 N. BURGARD WAY
SCHNITZER INVESTMENT CORP., PORTLAND, OREGON

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information provided by these sources that could not be reasonably and appropriately verified.

This report is not a legal representation or legal interpretation of environmental laws, rules, regulations, or policies of local, state, or federal governmental agencies.

No investigation is thorough enough to exclude the presence of hazardous substances at a given location. If hazardous substances or hazardous conditions have not been identified during the assessment, such a finding should not be construed as a guarantee of the absence of such substances or conditions.

Any opinions or recommendations presented herein apply to the environmental conditions existing at the time services were performed. CH2M HILL is unable to report on, or accurately predict, events that may change site conditions after the described services are performed, whether those events occur naturally or are caused by external forces. CH2M HILL assumes no responsibility for conditions the firm is not authorized to investigate or conditions that CH2M HILL determined did not have an environmental impact at the time the services were performed or contained within the scope of the environmental assessment specified above.

Section 1 of the ERLU specifies that an area within 1 mile (as reasonably possible and appropriate) of the property boundary be assessed for the presence of several indicators of environmental impacts to the subject property. The appropriate search distance used for each of the items in the ERLU in this environmental site assessment was site- and item-specific and was based on our professional judgment and experience regarding how close the item would need to be to the site to have a potential impact on the site. In our opinion, the presence of these items at a distance beyond what we considered (including the 1-mile distance required by the ERLU) does not pose a potential impact to the subject property.

Site Location and Surrounding Property Uses

The Morgan CFS SIC property is located at 9445 North Burgard Way in Portland, Oregon (Figure 1). The land around the subject property is generally used for industrial purposes and some land is vacant.

The subject property is bounded by the following:

- To the north:
  - Vacant land owned by Time Oil Company (Time Oil)—immediately adjacent to the subject property
- To the west:
  - Premier Edible Oils Corporation (Premier Edible Oils)—700 feet from the subject property
  - East bank of the Willamette River—1,300 feet from the subject property
  - Time Oil Company aboveground storage tank (AST) farm and loading rack—immediately adjacent to subject property (this portion of the Time Oil site is referred

to as the Bell Oil Terminal); another part of Time Oil is located 900 feet northwest of the subject property.

- To the south:
  - North Burgard Way— immediately adjacent to the subject property
  - An loading inlet of the Willamette River—650 feet from the subject property
  - Jefferson Smurfit Corporation Container Corporation of America (Jefferson Smurfit CCA)—immediately adjacent on the south side of North Burgard Way from the subject property
- To the east:
  - Strip of vacant land—immediately adjacent to the subject property
  - Schnitzer Steel Industries Company (Schnizter Steel) storage area—approximately 330 feet from the subject property
  - Schnitzer Steel Products railroad tracks—approximately 650 feet from the subject property
  - Schnitzer Steel Products Co. at International Terminal Gate No. 5—approximately 800 feet from the subject property on the south side of North Burgard Way
  - Portland Container—approximately 800 feet from the subject property on the north side of North Burgard Way
  - Romar Transportation Systems, Incorporated (Romar)—approximately 1,000 feet from the subject property

The subject property consists of one single-story 72,000-square-foot office and warehouse building on a parcel of land approximately 10 acres in size. The building was constructed in 1977 and the site is essentially flat.

According to an August 1978 report, the subject property is underlain by medium dense, fine to medium sand fill approximately 10 to 15 feet thick. This upper layer is dredged sediment from the loading inlet to the Willamette River constructed in the early 1940s. The fill layer consists of gravel with cobbles and some boulders in a sand matrix. This upper fill layer is underlain by compressible silty clay and silt 24 to 50 feet thick. These soils are underlain by medium dense sand that becomes more dense with depth.

The building on the subject property receives potable water and sewer service from the City of Portland. The closest water supply well is located approximately 600 feet north from the subject property and is used for irrigation. The well was drilled to a depth of about 200 feet below the ground surface (bgs).

Current Site Condition and Use

Figure 2 shows the current layout of the Morgan CFS site. The site is currently being used for warehousing and consolidating packaging of wood products (primarily particle board) to load into intermodal containers for export. The current tenant is Morgan CFS No. 2 Company and there are 10 to 15 employees at the site. Morgan CFS leases approximately 5 of the 10 acres of the subject property. Approximately 50 percent of the parcel surface is covered with asphalt or the building; the remaining 50 percent of the parcel is bare ground, or surfaced with gravel.

Site and Adjacent Properties History

The history of the Morgan CFS site was assessed by reviewing available aerial photographs and interviews with persons familiar with the site history. Sanborn Fire Insurance maps and city directories were not available for the subject property.

Property Ownership Since 1940

The subject property ownership since 1940 was assessed by reviewing a title report provided by SIC, a copy of which is provided in Appendix B. Based on the title report, the subject property has been owned by SIC since 1972. Since the early 1940s the land has been owned by individuals, Oregon Shipbuilding Corporation, Broadway Holding Company, and Dulien Steel Products, Inc.

Property and Adjacent Property Use Since 1940

The history of the Morgan CFS site was assessed by reviewing aerial photographs taken in 1940, 1944, 1956, 1961, 1967, 1973, 1978, 1980, 1986, 1991, and 1995 (Appendix C). In the aerial photographs taken between 1956 and 1978, the site was largely vacant. The aerial photograph from 1940 shows that the subject property and the surrounding areas were all undeveloped.

According to an account written by Julia Osborn, a woman living in the area during the war, the entire area to the west, south, and east of the subject property was dominated by the Oregon Shipyard, the leading shipyard in the country at the time, with 330 acres of land and 30,000 employees. The entire construction of ships took place in the area, from the time the raw materials were delivered to the site to the time the ships, were launched into the water. The materials stored and used by the shipyards included lumber, steel, rope, electric cable, copper, brass tubing, metal casings, and scrap paper. The operations included outfitting of the ships in the ways to the southwest of the subject property seen in the southwest corner of the 1944 aerial photograph. Other operations areas included the salvage yard, plate shop, and the gadget shop (for fabrication and assembly of small parts). The subject property and adjacent areas were used as part of the production or material storage area.

The 1944 aerial photograph shows that the subject property and adjacent property was used as a storage area for shipbuilding for World War II. Parallel railroad tracks approximately 150 feet apart traverse the area. The photograph appears to show storage of steel, lumber, drums, and structures. Dormitories for employees working at the shipyard are located to

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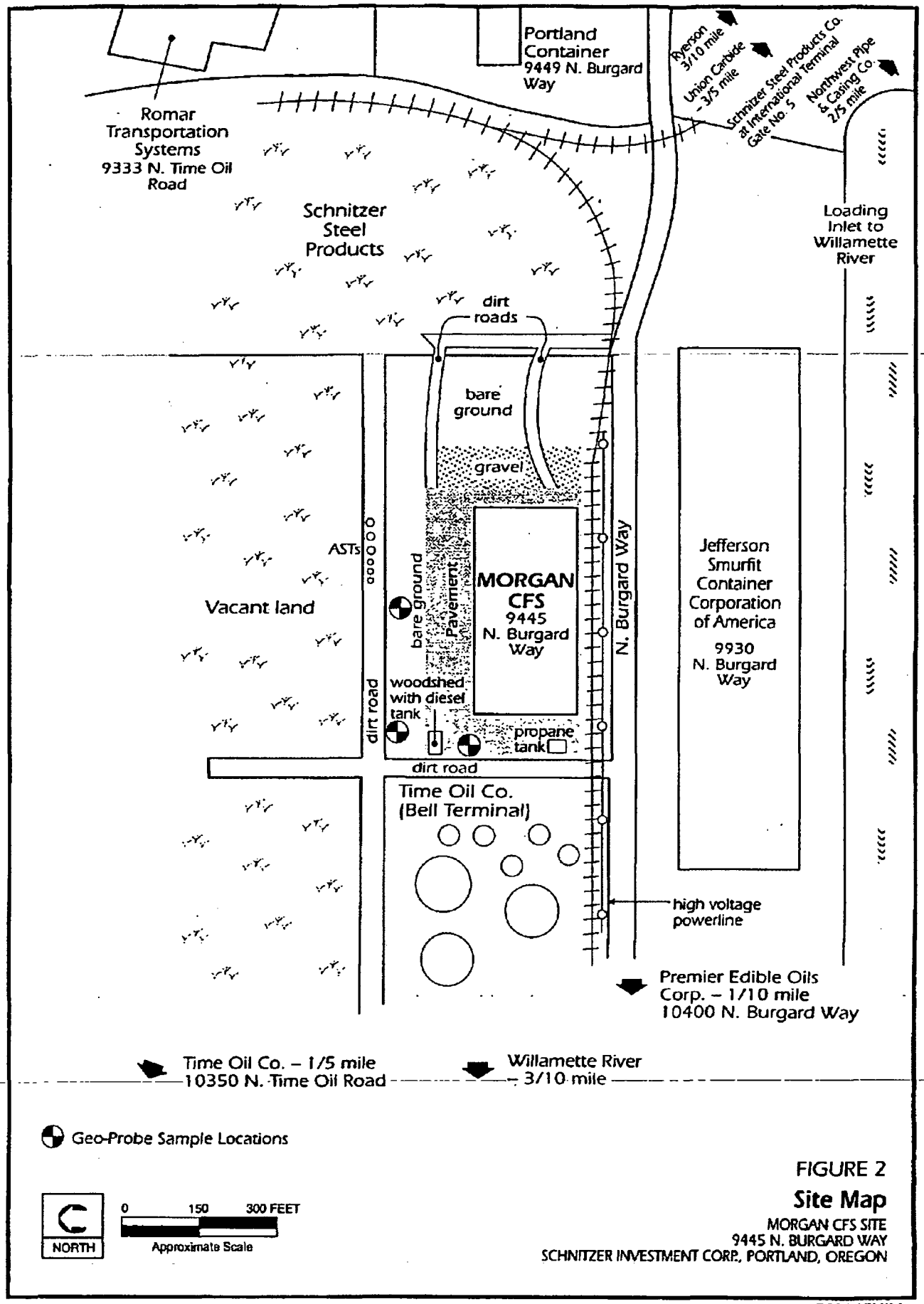

FIGURE 2

Site Map

MORGAN CFS SITE
9445 N. BURGARD WAY
SCHNITZER INVESTMENT CORP., PORTLAND, OREGON

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the northwest of the subject property. The building currently used by Jefferson Smurfit CCA and the loading inlet of the Willamette River is present in the 1944 aerial photograph.

In the 1956 aerial photograph, the subject property and most of the adjacent property is vacant and the storage areas and dormitories for the shipbuilding operations have been removed. Some buildings or structures occupy the northwestern corner of the subject property. About five or six structures that appear in the storage area in the 1944 photograph are still present at various locations around the adjacent property in the 1956 photograph. Seven ASTs on the site currently occupied by Time Oil Company appear immediately adjacent to the west of the subject property. The building currently used by Jefferson Smurfit CCA and the loading inlet of the Willamette River are shown on the 1956 aerial photograph.

On the 1961, 1967, and 1973 aerial photographs, the subject property and most of the adjacent property to the north and east remain vacant. The buildings or structures on the northwestern corner of the subject property shown in the 1956 aerial photograph have been removed by 1961. There are still five or six structures that appear in the storage area on the 1944 photograph and are present at various locations around the adjacent property until the 1973 aerial photograph. Two approximately 130-foot diameter ASTs in 1961 and the seven ASTs shown in the 1956 aerial photograph are on the site currently occupied by Time Oil immediately adjacent to the west of the subject property. The railroad tracks shown in the 1944 aerial photograph appear to have been removed by 1973. By 1973, a log storage yard located approximately 1,300 feet to the southeast of the subject property has been developed. The building currently used by Jefferson Smurfit CCA and the loading inlet of the Willamette River are shown on the 1961, 1967, and 1973 aerial photographs. A barrel storage area, approximately 400 feet southeast of the subject property and immediately east of the building used by Jefferson Smurfit CCA, has been developed by 1967.

The building on the subject property has been constructed by 1978 and the immediately adjacent areas to the north and east are vacant. The subject property and the area immediately to the east have been graded in the 1978 aerial photograph and are vegetated in the 1980 and 1986 photographs. Most of the log storage yard shown in 1973 aerial photograph has been removed by 1978 and it is replaced by 1986 with the Metra Steel (a predecessor to Ryerson Steel) building. The ASTs on the Time Oil site immediately adjacent to the west of the subject property are present. The railroad tracks presently used by Schnitzer Steel Industries appear in the 1978 aerial photograph and are located approximately 650 feet east of the subject property. Pipe and metal storage areas for recycling have been developed on both sides of these railroad tracks by the 1980 photograph. These storage areas are no longer being used by the 1986 photograph. The building and storage area currently used by Jefferson Smurfit CCA and the loading inlet of the Willamette River are shown in the 1978, 1980, and 1986 aerial photographs.

In the 1991 aerial photograph, the building that is currently on the subject property appears and the immediately adjacent areas to the north and east are undeveloped. An area approximately 330 feet east of the subject property is being used to store pipe and metal for recycling. This is the same storage area shown in the 1980 photograph, but the size of the storage area has been reduced to about ⅓ of the area. There are what appear to be 15 tanks stored approximately 650 feet northeast of the subject property. The ASTs on the Time Oil site adjacent to the west of the subject property are present. Railroad tracks presently used by Schnitzer Steel Industries are located in this photograph approximately 650 feet east from

the subject property. The building and storage area currently used by Jefferson Smurfit CCA and the loading inlet of the Willamette River are shown on the 1978, 1980, and 1986 aerial photographs.

In the 1995 aerial photograph, the parking areas around the subject property have been paved with asphalt and a new elevated loading dock appears at the northeast corner of the building. The adjacent properties to the north and east are undeveloped. Six ASTs are located adjacent to the north on the Time Oil property on the subgrade of the former railroad tracks. The storage area approximately 330 feet east of the subject property is being used to store pipe and metal for recycling and has been expanded to the north to include an intermodal container storage in the area where the 15 tanks were located in 1991. Portland Container has been constructed 750 feet east of the subject property.

Based on the Owner/Occupant Questionnaire (Appendix D), and an interview with Linda Wakefield of SIC, the site was originally developed by SIC in 1977 and has been used as a warehouse for storage and distribution of urea and wood products. The current tenant is Morgan CFS No. 2 Company who has used the subject property since 1987 for warehousing and consolidating packaging of wood products (primarily particle board) to load into intermodal containers. According to the SIC representative, the building was constructed for Pacific Supply Co-op (Senex) who used the building for bulk storage of urea for about two years. The building was remodeled to accommodate dock-high loading and leased to DHL Container Company who used the building as a depot prior to the time when Morgan CFS moved in. Jefferson Smurfit CCA also has rented space in the building from time to time. No manufacturing activities have been conducted in the building. There were no USTs on the subject property.

During a flood in February 1996, the subject property was not flooded, unlike most of the adjacent properties. The subject property is part of an area that was filled with dredged sediment in the early 1940s, when the loading inlet to the Willamette River was constructed. According to Don Carpenter of SIC, the Morgan CFS site was built at grade.

Wetlands Designations Onsite

Wetlands, as designated by the U.S. Fish and Wildlife Service National Wetland Inventory maps or the Oregon Division of State Lands Wetlands Database, are not present on the Morgan CFS site. Although a detailed wetlands survey was not performed, no obvious evidence of potential wetlands (for example, ponded water or swampy areas) was observed on the subject property.

Environmental Property Disclosure Statutes

There are no environmental property disclosure statutes in Oregon.

Regulatory Agency Database Search

CH2M HILL contracted with Environmental Data Resources, Inc. (EDR) and SAFE Research, Inc. (SAFE) to perform database searches of U.S. Environmental Protection

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Agency (EPA) and Oregon Department of Environmental Quality (DEQ) records. The following databases were reviewed.

- Databases searched to within 1 mile of the subject property:
  - EPA National Priorities List (NPL)
  - EPA Resource Conservation and Recovery Information System (RCRIS) (search for Resource Conservation Recovery Act [RCRA] Treatment, Storage, and Disposal Facilities)
  - DEQ Environmental Cleanup Information System (ECSIS)
  - DEQ Confirmed Release List (CRL)
- Databases searched to within ½ mile of the subject property:
  - EPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
  - DEQ Closure and Regular Solid Waste Active Disposal Permits
  - DEQ Leaking Underground Storage Tanks (LUSTs)
- Databases searched to within ¼ mile of the subject property:
  - DEQ Underground Storage Tanks (USTs)
  - EPA RCRIS (search for RCRA small-quantity generators)
  - EPA RCRIS (search for RCRA large-quantity generators)
- Databases searched for the subject property:
  - EPA Emergency Response Notification System (ERNS)
  - Oregon State Fire Marshal
  - Local Fire Department

Results of the database review discussed below represent the combined information from the EDR and SAFE reports. Because the EDR and SAFE listings are based on the reported company's street address, the features of concern on a property may be closer to or farther from the subject property, depending upon the actual layout. Several sites had old addresses on North Burgard Road and have been assigned new addresses on North Burgard Way or North Time Oil Road.

After reviewing the EDR and SAFE reports, CH2M HILL observed inconsistencies and inaccuracies in facility locations and distances reported. When possible, CH2M HILL has corrected the inaccurate distances in the sites reported below by using historical photographs and information gathered during the site reconnaissance. Therefore, some

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discrepancies may be noted between the sites and distances listed below and those in the EDR and SAFE reports provided in Appendix E.

Subject Property

The subject property is not listed in any of the above lists.

EPA NPL Sites

The NPL is the EPA's database of uncontrolled or abandoned hazardous waste sites identified for remedial action under the Superfund program.

No NPL sites were found within 1 mile of the Morgan CFS site.

EPA CERCLIS List

The CERCLIS list is a compilation by the EPA of sites that the agency has investigated or is currently investigating for a release or threatened release of hazardous substances pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). As of February 1995, CERCLIS sites designated No Further Remedial Action Planned (NFRAP) have been removed from CERCLIS.

There is one CERCLIS site 1 mile northwest the subject property: Oregon Steel Mills (also known as Gilmore Steel Corporation) at 14400 North Rivergate Boulevard. The plotted location of Oregon Steel Mills is inconsistent with the physical location of the site. According to database records, a preliminary assessment was conducted in September 1992. The site is under investigation to assess the extent of further action.

EPA RCRIS List

RCRIS identifies selected information on sites that generate, transport, treat, or dispose of hazardous waste. A small-quantity generator (SQG) generates between 100 and 1,000 kilograms per month (kg/mo) of hazardous waste or less than 1 kg/mo of acutely hazardous waste. A large-quantity generator (LQG) generates greater than 1,000 kg/mo of hazardous waste or greater than 1 kg/mo of acutely hazardous waste. Information obtained from the database reviews revealed five SQGs and one LQG within 1 mile of the subject property. The SQGs and LQG are as follows.

- There are three sites southeast of the subject property:
  - Northwest Pipe & Casing Company is an SQG—approximately ⅗ mile at 12005 North Burgard Road.
  - Northwest Container Services is an LQG—approximately ⅗ mile at 11920 North Burgard Road.
  - Schnitzer Steel Products Co. is an SQG—approximately ⅕ mile at International Terminals Gate No. 5.
- There is one site south of the subject property: Jefferson Smurfit Container Corporation of America is an SQG—immediately adjacent at 9930 North Burgard Way.

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- There is one site northwest of the subject property: Time Oil Company is an SQG-approximately ⅕ mile at 10350 North Time Oil Road.
- There is one site west of the subject property: Premier Edible Oils is an SQG-approximately 1/10 mile at 10400 North Burgard Way.

Oregon Steel Mills, located 1 mile northwest of the subject property at 14400 North Rivergate Boulevard, is listed in the EPA Corrective Action Report (CORRACTS). CORRACTS identifies hazardous waste handlers with RCRA corrective action activity. According to database records there have been nine RCRA compliance violations between 1984 and 1994. The reported waste codes at the Oregon Steel Mills site are D001, D006, D008, D039, K061, D007, D005, D035, F001, and F018.

DEQ ECSIS List

ECSIS is DEQ's equivalent to CERCLIS and sites listed in ECSIS may or may not be listed in CERCLIS. The database includes sites in Oregon with contamination or potential contamination from hazardous substances. These sites have been evaluated in the past, are currently being evaluated, or will be evaluated in the future. ECSIS is used only to track the status of a site. The database review revealed that there are 14 ECSIS sites within 1 mile of the Morgan CFS site.

- There are three sites east of the subject property:
  - Northwest Pipe & Casing Company (NPAC), approximately ⅗ mile at 12005 North Burgard Road
  - Union Carbide Corporation (Union Carbide), approximately ⅗ mile at 11920 North Burgard Road
  - Time Oil Company—approximately ⅕ mile at 10350 North Time Oil Road (the database record address of 12005 North Burgard Street is incorrect)
- There are six sites between ⅕ and ¾ mile southeast of the subject property.
- There are three sites 1 mile southwest of the subject property.
- There is one site approximately ⅘ mile northwest of the property—Union Chemical Division at 14025 North Rivergate Boulevard.
- There is one site that is ⅘ mile north of the subject property.

DEQ CRL

The CRL is DEQ's list of sites with confirmed releases of hazardous substances.

- There are three sites southeast of the subject property:
  - Chemcentral Corporation—approximately ⅘ mile at 10821 North Lombard Street
  - Toyota Motor Sales—approximately 1 mile at 10400 North Lombard Street
  - St. John's Landfill—approximately 1 mile at 9363 North Columbia Boulevard

DEQ LUST List

LUST records contain an inventory of reported leaking underground storage tank incidents. There are a total of 14 sites within from ¼ to ½ mile of the subject property with LUST records. The listed sites are as follows.

- There are two sites east of the subject property:
  - Northwest Pipe & Casing Company—approximately ⅖ mile at 12005 North Burgard Road
  - Hawkeye Construction—approximately ⅖ mile at 12005 North Burgard Way
- There are five sites southeast of the subject property:
  - Port of Portland (POP), Terminal 4—approximately ⅗ mile at 11040 North Lombard Street (3 records)
  - Vehicle Processors—approximately ⅗ mile at 11040 North Lombard Street
  - Harris Transportation—approximately ⅗ mile at 11640 North Lombard Street (2 records)
  - Chemcentral Corporation—approximately ⅘ mile at 10821 North Lombard Street
  - KLIX Corporation—approximately ⅘ mile at 10771 North Lombard Street (2 records)
- There are three sites northwest of the subject property:
  - Ash Grove Cement Company—approximately ⅘ mile at 13939 North Rivergate Road
  - Steinfeld's Products Company (Steinfeld's)—approximately ½ mile at 10001 North Rivergate Road
  - Oregon Steel Mills—14400 North Rivergate Road (the plotted location of this site is inconsistent with its physical location, which is approximately 1 mile from the subject property)

DEQ UST List

- There are no underground storage tanks (USTs) within ¼ mile of the subject property.
- There are three sites southeast of the subject property:
  - Northwest Pipe & Casing Company—approximately ⅖ mile at 12005 North Burgard Road
  - Harris Transportation—approximately ⅖ mile at 11640 North Lombard Street

- Schnitzer Steel Products Co.—approximately 1/5 mile at International Terminals Gate No. 5

- There are two sites northwest of the subject property:
  - Time Oil Company—approximately 1/5 mile at 10350 North Time Oil Road
  - Steinfeld's Products Company—approximately 1/2 mile at 10001 North Rivergate Boulevard

- There is one site east of the subject property: Hawkeye Construction—approximately 3/5 mile at 12005 North Burgard Road.

Oregon State Fire Marshal

The Oregon State Fire Marshal's office was contacted to determine whether the subject property or any adjacent sites are reported under Sections 302, 312, and 313 of the Superfund Amendments and Reauthorization Act (SARA) Title III—Emergency Planning and Community Right-to-Know Act (EPCRA). Section 302 requires any facility that produces, uses, or stores any of the substances on EPA's List of Extremely Hazardous Substances in a specified quantity equal to or greater than a threshold planning quantity to notify the state emergency response commission (SERC). Section 312 requires any facilities subject to the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard to submit an emergency and hazardous chemical inventory form to the SERC, the local emergency planning commission (LEPC), and local fire department. Section 313 requires annual reporting of releases of "toxic chemicals" to the environment that occur as a result of normal operations. There are eight sites listed in the Oregon State Fire Marshal's records in the vicinity, as follows:

- Premier Edible Oils Corporation—approximately 1/10 mile west at 10400 North Burgard Way
- Northwest Container Services—approximately 3/5 mile southeast at 11920 North Burgard Road
- Crown Cork & Seal Company Incorporated (Crown Cork & Seal)—approximately 1 mile southwest at 10200 North Lombard Street
- Blickle Company—approximately 1/2 to 1 mile northwest at 13035 North Rivergate Boulevard
- Ryerson Steel—approximately 3/10 mile southeast at 9040 North Burgard Way
- Jefferson Smurfit Container Corporation of America—immediately south at 9930 North Burgard Way
- Time Oil Company—approximately 1/5 mile northwest at 10350 North Time Oil Road
- Crown Cork & Seal warehouse (also known as Crown Beverage Building)—approximately 3/5 mile northeast at 9125 North Time Oil Road

Local Fire Department

The Portland Fire Department was contacted to determine whether there are USTs or ASTs registered by the owner of the subject property with the local fire department.

According to Portland Fire Department records, there are no USTs or ASTs registered for the subject property.

Summary of Regulatory Agency Database Search

In our opinion, all but four of the sites listed in the databases reviewed are not anticipated to cause an environmental impact to the subject property based on the distance from the subject property and the activities occurring on the properties. The following four sites are considered, based on the distance from the subject property and the activities occurring on the properties as indicated by the database information, to pose a potential threat to the environmental conditions on the subject property:

- Time Oil Company
- Northwest Pipe & Casing Company
- Premier Edible Oils Corporation
- Jefferson Smurfit Container Corporation of America

Regulatory Agency File Review

To further assess the environmental conditions on the subject property and the potential impact to the subject property from nearby properties, DEQ files for the properties identified above as potentially having caused an impact to the subject property were reviewed. Romar Transportation Systems, Incorporated, is a nearby property that was identified through regulatory agency file review as a conditionally exempt SQG of hazardous waste.

Reasonable and appropriate inquiry was made to regulatory agencies to determine whether environmental reports pertaining to the subject property had been produced. There were no environmental reports identified by a regulatory agency pertaining to the Morgan CFS Building.

Copies of the letters sent to the various regulatory agencies requesting site environmental file information and letter responses from the agencies (if any) are provided in Appendix F. A list and copies of relevant file information reviewed are provided in Appendix G.

A brief description obtained from DEQ files of these sites appears below.

Time Oil Company

Time Oil Company owns and operates a petroleum products storage terminal on approximately 52 acres. The property consists of four parcels, three of which constitute the Northwest Terminal. The Northwest Terminal area is approximately 900 feet northwest of the Morgan CFS site. One parcel immediately adjacent to the Morgan CFS site known as the Bell Terminal contains ASTs.

Time Oil is located along the east bank of the Willamette River within the 100-year floodplain. The subsurface soil is sand to 16 feet bgs, underlain by a zone of silt and fine

sand interbeds to 25 feet bgs, which is underlain by fine sand to at least 40 feet bgs. The site is generally flat.

The groundwater table is found at 13 to 18 feet bgs and generally flows west toward the river. The silt layers represent an aquitard separating the water table from a lower, confined aquifer that maintains a water level of about 20 feet bgs. The aquitard appears to pinch out toward the river. Shallow groundwater exhibits a response to tidal and seasonal fluctuations.

Terminal operations began in the 1953. Koppers Industries Incorporated leased tanks from Time Oil for pentachlorophenol (PCP) product formulation and storage from 1967 to 1982. Crosby and Overton leased tanks from Time Oil in the 1980s for waste oil storage. An EPA preliminary assessment was performed in 1985 and soil contamination resulting from waste oil handling and PCP blending operations was identified. The site was referred to DEQ for further action.

About 290 cubic yards of contaminated soil containing PCP in concentrations of up to 1,820 milligrams per kilogram (mg/kg) were removed from the site in 1985 for offsite disposal. Excavation depths were approximately 2 to 4 feet bgs. The excavation was located to the south of the former PCP warehouse, which is approximately 1,000 feet northwest of the subject property. RCRA land ban restrictions for F027 waste prohibited further offsite disposal after 1985. Further site investigations in 1985 found that soil was contaminated with PCP in concentrations of up to 116,000 mg/kg. Monitoring wells were installed in 1986 and groundwater was found to be contaminated with PCP in concentrations of up to 60 mg/L. The closest well with PCP is located about 900 feet northwest of the subject property.

Time Oil constructed an onsite slurry bioreactor to treat contaminated soil in 1988. About 3,000 cubic yards of PCP-contaminated soil were excavated in the same area as the original excavation to a depth of about 12 beet bgs and stockpiled onsite in 1989. The slurry bioreactor system was unable to reach the target PCP treatment level of 0.5 mg/kg owing to the presence of mineral spirits and related solvents in the PCP formulation, and treatment operations were terminated in 1989. The lowest concentration that could practically be achieved was 100 mg/kg. The PCP-contaminated soil stockpile remains onsite in a bermed, lined storage area next to the former PCP mixing area. This stockpile is located approximately 900 feet northwest of the northwest corner of the Morgan CFS site. According to a letter from Time Oil dated February 28, 1996, the flood in February 1996 reached the edges of the contaminated soil stockpile, but did not breach the containment.

Time Oil signed a Voluntary Cleanup Agreement (VCA) with DEQ in July 1991. A site visit and detailed report were completed in 1992. It was determined that the stockpiled soil was a listed hazardous waste, and was not being stored in compliance with RCRA regulations. The project was referred to the DEQ Hazardous Waste section in 1992 for resolution of the RCRA issues. Time Oil prepared a Site Characteristics Report in 1993 and a work plan for additional investigation activities was submitted to the DEQ Hazardous Waste section in December 1993. The DEQ Hazardous Waste section found that the long-term storage and treatment of contaminated stockpiled soil could not be permitted under RCRA regulations. The site was referred back to the Voluntary Cleanup Program (VCP) and Time Oil re-submitted its Intent to Participate in the VCP in August 1994. The issues and areas of concern for a remedial investigation/feasibility study (RI/FS) include the soil stockpile,

former PCP mixing area, former waste oil tank area, the tank farm area, and groundwater. Time Oil Company and DEQ met in December 1995 to discuss the treatability studies being conducted and the focus of additional site investigation work.

In 1996, Time Oil reported to DEQ that 27 drums and a 50-cubic-yard debris stockpile were discovered in the eastern undeveloped portion of the Time Oil site. The drums and debris stockpile are located approximately 700 feet north of the Morgan CFS site. The drums contain PCP wastes and are located in surface depressions that contain standing water. Some of the drums are partially or completely submerged in water or partially buried in soil. Some of the drums have corrosion holes and some have been partially crushed. The debris stockpile contains PCP in concentrations of up to 800 mg/kg, total petroleum hydrocarbons such as diesel in concentrations of up to 900 mg/kg, and metals. Time Oil plans to consolidate the debris stockpile with other hazardous waste management areas and remove the drums for offsite disposal. In June 1996, DEQ issued a comment letter on Time Oil's removal plan directing that a revised removal plan be submitted and that further investigation be done in the eastern portion of the Time Oil site. An announcement in the September 10, 1996, edition of the *Daily Journal of Commerce* indicated that Time Oil Company signed another VCA to conduct a comprehensive site investigation and evaluate appropriate cleanup measures for PCP and other hazardous substances.

Based on the type of activities reported on the Time Oil site and the distance to the subject property, activities at the Time Oil site are suspected to have impacted the soil or groundwater at the subject property. To assess the potential impact to the subject property, soil and groundwater sampling and analysis was performed as part of this site assessment.

Romar Transportation Systems, Incorporated

Romar Transportation Systems, Incorporated is registered as a conditionally exempt small-quantity generator (CQG) of hazardous waste. Romar is a CEG of silicon dioxide and ammonium hydroxide (<12 percent ammonia). No other information was contained in the file.

Northwest Pipe & Casing Company

Northwest Pipe and Casing Company is a manufacturer of steel and stainless steel pipe for water transport of potable water, irrigation water, hydroelectric water, and wastewater. NPAC has been in operation at this 26-acre site since 1982. Previously, the facility was operated by Beall Pipe and Tank and L. B. Foster. The site has been used for a variety of industrial purposes since at least 1937.

NPAC conducted its own investigation of the site in 1989. Petroleum hydrocarbons, chlorinated solvents, PCBs, and polycyclic aromatic hydrocarbons (PAHs) were discovered in the soil. A LUST caused localized groundwater contamination. NPAC agreed to investigate and clean up the site under a voluntary agreement, but did not always follow DEQ's recommendations on how to conduct the investigation and cleanup. Approximately 1,900 cubic yards of contaminated soil were excavated in 1989 and disposed of at the St. Johns Landfill in 1989 and 1990. The LUST was removed in 1989. Monitoring wells were installed prior to 1990 and analytical results from 1990 showed concentrations of benzene of up to 4 micrograms per liter (µg/L), ethylbenzene of up to 3 µg/L, and xylene of up to 18 µg/L.

Based on the activities and conditions reported on the NPAC site, located ⅕ mile southeast of the subject property, environmental conditions at the NPAC site are not anticipated to affect the environmental conditions at the Morgan site.

Premier Edible Oils Corporation (a.k.a., Palmco Incorporated)

According to DEQ files, Premier Edible Oils Corporation is an SQG of hazardous waste. Hazardous wastes generated are a mixture of glacial acetic acid, solvents, vegetable oils, and water. There was also information in the DEQ file related to offsite disposal of industrial waste materials. Based on the reported activities and conditions, it is not anticipated that activities at Premier Edible Oils Corporation will affect the environmental conditions at the Morgan CFS site.

Jefferson Smurfit Container Corporation of America

DEQ did not have files related to Jefferson Smurfit Container Corporation of America. Based on the activities conducted at the site, Jefferson Smurfit Container Corporation of America is not anticipated to have caused an environmental hazard on the subject property.

Summary of Regulatory Agency File Review

In our opinion, environmental conditions at Romar Transportation Systems, Incorporated, Northwest Pipe & Casing Company, Premier Edible Oils Corporation, and Jefferson Smurfit Container Corporation of America are not anticipated to cause an environmental impact on the subject property.

Based on the type of activities reported on the Time Oil site and the distance to the subject property, activities at the Time Oil site are suspected to have caused an environmental hazard on the subject property. To assess the potential impact on the subject property, soil and groundwater sampling and analysis were performed as part of this site assessment.

SIC File Review

Reasonable and appropriate inquiry was made to SIC and representatives of tenants at the subject property to determine whether environmental reports pertaining to the subject property had been produced. Limited file information was identified for the subject property. There were files for two nearby properties: Romar Transportation Systems, Incorporated, and St. Johns-Keller #2 Right-of-Way.

Subject Property

There was limited environmental information regarding the Morgan CFS site available from SIC. A geotechnical report for a proposed building to be constructed north of the existing building was reviewed. (The proposed building was never constructed.) The report is titled "Report, Soils Investigation, Proposed Warehouse, International Terminal Site, Portland, Oregon," and was prepared by Dames & Moore in August 1978. This report, along with reports for Romar Transportation Systems, Incorporated, is provided in Appendix H.

Adjacent Properties

Romar Transportation, Incorporated

Environmental files pertaining to Romar were obtained from SIC. Three investigations were conducted at the Romar site, and the results are described in the following reports, provided in Appendix H:

- Environmental Management Solutions. "Field Sampling Study for IT Terminal Property." January 1992. This report was prepared for SIC and covers both the Portland Container and the Romar site.
- Environmental Management Solutions. "Expanded Environmental Site Assessment and Gross Indicators Sampling Study of IT Terminal Property Lot 8." May 1993. This report was prepared for SIC.
- Technical Action Group, Inc. "Technical Review and Sampling Study of Schnitzer Investment Corporation Property at International Terminal Site in Portland, Oregon." June 1993. This report was prepared for Romar.

The three investigations found polychlorinated biphenyls (PCBs) across the Romar site at concentrations ranging up to 20 mg/kg. These investigations indicated PCBs exist on the Romar site in isolated areas where equipment was stored and that no contaminants other than PCBs were found above regulatory levels.

Three contaminated areas on the Romar site were excavated and approximately 40 tons of contaminated material was hauled to the Hillsboro landfill under Special Waste Permit No. 1571 issued to SIC. Four confirmation samples were collected and the results indicated the remaining PCB concentrations ranged up to 0.12 mg/kg. Results of the remediation are described in a report titled "Technical Review and Sampling Study of Schnitzer Investment Corp. Property at International Terminals Site in Portland, Oregon" prepared by Technical Action Group, Inc. in July 1993 for SIC.

Further verification and investigation of the Romar site was conducted by collecting and analyzing 13 samples from a sampling grid on the unpaved areas of the Romar site. Results of the investigation found PCBs up to 1.5 mg/kg. This investigation is summarized in the following report:

- Quality Group NW. "Phase II Environmental Site Assessment." November 1993. This report, prepared for SIC, states: "*... it is concluded that there is a very low likelihood that significant amounts of PCB contamination above TOSCA limits remain on the subject property in areas that will remain unpaved....*" The reports describing remedial activity and the verification investigation are provided in Appendix H.

Based on the low mobility of PCBs, it is not anticipated that the PCBs present in the soil at the Romar site will have an impact on the subject property.

St. Johns-Keeler #2 Right-of-Way

In August 1989, the Bonneville Power Administration (BPA) discovered contamination in subsurface soil excavated during the replacement of a power pole at the St. Johns - Keeler #2 Right-of-Way. The St. Johns - Keeler #2 Right-of-Way is located ¼ mile north of the subject property. BPA contacted the Port of Portland (POP) to report the subsurface contamination,

and the POP subsequently reported this information to the DEQ. The DEQ requested that the POP and SIC conduct an investigation of the contamination on the site. The source of the contamination is unknown.

According to "A Report on Subsurface Soil Sampling and Analyses," (Appendix H) prepared by Hahn and Associates, Inc. (Hahn) on January 15, 1990, six near-surface and shallow subsurface soil samples were collected and analyzed for total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs). A visual inspection found that potential surface and shallow subsurface contamination was covered by 2 to 5 feet of clean fill. The results of the laboratory analyses revealed that three soil samples contained TPH at concentrations of 7,200 mg/kg, 2,000 mg/kg, and 4,500 mg/kg, respectively. One of these three samples also contained PCBs at concentrations of 6.7 mg/kg, which is well below cleanup levels. The other three samples did not contain TPH or PCBs above the reported detection limits.

Due to the findings of this report, the POP, in cooperation with SIC, contracted with Hahn to conduct further subsurface investigations. Hahn prepared a report titled "Subsurface Investigation," (Appendix H) dated September 26, 1990, to discuss their findings. Fourteen soil samples were collected from soil borings and six groundwater samples were collected from monitoring wells for laboratory analysis. Analytical results showed that petroleum hydrocarbon contamination as high as 33,000 mg/L was present at the site. This contamination appeared to have been limited to the northern portion of the site at depths between 2 and 15 feet below ground surface (bgs). PCBs were not detected in any of the samples analyzed during this investigation.

Groundwater gradient calculations indicated that groundwater flows in a southerly direction at about eight feet bgs. Petroleum hydrocarbons were not detected in the two downgradient monitoring wells. However, a low level of petroleum hydrocarbon contamination was detected at 1.7 mg/L in the upgradient monitoring well.

The investigation concluded that, given limitations imposed by utilities and railroad tracks on drilling locations at the subject site, the vertical and lateral extent of the soil and groundwater contamination has been defined on the subject site. The full extent of contamination, however, was not defined since the contamination appeared to extend off of the subject property to the north.

Based on the file information reviewed and the distance to the subject property, the St. Johns - Keeler #2 Right-of-Way is not anticipated to impact the environmental conditions at the subject property.

Site Reconnaissance

The Morgan CFS site was visited on August 8, 1996, to observe the site and adjacent properties that may have an impact on the environmental conditions at the subject site. The site reconnaissance was performed by Mark Bricker and Darren Nakata of CH2M HILL; they were accompanied by Tim Michalek of Morgan CFS No. 2 Company. A copy of the field checklist completed during the site reconnaissance is provided in Appendix I. Photographs of the site reconnaissance are provided in Appendix J. Figure 2 presents some of the site features observed during the site reconnaissance.

Subject Property

The subject property consists of a concrete single-story office and warehouse building that is approximately 40 feet tall and that, according to aerial photographs, was constructed sometime between 1973 and 1978. The building has approximately 72,000 square feet (ft^2) and sits on a parcel of land that is approximately 10.07 acres in size. Approximately 50 percent of the surface of the parcel is covered with asphalt or the building. The remaining 50 percent of the parcel is vacant bare ground, or surfaced with gravel. The subject property is generally flat and has good storm drainage; there were no visible signs of standing water. The parcel has a chain-link fence along the western and northern property boundary.

According to Tim Michalek of Morgan CFS No. 2 Company and Linda M. Wakefield of SIC, there were no USTs located on the subject property. No visible evidence of USTs was observed during the site visit. A horizontal 500-gallon steel aboveground diesel tank is located inside of a wooden shed on the edge of the asphalt at the northwest corner of the subject property. The wooden floor is stained and there is a spillage area of approximately 20 ft^2 on the asphalt where the door opens. A visual inspection of the back side of the wooden shed revealed that the spillage area is contained on the asphalt. An abandoned car and truck were also observed in trees behind the wooden shed in this same area. There were no visible signs of soil staining around the vehicles.

There are several intermodal containers parked on the bare ground along the northern boundary of the subject property. There is a debris pile of tires, pallets, metal posts, scrap metal, and wood spools against the fence behind some trees in the middle of the northern boundary. There were no visible signs of soil staining from the sweeping or cleaning of intermodal containers.

The north side of the building is the primary area for loading intermodal containers. This side of the building has several dock-high loading areas and four or five intermodal containers were parked at the loading dock during the site visit.

Outside of the building on the east end were several stacks of wood products. Most of the outside area on the east end has a gravel surface. A dumpster for wood recycling was located in this area. There were numerous pieces of wood scattered around the dumpster.

The south side of the building faces North Burgard Way. A high-voltage powerline and rail spur run in an east-west direction along the southern edge of the building. According to Tim Michalek of Morgan CFS No. 2 Company, 30 to 40 rail cars traverse the property each month.

There are additional stacks of wood products on the west end of the building. This area is also used for truck loading. A propane tank is located at the southwest corner of the subject property. A 250-gallon steel tank and a 55-gallon barrel were observed on top of a 15-foot stack of wood products against the building; Tim Michalek of Morgan CFS No. 2 Company indicated that the tank had been used to store diesel inside of the building. During an insurance inspection, Morgan CFS was directed not to store diesel inside the building. The tank and barrel were inaccessible from ground level, and the site reconnaissance was unable to confirm that they were empty.

Approximately 5 percent of the building is used as office space and the remaining 95 percent is dedicated to warehousing. The heating and cooling systems are electrical.

Potable water and sewer service are provided by the City of Portland. The roof of the building is supported from the inside with wooden beams. There was no insulation in the roof and there were no floor drains observed. A 75-kilovolt-ampere (kVA) transformer inside a framed area along the middle of the southern wall of the building was observed. According to Pat Brasner with Portland General Electric, this transformer was tested in 1988 and does not contain PCBs.

The floor inside of the building consists of asphalt on top of concrete. According to a SIC representative and Tim Michalek, prior tenants used the building for bulk storage of urea. The urea pitted the concrete floor, and installation of an asphalt cap was necessary before Morgan CFS could occupy the building.

Adjacent Properties

Jefferson Smurfit Container Corporation of America is located to the southwest of the subject property. Jefferson Smurfit CCA collects, sorts, and bales wastepaper for recycling. The building at this site dates back to the 1940s when it was used as a part of a major shipyard in this area. There is a large steel tank possibly used to store propane on the north side of the Jefferson Smurfit CCA building. Outside, on the north end of the Jefferson Smurfit CCA building, is a storage area used to store empty pallets. The areas around the Jefferson Smurfit CCA building are not paved. There were no visible signs of soil staining in the areas observed.

There is a strip of undeveloped land and a storage area used to store pipe and metal for recycling by Schnitzer Steel to the east of the subject property. To the southeast of the subject property is International Terminal Gate No. 5, which is the entrance to Schnitzer Steel's scrap metal recycling operations.

Property owned by Time Oil is immediately adjacent to the subject property to the north and west. There is vacant land to the north, and ASTs and a loading rack referred to as the Bell Terminal are immediately to the west of the subject property.

Sampling and Analysis Performed for This Assessment

Asbestos

Representative samples of suspect asbestos-containing material (ACM) were collected from the site by Professional Service Industries (PSI) under a subcontract with CH2M HILL because the building was constructed in the 1970s. No sampled material resulted in a positive reading for the presence of asbestos. Table 1 and Appendix K present the results of the PSI suspect ACM sampling.

Roof materials at the site were not sampled due to lack of safe access. If the roof had been accessible, it is not likely that a sample would have been collected in order to protect the integrity of the roof. It is anticipated, based on the age of the building, that asbestos is present in the tar materials used for the approximately 72,000 square feet of roofing.

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TABLE 1
Results of Asbestos-Containing Material Sampling

Sample Type/ Description	Sample Location	Condition	Result
Front door to office	Office	Good	0
Door frame to office	Office	Good	0.1
Men's restroom door	Office	Good	-0.2
Men's room door frame	Office	Good	0.2
Office window frame	Office	Good	-0.2
Door to warehouse	Warehouse	Good	0
Frame on roll-up door #1	Warehouse	Good	-0.4
Roll up door #1-bump post	Warehouse	Good	-0.4
Interior support column #13	Warehouse	Good	-0.5
Red painted fire valve	Warehouse	Good	1

mg/cm^2 = milligram per square centimeter.

Radon

A May 1996 draft report titled "Presentation of Radon Potential Maps to the Public: A Case History of Portland, Oregon," prepared by Scott F. Burns and Stuart G. Ashbaugh with Portland State University, and Ray Paris and George Toombs with the Radiation Control Section of the Oregon Health Division, was reviewed in order to provide information about radon in the Portland area.

Radon is a naturally occurring, odorless, tasteless, radioactive gas produced as one of the decay products of the uranium and thorium series. It comes from rocks, soil, and water.

EPA has established a level of 4 picoCuries per liter (pCi/L) as the action level for radon. Owners of buildings containing levels greater than this amount of radon are recommended to take "action" to reduce the radon levels. This action level is only an estimate of a concentration target to which indoor levels should be reduced. Indoor radon values are controlled by the following factors: bedrock under a building; soil porosity and permeability; construction of the building; groundwater levels; and the presence of faults.

On a national scale, 1 in every 12 homes has radon levels above the action level. In Oregon, a 1993 study by the Bonneville Power Administration of more than 1,135 homes in the Portland area revealed an elevated indoor radon level in one of every five homes.

According to the May 1996 draft report: *"Using data collected by the Oregon Health Division's Radiation Control Section, Portland was found to have elevated radon values in 22% of homes. A radon potential map has been produced for 39 zip code regions of Portland based on the rank sums of maximum radon values, average indoor radon values, and the percentage of homes with radon values >4 pCi/L. Eight zip codes have high, 15 moderate, and 16 low radon potential."*

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The Portland Container site is located in zip code are 97203 and, according to Figure 5 in the May 1996 draft report, this area is rated as having medium radon potential.

The atmosphere in the Morgan CFS site was sampled for the presence of radon by PSI under a subcontract with CH2M HILL. Appendix K presents the results of the PSI radon sampling. Radon results range from less than <0.2 to 0.6 pCi/L. These results, shown in Table 2, are well below the EPA-recommended radon exposure level of 4 pCi/L.

TABLE 2
Results of Radon Gas Survey

Sample Location	Radon Levels (pCi/L)
Office	0.6
Scale in warehouse	0.2 U

U—Not detected at the noted detection limit.

Lead-Based Paint

Representative samples of paint potentially containing lead were collected from the site by PSI under a subcontract with CH2M HILL. Appendix L presents the results of the PSI lead-based paint sampling. Red paint on the fire water supply valves tested at 1 milligram per square centimeter (mg/cm^2) for lead-based paint. The red paint covered an area less than 20 ft^2. Nine other areas tested were below 1 milligram per square centimeter (mg/cm^2).

Drinking Water

A representative water sample was collected from a restroom sink at the subject property, as indicated in Table 2. The sample was collected by opening the water tap and allowing the water to run for 1 to 2 minutes. It was not possible to coordinate with property tenants to enable obtaining first draw water samples. The sample was collected in 500-milliliter (ml). sample containers which were preserved with nitric acid. Once the sample container was filled, the sample bottle was capped, labeled, placed in a cooler of ice for storage, and transported to North Creek Analytical Laboratory in Beaverton, Oregon, under chain-of-custody for analysis. The samples were analyzed for total lead at North Creek Analytical Laboratory by EPA Method 200.8. The results of the analyses are presented in Table 3 and analytical reports are presented in Appendix L. The measured concentration was less than the EPA drinking water action level of 0.015 mg/L.

TABLE 3
Results of Lead Analysis for Tap Water Samples

Site	Address	Sample Identification Number	Sample Location	Total Lead Concentration (mg/L)
Morgan CFS	9445 North Burgard Way	NW-04-9445-01	Restroom	0.002U

U—Not detected at the noted detection limit

Soil

Because of the potential impact to the subject property from activities at Time Oil Company, three Geo-probes were drilled at the Morgan CFS site on September 9, 1996. Soil samples were collected with a Geo-probe operated by Geo-Tech Explorations, Incorporated. Three borings were installed with the Geo-probe: one to the north of the building, one to the west, and one to the northwest (Figure 2). One soil sample was collected from each of the borings at 1 foot bgs. The soil was placed in a laboratory-prepared jar and transported to North Creek Analytical Laboratories in Beaverton, Oregon, under standard chain-of-custody procedures. Three soil samples were analyzed for PCP at North Creek Analytical Laboratories by EPA Method 8270, and all were found to be "nondetect" (method reporting level of 13 µg/kg). The results of the analyses are presented in Appendix L.

Groundwater

To evaluate the potential impact of activities at Time Oil Company on the subject property, three Geo-probes were drilled at the Morgan CFS site on September 9, 1996. Groundwater samples were collected from each of the borings described in the soil sampling sections. The Geo-probe boring was advanced as far down as the soil appeared wet. A water sampling screen was then pushed into the wet soil so that the surface of the groundwater was included in the screened portion of the boring. Groundwater was then hand pumped through disposable tubing and into a laboratory-prepared jar. The samples were transported to North Creek Analytical Laboratories in Beaverton, Oregon, under standard chain-of-custody procedures. Three groundwater samples were analyzed for PCP at North Creek Analytical Laboratories by EPA Method 8270, and all were found to be "nondetect" (method reporting level of 0.5 µg/L). The results of the analyses are presented in Appendix L.

Identified Environmental Concerns

The following are CH2M HILL judgments and opinions regarding environmental concerns at the Morgan CFS site based on the information presented in the previous sections and appendixes of this environmental assessment report. It is reasonable for Northwest to conclude that, except as expressly set forth below, Items (1) a-u specified in the ERLU are not present on the subject property.

- USTs have not been present on the subject property. USTs on properties within 1 mile of the site have not caused an environmental hazard on the subject property.
- ACM is presumed present in approximately 72,000 square feet of roofing material at the subject property. Other than roofing material, ACM is not present on the subject property. ACM on properties within 1 mile of the site has not caused an environmental hazard on the subject property.
- Transformers and electrical equipment located at the Morgan CFS site do not contain PCBs. The transformers and electrical equipment have not caused an environmental hazard. Transformers and electrical equipment located within 1 mile of the subject property that contain PCBs above regulated levels have not caused an environmental hazard on the subject property.

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- Lead-based paint tested positive in one of ten samples from the subject property, representing on the order of 20 ft^2 of painted surface. Lead-based paint on properties within 1 mile of the site has not caused an environmental hazard on the subject property.
- Petroleum products at the site are of sufficiently low quantities and stored in such a manner that they are not anticipated to affect the environmental conditions on the subject property. Petroleum products on properties within 1 mile of the site have not caused an environmental hazard on the subject property.
- Drums containing hazardous substances are not present at the subject property. No drums containing hazardous substances that would cause an environmental hazard to the subject property were observed on properties within 1 mile of the subject property.
- A diesel spill of approximately 20 ft^2 on the asphalt in the northwest corner of the site was observed. The observed diesel spill does not pose an environmental threat to the subject property. There were no observed or reported material spills on properties within 1 mile of the subject property that would cause an environmental hazard on the subject property.
- There was no observed evidence of stressed vegetation on the subject property. There was no observed evidence of stressed vegetation on properties within 1 mile of the subject property that suggested an environmental hazard on the subject property.
- Other than the small spill of diesel discussed above, there was no observed evidence of discolored or disturbed soil on the subject property. There was no observed evidence of discolored or disturbed soil on properties within 1 mile of the subject property that suggested an environmental hazard on the subject property.
- There were no unusual or noxious odors on the subject property. There were no unusual or noxious odors on properties within 1 mile of the subject property that suggested an environmental hazard on the subject property.
- Monitoring wells were not observed or found at the site. There are monitoring wells on the Time Oil Company property approximately 900 feet northwest and generally downgradient of the subject property; samples of groundwater from these monitoring wells have been found to contain PCP. There were no other monitoring wells on properties within 1 mile of the subject property that suggested an environmental hazard on the subject property.
- No trails with no apparent outlets or purposes were observed on the subject property. No trails with no apparent outlets or purposes were observed on properties within 1 mile of the subject property that suggested an environmental hazard on the subject property.
- Toxic and hazardous substances are used or stored on the subject property in quantities and ways that are not anticipated to cause an environmental hazard at the site. No toxic and hazardous substances that have caused an environmental hazard to the subject property have been observed on properties within 1 mile of the subject property.

- No radon levels above the recommended action levels were detected in the samples collected at the subject property. No radon has been observed on properties within 1 mile of the site that has caused an environmental hazard on the subject property.
- No refrigerated drinking water fountains listed in the "Federal Register" as coolers that are not lead-free were observed on the subject property. No refrigerated drinking water fountains listed in the "Federal Register" as coolers that are not lead-free that have caused an environmental hazard on the subject property have been observed on properties within 1 mile of the subject property.
- Results from analysis of drinking water samples taken from each of the buildings onsite do not indicate levels of lead that pose a threat to human health. No lead-contaminated drinking water has been observed within 1 mile of the site that has caused an environmental hazard to the subject property.
- There were no reports of past or present dry-cleaning operations conducted onsite.
- Overhead transmission lines are present along the southern border of the subject property.
- The subject property was constructed on grade and is located within an area that was filled with dredged sediment in the early 1940s, when a loading inlet to the Willamette River was excavated. In general, SIC policies prevented contaminated material from being used at the subject property as outlined in Appendix M.

In our opinion, which is partly based on soil and groundwater sampling conducted as part of this environmental site assessment, Time Oil Company does not pose an environmental hazard to the Morgan CFS site.

References

Personnel Performing Site Assessment

The environmental site assessment was performed by Ross Rieke and Mark Bricker. Resumes of both individuals are included in Appendix N.

Reports Reviewed

Dames & Moore "Report, Soils Investigation, Proposed Warehouse, International Terminal Site, Portland, Oregon." August 1978.

Environmental Management Solutions. "Field Sampling Study for IT Terminal Property." January 1992.

Environmental Management Solutions. "Expanded Environmental Site Assessment and Gross Indicators Sampling Study of IT Terminal Property Lot 8." May 1993.

Quality Group NW. "Phase II Environmental Site Assessment." November 1993.

Technical Action Group, Inc. "Technical Review and Sampling Study of Schnitzer Investment Corporation Property at International Terminal Site in Portland, Oregon." June 1993.

Technical Action Group, Inc. "Technical Review and Sampling Study of Schnitzer Investment Corp. Property at International Terminals Site in Portland, Oregon." July 1993.

Persons Interviewed

Don Carpenter, Construction Manager—Schnitzer Investment Corp.
Tim Michalek, President—Morgan CFS No. 2 Company
Linda M. Wakefield, Vice President—Schnitzer Investment Corp.

Jim to NW Pipe

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DEPT OF ENVIRONMENTAL QUALITY
RECEIVED

FEB 27 2001

NORTHWEST REGION

February 27, 2001

Ms. Alicia C. Voss
Oregon Department of Environmental Quality
Northwest Region
Suite 400
2020 SW Fourth Avenue
Portland, OR 97201

Subject: Northwest Pipe Company

Dear Ms. Voss:

This letter transmits one copy of the Preliminary Assessment Addendum for Northwest Pipe Company, 12005 North Burgard Road, Portland, Oregon.

This report was prepared on behalf of Northwest Pipe in accordance with the August 17, 2000 Voluntary Cleanup Letter Agreement between the Oregon Department of Environmental Quality and Northwest Pipe Company.

Please contact me at 503/235-5022, ext. 4387 if you have questions regarding this report.

Sincerely,

CH2M HILL

Ken Shump

Ken Shump, P.G.
Project Manager

c: Carol Grant, Northwest Pipe Company
Claudia Powers, Ater Wynne LLP

SI-21

SCHN00206016

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED

FEB 27 2001

NORTHWEST REGION

Preliminary Assessment Addendum

Prepared for

Northwest Pipe Company

12005 North Burgard Road
Portland Oregon
ECSI No. 138

February 2001

Prepared by

CH2MHILL
Portland, Oregon

SCHN00206017

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Preliminary Assessment Addendum
Northwest Pipe Company, Portland Oregon

1.0 Introduction

Northwest Pipe Company delivered a Preliminary Assessment to The Oregon Department of Environmental Quality (DEQ) on November 21, 2000. This addendum was prepared in response to the DEQ's comments on the Preliminary Assessment provided in letters dated December 19, 2000 and February 1, 2001, and based on information discussed in a January 18, 2001 meeting between Northwest Pipe, DEQ, Ater Wynne LLP, and CH2M HILL (counsel and consultant, respectively, to Northwest Pipe Company).

The objective of this addendum is to provide additional information to DEQ to satisfy its requirements for a Preliminary Assessment of the Northwest Pipe Company Portland facility. This addendum contains the following sections:

- An expanded description of background information on the Northwest Pipe facility, including a description of current operations (requested in the December 19, 2000 letter and in the January 18 meeting)
- A description of available sampling information and assessment of its sufficiency, with any recommendations for additional sampling (requested in the December 19 letter and discussed in more detail in the January 18 meeting and February 1 letter).
- Information on the status of groundwater monitoring wells at the site, and a description of groundwater flow direction (requested in the December 19 letter).
- A discussion of the hazardous waste generator status of the facility (requested in the December 19 letter)
- A discussion of more recent information on storm water at the site (requested in the December 19 letter)
- Comments and clarifications on information regarding the Northwest Pipe facility contained in reports submitted to DEQ for the Burgard Industrial Park by Schnitzer Investment Corp. (requested in the January 18 meeting).
- Recommendations for further work

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2.0 Northwest Pipe Company Site Background

2.1 Early Industrial Activities

Industrial activities on the land currently owned by Northwest Pipe Company in Portland began during World War II, with the construction of the Oregon Shipbuilding Corporation shipyard. Prior to this time, aerial photographs indicate the property was undeveloped.

The Oregon Historical Society holdings on shipyard operations were reviewed as a source of information on past practices at the Northwest Pipe facility. The principal sources of information reviewed included historical maps, a report by Julia Osborn (1945) entitled *A Story of a Shipyard*, an Oregon Shipbuilding Corporation document entitled *Survey of Shipyard Operations, Vol. 1*, and copies of a shipyard newsletter called *The Bosun's Whistle*. Figure 1 is a copy of an historic map showing the layout of shipyard operations. When the site currently owned by Northwest Pipe was used as part of the Oregon Shipbuilding yard, it was dominated by the Assembly Building. As shown in Figure 2, the footprint of the Assembly Building conforms generally to the present-day footprints of the two buildings containing Bays 1 though 6 and Bay 9. Figure 2 shows the following features from the Oregon Shipbuilding Corporation era within the present-day boundaries of the Northwest Pipe Company facility:

- Assembly Building
- Tool Room and Weld Rod Storage
- Hull Materials Office
- Pipe Shop
- Maintenance Shop
- PFM (undefined)
- Substations (3)
- Lockers (2)
- Toilets
- Offices (2)
- Union Meeting Hall

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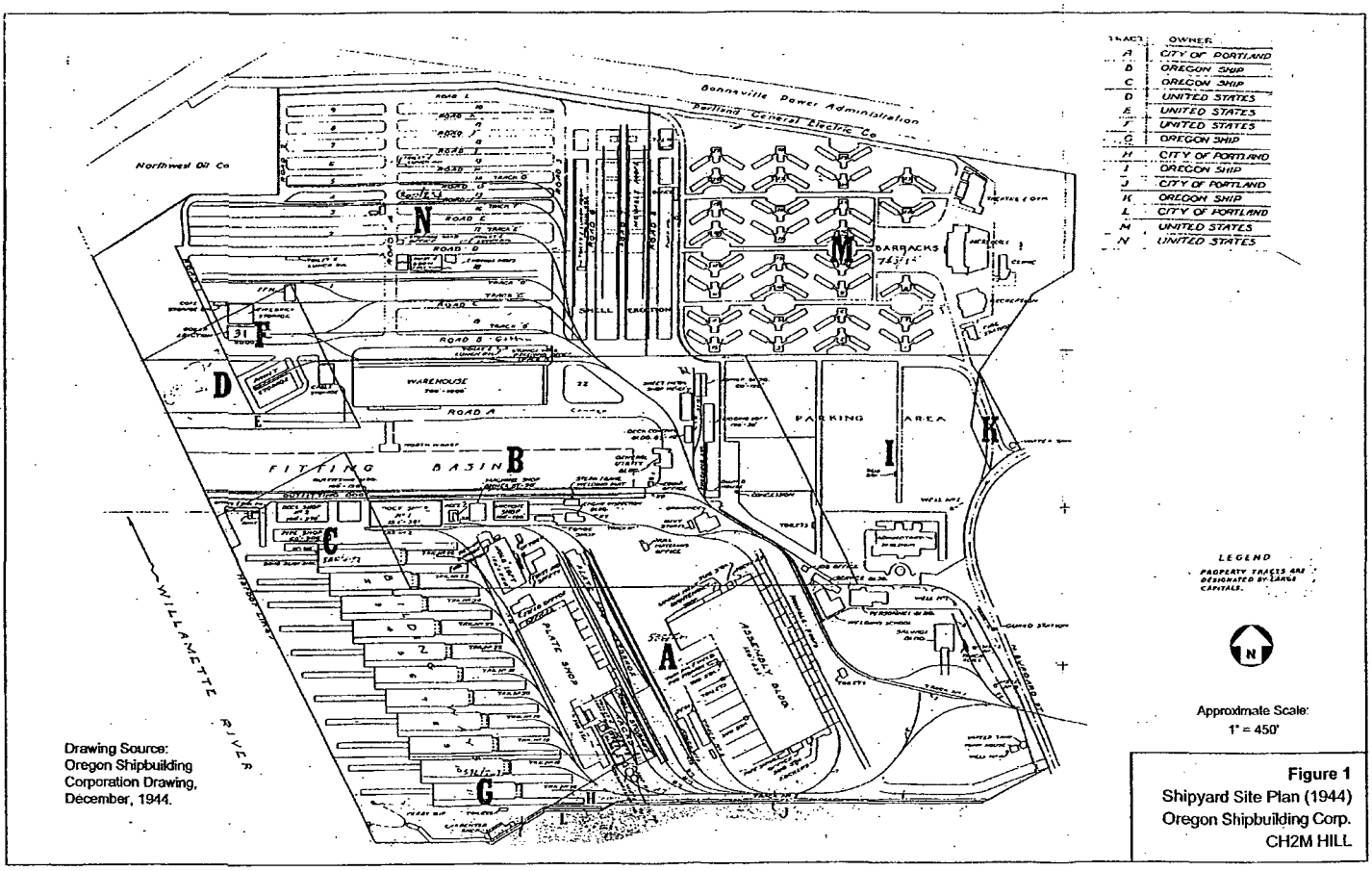

Drawing Source:
Oregon Shipbuilding Corporation Drawing, December, 1944.

Figure 1
Shipyard Site Plan (1944)
Oregon Shipbuilding Corp.
CH2M HILL

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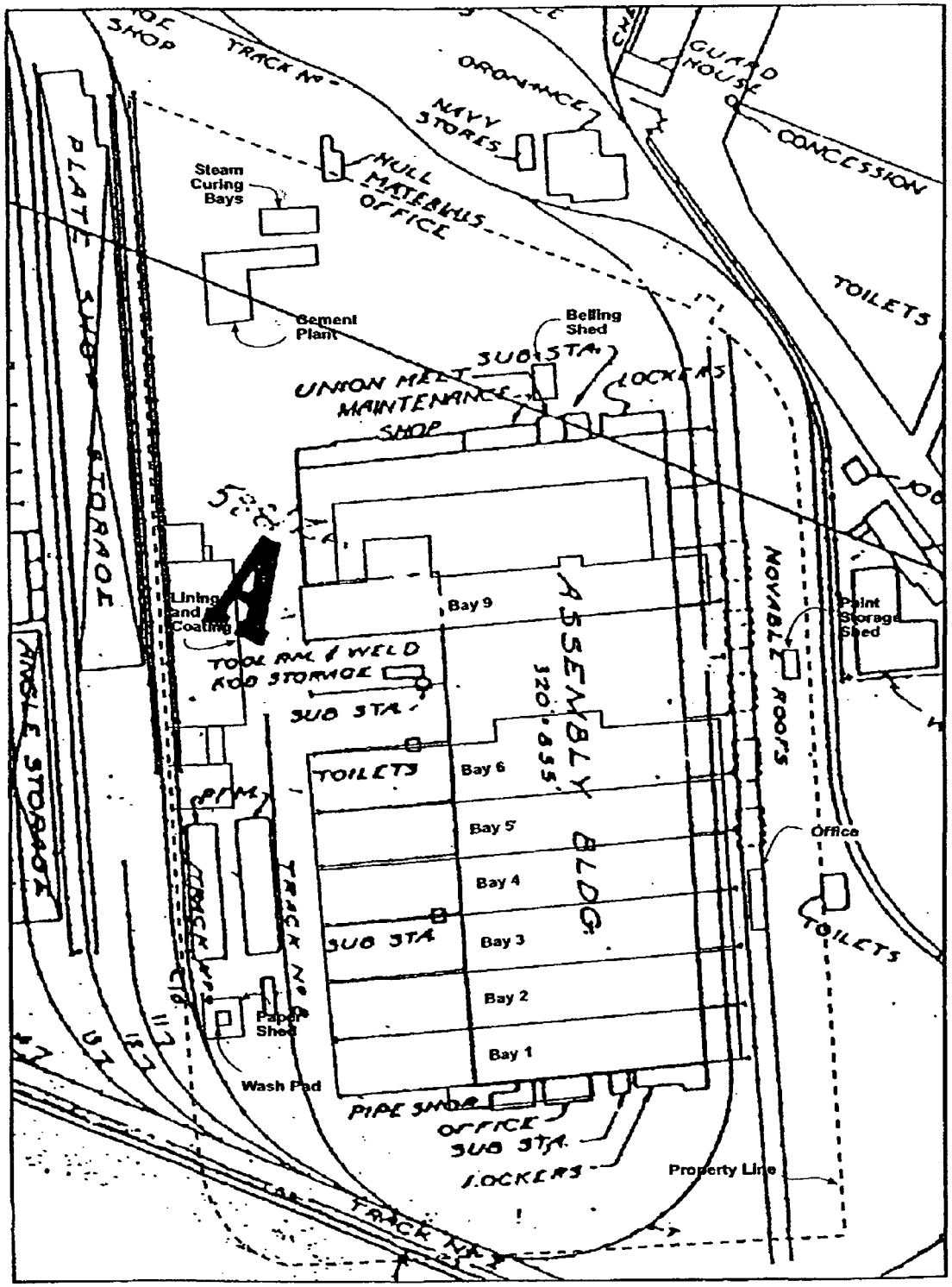

0 200'
Approximate Scale

Figure 2
Current Site Features Compared to Historical Features
NORTHWEST PIPE COMPANY
PORTLAND, OREGON

CH2MHILL

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Production at the Oregon Shipbuilding Corporation took place in four general areas: the Plate Shop, the Assembly Building, the Shipbuilding Ways, and the Outfitting Dock. Steel plate was shaped and cut at the Plate Shop, which was located east of the Northwest Pipe property. The shaped steel plate was transported by rail to the Assembly Building where it was welded into large ship sections weighing up to 250 tons. These prefabricated sections were transported by rail to the Shipbuilding Ways (located on the riverfront east of the Northwest Pipe facility) and attached to the hull. Welding was the principal method used for assembly both in the Ways and in the Assembly Building. In addition to welding, some exterior painting also occurred on the Ways. After the major structure of each ship was completed, the ship was launched and final outfitting occurred at the fitting basin and outfitting dock. Final outfitting included electrical, painting, and interior assembly. In summary, the major industrial process that occurred on the Northwest Pipe site during operation of the Oregon Shipbuilding Corporation was welding steel plate in the Assembly Building.

2.2 Post-War Property Use

Based on property ownership records, the property that currently is owned by Northwest Pipe Company passed in ownership from Oregon Shipbuilding Corporation to Surplus Properties Corporation in 1950, and subsequently to Beall Pipe and Tank Corporation in 1950.

Based on interviews with company representatives familiar with the former Beall Pipe and Tank Corporation operations at the property, the major buildings and structures used by Beall are in the same locations and are the same approximate size as those currently used by Northwest Pipe Company. The buildings comprising Bays 1 through 6 and Bay 9 are the same, as are the cement mortar lining facility; the pipe lining and coating facility, the wood
cutting shed, the plant office, the administration office, and the paper storage shed. Similar to Northwest Pipe, Beall manufactured steel pipe; but Beall also manufactured products that Northwest Pipe did not and does not make. For example, Beall Transliner built tanks for tanker trucks in parts of Bay 1 and Bay 2; Beall riveted and spot welded galvanized culvert pipe (it did not manufacture the galvanized steel) in Bay 4; and it applied asphalt wrap in the coating and lining facility and asphalt dip coatings and linings in Bay 9. The asphalt coating material used by Beall Pipe and Tank was manufactured by Shell Oil Company. Beall significantly reduced its asphalt coating and lining operations in the 1970's and by approximately 1976 had discontinued the process altogether. For a short period of time, Beall built and operated a hydrotester in what is now referred to as the paper shed. The hydrotester was subsequently decommissioned by Beall.

Beall's major market was irrigation pipe, both straight-steam and spiral weld pipe. Straight seam steel pipe was made by the electric resistance welding process and the spiral weld was made by the submerged arc welding process. Beall also produced

pipe by the pyramid roll process. Beall produced potable water pipe, custom-fabricated pipe and tanks, square and rectangular tubing, corrugated culvert, tanks and pressure vessels. During its tenure, Beall leased storage space to American Steel Company. In approximately 1970, a Japanese trading company, Okura, became a co-owner of Beall Pipe and Tank Corporation.

In approximately 1976, Beall Pipe sold its business to L B. Foster Company. L. B. Foster continued to make large water pipe and tubular pipe used for such applications as irrigation pipe, but it discontinued making pipe from pyramid rolls.

2.3 Current Manufacturing Activities

Northwest Pipe Company has owned its Portland Facility since 1997, however, the company began operations at the site in 1983 under a lease from Multnomah Land and Equipment Company. Northwest Pipe manufactures potable water transmission pipe and tubular products that are used in water utility, hydroelectric construction, agricultural, mining, fire protection and industrial applications. Steel pipe is manufactured using both the electric resistance welding and the submerged arc welding processes.

Northwest Pipe operates three spiral weld mills and three straight seam mills to produce welded steel pipe ranging in size from 2 3/8-inch outside diameter through 144-inch outside diameter. If desired by the customer, the facility can produce pipe with coatings and linings, specifically, cement mortar, coal tar enamel, polyethylene tape, rust-inhibitive primers, polyurethane, coal tar epoxy, and specialty paints. A list of chemicals used at the site is provided in Section 3.0 of the URS Letter Report (URS 2000).

Figure 3 is a site map showing the location of Northwest Pipe's production areas. Pipe is welded and cut in Bays 1 though 6. The X-ray area, quality control laboratory, and shipping and receiving area are located adjacent to Bay 1. Pipe fittings such as elbows, tees, manifolds, reducers, and manholes are fabricated in Bay 3. The maintenance area is located in a portion of Bay 4. Sand blasting prior to taping or coating occurs in Bay 9, within the Sand Blast Room. A hydrotest facility is also in Bay 9, and pipe lacquering occurs in the Bay 9 annex.

Cement mortar lining and coating occurs at the Cement Plant in the northeast corner of the facility. During its tenure at the property, Northwest Pipe added the Cement Curing Bays at the north edge of the facility. Paint and coal tar enamel are applied in the Lining and Coating Facility, which is located in a building on the western edge of the site. Solid coal tar enamel is stored outside in an area at the north end of the Lining and Coating Facility. Paint is stored in a contained area under cover in the Paint Storage Shed near the eastern property line. Wood cutting, pipe cutting, and pipe belling occurs in the northeastern part of the site. Also in this area, gasoline and diesel fuel is stored in two above-ground storage tanks with secondary containment. A steam cleaning/hot water wash pad that has a closed sump is

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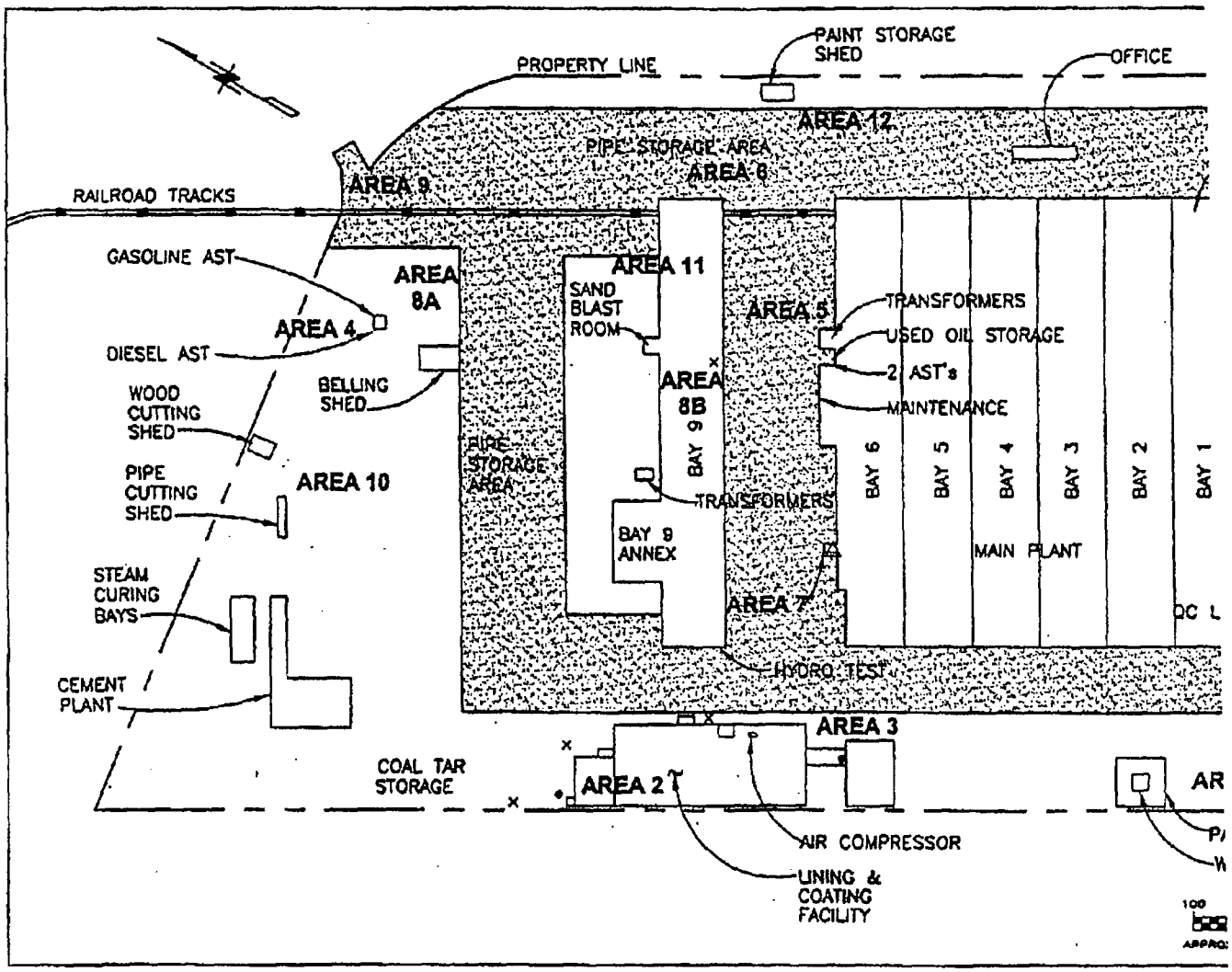

EXPLANATION:

△ WATER WELL

• SUMP

× COAL TAR RECLAMATION BLOWERS

PAVEMENT AREA (APPROXIMATE)

NORT

FIG2.dwg

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located under cover within the Paper Shed. The wash pad sump is pumped out as needed by Spencer Environmental. An Office Building containing offices, restrooms, and a meeting room is located east of the building containing Bays 1 through 6. The remainder of the facility is used for storing finished pipe and coiled steel, and for shipping access by rail and truck . As detailed in the URS Letter Report (2000), Northwest Pipe has decommissioned all underground storage tanks, conducted extensive site investigations and cleanup, and has continually improved the existing facilities at the property during its tenure at the site.

Northwest Pipe has upgraded its processes over time to improve efficiency and enhance the environmental benefits of its production processes. Changes to the facility that have occurred since Dames & Moore's Phase I and II Report (1989) include:

- The facility's coal tar vapor reclamation blowers were upgraded in 1995 to a hood and reheating system that filters and condenses the vapor.
- Because of process changes, Northwest Pipe has upgraded Areas 2 and 3 since 1995. The superficially stained surface soil in this area were capped with concrete. Northwest Pipe installed a chiller for the coatings department on part of the concrete cap in late 1999.
- Since the mid 1990s, Northwest Pipe has made a concerted effort and invested a considerable amount of money to induce its suppliers to provide coating products that contain lower levels of volatile organic compounds (VOCs). As a result, the amount of VOCs in coating products used at the facility, and the amount of VOCs emitted during pipe coating have been substantially reduced.
- In 1998, the 207 Mill was constructed at one end of Bay 4 to produce tubular products ranging in diameter from 2 inches to 18 inches. This process employs an ultraviolet light (UV) coating line that eliminates VOC emissions by using UV light to cure the coating.
- An X-ray area was installed adjacent to Bay 1 in 1995 for manufacturing quality assurance.
- Coal tar in solid form formerly was stored in two locations: south-southeast of the Paper Shed and north-northwest of the Lining and Coating Facility. In 1997, solid-form coal tar storage was consolidated in the area adjacent to the Lining and Coating Facility. The area near the Paper Shed no longer is used for solid-form coal tar storage.
- In 1999, the 250-gallon gasoline above ground storage tank was moved into the diesel containment area. The tank and its containment shed currently are located inside the diesel containment area.

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- For information on implemented environmental management activities since 1991, see the URS Letter Report (2000), Section 6.8.

3.0 Available Sampling Information Assessment

DEQ has expressed concern that the existing documentation on sampling and remediation at the site may be inadequate to assess areas of potential concern. DEQ's areas of interest regarding past work are those identified in it its February 1, 2001 letter:

- Potential groundwater contamination at the site; Item 1 in DEQ (2001)
- Insufficient soil sampling in Areas 1, 3, 5, 9, and 12; Item 2 in DEQ (2001)
- VOCs and polynuclear aromatic hydrocarbon (PAH) concentrations potentially present at or below the water table in Areas 1 and 3; Item 3 in DEQ (2001)
- Residual, low level concentrations of polychlorinated biphenyls (PCBs) and total petroleum hydrocarbon (TPH) in Area 5, and concern about historic PCB detection limits above some current action levels; Item 4 in DEQ (2001)
- Potential VOC concentrations in Areas 9 and 12; Item 5 in DEQ (2001)
- Additional information needed on petroleum hydrocarbons in the "plugged storm drain" at Area 14; Item 6 in DEQ (2001)
- Additional information on the site storm water discharge system; Item 7 in DEQ (2001) and also requested in DEQ (2000).
- Additional information on the site's industrial production well; Item 8 in DEQ (2001)

This section responds to these concerns and describes the general scope of proposed sampling and analysis to resolve remaining uncertainties.

3.1 Groundwater

DEQ currently indicates that it is interested in groundwater at the Northwest Pipe facility because groundwater at the site is shallow, because the agency considers the confirmation sampling documentation of past soil remediation activities inconclusive, and because DEQ feels the nature and extent of chlorinated solvents and petroleum products was not adequately defined by past work. Although available documentation on past sampling and analysis is not as detailed as the current standard of practice, extensive sampling and analysis has been completed at the site indicating that the concentrations of constituents in soil were significantly reduced by past remedial efforts. This conclusion was shared by DEQ (1991a) after a review of data generated by Dames & Moore (1989) and Crosby & Overton (1989). Moreover, the materials used or present at the site of most interest in sediment –

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petroleum hydrocarbons and much smaller quantities of PCBs – tend to have low mobility and rarely cause significant or extensive contamination of groundwater unless released in large quantities. Chlorinated solvents that formerly were used in limited quantities at the site have been detected sporadically in site soil. DEQ (1991a), however, observed that concentrations of chlorinated solvents, PCBs, and petroleum hydrocarbons, where detected at all, decrease rapidly with depth. In summary, the available soil sampling data at the site indicates that constituents, where present, occur predominately in near-surface soil. This situation is inconsistent with the distribution of contaminants in soil that would be capable of causing significant groundwater contamination.

To respond to DEQ's current concerns about soil and groundwater at the Northwest Pipe facility, CH2M HILL recommends that a focused soil and groundwater sampling effort be conducted to address specific areas. The scope of this investigation is described below in Section 3.2.

3.2 Areas 1, 3, 5, 9, and 12

These areas were identified in DEQ's February 1, 2001 letter after reviewing both the Preliminary Assessment Report (CH2M HILL 2000) and previous DEQ memoranda describing remaining areas of concern at the site (DEQ 1991a and 1991b). DEQ has requested that the soil sampling data in these areas be re-evaluated, with a recommendation about the need for additional sampling to supplement current information.

3.2.1 Area 1

Area 1 is the site of a former above-ground waste oil tank, drums, and stained soil (Dames & Moore 1989). Northwest Pipe investigated and remediated soil in Area 1 in 1989. The confirmation sampling, however, was not as well documented as DEQ would have preferred. To supplement the current understanding of soil conditions in Area 1, CH2M HILL recommends that a Geoprobe boring be advanced in this area from the ground surface to the water table. Soil samples are recommended to be collected at the surface (i.e., immediately below pavement), 3 feet, and 6 feet (the anticipated depth of groundwater). These soil samples will be analyzed for TPH, PAHs, and VOCs. A groundwater sample is recommended to be collected near the water table and analyzed for TPH and VOCs.

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3.2.2 Area 3

Area 3 also was remediated in 1989. Although the specific locations of confirmation soil samples are not clearly described in Crosby & Overton's (1989) report, the sample results document the presence of relatively low remaining concentrations of VOCs and TPH that are near or below EPA Region 9 Preliminary Remediation Goals (PRGs) and DEQ's petroleum hydrocarbon criteria for underground storage tanks. Because Area 3 lies inside an active industrial building under a paved floor and under a roof, the risk of exposure is controlled and the potential for leaching to groundwater is minimized. No additional sampling is recommended for Area 3.

3.2.3 Area 5

Sampling and analysis for VOCs, TPH, and PCBs showed that VOCs were not present in soil at Area 5. TPH was present at elevated concentrations on the surface; however, the concentrations of petroleum hydrocarbons decreased significantly with depth to concentrations below potentially applicable criteria for the site. Therefore, the oil staining described in 1989 appeared to be localized, limited to the near-surface, and had decreased to low concentrations at depth. Also in this area, PCB concentrations were found to be below the industrial soil PRG (1.3 mg/kg) in the surface sample at the general plant Maintenance Shop (0.7 mg/kg) and slightly above this level in the surface soil sample in front of the transformers (3.1 mg/kg). In both locations, PCBs were not detected above the detection limit of 0.1 mg/kg at a sample depth of 4 feet.

Because TPH concentrations in soil generally decrease over time due to microbial degradation, it is anticipated that current TPH concentrations are below those documented in 1989. To investigate this possibility, it is recommended that Northwest Pipe collect surface soil samples at two locations (one in front of the transformers and one at the Maintenance Shop) to determine if TPH concentrations remain above potentially applicable criteria. No further PCB analysis is recommended because the existing data show that concentrations were low, near the potentially applicable industrial soil PRG, and limited to the near-surface only.

3.2.4 Area 9

Area 9 was included by Crosby & Overton as part of the underground tank remediation area. As such, it was Northwest Pipe's impression that the "no further action" determination made by DEQ on April 16, 1990 included Area 9. Area 9 originally was identified because stained surficial soil was observed next to the railroad track in this area. Sampling from this area showed the following:

- Surface soil: in a single sample, TPH (22,000 mg/kg) and PCE (0.31 mg/kg) were detected by Dames & Moore (1989); other VOCs were not detected at detection limits ranging from 0.005 to 0.01 mg/kg.

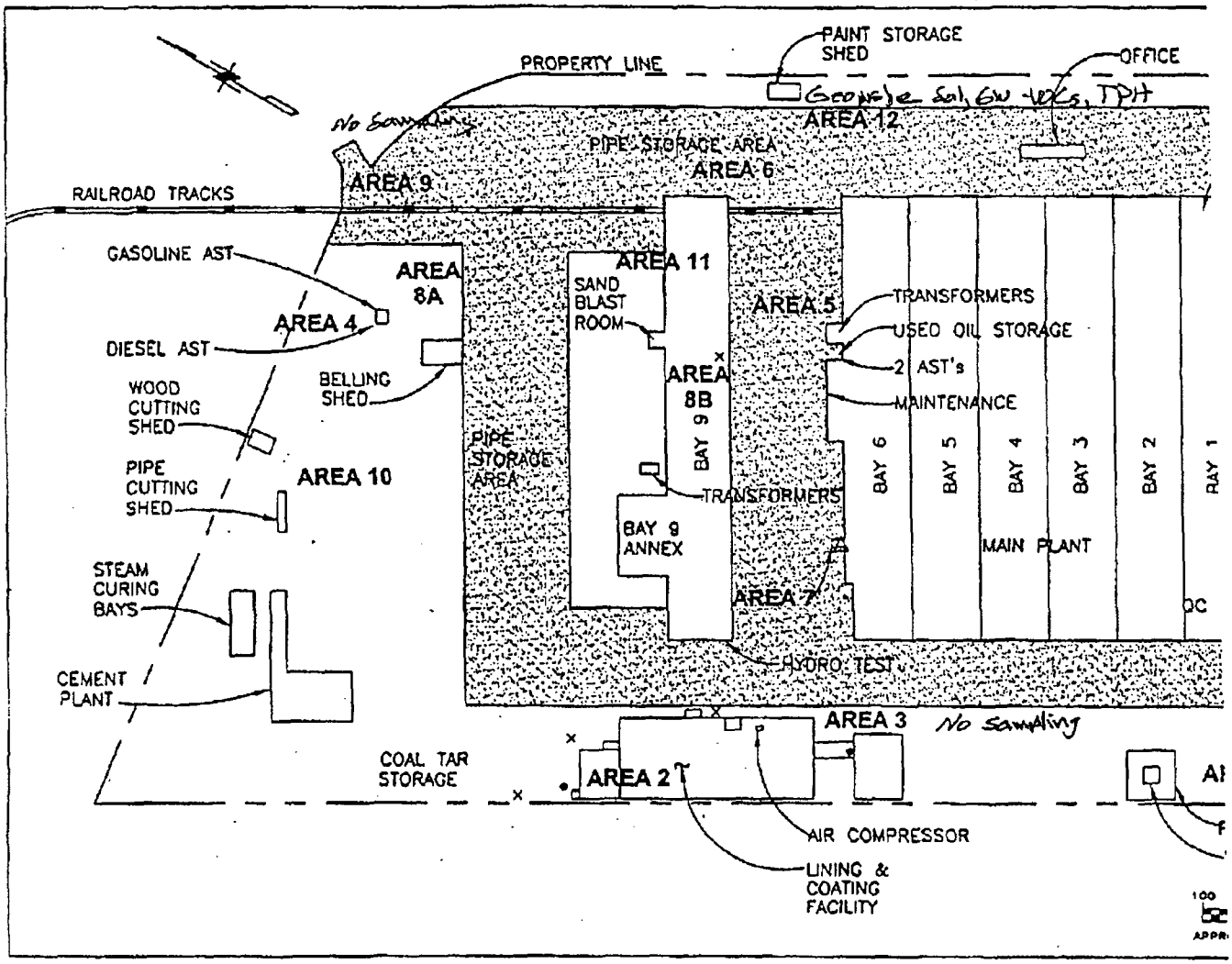
- 1-foot depth: in two samples, TPH was detected (420 and 530 mg/kg) and VOCs were not detected at detection limits likely ranging from 0.005 to 0.01 mg/kg (based on other samples from the site reported by the same laboratory during the same time period).
- 2-foot depth: in a single sample, 88 mg/kg TPH and 0.2 mg/kg PCE were detected; other VOCs were not detected at detection limits likely ranging from 0.005 to 0.01 mg/kg (based on other samples from the site reported by the same laboratory during the same time period).
- 4-foot depth: in three samples collected after soil was removed from this area, PCE was detected at concentrations ranging from 0.14 to 0.16 mg/kg; other VOCs were not detected at detection limits ranging from 0.005 to 0.01 mg/kg.
- 6-foot depth: in a single sample, no VOCs and no TPH were detected; the VOC detection limit likely ranged from 0.005 to 0.01 mg/kg (based on other samples from the site reported by the same laboratory during the same time period).

None of the detected concentrations of PCE exceed the industrial soil PRG of 16 mg/kg, and no other VOCs were detected; therefore, VOCs are not considered constituents of potential concern in Area 9. DEQ is correct that TPH analysis was not done on soil samples collected after remediation in Area 9 (the samples collected at a 4-foot depth). The mechanism of release of hydrocarbons in this area was considered to be a surface spill from a rail car, according to Dames & Moore's (1989) observations. In other words, it is unlikely that routine or ongoing hydrocarbon releases occurred in Area 9. Hydrocarbons would therefore be expected to be limited to the surficial soil that was removed by Crosby & Overton. This is supported by the low concentration of TPH detected in the sample from a 2-foot depth and the lack of TPH in the sample from the 6-foot depth. For these reasons – no VOCs at concentrations of concern and hydrocarbons only in surficial staining that has been addressed by past remediation – no additional sampling in Area 9 is proposed.

3.2.5 Area 12

Area 12 consists of stained soil adjacent to the paint storage shed. Northwest Pipe investigated and remediated soil in this area in 1989. The confirmation sampling, however, was unclear. To supplement the current understanding of soil conditions in Area 12, a Geoprobe boring is recommended in this area to be advanced from the ground surface to the water table. Soil samples would be collected at the surface, 3 feet, and 6 feet (the anticipated depth of groundwater). These soil samples would be analyzed for TPH and VOCs. To address DEQ's current concern about groundwater quality, a groundwater sample would be collected with the Geoprobe rig and analyzed for VOCs and TPH.

SCHN00206031



EXPLANATION:

△ WATER WELL

• SUMP

× COAL TAR RECLAMATION BLOWERS

PAVEMENT AREA (APPROXIMATE)

NOR

FIG2.dwg

3.3 Residual, Low Level VOCs and PAHs in Areas 1 and 3

Available sampling data from Areas 1 and 3 are described in Sections 3.2.1 and 3.2.2 of this Addendum, respectively. CH2M HILL has recommended that soil and groundwater samples be collected from Area 1to address the DEQ's current concern. As described in Section 3.2.2, the soil in Area 3 lies under a concrete floor and roof in an active industrial facility. No additional sampling is proposed for this location.

Area 1 and 3 were sampled and remediated by Crosby & Overton in 1989. In Area 1, the concentrations of tetrachloroethene (PCE) documented to be present were low: PCE concentrations ranged from 0.16 milligrams per kilogram (mg/kg) in a composite sample representative of the bottom of the remedial excavation to 0.17 mg/kg in a wall sample. Both of these concentrations are about two orders of magnitude below the PRG for PCE of 16 mg/kg.

3.4 Residual, Low Level PCBs and TPH in Area 5

In its February 1, 2001 letter, DEQ, implies that it had, in the past, recommended that remedial action be taken in Area 5. A review of past agency memoranda (DEQ 1991a and 1991b) suggests that DEQ did not recommend in writing excavation for this area; rather, the agency relates a telephone conversation with a Crosby & Overton staff member who had expressed an opinion about petroleum hydrocarbons being limited only to surface soil in Area 5. DEQ noted that this opinion "was apparently not confirmed by excavation" (DEQ 1991a). DEQ's statement in its 1991 memorandum appears to be a declaration of fact rather than a recommendation for remedial action.

Although Crosby & Overton did not confirm its opinion about surficial contamination by excavating soil, it did collect subsurface soil samples that confirm the elevated TPH and PCB concentrations in Area 5 were limited to surficial soil. These samples show that TPH concentrations at a 5 foot depth inside the Machine Shop, and at a 4 foot depth around the transformers, were either below detection limits or were detected at concentrations below the potentially applicable TPH criterion of 500 mg/kg. Similarly, PCBs, which were detected either below or slightly above the Region 9 PRG for PCB in the near-surface samples in Area 5, were not present in deeper samples. Additional information on Area 5 sampling is provided in Section 3.2.3 of this Addendum.

Note that the detection limit achieved by the laboratory used by Crosby & Overton for this work (0.1 mg/kg) is two orders of magnitude below the detection limit of 10 mg/kg cited by DEQ in its February 1, 2001 letter.

3.5 Residual, Low Level VOCs in Areas 9 and 12

DEQ's comments regarding this area are addressed in Sections 3.2.4 (Area 9) and 3.2.5 (Area 12) of this Addendum.

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3.6 "Storm Drain" Sediment at Area 14

Historical Steam Cleaner Settling Tank?

Area 14 was described erroneously by Dames & Moore (1989) as a "plugged storm drain". Based on additional work by Northwest Pipe and Crosby & Overton, this feature was determined to be a large (approximately six feet deep) underground catch basin that apparently was associated with the former Beall Pipe and Tank Corporation wash pad. It has an outlet near its top that, if the catch basin filled with water, could serve as an overflow outlet. Dames & Moore (2000) indicated that this outlet is connected to the facility storm water system. In 1989, Crosby & Overton removed two feet of sludge from the bottom of the catch basin. The catch basin at Area 14 is not used by any Northwest Pipe process and currently is empty.

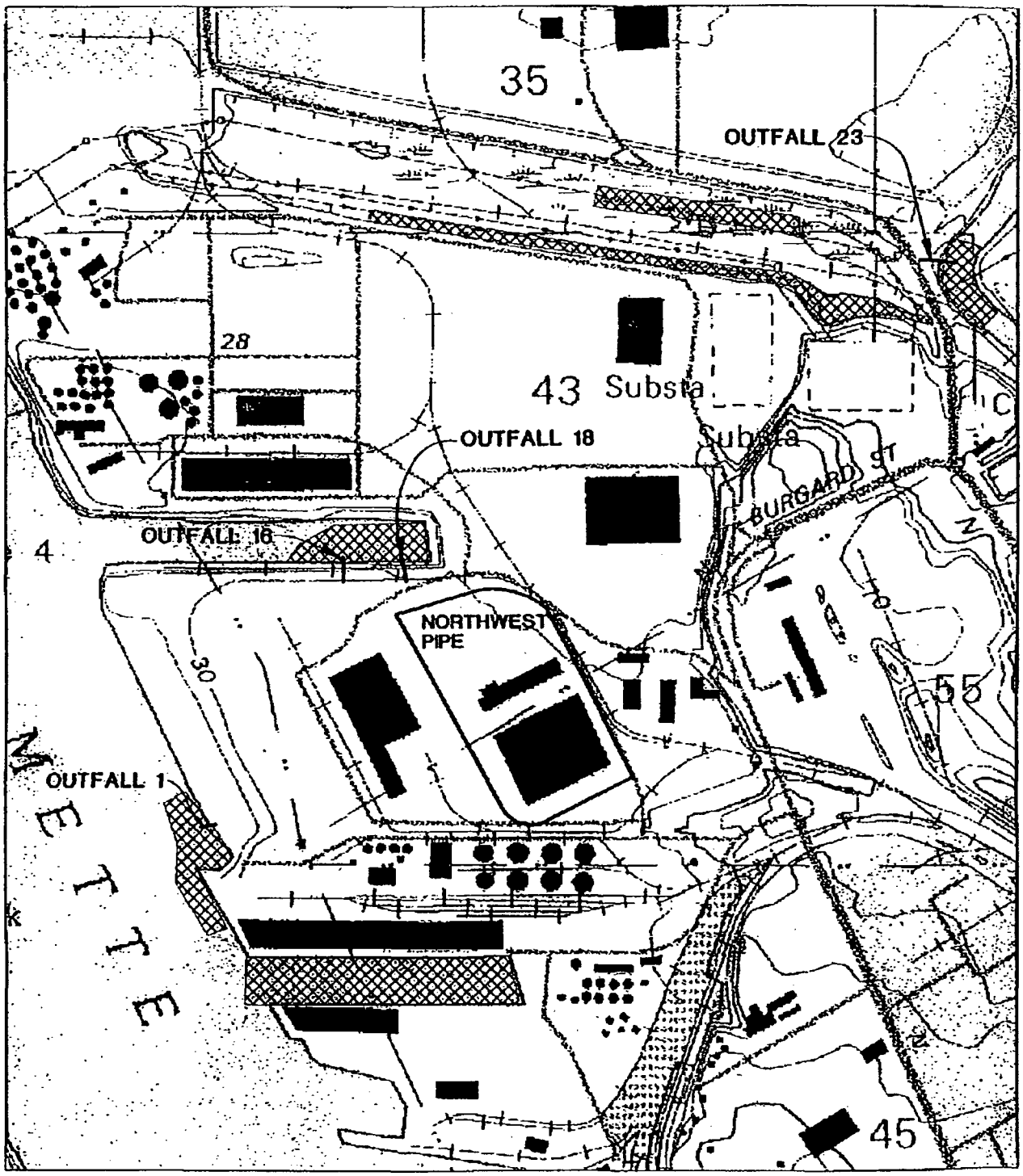
3.7 Storm Water Discharge System

Historical mapping that is available for the storm water system indicates that storm water from the northern two-thirds of the Northwest Pipe property discharges to Schnitzer's Slip (formerly the Oregon Shipbuilding Corporation Fitting Basin) via Outfall No. 18 (as numbered on Schnitzer's storm water map contained in the Bridgewater Group Storm Water System Assessment [2000b]). The southern third of the Northwest Pipe property is shown on old Oregon Shipbuilding Corporation maps to discharge to the Willamette River through Outfall No. 1.

Northwest Pipe Company has expended considerable effort during the Winter of 2000-2001 to document its storm water discharge system. During this period, the weather has been unusually dry, preventing direct observation of storm water flow patterns. In an attempt to provide more complete information to DEQ regarding its storm water system, Northwest Pipe conducted two flow tests, both using introduced water to create flow within the facility storm water system.

The first flow test occurred on January 9, 2001. Northwest Pipe staff used a fire hose to introduce approximately 30 gallons per minute (gpm) of flow into a catchbasin near the southeastern corner of Bay 1 (Figure 4). After discharging approximately 500 gallons of water, CH2M HILL began dropping oranges into the catchbasin that was receiving the water flow at a rate of approximately one every thirty seconds. Oranges were selected for use because their subspherical shape precludes "hanging up" on obstructions; their density is only slightly less than water, so that they float with the majority of their bulk below the water surface; and their color makes for easy visual identification. Light rain fell during the early part of the test, adding storm water runoff to the system, but the rain stopped after about a half hour. The fire hose was allowed to discharge into the storm water system for a total duration of approximately 45 minutes.

A CH2M HILL observer was posted at Outfall No. 18 for the duration of the test. In addition, a CH2M HILL observer was escorted to Outfall No. 1 by a Schnitzer Steel Corp. representative. No oranges appeared during the course of the test at either outfall. The Schnitzer Steel Corp. representative commented that Outfall No. 1



N

0 400 800

SCALE IN FEET

LEGEND

AREAS OBSERVED

Figure 4
DYE TEST OBSERVATION
NORTHWEST PIPE CO.
PORTLAND, OREGON

CH2MHILL

1844G001.DWG

SCHN00206035

appears to be plugged and that he had not seen water flow from Outfall No. 1 for at least three years. Schnitzer's storm water maps show that the pipe leading to Outfall No. 1 is plugged on Schnitzer's property between the Northwest Pipe site and the Willamette River. During the week following the storm water flow test, Schnitzer's Slip in the vicinity of Outfall No. 18 and the Columbia Slough in the vicinity of another potential storm water outfall from Burgard Industrial Park were observed with no indication of oranges.

The second flow test was conducted on February 20, 2001. For this test, water was introduced from two sources into catchbasins near the southwest corner of Bay 1. One source was a fire hose flowing at approximately 50 gpm and discharging into the location identified on Figure 4 as Drain No. 2. The second source of water was a 2,200-gallon water truck discharging directly into a second catchbasin (Drain No. 1) and making a total of six rounds over 90 minutes, for an average flow of about 140 gpm from the water truck. The total amount of water introduced during the test is estimated to be 17,700 gallons.

Specially-formulated versions of Rhodamine WT dye (Ben Meadows Corporation FWT Red) and Fluorescein dye (Ben Meadows Corporation FLT Yellow/Green), each certified by the National Sanitation Foundation for use in potable water systems, were used in the dye test. The red dye tablets were introduced at Drain No. 1, along with the water that was being discharged by the water truck (see Figure 4). After the conclusion of the storm water dye test, the FLT Yellow/Green dye was introduced in Drain No. 5 (inside Bay 5) to document the location where water from the northern two thirds of the site discharges.

Dye test observations were made at Outfall No. 18 during and after the storm water dye test, with no indication of red dye or increased flow such as might be attributable to the water introduced at the site. In addition, a manhole located near Outfall No. 18 also was observed periodically for presence of red dye or changes in flow conditions. CH2M HILL also checked Drain No. 3, just outside the Lining and Coating Facility, for increased flow and for presence of dye. Because of information provided by Schnitzer regarding the blockage and lack of flow for a period of years at Outfall No. 1, an observer was not stationed at this location; however, this outfall was checked at the end of the test to determine if it was carrying any flow. Again, no flow was observed.

No red dye was observed to discharge during the storm water-test, and no flow changes that could be attributed to the testing were observed. At the conclusion of the test, CH2M HILL staff observed Outfall Nos. 16 and 18 (at Schnitzer's Slip), Outfall No. 1 (at the Willamette River near the south edge of Schnitzer's property), as well as the slip at Terminal 4 and, the following day, in the Columbia Slough. These locations are shown on Figure 4. No red dye was observed in any of these locations. Yellow/green dye was observed at Outfall No. 18 after it was introduced

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in Bay No. 5, confirming that the storm sewers in this portion of the Northwest Pipe facility discharge to Schnitzer's Slip.

In conclusion, the location where flow from the northern two-thirds of the site discharges was confirmed to be Outfall No. 18 near the east end of Schnitzer's Slip. The location where storm water from the southern third of the Northwest Pipe facility discharges was not confirmed. It is possible, given the storage capacity of the pipes in the drain system, that CH2M HILL was unable to introduce sufficient flow in the absence of any precipitation to cause water to flow all the way to its discharge point. Another dye test under steady rain conditions, when they occur, may provide a more conclusive result.

3.8 Additional Information on the Industrial Production Well

It is not known specifically when the site production well originally was installed. At the time the Oregon Shipbuilding Corporation facility was built, the State of Oregon did not require well logs to be filed with the state. A 1973 copy of State Water Well Report was obtained and reviewed. The log print is of poor quality, but it indicates that the well was deepened in late 1972 and early 1973 from its original depth of 25 feet to a new depth of 258 feet. The original installation date of the well is not noted on the report. According to the report, the well currently has an 8-inch diameter casing to its total depth, has a bentonite seal in a 12-inch borehole from the ground surface to a depth of 30 feet, and is perforated from 195 to 201 feet. A stepped specific capacity test was conducted on the well at the time of deepening, which indicated that the well yielded 204 gpm with 19 feet of drawdown for the first hour; 250 gpm with 28 feet of drawdown for the second; and 440 gpm with 42 feet of drawdown for the third hour. A copy of the 1973 water well report is provided in Attachment 1.

In its February 1, 2001 letter, DEQ requested documentation of the three sampling events at the site water well. This information was provided in Northwest Pipe's November 21, 2000 Preliminary Assessment (Attachment 1 to Appendix A, page 22). This page and the associated laboratory reports have been excerpted and are provided in Attachment 2.

Three samples have been collected from the well. The testing on the industrial production well showed the following results:

- Low concentrations of TPH was detected, ranging in concentration from 0.17 mg/L to 18 mg/L.

- A single non-carcinogenic PAH (fluoranthene) was detected at a concentration of 0.026 micrograms per liter (μg/L). No other PAHs were detected in the sample, with detection limits ranging from 0.028 μg/L to 0.54 μg/L. Although Northwest Pipe's well is not used for drinking water, the concentration of fluoranthene that was detected in one of the production well samples (0.026 μg/L) is approximately five orders of magnitude under the Region 9 PRG for tap water (1,500 μg/L).
- PCBs were not detected in a sample from the well, with a detection limit of 1 μg/L.
- PCE was detected in the first sample from the production well at a concentration of 0.5 μg/L; a concentration equivalent to the detection limit for PCE. This initial result was not repeated in subsequent sampling: neither of the follow-up samples from the production well detected PCE at or above its detection limit of 0.5 μg/L. No other VOCs were detected in these samples, with detection limits ranging from 0.2 μg/L to 2 μg/L (however, the detection limit for the common laboratory contaminant methylene chloride should be adjusted in the first sample to 23 μg/L due to its detection at a concentration of 2.3 μg/L in the blank for this sample [EPA 1999]). Although Northwest Pipe's well is not used for drinking water, the concentration of PCE detected in the first of three samples from the well is an order of magnitude below the maximum contaminant level for drinking water (5 μg/L) and less than one-half the Region 9 PRG for tap water (1.1 μg/L).

In summary, the only constituents detected in the site production well are TPH, fluoranthene at an extremely low concentration, and a single, very low detection of PCE that could not be replicated in follow-up samples.

Water from the site production well is used as non-contact cooling water for pumps, as cement mortar make-up water, and as a source of water for hydrotesting finished pipes. The non-contact cooling water is discharged to Schnitzer's slip via the site storm water system. Given the very low constituent concentrations detected in the well and its use at the site solely for industrial processing, the low level concentrations of these constituents that have been detected do not appear to be significant.

4.0 Groundwater Monitoring Well Status

Six monitoring wells were installed by OMNI Environmental to investigate groundwater conditions around a former underground storage tank area that was undergoing remediation (Area 4). This area received a "No Further Action" determination from DEQ in 1990. A map showing the location of the wells was provided in Figure 2, Attachment 2, of URS (2000).

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The shallow groundwater elevation and the flow direction for shallow groundwater at the site was determined by OMNI Environmental (Preliminary Assessment Report Appendix A, Attachment 2), and briefly addressed in Section 5 of the Preliminary Assessment Report. Based on groundwater measurements made by OMNI Environmental at the site in March 1990, the shallow groundwater at the site ranged in elevation from 15.9 feet to 18.0 feet, which correlates to a depth to water ranging from approximately 6.5 to 7.8 feet. The groundwater gradient appeared to be generally westward and toward the Willamette River.

Three of the monitoring wells (MW1, MW-2, and MW-4) currently are visible at the facility. A fourth well, MW-0, may be present within a steel protective casing under a rack of stored pipe. The remaining two monitoring wells – MW3 and MW-5 – could not be located using close visual observation and use of a metal detector. However, the metal detector may not have not have been reliable due to the amount of steel pipe in the vicinity of the test area. Because the OMNI Environmental wells no longer are needed and because it is not known if they can continue to yield groundwater samples that are representative of the aquifer, CH2M HILL recommends that the location of the remaining two wells be confirmed and that all five wells be decommissioned in accordance with Oregon Water Resources Department regulations.

5.0 Clarification on Hazardous Waste Generator Status

In its December 18, 2000 letter, DEQ noted that in 1999, Northwest Pipe was a large quantity generator of hazardous waste after being a small quantity generator for several years. Northwest Pipe has reviewed its 1999 Waste Generation and Management – Answer Sheets, and identified a reporting error that has since been corrected. In its original version of these sheets, Northwest Pipe inadvertently reported waste "as shipped" rather than "as generated." The sheets have since been corrected, confirming that Northwest Pipe continued to qualify as a small quantity generator of hazardous waste during 1999.

6.0 Comments on Burgard Industrial Park Documents

Schnitzer Investment Corp. has prepared reports related to site conditions at the Burgard Industrial Park, which completely surrounds the Northwest Pipe facility. In a January 18, 2001 meeting, DEQ requested that Northwest Pipe provide comments on these reports.

6.1 Burgard Site History Review

Section 2.6.2.9 of the Site History Review (Bridgewater 2000a) has a description of the Northwest Pipe facility that contains incomplete and potentially misleading information:

- The Bridgewater report describes an EPA inspection in July 1986 that noted accumulated drums and stained soil. These areas were successfully addressed by Northwest Pipe Company in 1989 and 1990. The Bridgewater report failed to mention the most recent RCRA inspection on February 3, 1998, in which DEQ noted "no violations of the Oregon hazardous waste management statutes and rules" were present at the site.

- The report mentioned that EPA collected soil samples during a August 1986 Toxic Substances Control Act (TSCA) inspection. This area also was remediated by Northwest Pipe during the late 1980s. On September 25, 1991, EPA completed a TSCA inspection and concluded that the site was in compliance with the agency's PCB regulations.

- The Bridgewater report repeats DEQ's (1991b) comment that reporting of site remediation information was not "well documented." Although the reporting prepared by Crosby & Overton was not as detailed as DEQ would have preferred, Northwest Pipe, through preparation of consultant reports by URS (2000), CH2M HILL (2000) and this Addendum, has clarified the characterization and confirmation sampling conducted at the site.

- Bridgewater repeats a DEQ (1991b) comment that "...significant contaminant concentrations levels were detected" in areas where no remediation was performed. This comment relates to Area 5 – the machine shop/transformer area adjacent to Bay 6. As described in Section 3.2.3 of this addendum, elevated concentrations of petroleum hydrocarbons in this area were shown by sampling to be limited to surficial soil. Subsurface soil samples showed that TPH concentrations decreased substantially with depth. The other example provided by DEQ (1991b) relates to "...a small area of stained surface soil in a building", which is a common situation at active industrial sites that is unlikely to pose a significant threat to human health or the environment.

- Bridgewater also cites a DEQ (1991b) comment that Crosby & Overton (1989), at times, did not include an analysis of the constituent for which soil remediation had been conducted. When making this comment, DEQ apparently was referring to a portion of the sampling data for Area 9. Section 3.2.4 of this addendum reviews the sampling data available this area. While it is technically accurate to state that the *confirmation* samples from this area (e.g., samples from the four-foot-depth) were not analyzed for the constituent of interest – TPH – it is more accurate to note that soil sample data collected *prior to remediation* already had documented that the TPH was limited to surficial soil. These pre-remediation samples showed that TPH data exhibited the following trend with depth:

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- Surface – 22,000 mg/kg TPH
- 1-foot depth – 420 and 530 mg/kg TPH
- 2-foot depth – 88 mg/kg TPH
- 6-foot depth – TPH not detected

Given that at 2 feet the TPH concentration already had decreased in concentration well below potentially applicable criteria for TPH, and no TPH was detected at the 6-foot depth, the absence of additional TPH data from the 4-foot depth should be considered insignificant.

- Lastly, the Bridgewater report points out that TPH, fluoranthene, and PCE had been detected in the industrial production well at the site. As described in Section 3.8, the initial detection of PCE at the detection limit of 0.5 μg/L could not be repeated in two subsequent samples, both of which did not detect PCE. Also, the concentration of fluoranthene that was detected is extremely low: 0.026 μg/L, or 26 parts per trillion, which is 5 orders of magnitude below the Region 9 PRG for fluoranthene.

6.2 Burgard Storm Water System Assessment

A description of the Northwest Pipe facility is provided in Section 3.2 of the Storm Water System Assessment for the Burgard Industrial Park (Bridgewater 2000b). The report lists a number of activities and features at the site and could be read to imply that each of these contributes to storm drainage from the site. Such an interpretation would be inaccurate. For example, pipe coating occurs inside buildings (the Lining and Coating Facility and the 207 Mill). The coating process is not exposed to precipitation and therefore does not contribute to storm water runoff. Similarly, the Wash Pad is located inside a building, and consists of a concrete pad with a central collection sump that has no outlet. As with the coating operation, the Wash Pad is not exposed to precipitation and does not contribute to storm water runoff. Finally, the petroleum above ground storage tanks are located within a concrete secondary containment structure that does not contribute to storm water runoff.

Bridgewater describes the cement plant as being located along the southern edge of the Northwest Pipe facility. The cement plant actually is located in the northwest corner of the site. The feature described as "steam cleaner settling tank" appears to be consistent with the catch basin identified as Area 14. As described in Section 3.6, the catch basin is not used by any Northwest Pipe process and currently is empty.

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7.0 Recommendations

This Addendum contains the following recommendations for further work to address DEQ's current concerns:

- Additional sampling in Area 1 (soil and groundwater), Area 5 (soil), and Area 12 (soil and groundwater). A description and rationale for this sampling are provided in Section 3.2.
- Additional work to identify and subsequently decommission monitoring wells installed by OMNI Environmental.

It is recommended that a work plan be prepared that describes sampling and analysis methods, well decommissioning procedures, quality assurance/quality control procedures, reporting, and a proposed schedule.

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8.0 References

Bridgewater Group. 2000a. Site History Review, Burgard Industrial Park. Unpublished consultant's report prepared for Schnitzer Investment Corp. September 25, 2000.

Bridgewater Group. 2000b. Storm Water System Assessment. Unpublished consultant's report prepared for Schnitzer Investment Corp. December 21, 2000.

CH2M HILL. 2000. Preliminary Assessment Report for Northwest Pipe Company, Portland, Oregon. Unpublished consultant's report prepared for Northwest Pipe Company. November 2000.

Crosby & Overton. 1989. Letter report to Bill Dana of Oregon DEQ regarding Northwest Pipe and Casing. August 11, 1989.

Dames & Moore. 1989. Phase I and Phase II Property Transfer Site Assessment. Unpublished consultant's report prepared for Northwest Pipe Company, Portland, Oregon. March 9, 1989.

Department of Environmental Quality. 1990. Letter from Andree Pollock, UST Cleanup Specialist, to John Miller of Northwest Pipe and Casing. April 16, 1990.

Department of Environmental Quality. 1991a. Strategy Recommendation prepared by Bill Dana. October 31, 1991.

Department of Environmental Quality. 1991b. Memorandum from Bill Dana of DEQ to Loretta Pickerell of DEQ. September 3, 1991.

Environmental Protection Agency. 1999. USEPA Contract Laboratory Program. National Functional Guidelines for Organic Data Review. EPA 540/R-99/008. October 1999.

Osborn, Julia. 1945. A Story of a Shipyard. Available at Oregon Historical Society, Portland, Oregon.

URS. 2000. Letter Report. Environmental Review. Northwest Pipe Company North Portland Plant. Unpublished consultant's report prepared for Northwest Pipe Company, Portland, Oregon. November 2000.

SCHN00206043

Attachment 1

Production Well Log

WATER WELL REPORT

STATE OF OREGON

(Please type or print)

(Do not write above this line)

... of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

State Well No. _____

State Permit No. _____

(1) OWNER:

Name: Ecoll Plas & Tank Corp.

Address: 12205 N. Burgard Rd. Portland, Oregon

(2) TYPE OF WORK (check):

New Well ☐ Deepening ☒ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED: Threaded ☐ Welded ☒

8" Diam. from 0 ft. to 216 ft. Gage .250
Diam. from ____ ft. to ____ ft. Gage ____
Diam. from ____ ft. to ____ ft. Gage ____

(6) PERFORATIONS: Perforated? ☒ Yes ☐ No.

Type of perforator used: Mills Knife

Size of perforations 1/8 in. by 3 in.

72 perforations from 195 ft. to 209 ft.
perforations from ____ ft. to ____ ft.
perforations from ____ ft. to ____ ft.

(7) SCREENS: Well screen installed? ☒ Yes ☐ No

Manufacturer's Name: UOP Johnson

Type: 5" Telescoping Stainless Model No. 204

Diam. 6" Slot size .020 Set from 215 ft. to 220 ft.

Diam. ____ Slot size ____ Set from ____ ft. to ____ ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom?

Yield: 204 gal./min. with 19 ft. drawdown after 1 hrs.
250 " 28 " 1 "
440 " 42 " 1 "

Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.

Artesian flow ____ g.p.m.

Temperature of water ____ Depth artesian flow encountered ____ ft.

(9) CONSTRUCTION:

Well seal—Material used: Bentonite

Well sealed from land surface to 30 ft.

Diameter of well bore to bottom of seal 12" in.

Diameter of well bore below seal 8 in.

Number of sacks of cement used in well seal 0 sacks

Number of sacks of bentonite used in well seal 5 sacks

Brand name of bentonite: International Gel

Number of pounds of bentonite per 100 gallons of water 50 lbs./100 gals.

Was a drive shoe used? ☒ Yes ☐ No. Plug: ____ Size: location ____ ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? ____ depth of strata ____

Method of sealing strata off: PLICAL

Was well gravel packed? ☐ Yes ☒ No Size of gravel: ____

Gravel placed from ____ ft. to ____ ft.

(10) LOCATION OF WELL:

County: Multnomah Driller's well number

N. Section 35 T. 2S R. 1 W. W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well

Depth at which water was first found 198 ft.

Static level 16 ft. below land surface. Date 1/22/73

Artesian pressure ____ lbs. per square inch. Date ____

(12) WELL LOG: Diameter of well below casing 8"

Depth drilled 220 ft. Depth of completed well 220 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Previously drilled	0	25	
Silty gray clay-soft	25	46	
Fine gray sand	46	64	
Gray silty clay	64	98	
Fine gray sand	98	118	
Gray silty clay	118	122	
Fine gray sand	122	133	
Gray silty clay	133	161	
Fine gray sand	161	174	
Cemented gravel	174	191	
Coarse sand & gravel	198	203	
Fine brown sand	203	207	
Fine black sand	207	212	
Med. fine & coarse sand w/some fine gravel	212	221	
Fine silty clay/gravel seams	221	222	
Gray clay (soft)	222	240	
Fine sand-brown clay	240	255	
Soft gray clay	255		

Work started 11/3/72 19 Completed 1/22/73 19

Date well drilling machine moved off of well 1/22/73 19

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] [illegible] (Drilling Machine Operator) Date 1/24/73 19

Drilling Machine Operator's License No. 751

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name A. H. Jackson Drilling Co. (Person, firm or corporation) (Type or print)

Address 21075 S. W. Tualatin Valley Hwy, Aloha

[Signed] [illegible] (Water Well Contractor)

Contractor's License No. 79 Date 1/24/73 19

SCHN00206045

Attachment 2

Production Well Groundwater Sampling Information

On February 6, 1989, the gap between the asphalt and the concrete foundation was widened. Soils were excavated to a depth of 6 inches until a pipe was encountered. The soils did not exhibit odor or sheen and the HNU did not detect any volatilization of chemicals. Sample 6-S-01 was collected at the six inch depth and tested for chlorinated solvents.

Area 7:

On December 8, 1988, a sample from the on-site industrial water supply well was collected. The well, located outside the northwest portion of the main fabrication building (Figure 5), was purged of approximately 10 - 15 gallons of water before sample W-1 was collected from a small valve located on the well head. Sample W-1 was analyzed for PCBs, TPH, PNA, and chlorinated solvents.

On February 14, 1989, two additional water well samples were collected from the on-site industrial well. A review of the well log indicated that approximately 537 gallons represented one well pore volume. Mr. Vick informed Dames & Moore that daily water use at the facility was significant (over 3000 gallons per day). It was estimated that three well pore volumes or approximately 1620 gallons would be evacuated from the well after three hours of plant operation. On February 14, samples were collected at 14:45 after nearly seven hours of plant operation. Water sample 7-W-01 was retested for chlorinated solvents, PCB, TPH, and PNA. Water sample 7-W-02 acted as a duplicate for 7-W-01 and was only tested for chlorinated solvents.

Area 8A:

During the December sampling program, borehole B-1 was hand augered adjacent to the southern end of the underground gasoline storage tank (Figure

TABLE 7

DETECTED COMPOUNDS FOR AREA 7

NORTHWEST PIPE AND CASING COMPANY

SAMPLE #	DEPTH (FEET)	1,1,1 TRI-CHLOROETHANE	PCE	TCE	TPH	PCB	FLUORANT
W-1	200	<0.2	0.5	<0.2	0.17ppm	<1.0	ND
7-W-01	200	<0.5	<0.5	<0.5	18ppm	<0.15	0.026
7-W-02 (Dup)	200	<0.5	<0.5	<0.5	NT	NT	NT

<0.1 Indicates compound not detected at specified detection limit

ND: Indicates sample not tested for compound

NT: Indicates that sample not tested for compound

Note: All results listed in parts per billion (ppb) unless otherwise noted

WD40/NW.T7

AnalyticalTechnologies,Inc.

ATI I.D. # 8812-046-9

VOLATILE HALOCARBONS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: 12/08/88
PROJECT #	: 18050-002	DATE RECEIVED	: 12/09/88
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-1	DATE ANALYZED	: 12/13/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 601	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.5
CARBON TETRACHLORIDE	<0.2
CHLOROETHANE	<0.5
CHLOROFORM	<0.2
CHLOROMETHANE	<2.0
DIBROMOCHLOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
TRANS-1,2-DICHLOROETHENE	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
METHYLENE CHLORIDE	1.7 B
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE (TCE)	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE	109

B = Also found in blank.

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ATI I.D. # 8812-046

VOLATILE HALOCARBONS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: N/A
PROJECT #	: 18050-002	DATE RECEIVED	: N/A
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 12/13/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 601	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.5
CARBON TETRACHLORIDE	<0.2
CHLOROETHANE	<0.5
CHLOROFORM	<0.2
CHLOROMETHANE	<2.0
DIBROMOCHLOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
TRANS-1,2-DICHLOROETHENE	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
METHYLENE CHLORIDE	2.3
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE (TCE)	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE	96

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ATI I.D. # 8812-046

VOLATILE HALOCARBONS
QUALITY CONTROL DATA

CLIENT : DAMES & MOORE
PROJECT # : 18050-002
PROJECT NAME : N.W. PIPE & CASING CO.
EPA METHOD : 601

SAMPLE I.D. : 8812-015-11
DATE ANALYZED : 12/09/88
SAMPLE MATRIX : WATER
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % REC	RPD
CHLOROBENZENE	<0.5	12	11.4	95	11.2	93	2
1,1-DICHLOROETHENE	<0.2	4.0	4.64	116	4.67	117	1
TETRACHLOROETHENE	<0.2	4.0	4.31	108	4.40	110	2
TOLUENE	<0.5	12	12.1	101	13.1	109	8
TRICHLOROETHENE	<0.2	4.0	4.45	111	4.69	117	5
META XYLENE	<0.5	12	12.2	102	11.6	97	5

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

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ATI I.D. # 8812-046

POLYCHLORINATED BIPHENYLS (PCB) ANALYSIS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: N/A
PROJECT #	: 18050-002	DATE RECEIVED	: N/A
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: 12/10/88
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 12/14/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 608	DILUTION FACTOR	: 1

COMPOUND	RESULT
PCB 1016	<1.0
PCB 1221	<1.0
PCB 1232	<1.0
PCB 1242	<1.0
PCB 1248	<1.0
PCB 1254	<1.0
PCB 1260	<1.0

SURROGATE PERCENT RECOVERIES

ISODRIN	85

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ATI I.D. # 8812-046-9

POLYNUCLEAR AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: 12/08/88
PROJECT #	: 18050-002	DATE RECEIVED	: 12/09/88
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: 12/10/88
CLIENT I.D.	: W-1	DATE ANALYZED	: 12/14/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 610	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ACENAPHTHENE	<5
ACENAPHTHYLENE	<5
ANTHRACENE	<1
BENZO(a)ANTHRACENE	<1
BENZO(a)PYRENE	<1
BENZO(b)FLUORANTHENE	<1
BENZO(g,h,i)PERYLENE	<1
BENZO(K)FLUORANTHENE	<1
CHRYSENE	<1
DIBENZO(a,h)ANTHRACENE	<5
FLUORANTHENE	<1
FLUORENE	<1
INDENO(1,2,3-cd)PYRENE	<1
NAPHTHALENE	<5
PHENANTHRENE	<1
PYRENE	<1

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ATI I.D. # 8812-046

POLYNUCLEAR AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: N/A
PROJECT #	: 18050-002	DATE RECEIVED	: N/A
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: 12/10/88
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 12/14/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 610	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ACENAPHTHENE	<5
ACENAPHTHYLENE	<5
ANTHRACENE	<1
BENZO(a)ANTHRACENE	<1
BENZO(a)PYRENE	<1
BENZO(b)FLUORANTHENE	<1
BENZO(g,h,i)PERYLENE	<1
BENZO(K)FLUORANTHENE	<1
CHRYSENE	<1
DIBENZO(a,h)ANTHRACENE	<5
FLUORANTHENE	<1
FLUORENE	<1
INDENO(1,2,3-cd)PYRENE	<1
NAPHTHALENE	<5
PHENANTHRENE	<1
PYRENE	<1

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ATI I.D. # 8812-046

POLYNUCLEAR AROMATICS
QUALITY CONTROL DATA

CLIENT	: DAMES & MOORE	SAMPLE I.D.	: 8812-046-9
PROJECT #	: 18050-002	DATE ANALYZED	: 12/14/88
PROJECT NAME	: N.W. PIPE AND CASING CO.	MATRIX	: WATER
EPA METHOD	: 610	UNITS	: ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % REC	RPD
ACENAPHTHYLENE	<5	400	300	75	270	68	11
BENZO(K)FLUORANTHENE	<1	20	17	85	17	85	0
DIBENZO(A,H)ANTHRACENE	<5	40	35	88	34	85	3
PHENANTHRENE	<1	20	16	80	15	75	6
PYRENE	<1	20	17	85	16	80	6

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$

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ATI I.D. # 8812-046

GENERAL CHEMISTRY RESULTS

CLIENT : DAMES & MOORE
PROJECT # : 18050-002
PROJECT NAME : N.W. PIPE & CASING CO.

SAMPLE MATRIX : WATER

PARAMETER	UNITS	-9
PETROLEUM HYDROCARBONS	mg/L	0.17

AnalyticalTechnologies,Inc.

ATI I.D. # 8812-046

GENERAL CHEMISTRY QUALITY CONTROL

CLIENT : DAMES & MOORE
PROJECT # : 18050-002
PROJECT NAME : N.W. PIPE & CASING CO.

SAMPLE MATRIX : WATER

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED CONC	SPIKE ADDED	% REC
PETROLEUM HYDROCARBONS	mg/L	8812-044-1	2.8	2.8	0	N/A	N/A	N/A
PETROLEUM HYDROCARBONS	mg/L	8812-046-9	N/A	N/A	N/A	37.7	51.8	73

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

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ENVIRONMENTAL LABORATORY

Peter Stroud
Dames & Moore
1220 S.W. Morrison St.
Portland, OR 97205

Client Code: DAMP1
Survey #
NW PIPE18050-002

L A B O R A T O R Y R E S U L T S

Laboratory Job No.: 890597
Date Received: 02/15/89
Date Reported: 03/02/89

Date Collected: 02/14/89
Date Analyzed: 02/18/89

TOTAL PETROLEUM HYDROCARBONS(EPA 418.1)

MATRIX:WATER TOTAL DIGEST

LABNO	SMPLNO	COMPOUND	FOUND mg/lt	DET.LIM. mg/lt
3461	7-W-01	TPH	18	1.0

ANALYST:ROBERT REMLINGER

THIS REPORT HAS BEEN REVIEWED
AND APPROVED FOR RELEASE.

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ENVIRONMENTAL LABORATORY

LABORATORY RESULTS

Date Collected: 02/14/89
Date Extracted: 02/16/89
Date Analyzed: 02/17/89

Laboratory Job No.: 890597
Date Received: 02/15/89
Date Reported: 03/02/89

ASSAY:PCBS IN WATER (GC/ECD EPA 608)
MATRIX:WATER

LABNO	SMPLNO-ID	RESULTS	DET.LIM
3461	7-W-01		
PCBs		ND	0.15 ug/lt

ND=Not Detected
NOTE: THE RESULTS WERE QUANTITAED FOR PCB'S AS AROCLORS 1242, 1254 AND 1260.
ANALYST:DAVE BUSCH

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ENVIRONMENTAL LABORATORY

LABORATORY RESULTS

Date Collected: 02/14/89
Date Extracted: 02/17/89
Date Analyzed: 02/22/89

Laboratory Job No.: 890597
Date Received: 02/15/89
Date Reported: 03/02/89

ASSAY:POLYNUCLEAR AROMATICS IN WATER (HPLC EPA 8310)
MATRIX:WATER

LABNO	SMPLNO-ID	RESULTS	DET.LIM
3461	7-W-01		
	PHENANTHRENE	ND	0.19 ug/lt
	ANTHRACENE	ND	0.54 ug/lt
	FLUORANTHENE	0.026 ug/lt	0.0096 ug/lt
	PYRENE	ND	0.054 ug/lt
	BENZO(A)ANTHRACENE	ND	0.0037 ug/lt
	CHRYSENE	ND	0.065 ug/lt
	BENZO(B)FLUORANTHENE	ND	0.0071 ug/lt
	BENZO(K)FLUORANTHENE	ND	0.0018 ug/lt
	BENZO(A)PYRENE	ND	0.0031 ug/lt
	DIBENZ(AH)ANTHRACENE	ND	0.0082 ug/lt
	BENZO(GHI)PERYLENE	ND	0.0051 ug/lt
	INDENO(123CD)PYRENE	ND	0.028 ug/lt
3461	7-W-01		
	NAPHTHALENE	ND	0.87 ug/lt
	ACENAPHTHYLENE	ND	1.5 ug/lt
	ACENAPHTHENE	ND	2.2 ug/lt
	FLUORENE	ND	0.20 ug/lt

NOTE: RESULTS FOR EACH SAMPLE ARE REPORTED IN 2 GROUPS WHICH ARE DIVIDED ACCORDING TO THE DETECTOR USED TO QUANTITATE CHROMATOGRAPHIC PEAKS 12 COMPOUNDS ARE QUANTITATED BY FLUORESCENCE, 4 BY UV.

ANALYST:TIM AOKI

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Petaluma, CA 94952
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ENVIRONMENTAL LABORATORY

Peter Stroud
Dames & Moore
1220 S.W. Morrison St.
Portland, OR 97205

Client Code: DAMP1
Survey #
NWPIPE 18050-002

LABORATORY RESULTS

Date Collected: 02/14/89
Date Extracted: 02/15/89
Date Analyzed: 02/15/89

Laboratory Job No.: 890598
Date Received: 02/15/89
Date Reported: 02/21/89

PURGEABLES IN WATER (EPA 5030/601)

COMPOUNDS:	LAB#	3462	DET.	3463	DET.
	SMP#	7-W-01	LIM.	7-W-02	LIM.
PURGEABLES		UG/lt		UG/lt	
BROMODICHLOROMETHANE		ND	0.5	ND	0.5
BROMOFORM		ND	0.5	ND	0.5
BROMOMETHANE		ND	0.5	ND	0.5
CARBON TETRACHLORIDE		ND	0.5	ND	0.5
CHLOROETHANE		ND	0.5	ND	0.5
2-CHLOROETHYLVINYL ETHER		ND	1.0	ND	1.0
CHLOROFORM		ND	0.5	ND	0.5
CHLOROMETHANE		ND	0.5	ND	0.5
DIBROMOCHLOROMETHANE		ND	0.5	ND	0.5
1,4-DICHLOROBENZENE		ND	0.5	ND	0.5
1,1-DICHLOROETHANE		ND	0.5	ND	0.5
1,2-DICHLOROETHANE		ND	0.5	ND	0.5
1,1-DICHLOROETHENE		ND	0.2	ND	0.2
TRANS-1,2-DICHLOROETHENE		ND	0.5	ND	0.5
1,2-DICHLOROPROPANE		ND	0.5	ND	0.5
CIS-1,3-DICHLOROPROPENE		ND	0.5	ND	0.5
TRANS-1,3-DICHLOROPROPENE		ND	0.5	ND	0.5
METHYLENE CHLORIDE		ND	0.5	ND	0.5
1,1,2,2-TETRACHLOROETHANE		ND	0.5	ND	0.5
TETRACHLOROETHENE		ND	0.5	ND	0.5
1,1,1-TRICHLOROETHANE		ND	0.5	ND	0.5
1,1,2-TRICHLOROETHANE		ND	0.5	ND	0.5
TRICHLOROETHENE		ND	0.5	ND	0.5

THIS REPORT HAS BEEN REVIEWED
AND APPROVED FOR RELEASE.

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ENVIRONMENTAL LABORATORY

L A B O R A T O R Y R E S U L T S

Laboratory Job No.: 890598

COMPOUNDS:	LAB#	3462	DET.	3463	DET.
	SMP#	7-W-01	LIM.	7-W-02	LIM.
PURGEABLES		UG/lt		UG/lt	
TRICHLOROFLUOROMETHANE		ND	0.5	ND	0.5
VINYL CHLORIDE		ND	1.0	ND	1.0

ANALYST:MARK VALENTINI

FILE COPY

International Terminal Sediment Data Report

Prepared for

SCHNITZER STEEL INDUSTRIES, INC

Prepared by

Floyd Snider McCarthy, Inc.
83 South King Street
Suite 614
Seattle, Washington 98104

June 26, 2003

Final

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1.0 Introduction

Schnitzer Steel Industries, Inc. (Schnitzer) operates the Burgard Industrial Yard located near the 12000 block of North Burgard Road in north Portland, Oregon. The International Terminals (IT) slip and associated berths are located adjacent to the Burgard Industrial Yard. The property was originally developed as a shipyard in 1939 and 1940. For the last three decades the slip has supported commercial marine repair, fabrication, construction and dismantling services. Currently these berths support metal recycling operations as well as barge and ship dismantling operations. These berths are also used to import bulk cargo such as manganese, pig iron, steel coils and steel slabs.

The slip contains three berths and 1,680 feet of docking facilities. Berths 1 through 3 are located within the International Terminals slip (IT Slip) adjacent to the Burgard Yard. Berths 4 and 5 are located on the river side of facility. The slip and associated berths are an existing facility and have been maintained under previous maintenance dredging permits (U.S. Army Corps of Engineers Section 10/404 Permit #199100099 and Oregon Division of State Lands Removal-Fill Permit No. 1055).

Due to shoaling at the mouth of the slip and within the berths, there is a critical and urgent need to perform maintenance dredging for these facilities. In the fall of 2002 an incoming ship was required to dock and offload several thousand tons of cargo prior to arrival at the IT Slip to prevent grounding. Subsequent to that event, a meeting was held with the Columbia River Pilots (Pilots) to determine the minimum acceptable conditions needed for safe navigation access and berthing in the slip given the draft, length, and width of vessels that are expected use this facility over the next five years. The proposed dredge prisms were developed based on the suggestions from the Pilots in addition to other engineering considerations such as slope stability.

In anticipation of maintenance dredging, sediment sampling was performed from March 11 through March 13, 2003. Due to a lack of available data on sediment quality, this advance sediment sampling was necessary to aid in dredge design considerations. It was also necessary to gather additional sediment data to characterize sediment quality for the proposed dredging. Data obtained from this sampling event was used to evaluate sediment quality consistent with the guidance found in the Dredged Material Evaluation Framework (DMEF) (USACE 1998).

The purposes of this sampling and analyses project include:

- Provide sediment quality data to allow refinement of dredge design so that the post-dredge surface will be acceptable.
- Assess the appropriateness of DMEF Site Ranking for this project.
- Provide data to support a joint federal and state permit application with acceptable dredge design and site ranking.

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2.0 Methods

2.1 CORE COLLECTION PROCEDURES

Sediment sampling was conducted on March 11, 12, and 13, 2003, with mobilization on March 10th and demobilization on March 14, 2003. Sediment cores were taken from six locations along the riverfront and within the IT Slip. Core coordinates are listed in Table 2.1, core locations are shown on Figure 2.1. Cores SDC-SS01 and SDC-SS02 are located within Berths 4 and 5. Cores SDC-SS03 through SDC-SS06 are located within the IT Slip.

Sediment core locations were determined by differential GPS (DGPS) methods relative to Oregon State Plane North Zone North American Datum 1927 (NAD27). Elevations during sampling were determined by reading a surveyed tide gauge immediately prior to sampling. The tide gauge is located at Terminal 4 (adjacent to the IT Slip) and reads in Columbia River Datum (CRD).

Cores were taken with a *MudMole*™ pneumatic core sampler. The sampler consists of a square 4-inch aluminum core tube attached to a pneumatic-powered driving assembly with a quick-release pin. Core tubes 21 feet in length were used at all sampling locations. The tubes were cleaned before fieldwork was initiated and the ends were sealed to prevent contamination. Because core tubes are single-use, these measures minimized recontamination risks that can occur when sampling equipment is reused for multiple locations.

The *MudMole*™ pneumatic core samplers were driven into the sediment with a linear pneumatic hammer that delivers approximately 300 blows per minute. The bottom of each core tube is fitted with a hinged core catcher to prevent loss of sediment during extraction. Air to operate the pneumatic corer is provided by an industrial air compressor located on the deck of the sampling vessel. The sampler was operated by personnel on the sampling vessel in shallow waters and by a diver in deeper waters.

After reaching the selected sampling location, the core sampler was lowered to the bottom using a winch. The operator turned on the air hammer once the core tube entered the sediment. At approximately 2-foot intervals, the operator suspended the driving operation and measured the penetration and recovery of the core. Internal recovery was measured by lowering a weighted tape measure inside the core tube until the weight contacted the surface of the sediment. The penetration of the core tube was then measured using a second tape measure and reference marks on the outside of the core tube. Internal recovery and penetration information was recorded during the drilling operation. After driving the core to the desired depth (or until refusal), the air hammer was turned off and a final set of penetration and recovery measurements was taken. The actual sampling position was logged and a lifting winch was used to extract the core.

After the core was extracted, the distance from the top of the core tube to the surface of the sediment was measured on-deck to account for any movement or loss of sediment in the core tube. This top-of-sediment measurement along with the paired penetration and recovery

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measurements was used to account for thinning and compaction of the sediments during driving, and was entered into a spreadsheet program to generate a bore log (Appendix A).

A single core was collected and sampled at each sampling station. Cores were driven to the proposed sample depth or until refusal. If penetration or recovery was insufficient to meet the study needs, a second and sometimes third attempt was made to obtain a satisfactory core.

2.2 SAMPLE COLLECTION

Cores were processed immediately upon collection. Unprocessed cores held more than 4 hours were chilled with ice.

Core-tubes were processed at an upland staging area within 8 hours of extraction. Cores that remained unprocessed 4 hours after sampling were stored on ice. Cores were transported and stored horizontally, and one core was processed and handled at a time. The core tubes were placed on sawhorses and oriented with the hinged side of the core catcher on the bottom. The uppermost side of the core tube was removed using a small saw. The depth of the cut on the saw was set to just slightly greater than the wall thickness of the aluminum tube. Approximately 1 cm (0.38 inch) of sediment was removed from the exposed sediment surface with a decontaminated stainless steel scraper. The surface layer of sediment was removed starting at the bottom of the core tube and moving toward the top to minimize the potential contamination of clean, deeper layers with material from shallower, potentially more contaminated layers.

A qualified field geologist logged each core for Universal Soil Classification and noted the presence of any soil structures, odors, or visible oil sheens. Sediment descriptions and the interpreted *in situ* depths of each sediment horizon were transcribed into a summary core log (Appendix A).

Stainless steel plates were inserted between each sampling segment, and sediment from each segment were collected from the center of the core starting at the inserted plate marking the top of a segment and extending downward until sufficient sample volume was obtained. Sediment touching the sides of the core tube was left in place, thus minimizing the potential for cross-contamination from overlying sediments. The distance down the tube was recorded to provide information on the actual collection interval for each sample.

2.2.1 Sample Processing

Samples were processed according to the scheme detailed in this section. Overall, the goal was to create two composites per core. One composite, composed of an interval from the mudline to the bottom of the proposed dredge cut, characterizes the material to be removed during maintenance dredging. The bottom composite, usually consisting of the top interval "exposed" by the proposed dredge cut plus the next lower adjacent interval, characterizes the post-dredge surface sediments. Note that the descriptions below represent targets. In some cases less material was collected due to volume considerations in core segments. However, sufficient material was collected for each core to perform required analyses.

- **Top Core Segment:** The first core segment reached from the top of the sediment to a depth corresponding to an elevation of –38 ft CRD or a depth comparable to the bottom of the proposed dredge cut for that area. A target sample volume of 2.5 liters was collected from this core segment (Section 2.2), placed in a clean stainless steel bowl and homogenized with a mechanical mixer. Alternate spoonfuls of sediment were then partitioned between four 16-ounce and two 8-ounce glass jars. The two 16-ounce and two 8-ounce jars were designated for analytical analysis; the other two 16-ounce jars were archived for 90 days at -20° C pending further analysis.
- **1-foot Core Segments:** The remaining core was sectioned into 1-foot long core segments. Approximately 1.25 liters of sediment was removed from each core segment (Section 2.2). The material from a specific core segment was homogenized in a clean stainless steel bowl, and then placed into three 8-ounce jars and one 16-ounce glass jar using alternating spoonfuls. Each of these core segments were designated by a six-digit number corresponding to the top elevation and bottom interval of the core segment. The two 8-ounce jars were designated for PAH screening analysis; the 16-ounce jar was archived at 4°C for later compositing; the third 8-ounce jar was archived for 90 days (frozen) pending further analysis or reanalysis.
- **Compositing Core Segments:** After the initial testing for PAHs (Section 2.3.1), one additional core segment was created per core at the lab by compositing the 16-ounce jars from the 1-foot core segments.

2.2.2 Sample Designations

All core samples were assigned a unique identification code. A hyphenated, alphanumeric code consisting of a media code and a location code along with interval sampling information was used for core sample designations. Format used for this project was as follows: SDC-SSXX-YYYYYY, where SDC represented sediment media of a core type. SS indicated project affiliation, and XX indicated the core number. The 6-digit sample-depth identifier YYYYYY indicated the sample interval. For example, 003004 would indicate the depth interval from 3 to 4 feet.

Core summary logs contained in Appendix A show sample identifications (located under column labeled "Primary Sample ID").

2.3 LABORATORY METHODS

Analytical testing was conducted by Columbia Analytical Services, Inc. (CAS) in Kelso, Washington.

2.3.1 PAH Screening of 1-foot Core Segments

One of the goals of this sediment characterization project is to characterize the post-dredge sediment surface quality. Information was not previously available that provided data showing depth to "native" sediments, nor was any information available that provided data showing

sediment quality changes with depth. Since PAHs can occur in both anthropogenic (combustion of petroleum products, urban run-off) and natural (forest fires) sources, PAHs can be viewed as a conservative tracer of potential sediment quality. Figure 2.2 illustrates sample intervals subject to PAH-screening analyses. Briefly, this PAH-screening involved performing EPA method 8270 (USEPA 1994) gas chromatography coupled to mass spectrophotometry and reporting only total PAHs with an urgent turnaround time.

2.3.2 Dredged Material Evaluation Framework Analytes

Analytical procedures for the chemical analysis of sediment samples collected during this investigation will include a determination of grain size, total solids, total organic carbon, metals, tribultyltin, semivolatiles (organics, phthalates, phenols and miscellaneous extractables), chlorinated pesticides, chlorinated hydrocarbons and PCBs (Table 2.2). Standard USEPA sample preparation, cleanup, and analytical methods are used for these chemical analyses.

There were minor deviations from DMEF-recommended analyses for the following reasons:

- Open water disposal was not considered a likely option for these sediments.
- Landfill disposal and/or reuse of sediments as upland fill were regarded as the most likely options.
- Conventional parameters lack sediment quality criteria guidance.

Therefore, total sulfides, ammonia, and total volatile solids were not analyzed. These parameters are most relevant to open water disposal and possible tiered biological evaluations. DMEF guidance was adhered to for all other analytes.

DMEF guidance recommends quantifying tributyltin in porewater (i.e. interstitial water). However, the Weston investigation found elevated levels of organotins at station SD012, near the IT slip mouth, in sediments (i.e. solids, not porewater). Furthermore, Puget Sound studies have indicated a lack of correlation between porewater values and bioaccumulation potential (EVS 1999). Therefore, TBT was not measured in porewater, but instead was measured in sediments (solids).

2.3.3 Geotechnical Classification

Sediment samples were classified and described in accordance with the Unified Soil Classification System, as defined in ASTM D-2488-93 and D-2487-93 by a qualified field geologist.

2.4 WASTE MANAGEMENT

All sediment derived during this sampling was placed in the proper containers, labeled, and disposed of by Schnitzer in accordance with applicable regulations.

3.0 Results

3.1 CORE COLLECTION

Seven cores were collected from March 11 through March 13, 2003. Locations are shown on Figure 2.1; Table 2.1 lists station coordinates. Appendix A contains core summary logs describing the sediment types, stratigraphic contacts, and sample interval identifications for each of the cores. In general, penetration was difficult due to the density of the packed river sand. Multiple coring attempts were made at most stations.

An additional proposed station, SDC-SS07, was abandoned due to poor core recoveries. SDC-SS06 is considered representative of this area. SDC-SS03R2 was adjusted in the field to sample deeper sediments and thus "overshoot" the proposed post-dredge surface to ensure that depth to native sediment was fully understood (i.e. that another geologic layer did not occur at depth). SDC-SS04 did not reach target penetration to fully characterize the post-dredge surface but is considered representative of material to be removed.

3.2 CORE GEOLOGY

Appendix B contains extrapolated stratigraphic cross sections with core locations. In general, on the river side, layers of fine silty clay or sandy silt with thicknesses ranging from 6 to about 12 feet overlay a continuous layer of dense fine sand with trace silt. This silty clay or sandy silt may be representative of more fine-grained material deposited by the river. Within the slip berths, a similar fine sand layer is overlain by a thin silty sand or fine sandy silt layer, and then overlain by similar fine sand at the surface. The thin silty sand deposit may represent an episodic event (i.e. flood).

In general it appears that the dense fine sand represents "native" sediments since no deeper layers were detected. Furthermore, this dense fine sand is low in organic content and contains at most, only trace contaminant detections.

3.3 SEDIMENT CHEMISTRY

Appendix C contains the Chain of Custody forms for samples analyzed during this investigation.

3.3.1 Analytical Results

Table 3.1 shows results of the conventional and chemical analyses. Table 3.2 shows PAH-screening level results. Figure 2.2 shows intervals subjected to PAH-screening and subsequent composite generation.

3.3.2 Data Quality Review

A Level 1 data quality review was conducted on each analytical batch analyzed for this investigation. A summary of the data quality review is presented below; a complete review is presented in a Data Validation Report, attached as Appendix D. Sediment samples collected for chemical analysis were submitted to CAS as per method specifications.

The data quality review process includes the following steps:

- Verify that sample numbers and analyses match those requested on the chain-of-custody form
- Review sample holding time
- Verify that required reporting limits have been achieved
- Verify the accuracy of the electronic data deliverable (EDD)
- Verify that matrix spikes (MS) and lab control samples were run at the proper frequency
- Verify that surrogate compound analyses have been performed and have met quality control criteria
- Verify that MS and matrix spike duplicate (MSD) recoveries were within control limits
- Verify that lab control sample (LCR) recoveries were within control limits
- Verify that lab duplicate or triplicate sample results relative percent differences (RPD) are within control limits
- Verify that laboratory blanks are free of contaminants at or below the method reporting limits (MRL).

All data were determined to be acceptable for use, with certain qualifiers defined in the Data Validation Report and associated Table 1 (Appendix D). The data quality review is summarized briefly below; summaries are by analytical group.

3.3.2.1 Conventionals

Grain size, total solids, and total organic carbon (TOC) analyses were all acceptable. All required holding times were met. All reporting limits were met. Control samples were run at the required frequency and were within control limits. Grain size samples were frozen first for composite samples, which is not recommended under PSEP guidelines, but due to the nature of the sediments (i.e. predominantly sand), this freezing and thawing is unlikely to affect particle size distribution.

3.3.2.2 Metals

All required holding times were met. Reporting limits were slightly elevated compared to those specified by CAS. This was considered acceptable. A method blank, MS/MSDs, and LCS were

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run with each batch at the required frequency. No target analytes were detected in the method blanks above the MRL.

3.3.2.3 Organics

All required holding times were met. Reporting limits were slightly elevated for two samples – SDC-SS01-000007 and SDC –SS02-000013, in part due to dilutions. Laboratory quality control analysis frequencies were acceptable. Laboratory blank results were acceptable. Surrogate recoveries were within control limits for most samples. However, due to poor surrogate recoveries for SDC-SS03R2-002004 for the base/neutral fraction, all compounds within the base/neutral fraction for this sample are either UJ flagged or J flagged. LCS recoveries were acceptable, as were matrix spike and matrix spike duplicates and MS MSD RPDs.

3.3.2.3 Pesticides

All required holding times were met. Laboratory quality control analyses frequencies were acceptable. Reporting limits were slightly elevated. Laboratory blank results were acceptable after reanalyses. Surrogate, LCS, and MS, MSD recoveries were all acceptable. MS, MSD RPDs were acceptable. For sample SDC-SS01-000007 (Aldrin) and SDC-SS01-000007, SDC-SS02-000013, and SDC-SS04-000008 (DDE), the confirmation comparison between dual columns was outside of CAS control limits and therefore were flagged with J.

3.3.2.4 PCBs

All holding times were met. Laboratory quality control analysis frequencies were acceptable. Reporting limits were slightly elevated. All LCS and surrogate recoveries and most MS and MSD recoveries were within control limits. MS/MSD RPDs were within the laboratory-specified control limits. Sample confirmation criteria were met for most samples and analytes. However, SDC-SS02-000014 exceeded the sample confirmation criteria for Aroclor 1254, and the associated result was flagged with a J.

3.3.2.5 Organotins

Most holding times and holding requirements were met, and if exceedances occurred, these were considered acceptable. Reporting limits were slightly elevated for a few samples. With reanalyses, most laboratory blank results were acceptable. However, the surrogate recovery in the method blank was less than the control limit for several samples. These samples were not re-extracted because no analyte was detected, but associated values received a UJ flag. LCS, MS, and MSD recoveries were all acceptable. MS, MSD RPDs were acceptable.

3.3.2.6 PAHs (Screening Method)

All holding times and reporting limits were met for PAH screening. Surrogate, LCS, MS, and MSD recoveries were all acceptable. MS and MSD RPDs were slightly above the laboratory control limit.

3.4 COMPARISON TO RELEVANT CRITERIA

Analytical results from top composites (representative of material to be removed) and bottom composites (representative of the post-dredge surface) were compared to various sediment criteria, with comparison to DMEF criteria as the most relevant. PAH-screening results were not compared to criteria as these individual intervals were subsequently used to generate a bottom composite. Therefore, the bottom composite results are more representative of the post-dredge surface quality.

3.4.1 Dredge Material Evaluation Framework

Since this sediment characterization project is directed towards characterizing material for maintenance dredging, comparison to DMEF criteria is the most relevant. In general, there were very few DMEF screening level exceedances (six, total). They occurred only in surface composites; composites generated at depth considered representative of the post-dredge surface were largely devoid of detections and when detections occurred, they were many times below screening levels. Table 3.3 shows only those samples that exceed screening levels and the degree of exceedance (i.e. how many times the sample exceeded the SL). There were no DMEF bioaccumulation trigger exceedances. There was a summed DDT exceedance for SS01-000007, a surface composite located on the southern river side, but the degree of exceedance was slight (1.48). The majority of exceedances (four of six) occurred in SS02-000013, the surface composite of the more northern river core. There were very slight exceedances for indeno(1,2,3-cd)pyrene and benzo(g,h,I)perylene, two ubiquitous high molecular weight PAHs. Furthermore, there was a slight (1.46) screening level exceedance for total PCBs at this core. The most significant screening level exceedance for the entire sampling effort was summed DDTs in this sample (37 ug/Kg, 5.36 times the screening level). Notably, this core contained the thickest lens of overlying silty sand/sandy silt that appeared to be unique to these river cores.

SDC-SS06-000007, the surface composite of core SS06 located in Berth 3, also contained an exceedance for total PCBs (2.31 times the screening level value).

No exceedances occurred in cores SDC-SS03 through SDC-SS05. Importantly, even in cores with minor exceedances, no exceedances occurred at depth (i.e. lower composite) in the cores.

3.4.2 Freshwater Sediment Quality Values

In the absence of any Oregon freshwater sediment quality guidance, freshwater sediment quality values developed by MacDonald et al and Ingersoll et al have been used for comparison. MacDonald et al developed 28 Freshwater Sediment Quality Guidelines called "Consensus Based Freshwater Quality Guidelines", including a "Probable Effects Concentration" (PEC) above which adverse effects may occur (MacDonald et al 2000; Ingersoll et al 2000). Additionally, these values or multiplications of these values (i.e. 5X PEC) have been proposed for use as screening tools for Portland Harbor by the Lower Willamette Group (LWG 2002). These comparisons are provided only to illustrate the very high quality of the post-dredge surface (i.e. the bottom composites).

There were only three PEC value exceedances, all less than 1.4 times the PEC value, and all for PAHs occurring in the surface composite of core SDC-SS02 (sample SDC-SS02-000013). These exceedances were for naphthalene, phenanthrene, and pyrene. No exceedances occurred at depth. There were no exceedances of any 5X PEC "screening" values.

3.4.3 Portland Harbor Area-Wide "Baseline" Values

It is important to note that all exceedances are within the "baseline" or "background" Portland Harbor range of data developed by the Oregon Department of Environmental Quality (ODEQ). Table 3.5 shows several lines of evidence for this. For instance, ODEQs apparent Portland Harbor Sediment baseline for total DDTs is 220 µg/Kg, and the maximum detected DDTs value during this project in core SDC-SS02 is 37 µg/Kg. The LWG's Phase 1 Work Plan cites a detection frequency for DDTs of 73 percent within the Portland Harbor Initial Study Area with maximum detects up to 84,909 µg/Kg, indicating a widespread occurrence of DDTs within the study area (LWG 2002). Subsurface sediment results developed by Weston do not tabulate total DDTs, but instead provide arthimetic means for 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT range from 213 to 1762 µg/Kg. Therefore, these DDT exceedances in this March IT Slip sampling event are well within the general "background", and in fact at the low end, for Portland Harbor. Notably, DDT exceedances only occurred in the river berths, not within the slip. Also importantly, these exceedances were not PEC value exceedances, just DMEF screening level exceedances related to tiered testing for open water disposal. These exceedances may not relate to a genuine biological effect.

Total PCBs exceeded DMEF screening values at two cores, one on the river side at SDC-SS02 (190 µg/Kg J) and one within the slip at SDC-SS06 (300 µg/Kg). ODEQ's baseline value is 180 µg/Kg. The LWG notes a detection frequency of total PCBs at 45 percent within the initial study area. Weston subsurface data indicates an arithmetic mean of 3818.7 µg/Kg and a median value of 72 µg/Kg. Therefore, these detections should not be considered remarkable or as an indication of ongoing sources, but rather as potentially indicative of a general background. Importantly, these exceedances were not PEC value exceedances and therefore may not relate to a genuine biological effect.

3.4.4 DMEF Site Ranking

The Lower Columbia River Management Area DMEF guidance manual (USACE1998) provides a classification scheme for initial management area ranking. These initial rankings serve as one of the project variables factored into the development of sediment sampling and analyses plans. Due to both upland activities (i.e. the Burgard Yard) and the location of the site (within both an active shipping area and a Superfund site), the IT Slip and river berths could receive an initial Management Area Ranking definition/classification of "Moderate" or possibly, "High."

The DMEF guidance also defines heterogeneous sediments as those in which physical characteristics are dissimilar within the sampling depth. Characteristics of such sediments include obvious layering of sediments, lenses of dissimilar material, or other characteristics. Due to the stratigraphic appearance of cores collected, these sediments seem to be heterogeneous (Appendix A).

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Based on analytical results gathered during these investigations, this project should receive a ranking of "Low Moderate", as there are six screening level exceedances but no exceedances are greater than the screening level plus maximum level divided by two.

4.0 Conclusions

This sampling and analyses project was conducted to characterize sediment quality for refinement of dredge design to ensure that the post-dredge sediment surface will be acceptable. The project was also undertaken to characterize dredge materials to be removed and the appropriateness of the DMEF site ranking.

Results indicate that the sediments are within the range of "background" or "baseline" Portland Harbor sediment contaminant concentrations. Only six DMEF screening level value exceedances occurred, with five out of six exceedances occurring within a thicker surface lens of silty material of likely depositional origin within the river berths. All exceedances are within the expected background levels of widely distributed contaminants found in Portland Harbor. The sediment analytical data also indicates that the predicted exposed post-dredge surface within each berth will be of high quality with zero to trace analyte detection. Based on the results of this investigation, the Management Area Ranking definition/classification for this project should be classified as "Low Moderate".

5.0 References

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Lower Willamette Group. 2002. Draft Round 1 Work Plan. June 7.

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Tables

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Table 2.1
Core Designations and Coordinates

Core Designation	Oregon State Plane North Zone NAD27	
	Y (Northing)	X (Easting)
SDC-SS01	715858	1416509
SDC-SS02	716566	1416243
SDC-SS03R	717170	1416183
SDC-SS04	717245	1416540
SDC-SS05	717228	1417008
SDC-SS06	717197	1417424

Table 2.2
Compounds Analyzed, Analysis Methods, and Target Reporting Limits

Parameter	Analysis Method	Reporting Limit[1]
Conventionals		
Grain Size	PSEP/ASTM D 422	NA
Total Solids (%)	EPA 160.3 M/PSEP	NA
Total Organic Carbon (%)	ASTM D 4129-82 M/ PSEP	0.05
Metals (mg/kg)		
Antimony	EPA 200.8	0.05
Arsenic	EPA 200.8	0.5
Cadmium	EPA 200.8	0.05
Copper	EPA 200.8	0.1
Lead	EPA 200.8	0.05
Mercury	EPA 7471 CVAA	0.02
Nickel	EPA 200.8	0.2
Silver	EPA 200.8	0.02
Zinc	EPA 200.8	0.5
Organometallic compounds (µg/kg)		
Tributyltin (sediment)	Krone	1
Organics (µg/kg)		
Total LPAH		
Naphthalene	EPA 8270C-low level	10
Acenaphthylene	EPA 8270C-low level	10
Acenaphthene	EPA 8270C-low level	10
Fluorene	EPA 8270C-low level	10
Phenanthrene	EPA 8270C-low level	10
Anthracene	EPA 8270C-low level	10
2-Methylnaphthalene	EPA 8270C-low level	10
Total HPAH		
Fluoranthene	EPA 8270C-low level	10

Table 2.2
Compounds Analyzed, Analysis Methods, and Target Reporting Limits

Parameter	Analysis Method	Reporting Limit[1]
Pyrene	EPA 8270C-low level	10
Benz(a)anthracene	EPA 8270C-low level	10
Chrysene	EPA 8270C-low level	10
Benzofluoranthenes (b+k)	EPA 8270C-low level	20
Benzo(a)pyrene	EPA 8270C-low level	10
Indeno(1,2,3-c,d)pyrene	EPA 8270C-low level	10
Dibenz(a,h)anthracene	EPA 8270C-low level	10
Benzo(g,h,I)perylene	EPA 8270C-low level	10
Chlorinated hydrocarbons (µg/kg)		
1,3-Dichlorbenzene	EPA 8270C-low level	10
1,4-Dichlorobenzene	EPA 8270C-low level	10
1,2-Dichlorobenzene	EPA 8270C-low level	10
1,2,4-Trichlorobenzene	EPA 8270C-low level	10
Hexachlorobenzene	EPA 8270C-low level	10
Phthalates (µg/kg)		
Dimethyl phthalate	EPA 8270C-low level	10
Diethyl phthalate	EPA 8270C-low level	10
Di-n-butyl phthalate	EPA 8270C-low level	10
Butyl benzyl phthalate	EPA 8270C-low level	10
Bis(2-ethylhexyl) phthalate	EPA 8270C-low level	200
Di-n-octyl phthalate	EPA 8270C-low level	10
Phenols (µg/kg)		
Phenol	EPA 8270C-low level	30
2-Methylphenol	EPA 8270C-low level	10
Phenols (µg/kg) cont.		
4-Methylphenol	EPA 8270C-low level	10
2,4-Dimethylphenol	EPA 8270C-low level	50

Table 2.2
Compounds Analyzed, Analysis Methods, and Target Reporting Limits

Parameter	Analysis Method	Reporting Limit[1]
Pentachlorophenol	EPA 8270C-low level	50
Misc. extractables (µg/kg)		
Benzyl alcohol	EPA 8270C-low level	10
Benzoic acid	EPA 8270C-low level	200
Dibenzofuran	EPA 8270C-low level	10
Hexachloroethane	EPA 8270C-low level	10
Hexachlorobutadiene	EPA 8270C-low level	10
N-Nitrosodiphenylamine	EPA 8270C-low level	10
Pesticides (µg/kg)		
Total DDT (4,4'-DDD, 4,4'-DDE, 4,4'-DDT)	--	3.0
4,4'-DDD	EPA 8081 A-low level	1.0
4,4'-DDE	EPA 8081 A-low level	1.0
4,4'-DDT	EPA 8081 A-low level	1.0
Aldrin	EPA 8081 A-low level	1.0
Alpha-Chlordane	EPA 8081 A-low level	1.0
Dieldrin	EPA 8081 A-low level	1.0
Heptachlor	EPA 8081 A-low level	1.0
Gamma-BHC (Lindane)	EPA 8081 A-low level	1.0
PCBs (µg/kg)		
Total PCBs[2]	EPA 8082 A-low level	80
PAH screening (µg/kg)		
Total PAHs	GC/MS-SIM	90

Notes:

1. Reporting limits are for soil with 0% moisture content. The actual reporting limits for sediment samples can vary depending on the moisture content. Assuming 50% moisture content, the reporting limits will double for each analyte but still remain below the screening levels specified in the DMEF (USACE 1998). Deviations are noted in the Data Validation Report (see Appendix D).
2. Total PCBs is a sum of Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Antimony (total)	0.392	J	mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Arsenic (total)	2.72		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Cadmium (total)	0.48		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Copper (total)	27.4		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Lead (total)	25.6		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Nickel (total)	19.1		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Silver (total)	0.324		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Zinc (total)	107		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	7471A	Mercury (total)	0.09		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	4,4'-DDD	5.5		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	4,4'-DDE	4.7	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	4,4'-DDT	5.2	UM	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	Aldrin	2.4	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	alpha-Chlordane	0.19	UM	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	DDTs (total-calc'd p,p')	10.2	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	Dieldrin	0.2	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	gamma-BHC	1.6	UM	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	Heptachlor	0.29	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1016	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1221	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1232	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1242	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1248	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1254	89		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1260	25		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCBs (total)	114		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	1,2,4-Trichlorobenzene	2.7	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	1,2-Dichlorobenzene	2.3	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	1,3-Dichlorobenzene	2.9	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	1,4-Dichlorobenzene	3.4	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	2,4-Dimethylphenol	9.8	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	2-Methylnaphthalene	100		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	2-Methylphenol	6.1	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	4-Methylphenol	84		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Acenaphthene	85		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Acenaphthylene	42		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Anthracene	95		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(a)anthracene	180		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(a)pyrene	260		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(b)fluoranthene	220		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(g,h,i)perylene	210		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(k)fluoranthene	170		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(b+k)fluoranthene	390		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzoic acid	170	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzyl alcohol	7.9	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	bis(2-ethylhexyl)phthalate	770	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Butyl benzyl phthalate	170		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Chrysene	230		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Dibenzo(a,h)anthracene	41		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Dibenzofuran	40		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Diethylphthalate	6.2	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Dimethyl phthalate	3.2	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Di-n-butyl phthalate	23		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Di-n-octyl phthalate	2.2	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Fluoranthene	350		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Fluorene	76		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Hexachlorobenzene	3.8	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Hexachlorobutadiene	2.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Hexachloroethane	3.9	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Indeno(1,2,3-cd)pyrene	200		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Naphthalene	270		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	N-Nitrosodiphenylamine	3.9	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Pentachlorophenol	16	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Phenanthrene	360		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Phenol	11	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Pyrene	460		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	LPAH (Total)	1028		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	HPAH (Total)	2321		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	Krone	Butyltin	2		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	Krone	Dibutyltin	25		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	Krone	Tetrabutyltin	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	Krone	Tributyltin	150		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Clay (percent)	11.1		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Coarse Sand	2.01		%

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Fine Sand	11.7		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Gravel (percent)	1.47		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Medium Sand	21.1		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Silt (percent)	39.7		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Very Fine Sand	13.1		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Very Coarse Sand	0.51		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Total Organic Carbon (TOC)	1.59		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Antimony (total)	0.05	UJ	mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Arsenic (total)	1.9		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Cadmium (total)	0.05		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Copper (total)	13.2		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Lead (total)	2.63		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Nickel (total)	16.1		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Silver (total)	0.02	J	mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Zinc (total)	36.6		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	7471A	Mercury (total)	0.01	J	mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	4,4'-DDD	0.11	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	4,4'-DDT	0.22	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	Aldrin	0.12	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	alpha-Chlordane	0.13	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	DDTs (total-calc'd p,p')	0.22	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	Dieldrin	0.15	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	gamma-BHC	0.22	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	Heptachlor	0.21	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1016	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1221	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1232	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1242	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1248	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1254	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1260	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCBs (total)	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	1,2,4-Trichlorobenzene	2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	1,2-Dichlorobenzene	1.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	1,3-Dichlorobenzene	2.1	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	1,4-Dichlorobenzene	2.5	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	2,4-Dimethylphenol	7.1	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	2-Methylnaphthalene	1.6	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	2-Methylphenol	4.4	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	4-Methylphenol	3.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Acenaphthene	1.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Acenaphthylene	1.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Anthracene	1.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(a)anthracene	1.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(a)pyrene	2.1	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(b)fluoranthene	3.2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(g,h,i)perylene	3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(k)fluoranthene	3.2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(b+k)fluoranthene	3.2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzyl alcohol	4.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	bis(2-ethylhexyl)phthalate	7.9	J	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Butyl benzyl phthalate	2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Chrysene	1.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Dibenzo(a,h)anthracene	2.9	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Dibenzofuran	1.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Diethylphthalate	4.5	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Dimethyl phthalate	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Di-n-butyl phthalate	3.4	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Di-n-octyl phthalate	1.6	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Fluoranthene	2.9	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Fluorene	2.2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Hexachlorobenzene	2.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Hexachlorobutadiene	1.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Hexachloroethane	2.9	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Indeno(1,2,3-cd)pyrene	2.5	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Naphthalene	1.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	N-Nitrosodiphenylamine	2.9	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Pentachlorophenol	11	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Phenanthrene	1.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Phenol	2.5	J	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Pyrene	1.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	LPAH (Total)	2.2	U	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	HPAH (Total)	3.2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	Krone	Butyltin	0.8	UJ	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	Krone	Dibutyltin	0.94	UJ	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	Krone	Tetrabutyltin	1.1	UJ	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	Krone	Tributyltin	0.46	UJ	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Clay (percent)	0.56		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Coarse Sand	10.8		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Fine Sand	23		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Gravel (percent)	0.1		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Medium Sand	63.1		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Silt (percent)	1.68		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Very Fine Sand	1.96		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Very Coarse Sand	0.3		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Total Organic Carbon (TOC)	0.12		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Antimony (total)	0.371	J	mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Arsenic (total)	3.18		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Cadmium (total)	0.456		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Copper (total)	26.6		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Lead (total)	23.5		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Nickel (total)	17		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Silver (total)	0.442		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Zinc (total)	84.7		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	7471A	Mercury (total)	0.25		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	4,4'-DDD	20		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	4,4'-DDE	17	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	4,4'-DDT	6.3	UM	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	Aldrin	1.2	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	alpha-Chlordane	0.18	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	37	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	Dieldrin	0.19	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	gamma-BHC	1.5	UM	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	Heptachlor	0.28	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1016	1.5	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1221	1.5	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1232	1.5	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1242	1.5	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1248	1.5	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1254	110	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1260	80		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCBs (total)	190	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	1,2,4-Trichlorobenzene	26	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	1,2-Dichlorobenzene	23	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	1,3-Dichlorobenzene	28	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	1,4-Dichlorobenzene	33	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	2,4-Dimethylphenol	95	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	2-Methylnaphthalene	290		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	2-Methylphenol	59	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	4-Methylphenol	190		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Acenaphthene	350		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Acenaphthylene	130		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Anthracene	340		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(a)anthracene	560		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(a)pyrene	780		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(b)fluoranthene	510		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(g,h,i)perylene	740		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(k)fluoranthene	460		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(b+k)fluoranthene	970		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzoic acid	1700	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzyl alcohol	64	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	bis(2-ethylhexyl)phthalate	62	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Butyl benzyl phthalate	26	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Chrysene	710		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Dibenzo(a,h)anthracene	92	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Dibenzofuran	110		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Diethylphthalate	61	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Dimethyl phthalate	32	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Di-n-butyl phthalate	45	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Di-n-octyl phthalate	21	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Fluoranthene	1400		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Fluorene	290		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Hexachlorobenzene	37	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Hexachlorobutadiene	25	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Hexachloroethane	38	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Indeno(1,2,3-cd)pyrene	620		µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Naphthalene	740		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	N-Nitrosodiphenylamine	38	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Pentachlorophenol	150	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Phenanthrene	1400		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Phenol	33	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Pyrene	2100		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	LPAH (Total)	3540		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	HPAH (Total)	7982	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	Krone	Butyltin	0.82		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	Krone	Dibutyltin	2.3		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	Krone	Tetrabutyltin	1.4		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	Krone	Tributyltin	7.9		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Clay (percent)	17.1		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Coarse Sand	3.31		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Fine Sand	6.44		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Gravel (percent)	0.09		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Medium Sand	15.2		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Silt (percent)	47.3		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Very Coarse Sand	0.53		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Very Fine Sand	9.32		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Total Organic Carbon (TOC)	2.06		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Antimony (total)	0.05	J	mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Arsenic (total)	2.5		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Cadmium (total)	0.06		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Copper (total)	13.1		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Lead (total)	2.96		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Nickel (total)	16.3		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Silver (total)	0.02	J	mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Zinc (total)	37.5		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	7471A	Mercury (total)	0.01	U	mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	4,4'-DDD	0.1	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	4,4'-DDT	0.22	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	Aldrin	0.12	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	alpha-Chlordane	0.13	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	0.22	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	Dieldrin	0.14	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	gamma-BHC	0.22	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	Heptachlor	0.21	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1016	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1221	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1232	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1242	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1248	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1254	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1260	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCBs (total)	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	1,2,4-Trichlorobenzene	1.9	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	1,2-Dichlorobenzene	1.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	1,3-Dichlorobenzene	2.1	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	1,4-Dichlorobenzene	2.5	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	2,4-Dimethylphenol	7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	2-Methylnaphthalene	1.6	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	2-Methylphenol	4.4	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	4-Methylphenol	3.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Acenaphthene	1.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Acenaphthylene	1.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Anthracene	1.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(a)anthracene	2.4	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(a)pyrene	2.4	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(b)fluoranthene	3.2	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(g,h,i)perylene	3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(k)fluoranthene	3.2	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(b+k)fluoranthene	3.2	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzyl alcohol	4.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	bis(2-ethylhexyl)phthalate	5	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Butyl benzyl phthalate	1.9	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Chrysene	2.5	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Dibenzo(a,h)anthracene	2.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Dibenzofuran	1.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Diethylphthalate	4.5	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Dimethyl phthalate	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Di-n-butyl phthalate	3.3	U	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Di-n-octyl phthalate	1.6	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Fluoranthene	3.9	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Fluorene	2.2	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Hexachlorobenzene	2.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Hexachlorobutadiene	1.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Hexachloroethane	2.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Indeno(1,2,3-cd)pyrene	2.5	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Naphthalene	1.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	N-Nitrosodiphenylamine	2.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Pentachlorophenol	11	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Phenanthrene	2.4	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Phenol	2.5	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Pyrene	5.6	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	LPAH (Total)	2.4	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	HPAH (Total)	16.8	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	Krone	Tetrabutyltin	1.1	UJ	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	Krone	Tributyltin	0.46	UJ	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Clay (percent)	0.71		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Coarse Sand	5.64		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Fine Sand	25.1		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Gravel (percent)	0.04		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Medium Sand	62		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Silt (percent)	2.96		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Very Coarse Sand	0.12		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Very Fine Sand	2.9		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Total Organic Carbon (TOC)	0.07		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Antimony (total)	0.05	J	mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Arsenic (total)	1.7		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Cadmium (total)	0.05	J	mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Copper (total)	12.8		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Lead (total)	2.52		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Nickel (total)	16.7		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Silver (total)	0.03		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Zinc (total)	35.5		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	7471A	Mercury (total)	0.01	U	mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	4,4'-DDD	0.11	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 16:45	Sediment	8081A	4,4'-DDT	0.23	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	Aldrin	0.12	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	alpha-Chlordane	0.14	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	0.23	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	Dieldrin	0.15	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	gamma-BHC	0.63	J	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	Heptachlor	0.24	UM	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1016	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1221	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1232	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1242	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1248	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1254	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1260	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCBs (total)	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	1,2,4-Trichlorobenzene	2	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	1,2-Dichlorobenzene	1.7	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	1,3-Dichlorobenzene	2.1	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	1,4-Dichlorobenzene	2.5	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	2,4-Dimethylphenol	7.2	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	2-Methylnaphthalene	1.6	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	2-Methylphenol	4.5	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	4-Methylphenol	3.8	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Acenaphthene	1.4	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Acenaphthylene	1.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Anthracene	1.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(a)anthracene	1.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(a)pyrene	2.1	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(b)fluoranthene	3.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(g,h,i)perylene	3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(k)fluoranthene	3.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(b+k)fluoranthene	3.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzyl alcohol	4.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	bis(2-ethylhexyl)phthalate	5.4	J	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Butyl benzyl phthalate	2	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Chrysene	1.9	UJ	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Dibenzo(a,h)anthracene	2.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Dibenzofuran	1.7	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Diethylphthalate	4.6	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Dimethyl phthalate	2.4	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Di-n-butyl phthalate	3.4	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Di-n-octyl phthalate	1.6	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Fluoranthene	2.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Fluorene	2.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Hexachlorobenzene	2.8	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Hexachlorobutadiene	1.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Hexachloroethane	2.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Indeno(1,2,3-cd)pyrene	2.5	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Naphthalene	1.7	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	N-Nitrosodiphenylamine	2.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Pentachlorophenol	12	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Phenanthrene	1.7	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Phenol	2.5	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Pyrene	1.7	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	LPAH (Total)	2.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	HPAH (Total)	3.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	Krone	Butyltin	0.62	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	Krone	Dibutyltin	0.95	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	Krone	Tetrabutyltin	1.1	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	Krone	Tributyltin	0.47	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Clay (percent)	0.41		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Coarse Sand	4.98		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Fine Sand	25		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Gravel (percent)	0.05		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Medium Sand	69.6		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Silt (percent)	0.71		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Very Coarse Sand	0.07		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Very Fine Sand	1.14		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Total Organic Carbon (TOC)	0.05		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Antimony (total)	0.262	J	mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Arsenic (total)	1.98		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Cadmium (total)	0.122		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Copper (total)	15.3		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Lead (total)	9.02		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Nickel (total)	16.3		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Silver (total)	0.123		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Zinc (total)	56.9		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	7471A	Mercury (total)	0.06		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	4,4'-DDD	2.4		µg/kg
SDC-SS04-000008	3/12/2003 16:45	Sediment	8081A	4,4'-DDE	4.1	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	4,4'-DDT	3.4	UM	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	Aldrin	0.13	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	alpha-Chlordane	0.14	U	µg/kg
SDC-SS04-000008	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	6.5	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	Dieldrin	0.15	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	gamma-BHC	1.2	UM	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	Heptachlor	0.22	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1016	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1221	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1232	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1242	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1248	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1254	69		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1260	27		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCBs (total)	96		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	1,2,4-Trichlorobenzene	2.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	1,2-Dichlorobenzene	1.8	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	1,3-Dichlorobenzene	2.2	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	1,4-Dichlorobenzene	2.6	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	2,4-Dimethylphenol	7.4	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	2-Methylnaphthalene	3.5	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	2-Methylphenol	4.6	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	4-Methylphenol	5.3	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Acenaphthene	4.2	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Acenaphthylene	12		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Anthracene	15		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(a)anthracene	48		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(a)pyrene	72		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(b)fluoranthene	52		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(g,h,i)perylene	60		µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(k)fluoranthene	41		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(b+k)fluoranthene	93		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzyl alcohol	5	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	bis(2-ethylhexyl)phthalate	18	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Butyl benzyl phthalate	2.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Chrysene	58		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Dibenzo(a,h)anthracene	9.8	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Dibenzofuran	1.8	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Diethylphthalate	4.7	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Dimethyl phthalate	2.5	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Di-n-butyl phthalate	3.5	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Di-n-octyl phthalate	1.7	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Fluoranthene	49		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Fluorene	2.7	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Hexachlorobenzene	2.9	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Hexachlorobutadiene	1.9	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Hexachloroethane	3	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Indeno(1,2,3-cd)pyrene	57		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Naphthalene	11		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	N-Nitrosodiphenylamine	3	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Pentachlorophenol	12	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Phenanthrene	45		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Phenol	6.2	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Pyrene	97		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	LPAH (Total)	93.4	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	HPAH (Total)	543.8	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	Krone	Butyltin	0.63	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	Krone	Dibutyltin	2.4		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	Krone	Tetrabutyltin	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	Krone	Tributyltin	11		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Clay (percent)	4.28		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Coarse Sand	6.08		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Fine Sand	18.6		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Gravel (percent)	0.46		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Medium Sand	54.9		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Silt (percent)	10.8		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Very Coarse Sand	0.19		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Very Fine Sand	4.09		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Total Organic Carbon (TOC)	0.38		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Antimony (total)	0.328	J	mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Arsenic (total)	1.5		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Cadmium (total)	0.096		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Copper (total)	13.6		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Lead (total)	7.87		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Nickel (total)	15.6		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Silver (total)	0.091		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Zinc (total)	51.1		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	7471A	Mercury (total)	0.04		mg/kg
SDC-SS05-0000012	3/12/2003 16:45	Sediment	8081A	4,4'-DDD	0.47	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	4,4'-DDE	1.1	UM	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	4,4'-DDT	4.1	UM	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	Aldrin	0.12	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	alpha-Chlordane	0.14	U	µg/kg
SDC-SS05-0000012	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	0.47	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	Dieldrin	0.15	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	gamma-BHC	0.23	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	Heptachlor	0.22	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1016	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1221	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1232	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1242	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1248	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1254	71		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1260	23		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCBs (total)	94		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	1,2,4-Trichlorobenzene	2	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	1,2-Dichlorobenzene	1.8	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	1,3-Dichlorobenzene	2.2	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	1,4-Dichlorobenzene	2.6	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	2,4-Dimethylphenol	7.4	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	2-Methylnaphthalene	5.4	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	2-Methylphenol	4.6	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	4-Methylphenol	5.1	J	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Acenaphthene	4.8	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Acenaphthylene	9.8	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Anthracene	18		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(a)anthracene	31		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(a)pyrene	50		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(b)fluoranthene	43		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(g,h,i)perylene	50		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(k)fluoranthene	30		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(b+k)fluoranthene	73		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzyl alcohol	5	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	bis(2-ethylhexyl)phthalate	24	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Butyl benzyl phthalate	7.5	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Chrysene	45		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Dibenzo(a,h)anthracene	6.7	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Dibenzofuran	2.8	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Diethylphthalate	4.7	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Dimethyl phthalate	2.4	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Di-n-butyl phthalate	3.6	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Di-n-octyl phthalate	1.6	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Fluoranthene	35		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Fluorene	4.1	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Hexachlorobenzene	2.8	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Hexachlorobutadiene	1.9	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Hexachloroethane	3	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Indeno(1,2,3-cd)pyrene	43		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Naphthalene	22		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	N-Nitrosodiphenylamine	3	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Pentachlorophenol	12	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Phenanthrene	36		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Phenol	5.5	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Pyrene	93		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	LPAH (Total)	100.1	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	HPAH (Total)	426.7	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	Krone	Butyltin	0.63	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	Krone	Dibutyltin	1.1	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	Krone	Tetrabutyltin	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	Krone	Tributyltin	2.6		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Clay (percent)	2.98		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Coarse Sand	3.83		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Fine Sand	22.7		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Gravel (percent)	0.07		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Medium Sand	58.1		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Silt (percent)	8.86		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Very Coarse Sand	0.22		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Very Fine Sand	6.52		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Total Organic Carbon (TOC)	0.3		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Antimony (total)	0.06	J	mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Arsenic (total)	1.2		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Cadmium (total)	0.04	J	mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Copper (total)	11.8		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Lead (total)	2.28		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Nickel (total)	14		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Silver (total)	0.03		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Zinc (total)	33		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	7471A	Mercury (total)	0.01	U	mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	4,4'-DDD	0.11	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS05-014016C	3/12/2003 16:45	Sediment	8081A	4,4'-DDT	0.22	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	Aldrin	0.12	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	alpha-Chlordane	0.13	U	µg/kg
SDC-SS05-014016C	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	0.22	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	Dieldrin	0.15	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	gamma-BHC	0.22	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	Heptachlor	0.21	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1016	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1221	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1232	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1242	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1248	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1254	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1260	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCBs (total)	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	1,2,4-Trichlorobenzene	2	U	µg/kg

SCHN00206091

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	1,2-Dichlorobenzene	1.7	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	1,3-Dichlorobenzene	2.1	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	1,4-Dichlorobenzene	2.5	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	2,4-Dimethylphenol	7.2	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	2-Methylnaphthalene	1.6	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	2-Methylphenol	4.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	4-Methylphenol	3.6	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Acenaphthene	1.3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Acenaphthylene	1.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Anthracene	1.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(a)anthracene	1.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(a)pyrene	2.1	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(b)fluoranthene	3.3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(g,h,i)perylene	3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(k)fluoranthene	3.3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(b+k)fluoranthene	3.3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzyl alcohol	4.8	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	bis(2-ethylhexyl)phthalate	9.9	J	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Butyl benzyl phthalate	2	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Chrysene	1.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Dibenzo(a,h)anthracene	2.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Dibenzofuran	1.7	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Diethylphthalate	4.6	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Dimethyl phthalate	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Di-n-butyl phthalate	3.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Di-n-octyl phthalate	1.6	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Fluoranthene	2.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Fluorene	2.2	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Hexachlorobenzene	2.8	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Hexachlorobutadiene	1.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Hexachloroethane	2.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Indeno(1,2,3-cd)pyrene	2.5	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Naphthalene	1.7	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	N-Nitrosodiphenylamine	2.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Pentachlorophenol	11	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Phenanthrene	1.7	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Phenol	2.5	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Pyrene	1.7	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	LPAH (Total)	2.2	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	HPAH (Total)	3.3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	Krone	Butyltin	0.61	UJ	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	Krone	Dibutyltin	0.95	UJ	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	Krone	Tetrabutyltin	1.1	UJ	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	Krone	Tributyltin	0.47	UJ	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Clay (percent)	0.4		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Coarse Sand	9.26		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Fine Sand	15.4		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Gravel (percent)	0		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Medium Sand	69.8		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Silt (percent)	1.96		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Very Coarse Sand	0.2		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Very Fine Sand	1.97		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Total Organic Carbon (TOC)	0.04	J	%
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Antimony (total)	0.34	J	mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Arsenic (total)	2.98		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Cadmium (total)	0.349		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Copper (total)	29.3		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Lead (total)	30.5		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Nickel (total)	18.5		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Silver (total)	0.238		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Zinc (total)	91.5		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	7471A	Mercury (total)	0.12		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	4,4'-DDD	0.5	J	µg/kg
SDC-SS06-000007	3/12/2003 16:45	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	4,4'-DDT	2.6		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	Aldrin	0.61	UM	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	alpha-Chlordane	0.36	J	µg/kg
SDC-SS06-000007	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	3.1	J	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	Dieldrin	0.18	UM	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	gamma-BHC	1.2	UM	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	Heptachlor	0.22	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1016	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1221	1.4	U	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1232	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1242	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1248	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1254	300		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1260	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCBs (total)	300		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	1,2,4-Trichlorobenzene	2.6	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	1,2-Dichlorobenzene	2.2	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	1,3-Dichlorobenzene	2.7	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	1,4-Dichlorobenzene	3.2	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	2,4-Dimethylphenol	9.3	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	2-Methylnaphthalene	11		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	2-Methylphenol	5.7	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	4-Methylphenol	13		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Acenaphthene	22		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Acenaphthylene	25		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Anthracene	54		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(a)anthracene	150		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(a)pyrene	210		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(b)fluoranthene	270		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(g,h,i)perylene	200		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(k)fluoranthene	120		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(b+k)fluoranthene	390		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzoic acid	170	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzyl alcohol	6.2	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	bis(2-ethylhexyl)phthalate	250		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Butyl benzyl phthalate	28		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Chrysene	220		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Dibenzo(a,h)anthracene	61		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Dibenzofuran	9.2	J	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Diethylphthalate	5.9	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Dimethyl phthalate	3.1	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Di-n-butyl phthalate	7.8	J	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Di-n-octyl phthalate	2.1	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Fluoranthene	200		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Fluorene	19		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Hexachlorobenzene	3.6	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Hexachlorobutadiene	2.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Hexachloroethane	3.7	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Indeno(1,2,3-cd)pyrene	200		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Naphthalene	30		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	N-Nitrosodiphenylamine	3.7	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Pentachlorophenol	15	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Phenanthrene	110		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Phenol	10	J	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Pyrene	290		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	LPAH (Total)	271		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	HPAH (Total)	1921		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	Krone	Butyltin	5		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	Krone	Dibutyltin	24		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	Krone	Tetrabutyltin	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	Krone	Tributyltin	67		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Clay (percent)	14.5		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Coarse Sand	0.81		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Fine Sand	11.4		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Gravel (percent)	0.05		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Medium Sand	11		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Silt (percent)	47.6		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Very Coarse Sand	0.18		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Very Fine Sand	13.3		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Total Organic Carbon (TOC)	1.21		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Antimony (total)	0.05	J	mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Arsenic (total)	1.1		mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Cadmium (total)	0.05	J	mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Copper (total)	12.2		mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Lead (total)	2.47		mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Nickel (total)	15		mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Silver (total)	0.02	J	mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Zinc (total)	33.8		mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	7471A	Mercury (total)	0.01	J	mg/kg
SDC-SS06-008010C	3/12/2003 16:45	Sediment	8081A	4,4'-DDD	0.11	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	4,4'-DDT	0.22	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	Aldrin	0.12	U	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	alpha-Chlordane	0.13	U	µg/kg
SDC-SS06-008010C	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	0.22	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	Dieldrin	0.14	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	gamma-BHC	0.22	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	Heptachlor	0.21	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1016	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1221	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1232	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1242	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1248	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1254	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1260	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCBs (total)	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	1,2,4-Trichlorobenzene	2	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	1,2-Dichlorobenzene	1.7	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	1,3-Dichlorobenzene	2.1	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	1,4-Dichlorobenzene	2.5	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	2,4-Dimethylphenol	7	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	2-Methylnaphthalene	1.6	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	2-Methylphenol	4.4	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	4-Methylphenol	3.7	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Acenaphthene	1.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Acenaphthylene	1.8	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Anthracene	3	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(a)anthracene	11		µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(a)pyrene	6.6	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(b)fluoranthene	9.2	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(g,h,i)perylene	6.3	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(k)fluoranthene	9.2	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(b+k)fluoranthene	18.4	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzyl alcohol	4.7	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	bis(2-ethylhexyl)phthalate	24	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Butyl benzyl phthalate	2	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Chrysene	12		µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Dibenzo(a,h)anthracene	2.8	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Dibenzofuran	2.1	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Diethylphthalate	4.5	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Dimethyl phthalate	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Di-n-butyl phthalate	3.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Di-n-octyl phthalate	1.6	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Fluoranthene	31		µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Fluorene	2.2	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Hexachlorobenzene	2.7	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Hexachlorobutadiene	1.8	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Hexachloroethane	2.8	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Indeno(1,2,3-cd)pyrene	6.7	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Naphthalene	2.4	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	N-Nitrosodiphenylamine	2.8	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Pentachlorophenol	11	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Phenanthrene	30		µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Phenol	2.5	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Pyrene	20		µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	LPAH (Total)	35.4	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	HPAH (Total)	112	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	Krone	Butyltin	0.6	UJ	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	Krone	Dibutyltin	0.93	UJ	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	Krone	Tetrabutyltin	1.1	UJ	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	Krone	Tributyltin	0.46	UJ	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Clay (percent)	0.6		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Coarse Sand	12.7		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Fine Sand	13.6		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Gravel (percent)	0.01		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Medium Sand	69.4		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Silt (percent)	2.42		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Very Coarse Sand	0.12		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Very Fine Sand	1.59		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Total Organic Carbon (TOC)	0.1		%

Notes:
In the case of non-detects, the method detection limit is reported.
LPAH is a sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene and 2-methylnaphthalene
HPAH is a sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b+k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenz(a)anthraceneand benzo(g,h,i)perylene

Table 3.2
PAH Screening Results

SampleID	Collection Date	Matrix	Analysis	Analyte	Conc.	Interpretive Qualifier	Unit Name
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Acenaphthylene	0.21	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Anthracene	0.25	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Benzo(a)anthracene	0.17	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Benzo(a)pyrene	19.1	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.31	J	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.24	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Dibenzofuran	0.27	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Fluoranthene	0.23	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Fluorene	0.23	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.2	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Naphthalene	0.28	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Phenanthrene	0.2	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Pyrene	0.15	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Acenaphthylene	0.21	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Anthracene	0.25	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Benzo(a)anthracene	0.17	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Benzo(a)pyrene	0.19	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.14	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.24	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Dibenzofuran	0.27	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Fluoranthene	0.23	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Fluorene	0.23	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.2	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Naphthalene	0.28	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Phenanthrene	0.2	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Pyrene	0.15	U	µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	2-Methylnaphthalene	38		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Acenaphthene	35		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Acenaphthylene	37		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Anthracene	85		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Benzo(a)anthracene	230		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Benzo(a)pyrene	420		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Benzo(b)fluoranthene	260		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Benzo(g,h,i)perylene	370		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Benzo(k)fluoranthene	220		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Chrysene	300		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Dibenzo(a,h)anthracene	26		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Dibenzofuran	13		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Fluoranthene	660		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Fluorene	37		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	350		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Naphthalene	180		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Phenanthrene	380		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Pyrene	950		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	2-Methylnaphthalene	0.65	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Acenaphthene	0.33	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Acenaphthylene	1	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Anthracene	3.6	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Benzo(a)anthracene	11		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Benzo(a)pyrene	12		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Benzo(b)fluoranthene	7.9		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Benzo(g,h,i)perylene	8.2		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Benzo(k)fluoranthene	8.6		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Chrysene	13		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.98	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Dibenzofuran	0.32	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Fluoranthene	19		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Fluorene	0.76	J	µg/kg

Table 3.2
PAH Screening Results

SampleID	Collection Date	Matrix	Analysis	Analyte	Conc.	Interpretive Qualifier	Unit Name
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	7.2		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Naphthalene	5	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Phenanthrene	9.7		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Pyrene	26		µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	2-Methylnaphthalene	0.27	U	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Acenaphthene	0.27	U	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Acenaphthylene	0.21	U	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Anthracene	0.39	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Benzo(a)anthracene	1.3	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Benzo(a)pyrene	1.4	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Benzo(b)fluoranthene	1.3	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Benzo(g,h,i)perylene	1.7	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Benzo(k)fluoranthene	1.3	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Chrysene	1.9	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.37	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Dibenzofuran	0.26	U	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Fluoranthene	2.3	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Fluorene	0.22	U	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	1.6	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Naphthalene	0.43	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Phenanthrene	1.1	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Pyrene	2.9	J	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Acenaphthylene	0.22	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Anthracene	0.26	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Benzo(a)anthracene	0.18	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Benzo(a)pyrene	0.19	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.74	J	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.49	J	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Dibenzofuran	0.27	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Fluoranthene	0.23	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Fluorene	0.23	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.69	J	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Naphthalene	0.28	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Phenanthrene	0.2	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Pyrene	0.15	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Acenaphthylene	0.22	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Anthracene	0.26	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Benzo(a)anthracene	0.18	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Benzo(a)pyrene	0.19	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.14	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.24	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Dibenzofuran	0.27	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Fluoranthene	0.23	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Fluorene	0.23	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.2	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Naphthalene	0.28	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Phenanthrene	0.2	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Pyrene	0.15	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Acenaphthylene	0.21	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Anthracene	0.25	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Benzo(a)anthracene	0.17	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Benzo(a)pyrene	0.19	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.78	J	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg

Table 3.2
PAH Screening Results

SampleID	Collection Date	Matrix	Analysis	Analyte	Conc.	Interpretive Qualifier	Unit Name
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.35	J	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Dibenzofuran	0.26	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Fluoranthene	0.22	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Fluorene	0.22	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.8	J	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Naphthalene	0.28	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Phenanthrene	0.2	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Pyrene	0.15	U	µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	2-Methylnaphthalene	7.1		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Acenaphthene	7.5		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Acenaphthylene	11		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Anthracene	21		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Benzo(a)anthracene	120		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Benzo(a)pyrene	220		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Benzo(b)fluoranthene	160		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Benzo(g,h,i)perylene	180		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Benzo(k)fluoranthene	130		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Chrysene	170		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Dibenzo(a,h)anthracene	22		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Dibenzofuran	3.2	J	µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Fluoranthene	230		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Fluorene	6.7		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	180		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Naphthalene	19		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Phenanthrene	90		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Pyrene	360		µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Acenaphthylene	0.22	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Anthracene	0.25	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Benzo(a)anthracene	0.18	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Benzo(a)pyrene	0.19	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.22	J	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.24	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Dibenzofuran	0.27	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Fluoranthene	0.23	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Fluorene	0.23	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.21	J	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Naphthalene	0.3	J	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Phenanthrene	0.3	J	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Pyrene	0.22	J	µg/kg

Table 3.3
Comparison to Dredge Material Evaluation Framework Criteria

Sample ID	Analyte	Conc.	Interpretive Qualifier	Unit Name	Ratio of Exeedance	
					DMEF BT	DMEF SL
SDC-SS01-000007	DDTs (total-calc'd p,p')	10.2	J	µg/kg		1.48
SDC-SS02-000013	Benzo(g,h,i)perylene	740		µg/kg		1.1
SDC-SS02-000013	DDTs (total-calc'd p,p')	37	J	µg/kg		5.36
SDC-SS02-000013	Indeno(1,2,3-cd)pyrene	620		µg/kg		1.03
SDC-SS02-000013	PCBs (total)	190	J	µg/kg		1.46
SDC-SS06-000007	PCBs (total)	300		µg/kg		2.31

Note:
Only exceedances of criteria are shown, i.e., when ratio of exceedance is greater than one.

Table 3.4
Comparison to Freshwater Sediment Quality Values

Sample ID	Analyte	Conc.	Interpretive Qualifier	Unit Name	Ratio of Exeedance
					Ingersoll PEC
SDC-SS02-000013	Naphthalene	740		µg/kg	1.32
SDC-SS02-000013	Phenanthrene	1400		µg/kg	1.2
SDC-SS02-000013	Pyrene	2100		µg/kg	1.38

Notes:
PEC values from Ingersoll et al 2000 and MacDonald et al 2000.
Only exceedances of criteria are shown, i.e., when ratio of exceedance is greater than one.

Table 3.5
Portland Harbor "Baseline" Values

Parameter	Apparent Portland Harbor Sediment Baseline Maximum Value	Sediment Concentrations From the Initial Study Area (LWG 2002)			Subsu Concentrati (W
		Detection Frequency	Minimum	Maximum	Arithmetic Mean
Conventionals					
Total Organic Carbon (%)	2				2.0
Metals (mg/kg)					
Antimony	<5	35.7	0.02	13	3.2
Arsenic	<5	61.0	0.001	140	3.5
Cadmium	0.6	92.6	0.05	6.6	0.8
Copper	60	100	0.002	2200	85.9
Lead	30	95.8	0.01	1160	78.2
Mercury	0.1	88.6	0.01	2.1	0.18
Nickel	32	100	0.01	594	31.9
Silver	1.4	87.2	0.0002	3.4	1.3
Zinc	118	100	0.005	2700	205.8
Organometallic compounds (µg/kg)					
Tributyltin	300[1]	89.8[2]	1[2]	42900[2]	1311.8[2]
Organics (µg/kg)					
Total LPAH[3]	700	88.0	1.7	4299000	8224.729
Naphthalene		53.2	0.2	1900000	443.8
Acenaphthylene		28	8800	9000	87.4
Acenaphthene		58.5	0.4	580000	994.97
Fluorene		58.9	0.5	260000	804.5
Phenanthrene		88.2	0.4	1300000	5156.6
Anthracene		64.2	0.8	250000	809.6

Table 3.5
Portland Harbor "Baseline" Values

Parameter	Apparent Portland Harbor Sediment Baseline Maximum Value	Sediment Concentrations From the Initial Study Area (LWG 2002)			Subsu Concentratic (W
		Detection Frequency	Minimum	Maximum	Arithmetic Mean
2-Methylnaphthalene	150	42.5	1	44000	300.4
Total HPAH[4]	2400	95.0	2	1893000	19623.7
Fluoranthene		94.7	0.7	480000	4307.0
Pyrene		94.6	0.1	670000	5033.97
Benz(a)anthracene		87.8	3	120000	1318.0
Chrysene		91.9	3	160000	1755.4
Benzofluoranthenes (b+k)		92.9	4	157000	2561.1
Benzo(a)pyrene		87.6	0.5	130000	1711.9
Indeno(1,2,3-c,d)pyrene		81.5	1	110000	1226.6
Dibenz(a,h)anthracene		48.5	0.7	25000	348.0
Benzo(g,h,I)perylene		80.8	0.6	6.3	1465.9
Chlorinated hydrocarbons (µg/kg)					
1,3-Dichlorbenzene		0.82	10	31	28.7
1,4-Dichlorobenzene		0.82	18	230	28.7
1,2-Dichlorobenzene		0.82	11	22	28.7
1,2,4-Trichlorobenzene		2.13	10	530	28.7
Hexachlorobenzene		2.26	19	14000	68.6
Phthalates (µg/kg)					
Dimethyl phthalate	<20	5.82	3.1	171	30.0
Diethyl phthalate		1.27	15.6	26.5	28.7
Di-n-butyl phthalate	<20	26.4	4.4	1500	32.8
Butyl benzyl phthalate	<20	31.1	3.4	3000	33.6

Table 3.5
Portland Harbor "Baseline" Values

Parameter	Apparent Portland Harbor Sediment Baseline Maximum Value	Sediment Concentrations From the Initial Study Area (LWG 2002)			Subsu Concentrati (W
		Detection Frequency	Minimum	Maximum	Arithmetic Mean
Bis(2-ethylhexyl) phthalate	390	66.8	11	38000	379.3
Di-n-octyl phthalate	<20	15.9	11	10100	28.7
Phenols (µg/kg)					
Phenol	<20	4.39	5.1	300	39.1
2-Methylphenol		0.52	17	51	28.7
4-Methylphenol	680	46.6	20	1400	151.3
2,4-Dimethylphenol		0.775	31	6000	28.7
Pentachlorophenol	Detect	3.11	9.4	680	137.6
Misc. extractables (µg/kg)					
Benzyl alcohol	<20	2.90	5.5	15	28.6
Benzoic acid	<200	6.60	8.7	2600	534.2
Dibenzofuran	100	43.9	2	13900	291.2
Hexachloroethane		4.03	31	20000	569.8
Hexachlorobutadiene		2.17	19	34000	946.9
N-Nitrosodiphenylamine					28.7
Pesticides (µg/kg)					
Total DDT (4,4'-DDD, 4,4'-DDE, 4,4'-DDT)	220	72.8	1.2	84909	
4,4'-DDD		62.5	0.4	29000	1762.2
4,4'-DDE		50.3	0.7	1840	213.0
4,4'-DDT		56.5	0.2	81000	1267.6
Aldrin		6.56	0.2	60	107.1

Table 3.5
Portland Harbor "Baseline" Values

Parameter	Apparent Portland Harbor Sediment Baseline Maximum Value	Sediment Concentrations From the Initial Study Area (LWG 2002)			Subsı Concentrati (W
		Detection Frequency	Minimum	Maximum	Arithmetic Mean
Alpha-Chlordane					107.1
Dieldrin		3.83	0.4	10	211.4
Heptachlor		0.55	6	6	107.1
Gamma-BHC (Lindane)					107.1
Total PCBs	<180	45.0	3	2500	3818.7

Notes:

1 This value is for total organotins, a sum of tetra-n-butyltin, tri-n-butyltin, di-n-butyltin and n-butyltin.
2 These values are for tri-n-butyltin ion.
3 Compounds that are included in the sum of LPAH may vary among the different sources.
4 Compounds that are included in the sum of HPAH may vary among the different sources.

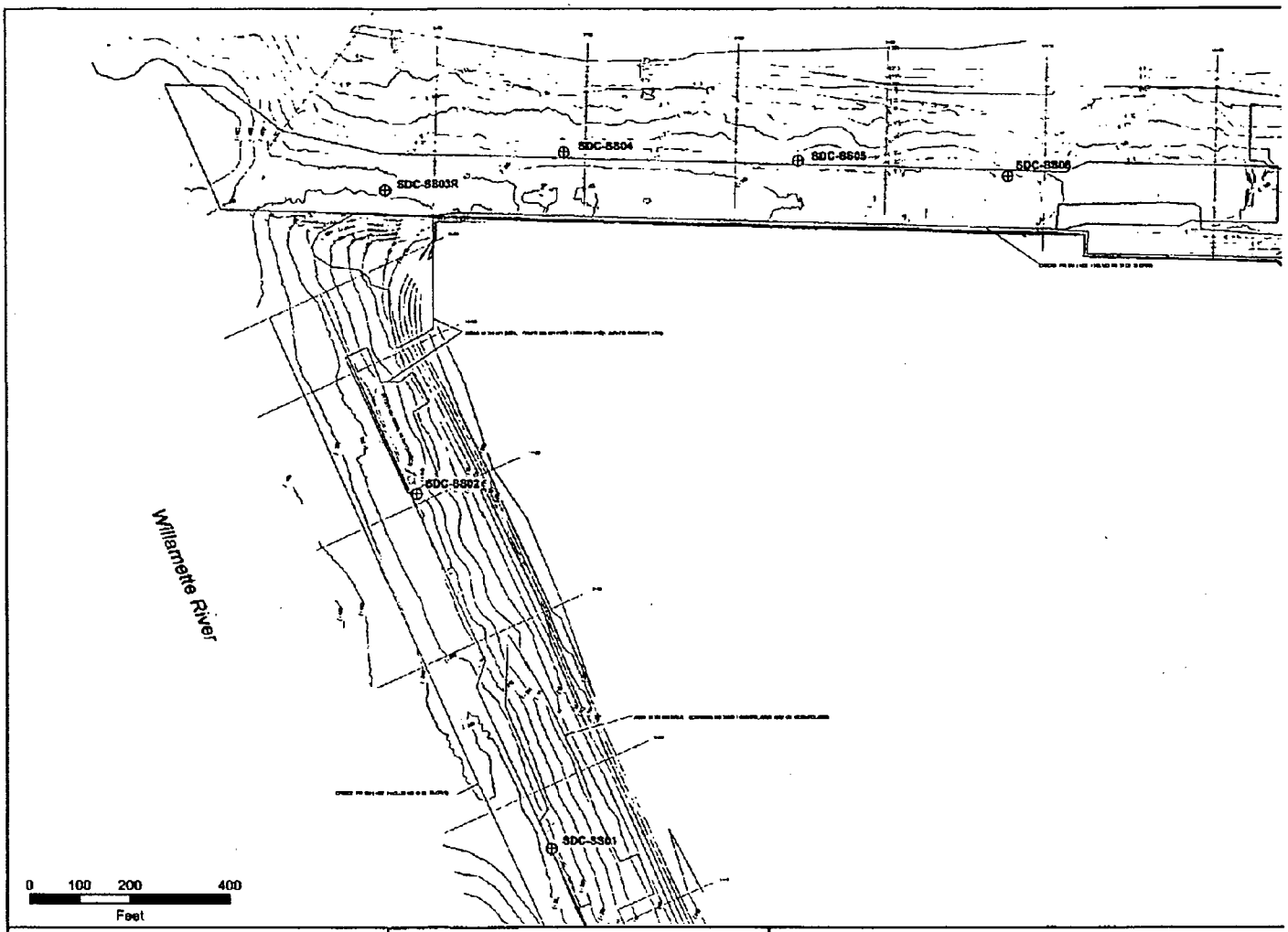
SSI-IT SEDS

International Terminal Sediment Data Report

Figures

Final

SCHN00206104

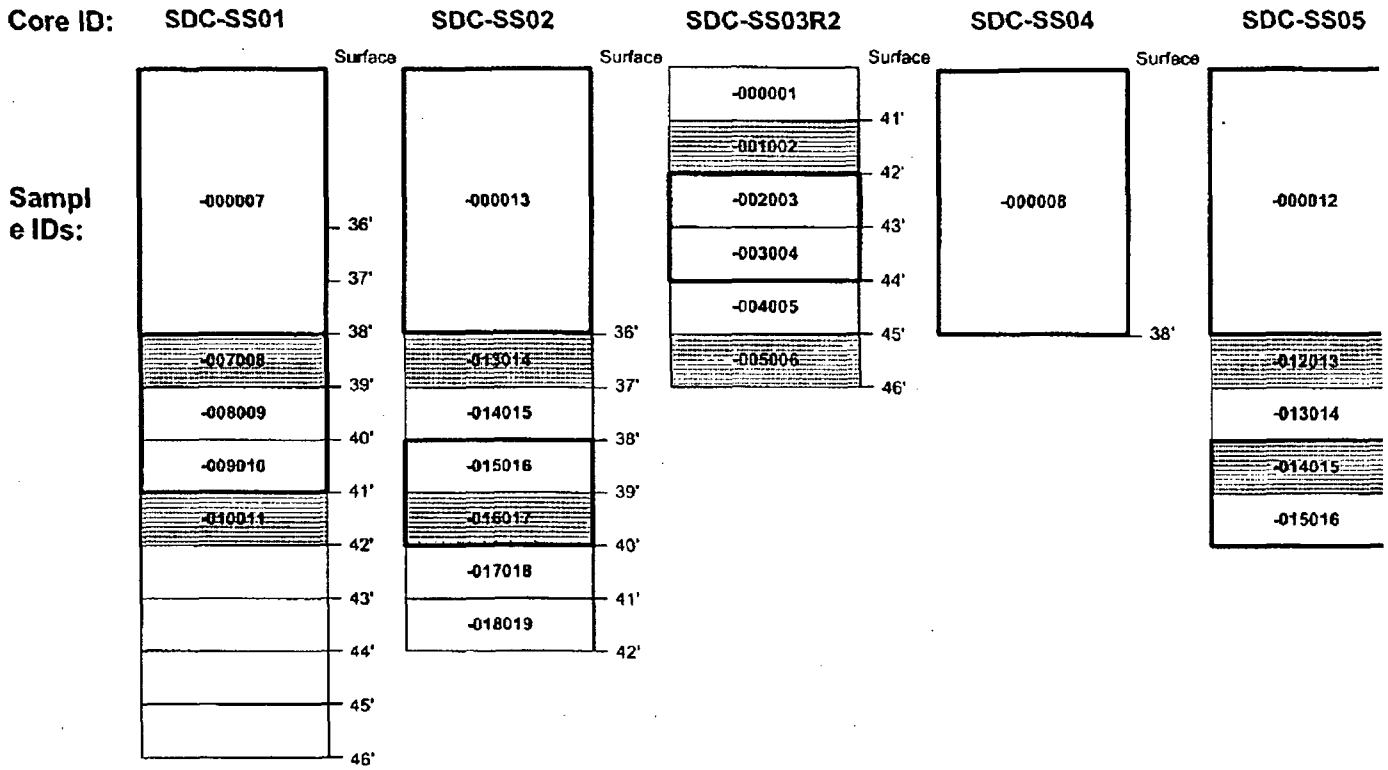


Floyd Snider McCarthy, Inc.

Data Report

DATE: 8/3/2003 10:41:52
MXD NAME: [illegible]

Figure 2.2. PAH Screening and Compositing Scheme



Top and bottom composites (boxes with thick lines) show samples submitted for full analysis. Shaded intervals show s screening. Top composites were analyzed immediately after sampling. The bottom composites were created based or shown. Depth is indicated relative to Columbia River Datum (CRD).

SSI-IT SEDS

International Terminal Sediment Data Report

Appendix A
Bore Logs

Final

SCHN00206107

Project: International Terminals (IT) Slip

Station: SS-01

Maximum depth of retained sediment: 12.0 ft

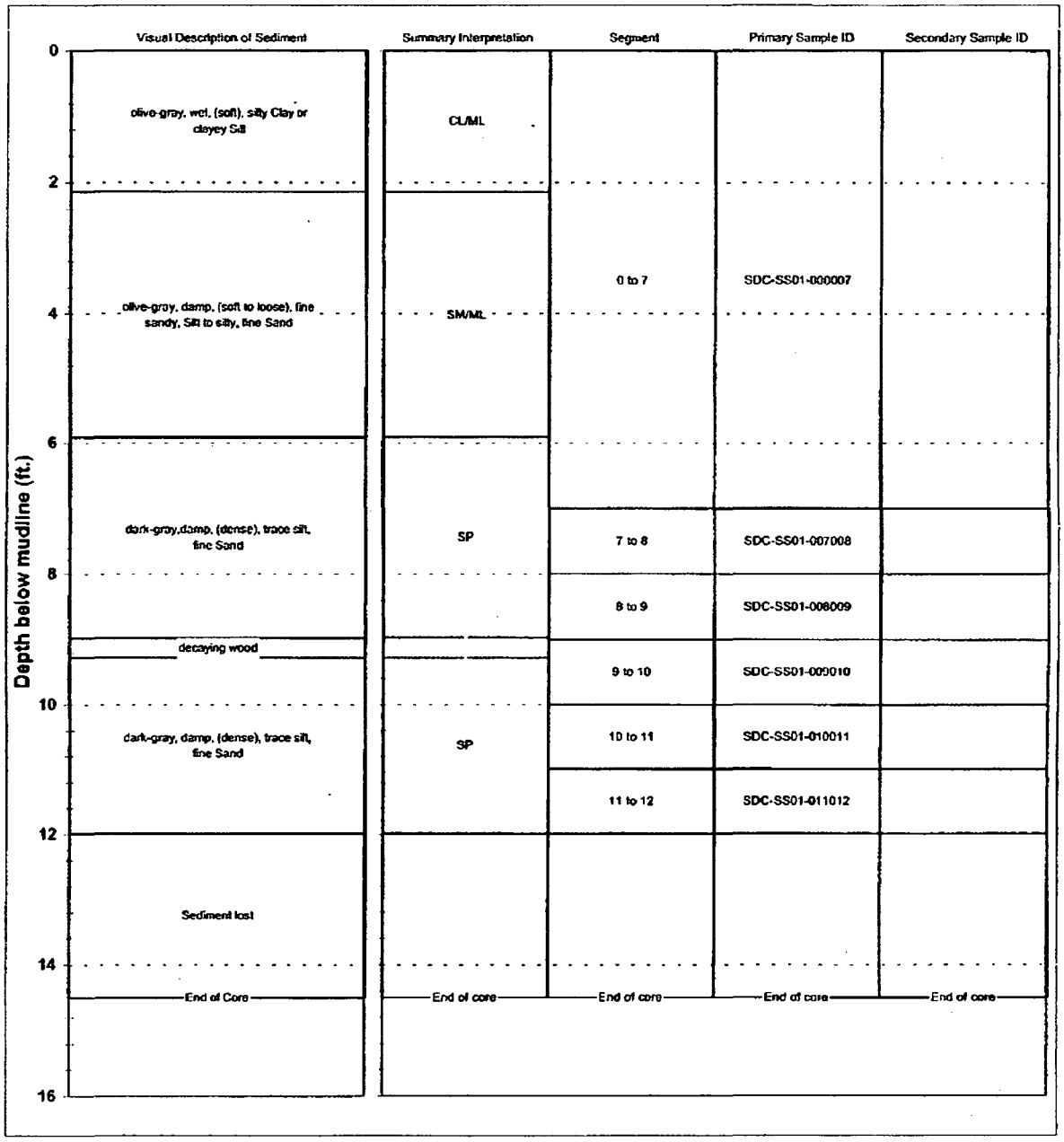
Mudline elevation: -31.1 ft CRD

Percent recovery (on-deck): 70%

	Core collection	Laboratory processing
Date:	3/12/03	3/12/03
Time:	13:40	15:16

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



SCHN00206108

Project: International Terminals (IT) Slip

Station: SS-02

Maximum depth of retained sediment: 20.8 ft

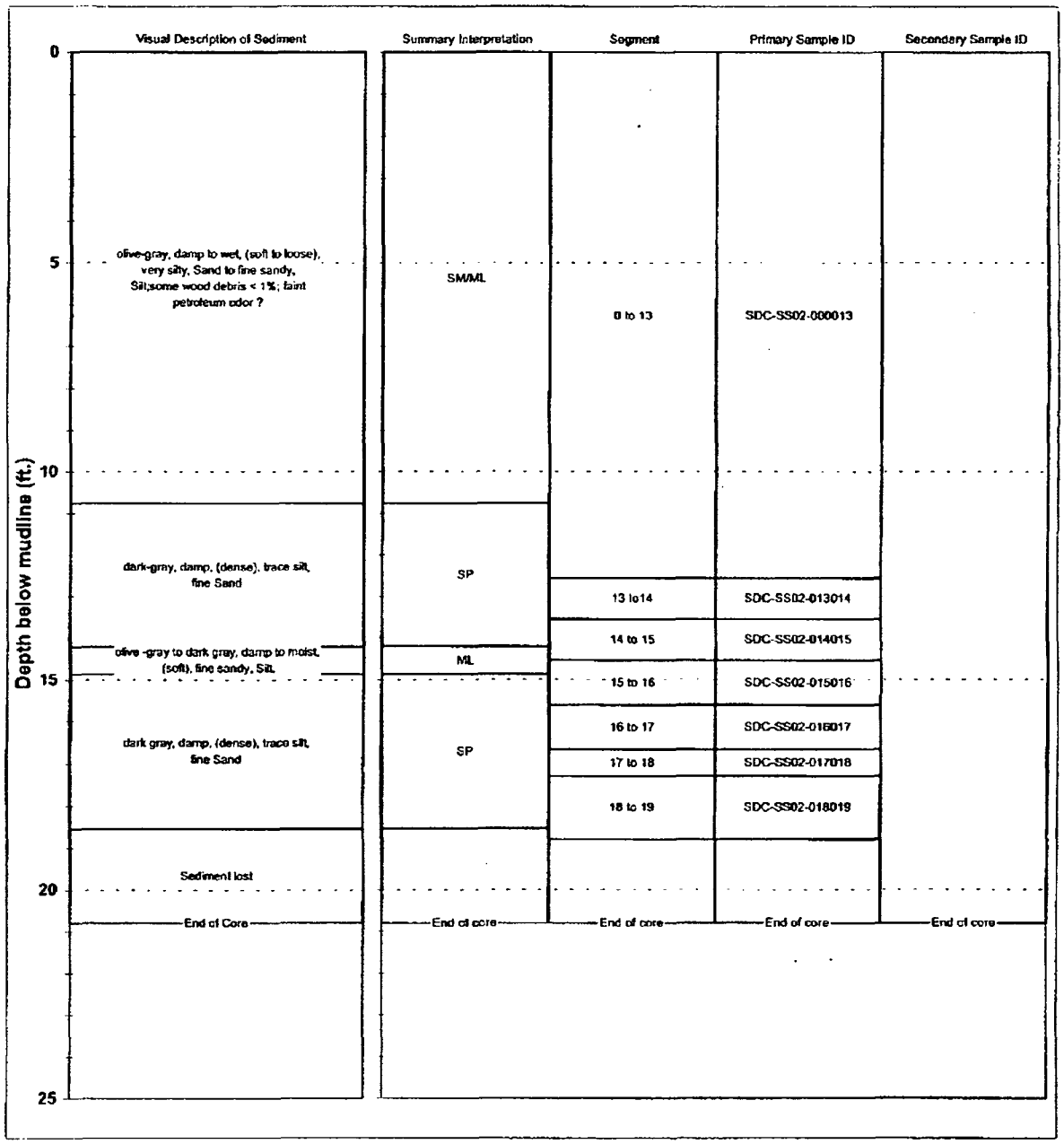
Mudline elevation: -23.4 ft CRD

Percent recovery (on-deck): 65%

	Core collection	Laboratory processing
Date:	3/12/03	3/12/03
Time:	14:54	16:45

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



SCHN00206109

Project: International Terminals (IT) Slip

Station: SS-03R2

Mudline elevation: -40.4 ft CRD

Maximum depth of retained sediment: 7.0 ft
Percent recovery (on-deck): 54%

	Core collection	Laboratory processing
Date:	3/12/03	3/12/03
Time:	10:37	12:45

Field Log: Tom Cammarata
Summary Log: Rob Gilmour

Visual Description of Sediment	Summary Interpretation	Segment	Primary Sample ID	Secondary Sample ID
dark-gray, (soft), damp to wet, fine sandy Silt; faint petroleum odor ?	ML	0 to 1	SDC-SS03R2-000001	
		1 to 2	SDC-SS03R2-001002	
		2 to 3	SDC-SS03R2-002003	
		3 to 4	SDC-SS03R2-003004	
dark-gray, (dense), damp to moist, trace silt, fine Sand	SP	4 to 5	SDC-SS03R2-004005	
		5 to 6	SDC-SS03R2-005006	
Sediment lost				
End of Core	End of core	End of core	End of core	End of core

Depth below mudline (ft.): 0, 2, 4, 6, 8, 10, 12, 14

SCHN00206110

Project: International Terminals (IT) Slip

Station: SS-04

Maximum depth of retained sediment: 8.0 ft

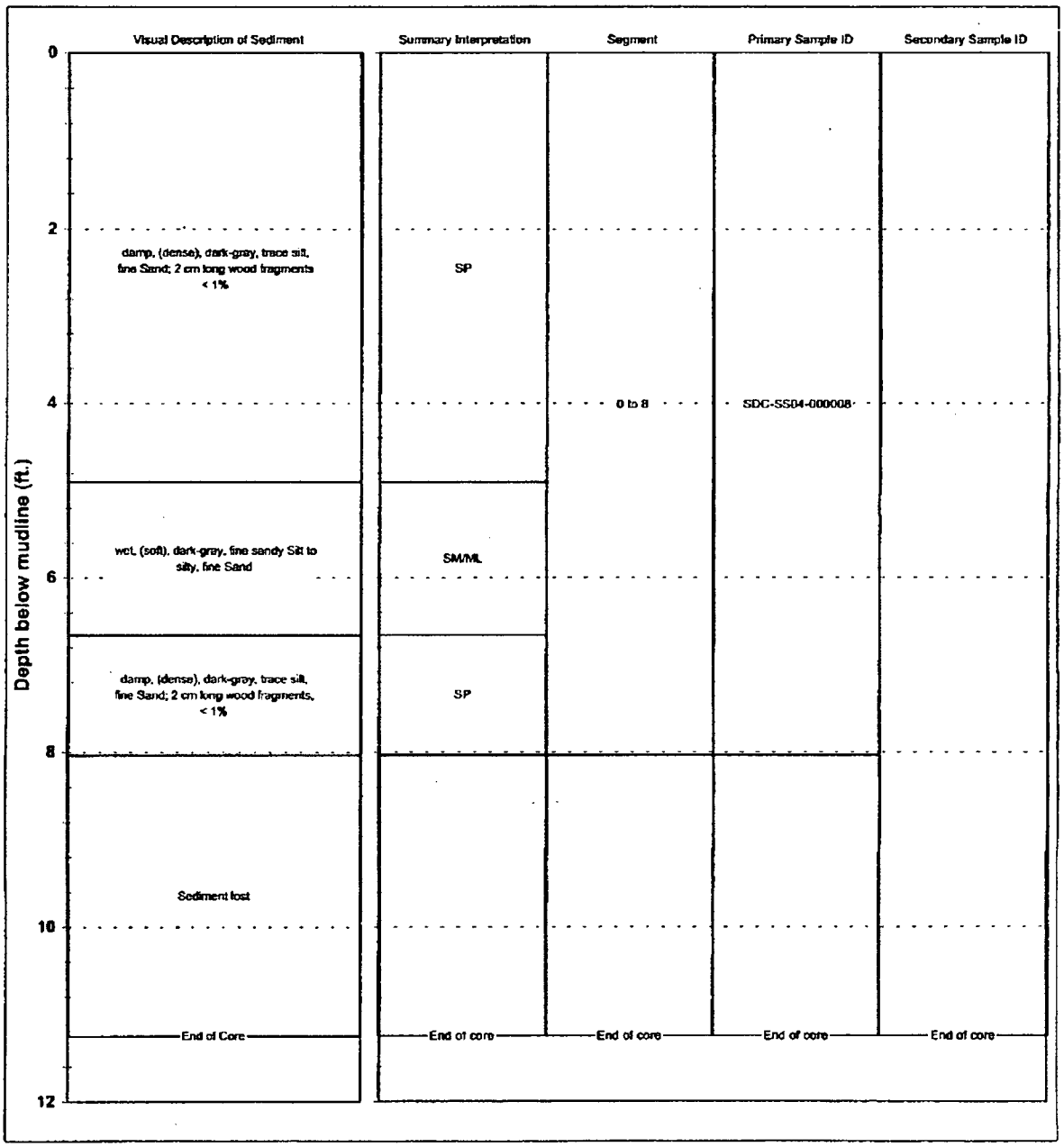
Mudline elevation: -29.5 ft CRD

Percent recovery (on-deck): 55%

	Core collection	Laboratory processing
Date:	3/11/03	3/11/03
Time:	12:37	14:21

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



SCHN00206111

Project: International Terminals (IT) Slip

Station: SS-05

Maximum depth of retained sediment: 16.9 ft

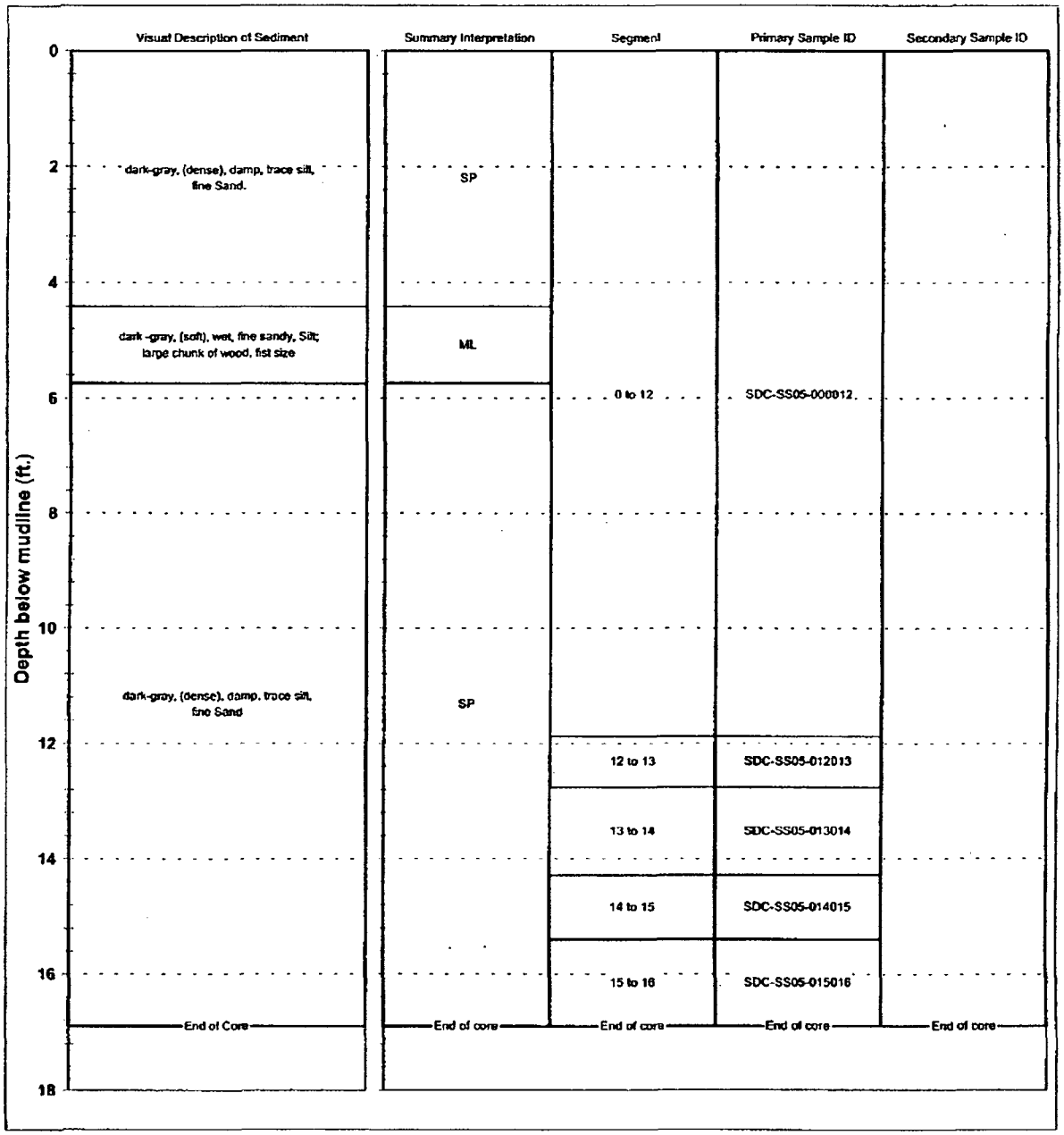
Mudline elevation: -26.5 ft CRD

Percent recovery (on-deck): 65%

	Core collection	Laboratory processing
Date:	3/11/03	3/11/03
Time:	14:33	17:00

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



SCHN00206112

Project: International Terminals (IT) Slip

Station: SS-06

Maximum depth of retained sediment: 12.7 ft

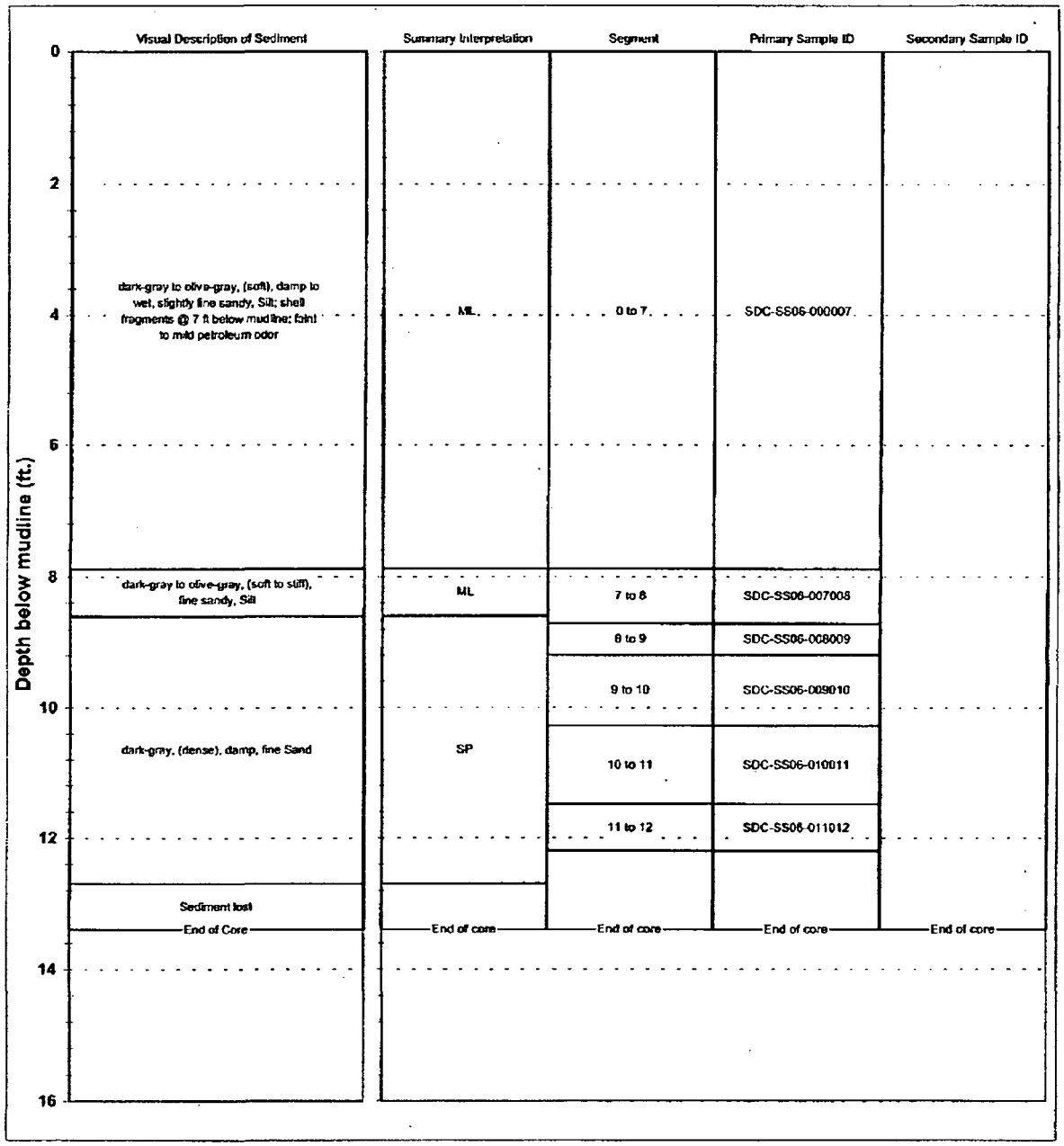
Mudline elevation: -30.6 ft CRD

Percent recovery (on-deck): 82%

	Core collection	Laboratory processing
Date:	3/13/03	3/13/03
Time:	13:29	15:05

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



SCHN00206113

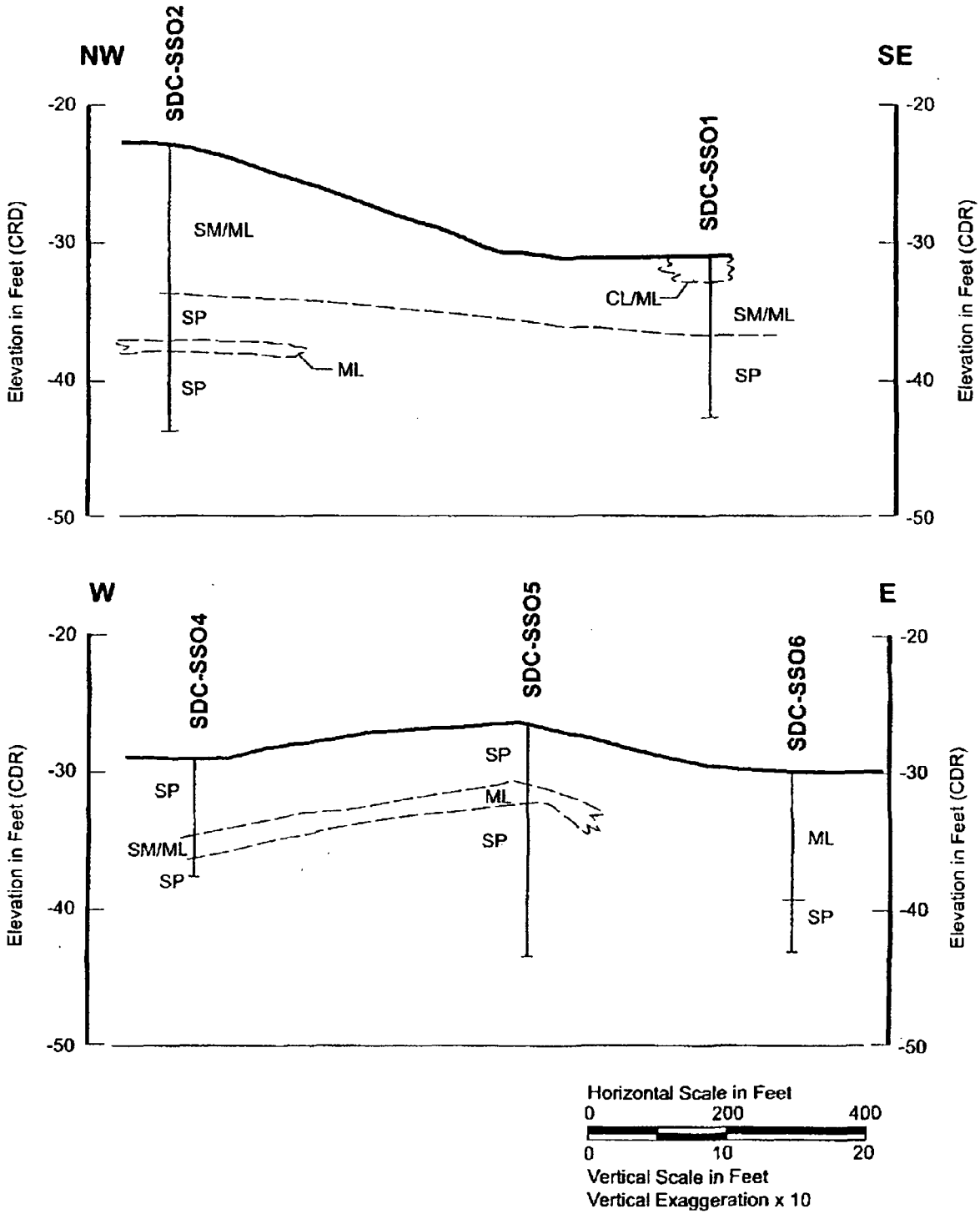
SSI-IT SEDS

International Terminal Sediment Data Report

Appendix B
Cross-Sections

Final

SCHN00206114



Floyd Snider McCarthy Inc.

International Terminal Slip
Portland, Oregon

Figure 1

corel/floydandsnider/TI-SLIP/Section1

SCHN00206115

SSI-IT SEDS

International Terminal Sediment Data Report

Appendix C
Chain of Custody Forms

Final

SCHN00206116

Columbia Analytical Services INC.
An Employee-Owned Company

CHAIN OF CUSTODY

Sediment and Tissue Chemistry

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • FAX (360) 636-1068

PAGE 2

PROJECT NAME: IT-SCIP

PROJECT NUMBER: SSI-ITSEDS.T5

PROJECT MANAGER: Allison Geiselbrecht

COMPANY/ADDRESS: Floyd Snider McCarthy
[illegible] South King St. Seattle, WA 98104

PHONE #: 206-292-2078 FAX #: 206-682-7867

SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	☐ Total Volatile Solids ☑ Total Solids	TOC ☐ (ASTM D4129M) ☑ PSEP	Grain size ☑ PSEP ☐ ASTM D422	Sulfide ☐ Total (9030M) ☐ PSEP ☐ Water Soluble	☐ AVS ☐ SEM (metals list below)	Ammonia ☐ Total (350.1m) ☐ Plumb ☐ Pore water	Metals (list below)	Pesticides (8081-L)	PCBs (8082-L) ☑ Aroclors ☐ Congeners	Semivolatiles ☐ GC/MS SIM (PAH) ☑ 8270-L	Organotins ☐ Bulk ☐ Pore Water ☑ TBT only	Volitiles (8260)	Dioxins ☐ 1613 ☐ 8290	TPH ☐ GRO
[illegible]	[illegible]	[illegible]			4														
[illegible]	[illegible]	[illegible]			4														
[illegible]	[illegible]	[illegible]			4														
[illegible]	[illegible]	[illegible]			4														
[illegible]	[illegible]	[illegible]			3														
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[illegible]	[illegible]	12-16			6	✓	✓	✓				✓		✓	✓	✓			
[illegible]	[illegible]	12-16																	
[illegible]	[illegible]	12-16																	
[illegible]	[illegible]	12-16																	

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

✓ Standard (10-15 working days)

___ Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

SMS Metals: As Cd Cr Cu Pb Hg Ag Zn
CA Metals: Ag As Cd Cr Cu Hg Ni Pb Se Zn Sb
SEM Metals: Cd Cu Pb Hg Ni Zn

SPECIAL INSTRUCTIONS/COMMENTS:

PAH Screening = 5 day turnaround
X [illegible]

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:	
Signature	Date/Time	Signature	Date/Time	Signature	Date/Time
Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

SCHN00206117

Columbia Analytical Services INC
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CHAIN OF CUSTODY

Sediment and Tissue Chemistry

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PROJECT NAME

PROJECT NUMBER

PROJECT MANAGER

COMPANY/ADDRESS

PHONE # | FAX #

SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	☐ Total Volatile Solids ☐ Total Solids	TOC ☐ (ASTM D4129M) ☐ PSEP	Grain size ☐ PSEP ☐ ASTM D422	Sulfide ☐ Total (9030M) ☐ PSEP	☐ AVS ☐ SEM ☐ Water Soluble (metals list below)	Ammonia ☐ Total (350.1m) ☐ Plumb ☐ Pore water	Metals (list below)	Pesticides (8081-L)	PCBs (8082-L) ☐ Aroclors ☐ Congeners	Semivolatiles ☐ GC/MS SIM (PAH) ☐ 8270-L	Organotins ☐ Bulk ☐ Pore Water ☐ TBT only	Volitiles (8260)	Dioxins ☐ 1613 ☐ 8290	TPH ☐ GRO
[illegible]	[illegible]	[illegible]		SED	3														
[illegible]	[illegible]	[illegible]		SED	3														
[illegible]	[illegible]	[illegible]		SED	3														
SDC-502-000013	3/12/03	1645		SED	6	✓	✓	✓				✓		✓	✓				
SDC-502-000014	3/12/03	1645		SED	3														
SDC-502-014015	3/12/03	1645		SED	3														
SDC-502-015016	3/12/03	1645		SED	4														
SDC-502-016017	3/12/03	1645		SED	3														
SDC-502-017018	3/12/03	1645		SED	3														
SDC-502-018019	3/12/03	1645		SED	3														

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

✓ Standard (10-15 working days)

___ Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

SMS Metals: As Cd Cr Cu Pb Hg Ag Zn
CA Metals: Ag As Cd Cr Cu Hg Ni Pb Se Zn
SEM Metals: Cd Cu Pb Hg Ni Zn

SPECIAL INSTRUCTIONS/COMMENTS:

PAH Screening 5-day turnaround

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:	
Signature	Date/Time	Signature	Date/Time	Signature	Date/Time
Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

SCHN00206118

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Sediment and Tissue Chemistry

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PAGE 2

PROJECT NAME: IT - SLIP

PROJECT NUMBER: Allison Reisselbrecht

PROJECT MANAGER: SS - ITSED - TS

COMPANY/ADDRESS: FSM

[illegible] South King St. Seattle, WA 98[illegible]

PHONE #: [illegible]-2[illegible]-2078 FAX #: [illegible]-682-7827

SAMPLER'S SIGNATURE: [signature]

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	☐ Total Volatile Solids ☐ Total Solids	TOC ☐ (ASTM D4129M) ☐ PSEP	Grain size ☐ PSEP ☐ ASTM D422	Sulfide ☐ Total (9030M) ☐ PSEP ☐ Water Soluble	☐ AVS ☐ SEM (metals list below)	Ammonia ☐ Total (350.1m) ☐ Plumb ☐ Pore water	Metals (list below)	Pesticides (8081-L)	PCBs (8082-L) ☐ Aroclors ☐ Congeners	Semivolatiles ☐ GC/MS SIM (PAH) ☐ 8270-L	Organotins ☐ Bulk ☐ Pore Water ☐ TBT only	Volitiles (8260)	Dioxins ☐ 1613 ☐ 8290	TPH ☐ GRO
SDC-SS08-[illegible]	3/1[illegible]	1713		[illegible]	2														
SDC-SS08-[illegible]	13/13	1713		SED	2														
SDC-SS08-006007	3/13	1713		SED	2														
[illegible]	3/13	1713		SED	2														
[illegible]	3/13	1713		SED	2														
[illegible]	3/13	1713		SED	1														

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

___ Standard (10-15 working days)

___ Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

SMS Metals: As Cd Cr Cu Pb Hg Ag Zn

CA Metals: Ag As Cd Cr Cu Hg Ni Pb Se Zn

SEM Metals: Cd Cu Pb Hg Ni Zn

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:	
[signature]	3/14/03 [illegible]	[signature]	3/14/03 1615		
Signature	Date/Time	Signature	Date/Time	Signature	Date/Time
[illegible]	FSM	[illegible]	CAS		
Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

SCHN00206119

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PAGE 1

PROJECT NAME: TT-SLIP

PROJECT NUMBER: 55-ITSED.TS

PROJECT MANAGER: Allison Geiselbrecht

COMPANY/ADDRESS: FSM
83 South King St. Seattle, WA 98004

PHONE #: 206-292-2078 FAX #: 206-682-7627

SAMPLER'S SIGNATURE: [signature]

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	☐ Total Volatile Solids ☑ Total Solids	TOC ☐ (ASTM D4129M) ☑ PSEP	Grain size ☑ PSEP ☐ ASTM D422	Sulfide ☐ Total (9030M) ☐ PSEP ☐ Water Soluble	☐ AVS ☐ SEM (metals list below)	Ammonia ☐ Total (350.1m) ☐ Plumb ☐ Pore water	Metals (list below)	Pesticides (8081-L)	PCBs (8082-L) ☑ Aroclors ☐ Congeners	Semivolatiles ☐ GC/MS SIM (PAH) ☑ 8270-L	Organotins ☐ Bulk ☐ Pore Water ☑ TBT only	Volatiles (8260)	Dioxins ☐ 1613 ☐ 8290	TPH ☐ GPC
SDC-SSC-[illegible]-[illegible]	3/13	1505		SED	6	✓	✓	✓				✓		✓	✓	✓			
SDC-[illegible]-[illegible]	3/13	1505		SED	3														
SDC-SSC-[illegible]	3/13	1505		SED	3														
SDC-SSC-[illegible]	3/13	1505		SED	3														
SDC-SSC-[illegible]	3/13	1505		SED	3														
SDC-SSC-[illegible]	3/13	1505		SED	3														
SDC-SSC-[illegible]	3/13	1713		SED	2														
SDC-SSC-001002	3/13	1713		SED	2														
SDC-SSC-002003	3/13	1713		SED	2														
SDC-SSC-[illegible]	3/13	1713		SED	2														

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

✓ Standard (10-15 working days)

___ Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

SMS Metals: As Cd Cr Cu Pb Hg Ag Zn
CA Metals: Ag As Cd Cr Cu Hg Ni Pb Se (Zn) (Cu)
SEM Metals: Cd Cu Pb Hg Ni Zn

SPECIAL INSTRUCTIONS/COMMENTS:

PALL SCREEN: 5 day turnaround
(X) [illegible]

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:	
[signature]	3/14/03 [illegible]	[signature]	3/14/03 1005		
Signature	Date/Time	Signature	Date/Time	Signature	Date/Time
[illegible]	FSM	A Paynter	CAS		
Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

SCHN00206120

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PAGE 1

PROJECT NAME: IT-SLIP

PROJECT NUMBER: SSI.ITSEDS.T5

PROJECT MANAGER: Allison Geisenhaut

COMPANY/ADDRESS: [illegible]

[illegible] King St, [illegible] WA 98104

PHONE # [illegible]-292-[illegible] FAX # [illegible]-682-[illegible]

SAMPLER'S SIGNATURE: [illegible]

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	☐ Total Volatile Solids ☐ Total Solids	TOC ☐ (ASTM D4129M) ☑ PSEP	Grain size ☑ PSEP ☐ ASTM D422	Sulfide ☐ Total (9030M) ☐ PSEP ☐ Water Soluble	☐ AVS ☐ SEM (metals list below)	Ammonia ☐ Total (350.1m) ☐ Plumb ☐ Pore water	Metals (list below)	Pesticides (8081-L)	PCBs (8082-L) ☐ Aroclors ☐ Congeners	Semivolatiles ☐ GC/MS SIM (PAH) ☐ 8270-L	Organotins ☐ Bulk ☐ Pore Water ☐ TBT only	Volitiles (8260)	Dioxins ☐ 1613 ☐ 8290	TPH ☐ GPC
SDC-[illegible]	3/11	1433		SED	6	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓			
SDC-SS05-[illegible]	3/11	1700		SED	5	✓	✓		✓	✓									
SDC-SS05	3/11	1700		SED	3														
SDC-SS05-013014	3/11	1700		SED	3														
SDC-SS05-014015	3/11	1700		SED	2														
SDC-SS05-015016	3/11	1700		SED	2														

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

✓ Standard (10-15 working days)

___ Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

SMS Metals: As Cd Cr Cu Pb Hg Ag Zn

CA Metals: Ag As Cd Cr Cu Hg Ni Pb Se Zn

SEM Metals: Cd Cu Pb Hg Ni Zn Sb

SPECIAL INSTRUCTIONS/COMMENTS:

(X) = [illegible]

PAH Screening = 5-day turnaround

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:	
Signature	Date/Time	Signature	Date/Time	Signature	Date/Time
Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

SCHN00206121

SSI-IT SEDS

International Terminal Sediment Data Report

Appendix D
Data Validation Report

Final

SCHN00206122

SSI-IT SEDS

DATA VALIDATION REPORT
INTERNATIONAL TERMINALS
SEDIMENT DATA COLLECTION

Prepared for

SCHNITZER STEEL INDUSTRIES, INC

Prepared by

Floyd Snider McCarthy, Inc.
83 South King Street
Suite 614
Seattle, Washington 98104

June 26, 2003

Final

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SCHN00206124

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Table 1 Summary of Qualified Data

SCHN00206127

1.0 INTRODUCTION

Samples were collected between March 11 and 13, 2003 for the International Terminal (IT) Slip Site. Chemical and physical sediment analyses were performed by Columbia Analytical Services, Inc. (CAS) in Kelso, Washington. Conventional parameters such as grain size, total solids and total organic carbon (TOC) were analyzed according to Puget Sound Estuary Program (PSEP) guidelines (PSEP, 1996). Metals were analyzed with USEPA method 200.8, mercury was analyzed with USEPA method 7471, and organometallic compounds were analyzed according to the Krone method (Krone et al. 1989). Organics including PAHs, chlorinated hydrocarbons, phthalates, phenols, and miscellaneous extractables were analyzed with USEPA method 8270C. Pesticides were analyzed with USEPA method 8081, and PCBs with USEPA method 8082 (USEPA, 1986).

A summary data evaluation was performed on the analytical results. Evaluation was performed by Jaana Pietari of Floyd Snider McCarthy, Inc. Quality control objectives in the CAS laboratory Standard Operating Procedures were used as data quality objectives. Data qualifiers are assigned based only on the criteria reviewed, and do not include calibration or instrument performance issues. Results of the data evaluation are presented in sections 2.0 to 10.0, qualified data are summarized in section 11.0, and qualifiers are defined in Section 12.0.

Data validation was performed on the following data:

Sample ID	Lab Code	Sample Date
SDC-SS01-000007	K2301912-013	3/12/2003
SDC-SS02-000013	K2301912-020	3/12/2003
SDC-SS04-000008	K2301912-001	3/11/2003
SCD-SS05-0000012	K2301912-002	3/11/2003
SDC-SS06-000007	K2301951-001	3/13/2003
SDC-SS01-007010C[1]	K2302533-010	3/12/2003
SDC-SS02-015017C[1]	K2302533-013	3/12/2003
SDC-SS03-002004C[1]	K2302533-006	3/12/2003
SDC-SS05-014016C[1]	K2302533-003	3/11/2003
SDC-SS06-008010C[1]	K2302533-016	3/13/2003
SDC-SS01-007008	K2301912-014	3/12/2003
SDC-SS01-010011	K2301912-017	3/12/2003
SDC-SS02-013014	K2301912-021	3/12/2003
SDC-SS02-016017	K2301912-024	3/12/2003
SDC-SS03R2-001002	K2301912-008	3/12/2003
SDC-SS03R2-005006	K2301912-012	3/12/2003

Sample ID	Lab Code	Sample Date
SDC-SS05-012013	K2301912-003	3/11/2003
SDC-SS05-015016	K2301912-006	3/11/2003
SDC-SS06-007008	K2301950-001	3/13/2003
SDC-SS06-010011	K2301950-002	3/13/2003
[1] These samples were composited in the analytical laboratory.		

The table below presents abbreviations and definitions used in this report.

Abbreviation	Definition
DV	Data Validation
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference

2.0 CHAIN OF CUSTODY FORMS-*ACCEPTABLE*

The Chain of Custody (COC) forms were completely and correctly filed and all required signatures were present. Sample names have been correctly transcribed from the COC forms. All analyses have been performed as requested. The pesticide analysis for samples SDC-SS01-000007, SDC-SS02-000013 and SDC-SS06-000007 was not checked in the COC forms although the SAP specified that the analysis was to be performed. The laboratory had performed the analysis for SDC-SS01-000007 and SDC-SS02-000013. Following a written request to CAS, the pesticide analysis for SDC-SS06-000007 was conducted.

3.0 GRAIN SIZE ANALYSES

3.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The PSEP guidelines recommend one triplicate grain size analysis for every 20 samples or per batch, whichever is more frequent. Grain size analyses were performed in triplicate in each analysis batch.

3.2 Extraction and Analysis Holding Times-*Acceptable*

The extraction and holding time analyses for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012 and SDC-SS06-000007 were met. Grain size analyses for SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-

014016C and SDC-SS06-008010C were performed from frozen samples. PSEP guidelines recommend that that samples for this analysis should not be frozen, since freezing and thawing may alter the particle size distribution. However, the sample material was composed of river sand, which is not likely to be affected by freeze and thaw processes. Therefore, using the best professional judgment, these results were not qualified.

3.3 Electronic Data Deliverable (EDD)-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

3.4 Overall Assessment

Laboratory triplicate variability was minimal, and should be considered in control.

4.0 TOTAL SOLIDS ANALYSES

4.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The PSEP guidelines recommend one triplicate total solids analysis for 20 samples or per batch. One duplicate analysis was performed per batch. Since the relative percent differences (RPD) were less than one percent for the duplicate results (see section 4.3), the results are considered valid and are not qualified.

4.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples must be analyzed within 14 days of collection and frozen samples must be analyzed within six months of collection (USACE 1998). All holding time requirements were met.

4.3 Laboratory Duplicate Relative Percent Differences-*Acceptable*

The laboratory has specified that RPDs for duplicate or triplicate results must be less than 40 percent. The RPDs for duplicate analyses was less than one percent.

4.4 Electronic Data Deliverable-*Acceptable*

Total solids results were not reported in the EDD.

4.5 Overall Assessment

Total solids analysis was performed in duplicate instead of the recommended triplicate. However, the variability between the duplicate results was minimal, which indicates that the analysis was in control.

5.0 TOC ANALYSES

5.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

Each analytical batch included a method blank, a matrix spike (MS), and a laboratory control sample (LCS). No matrix spike duplicate (MSD) was run.

5.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples must be analyzed within 14 days of collection and frozen samples must be analyzed within six months of collection (USACE 1998). All holding time requirements were met.

5.3 Reporting Limits-*Acceptable*

The reporting limits specified in the SAP were met.

5.4 Laboratory Blank Results-*Acceptable*

No target analytes were detected in the method blanks.

5.5 Laboratory Control Sample Recoveries (LCS)-*Acceptable*

The CAS-specified acceptable recoveries for TOC in laboratory control samples are between 85 and 115 percent. All LCS recoveries were within the limits.

5.6 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

The CAS-specified acceptable MS recoveries for TOC are between 75 and 125 percent. All MS recoveries were within the limits. No MSD samples were analyzed.

5.7 Laboratory Triplicate Relative Percent Differences-*Acceptable*

Laboratory has specified that RPDs for duplicate or triplicate results must be less than 40 percent. The RPD for triplicate TOC analyses were two percent or less than one percent.

5.8 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

5.9 Overall Assessment

All LCS and MS recoveries were within control limits, demonstrating that method accuracy was in control. The laboratory triplicate variability was minimal, which indicates the analysis method was in control.

6.0 METALS ANALYSES

6.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, duplicate, and laboratory control sample.

6.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples must be analyzed within six months of collection for metals analyzed by inductively coupled plasma (ICP) emission spectrometry and within 28 days of collection for mercury analysis. All holding times were met.

6.3 Reporting Limits-*Acceptable*

Reporting limits were slightly elevated to meet requirements specified in the SAP. Metals, except for mercury, were analyzed from samples that were diluted by a factor of five. The reporting limits in the SAP are for soil, and do not take into account the moisture content of the sediments, and therefore are acceptable.

6.4 Laboratory Blank Results-*Acceptable*

No target analytes were detected in the method blanks in concentrations greater than the method reporting limits (MRL).

6.5 Laboratory Control Sample Recoveries-*Acceptable*

All LCS recoveries were within the laboratory's control limits.

6.6 Matrix Spike Recoveries-*Acceptable*

All MS recoveries were within the laboratory's control limits except for antimony. The MS recoveries for antimony were 27 percent or 39 percent while laboratory's control limits for antimony are between 70 and 130 percent. Since the MS recoveries were low and no post-digestion spike was added to the samples, the associated sample results (antimony in SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012, SDC-SS06-000007, SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C) were qualified as "J"

6.7 Laboratory Duplicate Relative Percent Differences-*Acceptable*

The laboratory has specified that RPDs for duplicate or triplicate results must be less than 40 percent. The RPDs for duplicate samples were less than 40 percent for all analytes except for antimony for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012 and SDC-SS06-000007. The RPD for antimony was 64 percent. The associated antimony results for the samples were previously qualified as "J" (Section 6.6), therefore, no additional qualifiers were assigned.

For samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C, the RDPs for antimony, silver, and mercury were 200 percent, 50 percent and 200 percent, respectively. Both results for mercury were less than the MRL. The results for silver were 0.03 and 0.02 mg/kg while the MRL was 0.02 mg/kg. The results for antimony were 0.06 and 0.05 mg/kg while the MRL was 0.05. Since the results were either less than or near the MRLs, they are not qualified.

6.8 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

6.9 Overall Assessment

All LCS and the majority of MS were within control limits, demonstrating in-control method accuracy. Duplicate variability was minimal, except for antimony. Therefore, the analysis method should be considered in control.

The metals data qualifiers are summarized in Section 12.0 of this report.

7.0 ORGANICS ANALYSES

7.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, matrix spike duplicate, laboratory control sample and laboratory control sample duplicate.

7.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples should be extracted within 14 days of collection and frozen samples within one year of collection. Extracted samples should be analyzed within 40 days of extraction. All holding time requirements were met.

7.3 Reporting Limits-*Acceptable*

Most samples met the reporting limit requirements specified in the SAP. The reporting limits were slightly elevated for SDS-SS01-000007 for all compounds and elevated by a factor of five

for bis(2-ethylhexyl)phthalate (1100 µg/kg versus 200 µg/kg specified in the SAP). Sample SDC-SS02-000013 was analyzed from a sample diluted by a factor of 10, and therefore, the reporting limits were elevated.

7.4 Laboratory Blank Results-*Acceptable*

No target analytes were recovered in the method blanks for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012 and SDC-SS06-000007. Di-n-butylphthalate was detected at concentrations greater than the MRL at 12 µg/kg in method blanks associated with samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, and SDC-SS06-008010C. Since di-n-butylphthalate was not detected in these samples, the results were not qualified.

7.5 Surrogate Recoveries-*Acceptable*

Laboratory-specified surrogate recovery limits for 2-fluorophenol, phenol-d6, nitrobenzene-d5, 2-fluorobiphenyl, 2,4,6-tribromophenol, p-terphenyl-d14 are 38-110 percent, 43-128 percent, 30-139 percent, 37-126 percent, 38-157 percent and 54-158 percent, respectively. The surrogate recoveries for most samples were within the control limits. Recoveries for 2-fluorophenol, nitrobenzene-d5 and 2-fluorobiphenyl were 28 percent, 22 percent and 18 percent, respectively in sample SDC-SS03R2-002004. Recovery for 2-fluorobiphenyl in sample SDC-SS06-008010 was 30 percent. These samples were re-extracted and reanalyzed, but they produced similar results due to matrix interferences. The original results are reported. Since two surrogates within the base/neutral fraction were out of specification in SDC-SS03R2-002004, all compounds in the base/neutral fraction for this sample are qualified. The associated results for 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, benzyl alcohol, 1,2,4-trichlorobenzene, naphthalene, hexachlorobutadiene, 2-methylnaphthalene, acenaphthylene, dimethylphthalate, acenaphthene, dibenzofuran, fluorene, diethyl phthalate, N-nitrosophenylamine, hexachlorobenzene, phenanthrene, anthracene, di-n-butylphthalate, fluoranthene, pyrene, butyl benzyl phthalate, benz(a)anthracene, chrysene, di-n-octylphtalate, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeo(1,2,3-c,d)pyrene, dbenz(a,h)anthracene and benzo(g,h,i)perylene are qualified as "UJ". The result for bis(2-ethylhexyl)phthalate is qualified as "J".

Recoveries for 2-fluorophenol and 2-fluorobiphenyl for sample SDC-SS05-014016C were also outside the control limits. The sample was also re-extracted and reanalyzed and surrogate recoveries met the control criteria. The results from reanalysis are reported.

7.6 Laboratory Control Sample Recoveries-*Acceptable*

LCS and LCS duplicate samples were all within the laboratory-specified control limits. The RPD for LCS and LCS duplicate was less than 40 percent, which is the laboratory's upper limit for RPD.

7.7 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

Laboratory-specified MS and MSD recoveries for phenol, 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, acenaphthene, pentachlorophenol and pyrene are 17-163 percent, 25-106 percent, 47-106 percent, 54-111 percent, 29-136 percent and 53-136 percent, respectively. The MS and MSD recoveries for all compounds except for pyrene were within the control limits for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007. MS and MSD recoveries for pyrene were 137 percent and 204 percent, respectively.

The MS and MSD recoveries for 1,4-dichlorobenzene were 6 and 5 percent, respectively, and for 1,2,4-trichlorobenzene 22 and 20 percent, respectively, for samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C.

The results were not qualified based on the MS and MSD recoveries.

7.8 MS and MSD Relative Percent Differences-*Acceptable*

The RPD for MS and MSD for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007 for all compounds except for 1,4-dichlorobenzene were less than 40 percent, which is the laboratory's upper limit for RPD. The results were not qualified based on the RPD.

The RPD for 1,4-dichlorobenzene was 54 percent. The RPDs for the MS and MSD for the remaining samples were within the laboratory control limits.

7.9 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

7.10 Overall Assessment

All LCS and the majority of MS, MSD, and surrogate recoveries were within control limits, demonstrating that method accuracy was in control.

Organics data qualifiers are summarized in Section 12.0 of this report.

8.0 PESTICIDE ANALYSES

8.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, matrix spike duplicate, and laboratory control sample.

8.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples should be extracted within 14 days of collection and frozen samples within one year of collection. The extracted samples should be analyzed within 40 days of extraction. All holding time requirements were met. For re-extraction and re-analysis of DDT, a frozen sample was used for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012 and SDC-SS06-000007. Pesticides were analyzed from a frozen sample for SDC-SS06-000007.

8.3 Reporting Limits-*Acceptable*

Reporting limits for some analytes were slightly elevated due to matrix interferences for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012 and SDC-SS06-000007. Reporting limits for DDT re-analysis ranged from 3.4 to 6.3 µg/kg versus 1.0 µg/kg. (The reporting limit specified in the SAP is 1.0 µg/kg.) Reporting limits for sample SDC-SS02-015017C were slightly elevated. Reporting limits for the remaining samples were within the requirements specified in the SAP.

8.4 Laboratory Blank Results-*Acceptable*

During the initial analysis of samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007, DDT was found in the method blank at concentrations greater than the MRL and therefore DDT results were not reported. No other target analytes were found in the method blank. The samples were re-extracted and reanalyzed for DDT. During the re-analysis, no target analytes were found in the method blank. No target analytes were found in the method blanks for the remaining samples.

8.5 Surrogate Recoveries-*Acceptable*

Laboratory-specified surrogate recoveries for tetrachloro-m-xylene and decachlorobiphenyl are 48-119 percent and 48-136 percent, respectively. Surrogate recoveries for all samples were within the control limits.

8.6 Laboratory Control Sample Recoveries-*Acceptable*

LCS recoveries were all within the laboratory specified control limits.

8.7 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

Laboratory specified MS and MSD recoveries for DDT, DDD, DDE, Aldrin, alpha-Chlordane, Dieldrin, gamma-BHC and Heptachlor are 16-175 percent, 30-170 percent, 12-197 percent, 28-155 percent, 21-161 percent, 14-183 percent, 48-138 percent and 32-142 percent, respectively. The MS and MSD recoveries for all samples were within the control limits. The limits did not apply to alpha-Chlordane, gamma-BHC and DDT due to matrix interferences in samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 and SDC-SS05-0000012. For sample

SDC-SS06-000007, the limits did not apply to alpha-Chlordane and DDE due to matrix interferences.

8.8 MS and MSD Relative Percent Differences-*Acceptable*

RPDs for MS and MSD for all compounds were within the laboratory-specified control limit.

8.9 Sample Confirmation

The pesticide analysis was conducted with a dual column setup. The laboratory has specified a confirmation comparison criterion of 40 percent, which is the upper limit for differences between results from the two columns. The confirmation comparison criterion was exceeded for Aldrin in sample SDC-SS01-000007 and for DDE in samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008. The result reported by the laboratory was the greater of the two values. The analyte results in samples that exceeded the confirmation criterion were qualified as "P" by the laboratory. These results should be considered estimates and are qualified as "J. Also, the criterion was exceeded for DDD in SDC-SS05-0000012. However, the analyte was less than the MRL and was qualified as "J" by the laboratory.

8.10 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

8.11 Overall Assessment

All LCS, MS, MSD and surrogate recoveries were within control limits, demonstrating that method accuracy was in control. Sample confirmation criteria were met for most of the analytes.

Pesticide data qualifiers are summarized in Section 12.0 of this report.

9.0 PCB ANALYSES

9.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, matrix spike duplicate and laboratory control sample.

9.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples should be extracted within 14 days of collection and frozen samples within one year of collection. The extracted samples should be analyzed within 40 days of extraction. All holding time requirements were met.

9.3 Reporting Limits-*Acceptable*

Reporting limits for some samples were elevated slightly compared to those specified in the SAP. However, the reporting limits in the SAP are for soil, and do not take into account the moisture content of the sediments, and therefore are acceptable.

9.4 Laboratory Blank Results-*Acceptable*

No target analytes were recovered in the method blanks.

9.5 Surrogate Recoveries-*Acceptable*

The laboratory-specified surrogate recovery for decachlorobiphenyl is 57-149 percent. Most surrogate recoveries were within the control limits. The decachlorobiphenyl surrogate recovery for sample SDC-SS05-014016C exceeded the laboratory control limits. The sample was re-extracted and reanalyzed. The surrogate recoveries for the reanalyzed sample were all within the control limits. The laboratory reported results from the reanalysis.

9.6 Laboratory Control Sample Recoveries-*Acceptable*

LCS recoveries were all within the laboratory specified control limits.

9.7 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

Laboratory specified MS and MSD recoveries for Aroclor 1016 and Aroclor 1260 are 31-147 percent and 29–163 percent. The MS and MSD recoveries for most samples were within the control limits. MS recoveries for Aroclor 1016 and 1260 and MSD recovery for Aroclor 1016 in sample SDC-SS06-000007 were outside the control limits (applicable to samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007). The MS recovery for Aroclor 1016 and 1260 were 159 percent and 165 percent, and the MSD recovery for Aroclor 1016 was 148 percent. The results were not qualified based on the MS and MSD recoveries.

9.8 MS and MSD Relative Percent Differences-*Acceptable*

RPDs for MS and MSD for all compounds were within the laboratory-specified control limits.

9.9 Sample Confirmation

The sample confirmation criterion of 40 percent was exceeded for Aroclor 1254 in sample SDC-SS02-000013. The associated sample result is qualified as "J"

9.10 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

9.11 Overall Assessment

All LCS and surrogate recoveries and most MS and MSD recoveries were within control limits, demonstrating that method accuracy was in control. Sample confirmation criterion was met for most samples and analytes.

PCB data qualifiers are summarized in Section 12.0 of this report.

10.0 ORGANOTINS

10.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, matrix spike duplicate and laboratory control sample.

10.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples should be analyzed within 14 days of sample collection. The sample holding times were exceeded for SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 and SDC-SS05-0000012. Initially, these samples were extracted and analyzed within the holding time requirements. However, re-extraction exceeded the holding time requirement by two days. The laboratory reported the initial results and re-extraction results. The initial results were rejected (see Section 10.4) despite the holding time exceedance. Due to the stability of these compounds, the holding time exceedance should not have a significant impact on the results.

Samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C were analyzed from frozen samples. PSEP guidelines do not specify whether frozen samples can be used for this analysis. Due to the stability of these compounds, it is judged that the results are valid and are not qualified.

10.3 Reporting Limits-*Acceptable*

Reporting limits requirements specified in the SAP for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007 were met except for the initial analysis of tri-n-butyltin from sample SDC-SS01-000007.

Reporting limits for samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C were slightly elevated compared to those specified in the SAP. The reporting limits in the SAP are for soil, and do not take into account the moisture content of the sediments, and therefore are acceptable.

10.4 Laboratory Blank Results-*Acceptable*

Analytes were not recovered from the laboratory blank. However, the surrogate recovery in the method blank for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007 was 3 percent, which is greater than the laboratory's control limits for tri-n-propyltin (22-113 percent). Samples were re-extracted and analyzed. No analytes were recovered in the method blank, and the surrogate recovery in the method blank was within laboratory's control limits. Original results were reported for SDC-SS06-000007 while original results and results from re-analysis were reported for SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 and SDC-SS05-0000012. The original results for SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 and SDC-SS05-0000012 were rejected in favor of the more accurate results.

The surrogate recovery in the method blank for samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C was 17 percent, which was also less than the laboratory control limits. Samples were not re-extracted because no analytes were recovered in the samples. The associated results for tetra-n-butyltin, tri-n-butyltin, di-n-butyltin and n-butyltin for these samples were qualified as "UJ".

10.5 Surrogate Recoveries-*Acceptable*

Laboratory-specified surrogate recovery for tri-n-propyltin is 22-113 percent. Surrogate recoveries were within the control limits in all samples.

10.6 Laboratory Control Sample Recoveries-*Acceptable*

LCS recoveries were all within the laboratory-specified control limits.

10.7 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

Laboratory-specified MS and MSD recoveries for tetra-n-butyltin, tri-n-butyltin, di-n-butyltin and n-butyltin are 25-125 percent, 12- 138 percent, 10-155 percent and 10-99 percent, respectively. During the initial analysis the MS and MSD recoveries were within control limits for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007. Recoveries for all MSD compounds were greater than the control criteria for a Batch Quality Control sample for the analysis of the re-extracted samples. The sediment sample that received the matrix spikes was not one of the samples collected in this study.

MS and MSD recoveries for tetra-n-butyltin were 21 percent, and for n-butyltin 2 and 6 percent, respectively, for samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C. The laboratory suspected matrix interferences with these samples. No results were qualified based on the MS and MSD recoveries.

10.8 MS and MSD Relative Percent Differences-*Acceptable*

RPDs for MS and MSD for all compounds were within the laboratory-specified control limits for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007

RPD for MS and MSD for n-butyltin was 115 percent, which is greater than the laboratory specified control limit for samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C. No results were qualified based on the MS and MSD RPDs.

10.9 Sample Confirmation

The organotin analysis was conducted with a dual column setup. The laboratory has specified a confirmation comparison criterion of 40 percent, which is the upper limit for differences between results from the two columns. The confirmation comparison criterion was exceeded for di-n-butyltin in samples SDC-SS04-000008 and in SDC-SS02-000013 during the initial analysis. The greater of the two values is reported, and the results for SDC-SS02-000013 were qualified by the laboratory as "P". The results for SDC-SS04-000008 were not qualified by the laboratory. For this report, the results for these two samples are not qualified since the results are rejected.

10.10 Electronic Data Deliverable-*Acceptable*

If the results were correctly transcribed in the EDD, approximately 10 percent of the samples were checked. No discrepancies were noted.

10.11 Overall Assessment

All LCS, surrogate and most MS and MSD recoveries met the control criteria, demonstrating that method accuracy was in control.

11.0 PAHS

The following samples were analyzed for PAHs: SDC-SS01-007008, SDC-SS01-010011, SDC-SS02-013014, SDC-SS02-016017, SDC-SS03R2-001002, SDC-SS03R2-005006, SDC-SS05-012013, SDC-SS05-015016, SDC-SS06-007008 and SDC-SS06-010011.

11.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, matrix spike duplicate, laboratory control sample and laboratory control sample duplicate.

11.2 Extraction and Analysis Holding Times- *Acceptable*

Refrigerated samples should be extracted within 14 days of collection and frozen samples within one year of collection. Extracted samples should be analyzed within 40 days of extraction. All holding time requirements were met.

11.3 Reporting Limits-*Acceptable*

All samples met the reporting limit requirements specified in the SAP.

11.4 Laboratory Blank Results-*Acceptable*

No target analytes were recovered in the method blanks.

11.5 Surrogate Recoveries-*Acceptable*

Laboratory-specified surrogate recovery limits for biphenyl-d10, fluorene-d10, fluoranthene-d10 and p-terphenyl-d14 are 39-99 percent, 43-98 percent, 52-108 percent and 54-158 percent, respectively. The surrogate recoveries for all samples were within the control limits.

11.6 Laboratory Control Sample Recoveries-*Acceptable*

LCS and LCS duplicate recoveries were all within laboratory-specified control limits.

11.7 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

The MS and MSD recoveries for all compounds were within laboratory-specified control limits.

11.8 MS and MSD Relative Percent Differences-*Acceptable*

RPDs for indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene and benzo(g,h,I)perylene in samples SDC-SS06-007008 and SDC-SS06-010011 were greater than the laboratory-specified control limit of 40 percent. Their respective RPDs were 41 percent, 43 percent and 43 percent. RPDs for other compounds in these two samples were generally greater than 30 percent. The RPDs for the remaining samples were within the laboratory-specified control limit.

11.9 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

11.10 Overall Assessment

All LCS, surrogate, MS and MSD recoveries were within control limits, demonstrating that method accuracy was in control.

12.0 SUMMARY OF QUALIFIED DATA

Table 1 (attached) presents data qualifiers assigned during the data validation process. Table 1a presents definitions of those qualifiers.

13.0 REFERENCES

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Table 1 Summary of Qualified Data			
Sample ID	**Analyte**	**DV Qualifier**	**Qualifier Reason**
SDC-SS01-000007	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS02-000013	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS04-000008	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS05-0000012	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS06-000007	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS01-007010C	Antimony	UJ	Low MS recovery, no post-digestion spike
SDC-SS02-015017C	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS3R2-002004C	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS05-014016C	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS06-008010C	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS01-000007	Aldrin	J	Sample confirmation criterion exceeded
SDC-SS01-000007	DDE	J	Sample confirmation criterion exceeded
SDC-SS02-000013	DDE	J	Sample confirmation criterion exceeded
SDC-SS04-000008	DDE	J	Sample confirmation criterion exceeded
SDC-SS02-000013	Aroclor 1254	J	Sample confirmation criterion exceeded
SDC-SS01-000007	Tetra-n-butyltin	R1	More accurate result
SDC-SS01-000007	Tri-n-butyltin	R1	More accurate result
SDC-SS01-000007	di-n-butyltin	R1	More accurate result
SDC-SS01-000007	n-butyltin	R1	More accurate result
SDC-SS02-000013	Tetra-n-butyltin	R1	More accurate result
SDC-SS02-000013	Tri-n-butyltin	R1	More accurate result
SDC-SS02-000013	di-n-butyltin	R1	More accurate result
SDC-SS02-000013	n-butyltin	R1	More accurate result
SDC-SS04-000008	Tetra-n-butyltin	R1	More accurate result
SDC-SS04-000008	Tri-n-butyltin	R1	More accurate result
SDC-SS04-000008	di-n-butyltin	R1	More accurate result
SDC-SS04-000008	n-butyltin	R1	More accurate result
SDC-SS05-0000012	Tetra-n-butyltin	R1	More accurate result
SDC-SS05-0000012	Tri-n-butyltin	R1	More accurate result

Table 1 Summary of Qualified Data			
Sample ID	**Analyte**	**DV Qualifier**	**Qualifier Reason**
SDC-SS05-0000012	di-n-butyltin	R1	More accurate result
SDC-SS05-0000012	n-butyltin	R1	More accurate result
SDC-SS01-007010C	Tetra-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS01-007010C	Tri-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS01-007010C	di-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS01-007010C	n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS02-015017C	Tetra-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS02-015017C	Tri-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS02-015017C	di-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS02-015017C	n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS03R2-002004C	Tetra-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS03R2-002004C	Tri-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS03R2-002004C	di-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS03R2-002004C	n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS05-014016C	Tetra-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS05-014016C	Tri-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS05-014016C	di-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS05-014016C	n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS06-008010C	Tetra-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS06-008010C	Tri-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS06-008010C	di-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS06-008010C	n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS03R2-002004C	1,3-dichlorobenzene	UJ	Surrogate recovery
SDC-SS03R2-002004C	1,4-dichlorobenzene	UJ	Surrogate recovery
SDC-SS03R2-002004C	1,2-dichlorobenzene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benzyl alcohol	UJ	Surrogate recovery
SDC-SS03R2-002004C	Hexachloroethane	UJ	Surrogate recovery
SDC-SS03R2-002004C	1,2,4-trichlorobenzene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Naphthalene	UJ	Surrogate recovery

Table 1 Summary of Qualified Data			
Sample ID	**Analyte**	**DV Qualifier**	**Qualifier Reason**
SDC-SS03R2-002004C	Hexachlorobutadiene	UJ	Surrogate recovery
SDC-SS03R2-002004C	2-methylnaphthalene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Acenaphthylene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Dimethyl phthalate	UJ	Surrogate recovery
SDC-SS03R2-002004C	Acenaphthene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Dibenzofuran	UJ	Surrogate recovery
SDC-SS03R2-002004C	Fluorene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Diethyl phthalate	UJ	Surrogate recovery
SDC-SS03R2-002004C	N-nitrosophenylamine	UJ	Surrogate recovery
SDC-SS03R2-002004C	Hexachlorobenzene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Phenanthrene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Anthracene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Di-n-butyl phthalate	UJ	Surrogate recovery
SDC-SS03R2-002004C	Fluoranthene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Pyrene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Butyl benzyl phthalate	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benz(a)anthracene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Chrysene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Di-n-octyl phthalate	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benzo(b)fluoranthene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benzo(k)fluoranthene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benzo(a)pyrene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Indeno(1,2,3-c,d)pyrene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Dibenz(a,h)anthracene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benzo(g,h,i)perylene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Bis(2-ethylhexyl)phthalate	J	Surrogate recovery

Table 1a Qualifiers and Definitions	
DV Qualifier	**Definition**
U	The material was analyzed for, but was not detected at levels greater than the level of the associated value.
UM	Indicates an analyte that was not detected, and where a matrix effect was present.
J	The associated value is an estimate.
UJ	The material was analyzed for, but was not detected at levels greater than the level of the associated value. The quantitation limit is approximate and may or may not represent the actual limit of quantitation.
R1	This sample result has been rejected in favor of a more accurate and/or precise result. The other result should be used.

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Environmental Site Assessment for Portland Container

9449 North Burgard Way
Portland, Oregon

Prepared for

Schnitzer Investment Corp.
The Prudential Insurance Company of America

OCTOBER 8, 1996

CH2M HILL

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SCHN00206304

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Purpose and Scope of Environmental Site Assessment

Purpose of Environmental Site Assessment

This report presents the results of the environmental site assessment performed for the Schnitzer Investment Corporation (SIC) Portland Container (subject property) site located at 9449 North Burgard Way in Portland, Oregon (Figure 1). This report has been prepared for SIC and The Prudential Insurance Company of America (Prudential) for the consideration of the proposed loan between SIC and Prudential.

Scope of Environmental Site Assessment

The scope of the environmental assessment is based on the requirements of the Standard Practice for Environmental Site Assessment: Phase I Environmental Assessment Process. This document is presented in Appendix A. The primary elements of the scope of work for the environmental assessment are the following:

- Assess and review the site history and property ownership
- Perform a regulatory agency database search
- Review regulatory agency files
- Perform a reconnaissance of the site and surrounding area

This report presents the results of the above tasks and discusses the anticipated nature and extent of environmental concerns associated with the subject property based on the task findings. CH2M HILL performed the environmental assessment by identifying potential past or current activities on or near the subject properties that may have led to the release of hazardous substances or hazardous materials onto the subject properties (as used herein, the term *hazardous substance* includes hazardous materials).

It was beyond the scope of services for this environmental assessment to identify concerns associated with the offsite management of solid or hazardous substances and wastes originating from the subject property and being managed at the time of this environmental site assessment more than 1 mile from the subject property, unless these instances were discovered incidentally during the performance of this scope of work.

Limitations of Environmental Site Assessment

This environmental site assessment has been performed and this report has been prepared for the exclusive use of SIC and Prudential. The services provided by CH2M HILL have been rendered in a manner consistent with the level of skill and care ordinarily exercised by members of the profession currently practicing under similar conditions.

CH2M HILL has relied upon the information provided by several sources who were not contracted by CH2M HILL in the preparation of this report. Reasonable and appropriate attempts were made to verify the information provided by these sources. CH2M HILL cannot guarantee the accuracy of the information provided by these sources that could not be reasonably and appropriately verified.

This report is not a legal representation or legal interpretation of environmental laws, rules, regulations, or policies of local, state, or federal governmental agencies.

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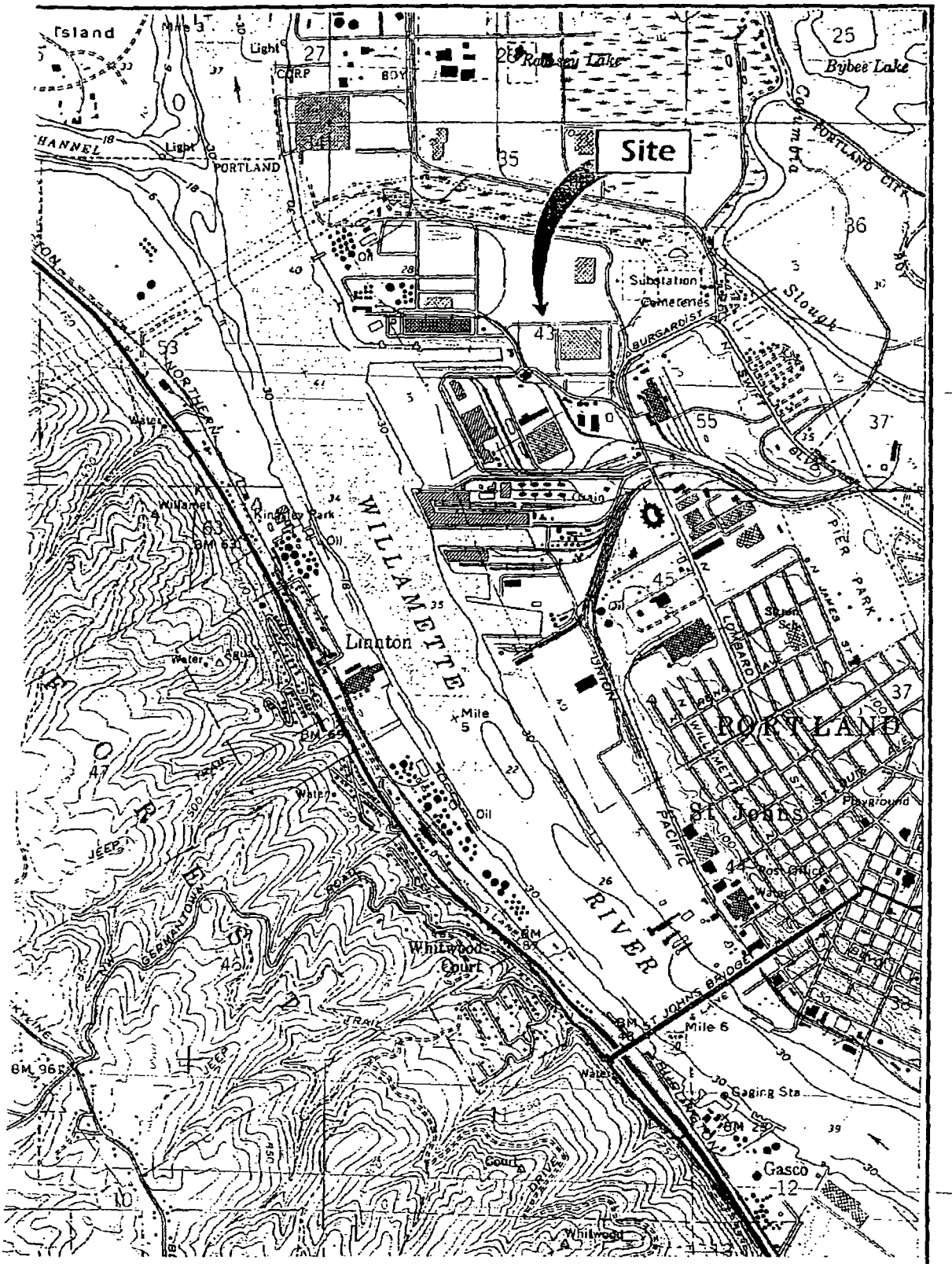

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FIGURE 1

Site Location Map

PORTLAND CONTAINER SITE
9449 N. BURGARD WAY
SCHNITZER INVESTMENT CORP., PORTLAND, OREGON

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No investigation is thorough enough to exclude the presence of hazardous substances at a given location. If hazardous substances or hazardous conditions have not been identified during the assessment, such a finding should not be construed as a guarantee of the absence of such substances or conditions.

Any opinions or recommendations presented herein apply to the environmental conditions existing at the time services were performed. CH2M HILL is unable to report on, or accurately predict, events that may change site conditions after the described services are performed, whether those events occur naturally or are caused by external forces. CH2M HILL assumes no responsibility for conditions the firm is not authorized to investigate or conditions that CH2M HILL determined did not have an environmental impact at the time the services were performed or contained within the scope of the environmental assessment specified above.

Site Location and Surrounding Property Uses

The Portland Container SIC property is located at 9449 North Burgard Way in Portland, Oregon (Figure 1). The land around the subject property is used for industrial purposes, and some land is undeveloped.

The subject property is bounded by the following:

- To the northeast:
  - Crown Beverage—adjacent to the subject property
- To the north:
  - Vacant land and Romar Transportation Systems, Incorporated (Romar)— adjacent to the subject property
- To the west and northwest:
  - Schnitzer Steel Products Co. railroad tracks and storage area for large pipe and metal—adjacent to the subject property
  - Morgan CFS No. 2 Company—approximately 800 feet west at 9445 North Burgard Way
- To the southwest:
  - Jefferson Smurfit Corporation Container Corporation of America (Jefferson Smurfit CCA)—approximately 300 feet of the subject property
  - A loading inlet of the Willamette River—approximately 600 feet from the subject property
- To the south:
  - North Burgard Way—adjacent to the subject property

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- Schnitzer Steel Products Co. (Terminal Gate No. 5) scrap metal recycling—approximately 100 feet from the subject property across North Burgard Way

- To the southeast:
  - Ryerson Steel's metal fabricating warehouse and office—approximately 100 feet from the subject property across North Burgard Way

To the east:

- Vacant land being used to store concrete pipe with Northwest Pipe & Casing Company (NPAC) labels—adjacent to the subject property

The subject property consists of an approximate 5,600-square-foot, two-story office and shop building and gravel-surfaced parking lot used for intermodal container storage on a parcel of land totaling approximately 11.7 acres. The building was constructed in 1995 and the site is essentially flat.

According to information for an adjacent site, subsurface soil in the area consists of sand to a depth of approximately 16 feet below the ground surface (bgs). Below the sand there are zones of silt and fine sands to approximately 40 feet bgs. Reportedly this area was filled by material excavated from the loading inlet to the Willamette River south of the subject property.

The building on the subject property receives potable water and sewer service from the City of Portland. The closest water supply well is located approximately 600 feet north from the subject property, and is used for irrigation only. The well was drilled to a depth of about 200 feet bgs.

Current Site Condition and Use

Figure 2 shows the current layout of the Portland Container site. The site is being used for handling, storage, and maintenance of intermodal containers and intermodal container chassis. The current tenant is Portland Container and there are approximately 10 to 12 employees at the site, not including truck drivers who deliver and pick up intermodal containers throughout the day.

Site and Adjacent Properties History

The history of the Portland Container site was assessed by reviewing available aerial photographs, previous environmental assessment reports, and interviews with persons familiar with the site history. Sanborn Fire Insurance maps and city directories were not available for the subject property.

Property Ownership Since 1940

The subject property ownership since 1940 was determined by reviewing a summary title report provided by SIC. A copy of the title report for this property is provided in Appendix B. Based on the title report, the subject property has been owned by SIC since 1972.

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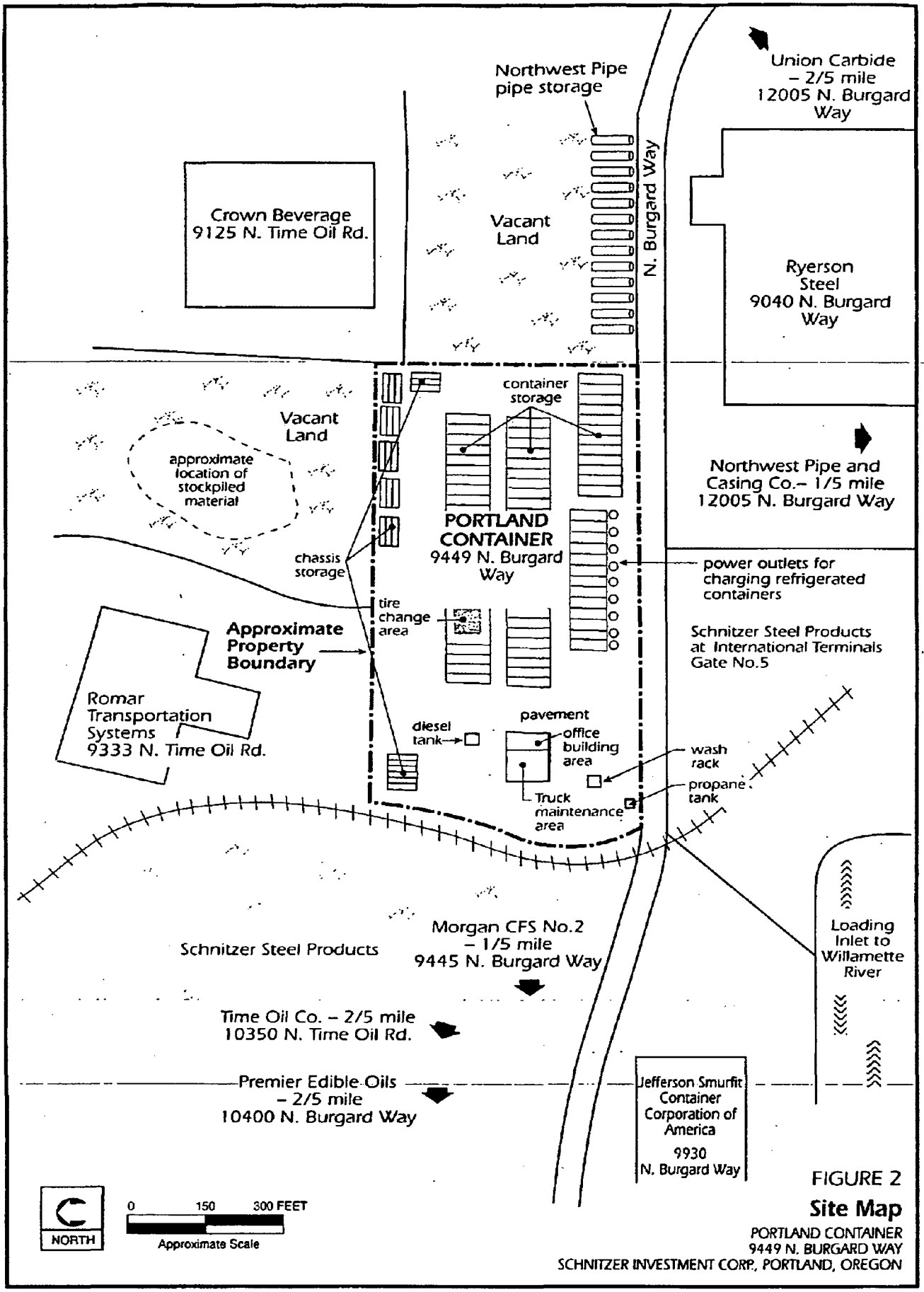

FIGURE 2

Site Map

PORTLAND CONTAINER
9449 N. BURGARD WAY
SCHNITZER INVESTMENT CORP., PORTLAND, OREGON

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Since the early 1940s the land has been owned by individuals, Oregon Shipbuilding Corporation, Broadway Holding Company, and Dulien Steel Products, Inc.

Property and Adjacent Property Use Since 1940

The history of the Portland Container site was assessed by reviewing aerial photographs taken in 1940, 1944, 1956, 1961, 1967, 1973, 1978, 1980, 1986, 1991, and 1995 (Appendix C). The aerial photograph from 1940 showed that the subject property and the surrounding areas were all undeveloped.

According to an account written by Julia Osborn, a woman living in the area during the war, the entire area to the west, south, and east of the subject property was dominated by the Oregon Shipyard, the leading shipyard in the country at that time, with 330 acres of land and 30,000 employees. The entire process of building ships, from the delivery of raw materials to the ship launch, took place in the area. The materials stored and used by the shipyard included lumber, steel, rope, electric cable, copper, brass tubing, metal casings, and scrap paper. The operations included the outfitting of the ships in the outfitting docks to the southwest of the subject property, as seen in the southwest corner of the 1944 aerial photograph. Other operations areas included the salvage yard, plate shop, and gadget shop (for fabrication and assembly of small parts). The subject property and adjacent areas were used as part of the production or materials storage area.

The 1944 aerial photograph showed the subject property and adjacent property was used for dormitories for employees working at the World War II shipyards. The building currently used by Jefferson Smurfit CCA and the loading inlet of the Willamette River are shown on the 1944 aerial photograph.

In the 1956 aerial photograph, the subject property and most of the adjacent property is vacant and the storage areas and dormitories for the shipbuilding workers have been removed. Some parts of the dormitories are still present. There are what appear to be metal pipes stored on vacant land south of the subject property adjacent to some of the vacant buildings used by the shipyard. The building currently used by Jefferson Smurfit CCA and the loading inlet of the Willamette River are shown on the 1956 aerial photograph.

In the 1961, 1967, and 1973 aerial photographs, the subject property and most of the adjacent property to the west, north, and east is vacant. A log storage yard has been developed by 1973 on property approximately 100 feet to the south of the subject property. The building currently used by Jefferson Smurfit CCA and the loading inlet of the Willamette River are shown on the 1961, 1967, and 1973 aerial photographs. A storage area for barrels was developed by 1967 approximately 300 feet southwest of the subject property and immediately east of the building used by Jefferson Smurfit CCA.

In the 1978, 1980, 1986, and 1991 aerial photographs, the subject property is mostly vacant and used for storage of pipe and metal for recycling. The building to the northeast of the subject property that is now used by Crown Beverage, appears on the 1980 aerial photograph. Most of the log storage yard, approximately 100 feet to the south of the subject property and shown on the 1973 aerial photograph, was removed by 1978 and was replaced by Metra Steel (a predecessor to Ryerson Steel), which is shown in the 1986 aerial photograph.

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In the 1980 aerial photograph, the area immediately to the north of the subject property contains piles of fill material that was likely dredged from the inlet. This fill material is partially on the north side of the subject property and is also being used to fill the Ryerson Steel area. Railroad tracks currently used by Schnitzer Steel Products Co. appear on the 1978 aerial photograph and are located west and immediately adjacent from the subject property. Storage areas for pipe and metal for recycling have been developed on both sides of these railroad tracks according to the 1980 aerial photograph. There are approximately 15 items that appear to be tanks stored on the north end of the storage area on the west side of the railroad tracks. These storage areas were no longer active by the time the 1986 aerial photograph was taken, but are active again in the 1991 aerial photograph. The building and storage area currently used by Jefferson Smurfit CCA and the loading inlet of the Willamette River are shown on the 1978, 1980, 1986, and 1991 aerial photographs.

The 1995 aerial photograph shows the building constructed on the subject property, gravel spread on the parking areas, and the site being used by Portland Container. The storage area for pipe and metal recycling on the west side of the Schnitzer Steel Products Co. railroad tracks has been expanded to the north to include intermodal container storage in the area where the 15 apparent tanks were located in 1991. The area immediately adjacent to the north is vacant and the Romar building has been constructed. The building and storage area currently used by Jefferson Smurfit CCA, the loading inlet of the Willamette River, Ryerson Steel, and Schnitzer Steel Products Co. Terminal Gate No. 5 recycling operations are shown on the 1995 aerial photographs.

Based on the Owner/Occupant Questionnaire (Appendix D), and an interview with Linda Wakefield of SIC, the site was developed by SIC in 1995 and has been used by Portland Container for handling, storage, and maintenance of intermodal containers and intermodal container chassis. There were no underground storage tanks (USTs) on the subject property.

The subject property is part of an area that was filled with dredged sediment in the early 1940s, when the loading inlet to the Willamette River was constructed. According to Don Carpenter with SIC, the Portland Container site was built at grade.

Wetlands Designations Onsite

Wetlands, as indicated by the U.S. Fish and Wildlife Service National Wetland Inventory Map or the Oregon Division of State Lands Wetland Database are not present on the Portland Container site. Although a detailed wetlands survey was not performed, no obvious evidence of potential wetlands (for example, ponded water or swampy areas) was observed on the subject property.

Regulatory Agency Database Search

CH2M HILL contracted with Environmental Data Resources, Inc. (EDR) and SAFE Research, Inc. (SAFE) to perform database searches of U.S. Environmental Protection Agency (EPA) and Oregon Department of Environmental Quality (DEQ) records. The following databases were reviewed:

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- Databases searched to within 1 mile of the subject property:
  - EPA National Priorities List (NPL)
  - EPA Resource Conservation and Recovery Information System (RCRIS) (search for Resource Conservation and Recovery Act [RCRA] treatment, storage, and disposal facilities)
  - DEQ Environmental Cleanup Information System (ECSIS)
  - DEQ Confirmed Release List (CRL)
- Databases searched to within ½ mile of the subject property:
  - EPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
  - DEQ Closure and Regular Solid Waste Active Disposal Permits
  - DEQ Leaking Underground Storage Tanks (LUSTs)
- Databases searched to within ¼ mile of the subject property:
  - DEQ USTs
  - EPA RCRIS (search for RCRA small-quantity generators)
  - EPA RCRIS (search for RCRA large-quantity generators)
- Databases searched for the subject property:
  - EPA Emergency Response Notification System (ERNS)
  - Oregon State Fire Marshal
  - Local Fire Department

Results of the database review that are discussed below represent combined information from the EDR and SAFE reports. Because the EDR and SAFE listings are based on the reported company's street address, the feature(s) of concern on a property may be closer to or farther from the subject property, depending on the actual layout. Several sites had old addresses on North Burgard Road and have been assigned new addresses on North Burgard Way or North Time Oil Road.

After reviewing the EDR and SAFE reports, CH2M HILL observed inconsistencies and inaccuracies in the reporting of facility locations and distances. CH2M HILL has corrected, when possible, the inaccurate distances using historical aerial photographs and information gathered during the site reconnaissance. Therefore, some location and distance discrepancies may be noted between the sites and distances listed below and those in the EDR and SAFE reports (provided in Appendix E).

Subject Property

The subject property is not listed in any of the above lists.

EPA NPL Sites

The NPL is EPA's database of uncontrolled or abandoned hazardous waste sites identified for remedial action under the Superfund program.

No NPL sites were found within 1 mile of the subject property.

EPA CERCLIS List

The CERCLIS list is a compilation by the EPA of sites that the agency has investigated or is currently investigating for a release or threatened release of hazardous substances pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS.

There were no sites listed on CERCLIS within 1 mile of the subject property.

EPA RCRIS List

RCRIS identifies selected information on sites that generate, transport, treat, or dispose of hazardous waste. The database review revealed that there are five small-quantity generators (SQGs) and one large-quantity generator (LQG). An SQG generates between 100 and 1,000 kilograms per month (kg/mo) of hazardous waste or less than 1 kg/mo of acutely hazardous waste. An LQG generates greater than 1,000 kg/mo of hazardous waste or greater than 1 kg/mo of acutely hazardous waste.

The listed SQGs and LQG are as follows.

- There is one SQG northwest of the subject property: Time Oil Company (Time Oil)—approximately ⅗ mile at 10350 North Time Oil Road (the database record incorrectly stated the address as 12005 North Burgard Street).
- There are two sites southeast of the subject property:
  - Northwest Pipe & Casing Company is an SQG—approximately ⅕ mile at 12005 North Burgard Road.
  - Northwest Container Services is an LQG—approximately ⅗ mile at 11920 North Burgard Road.
- There is one SQG south of the subject property: Schnitzer Steel Products Co. (Terminal Gate No. 5)—approximately 100 feet across North Burgard Way (the street address in the database record is 12005 North Burgard Street, which is not consistent with the site's physical location).
- There is one SQG southwest of the subject property: Jefferson Smurfit Container Corporation of America—approximately 300 feet across North Burgard Way at 9930 North Burgard Way (the street address in the database record is 12005 North Burgard Street, which is not correct).

- There is one SQG west of the subject property: Premier Edible Oils Corporation (Premier Edible Oils)—approximately 3/5 mile at 10400 North Burgard Way (the database record incorrectly stated the address as 12005 North Burgard Street).

Oregon Steel Mills, located 3/4 mile northwest of the subject property at 14400 North Rivergate Boulevard, is listed in the EPA Corrective Action Report (CORRACTS). CORRACTS identifies hazardous waste handlers with RCRA corrective action activity. According to database records there have been nine RCRA compliance violations between 1984 and 1994. The reported waste codes at the Oregon Steel Mills site are D001, D006, D008, D039, K061, D007, D005, D035, F001, and F018.

DEQ ECSIS List

ECSIS is DEQ's equivalent to CERCLIS and sites listed in ECSIS may or may not be listed in CERCLIS. The database contains sites in Oregon with contamination or potential contamination from hazardous substances. These sites have been evaluated in the past, are currently being evaluated, or will be evaluated in the future. ECSIS is used only to track the status of a site. The database review revealed a total of 14 sites within 1 mile of the Portland Container site. The listed sites follow.

- There are three sites east of the subject property:
  - Time Oil Company—3/5 mile east at 10350 North Time Oil Road (the database record address of 12005 North Burgard Street is incorrect; the correct address is 10350 North Time Oil Road)
  - Northwest Pipe & Casing Company—1/5 mile east at 12005 North Burgard Road
  - Union Carbide Corporation (Union Carbide)—3/5 mile east at 11920 North Burgard Road
- There are six sites between 1/2 and 1 mile southeast of the subject property.
- There are three sites within 1 mile southwest of the subject property.
- There is one site northwest of the subject property: Union Chemical Division—1/5 mile northwest at 14025 North Rivergate Boulevard.
- There is one site 4/5 mile north of the subject property.

DEQ CRL

The CRL is DEQ's list of sites with confirmed releases of hazardous substances. There are a total of three sites within 1 mile of the subject property with CRL records. The listed sites are as follows.

- There are three sites southeast of the subject property:
  - Chemcentral Corporation—approximately 3/5 mile at 10821 North Lombard Street
  - Toyota Motor Sales—approximately 9/10 mile at 10400 North Lombard Street
  - St. John's Landfill—approximately 1 mile at 9363 North Columbia Boulevard

DEQ LUST List

LUST records contain an inventory of reported leaking underground storage tank (LUST) incidents. There is a total of 13 sites within ¼ to ½ mile of the subject property with LUST records. The listed sites follow.

- There were no LUST sites within ⅛ mile of the subject property.
- There are five sites southeast of the subject property:
  - Port of Portland, Terminal 4—approximately ⅖ mile at 11040 North Lombard St.; 3 records
  - Vehicle Processors—approximately ⅖ mile at 11040 North Lombard St.
  - Harris Transportation—approximately ⅖ mile at 11640 North Lombard St.; 2 records
  - Chemcentral Corporation—approximately ⅗ mile at 10821 North Lombard St.;
  - KLIX Corporation—approximately ⅗ mile at 10771 North Lombard Road; 2 records
- There are three sites northwest of the subject property:
  - Ash Grove Cement Company—approximately ⅕ mile at 13939 North Rivergate Road
  - Steinfield's Products Company (Steinfeld's)—approximately ½ mile at 10001 North Rivergate Road
  - Oregon Steel Mills—14400 North Rivergate Road (the plotted location of this site is inconsistent with its physical location, which is approximately 1 mile from the subject property)
- There is one site east of the subject property: Hawkeye Construction—approximately ⅕ mile at 12005 North Burgard Road (this site was not listed in the EDR or SAFE reports for Portland Container but was identified from the Crown Beverage Building report).

DEQ UST List

A review of the UST database revealed that there are six UST sites within ¼ mile of the subject property. The listed sites follow.

- There is one site south of the subject property: Schnitzer Steel Products Company (Terminal Gate No. 5—International Terminals)—approximately 100 feet across North Burgard Way (the street address in the database record is 12005 North Burgard, which is not consistent with the site's physical location).
- There are two sites southeast of the subject property:
  - Northwest Pipe & Casing Company—approximately ⅕ mile at 12005 North Burgard Road

- Harris Transportation—approximately ¼ mile at 11640 North Lombard St.

- There are two sites northwest of the subject property:
  - Time Oil Company—approximately ⅖ mile at 10350 North Time Oil Road (the database record incorrectly stated the address as 12005 North Burgard Street).
  - Steinfield's Products Company—approximately ½ mile at 10001 North Rivergate Boulevard (this site was not listed in the EDR and SAFE reports for Portland Container, but was identified in the Crown Beverage Building EDR report).
- There is one site east of the subject property: Hawkeye Construction—approximately ⅕ mile at 12005 North Burgard Road.

Oregon State Fire Marshal

The Oregon State Fire Marshal's office was contacted to determine whether the subject property or any adjacent sites are reported under Sections 302, 312, and 313 of the Superfund Amendments and Reauthorization Act (SARA) Title III—Emergency Planning and Community Right-to-Know Act (EPCRA). Section 302 requires any facility that produces, uses, or stores any of the substances on EPA's List of Extremely Hazardous Substances in a specified quantity equal to or greater than a threshold planning quantity, to notify the state emergency response commission (SERC). Section 312 requires any facilities subject to the Occupational Health and Safety Administration (OSHA) Hazard Communication Standard to submit an emergency and hazardous chemical inventory form to the SERC, the local emergency planning commission (LEPC), and local fire department. Section 313 requires annual reporting of releases of "toxic chemicals" to the environment that occur as a result of normal operations. Eight sites are listed in the Oregon State Fire Marshal's records for the vicinity, as follows:

- Premier Edible Oils Corporation—approximately ⅖ mile west at 10400 North Burgard Way
- Northwest Container Services—approximately ⅖ mile southeast at 11920 North Burgard Road
- Crown Cork & Seal Company Incorporated (Crown Cork & Seal)—approximately 1 mile southeast at 10200 North Lombard Street
- Blickle Company—approximately ½ to 1 mile northwest at 13035 North Rivergate Boulevard
- Ryerson Steel—approximately 100 feet southeast across North Burgard Way at 9040 North Burgard Way
- Jefferson Smurfit CCA—approximately 300 feet west at 9930 North Burgard Way
- Time Oil Company—approximately ⅖ mile northwest at 10350 North Time Oil Road
- Crown Cork & Seal warehouse (also known as Crown Beverage Building)—immediately to the northeast at 9125 North Time Oil Road

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Local Fire Department

The Portland Fire Department was contacted to determine whether USTs or aboveground storage tanks (ASTs) were registered with the local fire department. According to the Portland Fire Department records, there are no registered USTs or ASTs at the subject property.

Summary of Regulatory Agency Database Search

In our opinion, all but three of the sites listed in the databases reviewed are not anticipated to cause an environmental impact to the subject property based on the distance from the subject property and the activities occurring on the properties. The following three sites are considered, based on the distance from the subject property and the activities occurring on the properties as indicated by the database information, to pose a potential threat to the environmental conditions on the subject property:

- Time Oil Company
- Northwest Pipe & Casing Company
- Union Carbide Corporation

Regulatory Agency File Review

To further assess the environmental conditions on the subject property and the potential impact to the subject property from nearby properties, DEQ files for the properties identified above as potentially having caused an impact to the subject property were reviewed. Romar Transportation Systems, Incorporated, was identified through regulatory agency file review as a conditionally exempt SQG of hazardous waste. Romar is located adjacent to the subject property. Reasonable and appropriate inquiry was made to regulatory agencies to determine whether environmental reports pertaining to the subject property had been produced. No environmental reports pertaining to the Portland Container property were identified by a regulatory agency.

Copies of the letters sent to the various regulatory agencies requesting site environmental file information and letter responses from the agencies (if any) are provided in Appendix F. A list and copies of relevant file information reviewed are provided in Appendix G.

A brief description obtained from DEQ files of these sites appears below.

Time Oil Company

Time Oil Company owns and operates a petroleum products storage terminal on approximately 52 acres. The property consists of four parcels, three of which comprise the Northwest Terminal. The Northwest Terminal area is approximately 2,400 feet northwest of the Portland Container site. One parcel is know as the Bell Terminal, contains ASTS, and is located approximately 1,800 feet west of the Portland Container site.

Terminal operations began in the 1953. Koppers Industries Inc. leased tanks from Time Oil Company for pentachlorophenol (PCP) product formulation and storage from 1967 to 1982. Crosby and Overton leased tanks from Time Oil in the 1980s for waste oil storage. An EPA preliminary assessment was performed in 1985. Soil contamination was identified resulting from waste oil handling and PCP blending operations. The site was referred to DEQ for

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further action. Time Oil is located along the east bank of the Willamette River within the 100-year floodplain. The subsurface soil is sand to 16 feet bgs underlain by a zone of silt and fine sand which interbeds to 25 feet bgs. This is underlain by fine sand to at least 40 feet bgs. The site is generally flat.

The groundwater table is found at 13 to 18 feet bgs and generally flows west toward the river. The silt layers represent an aquitard separating the water table from a lower, confined aquifer that maintains a water level of about 20 feet bgs. The aquitard appears to pinch out towards the river. Shallow groundwater exhibits a response to tidal and seasonal fluctuations.

About 290 cubic yards (yd^3) of contaminated soil containing PCPs at concentrations up to 1,820 milligrams per kilogram (mg/kg) were removed from the site in 1985 for offsite disposal. Excavation depths were approximately 2 to 4 feet bgs. The excavation was located to the south of the former PCP warehouse, which is approximately 2,700 feet northwest of the subject property. RCRA land ban restrictions for F027 waste prohibited further offsite disposal after 1985. Further site investigations in 1985 found soil was contaminated with PCP in concentrations up to 116,000 mg/kg. Monitoring wells were installed in 1986 and groundwater was found to be contaminated with PCP concentrations up to 60 milligrams per liter (mg/L). The closest well to the subject property with PCP concentrations is located about 2,600 feet northwest.

Time Oil constructed an onsite slurry bioreactor in 1988 to treat contaminated soil. About 3,000 yd^3 of PCP-contaminated soil were excavated in the same area as the original excavation, to a depth of about 12 beet bgs and were stockpiled onsite in 1989. The slurry bioreactor system was not able to reach the target PCP treatment level of 0.5 mg/kg because of the presence of mineral spirits and related solvents in the PCP formulation, and treatment operations were terminated in 1989. The lowest concentration that could be practically achieved was determined to be 100 mg/kg. The PCP-contaminated soil stockpile remains onsite in a bermed, lined storage area next to the former PCP mixing area. This stockpile is located approximately 2,700 feet northwest from the northwest corner of the Portland Container site. According to a letter from Time Oil dated February 28, 1996, the flood in February 1996 reached the edges of the contaminated soil stockpile, but did not breach the containment.

Time Oil signed a Voluntary Cleanup Agreement (VCA) with DEQ in July 1991. A site visit and detailed report were completed in 1992. It was determined that the stockpiled soil onsite was a listed hazardous waste, and not stored in compliance with RCRA regulations. The project was referred to the DEQ Hazardous Waste section in 1992 for resolution of the RCRA issues. Time Oil prepared a Site Characteristics Report in 1993 and a work plan for additional investigation activities was submitted to the DEQ Hazardous Waste section in December 1993. The DEQ Hazardous Waste section found that the long-term storage and treatment of contaminated stockpiled soil could not be permitted under RCRA regulations. The site was referred back to the Voluntary Cleanup Program (VCP) and Time Oil resubmitted its Intent to Participate in the VCP in August 1994. The issues and areas of concern for a remedial investigation/feasibility study (RI/FS) include the soil stockpile, former PCP mixing area, former waste oil tank area, the tank farm area, and groundwater. Time Oil Company and DEQ met in December 1995 to discuss treatability studies being conducted and the focus of additional site investigation work.

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In 1996, Time Oil reported to DEQ that 27 drums and a 50-yd^3 debris stockpile were discovered in the eastern, undeveloped portion of the Time Oil site. The drums and debris stockpile are located approximately 1,500 feet northwest of the Portland Container site. The drums contain PCP wastes and are located in surface depressions that contain standing water. Some of the drums are partly or completely submerged in water or partly buried in soil. Some of the drums have corrosion holes and some have been partially crushed. The debris stockpile contains PCP concentrations up to 800 mg/kg, total petroleum hydrocarbons as diesel up to 900 mg/kg, and metals. Time Oil plans to consolidate the debris stockpile into other hazardous waste management areas and remove the drums for offsite disposal. In June 1996, DEQ issued a comment letter on Time Oil's removal plan that directed a revised removal plan be submitted and required further investigation in the eastern portion of the Time Oil site. An announcement in the September 10, 1996, edition of the *Daily Journal of Commerce* indicated that Time Oil signed another VCA to conduct a comprehensive site investigation and evaluate appropriate cleanup measures for PCP and other hazardous substances.

Based on the file review and the fact that the nearest contaminated soil area is 1,500 feet generally downgradient to the Portland Container site, the Time Oil site is not anticipated to impact the Portland Container site.

Romar Transportation Systems, Incorporated

Romar Transportation Systems, Incorporated is registered as a conditionally exempt small-quantity generator (CEG) of hazardous waste. Romar is a CEG of silicon dioxide and ammonium hydroxide (<12 percent ammonia). No other information was contained in the file.

Northwest Pipe & Casing Company

Northwest Pipe and Casing Company is a manufacturer of both steel and stainless steel pipe used for water transport, including potable water, irrigation water, hydroelectric water and wastewater. NPAC has been in operation at this 26-acre site since 1982. Previously, the facility was operated by Beall Pipe and Tank and L. B. Foster. The site has been used for a variety of industrial purposes since at least 1937.

Northwest Pipe & Casing Company conducted its own investigation of the site in 1989. Petroleum hydrocarbons, chlorinated solvents, PCBs, and polycyclic aromatic hydrocarbons (PAHs) were discovered in soil. A leaking UST caused localized groundwater contamination. NPAC agreed to investigate and cleanup under a voluntary agreement, but did not always follow DEQ's recommendations on how to conduct investigation and cleanup. Approximately 1,900 yd^3 of contaminated soil was excavated in 1989 and disposed at the St. Johns Landfill in 1989 and 1990. The LUST was removed in 1989. Monitoring wells were installed prior to 1990 and analytical results from 1990 showed benzene up to 4 µg/L, ethylbenzene up to 3 µg/L, and xylene up to 18 µg/L.

Based on the activities reported on the NPAC site and the fact that the NPAC site is located ⅕ mile cross gradient from the subject property, the NPAC site is not anticipated to impact the environmental conditions at the Portland Container site.

Union Carbide Corporation

According to the DEQ, Union Carbide Corporation is an inactive metals facility that produced calcium carbide and magnesium alloys on a parcel of land that was about 84 acres in size. The carbide furnace was converted to ferro-alloy production in 1974. Union Carbide operated at the site from 1942 to 1981. Union Carbide sold the property to Elkem Metals Company in 1981. A predecessor company to what is now Oregon Steel Mills purchased the property from Elkem Metals in 1983. In 1987 Oregon Steel Mills sold 10 acres to Donald Chappell, who subsequently sold 5 acres to Mt. Hood Metals Company in 1988. Currently there are three intermodal container storage companies and Mt. Hood Metals, which conducts scrap metal consolidation and salvage activities, operating at the site.

During the time Union Carbide operated the facility, the property was divided into two operations, the plant complex and the sludge pond. The sludge pond is located approximately ½ mile southeast of Portland Container. Waste streams deposited into the sludge pond included scrubber sludge and wastewater and baghouse waste. During a field investigation in 1989, materials deposited into the settling pond were reported to contain manganese oxide, silicon dioxide, calcium dioxide, magnesium oxide, benzene, chloroform, naphthalene, toluene, phenols, tetrachloroethene, and 13 mg/kg cyanide. Two PCB transformers were removed from the site in 1983 and found to contain PCBs at levels of 160 mg/kg and 28 mg/kg. Though the discharge to the settling pond was the subject of numerous complaints and a notice of compliance violation, a 1982 RCRA inspection determined that the sludge in the settling pond was nonhazardous under RCRA regulations. In addition, no release to groundwater was determined and no further action was recommended.

Based on the activities reported on the Union Carbide site and the fact that the Union Carbide site is located ⅕ mile cross gradient from the subject property, the Union Carbide site is not anticipated to impact the environmental conditions at the Portland Container site.

Summary of Regulatory Agency File Review

In our opinion, Time Oil Company, Romar Transportation Systems, Incorporated, Northwest Pipe & Casing Company, and Union Carbide Corporation are not anticipated to cause an environmental impact to the subject property.

SIC File Review

Reasonable and appropriate inquiry was made to SIC and representatives of tenants at the subject property to determine whether environmental reports pertaining to the subject property had been produced. Several files pertaining to the subject property were provided by SIC. There were also files for Romar Transportation Systems, Incorporated, which is a nearby property.

Subject Property

Environmental file information regarding the Portland Container site was provided by SIC and reviewed as part of the environmental site assessment. The file information generally consisted of environmental site assessments and a report on polychlorinated biphenyl

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(PCB) remediation. Specific reports and documents reviewed, with the conclusions presented in the report, are summarized below:

- Environmental Management Solutions. "Level I Environmental Site Assessment of Real Property located at the IT Terminal in North Portland, Oregon." October 1991. The report states the following conclusions:
  - *"Visual observations of soil staining on the surface of the subject property would serve to suggest at least the presence of slight amounts of hazardous substances. There is also potential for hazardous substance contamination as a result of historical usage of the neighboring properties for heavy industrial manufacturing and wartime shipbuilding purposes."*
  - *"In addition, current and past practices involving the storage of scrap railroad tank and box cars, in addition to used large diameter piping and used steel storage tanks used for the storage of various substances, pose a risk of contamination from residual chemicals that may have leaked from these containers."*
  - *"Further investigation, including soil sampling, would be necessary to determine the nature and extent of any hazardous substance contamination."*
- Environmental Management Solutions. "Field Sampling Report for IT Terminal Property." January 1992. This report covers an area that includes Portland Container and Romar Transportation Systems, Inc. The report and cover letter stated:
  - *"...There is a scant amount of automobile fluff (nonmetallic automotive scrap) distributed across the entire area."*
  - *"...Surface indicators of contamination were petroleum staining of sand and gravel, and areas with debris-laden fill. The debris was a mix of wood products and automotive fluff; there was also some apparent petroleum contamination. The fill was typically found to be less than 1 foot in depth, but in one localized area, it was 3 feet in depth."*
  - *"Much of the contamination identified was associated with the surface fill/debris. Specifically, the shallow fill was found to contain diesel fuel, heavy oils, and in one instance 20 ppm of PCBs."*
  - *"PCBs were also found in surface samples which were free of debris. All five samples tested for PCBs had some detectable concentration."*
  - *"Surface staining was found at the active, above ground fuel tank. Petroleum contamination appears to be localized and limited in depth; testing indicated nondectable HCID levels at 5 feet depth."*
  - *"With one possible exception, no chlorinated or aromatic solvents were detected (separate of diesel fuel), and leachable metals were only found at low concentrations, less than 1 ppm. A water sample may have had 5 ppb of PCE, however this may be a consequence of cross contamination since the sample was collected from a shallow pit, dug by a backhoe."*
  - *"Based on the results of our Level 1 assessment and the sampling results reported here the extent of contamination appears to be limited to a relatively small portion of the total area of*

the property, primarily where there is visible surface staining or where debris-laden fill material exists."

- Environmental Management Solutions. "Expanded Environmental Site Assessment and Sampling Study of the IT Terminal Property Lots 1, 2, 3, & 4." March 1993. The following specific findings are stated in the report:
  - *"Nine of 31 soil samples tested for eight heavy metals (TCLP) revealed low concentrations of six metals: barium, arsenic, lead, chromium, and cadmium [sic]. All samples are below DEQ soil standards for industrial sites."*
  - *"Organic vapor monitoring (OVM) conducted in a grid pattern indicated 13 of 113 total shallow subsurface borings had detectable levels of organic vapors, ranging from 0.5 ppm to 5.0 ppm..."*
  - *"There are two soil samples with very low levels of total petroleum hydrocarbons (TPH), ranging from 12 to 84 ppm."*
  - *"There were seven soil samples which tested positive for the presence of PCBs in very low concentrations, from 0.072 ppm to 12 ppm."*
  - *"Analysis of groundwater samples tested for eight heavy metals revealed very low concentrations of arsenic, at a concentration below EPA drinking water standards."*
  - *"Based on the results of this site characterization and sampling study, the low levels of contaminants detected can be expected to be present and perhaps ubiquitous in soils throughout the subject property and the surrounding area and can be reasonably expected to present a minimal risk for industrial land use and development."*
- Quality Group NW. "Interim Report of Survey and Remediation for PCB Containing Materials at International Terminals Property, East Lots." August 1994. The following are some of the conclusions stated in the report:
  - *"...evidence supports that the subject property was contaminated with trace amounts of polychlorinated biphenyls generally across its surface. Levels of PCB contamination in excess of regulatory limits were found only in discrete areas, and to a high degree of certainty, only at the surface."*
  - *"Two areas on the subject property, in which previous studies had shown levels of PCB contamination in excess of regulatory limits, were excavated on July 13, 1993."*
  - *"Laboratory analysis of samples taken from the excavations in the two areas of the property which were subject to remediation showed non-detectable levels of PCBs remaining on site."*

In July 1994, approximately 50 tons of contaminated soil was excavated from two areas and hauled to the Hillsboro landfill. Cleanup levels were 1 mg/kg PCBs in surface soil and 10 mg/kg PCBs for subsurface soil. These levels were the federal TSCA limits, since DEQ SO-CLEAN guidelines were recommended goals, not a formal administrative rule at that time. Laboratory analysis of confirmation samples collected showed nondetectable levels of PCBs remaining at the subject property.

Romar Transportation Systems, Incorporated

Environmental files pertaining to Romar Transportation Systems, Incorporated were obtained from SIC. Three investigations were conducted at the Romar site and the results are described in the following reports, which are provided in Appendix H.

- Environmental Management Solutions. "Field Sampling Study for IT Terminal Property." January 1992. This report was prepared for SIC and covers both the Portland Container and the Romar sites.
- Environmental Management Solutions. "Expanded Environmental Site Assessment and Gross Indicators Sampling Study of IT Terminal Property Lot 8." May 1993. This report was prepared for SIC.
- Technical Action Group, Inc. "Technical Review and Sampling Study of Schnitzer Investment Corporation Property at International Terminal Site in Portland, Oregon." June 1993. This report was prepared for Romar.

The three investigations found polychlorinated biphenyls (PCBs) across the Romar site at concentrations ranging up to 20 mg/kg. These investigations indicated that PCBs exist on the Romar site in isolated areas where equipment was stored and no contaminants, other than PCBs, were found above regulatory limits.

Three contaminated areas on the Romar site were excavated, and approximately 40 tons of contaminated material were hauled to the Hillsboro Landfill under Special Waste Permit No. 1571, issued to SIC. Four confirmation samples were collected and the results indicated that the remaining PCB concentrations ranged up to 0.12 mg/kg. Results of the remediation are described in a report titled "Technical Review and Sampling Study of Schnitzer Investment Corp. Property at International Terminals Site in Portland, Oregon," prepared by the Technical Action Group, Inc., in July 1993 for SIC.

Further verification and investigation of the Romar site was conducted by collecting and analyzing 13 samples from a sampling grid on the unpaved areas of the Romar site. PCBs up to 1.5 mg/kg were found. This investigation is summarized in a report titled "Phase II Environmental Site Assessment," prepared by Quality Group NW in November 1993 for SIC. The report states "...it is concluded that there is a very low likelihood that significant amounts of PCB contamination above TOSCA limits remain on the subject property in areas that will remain unpaved. ..." The reports describing remedial activity and the verification investigation are provided in Appendix H.

Based on the activities reported and the remediation performed on the Romar site, which is located 250 feet north of the subject property, the Romar site is not anticipated to impact the environmental conditions at the Portland Container site.

Copies of relevant file information obtained and reviewed from SIC are presented in Appendix H.

Site Reconnaissance

The Portland Container site was visited on August 6, 1996, to observe the site and adjacent properties that may have an impact on the environmental conditions at the subject site. The

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site reconnaissance was performed by Mark Bricker and Darren Nakata of CH2M HILL. They were accompanied by Paul Butler of Portland Container. A copy of the field checklist completed during the site reconnaissance is provided in Appendix I. Photographs of the site reconnaissance are provided in Appendix J. Figure 2 presents some of the site features observed during the site reconnaissance.

Subject Property

The subject property consists of a metal two-story office/maintenance shop approximately 30 feet tall, which was constructed in 1995. The building is approximately 5,600 square feet (ft^2) in size and sits on a parcel of land approximately 11.69 acres in size. Approximately 5 percent of the parcel is covered with asphalt or by the building. The remaining 95 percent of the parcel is surfaced with about 1 foot of gravel. The subject property is generally flat and appears to have good storm drainage because there were no visible signs of standing water. The parcel has a chain link fence surrounding the property boundary.

A wash rack and propane tank are located on the southwest corner of the subject property. The propane tank holds approximately 2,000 gallons and propane is used to fuel service trucks. At the wash rack, a pressure washer that uses alkaline-based chemicals is used to clean out intermodal containers. A sloped concrete pad approximately 200 ft^2 collects drainage from the intermodal containers and routes it to a drain in the center of the pad. The intermodal containers are placed on the edge of the concrete pad and are propped up on the opposite end so that they slope and discharge to the concrete pad when washing. There was no visible staining on the gravel where the intermodal containers are washed. In this area were about 15 to 20 oil and grease drips in various sizes, the largest being no more than 0.25 ft^2. In our opinion, the oil and grease drops do not pose a potential environmental hazard to the subject property.

Along the western boundary of the subject property are intermodal container storage areas. Wood and scrap metal are stored in the northwest corner. Also located in the northwest portion of the site were five 55-gallon barrels. Two are labeled as used oil and three are not labeled. Four of the barrels have liquids and all are sealed. This area is also used for employee parking. There were no visible signs of stained soil around the barrels or vehicles. In our opinion, the five 55-gallon barrels have not caused an environmental impact to the subject property.

The eastern half of the property is used for intermodal container and chassis storage. A tire repair area is situated in the center of this area. According to Paul Butler of Portland Container, about 400 to 500 intermodal containers are typically stored onsite and less than 10 percent of these are refrigerated units. There are electrical plugs for the refrigerated units along the southern site boundary. An electrical panel and transformer are located in this area. The refrigerated units have a compressor built into the intermodal container for cooling. There were no visible signs of soil stains around the transformer or refrigerated units. The transformer and electrical equipment are presumed not to contain PCBs since they were new when the site was built in 1995. Outside the fence near the electrical panel is a 150-kilovolt-ampere (kVA) Portland General Electric transformer with a sticker that indicates "less than 1 ppm." This statement refers to the fact that the transformer contains less than 1 part per million (ppm) PCB oil.

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An aboveground diesel tank is located on gravel near the northeast corner of the building. According to Paul Butler of Portland Container, there was a minor (about 1 to 2 gallons) spill of diesel fuel. The gravel where the fuel spilled was excavated, mixed with floor dry material until dry, and then returned to the excavation. There were no visible signs of soil contamination around the diesel tank at the time of the site visit. On the basis of discussions with Mr. Butler, the area of potential of diesel-contaminated soil is less than 20 ft^2.

A 55-gallon barrel is located just outside the north side of the maintenance shop. This barrel is used to store used oil. There were four other 5-gallon pails around the barrel that appeared to also contain used oil. The barrel and pails had lids. There was no evidence of staining on the concrete around the barrel and pails.

Inside the building are offices and a maintenance shop. There were no floor drains observed in the concrete floor. The offices make up about 33 percent of the building space and the maintenance shop takes up the remaining 67 percent. Offices on the second floor were under construction. No floor drains were observed.

The maintenance shop is used to repair the intermodal containers. This involves welding and woodwork. There are welding supplies (wire, rods, etc.) and metal stored shelves and racks around the shop. A battery station was observed and Paul Butler indicated batteries are recycled by a third party. A parts cleaner station uses solvents comprised mainly of mineral spirits. There are small quantities of paint and thinner for touching up welds used and stored in the shop. The shop also stores oil and grease in drums and barrels. Used antifreeze is also collected along with the used oil for recycling offsite. There were no visible signs of spillage or leakage on the concrete floor in the maintenance shop.

No visible evident of underground storage tanks was observed.

Adjacent Properties

Jefferson Smurfit Corporation Container Corporation of America is located to the southwest of the subject property. Jefferson Smurfit CCA collects, sorts, and bales wastepaper for recycling. The building at this site dates back to the 1940s when it was used as part of the major shipyard in this area. A large steel tank, possibly used to store propane, is on the north side of the Jefferson Smurfit CCA building. Outside on the north end of the Jefferson Smurfit CCA building is a storage area used to store empty pallets. The areas around the Jefferson Smurfit CCA building are not paved. There were no visible signs of soil staining in the areas observed.

To the east is undeveloped land and a storage area used to store large-diameter concrete pipe which has Northwest Pipe & Casing Company labels. To the northeast is a Crown Beverage warehouse used to store empty cans for food and beverage products.

To the south is International Terminal Gate No. 5, which is the entrance gate to Schnitzer Steel Co. scrap metal recycling operations. The area immediately to the west of the subject property is also part of the recycling operation. Both of these areas are used to store metal pipe and steel used for scrap steel and metal recycling operations. Railcars are loaded with scrap steel for shipment to Oregon Steel Mills.

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Also to the south is Ryerson Steel, a subsidiary of Inland Steel Industries. Ryerson Steel manufacturers steel products. The majority of the site is either paved or covered with a building. There are storage areas for steel on the west side of the Ryerson Steel building.

Romar is located immediately to the north of the subject property. The south side of the Romar site visible from Portland Container was surfaced with gravel around the building. There were no visible signs of soil staining observed. There was several hundred cubic yards of excavated soil on the undeveloped portion of the Romar site. A conveyor was visible from North Time Oil Road. Individuals interviewed working for SIC and Portland Container did not know what the purpose of the excavation or stockpiling. The stockpiled material was observed about 200 feet away and did not appear to be contaminated.

According to Peter Manson with Romar Transportation Systems, Incorporated, the stockpiled material is the excess soil excavated during construction of the Romar building. At the time of the site reconnaissance, Romar had made arrangements to have this material screened and hauled to the St. Johns landfill (approximately 2½ miles southeast of the Romar site) to use as capping material.

Sampling and Analysis Performed for This Assessment

Asbestos

Representative samples of suspect asbestos-containing material (ACM) were not collected from the site, because the oldest buildings and structures were constructed in 1995. In our judgment, ACM are not expected to be present in buildings built after the mid- to late 1980s.

Radon

A May 1996 draft report titled "Presentation of Radon Potential Maps to the Public: A Case History of Portland, Oregon," prepared by Scott F. Burns and Stuart G. Ashbaugh with Portland State University, and Ray Paris and George Toombs with the Radiation Control Section of the Oregon Health Division, was reviewed in order to provide information about radon in the Portland area.

Radon is a naturally occurring, odorless, tasteless, radioactive gas produced as one of the decay products of the uranium and thorium series. It comes from rocks, soil, and water.

EPA has established a level of 4 picocuries per liter (pCi/L) as the action level for radon. Owners of buildings containing radon levels greater than this are recommended to take "action" to reduce the radon levels. This action level is only an estimate of a concentration target to which indoor levels should be reduced. Indoor radon values are controlled by the following factors: bedrock under a building; soil porosity and permeability; construction of the building; groundwater levels; and the presence of faults.

On a national scale, 1 in every 12 homes has elevated levels of radon above the action level. In Oregon, an extensive 1993 study by the Bonneville Power Administration of more than 1,135 homes in the Portland area revealed an indoor radon level of one in every five homes.

According to the May 1996 draft report: *"Using data collected by the Oregon Health Division's Radiation Control Section, Portland was found to have elevated radon values in 22% of homes. A radon potential map has been produced for 39 zip code regions of Portland based on the rank sums of*

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maximum radon values, average indoor radon values, and the percentage of homes with radon values >4 pCi/L. Eight zip codes have high, 15 moderate, and 16 low radon potential."

The Portland Container site is located in zip code area 97203. This area, according to Figure 5 in the May 1996 draft report, has a medium radon potential.

The atmosphere in the Portland Container site was sampled for the presence of radon by Professional Services Industries (PSI) under a subcontract with CH2M HILL. Appendix K and Table 1 present the results of the PSI radon sampling. In summary, radon results range from less than <0.2 to 0.3 pCi/L. These results are well below the federally recommended maximum action level of 4 pCi/L.

TABLE 1
Results of Radon Gas Survey

Sample Location	Radon Levels (pCi/L)
Receptionist desk	0.3
Back office	0.2U

U - Not detected at the noted detection limit.

Lead-Based Paint

Representative samples of paint potentially containing lead were not collected at the subject property because the building was constructed in 1995. In our opinion, it is not expected that surfaces were painted with this lead-based paint.

Drinking Water

A representative water sample was collected from the subject property, as indicated in Table 2. The sample was collected by opening the water tap and allowing the water to run for 1 to 2 minutes. It was not possible to coordinate with property tenants to enable obtaining first draw water samples. The sample was collected in a 500-milliliter (ml) sample container which was preserved with nitric acid. Once the sample container was filled, the sample bottle was capped, labeled, placed in a cooler of ice for storage, and transported to North Creek Analytical Laboratory in Beaverton, Oregon, for analysis under chain-of-custody procedures. The sample was analyzed for total lead at North Creek Analytical Laboratory using EPA Method 200.8. The results of the analysis are presented in Table 2 and analytical reports are presented in Appendix L. The measured concentration was less than the EPA drinking water action level of 0.015 mg/L.

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TABLE 2
Results of Lead Analysis for Tap Water Samples

Site	Address	Sample Identification Number	Sample Location	Total Lead Concentration (mg/L)
Portland Container	9449 North Burgard Way	NW-04-9449-01	Restroom	0.0093

U - Not detected at the noted detection limit.

Soil

On the basis of the lack of evidence suggesting soil contamination on the subject property, soil sampling was, in our opinion, not necessary for this environmental site assessment.

Groundwater

On the basis of the lack of evidence suggesting soil contamination at concentrations that would pose a threat to human health or the environment on the subject property, groundwater sampling and analysis were, in our opinion, not necessary for this environmental site assessment.

Identified Environmental Concerns

The following are CH2M HILL judgments and opinions regarding environmental concerns on the Portland Container site based on the information presented in the previous sections and appendixes of this environmental assessment report.

- USTs have not been present on the subject property. USTs on properties within 1 mile of the site have not caused an environmental hazard on the subject property.
- ACM is not present on the subject property. ACM on properties within 1 mile of the site have not caused an environmental hazard on the subject property.
- Transformers and electrical equipment located at the Portland Container site contain less than 1 ppm of PCBs or are presumed not to contain PCBs because the equipment was new in 1995. Transformers and electrical equipment located at the Portland Container site have not caused an environmental hazard on the subject property. Transformers and electrical equipment located within 1 mile of the subject property that contain PCBs above regulated levels have not caused an environmental hazard on the subject property.
- Lead-based paint is not present on the subject property and has not caused an environmental hazard on the subject property. Lead-based paint on properties within 1 mile of the site has not caused an environmental hazard on the subject property.
- Petroleum products present at the subject property have been stored in a manner that has not caused an environmental hazard to the subject property. Small releases around the aboveground diesel tank (approximately 20 square feet of area affected) have not caused an environmental hazard, on the basis of the relatively small volume of affected

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material. Petroleum products on properties within 1 mile of the site have not caused an environmental hazard on the subject property.

- Drums containing hazardous substances have not caused an environmental hazard on the subject property. No drums containing hazardous substances that have caused an environmental hazard to the subject property have been observed on properties within 1 mile of the site.
- The possible releases of wash water around the intermodal container wash pad are not anticipated to pose an environmental hazard on the subject property. There have been no observed or reported material spills on properties within 1 mile of the subject property that have caused an environmental hazard on the subject property.
- There was no observed evidence of stressed vegetation on the subject property. There was no observed evidence of stressed vegetation on properties within 1 mile of the subject property that suggested an environmental hazard to the subject property.
- Other than small areas of oil-stained soil, there was no observed evidence of discolored or disturbed soil on the subject property. The small areas of oil-stained soil are not anticipated to pose an environmental hazard to the subject property. There was no observed evidence of discolored or disturbed soil on properties within 1 mile of the subject property that suggested an environmental hazard on the subject property.
- There were no unusual or noxious odors on the subject property. There were no unusual or noxious odors on properties within 1 mile of the subject property that suggested an environmental hazard on the subject property.
- Monitoring wells were not observed or found to be located at the subject property. There were no monitoring wells on properties within 1 mile of the subject property that suggested an environmental hazard on the subject property.
- No trails with no apparent outlets or purposes were observed on the subject property. No trails with no apparent outlets or purposes were observed within 1 mile of the subject property that suggested an environmental hazard on the subject property.
- Products containing toxic and hazardous substances have been used or stored on the subject property in quantities and in ways that have not caused an environmental impact on the site. Previous investigations and remediations have identified and removed near-surface soil with PCBs. No toxic and hazardous substances that have caused an environmental hazard to the subject property have been observed on properties within 1 mile of the subject property.
- No radon levels above the recommended action levels were detected in the samples collected at the subject property. No radon has been observed on properties within 1 mile of the site that has caused an environmental hazard on the subject property.
- No refrigerated drinking water fountains listed in the "Federal Register" as coolers that are not lead-free have been observed on the subject property. No refrigerated drinking water fountains listed in the "Federal Register" as coolers that are not lead-free that have caused an environmental hazard on the subject property have been observed on properties within 1 mile of the subject property.

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- Results from analysis of drinking water samples taken from each of the buildings onsite do not indicate levels of lead that pose a threat to human health. No lead-contaminated drinking water has been observed within 1 mile of the site that has caused an environmental hazard on the subject property.
- There were no reports of past or present dry-cleaning operations conducted at the subject property.
- The subject property was constructed on grade and is located within an area that was filled with dredged sediment in the early 1940s, when a loading inlet to the Willamette River was excavated. In general, SIC policies prevented contaminated material from being used at the subject property, as outlined in Appendix M.
- No overhead transmission lines are present on or immediately adjacent to the subject property.

The presence of industrial activities in the area surrounding the site for more than 50 years is anticipated have resulted in low levels of hazardous substances in the surface soil. Because the subject property is covered with a clean gravel surface and is located in an area exclusively used for industrial activities, and because shallow groundwater beneath the site is not used as a source of drinking water, these hazardous substances in the site soil, if present, do not pose a current threat to human health or the environment or affect the current use of the property as an industrial site.

References

Personnel Performing Site Assessment

The environmental site assessment was performed by Ross Rieke and Mark Bricker. Resumes of both individuals are included in Appendix N.

Reports Reviewed

Burns, S. F., S. G. Ashbaugh (Portland State University), R. Paris, and G. Toombs (Radiation Control Section, Oregon Health Division). "Presentation of Radon Potential Maps to the Public: A Case History of Portland, Oregon." Draft report. May 1996.

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Quality Group NW. "Phase II Environmental Site Assessment." November 1993.

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Technical Action Group, Inc. "Technical Review and Sampling Study of Schnitzer Investment Corporation Property at International Terminal Site in Portland, Oregon." June 1993.

Technical Action Group, Inc. "Technical Review and Sampling Study of Schnitzer Investment Corp. Property at International Terminals Site in Portland, Oregon." July 1993.

Persons Interviewed

Paul Butler, Maintenance Supervisor—Portland Container
Don Carpenter, Construction Manager—Schnitzer Investment Corp.
Linda M. Wakefield, Vice President— Schnitzer Investment Corp.
Peter Manson, Vice President—Romar Transportation Systems, Incorporated

SCHN00206333

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SCHNTZIC-INT:BGDOC.117

CH2MHILL

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FEB 27 2001

NORTHWEST REGION

February 27, 2001

Ms. Alicia C. Voss
Oregon Department of Environmental Quality
Northwest Region
Suite 400
2020 SW Fourth Avenue
Portland, OR 97201

Subject: Northwest Pipe Company

Dear Ms. Voss:

This letter transmits one copy of the Preliminary Assessment Addendum for Northwest Pipe Company, 12005 North Burgard Road, Portland, Oregon.

This report was prepared on behalf of Northwest Pipe in accordance with the August 17, 2000 Voluntary Cleanup Letter Agreement between the Oregon Department of Environmental Quality and Northwest Pipe Company.

Please contact me at 503/235-5022, ext. 4387 if you have questions regarding this report.

Sincerely,

CH2M HILL

Ken Shump

Ken Shump, P.G.
Project Manager

c: Carol Grant, Northwest Pipe Company
Claudia Powers, Ater Wynne LLP

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DEPT OF ENVIRONMENTAL QUALITY
RECEIVED

FEB 27 2001

NORTHWEST REGION

Preliminary Assessment Addendum

Prepared for

Northwest Pipe Company

12005 North Burgard Road
Portland Oregon
ECSI No. 138

February 2001

Prepared by

CH2MHILL
Portland, Oregon

SCHN00206335

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Preliminary Assessment Addendum
Northwest Pipe Company, Portland Oregon

1.0 Introduction

Northwest Pipe Company delivered a Preliminary Assessment to The Oregon Department of Environmental Quality (DEQ) on November 21, 2000. This addendum was prepared in response to the DEQ's comments on the Preliminary Assessment provided in letters dated December 19, 2000 and February 1, 2001, and based on information discussed in a January 18, 2001 meeting between Northwest Pipe, DEQ, Ater Wynne LLP, and CH2M HILL (counsel and consultant, respectively, to Northwest Pipe Company).

The objective of this addendum is to provide additional information to DEQ to satisfy its requirements for a Preliminary Assessment of the Northwest Pipe Company Portland facility. This addendum contains the following sections:

- An expanded description of background information on the Northwest Pipe facility, including a description of current operations (requested in the December 19, 2000 letter and in the January 18 meeting)
- A description of available sampling information and assessment of its sufficiency, with any recommendations for additional sampling (requested in the December 19 letter and discussed in more detail in the January 18 meeting and February 1 letter).
- Information on the status of groundwater monitoring wells at the site, and a description of groundwater flow direction (requested in the December 19 letter).
- A discussion of the hazardous waste generator status of the facility (requested in the December 19 letter)
- A discussion of more recent information on storm water at the site (requested in the December 19 letter)
- Comments and clarifications on information regarding the Northwest Pipe facility contained in reports submitted to DEQ for the Burgard Industrial Park by Schnitzer Investment Corp. (requested in the January 18 meeting).
- Recommendations for further work

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2.0 Northwest Pipe Company Site Background

2.1 Early Industrial Activities

Industrial activities on the land currently owned by Northwest Pipe Company in Portland began during World War II, with the construction of the Oregon Shipbuilding Corporation shipyard. Prior to this time, aerial photographs indicate the property was undeveloped.

The Oregon Historical Society holdings on shipyard operations were reviewed as a source of information on past practices at the Northwest Pipe facility. The principal sources of information reviewed included historical maps, a report by Julia Osborn (1945) entitled *A Story of a Shipyard*, an Oregon Shipbuilding Corporation document entitled *Survey of Shipyard Operations, Vol. 1*, and copies of a shipyard newsletter called *The Bosun's Whistle*. Figure 1 is a copy of an historic map showing the layout of shipyard operations. When the site currently owned by Northwest Pipe was used as part of the Oregon Shipbuilding yard, it was dominated by the Assembly Building. As shown in Figure 2, the footprint of the Assembly Building conforms generally to the present-day footprints of the two buildings containing Bays 1 though 6 and Bay 9. Figure 2 shows the following features from the Oregon Shipbuilding Corporation era within the present-day boundaries of the Northwest Pipe Company facility:

- Assembly Building
- Tool Room and Weld Rod Storage
- Hull Materials Office
- Pipe Shop
- Maintenance Shop
- PFM (undefined)
- Substations (3)
- Lockers (2)
- Toilets
- Offices (2)
- Union Meeting Hall

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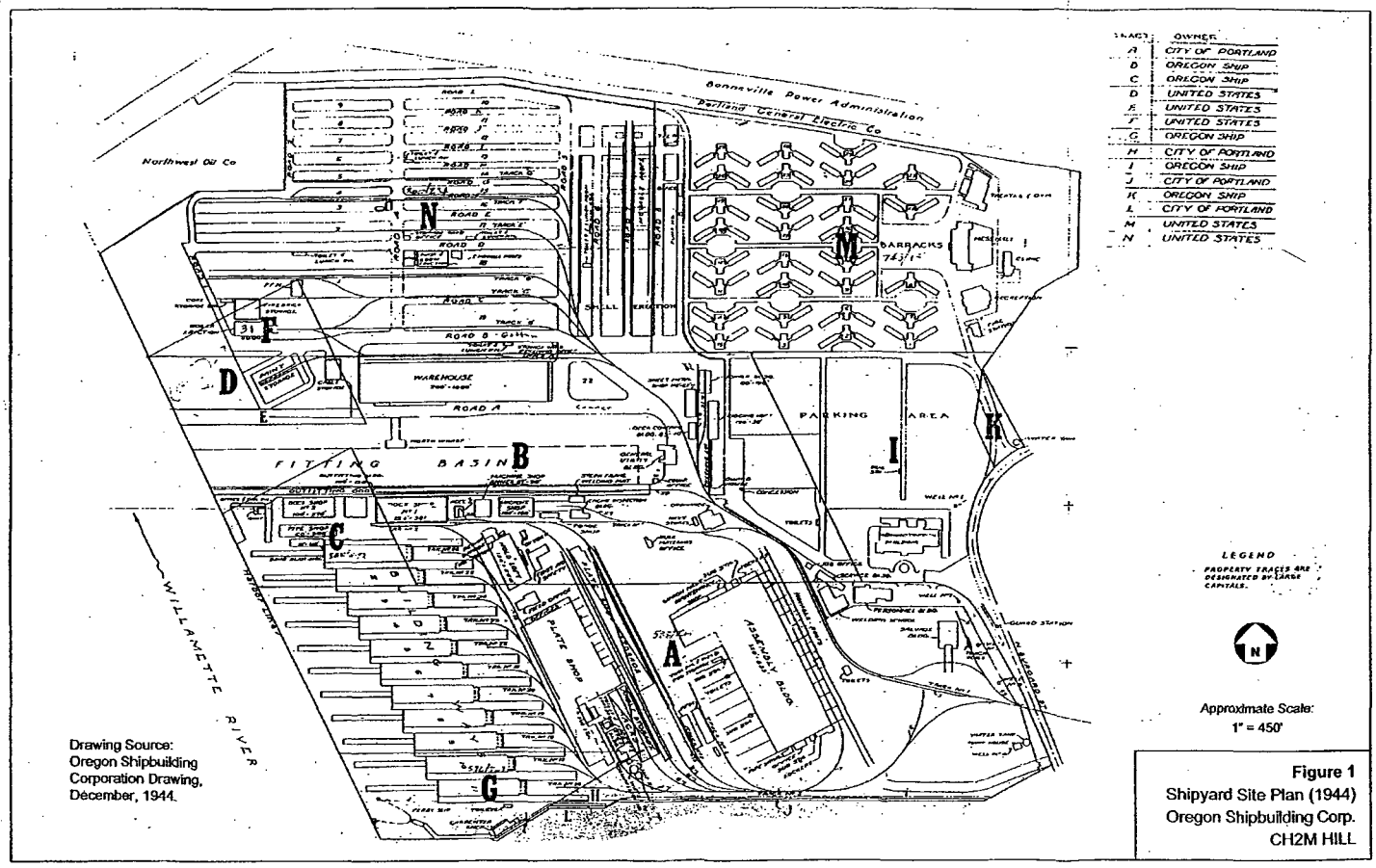

Drawing Source:
Oregon Shipbuilding Corporation Drawing, December, 1944.

Figure 1
Shipyard Site Plan (1944)
Oregon Shipbuilding Corp.
CH2M HILL

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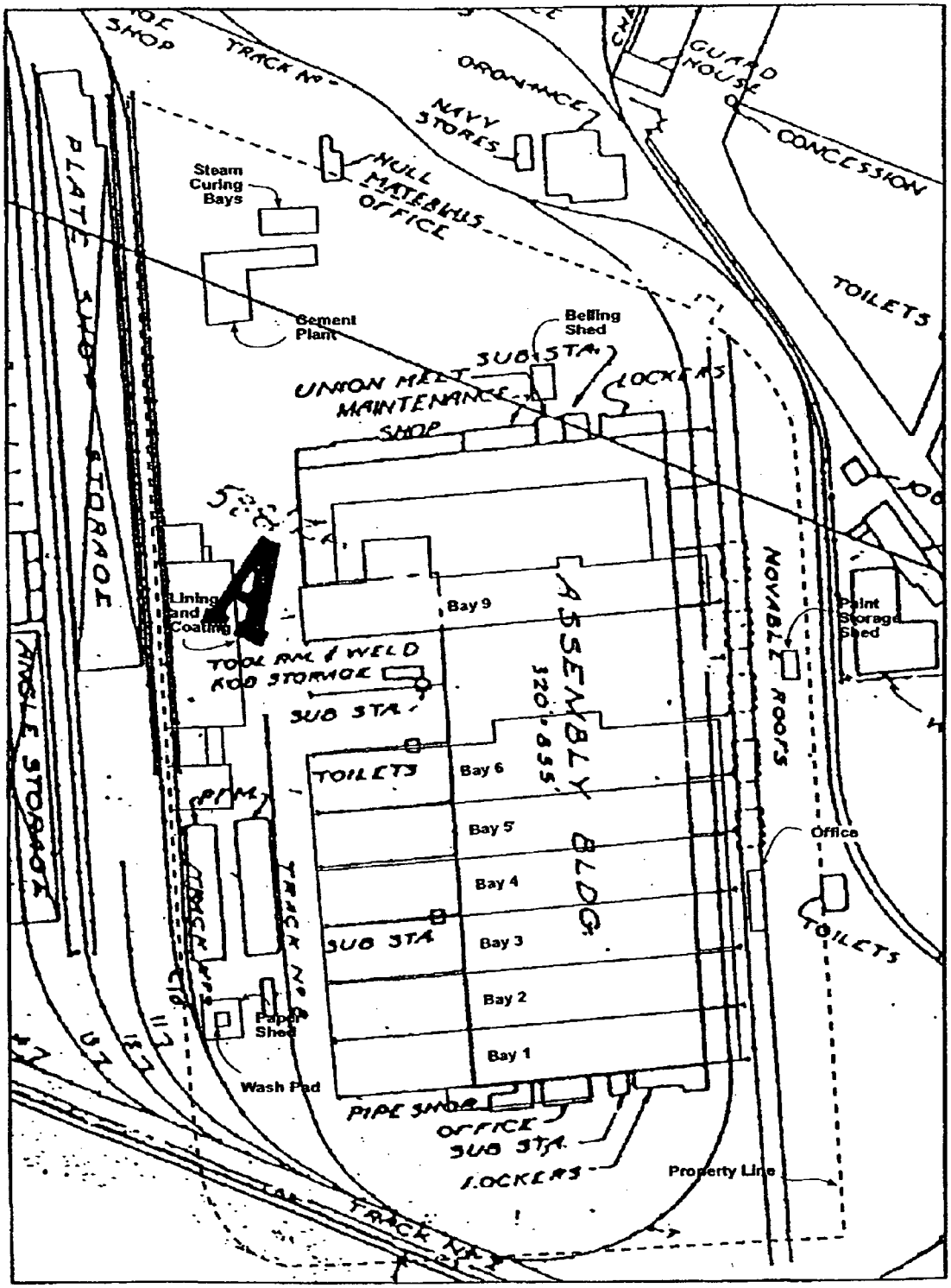

N

0 200'

Approximate Scale

Figure 2

Current Site Features Compared to Historical Features

NORTHWEST PIPE COMPANY
PORTLAND, OREGON

CH2MHILL

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Production at the Oregon Shipbuilding Corporation took place in four general areas: the Plate Shop, the Assembly Building, the Shipbuilding Ways, and the Outfitting Dock. Steel plate was shaped and cut at the Plate Shop, which was located east of the Northwest Pipe property. The shaped steel plate was transported by rail to the Assembly Building where it was welded into large ship sections weighing up to 250 tons. These prefabricated sections were transported by rail to the Shipbuilding Ways (located on the riverfront east of the Northwest Pipe facility) and attached to the hull. Welding was the principal method used for assembly both in the Ways and in the Assembly Building. In addition to welding, some exterior painting also occurred on the Ways. After the major structure of each ship was completed, the ship was launched and final outfitting occurred at the fitting basin and outfitting dock. Final outfitting included electrical, painting, and interior assembly. In summary, the major industrial process that occurred on the Northwest Pipe site during operation of the Oregon Shipbuilding Corporation was welding steel plate in the Assembly Building.

2.2 Post-War Property Use

Based on property ownership records, the property that currently is owned by Northwest Pipe Company passed in ownership from Oregon Shipbuilding Corporation to Surplus Properties Corporation in 1950, and subsequently to Beall Pipe and Tank Corporation in 1950.

Based on interviews with company representatives familiar with the former Beall Pipe and Tank Corporation operations at the property, the major buildings and structures used by Beall are in the same locations and are the same approximate size as those currently used by Northwest Pipe Company. The buildings comprising Bays 1 through 6 and Bay 9 are the same, as are the cement mortar lining facility; the pipe lining and coating facility, the wood
cutting shed, the plant office, the administration office, and the paper storage shed. Similar to Northwest Pipe, Beall manufactured steel pipe; but Beall also manufactured products that Northwest Pipe did not and does not make. For example, Beall Transliner built tanks for tanker trucks in parts of Bay 1 and Bay 2; Beall riveted and spot welded galvanized culvert pipe (it did not manufacture the galvanized steel) in Bay 4; and it applied asphalt wrap in the coating and lining facility and asphalt dip coatings and linings in Bay 9. The asphalt coating material used by Beall Pipe and Tank was manufactured by Shell Oil Company. Beall significantly reduced its asphalt coating and lining operations in the 1970's and by approximately 1976 had discontinued the process altogether. For a short period of time, Beall built and operated a hydrotester in what is now referred to as the paper shed. The hydrotester was subsequently decommissioned by Beall.

Beall's major market was irrigation pipe, both straight-steam and spiral weld pipe. Straight seam steel pipe was made by the electric resistance welding process and the spiral weld was made by the submerged arc welding process. Beall also produced

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pipe by the pyramid roll process. Beall produced potable water pipe, custom-fabricated pipe and tanks, square and rectangular tubing, corrugated culvert, tanks and pressure vessels. During its tenure, Beall leased storage space to American Steel Company. In approximately 1970, a Japanese trading company, Okura, became a co-owner of Beall Pipe and Tank Corporation.

In approximately 1976, Beall Pipe sold its business to L B. Foster Company. L. B. Foster continued to make large water pipe and tubular pipe used for such applications as irrigation pipe, but it discontinued making pipe from pyramid rolls.

2.3 Current Manufacturing Activities

Northwest Pipe Company has owned its Portland Facility since 1997, however, the company began operations at the site in 1983 under a lease from Multnomah Land and Equipment Company. Northwest Pipe manufactures potable water transmission pipe and tubular products that are used in water utility, hydroelectric construction, agricultural, mining, fire protection and industrial applications. Steel pipe is manufactured using both the electric resistance welding and the submerged arc welding processes.

Northwest Pipe operates three spiral weld mills and three straight seam mills to produce welded steel pipe ranging in size from 2 3/8-inch outside diameter through 144-inch outside diameter. If desired by the customer, the facility can produce pipe with coatings and linings, specifically, cement mortar, coal tar enamel, polyethylene tape, rust-inhibitive primers, polyurethane, coal tar epoxy, and specialty paints. A list of chemicals used at the site is provided in Section 3.0 of the URS Letter Report (URS 2000).

Figure 3 is a site map showing the location of Northwest Pipe's production areas. Pipe is welded and cut in Bays 1 though 6. The X-ray area, quality control laboratory, and shipping and receiving area are located adjacent to Bay 1. Pipe fittings such as elbows, tees, manifolds, reducers, and manholes are fabricated in Bay 3. The maintenance area is located in a portion of Bay 4. Sand blasting prior to taping or coating occurs in Bay 9, within the Sand Blast Room. A hydrotest facility is also in Bay 9, and pipe lacquering occurs in the Bay 9 annex.

Cement mortar lining and coating occurs at the Cement Plant in the northeast corner of the facility. During its tenure at the property, Northwest Pipe added the Cement Curing Bays at the north edge of the facility. Paint and coal tar enamel are applied in the Lining and Coating Facility, which is located in a building on the western edge of the site. Solid coal tar enamel is stored outside in an area at the north end of the Lining and Coating Facility. Paint is stored in a contained area under cover in the Paint Storage Shed near the eastern property line. Wood cutting, pipe cutting, and pipe belling occurs in the northeastern part of the site. Also in this area, gasoline and diesel fuel is stored in two above-ground storage tanks with secondary containment. A steam cleaning/hot water wash pad that has a closed sump is

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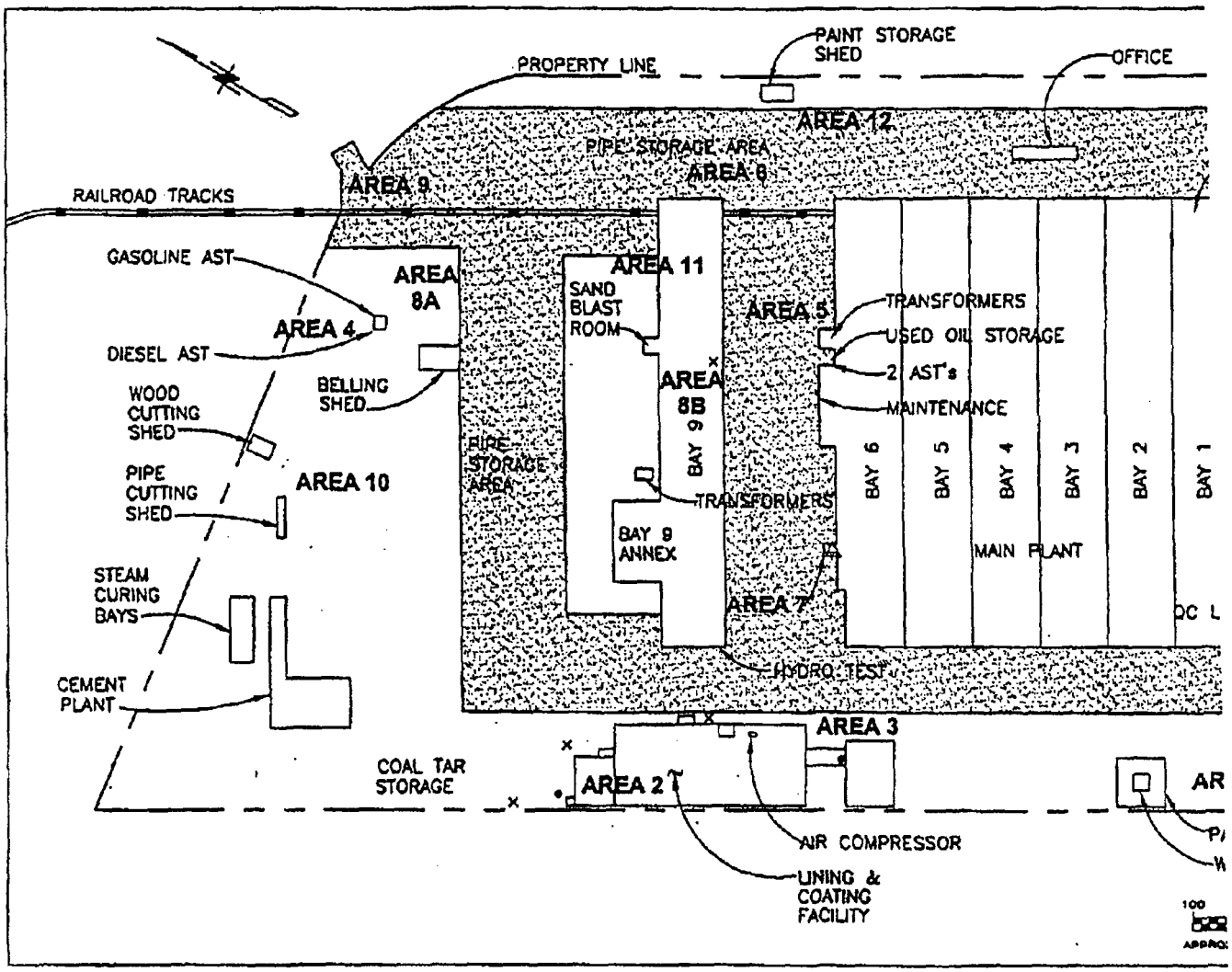

EXPLANATION:

△ WATER WELL

• SUMP

× COAL TAR RECLAMATION BLOWERS

PAVEMENT AREA (APPROXIMATE)

NORT

FIG2.dwg

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located under cover within the Paper Shed. The wash pad sump is pumped out as needed by Spencer Environmental. An Office Building containing offices, restrooms, and a meeting room is located east of the building containing Bays 1 through 6. The remainder of the facility is used for storing finished pipe and coiled steel, and for shipping access by rail and truck. As detailed in the URS Letter Report (2000), Northwest Pipe has decommissioned all underground storage tanks, conducted extensive site investigations and cleanup, and has continually improved the existing facilities at the property during its tenure at the site.

Northwest Pipe has upgraded its processes over time to improve efficiency and enhance the environmental benefits of its production processes. Changes to the facility that have occurred since Dames & Moore's Phase I and II Report (1989) include:

- The facility's coal tar vapor reclamation blowers were upgraded in 1995 to a hood and reheating system that filters and condenses the vapor.
- Because of process changes, Northwest Pipe has upgraded Areas 2 and 3 since 1995. The superficially stained surface soil in this area were capped with concrete. Northwest Pipe installed a chiller for the coatings department on part of the concrete cap in late 1999.
- Since the mid 1990s, Northwest Pipe has made a concerted effort and invested a considerable amount of money to induce its suppliers to provide coating products that contain lower levels of volatile organic compounds (VOCs). As a result, the amount of VOCs in coating products used at the facility, and the amount of VOCs emitted during pipe coating have been substantially reduced.
- In 1998, the 207 Mill was constructed at one end of Bay 4 to produce tubular products ranging in diameter from 2 inches to 18 inches. This process employs an ultraviolet light (UV) coating line that eliminates VOC emissions by using UV light to cure the coating.
- An X-ray area was installed adjacent to Bay 1 in 1995 for manufacturing quality assurance.
- Coal tar in solid form formerly was stored in two locations: south-southeast of the Paper Shed and north-northwest of the Lining and Coating Facility. In 1997, solid-form coal tar storage was consolidated in the area adjacent to the Lining and Coating Facility. The area near the Paper Shed no longer is used for solid-form coal tar storage.
- In 1999, the 250-gallon gasoline above ground storage tank was moved into the diesel containment area. The tank and its containment shed currently are located inside the diesel containment area.

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- For information on implemented environmental management activities since 1991, see the URS Letter Report (2000), Section 6.8.

3.0 Available Sampling Information Assessment

DEQ has expressed concern that the existing documentation on sampling and remediation at the site may be inadequate to assess areas of potential concern. DEQ's areas of interest regarding past work are those identified in it its February 1, 2001 letter:

- Potential groundwater contamination at the site; Item 1 in DEQ (2001)
- Insufficient soil sampling in Areas 1, 3, 5, 9, and 12; Item 2 in DEQ (2001)
- VOCs and polynuclear aromatic hydrocarbon (PAH) concentrations potentially present at or below the water table in Areas 1 and 3; Item 3 in DEQ (2001)
- Residual, low level concentrations of polychlorinated biphenyls (PCBs) and total petroleum hydrocarbon (TPH) in Area 5, and concern about historic PCB detection limits above some current action levels; Item 4 in DEQ (2001)
- Potential VOC concentrations in Areas 9 and 12; Item 5 in DEQ (2001)
- Additional information needed on petroleum hydrocarbons in the "plugged storm drain" at Area 14; Item 6 in DEQ (2001)
- Additional information on the site storm water discharge system; Item 7 in DEQ (2001) and also requested in DEQ (2000).
- Additional information on the site's industrial production well; Item 8 in DEQ (2001)

This section responds to these concerns and describes the general scope of proposed sampling and analysis to resolve remaining uncertainties.

3.1 Groundwater

DEQ currently indicates that it is interested in groundwater at the Northwest Pipe facility because groundwater at the site is shallow, because the agency considers the confirmation sampling documentation of past soil remediation activities inconclusive, and because DEQ feels the nature and extent of chlorinated solvents and petroleum products was not adequately defined by past work. Although available documentation on past sampling and analysis is not as detailed as the current standard of practice, extensive sampling and analysis has been completed at the site indicating that the concentrations of constituents in soil were significantly reduced by past remedial efforts. This conclusion was shared by DEQ (1991a) after a review of data generated by Dames & Moore (1989) and Crosby & Overton (1989). Moreover, the materials used or present at the site of most interest in sediment –

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petroleum hydrocarbons and much smaller quantities of PCBs – tend to have low mobility and rarely cause significant or extensive contamination of groundwater unless released in large quantities. Chlorinated solvents that formerly were used in limited quantities at the site have been detected sporadically in site soil. DEQ (1991a), however, observed that concentrations of chlorinated solvents, PCBs, and petroleum hydrocarbons, where detected at all, decrease rapidly with depth. In summary, the available soil sampling data at the site indicates that constituents, where present, occur predominately in near-surface soil. This situation is inconsistent with the distribution of contaminants in soil that would be capable of causing significant groundwater contamination.

To respond to DEQ's current concerns about soil and groundwater at the Northwest Pipe facility, CH2M HILL recommends that a focused soil and groundwater sampling effort be conducted to address specific areas. The scope of this investigation is described below in Section 3.2.

3.2 Areas 1, 3, 5, 9, and 12

These areas were identified in DEQ's February 1, 2001 letter after reviewing both the Preliminary Assessment Report (CH2M HILL 2000) and previous DEQ memoranda describing remaining areas of concern at the site (DEQ 1991a and 1991b). DEQ has requested that the soil sampling data in these areas be re-evaluated, with a recommendation about the need for additional sampling to supplement current information.

3.2.1 Area 1

Area 1 is the site of a former above-ground waste oil tank, drums, and stained soil (Dames & Moore 1989). Northwest Pipe investigated and remediated soil in Area 1 in 1989. The confirmation sampling, however, was not as well documented as DEQ would have preferred. To supplement the current understanding of soil conditions in Area 1, CH2M HILL recommends that a Geoprobe boring be advanced in this area from the ground surface to the water table. Soil samples are recommended to be collected at the surface (i.e., immediately below pavement), 3 feet, and 6 feet (the anticipated depth of groundwater). These soil samples will be analyzed for TPH, PAHs, and VOCs. A groundwater sample is recommended to be collected near the water table and analyzed for TPH and VOCs.

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3.2.2 Area 3

Area 3 also was remediated in 1989. Although the specific locations of confirmation soil samples are not clearly described in Crosby & Overton's (1989) report, the sample results document the presence of relatively low remaining concentrations of VOCs and TPH that are near or below EPA Region 9 Preliminary Remediation Goals (PRGs) and DEQ's petroleum hydrocarbon criteria for underground storage tanks. Because Area 3 lies inside an active industrial building under a paved floor and under a roof, the risk of exposure is controlled and the potential for leaching to groundwater is minimized. No additional sampling is recommended for Area 3.

3.2.3 Area 5

Sampling and analysis for VOCs, TPH, and PCBs showed that VOCs were not present in soil at Area 5. TPH was present at elevated concentrations on the surface; however, the concentrations of petroleum hydrocarbons decreased significantly with depth to concentrations below potentially applicable criteria for the site. Therefore, the oil staining described in 1989 appeared to be localized, limited to the near-surface, and had decreased to low concentrations at depth. Also in this area, PCB concentrations were found to be below the industrial soil PRG (1.3 mg/kg) in the surface sample at the general plant Maintenance Shop (0.7 mg/kg) and slightly above this level in the surface soil sample in front of the transformers (3.1 mg/kg). In both locations, PCBs were not detected above the detection limit of 0.1 mg/kg at a sample depth of 4 feet.

Because TPH concentrations in soil generally decrease over time due to microbial degradation, it is anticipated that current TPH concentrations are below those documented in 1989. To investigate this possibility, it is recommended that Northwest Pipe collect surface soil samples at two locations (one in front of the transformers and one at the Maintenance Shop) to determine if TPH concentrations remain above potentially applicable criteria. No further PCB analysis is recommended because the existing data show that concentrations were low, near the potentially applicable industrial soil PRG, and limited to the near-surface only.

3.2.4 Area 9

Area 9 was included by Crosby & Overton as part of the underground tank remediation area. As such, it was Northwest Pipe's impression that the "no further action" determination made by DEQ on April 16, 1990 included Area 9. Area 9 originally was identified because stained surficial soil was observed next to the railroad track in this area. Sampling from this area showed the following:

- Surface soil: in a single sample, TPH (22,000 mg/kg) and PCE (0.31 mg/kg) were detected by Dames & Moore (1989); other VOCs were not detected at detection limits ranging from 0.005 to 0.01 mg/kg.

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- 1-foot depth: in two samples, TPH was detected (420 and 530 mg/kg) and VOCs were not detected at detection limits likely ranging from 0.005 to 0.01 mg/kg (based on other samples from the site reported by the same laboratory during the same time period).
- 2-foot depth: in a single sample, 88 mg/kg TPH and 0.2 mg/kg PCE were detected; other VOCs were not detected at detection limits likely ranging from 0.005 to 0.01 mg/kg (based on other samples from the site reported by the same laboratory during the same time period).
- 4-foot depth: in three samples collected after soil was removed from this area, PCE was detected at concentrations ranging from 0.14 to 0.16 mg/kg; other VOCs were not detected at detection limits ranging from 0.005 to 0.01 mg/kg.
- 6-foot depth: in a single sample, no VOCs and no TPH were detected; the VOC detection limit likely ranged from 0.005 to 0.01 mg/kg (based on other samples from the site reported by the same laboratory during the same time period).

None of the detected concentrations of PCE exceed the industrial soil PRG of 16 mg/kg, and no other VOCs were detected; therefore, VOCs are not considered constituents of potential concern in Area 9. DEQ is correct that TPH analysis was not done on soil samples collected after remediation in Area 9 (the samples collected at a 4-foot depth). The mechanism of release of hydrocarbons in this area was considered to be a surface spill from a rail car, according to Dames & Moore's (1989) observations. In other words, it is unlikely that routine or ongoing hydrocarbon releases occurred in Area 9. Hydrocarbons would therefore be expected to be limited to the surficial soil that was removed by Crosby & Overton. This is supported by the low concentration of TPH detected in the sample from a 2-foot depth and the lack of TPH in the sample from the 6-foot depth. For these reasons – no VOCs at concentrations of concern and hydrocarbons only in surficial staining that has been addressed by past remediation – no additional sampling in Area 9 is proposed.

3.2.5 Area 12

Area 12 consists of stained soil adjacent to the paint storage shed. Northwest Pipe investigated and remediated soil in this area in 1989. The confirmation sampling, however, was unclear. To supplement the current understanding of soil conditions in Area 12, a Geoprobe boring is recommended in this area to be advanced from the ground surface to the water table. Soil samples would be collected at the surface, 3 feet, and 6 feet (the anticipated depth of groundwater). These soil samples would be analyzed for TPH and VOCs. To address DEQ's current concern about groundwater quality, a groundwater sample would be collected with the Geoprobe rig and analyzed for VOCs and TPH.

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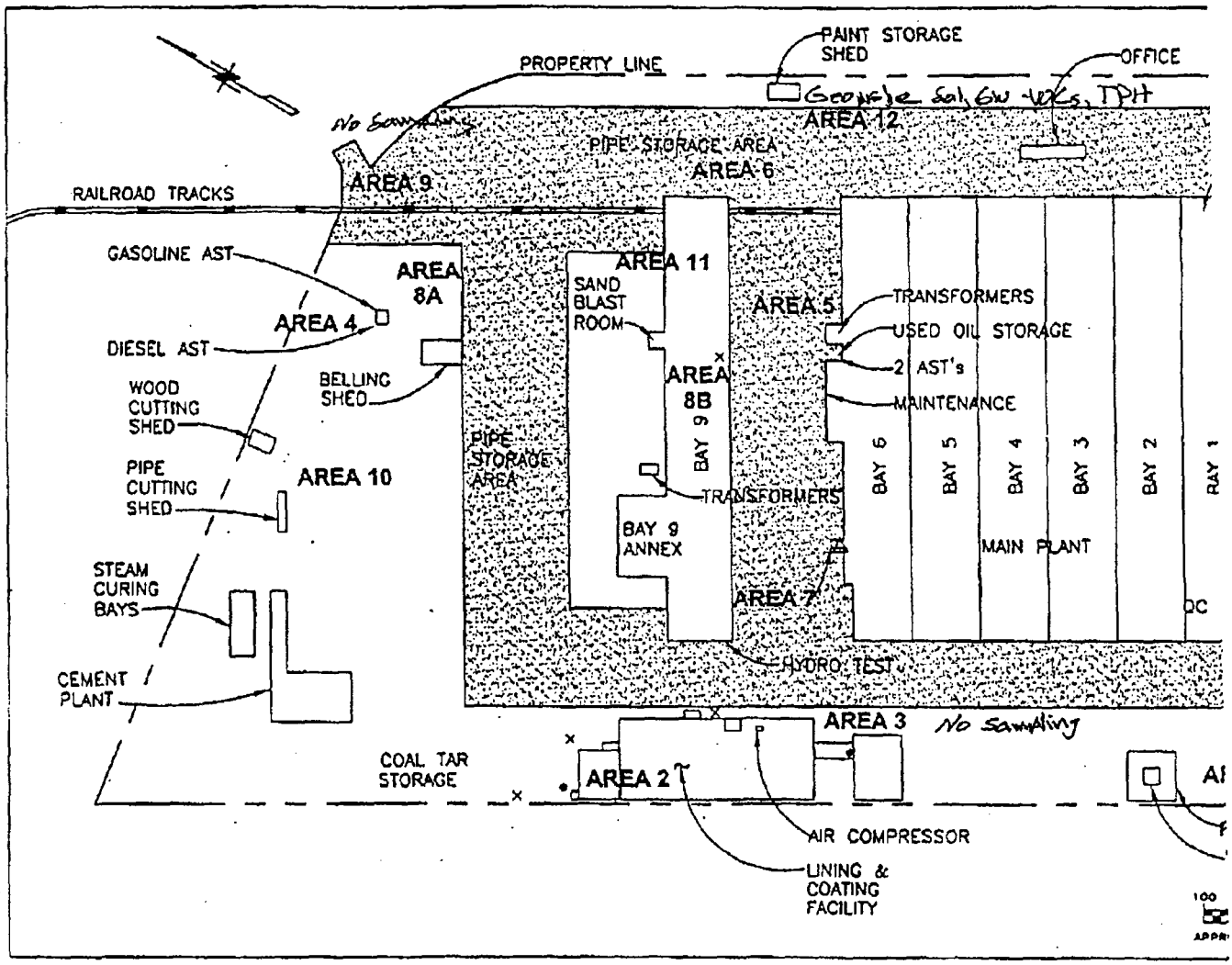

EXPLANATION:

△ WATER WELL

• SUMP

× COAL TAR RECLAMATION BLOWERS

PAVEMENT AREA (APPROXIMATE)

NOR

FIG2.dwg

3.3 Residual, Low Level VOCs and PAHs in Areas 1 and 3

Available sampling data from Areas 1 and 3 are described in Sections 3.2.1 and 3.2.2 of this Addendum, respectively. CH2M HILL has recommended that soil and groundwater samples be collected from Area 1to address the DEQ's current concern. As described in Section 3.2.2, the soil in Area 3 lies under a concrete floor and roof in an active industrial facility. No additional sampling is proposed for this location.

Area 1 and 3 were sampled and remediated by Crosby & Overton in 1989. In Area 1, the concentrations of tetrachloroethene (PCE) documented to be present were low: PCE concentrations ranged from 0.16 milligrams per kilogram (mg/kg) in a composite sample representative of the bottom of the remedial excavation to 0.17 mg/kg in a wall sample. Both of these concentrations are about two orders of magnitude below the PRG for PCE of 16 mg/kg.

3.4 Residual, Low Level PCBs and TPH in Area 5

In its February 1, 2001 letter, DEQ, implies that it had, in the past, recommended that remedial action be taken in Area 5. A review of past agency memoranda (DEQ 1991a and 1991b) suggests that DEQ did not recommend in writing excavation for this area; rather, the agency relates a telephone conversation with a Crosby & Overton staff member who had expressed an opinion about petroleum hydrocarbons being limited only to surface soil in Area 5. DEQ noted that this opinion "was apparently not confirmed by excavation" (DEQ 1991a). DEQ's statement in its 1991 memorandum appears to be a declaration of fact rather than a recommendation for remedial action.

Although Crosby & Overton did not confirm its opinion about surficial contamination by excavating soil, it did collect subsurface soil samples that confirm the elevated TPH and PCB concentrations in Area 5 were limited to surficial soil. These samples show that TPH concentrations at a 5 foot depth inside the Machine Shop, and at a 4 foot depth around the transformers, were either below detection limits or were detected at concentrations below the potentially applicable TPH criterion of 500 mg/kg. Similarly, PCBs, which were detected either below or slightly above the Region 9 PRG for PCB in the near-surface samples in Area 5, were not present in deeper samples. Additional information on Area 5 sampling is provided in Section 3.2.3 of this Addendum.

Note that the detection limit achieved by the laboratory used by Crosby & Overton for this work (0.1 mg/kg) is two orders of magnitude below the detection limit of 10 mg/kg cited by DEQ in its February 1, 2001 letter.

3.5 Residual, Low Level VOCs in Areas 9 and 12

DEQ's comments regarding this area are addressed in Sections 3.2.4 (Area 9) and 3.2.5 (Area 12) of this Addendum.

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3.6 "Storm Drain" Sediment at Area 14

Historical Steam Cleaner Settling Tank?

Area 14 was described erroneously by Dames & Moore (1989) as a "plugged storm drain". Based on additional work by Northwest Pipe and Crosby & Overton, this feature was determined to be a large (approximately six feet deep) underground catch basin that apparently was associated with the former Beall Pipe and Tank Corporation wash pad. It has an outlet near its top that, if the catch basin filled with water, could serve as an overflow outlet. Dames & Moore (2000) indicated that this outlet is connected to the facility storm water system. In 1989, Crosby & Overton removed two feet of sludge from the bottom of the catch basin. The catch basin at Area 14 is not used by any Northwest Pipe process and currently is empty.

3.7 Storm Water Discharge System

Historical mapping that is available for the storm water system indicates that storm water from the northern two-thirds of the Northwest Pipe property discharges to Schnitzer's Slip (formerly the Oregon Shipbuilding Corporation Fitting Basin) via Outfall No. 18 (as numbered on Schnitzer's storm water map contained in the Bridgewater Group Storm Water System Assessment [2000b]). The southern third of the Northwest Pipe property is shown on old Oregon Shipbuilding Corporation maps to discharge to the Willamette River through Outfall No. 1.

Northwest Pipe Company has expended considerable effort during the Winter of 2000-2001 to document its storm water discharge system. During this period, the weather has been unusually dry, preventing direct observation of storm water flow patterns. In an attempt to provide more complete information to DEQ regarding its storm water system, Northwest Pipe conducted two flow tests, both using introduced water to create flow within the facility storm water system.

The first flow test occurred on January 9, 2001. Northwest Pipe staff used a fire hose to introduce approximately 30 gallons per minute (gpm) of flow into a catchbasin near the southeastern corner of Bay 1 (Figure 4). After discharging approximately 500 gallons of water, CH2M HILL began dropping oranges into the catchbasin that was receiving the water flow at a rate of approximately one every thirty seconds. Oranges were selected for use because their subspherical shape precludes "hanging up" on obstructions; their density is only slightly less than water, so that they float with the majority of their bulk below the water surface; and their color makes for easy visual identification. Light rain fell during the early part of the test, adding storm water runoff to the system, but the rain stopped after about a half hour. The fire hose was allowed to discharge into the storm water system for a total duration of approximately 45 minutes.

A CH2M HILL observer was posted at Outfall No. 18 for the duration of the test. In addition, a CH2M HILL observer was escorted to Outfall No. 1 by a Schnitzer Steel Corp. representative. No oranges appeared during the course of the test at either outfall. The Schnitzer Steel Corp. representative commented that Outfall No. 1

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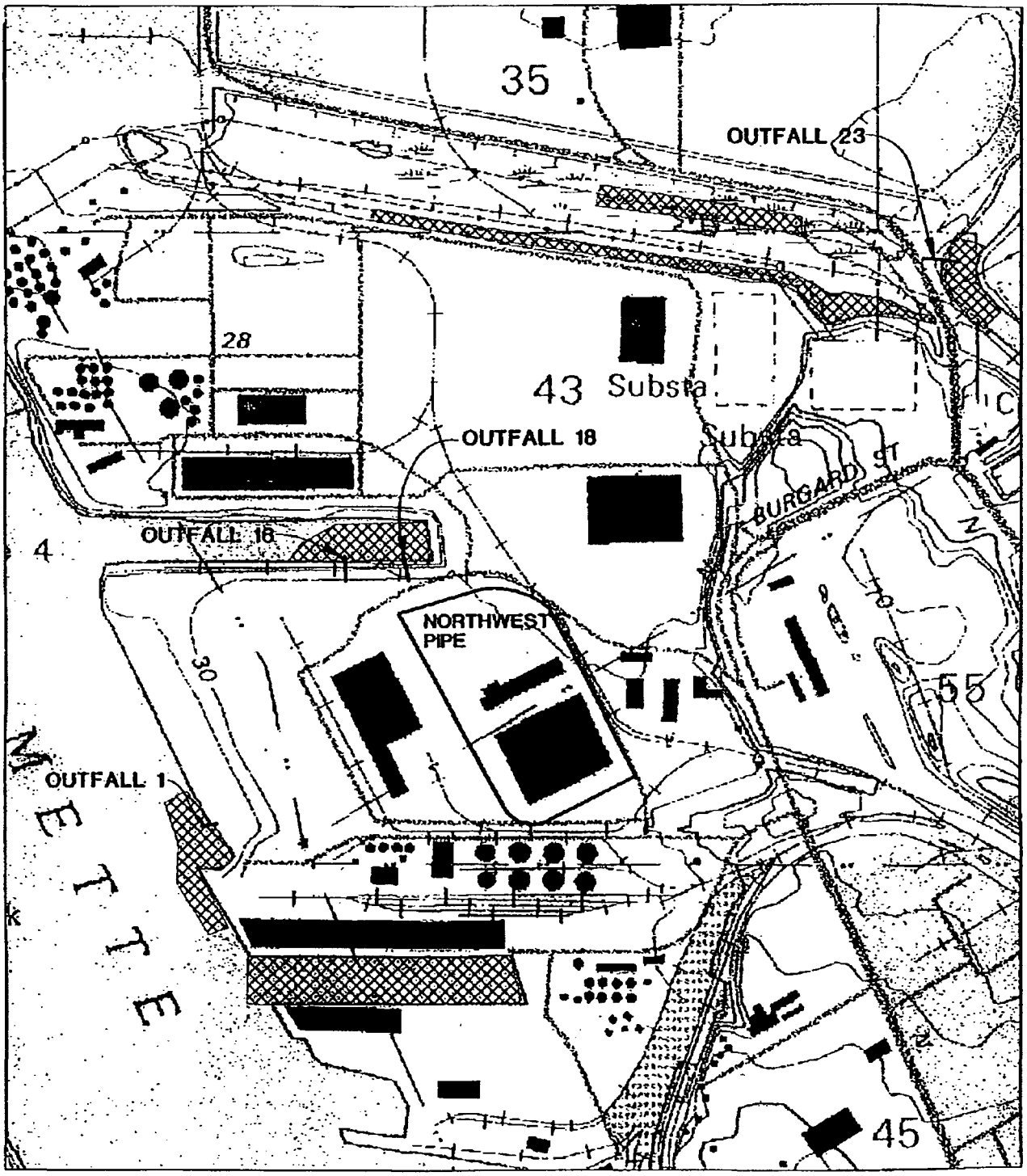

N

0 400 800

SCALE IN FEET

LEGEND

AREAS OBSERVED

Figure 4
DYE TEST OBSERVATION
NORTHWEST PIPE CO.
PORTLAND, OREGON

CH2MHILL

1844G001.DWG

SCHN00206353

appears to be plugged and that he had not seen water flow from Outfall No. 1 for at least three years. Schnitzer's storm water maps show that the pipe leading to Outfall No. 1 is plugged on Schnitzer's property between the Northwest Pipe site and the Willamette River. During the week following the storm water flow test, Schnitzer's Slip in the vicinity of Outfall No. 18 and the Columbia Slough in the vicinity of another potential storm water outfall from Burgard Industrial Park were observed with no indication of oranges.

The second flow test was conducted on February 20, 2001. For this test, water was introduced from two sources into catchbasins near the southwest corner of Bay 1. One source was a fire hose flowing at approximately 50 gpm and discharging into the location identified on Figure 4 as Drain No. 2. The second source of water was a 2,200-gallon water truck discharging directly into a second catchbasin (Drain No. 1) and making a total of six rounds over 90 minutes, for an average flow of about 140 gpm from the water truck. The total amount of water introduced during the test is estimated to be 17,700 gallons.

Specially-formulated versions of Rhodamine WT dye (Ben Meadows Corporation FWT Red) and Fluorescein dye (Ben Meadows Corporation FLT Yellow/Green), each certified by the National Sanitation Foundation for use in potable water systems, were used in the dye test. The red dye tablets were introduced at Drain No. 1, along with the water that was being discharged by the water truck (see Figure 4). After the conclusion of the storm water dye test, the FLT Yellow/Green dye was introduced in Drain No. 5 (inside Bay 5) to document the location where water from the northern two thirds of the site discharges.

Dye test observations were made at Outfall No. 18 during and after the storm water dye test, with no indication of red dye or increased flow such as might be attributable to the water introduced at the site. In addition, a manhole located near Outfall No. 18 also was observed periodically for presence of red dye or changes in flow conditions. CH2M HILL also checked Drain No. 3, just outside the Lining and Coating Facility, for increased flow and for presence of dye. Because of information provided by Schnitzer regarding the blockage and lack of flow for a period of years at Outfall No. 1, an observer was not stationed at this location; however, this outfall was checked at the end of the test to determine if it was carrying any flow. Again, no flow was observed.

No red dye was observed to discharge during the storm water-test, and no flow changes that could be attributed to the testing were observed. At the conclusion of the test, CH2M HILL staff observed Outfall Nos. 16 and 18 (at Schnitzer's Slip), Outfall No. 1 (at the Willamette River near the south edge of Schnitzer's property), as well as the slip at Terminal 4 and, the following day, in the Columbia Slough. These locations are shown on Figure 4. No red dye was observed in any of these locations. Yellow/green dye was observed at Outfall No. 18 after it was introduced

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in Bay No. 5, confirming that the storm sewers in this portion of the Northwest Pipe facility discharge to Schnitzer's Slip.

In conclusion, the location where flow from the northern two-thirds of the site discharges was confirmed to be Outfall No. 18 near the east end of Schnitzer's Slip. The location where storm water from the southern third of the Northwest Pipe facility discharges was not confirmed. It is possible, given the storage capacity of the pipes in the drain system, that CH2M HILL was unable to introduce sufficient flow in the absence of any precipitation to cause water to flow all the way to its discharge point. Another dye test under steady rain conditions, when they occur, may provide a more conclusive result.

3.8 Additional Information on the Industrial Production Well

It is not known specifically when the site production well originally was installed. At the time the Oregon Shipbuilding Corporation facility was built, the State of Oregon did not require well logs to be filed with the state. A 1973 copy of State Water Well Report was obtained and reviewed. The log print is of poor quality, but it indicates that the well was deepened in late 1972 and early 1973 from its original depth of 25 feet to a new depth of 258 feet. The original installation date of the well is not noted on the report. According to the report, the well currently has an 8-inch diameter casing to its total depth, has a bentonite seal in a 12-inch borehole from the ground surface to a depth of 30 feet, and is perforated from 195 to 201 feet. A stepped specific capacity test was conducted on the well at the time of deepening, which indicated that the well yielded 204 gpm with 19 feet of drawdown for the first hour; 250 gpm with 28 feet of drawdown for the second; and 440 gpm with 42 feet of drawdown for the third hour. A copy of the 1973 water well report is provided in Attachment 1.

In its February 1, 2001 letter, DEQ requested documentation of the three sampling events at the site water well. This information was provided in Northwest Pipe's November 21, 2000 Preliminary Assessment (Attachment 1 to Appendix A, page 22). This page and the associated laboratory reports have been excerpted and are provided in Attachment 2.

Three samples have been collected from the well. The testing on the industrial production well showed the following results:

- Low concentrations of TPH was detected, ranging in concentration from 0.17 mg/L to 18 mg/L.

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- A single non-carcinogenic PAH (fluoranthene) was detected at a concentration of 0.026 micrograms per liter ($\mu g/L$). No other PAHs were detected in the sample, with detection limits ranging from 0.028 $\mu g/L$ to 0.54 $\mu g/L$. Although Northwest Pipe's well is not used for drinking water, the concentration of fluoranthene that was detected in one of the production well samples (0.026 $\mu g/L$) is approximately five orders of magnitude under the Region 9 PRG for tap water (1,500 $\mu g/L$).
- PCBs were not detected in a sample from the well, with a detection limit of 1 $\mu g/L$.
- PCE was detected in the first sample from the production well at a concentration of 0.5 $\mu g/L$; a concentration equivalent to the detection limit for PCE. This initial result was not repeated in subsequent sampling: neither of the follow-up samples from the production well detected PCE at or above its detection limit of 0.5 $\mu g/L$. No other VOCs were detected in these samples, with detection limits ranging from 0.2 $\mu g/L$ to 2 $\mu g/L$ (however, the detection limit for the common laboratory contaminant methylene chloride should be adjusted in the first sample to 23 $\mu g/L$ due to its detection at a concentration of 2.3 $\mu g/L$ in the blank for this sample [EPA 1999]). Although Northwest Pipe's well is not used for drinking water, the concentration of PCE detected in the first of three samples from the well is an order of magnitude below the maximum contaminant level for drinking water (5 $\mu g/L$) and less than one-half the Region 9 PRG for tap water (1.1 $\mu g/L$).

In summary, the only constituents detected in the site production well are TPH, fluoranthene at an extremely low concentration, and a single, very low detection of PCE that could not be replicated in follow-up samples.

Water from the site production well is used as non-contact cooling water for pumps, as cement mortar make-up water, and as a source of water for hydrotesting finished pipes. The non-contact cooling water is discharged to Schnitzer's slip via the site storm water system. Given the very low constituent concentrations detected in the well and its use at the site solely for industrial processing, the low level concentrations of these constituents that have been detected do not appear to be significant.

4.0 Groundwater Monitoring Well Status

Six monitoring wells were installed by OMNI Environmental to investigate groundwater conditions around a former underground storage tank area that was undergoing remediation (Area 4). This area received a "No Further Action" determination from DEQ in 1990. A map showing the location of the wells was provided in Figure 2, Attachment 2, of URS (2000).

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The shallow groundwater elevation and the flow direction for shallow groundwater at the site was determined by OMNI Environmental (Preliminary Assessment Report Appendix A, Attachment 2), and briefly addressed in Section 5 of the Preliminary Assessment Report. Based on groundwater measurements made by OMNI Environmental at the site in March 1990, the shallow groundwater at the site ranged in elevation from 15.9 feet to 18.0 feet, which correlates to a depth to water ranging from approximately 6.5 to 7.8 feet. The groundwater gradient appeared to be generally westward and toward the Willamette River.

Three of the monitoring wells (MW1, MW-2, and MW-4) currently are visible at the facility. A fourth well, MW-0, may be present within a steel protective casing under a rack of stored pipe. The remaining two monitoring wells – MW3 and MW-5 – could not be located using close visual observation and use of a metal detector. However, the metal detector may not have not have been reliable due to the amount of steel pipe in the vicinity of the test area. Because the OMNI Environmental wells no longer are needed and because it is not known if they can continue to yield groundwater samples that are representative of the aquifer, CH2M HILL recommends that the location of the remaining two wells be confirmed and that all five wells be decommissioned in accordance with Oregon Water Resources Department regulations.

5.0 Clarification on Hazardous Waste Generator Status

In its December 18, 2000 letter, DEQ noted that in 1999, Northwest Pipe was a large quantity generator of hazardous waste after being a small quantity generator for several years. Northwest Pipe has reviewed its 1999 Waste Generation and Management – Answer Sheets, and identified a reporting error that has since been corrected. In its original version of these sheets, Northwest Pipe inadvertently reported waste "as shipped" rather than "as generated." The sheets have since been corrected, confirming that Northwest Pipe continued to qualify as a small quantity generator of hazardous waste during 1999.

6.0 Comments on Burgard Industrial Park Documents

Schnitzer Investment Corp. has prepared reports related to site conditions at the Burgard Industrial Park, which completely surrounds the Northwest Pipe facility. In a January 18, 2001 meeting, DEQ requested that Northwest Pipe provide comments on these reports.

6.1 Burgard Site History Review

Section 2.6.2.9 of the Site History Review (Bridgewater 2000a) has a description of the Northwest Pipe facility that contains incomplete and potentially misleading information:

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- The Bridgewater report describes an EPA inspection in July 1986 that noted accumulated drums and stained soil. These areas were successfully addressed by Northwest Pipe Company in 1989 and 1990. The Bridgewater report failed to mention the most recent RCRA inspection on February 3, 1998, in which DEQ noted "no violations of the Oregon hazardous waste management statutes and rules" were present at the site.

- The report mentioned that EPA collected soil samples during a August 1986 Toxic Substances Control Act (TSCA) inspection. This area also was remediated by Northwest Pipe during the late 1980s. On September 25, 1991, EPA completed a TSCA inspection and concluded that the site was in compliance with the agency's PCB regulations.

- The Bridgewater report repeats DEQ's (1991b) comment that reporting of site remediation information was not "well documented." Although the reporting prepared by Crosby & Overton was not as detailed as DEQ would have preferred, Northwest Pipe, through preparation of consultant reports by URS (2000), CH2M HILL (2000) and this Addendum, has clarified the characterization and confirmation sampling conducted at the site.

- Bridgewater repeats a DEQ (1991b) comment that "...significant contaminant concentrations levels were detected" in areas where no remediation was performed. This comment relates to Area 5 – the machine shop/transformer area adjacent to Bay 6. As described in Section 3.2.3 of this addendum, elevated concentrations of petroleum hydrocarbons in this area were shown by sampling to be limited to surficial soil. Subsurface soil samples showed that TPH concentrations decreased substantially with depth. The other example provided by DEQ (1991b) relates to "...a small area of stained surface soil in a building", which is a common situation at active industrial sites that is unlikely to pose a significant threat to human health or the environment.

- Bridgewater also cites a DEQ (1991b) comment that Crosby & Overton (1989), at times, did not include an analysis of the constituent for which soil remediation had been conducted. When making this comment, DEQ apparently was referring to a portion of the sampling data for Area 9. Section 3.2.4 of this addendum reviews the sampling data available this area. While it is technically accurate to state that the *confirmation* samples from this area (e.g., samples from the four-foot-depth) were not analyzed for the constituent of interest – TPH – it is more accurate to note that soil sample data collected *prior to remediation* already had documented that the TPH was limited to surficial soil. These pre-remediation samples showed that TPH data exhibited the following trend with depth:

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- Surface – 22,000 mg/kg TPH
- 1-foot depth – 420 and 530 mg/kg TPH
- 2-foot depth – 88 mg/kg TPH
- 6-foot depth – TPH not detected

Given that at 2 feet the TPH concentration already had decreased in concentration well below potentially applicable criteria for TPH, and no TPH was detected at the 6-foot depth, the absence of additional TPH data from the 4-foot depth should be considered insignificant.

- Lastly, the Bridgewater report points out that TPH, fluoranthene, and PCE had been detected in the industrial production well at the site. As described in Section 3.8, the initial detection of PCE at the detection limit of 0.5 μg/L could not be repeated in two subsequent samples, both of which did not detect PCE. Also, the concentration of fluoranthene that was detected is extremely low: 0.026 μg/L, or 26 parts per trillion, which is 5 orders of magnitude below the Region 9 PRG for fluoranthene.

6.2 Burgard Storm Water System Assessment

A description of the Northwest Pipe facility is provided in Section 3.2 of the Storm Water System Assessment for the Burgard Industrial Park (Bridgewater 2000b). The report lists a number of activities and features at the site and could be read to imply that each of these contributes to storm drainage from the site. Such an interpretation would be inaccurate. For example, pipe coating occurs inside buildings (the Lining and Coating Facility and the 207 Mill). The coating process is not exposed to precipitation and therefore does not contribute to storm water runoff. Similarly, the Wash Pad is located inside a building, and consists of a concrete pad with a central collection sump that has no outlet. As with the coating operation, the Wash Pad is not exposed to precipitation and does not contribute to storm water runoff. Finally, the petroleum above ground storage tanks are located within a concrete secondary containment structure that does not contribute to storm water runoff.

Bridgewater describes the cement plant as being located along the southern edge of the Northwest Pipe facility. The cement plant actually is located in the northwest corner of the site. The feature described as "steam cleaner settling tank" appears to be consistent with the catch basin identified as Area 14. As described in Section 3.6, the catch basin is not used by any Northwest Pipe process and currently is empty.

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7.0 Recommendations

This Addendum contains the following recommendations for further work to address DEQ's current concerns:

- Additional sampling in Area 1 (soil and groundwater), Area 5 (soil), and Area 12 (soil and groundwater). A description and rationale for this sampling are provided in Section 3.2.
- Additional work to identify and subsequently decommission monitoring wells installed by OMNI Environmental.

It is recommended that a work plan be prepared that describes sampling and analysis methods, well decommissioning procedures, quality assurance/quality control procedures, reporting, and a proposed schedule.

SCHN00206360

8.0 References

Bridgewater Group. 2000a. Site History Review, Burgard Industrial Park. Unpublished consultant's report prepared for Schnitzer Investment Corp. September 25, 2000.

Bridgewater Group. 2000b. Storm Water System Assessment. Unpublished consultant's report prepared for Schnitzer Investment Corp. December 21, 2000.

CH2M HILL. 2000. Preliminary Assessment Report for Northwest Pipe Company, Portland, Oregon. Unpublished consultant's report prepared for Northwest Pipe Company. November 2000.

Crosby & Overton. 1989. Letter report to Bill Dana of Oregon DEQ regarding Northwest Pipe and Casing. August 11, 1989.

Dames & Moore. 1989. Phase I and Phase II Property Transfer Site Assessment. Unpublished consultant's report prepared for Northwest Pipe Company, Portland, Oregon. March 9, 1989.

Department of Environmental Quality. 1990. Letter from Andree Pollock, UST Cleanup Specialist, to John Miller of Northwest Pipe and Casing. April 16, 1990.

Department of Environmental Quality. 1991a. Strategy Recommendation prepared by Bill Dana. October 31, 1991.

Department of Environmental Quality. 1991b. Memorandum from Bill Dana of DEQ to Loretta Pickerell of DEQ. September 3, 1991.

Environmental Protection Agency. 1999. USEPA Contract Laboratory Program. National Functional Guidelines for Organic Data Review. EPA 540/R-99/008. October 1999.

Osborn, Julia. 1945. A Story of a Shipyard. Available at Oregon Historical Society, Portland, Oregon.

URS. 2000. Letter Report. Environmental Review. Northwest Pipe Company North Portland Plant. Unpublished consultant's report prepared for Northwest Pipe Company, Portland, Oregon. November 2000.

SCHN00206361

Attachment 1

Production Well Log

of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

WATER WELL REPORT

STATE OF OREGON

(Please type or print)

(Do not write above this line)

State Well No. _____

State Permit No. _____

(1) OWNER:

Name Pacell Fire & Tank Corp.

Address 12005 N. Burgard Rd.

Portland, Oregon

(2) TYPE OF WORK (check):

New Well ☐ Deepening ☒ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:

Threaded ☐ Welded ☒

8" Diam. from 0 ft. to 216 ft. Gage .250

" Diam. from ____ ft. to ____ ft. Gage ____

" Diam. from ____ ft. to ____ ft. Gage ____

(6) PERFORATIONS:

Perforated? ☒ Yes ☐ No.

Type of perforator used Mills Knife

Size of perforations 1/8 in. by 3 in.

72 perforations from 195 ft. to 201 ft.

perforations from ____ ft. to ____ ft.

perforations from ____ ft. to ____ ft.

(7) SCREENS:

Well screen installed? ☒ Yes ☐ No

Manufacturer's Name UOP Johnson

Type 8" Telescoping Stainless Model No. 204

Diam. 8" Slot size .020 Set from 215 ft. to 220 ft.

Diam. ____ Slot size ____ Set from ____ ft. to ____ ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom?

Yield:	gal./min. with	ft. drawdown after	hrs.
204	19	1	
250	28	1	
440	42	1	

Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.

Artesian flow ____ g.p.m.

Temperature of water ____ Depth artesian flow encountered ____ ft.

(9) CONSTRUCTION:

Well seal—Material used Bentonite

Well sealed from land surface to 30 ft.

Diameter of well bore to bottom of seal 12" in.

Diameter of well bore below seal 8 in.

Number of sacks of cement used in well seal 0 sacks

Number of sacks of bentonite used in well seal 5 sacks

Brand name of bentonite International Gel

Number of pounds of bentonite per 100 gallons of water 50 lbs./100 gals.

Was a drive shoe used? ☒ Yes ☐ No. Plugs ____ Size: location ____ ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? ____ depth of strata ____

Method of sealing strata off ____

Was well gravel packed? ☐ Yes ☒ No Size of gravel ____

Gravel placed from ____ ft. to ____ ft.

(10) LOCATION OF WELL:

County Multnomah Driller's well number

¼ ¼ Section 35 T. 2N R. 1 W. W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found 198 ft.

Static level 16 ft. below land surface. Date 1/22/73

Artesian pressure ____ lbs. per square inch. Date ____

(12) WELL LOG:

Diameter of well below casing 8"

Depth drilled [illegible] ft. Depth of completed well 220 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Previously drilled	0	25	
Silty gray clay-soft	25	46	
Fine gray sand	46	64	
Gray silty clay	64	98	
Fine gray sand	98	118	
Gray silty clay	118	129	
Fine gray sand	129	133	
Gray silty clay	133	161	
Fine gray sand	161	174	
Cemented gravel	174	191	
Coarse sand & gravel	198	203	
Fine brown sand	203	209	
Fine black sand	209	212	
Med. fine & coarse sand w/some fine gravel	212	221	
Blue silty clay/gravel seams	221	229	
Gray clay (soft)	229	240	
Fine gray-brown clay	240	258	
Soft gray clay	258		

Work started 11/3/72 19 Completed 1/22/73 19

Date well drilling machine moved off of well 1/22/73 19

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] [signature] (Drilling Machine Operator) Date 1/24/73 19

Drilling Machine Operator's License No. 751

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name A. M. Jannsen Drilling Co. (Person, firm or corporation) (Type or print)

Address 21075 S. W. Tualatin Valley Hwy. Aloha, O.

[Signed] [signature] (Water Well Contractor)

Contractor's License No. 79 Date 1/24/73 19

SCHN00206363

Attachment 2

Production Well Groundwater Sampling Information

On February 6, 1989, the gap between the asphalt and the concrete foundation was widened. Soils were excavated to a depth of 6 inches until a pipe was encountered. The soils did not exhibit odor or sheen and the HNU did not detect any volatilization of chemicals. Sample 6-S-01 was collected at the six inch depth and tested for chlorinated solvents.

Area 7:

On December 8, 1988, a sample from the on-site industrial water supply well was collected. The well, located outside the northwest portion of the main fabrication building (Figure 5), was purged of approximately 10 - 15 gallons of water before sample W-1 was collected from a small valve located on the well head. Sample W-1 was analyzed for PCBs, TPH, PNA, and chlorinated solvents.

On February 14, 1989, two additional water well samples were collected from the on-site industrial well. A review of the well log indicated that approximately 537 gallons represented one well pore volume. Mr. Vick informed Dames & Moore that daily water use at the facility was significant (over 3000 gallons per day). It was estimated that three well pore volumes or approximately 1620 gallons would be evacuated from the well after three hours of plant operation. On February 14, samples were collected at 14:45 after nearly seven hours of plant operation. Water sample 7-W-01 was retested for chlorinated solvents, PCB, TPH, and PNA. Water sample 7-W-02 acted as a duplicate for 7-W-01 and was only tested for chlorinated solvents.

Area 8A:

During the December sampling program, borehole B-1 was hand augered adjacent to the southern end of the underground gasoline storage tank (Figure

TABLE 7

DETECTED COMPOUNDS FOR AREA 7

NORTHWEST PIPE AND CASING COMPANY

SAMPLE #	DEPTH (FEET)	1,1,1 TRI-CHLOROETHANE	PCE	TCE	TPH	PCB	FLUORANT
W-1	200	<0.2	0.5	<0.2	0.17ppm	<1.0	ND
7-W-01	200	<0.5	<0.5	<0.5	18ppm	<0.15	0.026
7-W-02 (Dup)	200	<0.5	<0.5	<0.5	NT	NT	NT

<0.1 Indicates compound not detected at specified detection limit

ND: Indicates sample not tested for compound

NT: Indicates that sample not tested for compound

Note: All results listed in parts per billion (ppb) unless otherwise noted

WD40/NW.T7

AnalyticalTechnologies,Inc.

ATI I.D. # 8812-046-9

VOLATILE HALOCARBONS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: 12/08/88
PROJECT #	: 18050-002	DATE RECEIVED	: 12/09/88
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-1	DATE ANALYZED	: 12/13/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 601	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.5
CARBON TETRACHLORIDE	<0.2
CHLOROETHANE	<0.5
CHLOROFORM	<0.2
CHLOROMETHANE	<2.0
DIBROMOCHLOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
TRANS-1,2-DICHLOROETHENE	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
METHYLENE CHLORIDE	1.7 B
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE (TCE)	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE	109

B = Also found in blank.

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AnalyticalTechnologies,Inc.

ATI I.D. # 8812-046

VOLATILE HALOCARBONS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: N/A
PROJECT #	: 18050-002	DATE RECEIVED	: N/A
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 12/13/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 601	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.5
CARBON TETRACHLORIDE	<0.2
CHLOROETHANE	<0.5
CHLOROFORM	<0.2
CHLOROMETHANE	<2.0
DIBROMOCHLOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
TRANS-1,2-DICHLOROETHENE	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
METHYLENE CHLORIDE	2.3
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE (TCE)	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE	96

SCHN00206368

AnalyticalTechnologies,Inc.

ATI I.D. # 8812-046

VOLATILE HALOCARBONS
QUALITY CONTROL DATA

CLIENT	: DAMES & MOORE	SAMPLE I.D.	: 8812-015-11
PROJECT #	: 18050-002	DATE ANALYZED	: 12/09/88
PROJECT NAME	: N.W. PIPE & CASING CO.	SAMPLE MATRIX	: WATER
EPA METHOD	: 601	UNITS	: ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % REC	RPD
CHLOROBENZENE	<0.5	12	11.4	95	11.2	93	2
1,1-DICHLOROETHENE	<0.2	4.0	4.64	116	4.67	117	1
TETRACHLOROETHENE	<0.2	4.0	4.31	108	4.40	110	2
TOLUENE	<0.5	12	12.1	101	13.1	109	8
TRICHLOROETHENE	<0.2	4.0	4.45	111	4.69	117	5
META XYLENE	<0.5	12	12.2	102	11.6	97	5

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

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ATI I.D. # 8812-046

POLYCHLORINATED BIPHENYLS (PCB) ANALYSIS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: N/A
PROJECT #	: 18050-002	DATE RECEIVED	: N/A
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: 12/10/88
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 12/14/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 608	DILUTION FACTOR	: 1

COMPOUND	RESULT
PCB 1016	<1.0
PCB 1221	<1.0
PCB 1232	<1.0
PCB 1242	<1.0
PCB 1248	<1.0
PCB 1254	<1.0
PCB 1260	<1.0

SURROGATE PERCENT RECOVERIES

ISODRIN	85

SCHN00206370

AnalyticalTechnologies,Inc.

ATI I.D. # 8812-046-9

POLYNUCLEAR AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: 12/08/88
PROJECT #	: 18050-002	DATE RECEIVED	: 12/09/88
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: 12/10/88
CLIENT I.D.	: W-1	DATE ANALYZED	: 12/14/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 610	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ACENAPHTHENE	<5
ACENAPHTHYLENE	<5
ANTHRACENE	<1
BENZO(a)ANTHRACENE	<1
BENZO(a)PYRENE	<1
BENZO(b)FLUORANTHENE	<1
BENZO(g,h,i)PERYLENE	<1
BENZO(K)FLUORANTHENE	<1
CHRYSENE	<1
DIBENZO(a,h)ANTHRACENE	<5
FLUORANTHENE	<1
FLUORENE	<1
INDENO(1,2,3-cd)PYRENE	<1
NAPHTHALENE	<5
PHENANTHRENE	<1
PYRENE	<1

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ATI I.D. # 8812-046

POLYNUCLEAR AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: N/A
PROJECT #	: 18050-002	DATE RECEIVED	: N/A
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: 12/10/88
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 12/14/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 610	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ACENAPHTHENE	<5
ACENAPHTHYLENE	<5
ANTHRACENE	<1
BENZO(a)ANTHRACENE	<1
BENZO(a)PYRENE	<1
BENZO(b)FLUORANTHENE	<1
BENZO(g,h,i)PERYLENE	<1
BENZO(K)FLUORANTHENE	<1
CHRYSENE	<1
DIBENZO(a,h)ANTHRACENE	<5
FLUORANTHENE	<1
FLUORENE	<1
INDENO(1,2,3-cd)PYRENE	<1
NAPHTHALENE	<5
PHENANTHRENE	<1
PYRENE	<1

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ATI I.D. # 8812-046

POLYNUCLEAR AROMATICS
QUALITY CONTROL DATA

CLIENT : DAMES & MOORE
PROJECT # : 18050-002
PROJECT NAME : N.W. PIPE AND CASING CO.
EPA METHOD : 610

SAMPLE I.D. : 8812-046-9
DATE ANALYZED : 12/14/88
MATRIX : WATER
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % REC	RPD
ACENAPHTHYLENE	<5	400	300	75	270	68	11
BENZO(K)FLUORANTHENE	<1	20	17	85	17	85	0
DIBENZO(A,H)ANTHRACENE	<5	40	35	88	34	85	3
PHENANTHRENE	<1	20	16	80	15	75	6
PYRENE	<1	20	17	85	16	80	6

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$

SCHN00206373

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ATI I.D. # 8812-046

GENERAL CHEMISTRY RESULTS

CLIENT : DAMES & MOORE
PROJECT # : 18050-002
PROJECT NAME : N.W. PIPE & CASING CO.

SAMPLE MATRIX : WATER

PARAMETER	UNITS	-9
PETROLEUM HYDROCARBONS	mg/L	0.17

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ATI I.D. # 8812-046

GENERAL CHEMISTRY QUALITY CONTROL

CLIENT : DAMES & MOORE
PROJECT # : 18050-002
PROJECT NAME : N.W. PIPE & CASING CO.

SAMPLE MATRIX : WATER

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED CONC	SPIKE ADDED	% REC
PETROLEUM HYDROCARBONS	mg/L	8812-044-1	2.8	2.8	0	N/A	N/A	N/A
PETROLEUM HYDROCARBONS	mg/L	8812-046-9	N/A	N/A	N/A	37.7	51.8	73

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

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ENVIRONMENTAL LABORATORY

Peter Stroud
Dames & Moore
1220 S.W. Morrison St.
Portland, OR 97205

Client Code: DAMP1
Survey #
NW PIPE18050-002

LABORATORY RESULTS

Laboratory Job No.: 890597
Date Received: 02/15/89
Date Reported: 03/02/89

Date Collected: 02/14/89
Date Analyzed: 02/18/89

TOTAL PETROLEUM HYDROCARBONS(EPA 418.1)

MATRIX:WATER TOTAL DIGEST

LABNO	SMPLNO	COMPOUND	FOUND mg/lt	DET.LIM. mg/lt
3461	7-W-01	TPH	18	1.0

ANALYST:ROBERT REMLINGER

THIS REPORT HAS BEEN REVIEWED
AND APPROVED FOR RELEASE.

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L A B O R A T O R Y R E S U L T S

Date Collected: 02/14/89
Date Extracted: 02/16/89
Date Analyzed: 02/17/89

Laboratory Job No.: 890597
Date Received: 02/15/89
Date Reported: 03/02/89

ASSAY:PCBS IN WATER (GC/ECD EPA 608)
MATRIX:WATER

LABNO	SMPLNO-ID	RESULTS	DET.LIM
3461	7-W-01		
PCBs		ND	0.15 ug/lt

ND=Not Detected
NOTE: THE RESULTS WERE QUANTITAED FOR PCB'S AS AROCLORS 1242, 1254 AND 1260.
ANALYST:DAVE BUSCH

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ENVIRONMENTAL LABORATORY

LABORATORY RESULTS

Date Collected: 02/14/89
Date Extracted: 02/17/89
Date Analyzed: 02/22/89

Laboratory Job No.: 890597
Date Received: 02/15/89
Date Reported: 03/02/89

ASSAY:POLYNUCLEAR AROMATICS IN WATER (HPLC EPA 8310)
MATRIX:WATER

LABNO	SMPLNO-ID	RESULTS		DET.LIM	
3461	7-W-01				
	PHENANTHRENE	ND		0.19	ug/lt
	ANTHRACENE	ND		0.54	ug/lt
	FLUORANTHENE	0.026	ug/lt	0.0096	ug/lt
	PYRENE	ND		0.054	ug/lt
	BENZO(A)ANTHRACENE	ND		0.0037	ug/lt
	CHRYSENE	ND		0.065	ug/lt
	BENZO(B)FLUORANTHENE	ND		0.0071	ug/lt
	BENZO(K)FLUORANTHENE	ND		0.0018	ug/lt
	BENZO(A)PYRENE	ND		0.0031	ug/lt
	DIBENZ(AH)ANTHRACENE	ND		0.0082	ug/lt
	BENZO(GHI)PERYLENE	ND		0.0051	ug/lt
	INDENO(123CD)PYRENE	ND		0.028	ug/lt
3461	7-W-01				
	NAPHTHALENE	ND		0.87	ug/lt
	ACENAPHTHYLENE	ND		1.5	ug/lt
	ACENAPHTHENE	ND		2.2	ug/lt
	FLUORENE	ND		0.20	ug/lt

NOTE: RESULTS FOR EACH SAMPLE ARE REPORTED IN 2 GROUPS WHICH ARE DIVIDED ACCORDING TO THE DETECTOR USED TO QUANTITATE CHROMATOGRAPHIC PEAKS 12 COMPOUNDS ARE QUANTITATED BY FLUORESCENCE, 4 BY UV.

ANALYST:TIM AOKI

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ENVIRONMENTAL LABORATORY

Peter Stroud
Dames & Moore
1220 S.W. Morrison St.
Portland, OR 97205

Client Code: DAMP1
Survey # NWPIPE 18050-002

L A B O R A T O R Y R E S U L T S

Date Collected: 02/14/89
Date Extracted: 02/15/89
Date Analyzed: 02/15/89

Laboratory Job No.: 890598
Date Received: 02/15/89
Date Reported: 02/21/89

PURGEABLES IN WATER (EPA 5030/601)

COMPOUNDS:	LAB#	3462	DET.	3463	DET.
	SMP#	7-W-01	LIM.	7-W-02	LIM.
PURGEABLES		UG/lt		UG/lt	
BROMODICHLOROMETHANE		ND	0.5	ND	0.5
BROMOFORM		ND	0.5	ND	0.5
BROMOMETHANE		ND	0.5	ND	0.5
CARBON TETRACHLORIDE		ND	0.5	ND	0.5
CHLOROETHANE		ND	0.5	ND	0.5
2-CHLOROETHYLVINYL ETHER		ND	1.0	ND	1.0
CHLOROFORM		ND	0.5	ND	0.5
CHLOROMETHANE		ND	0.5	ND	0.5
DIBROMOCHLOROMETHANE		ND	0.5	ND	0.5
1,4-DICHLOROBENZENE		ND	0.5	ND	0.5
1,1-DICHLOROETHANE		ND	0.5	ND	0.5
1,2-DICHLOROETHANE		ND	0.5	ND	0.5
1,1-DICHLOROETHENE		ND	0.2	ND	0.2
TRANS-1,2-DICHLOROETHENE		ND	0.5	ND	0.5
1,2-DICHLOROPROPANE		ND	0.5	ND	0.5
CIS-1,3-DICHLOROPROPENE		ND	0.5	ND	0.5
TRANS-1,3-DICHLOROPROPENE		ND	0.5	ND	0.5
METHYLENE CHLORIDE		ND	0.5	ND	0.5
1,1,2,2-TETRACHLOROETHANE		ND	0.5	ND	0.5
TETRACHLOROETHENE		ND	0.5	ND	0.5
1,1,1-TRICHLOROETHANE		ND	0.5	ND	0.5
1,1,2-TRICHLOROETHANE		ND	0.5	ND	0.5
TRICHLOROETHENE		ND	0.5	ND	0.5

THIS REPORT HAS BEEN REVIEWED
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L A B O R A T O R Y R E S U L T S

Laboratory Job No.: 890598

COMPOUNDS:	LAB#	3462	DET.	3463	DET.
	SMP#	7-W-01	LIM.	7-W-02	LIM.
PURGEABLES		UG/lt		UG/lt	
TRICHLOROFLUOROMETHANE		ND	0.5	ND	0.5
VINYL CHLORIDE		ND	1.0	ND	1.0

ANALYST:MARK VALENTINI

EMS Environmental Management Solutions
1800 SW First Avenue
Suite 610
Portland, Oregon 97201
503-225-9060
FAX: 503-273-8612

LOTS 5, 6 & 7

SCHNTZIC-INT:BGDOC.80

January 22, 1992

Tom Zelenka
Schnitzer Investment Corp.
3200 N.W. Yeon
Portland, OR 97210

RE: Field Sampling Report for IT Terminal Property

Dear Mr. Zelenka:

I am pleased to present the results of our field sampling on the IT Terminal property located in north Portland.

Our field sampling of the property was conducted pursuant to the approach outlined in the SONAS letter to your office dated October 25, 1991. This letter contained guidelines for a sampling approach to address issues raised in our Level I assessment of the property.

As you know, this was an exploratory survey to indicate general site conditions, and the results are based on the limited data collected.

The subject property consists of two and one-half Lots of undeveloped land, nine acres in area. Following the sampling approach as described in the SONAS letter, we collected samples for the following analysis: TPH-HCID, PCBs, TCLP (3 metals), and BTEX. In addition, we made Organic Vapor Meter (OVM) measurements at a number of shallow excavations throughout the property.

The samples analyzed were from areas with the highest probability for soil contamination, based on soil staining and in areas with debris-laden fill. Laboratory analysis of these surface soils revealed diesel fuel, heavy oils and in one instance 20 ppm of PCBs. this was collected from LOT 10 per RI

PCBs were also found in surface samples which were free of debris. All five samples tested for PCBs had some detectable concentration.

The subject property was being surveyed during our field work. Upon completion of the survey, it was determined that the location of the 20 ppm PCB sample (Site I) is located approximately 40 feet north of the property's northern boundary.

There was no evidence of chlorinated or aromatic solvents in any of the samples analyzed, with the possible exception of PCE at 5.5 ppb. Concentrations of leachable metals in the samples analyzed were less than 1 ppm. Systematic sampling from surface areas of the property utilizing an OVM indicated the extent of petroleum contamination appears to be confined to the areas we noted in the Level I assessment.

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Based on the results of our Level I assessment and the sampling results reported here, the extent of the contamination appears to be limited to a relatively small portion of the total area of the property, primarily where there is visible surface staining or where debris-laden fill material exists.

We appreciate the opportunity to be of assistance. I would be pleased to provide a briefing at your convenience.

Sincerely,

Dan Saltzman

Dan Saltzman
President

enclosure

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FIELD SAMPLING RESULTS FOR IT TERMINAL PROPERTY IN PORTLAND, OREGON

JANUARY 21, 1992

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503-225-9060
FAX: 503-273-8612

REGISTERED PROFESSIONAL ENGINEER 13,027 OREGON JULY 26, 1985 STUART L. GREENBERGER

To: Dan Saltzman

From: Stuart Greenberger, P.E.

Date: January 21, 1992

Subject: **Technical Memorandum No. 1: Field Sampling for IT Terminal, Schnitzer Investment Property**

INTENT AND LIMITATIONS

At the client's request, a supervised soil sampling program was conducted, with sample collection limited to six laboratory samples for each analysis. The samples were requested to be analyzed for: TPH-HCID, PCBs, TCLP (3 metals), and BTEX (see SONAS letter in Appendix B). Samples were collected at the engineer's discretion, based on general observations, gross indicators of contamination, and organic vapor monitoring. By intent, this was an exploratory survey to indicate general conditions. The amount of sampling does not approach the sampling and laboratory analyses necessary to characterize a site with statistical certainty. This report cannot and does not represent that the site contains no hazardous wastes, toxic materials, or latent conditions beyond those observed. Observations, findings, and opinions are based on the limited data collected.

GENERAL OBSERVATIONS AND SUMMARY OPINIONS

Most of the surface of the site is sand, however there is extensive gravel road bedding. From general observation of the large borrow pit and the exploratory pits, the top five feet of subsurface soil appears to be principally sand, debris-free. Groundwater was encountered at depth of 5 feet beneath the surface.

Organic vapor monitoring (OVM) was conducted in a grid pattern over the entire area and only two of 85 shallow borings showed detectable levels of organic vapor and these were low, 1 ppm and 0.25 ppm. There is a scant amount of automobile fluff (non-metallic automotive scrap) distributed across the entire area.

This field sampling survey focused on the most probable areas of soil contamination. Surface indicators of contamination were petroleum staining of sand and gravel, and areas with debris-laden fill. The debris was a mix of wood products and automotive fluff, there

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was also some apparent petroleum contamination. The fill was typically found to be less than 1 foot in depth, but in one localized area, it was 3 feet in depth.

Much of the contamination identified was associated with the surface fill/debris. Specifically, the shallow fill was found to contain diesel fuel, heavy oils and in one instance 20 ppm of PCBs.

PCBs were also found in surface samples which were free of debris. All five samples tested for PCBs had some detectable concentration.

Surface staining was found at the active, above ground fuel tank. Petroleum contamination appears to be localized and limited in depth; testing indicated nondetectable HCID levels at 5 feet depth.

With one possible exception, no chlorinated or aromatic solvents were detected (separate of diesel fuel), and leachable metals were only found at low concentrations, less than 1 ppm. A water sample may have had 5 ppb PCE, however this may be a consequence of cross contamination since the sample was collected from a shallow pit, dug by a backhoe.

Surface monitoring showed there was a high incidence of detectable organic vapor at the probable areas of contamination, as determined by visual observation. However, the more extensive grid survey identified only two areas with detectable organic vapors. This suggests the extent of contamination, as monitored by the OVM, appears to be limited to a relatively small portion of the total property, primarily where debris-laden fill material exists, and where there is visible petroleum staining.

SAMPLING PLAN AND SITE FINDINGS

Prior to collecting samples for laboratory analyses, the site was walked through its (north-south) length in 100-foot parallel (east-west) paths. Approximately every 50 feet, a shovel cut was made in the soil and an organic vapor reading was taken. (The gravel road at the 300-foot line was sampled at approximately 150-foot intervals.) The results of this surface grid survey of vapor readings are presented in Table 1. Only two of the 85 locations had detectable organic vapor readings, and these were quite low readings of 1.0 ppm and 0.25 ppm.

Sampling was then focused on areas of most probable contamination. Table 2 provides the results of the vapor monitoring in areas where there were surface indicators of possible contamination. Table 2 also contains the organic vapor monitoring results associated with the exploration pits.

A map of the subject property, with sampling locations, is presented in Figure 1. At the time of our field sampling a property survey was underway. When the property survey was

SCHN00206386

complete, it was determined that three borehole locations are in fact approximately 40 feet north of the northern property boundary (Sites H, I, & J).

As requested, samples were submitted for the following analysis: TPH-HCID, PCBs, TCLP (Cd, Cr, Pb), and BTEX. However, because of the favorable incremental cost of including analysis of chlorinated solvents with BTEX, a combined 8010/8020 analysis was performed for BTEX.

Table 3 summarizes the sampling and laboratory test results at each site. Appendix A contains the laboratory analysis results and chain-of-custody documents.

The findings, listed by sample site identified in Figure 1, are as follows:

SITE A

This is an abandoned electric utility concrete pad and the surrounding soil was tested for PCBs. Trace amounts were found in a 0–12 inches sample composited through depth. A composite sample of six locations around the pad, sample depth 0–6 inches, had a PCB concentration of 2.2 ppm.

SITE B

This is the site of a scrap railroad tanker labeled "OIL LUBE". Trace amounts of PCBs were found in a composite of six locations around the tank, at 0–6 inches sample depth. No 8010/8020 compounds were detected in a sample collected at a depth of 66 inches from an exploration pit. The pit profile was: 0–66 inches, sand, debris-free.

SITE C

This is a low area where sediment collects. A composite of six locations, 0–4 inches sample depth, was analyzed for leachable quantities of cadmium, chromium and lead; none were detected.

SITE D

There was a minor amount of surface debris at this site; an exploratory pit was dug. The pit profile was: 0–66 inches, sand, with groundwater at 60 inches. Both a soil and a water sample were collected from the bottom of the pit at 60 inches depth. The water sample was tested for BTEX and the soil sample was tested for all

SCHN00206387

8010/8020 compounds; no contaminants were identified, with the possible exception of 5.5 ppb PCE in the water sample.

This low concentration of PCE in the water sample may be the result of cross contamination arising from the manner of sample collection. To collect the sample a backhoe was used to dig a shallow pit and the water sample was collected from the backhoe bucket. This could be a cross contamination from the backhoe or from surface materials. Further sampling using a protocol for low concentrations of contaminant in water would be required to confirm this finding.

SITE E

This site had surface debris; an exploratory pit was dug. The pit profile was: 0–12 inches, debris; 12–42 inches, grey silt; 42–60 inches, sand. The surface debris and soil from the bottom of the pit were individually tested for the leachable metals cadmium, chromium, and lead. The surface debris sample showed low concentrations, 0.4 ppm and 0.3 ppm of cadmium and lead, respectively. No detectable concentrations of leachable metals were found in the 60 inches depth sample.

SITE F

There is an active above ground fuel tank at this location. There was surface staining and high organic vapor monitor readings. An HCID analysis of a sample taken at 12 inches depth indicated diesel fuel. An exploratory pit was dug and a sample was collected at 60 inches depth for HCID analysis. No diesel fuel was detected. This agrees with field observation of shallow migration of discernible diesel fuel. The pit profile was: 0–18 inches, compacted gravel and rock; 18–60 inches, sand.

SITE G

This is a site of surface debris; an exploratory pit was dug. The pit profile was: 0–36 inches, brown sand; 36-60 inches, grey sand. There was water inflow at the 36 inches depth. Presumably, there is a layer of fines restricting vertical water flow in this area. A sample was collected at the 36 inch interface and analyzed for 8010/8020 compounds and leachable cadmium, chromium, and lead. No detectable levels of these contaminants were found.

SCHN00206388

SITE H

This is a site of stained soil near a scrapped railroad tanker; an exploratory pit was dug. The pit profile was: 0–24 inches, sandy loam with debris; 24–60 inches, sand; 60 inches, groundwater.

The surface soil was tested for 8010/8020, HCID, and PCBs. There was no detectable level of 8010/8020 compounds. The HCID analysis indicated both diesel fuel and heavier oil fractions. The PCBs were at 4.6 ppm. Soil at the bottom of the pit was tested for leachable cadmium, chromium, and lead; none was detected. The groundwater was tested for petroleum contamination. Neither gasoline or diesel fuel was detected; however, a low level of hydrocarbons heavier than diesel was present in the sample.

Upon completion of the property survey, it was determined that this borehole is approximately 40 feet north of the subject property's northern boundary.

SITE I

This is an area of surface debris with apparent oil staining and relatively high organic vapor monitor readings. Two exploratory pits were dug. The first pit profile was: 0–18 inches, debris; 18–60 inches, sand. The second profile was: 0–36 inches, debris; 36–72 inches, sand.

The surface 0–12 inches was analyzed for HCID, PCBs, and leachable metals. A sample from the bottom of the pit at 60 inches depth was also analyzed for HCID. Diesel fuel was found in the surface sample but not in the deep sample. PCBs were found at 20 ppm in the surface sample. Cadmium, chromium, and lead were not at detectable levels.

Upon completion of the property survey, it was determined that this borehole is approximately 40 feet north of the subject property's northern boundary.

SITE J

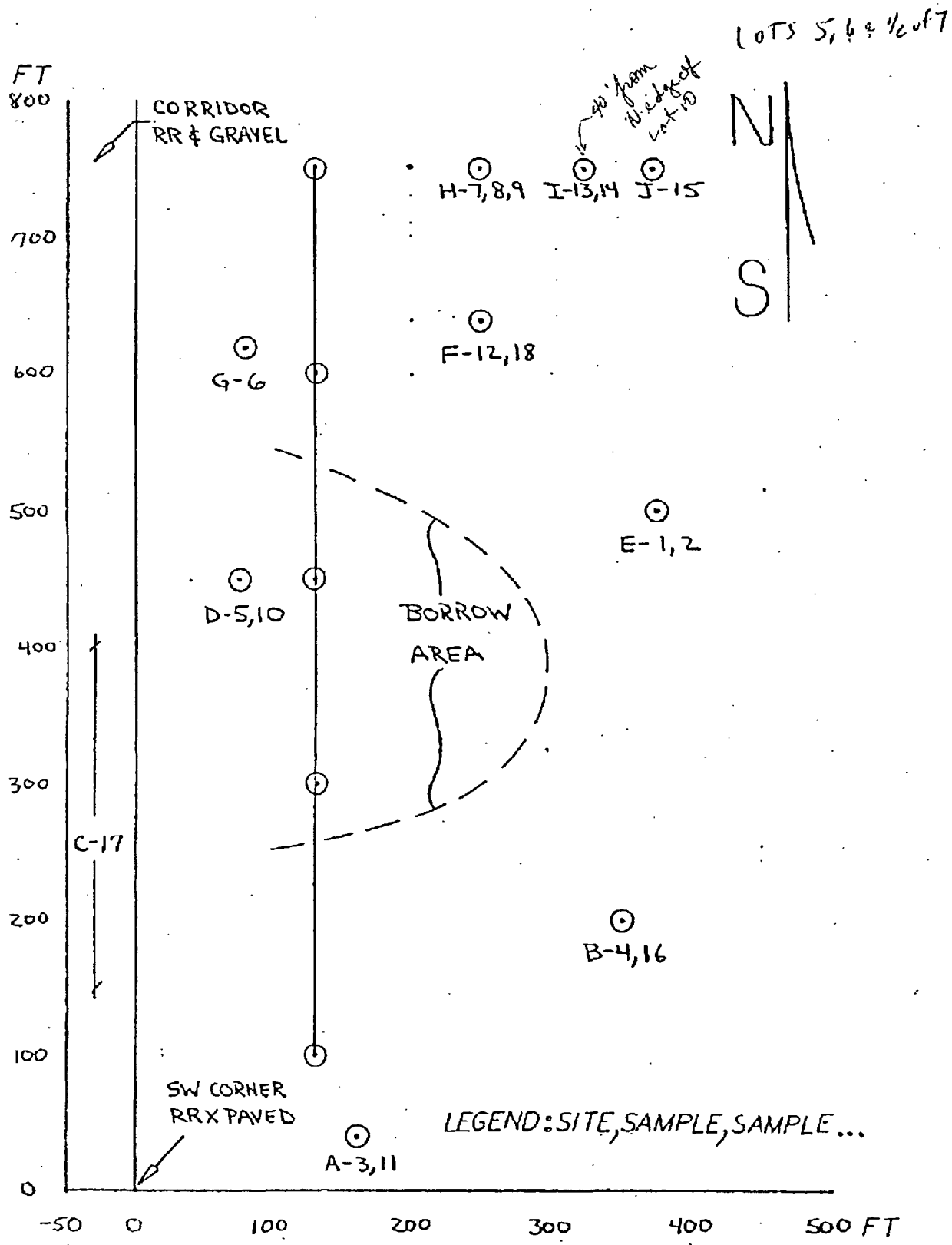
This is an area of surface debris; an exploratory pit was dug. The pit profile was: 0–6 inches, debris; 6–18 inches, sand. The debris was tested for the leachable metals cadmium, chromium, and lead. Chromium and lead were not at detectable levels. Cadmium was detected at the low level of 0.04 ppm.

Upon completion of the property survey, it was determined that this borehole is approximately 40 feet north of the subject property's northern boundary.

SCHN00206389

FIGURE 1: SITE MAP

FIGURE 1



PLAN: SAMPLING LOCATIONS
NTS—DISTANCES FIELD PACED AND APPROXIMATE

TABLES

TABLE 1

Photoionization Survey—Surface Grid[1]

Trace Gas in ppm as Benzene at 10.2 eV

	East to West (Ft.)					
North (Ft.)	0	100	200	300	400	500
750	ND	ND	ND		ND[2]	ND
700	ND	---	ND[2]	ND[3]	ND	ND
650	ND	ND	ND		ND[2]	ND
600	ND	ND[2]	ND		ND[2]	ND[2]
550	1.0	ND[2]	ND	ND[3]	ND	ND
500	ND	ND	ND		ND[2]	ND
450	ND	ND	ND	ND[3]	ND	ND
400	ND	ND	ND		ND	ND[2]
350	ND	ND	ND		ND	ND
300	ND	ND	ND	ND[3]	ND	ND
250	ND	ND	ND		ND	ND
200	ND	0.25	ND		ND	ND
150	ND	ND	ND		ND	ND
100	ND	ND	ND	ND[3]	ND	ND
50	ND	ND[2]	ND[2]		ND	ND
0	ND	ND	ND		ND	ND
South (Ft.)						

[1] Borehole depth ≥ 6" unless stated otherwise; ND = not detected, minimum detection 0.1 ppm
[2] ≤ 4" depth, rock and gravel surfacing
[3] 12–18" backhoe pit

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TABLE 2

Photoionization Survey—Surface Features and Exploration Pits[1]

Trace Gas in ppm as Benzene at 10.2 eV

Surface Features, 0–4" Borehole

1.	Borrow area, new cut	ND
2.	Borrow area, ponded water (0 depth)	ND
3.	Flat cars N of Site H	ND
4.	Site A	ND
5.	Site D	ND
6.	Site E	2 ppm, 1 ppm, ND, ND, ND
7.	Site F	12 ppm
8.	Site F (12" depth)	100 ppm
9.	Site H	ND
10.	Site I	6 ppm, 2 ppm, ND, ND, ND
11.	Site I (12" depth)	200 ppm
12.	Site J	ND, ND, ND

(Table 2 continues on next page)

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(Table 2, cont'd)

Exploration Pits

1. Site A	0–12"	sand	ND
2. Site B	0–66"	sand	ND
3. Site D	0–60"	sand	ND
	60"	ground water	
4. Site E	0–12"	debris	
	12–42"	grey silt	ND
	42–60"	sand	ND
5. Site F	0–18"	compacted rock and gravel	7–9 ppm at 6"
	18–60"	sand	1 ppm
	60"	ground water	
6. Site G	0–36"	brown sand	ND
	36–60"	grey sand	ND
	36"	water inflow	
7. Site H	0–24"	sandy loam with debris	ND at 12"
	24–60"	sand	ND
	60"	ground water	
8. Site I (center)	0–18"	debris	ND
	18–60"	sand	ND
9. Site I (SW corner)	0–36"	debris	15 ppm at 12"
	36–72"	sand	30 ppm at 60"
10. Site J	0–6"	debris	
	6–18"	sand	ND

[1] ND = not detected, minimum detection 0.1 ppm

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TABLE 3

Laboratory Analyses

SITE	SAMPLE #	DEPTH	ANALYSES	COMMENTS
A	3	0–12"	PCB'S	
A	11	0–6"	PCB'S	composite
B	4	66"	8010/8020	
B	16	0–6"	PCB's	composite
C	17	0–4"	TCLP (Cd, Cr, Pb)	composite
D	5	60"	8010/8020	
D	10	60"	8020	H_2O
E	2	0–12"	TLCP (Cd, Cr, Pb)	
E	1	60"	TLCP (Cd, Cr, Pb)	
F	12	12"	HCID	
F	18	60"	HCID	
G	6	36"	8010/8020, TCLP (Cd, Cr, Pb)	
H	7	0–6"	8010/8020, PCB's, HCID	
H	8	60"	TLCP (Cd, Cr, Pb)	
H	9	60"	HCID	H_2O
I	13	0–12"	HCID	
I	14	0–12"	PCB's, TCLP (Cd, Cr, Pb)	
I	19	60"	HCID	
J	15	0–12"	TCLP (Cd, Cr, Pb)	composite

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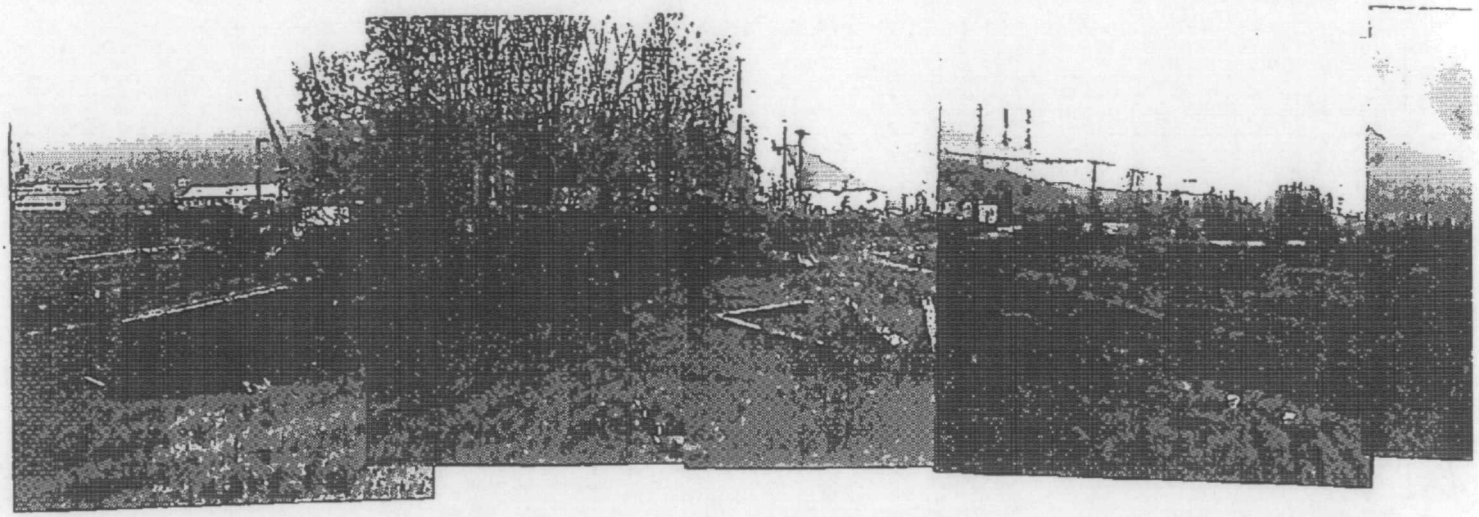
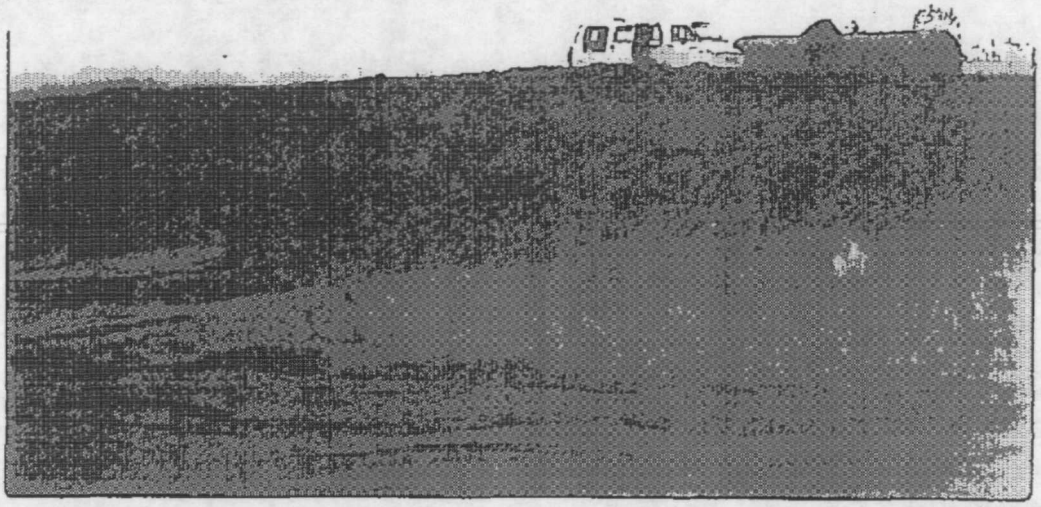
SITE PHOTOGRAPHS

SITE PHOTOGRAPHS

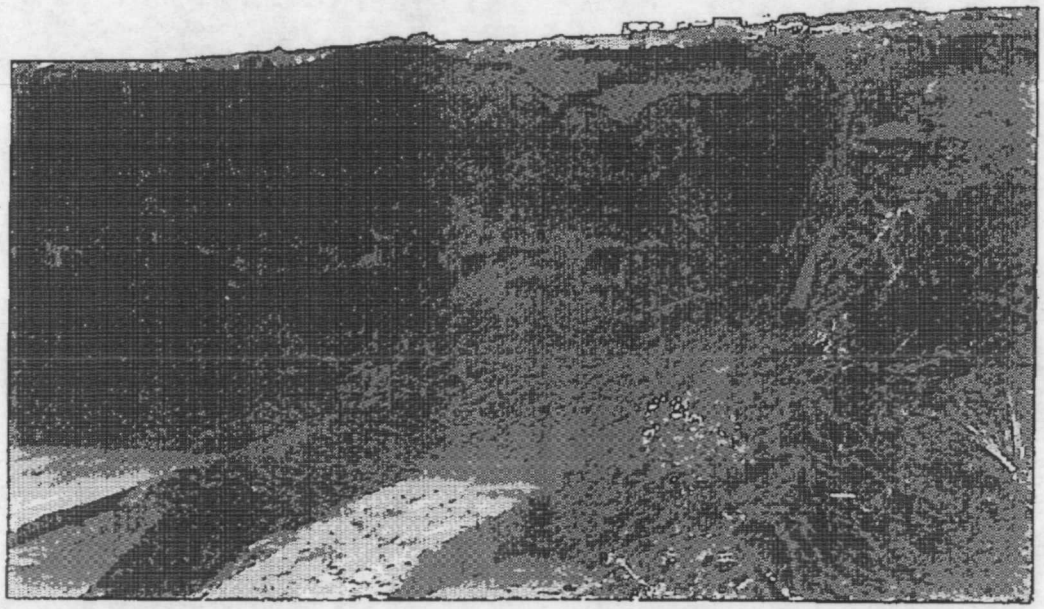


Panoramic view showing, left to right; SW property corner to NE property corner

SITE PHOTOGRAPHS



2. Borrow pit facing lube oil tanker, Site B



3. Close up of Photo 2 showing debris free soil of borrow material.

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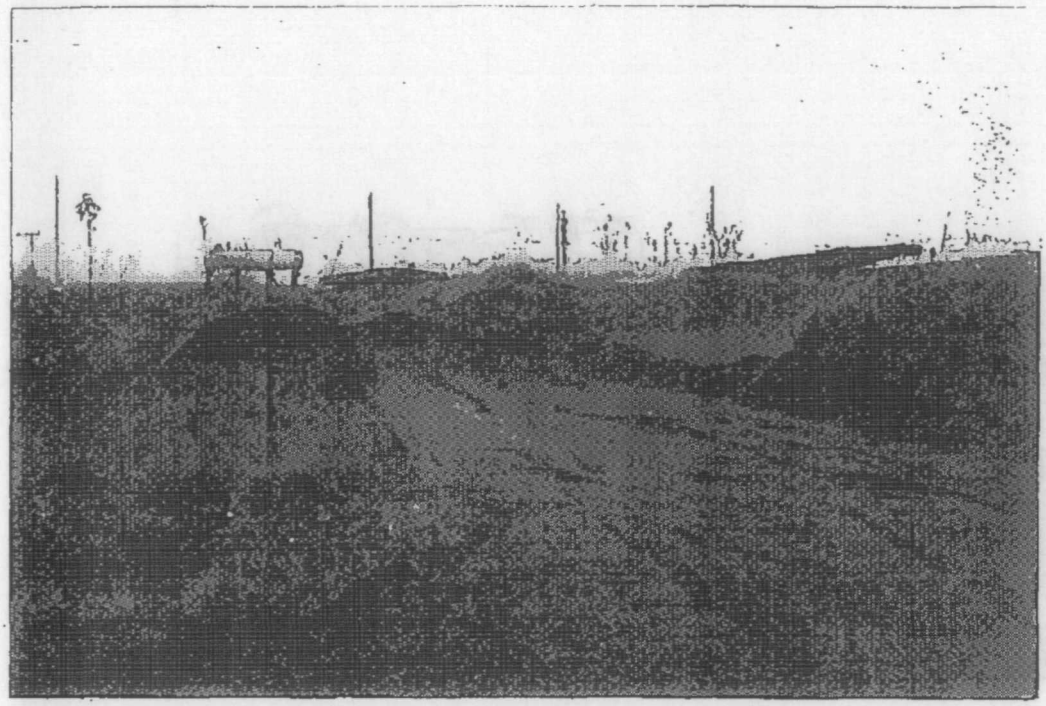
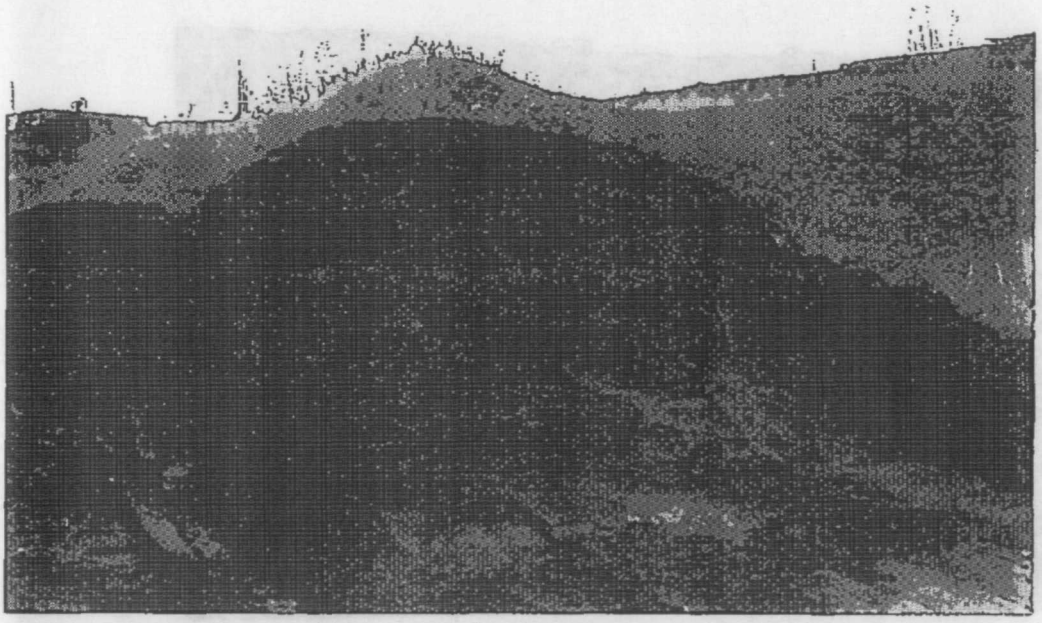


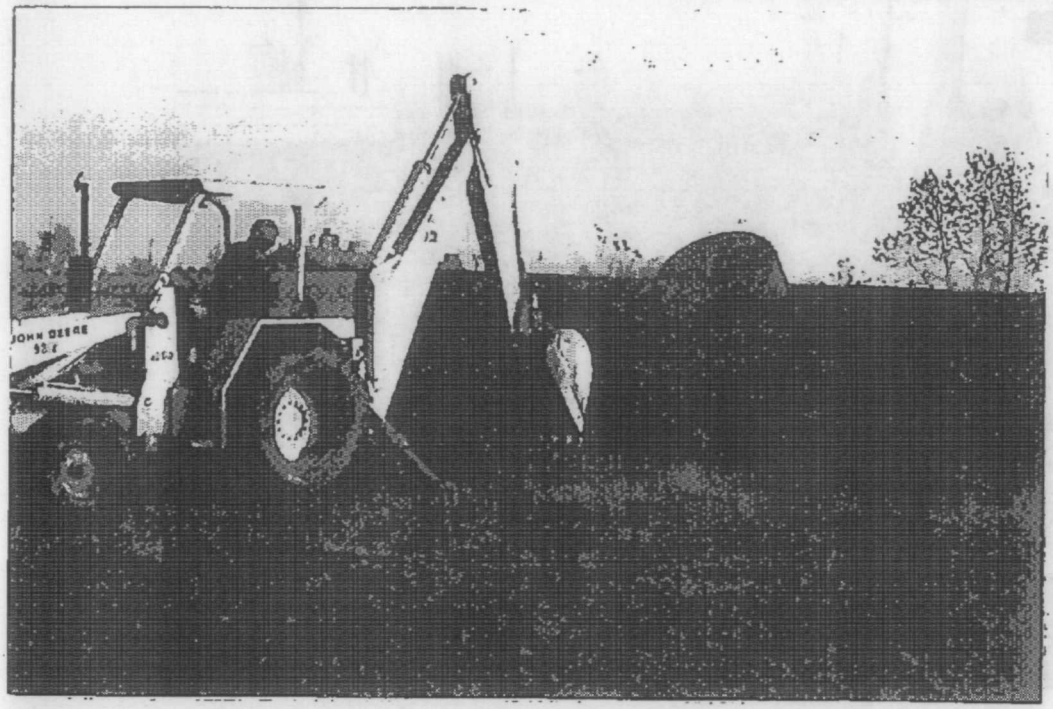
4. Borrow pit facing active fuel tank, site F



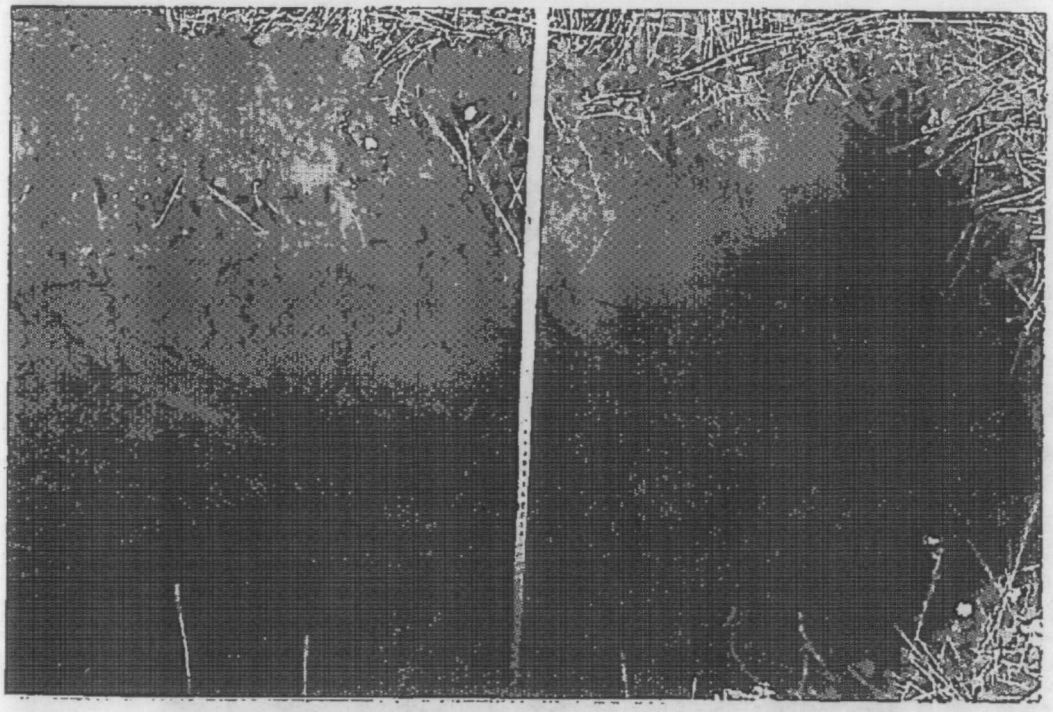
5. Close-up of Photo 4 showing debris free soil of borrow material

6. Fill area showing surface debris, site E

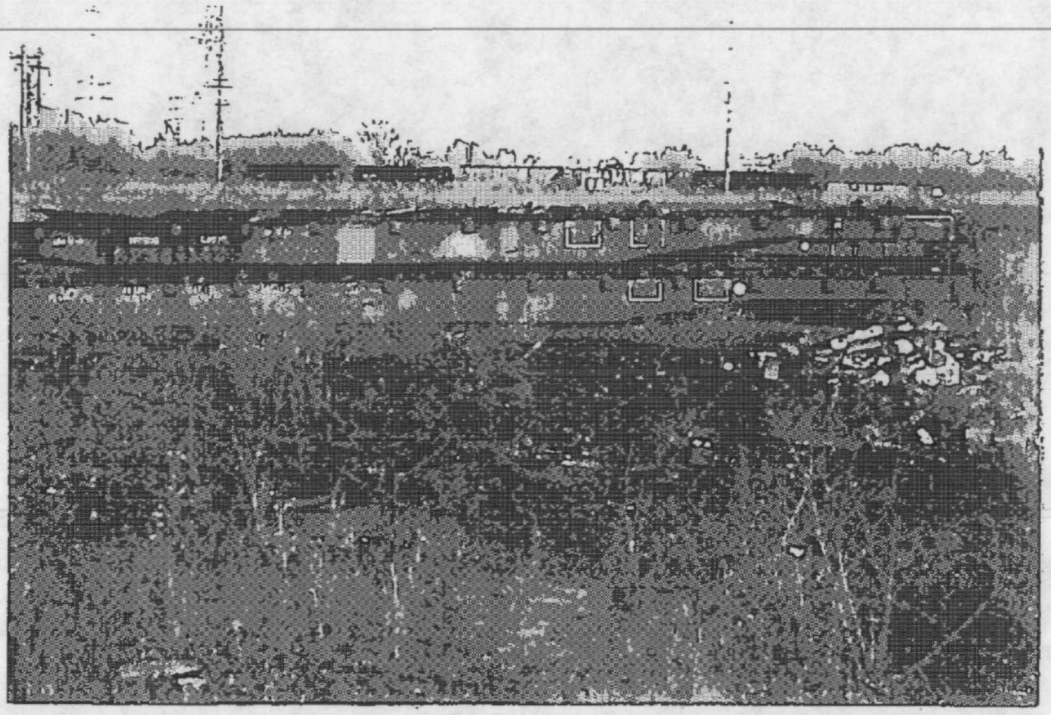
7. Close-up of Photo 6 showing shallow depth of surface fill and debris free silt and sand subsurface



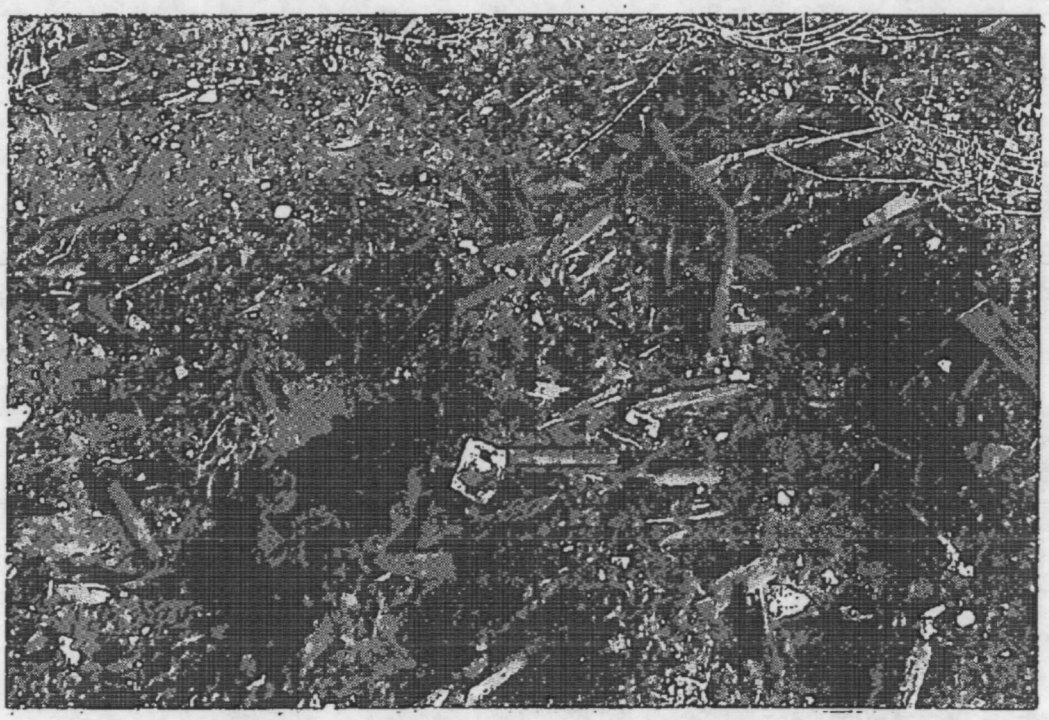
8. Exploration pit in areas without debris, site B



9. Close-up of Photo 8 showing debris free sand subsurface



10. Fill area showing surface debris, site I



11. Close-up of Photo 10 showing surface debris

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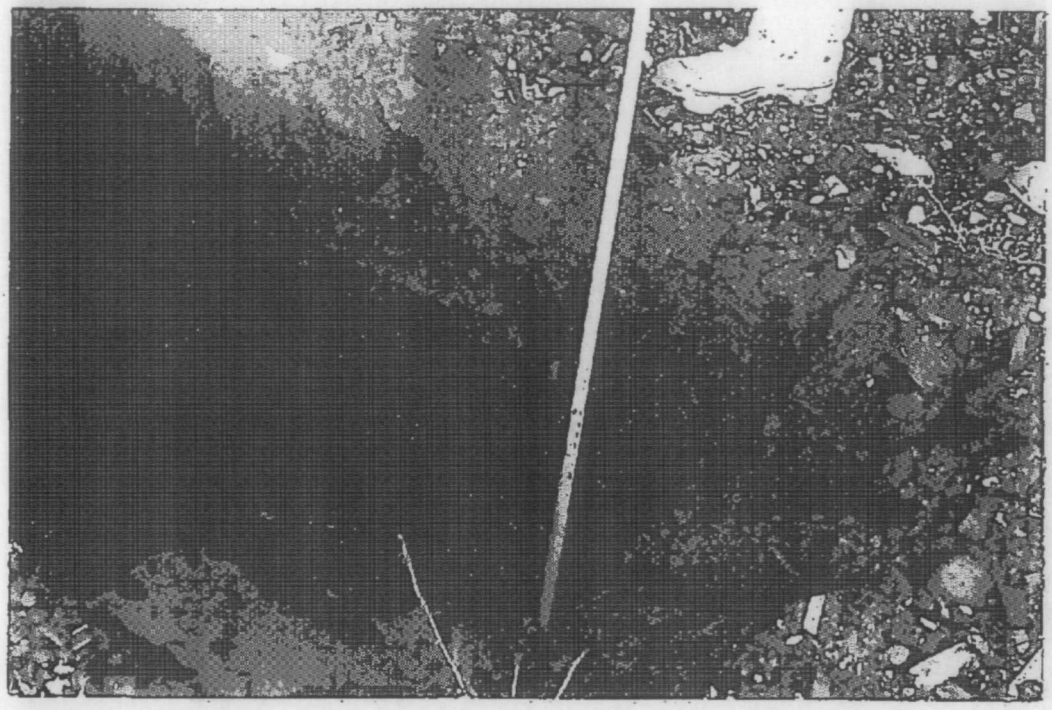
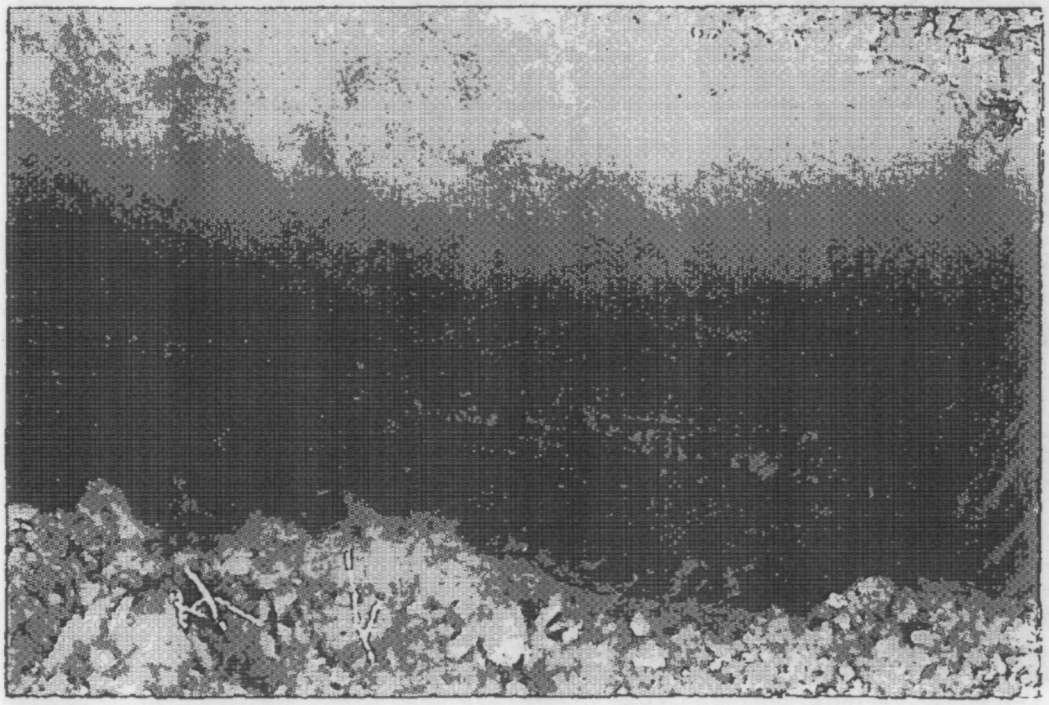


12. Exploration pit filling from bottom with groundwater, site J



13. Exploration pit with water inflow from the interface of distinct layers of fill, site G

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APPENDIX A:
LABORATORY ANALYSIS AND CHAIN OF CUSTODY DOCUMENTS

Report Date: December 31, 1991
Job#: GE-911216A-17
PO#: IT Terminal
Project: IT Terminal

Attention: Dan Saltzman
Environmental Management
Solutions
1800 SW First Ave., Suite 610
Portland, OR 97201

SAMPLE INFORMATION:
Date Samples Were Received By Laboratory: 12/16/91

Lab No.	Field Identification	Sample Matrix	Date
1	Sample #1	Soil	12-13-91
2	Sample #2	Soil	12-13-91
3	Sample #3	Soil	12-13-91
4	Sample #4	Soil	12-13-91
5	Sample #5	Soil	12-13-91
6	Sample #6	Soil	12-13-91
7	Sample #7	Soil	12-13-91
8	Sample #8	Soil	12-13-91
9	Sample #9	Ground Water	12-13-91
10	Sample #10	Ground Water	12-13-91
11	Sample #11	Soil	12-14-91
12	Sample #12	Soil	12-14-91
13	Sample #13	Soil	12-14-91
14	Sample #14	Soil	12-14-91
15	Sample #15	Soil	12-14-91
16	Sample #16	Soil	12-14-91
17	Sample #17	Soil	12-14-91

ANALYTICAL RESULTS ARE ON THE FOLLOWING PAGE(S)

Sincerely,

Renee Chauvin
Technical Director

RJC/mlh

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

COFFEY LABORATORIES, INC.
12423 N.E. Whitaker Way • Portland, OR • 97230 • (503) 254-1794 • FAX (503) 254-1452

Job#: GE-911216A-17

Environmental Management
Page 2

Analysis Performed: TPH-HCID qualitative scan for Hydrocarbons, by GC/FID

Summary of Qualitative Screening Test:*

	SAMPLE #7 RESULTS	SAMPLE #12 RESULTS	SAMPLE #13 RESULTS
Gasoline detected by TPH-HCID			
Gasoline not detected by TPH-HCID	√	√	√
Diesel detected by TPH-HCID	√	√	√
Diesel not detected by TPH-HCID			
Hydrocarbons heavier than C28 detected	√		
Recommended further analysis:			
TPH-G			
TPH-D		√	√
TPH-418.1	√		
None			

* Surrogate spike recoveries meet DEQ quality control requirements.

REPORT CONTINUES

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12423 N.E. Whitaker Way • Portland, OR • 97230 • (503) 254-1794 • FAX (503) 254-1452

Job#: GE-911216A-17

Environmental Management
Page 3

SUBJECT: TCLP Analysis

ANALYTE	METHOD	DETECTION LIMIT	SAMPLE #1 RESULTS	SAMPLE #2 RESULTS
Cadmium	*	0.02	ND	0.38
Chromium	*	0.3	ND	ND
Lead	*	0.2	ND	0.3

ANALYTE	METHOD	DETECTION LIMIT	SAMPLE #6 RESULTS	SAMPLE #8 RESULTS
Cadmium	*	0.02	ND	ND
Chromium	*	0.3	ND	ND
Lead	*	0.2	ND	ND

ANALYTE	METHOD	DETECTION LIMIT	SAMPLE #14 RESULTS	SAMPLE #15 RESULTS
Cadmium	*	0.02	ND	0.04
Chromium	*	0.3	ND	ND
Lead	*	0.2	ND	ND

ANALYTE	METHOD	DETECTION LIMIT	SAMPLE #17 RESULTS	EPA LIMIT
Cadmium	*	0.02	ND	1.0
Chromium	*	0.3	ND	5.0
Lead	*	0.2	ND	5.0

Results are reported in milligrams per liter (mg/L)

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

* Leachate preparation by EPA SW-846 Method 1311. Analysis by EPA SW-846 Method 6010, ICP, unless otherwise noted.

REPORT CONTINUES

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Job#: GE-911216A-17

Environmental Management
Page 4

Analysis Performed: Purgeable Halocarbons and Aromatics in soil by EPA Methods 8010/8020, GC/PID/HED.

ANALYTE	DETECTION LIMITS	LABORATORY BLANK	SAMPLE #4 RESULTS	SAMPLE #5 RESULTS
Benzene	0.15	ND	ND	ND
Bromodichloromethane	0.15	ND	ND	ND
Bromoform	0.15	ND	ND	ND
Bromomethane	0.60	ND	ND	ND
Carbon tetrachloride	0.15	ND	ND	ND
Chlorobenzene	0.15	ND	ND	ND
Chloroethane	0.30	ND	ND	ND
2-Chloroethylvinylether	0.60	ND	ND	ND
Chloroform	0.15	ND	ND	ND
Chloromethane	0.90	ND	ND	ND
Dibromochloromethane	0.15	ND	ND	ND
1,2-Dichlorobenzene	0.15	ND	ND	ND
1,3-Dichlorobenzene	0.15	ND	ND	ND
1,4-Dichlorobenzene	0.15	ND	ND	ND
Dichlorodifluoromethane	0.90	ND	ND	ND
1,1-Dichloroethane	0.15	ND	ND	ND
1,2-Dichloroethane	0.15	ND	ND	ND
1,1-Dichloroethene	0.15	ND	ND	ND
trans-1,2-Dichloroethene	0.15	ND	ND	ND
1,2-Dichloropropane	0.15	ND	ND	ND
cis-1,3-Dichloropropene	0.15	ND	ND	ND
trans-1,3-Dichloropropene	0.15	ND	ND	ND
Ethylbenzene	0.15	ND	ND	ND
Methylene chloride	0.15	ND	ND	ND
Toluene	0.15	ND	ND	ND
1,1,2,2-Tetrachloroethane	0.15	ND	ND	ND
Tetrachloroethene	0.15	ND	ND	ND
1,1,1-Trichloroethane	0.15	ND	ND	ND
1,1,2-Trichloroethane	0.15	ND	ND	ND
Trichloroethene	0.15	ND	ND	ND
Trichlorofluoromethane	0.60	ND	ND	ND
Vinyl chloride	0.60	ND	ND	ND
Total Xylenes	0.15	ND	ND	ND

Results expressed as mg/kg unless otherwise noted.

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

REPORT CONTINUES

Job#: GE-911216A-17

Environmental Management
Page 5

Analysis Performed: Purgeable Halocarbons and Aromatics in soil by EPA Methods 8010/8020, GC/PID/HED.

ANALYTE	DETECTION LIMITS	SAMPLE #6 RESULTS	SAMPLE #7 RESULTS
Benzene	0.15	ND	ND
Bromodichloromethane	0.15	ND	ND
Bromoform	0.15	ND	ND
Bromomethane	0.60	ND	ND
Carbon tetrachloride	0.15	ND	ND
Chlorobenzene	0.15	ND	ND
Chloroethane	0.30	ND	ND
2-Chloroethylvinylether	0.60	ND	ND
Chloroform	0.15	ND	ND
Chloromethane	0.90	ND	ND
Dibromochloromethane	0.15	ND	ND
1,2-Dichlorobenzene	0.15	ND	ND
1,3-Dichlorobenzene	0.15	ND	ND
1,4-Dichlorobenzene	0.15	ND	ND
Dichlorodifluoromethane	0.90	ND	ND
1,1-Dichloroethane	0.15	ND	ND
1,2-Dichloroethane	0.15	ND	ND
1,1-Dichloroethene	0.15	ND	ND
trans-1,2-Dichloroethene	0.15	ND	ND
1,2-Dichloropropane	0.15	ND	ND
cis-1,3-Dichloropropene	0.15	ND	ND
trans-1,3-Dichloropropene	0.15	ND	ND
Ethylbenzene	0.15	ND	ND
Methylene chloride	0.15	ND	ND
Toluene	0.15	ND	ND
1,1,2,2-Tetrachloroethane	0.15	ND	ND
Tetrachloroethene	0.15	ND	ND
1,1,1-Trichloroethane	0.15	ND	ND
1,1,2-Trichloroethane	0.15	ND	ND
Trichloroethene	0.15	ND	ND
Trichlorofluoromethane	0.60	ND	ND
Vinyl chloride	0.60	ND	ND
Total Xylenes	0.15	ND	ND

Results expressed as mg/kg unless otherwise noted.

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

COFFEY LABORATORIES, INC.
12423 N.E. Whitaker Way • Portland, OR • 97230 • (503) 254-1794 • FAX (503) 254-1452

Job#: GE-911216A-17

Environmental Management
Page 6

ANALYSIS PERFORMED: Hydrocarbon Scan of waste water by modified EPA Method 8015, GC/FID

COMPOUND *	DETECTION LIMIT	SAMPLE #9 RESULTS
Gasoline	100	ND
Diesel	200	ND

Results expressed as ug/L unless otherwise noted.

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

* A low level of hydrocarbons heavier than diesel is present in the sample.

Analysis Performed: Volatile Aromatics in ground water by EPA Method 8020,GC/PID

ANALYTE	DETECTION LIMIT	LABORATORY BLANK	SAMPLE #10 RESULTS
Benzene	0.5	ND	ND
Chlorobenzene	0.5	ND	ND
1,2-Dichlorobenzene	0.5	ND	ND
1,3-Dichlorobenzene	0.5	ND	ND
1,4-Dichlorobenzene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Toluene	0.5	ND	ND
Total Xylenes	0.5	ND	ND

Results expressed as µg/L unless otherwise noted.

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

REPORT CONTINUES

COFFEY LABORATORIES, INC.
12423 N.E. Whitaker Way • Portland, OR • 97230 • (503) 254-1794 • FAX (503) 254-1452

Job#: GE-911216A-17

Environmental Management
Page 7

Analysis Performed: Polychlorinated Biphenyls (PCBs) in soil by modified EPA Method 8080,GC/ECD.

SAMPLE ID	PCB	AROCLOR
Sample #3	trace	1260
Sample #7	4.6	1260
Sample #11	2.1	1254
Sample #14	20	1260
Sample #16	trace	1254

Detection Limit: 0.4 mg/kg

Results expressed as mg/kg unless otherwise noted.

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12423 N.E. Whitaker Way • Portland, OR • 97230 • (503) 254-1794 • FAX (503) 254-1452

COFFEY LABORATORIES * WORKSHEET

Analysis Requested: Volatile Aromatics in GW by EPA Method 8020, GC/PID.

Client: Environmental Job #: GE911016A

Analyst: JL Report Date: 12/22/91

Date Analyzed: 12/20 Date Extracted: —

Logbook Reference: Log 281 p. 47 Reviewed: 12/23

Prep. Info/Comments: PCE: 5.5ug/L #10

Units: ug/L

COMPOUND	DET. LIMIT	LAB BLANK	1216 A 10µ			
Benzene	0.5	ND	ND			
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene						
Toluene						
Total Xylenes						

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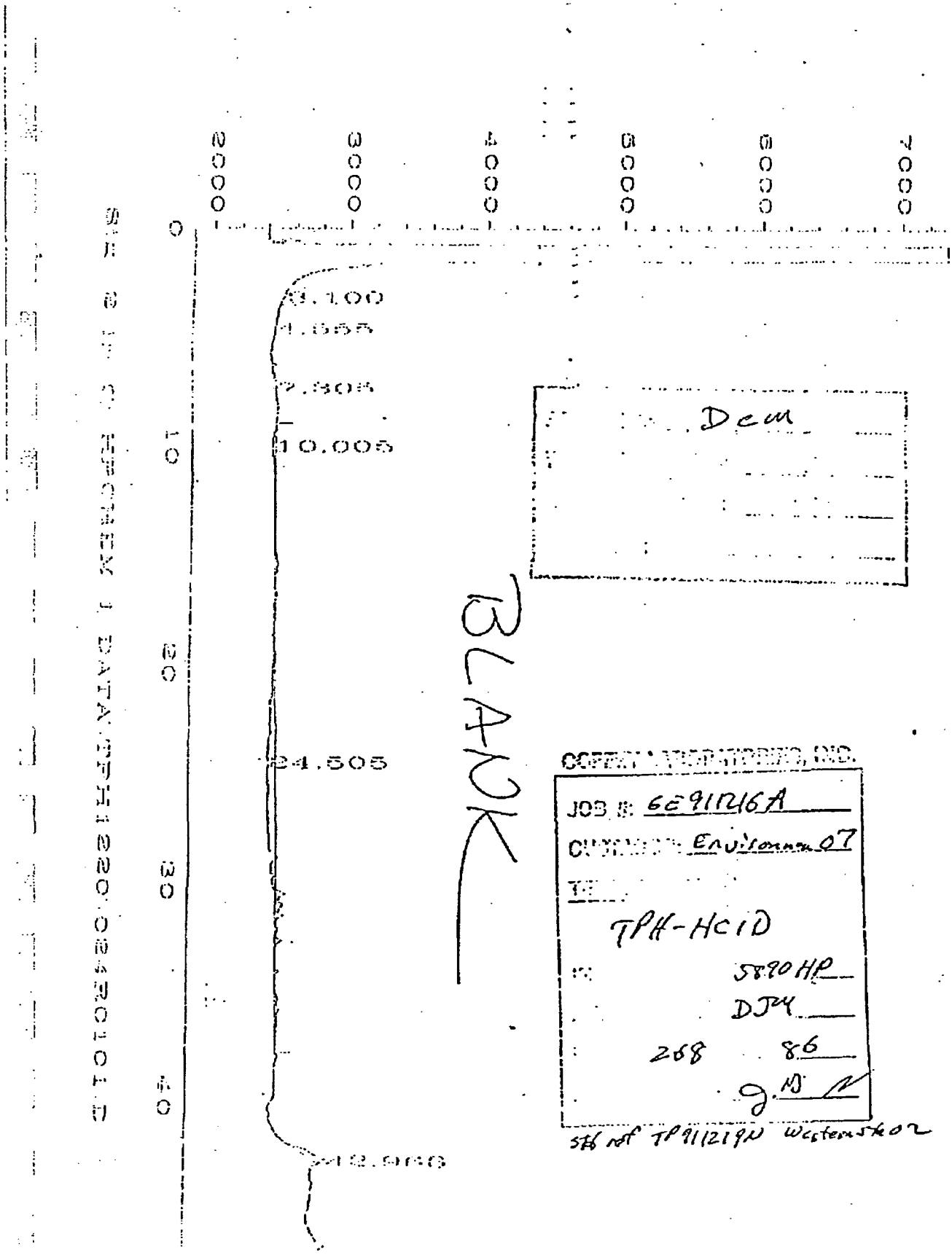
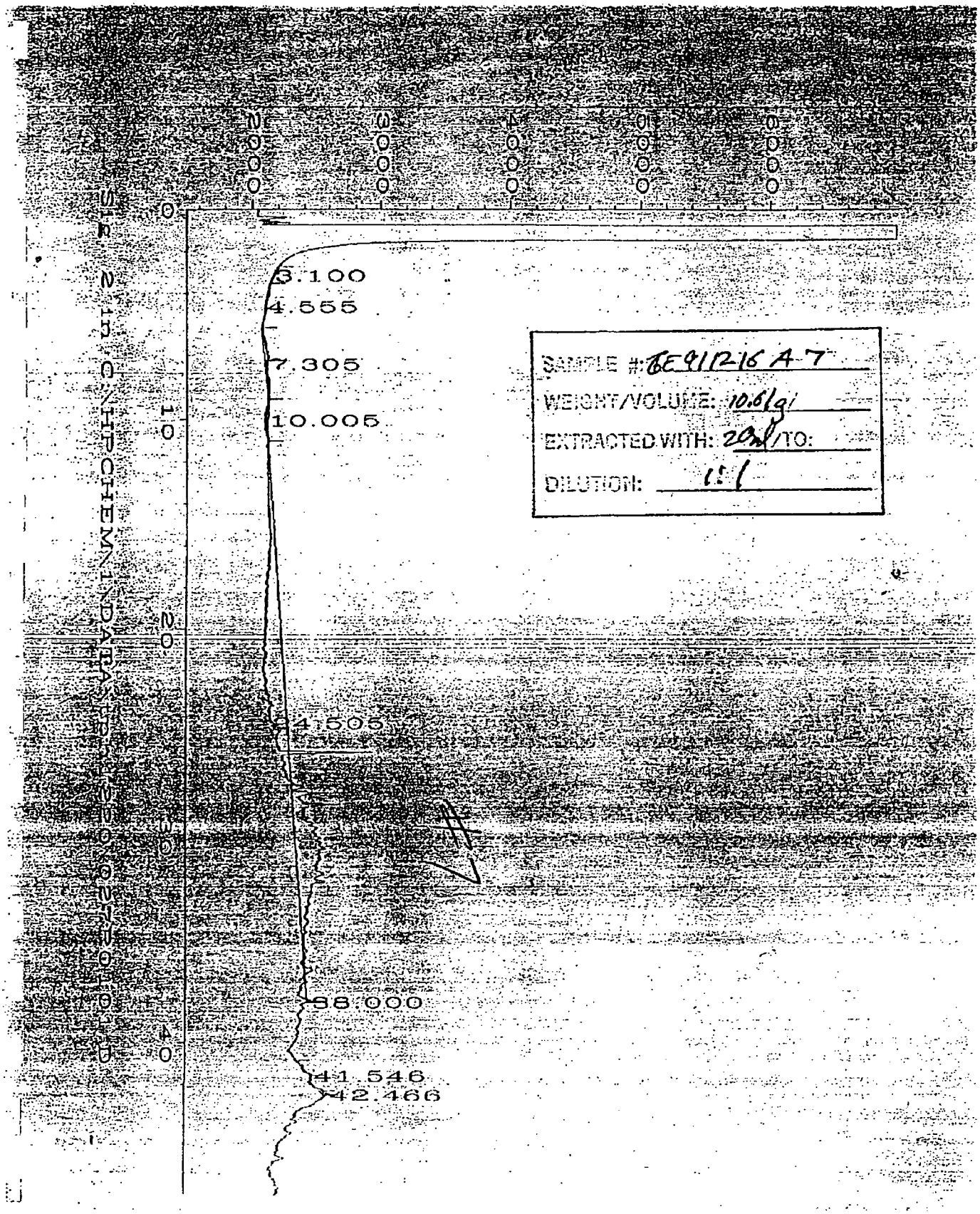


SCHN00206414


SAMPLE #: 6E91216 A 7
WEIGHT/VOLUME: 10.6 g
EXTRACTED WITH: 20 ml TO:
DILUTION: 1:1
3.100
4.555
7.305
10.005
14.505
38.000
41.546
42.466
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
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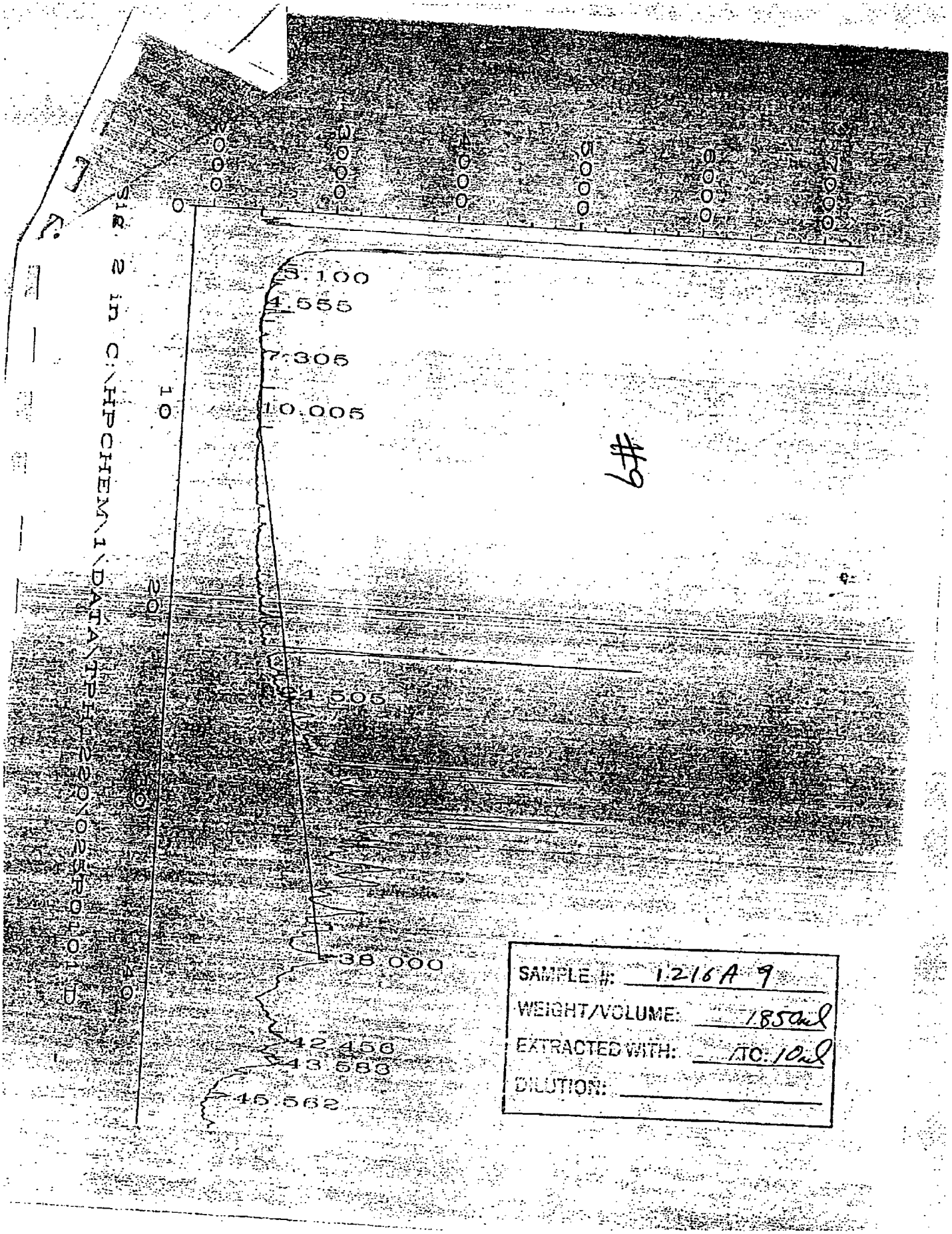
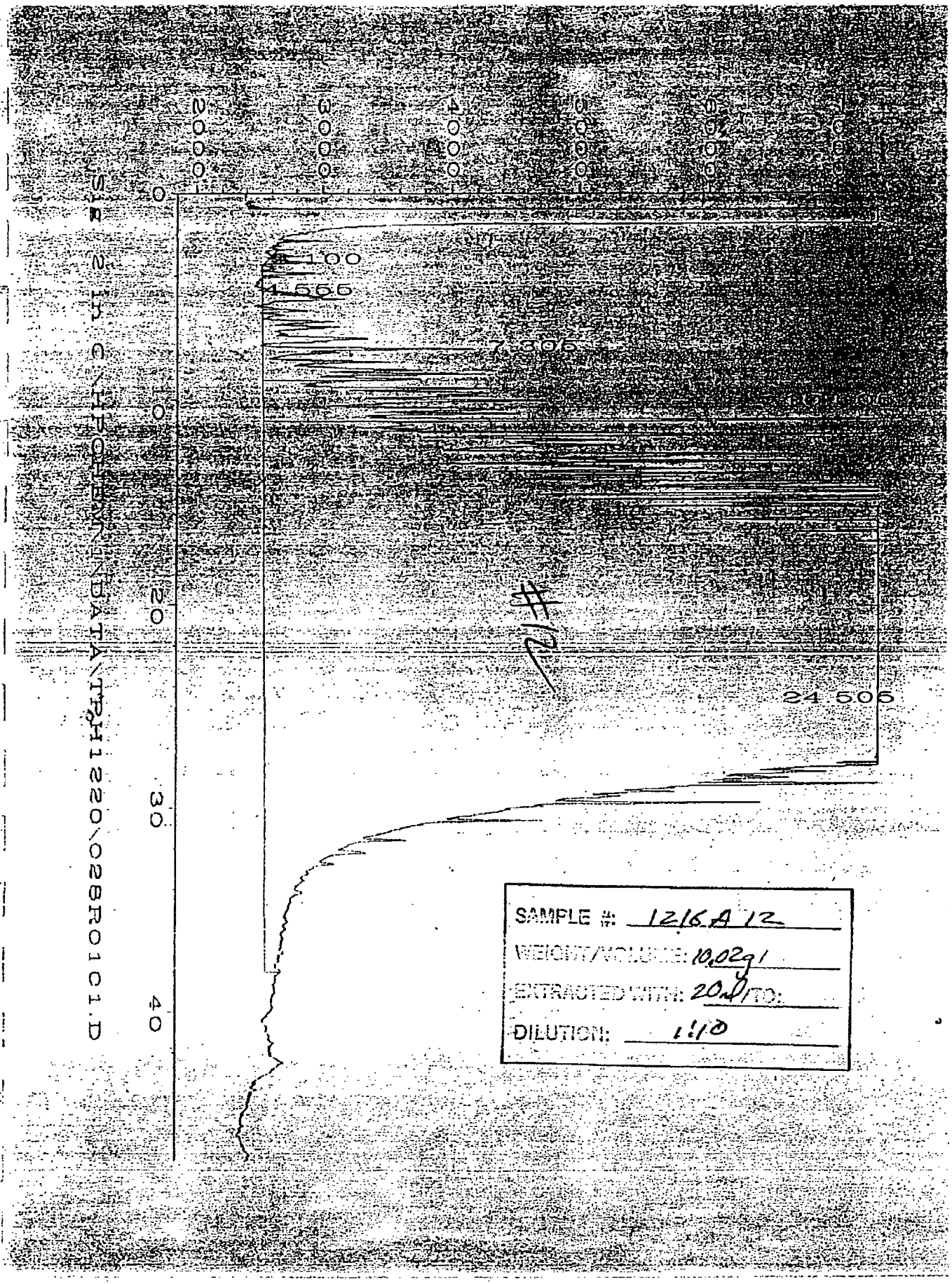
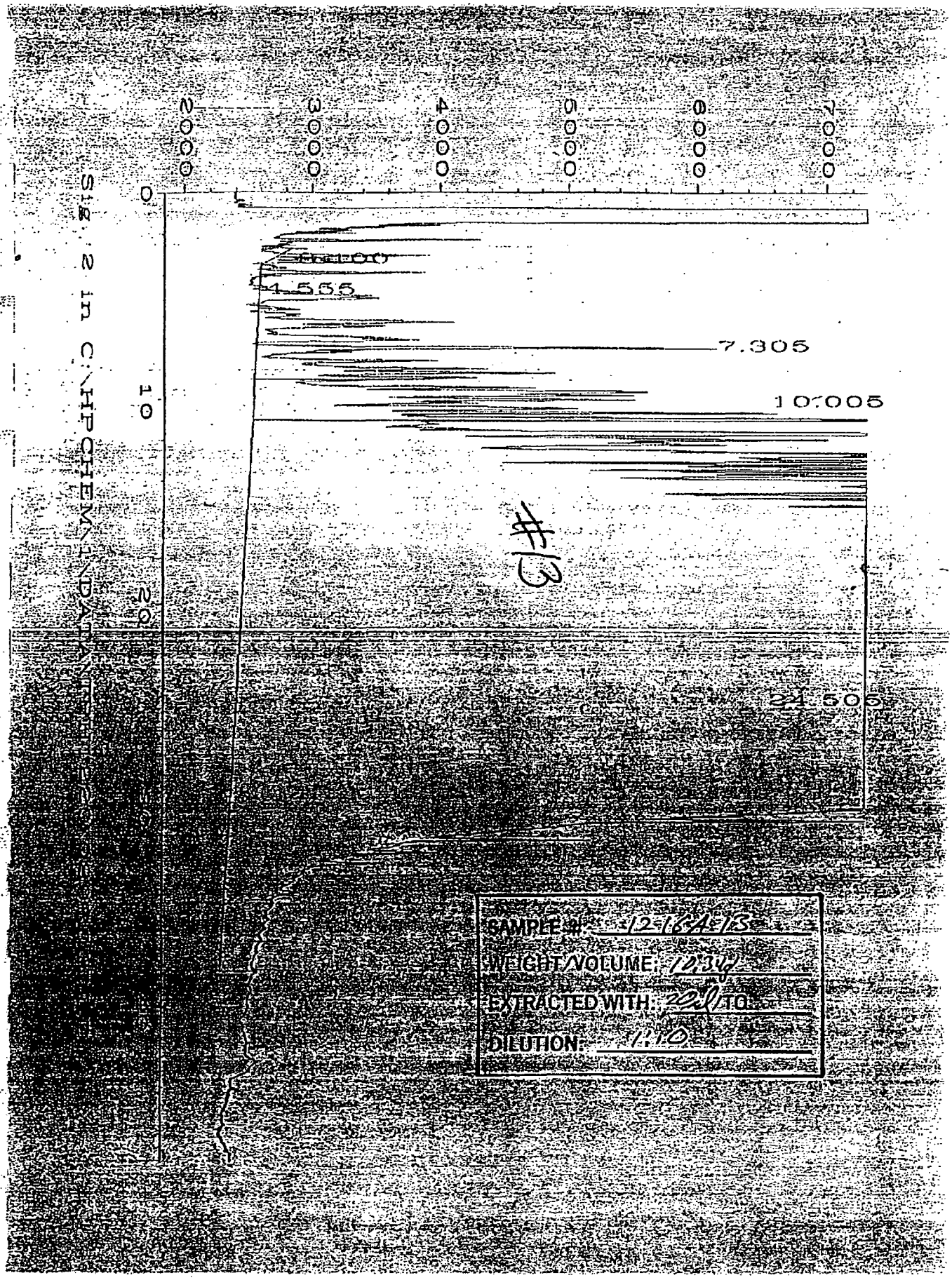


SCHN00206416



SCHN00206417



SCHN00206418

Report Date: January 2, 1992
Job#: TP-911217AY-2
PO#: IT Terminal
Project: IT Terminal

Attention: Dan Saltzman
Environmental Management
Solutions
1800 SW First Ave., Suite 610
Portland, OR 97201

SAMPLE INFORMATION:
Date Samples Were Received By Laboratory: 12/17/91

Lab No.	Field Identification	Sample Matrix	Date	Time
1	Sample #18	Soil	12-17-91	1430
2	Sample #19	Soil	12-17-91	1430

ANALYTICAL RESULTS ARE ON THE FOLLOWING PAGE(S)

Sincerely,

Renee Chauvin
Technical Director

RJC/lwb

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

Job#: TP-911217AY-2

Environmental Management Solutions
Page 2

Analysis Performed: TPH-HCID qualitative scan for Hydrocarbons, by GC/FID.

Summary of Qualitative Screening Test:*

	SAMPLE #18 RESULTS	SAMPLE #19 RESULTS
Gasoline detected by TPH-HCID		
Gasoline not detected by TPH-HCID	√	√
Diesel detected by TPH-HCID		
Diesel not detected by TPH-HCID	√	√
Hydrocarbons heavier than C28 detected		

Recommended further analysis:

TPH-G		
TPH-D		
TPH-418.1		
None	√	√

* Surrogate spike recoveries meet DEQ quality control requirements.

COFFEY LABORATORIES, INC.
12423 N.E. Whitaker Way • Portland, OR • 97230 • (503) 254-1794 • FAX (503) 254-1452

COFFEY LABORATORIES INC.
12423 N.E. WHITAKER WAY, PORTLAND, OR 97230
(503) 254-1794 • FAX (503) 254-1452

COFFEY LABORATORIE
287 S.E. FIR

CHAIN OF CUSTODY

PROJECT #:	PROJECT NAME: IT TERMINAL	P.O. #:	PAGE 1 of 2 PAGES PLEASE PRINT OR TYPE	FC

COMPANY NAME: ENVIRONMENTAL MANAGEMENT SOLUTIONS
REPORT ATTENTION: DAN SALTZMAN
JOB #: GE9
SAMPLES COLLECTED BY: STUART GREENBERGER P.E.
CUSTABBR: CNV46

FIELD IDENTIFICATION: ONE LINE PER SAMPLE CONTAINER	LAB LOC	LAB ID	COLLECTION DATE	COLLECTION TIME	MEDIA	ANALYSIS REQUESTED
SAMPLE 1			12/13	PM	SOIL	
2						
3						
4						
5						
6						
7						
8						
9					H2O	
10					H2O	
11			12/14	AM	SOIL	
12						
13						
14						

RELINQUISHED BY: Stuart Greenberger	DATE/TIME 12/16/91 07:15	RECEIVED BY:	DATE/TIME
RELINQUISHED BY:	DATE/TIME	RECEIVED BY LAB: [signature]	DAT
SAMPLE REMARKS:		LEVEL 1 2 3 4	EXPRESS UPS

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287 S.E. FIR

CHAIN OF CUSTODY

PROJECT #:	PROJECT NAME: 1T TERMINAL	P.O. #:	PAGE 2 of 2 PAGES PLEASE PRINT OR TYPE

COMPANY NAME: ENVIRONMENTAL MANAGEMENT SOLUTIONS
REPORT ATTENTION: DAN SALTZMAN
SAMPLES COLLECTED BY: STUART GREENBERGER P.E.

JOB #: GE
CUSTABBR: ENVIRO

FIELD IDENTIFICATION: ONE LINE PER SAMPLE CONTAINER	LAB LOC	LAB ID	COLLECTION DATE	COLLECTION TIME	MEDIA	ANALYSIS REQUESTED
SAMPLE 15			12/14	AM	SOIL	
16			↓	↓	↓	
17						

RELINQUISHED BY: Stuart Greenberger 12/16/91 01:15 DATE/TIME
RECEIVED BY: DATE/TIME
RELINQUISHED BY: DATE/TIME
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CHAIN OF CUSTODY

PROJECT #:	PROJECT NAME:	P.O. #:	PAGE 1 of 1 PAGES PLEASE PRINT OR TYPE
	IT TERMINAL		

COMPANY NAME: ENVIRONMENTAL MANAGEMENT SOLUTIONS
REPORT ATTENTION: DAN SALTZMAN
JOB #:

SAMPLES COLLECTED BY: STUART GREENBERGER P.E.
CUSTABB

FIELD IDENTIFICATION: ONE LINE PER SAMPLE CONTAINER	LAB LOC	LAB ID	COLLECTION DATE	COLLECTION TIME	MEDIA	ANALYSIS REQUESTED
SAMPLE #18			12/17/91	2:30PM		HCID
SAMPLE #19			12/17/91	2:30PM		HCID

RELINQUISHED BY: [signature] 12/17/91 DATE/TIME 2:30PM
RECEIVED BY: [signature] 12/17/91 DATE/TIME 2:
RELINQUISHED BY: [signature] 12/17/91 DATE/TIME 3:10 pm
RECEIVED BY LAB: [signature]

SAMPLE REMARKS:
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PROJECT #:	PROJECT NAME: IT TERMINAL	P.O. #:	PAGE 1 of 2 PAGES PLEASE PRINT OR TYPE

COMPANY NAME: ENVIRONMENTAL MANAGEMENT SOLUTIONS
REPORT ATTENTION: DAN SALTZMAN
SAMPLES COLLECTED BY: STUART GREENBERGER P.E.

JOB #: GE9
CUSTABBR: ENVIRO

FIELD IDENTIFICATION: ONE LINE PER SAMPLE CONTAINER	LAB LOC	LAB ID	COLLECTION DATE	COLLECTION TIME	MEDIA	ANALYSIS REQUESTED
SAMPLE 1			12/13	PM	SOIL	TCLP (Cd, Cr, Pb)
2			↓	↓	↓	TCLP (Cd, Cr, Pb)
3						PCB'S
4						8010/8020
5						8010/8020
6						8010/8020 TCLP(C
7						HCID, 8010/8020, T
8					↓	TCLP (Cd, Cr, Pb)
9					H2O	HCID
10			↓	↓	H2O	8020
11			12/14	AM	SOIL	PCB'S
12					↓	HCID
13						HCID
14					↓	TCLP (Cd, Cr, Pb) PC

RELINQUISHED BY: Stuart Greenberger 12/16/97 07:15 DATE/TIME
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RELINQUISHED BY: DATE/TIME
RECEIVED BY LAB: DA

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287 S.E. FIF

CHAIN OF CUSTODY

PROJECT #:	PROJECT NAME: 1T TERMINAL	P.O. #:	PAGE 2 of 2 PAGES PLEASE PRINT OR TYPE	F

COMPANY NAME: ENVIRONMENTAL MANAGEMENT SOLUTIONS
REPORT ATTENTION: DAN SALTZMAN
JOB #: GE
SAMPLES COLLECTED BY: STUART GREENBERGER P.E.
CUSTABBR Envir

FIELD IDENTIFICATION: ONE LINE PER SAMPLE CONTAINER	LAB LOC	LAB ID	COLLECTION DATE	COLLECTION TIME	MEDIA	ANALYSIS REQUESTED
SAMPLE 15			12/14	Am	SOIL	TCLP (Cd, Cr, Pb)
16			↓	↓	↓	PCB's
17			↓	↓	↓	TCLP (Cd, Cr, Pb)

RELINQUISHED BY: Stuart Greenberger 12/16/91 01:15 DATE/TIME
RECEIVED BY: DATE/TIME
RELINQUISHED BY: DATE/TIME
RECEIVED BY LAB: DA
SAMPLE REMARKS:
LEVEL 1 2 3 4 EXPRESS UP

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APPENDIX B:
SONAS LETTER

The SONAS Companies, Inc.

65 Valley Stream Parkway
Suite 110
Great Valley Corporate Center
Malvern, Pennsylvania
19355

(215) 640-0400
(215) 640-0401 Fax

To Tom Z
Charlie Ford

SONAS

October 25, 1991

Mr. Roger Neu - Vice President
The Schnitzer Group
3200 Northwest Yeon Avenue
Portland, OR 97210

RE: Level I Environmental Assessment Results

Dear Roger:

Scott Ewbank in our Phoenix office has communicated the results of the audit referenced above. In keeping with the spirit of the Non-Disclosure Agreement signed by Scott yesterday, please be assured that:

1. All of the conditions identified in the Agreement will be respected by SONAS.

2. The findings will be shared with only our most senior management.

In our view, the results of the Level I audit paint a compelling case for proceeding with analytical testing with respect to the property, as well as the balance of the adjacent Schnitzer real estate. We request that adequate sampling on the site be conducted immediately.

I believe the preliminary sampling should be done using two sampling methods. The first method would require a technician equipped with a hand held O.V.M. meter physically analyze several small excavations made by a backhoe primarily in the discolored zones. Also, we would like to see a half dozen radon samples exposed to laboratory analysis for TPH, BTEX, Metals, PCBs etc. This testing can be done very quickly at little cost by your environmental engineer.

The SONAS Companies, Inc.

85 Valley Stream Parkway
Suite 110
Great Valley Corporate Center
Malvern, Pennsylvania
19355

(215) 640-0400
(215) 640-0401 Fax

SONAS

Mr. Roger Neu
The Schnitzer Group
October 25, 1991
Page 2

We feel that we can proceed with the execution of the Purchase and Sale Agreement (as amended), provided satisfactory language acknowledging this environmental issue is incorporated into the document. However, we cannot proceed with our City of Portland permitting until the Level II test results are evaluated. Consequently, we must insist that this work be commissioned and conducted as expeditiously as possible.

Representations of the floodplain/flood-prone status of the property have not been made to date. We are also interested to learn more about this feature of the property as soon as possible.

Please contact the undersigned to advise us of your inclinations at your earliest convenience.

Sincerely,

The Sonas Companies, Inc.

Richard C. Young

RCY/cac

CC: Jack McConnell
Scott Ewbank

APPENDIX C:
MEMO ON BOREHOLES H, I, & J LOCATIONS WITH RESPECT TO SUBJECT PROPERTY NORTHERN BOUNDARY

EMS Environmental Management Solutions
1800 SW First Avenue
Suite 610
Portland, Oregon 97201
503-225-9060
FAX: 503-273-8612

To: Dan Saltzman

From: Stuart Greenberger, P.E.

Date: January 22, 1992

Subject: Technical Memorandum No. 2: Field Sampling for IT Terminal, Schnitzer Investment Property

Per your request, I made a site visit to the IT Terminal property to determine if the sampling points, H, I, and J listed on Figure 1 of the Technical Memorandum No. 1; were located on the subject property as recently field surveyed and marked.

Sampling points H, I and J were determined to not be on the subject property, and lie approximately 40 feet north of the subject property's northern boundary as delineated by the survey corner markers.

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From the Desk of: **TOM ZELENKA**

To: SSI-5

1/24/92

Bud Kramer —

Please review and return. Please note fuel tank issue.

thanks.

TM

Tom
This looks great.
22 ppm PCB is not contamination.
Bud

SCHN00206431

EMS Environmental Management Solutions
1800 SW First Avenue
Suite 610
Portland, Oregon 97201
503-225-9060
FAX: 503-273-8612

SCHNTZIC-INT:BGDOC.85
LOTS 6,7,8 2200

March 17, 1993

Tom Zelenka
Schnitzer Investments
3200 NW Yeon
Portland, OR 97210

RE: Expanded Environmental Site Assessment and Sampling Study of the IT Terminal Property Lots ~~1,2,3 & 4.~~ LOTS 6 7 8

Dear Mr Zelenka:

I am pleased to present the results of our expanded environmental site assessment and field sampling study of the IT Terminal Lots 1,2,3 & 4.

Sampling of the surface soils and groundwater from the IT Terminal Lots in north Portland was conducted by Environmental Management Solutions on February 5, 7, 12 and 13, 1993. In addition, a shallow subsurface soil gas survey and visual reconnaissance of the subject property were also conducted.

Executive Summary

Based on historic land use information contained in its 1991 Level I Environmental Site Assessment of property located in the immediate vicinity of Lots 1,2,3 & 4, Environmental Management Solutions conducted an expanded environmental site assessment and limited sampling survey of soils and groundwater on the subject property.

Specific findings are:

- Nine of 31 soil samples tested for eight heavy metals (TCLP) revealed low concentrations of six metals Barium: Arsenic, Lead, Chromium and Cadmium. All samples are below DEQ soil standards for industrial sites. (Table 1).

- Organic vapor monitoring (OVM) conducted in a grid pattern indicated 13 of 113 total shallow subsurface borings had detectable levels of organic vapors, ranging from 0.5 ppm to 5.0 ppm. Expanding the borings to 8 to 36 inches at these sites did not result in elevated soil gas readings.

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- There were two soil samples with very low levels of Total Petroleum Hydrocarbons (TPH), ranging from 12 to 84 ppm.

- There were seven soil samples which tested positive for the presence of PCBs in very low concentrations, from 0.072 ppm to 12 ppm.

- Groundwater was encountered at approximately seven feet beneath the surface.

- Analysis of groundwater samples tested for eight heavy metals revealed very low concentrations of Arsenic, at a concentration below EPA Drinking Water Standards. (Table 2).

- Excavation pits at the site did not reveal elevated soil gas readings.

- Surface debris was confined to two areas of the subject property, Land Features 9 & 10 (Drawing 1).

- Based on the results of this site characterization and sampling study, the low levels of contaminants detected can be expected to be present and perhaps ubiquitous in soils throughout the subject property and the surrounding area and can reasonably expected to present a minimal risk for industrial land use and development.

Introduction

Recognizing the industrial nature of the general area of the subject property, and in the interest of facilitating a site specific understanding of these lots, an expanded environmental site assessment of the property was conducted. This expanded environmental assessment, draws on information contained in our Level I Environmental Site Assessment of October 17, 1991 on IT Terminal Lots 5,6, & 7 (located immediately adjacent to the subject property).

This expanded environmental site assessment also includes a limited soil and groundwater sampling study, a shallow subsurface soil gas survey and a thorough visual reconnaissance of the site.

Appendix A contains excerpts of Environmental Management Solutions' Level I Environmental Assessment of Lots 5,6 & 7 of the IT Terminal properties.

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Sampling Study

The general site plan of the subject property is presented as Drawing 1. The drawing shows the locations of land features, observation test pits, and points of laboratory sampling. The site was evaluated by observations of test pits presented in Table 3; by a photoionization survey of the test pits, recorded in Table 4; and by a photoionization survey along grid lines recorded in Table 5. Field observations of land features are described in Table 6. Site locations and respective laboratory analysis results are summarized in Table 7. Photographs are provided in Table 8. Laboratory chain-of-custody and analysis are in Appendix B.

The test pit observations indicate that the site is principally sand, debris-free, with water at approximately 7 feet below grade. Some areas were found to have a layer of construction debris at 4 feet. In an area identified as having surface debris, debris was found to extend down 4 feet and to cover sand that was debris-free.

The photoionization survey of the test pits did not indicate contamination by volatile organics. Nor was contamination identified by the shallow surface grid survey. The low initial organic vapor readings identified in the surface grid sampling are thought to be de minimis, or from decay of organic matter, because readings did not persist when the spike holes were enlarged to a 4" x 36" borehole.

The areas of soil mounds/piles identified as Land Features 1, 2, 3, and 4 appear to be clean fill, principally sand. The piles identified as Land Features 5, 6, 7, and 8 are principally debris piles. There is surface debris at Land Features 9 and 10.

The other land features were delineated for sampling purposes. The gravel roadway and traffic turnaround, Land Features 11 and 12, were surveyed by photoionization; contaminant was not detected. Samples from the impoundment area and drainage way, Land Features 13 and 14, were collected for laboratory analyses.

Table 7 summarizes laboratory analyses throughout the site. Note from the site plan and soil profiles that samples were collected from points thought likely to contain contaminant. These included samples with apparent debris and visible discoloration.

Water and soil samples were analyzed for volatile aromatic and chlorinated organics, none were detected.

Soil and water samples were analyzed for (TCLP) metals and were found to typically have low metal concentrations. Metals leached from soils are well below RCRA and DEQ Environmental Cleanup Manual standards. The soluble metals in water were at or below the test detection limits. Therefore, no gross contamination of metals is noted by this

screening. [Note that samples 5, 9, and 21 are considered invalid due to a methods error and are replaced by samples 5-1, 9-1, and 21-1.]

Two water samples were nondetect for Total Petroleum Hydrocarbons (TPH). Of two soil samples collected from suspect piles of soil, one was at background TPH (12 ppm) and the other was at a low but detectable concentration of 84 ppm, indicating possible petroleum residue in that pile. Again, the visual and photoionization survey of the soil mounds/piles did not indicate widespread gross petroleum contamination in fill soils.

PCBs were detected in 7 of 9 soil samples. Values ranged from trace amounts to a notable 12 ppm for a composite sample. Of the 9 samples, 4 had concentrations above 1 ppm. PCBs are not naturally occurring compounds, and a possible concern regarding PCBs is identified by this preliminary screening.

Soil samples were tested for organochlorine and organophosphate pesticides and herbicides; none were detected.

Sample collection was as follows: soil VOCs, glass jars; water VOCs, glass vials with HCl, no head space; soil TPH, glass jars; water TPH, amber glass bottles with HCl; soil pesticides/herbicides/PCBs/metals, glass jars or polyethylene containers; water metals, samples 5-1, 9-1, 21-1, polyethylene bottles; water metals, samples 5, 9, 21, polyethylene bottles with HNO_3. Glass jars, vials, and bottles all have Teflon-lined screw caps. Samples were stored in an iced cooler.

Sample Analysis

Based on the prior historic land use reported in the October, 1991 Level I Assessment of Lots 5,6, & 7, immediately west of the subject property, samples of soils and groundwater from the subject property were analyzed for a variety of contaminants associated with industrial activities, these included: chlorinated and aromatic solvents, PCBs, TCLP for 8 heavy metals, and HCID. In addition, 4 composite samples, approximately one per Lot, of the surface soils were collected and tested for Organochlorine and Organophosphate Pesticides as well as Chlorinated Herbicides (see Appendix B).

Analysis and Conclusions

In our opinion, the shallow subsurface survey of the property using the OVM, the visual

recognizance of the property, and the soil and groundwater samples collected, form a reasoned approach for determining the potential for hazardous substance contamination of the property.

The photoionization survey of the test pits revealed no contamination by volatile organic compounds. No contamination was identified by the surface grid survey. The low initial organic vapor readings identified in the surface grid survey are thought to be de minimis, or from decay of organic matter, because the reading did not persist when the spike holes were enlarged to 4 inch by 36 inch boreholes.

Laboratory analysis of soil samples from these lots revealed low levels of 6 heavy metals, including: Barium, Cadmium, Chromium, Lead, Arsenic and Mercury. All of the metals detected were below DEQ standards for industrial sites (Table 1)

PCBs in low concentrations ranging from 0.072 to 12 ppm were detected (Table 7).

Analysis of filtered groundwater samples from the property revealed extremely low levels of Arsenic, below EPA drinking water standards (Table 2).

The two water samples were non-detect for Total Petroleum Hydrocarbons (TPH). Of the two soil samples collected from suspect soil piles, one was at background TPH (12 ppm) and the other at a low but detectable concentration of 84 ppm.

PCBs were detected in 7 of 9 samples. Values ranged from trace amounts to 12 ppm for a composite sample. Soil samples were tested for organochlorine and organophosphate pesticides and herbicides; none were detected.

The soil mounds/piles identified as land features LF 1,2,3 & 4 appear to be clean fill, principally sand. There is surface debris at Land Features 9 and 10.

Based on the results of this site characterization and sampling study, the low levels of contaminants detected can be expected to be present and perhaps ubiquitous in soils throughout the subject property and the surrounding area and can reasonably expected to present a minimal risk for industrial land use and development.

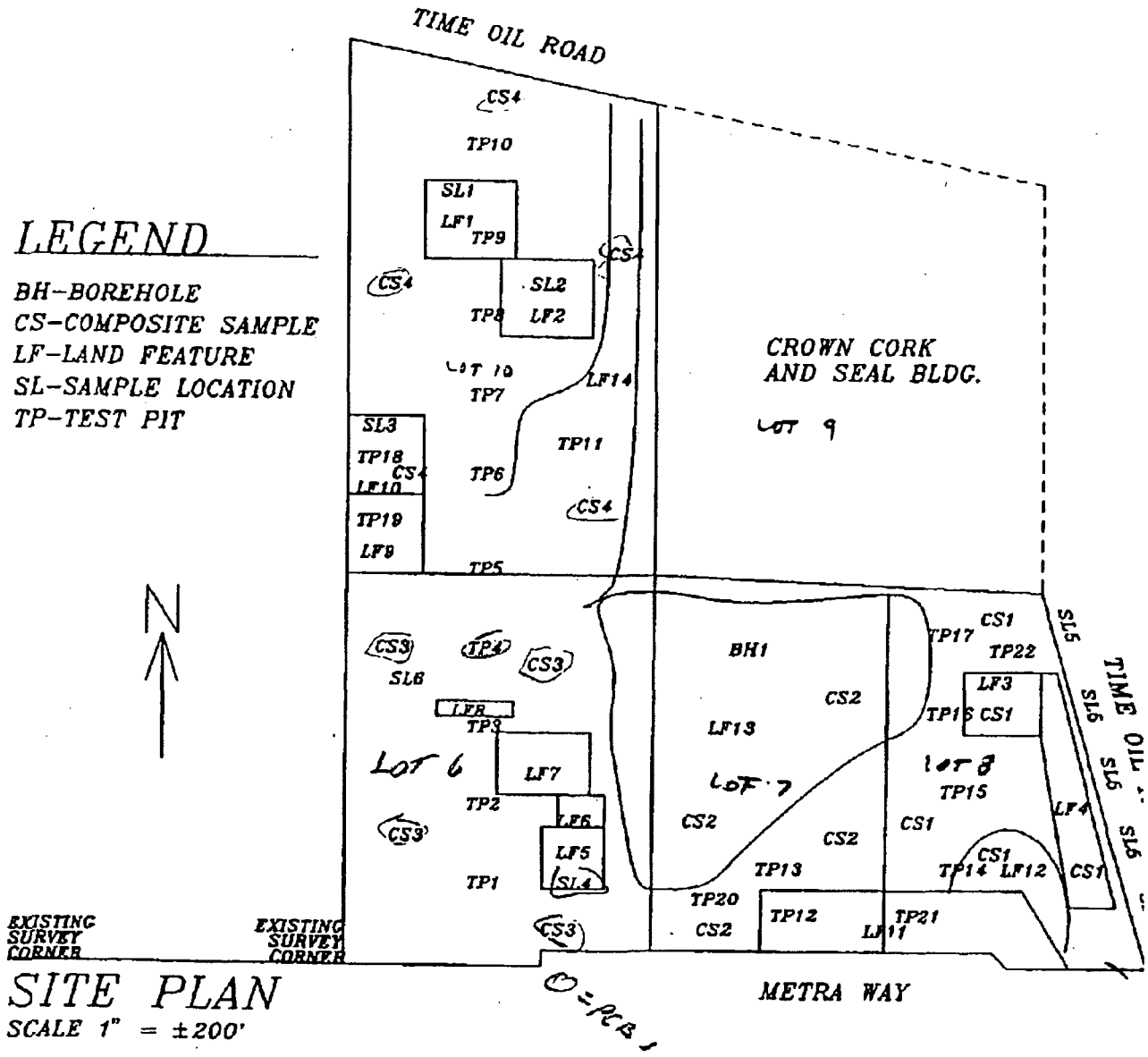
Intent and Limitations

By intent, this was an exploratory survey to indicate general conditions. The amount of sampling does not approach the sampling and laboratory analyses necessary to characterize

DRAWING

SCHN00206437

DRAWING



LEGEND

BH–BOREHOLE
CS–COMPOSITE SAMPLE
LF–LAND FEATURE
SL–SAMPLE LOCATION
TP–TEST PIT

SITE PLAN

SCALE 1" = ±200'

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TABLES & PHOTOGRAPHS

SCHN00206439

TABLE 1

SOIL SAMPLE ANALYSIS RESULTS COMPARISON WITH DEQ MAXIMUM ALLOWABLE SOIL CONCENTRATIONS*

CONTAMINANT	SAMPLE ANALYSIS	MAXIMUM ALLOWABLE
Arsenic	0.1 ppm	3.0 ppm
Barium	0.23 - 2.7 ppm	140,000 ppm
Cadmium	0.08 - 0.4 ppm	1,000 ppm
Chromium	0.32 ppm	1500 ppm
Lead	0.08 - 0.71 ppm	2000 ppm
Mercury	0.0017 - 0.005	600 ppm
PCBs	0.063 - 12.0 ppm	0.7 ppm

* The values indicated in Table 1 under DEQ Maximum Allowable Soil Concentrations, are based on a statistically significant site sampling study. The amount of sampling conducted in this expanded environmental site assessment, does not adequately represent the level of data required to make representative comparisons with published DEQ reference standards.

TABLE 2

SAMPLE ANALYSIS RESULT COMPARISON
WITH EPA DRINKING WATER REFERENCE STANDARDS

CONTAMINANT	SAMPLE ANALYSIS	MAXIMUM ALLOWABLE
Arsenic	.006 ppm	0.05 ppm

Table 3
Test Pit and Borehole Soil Profiles

Location	Depth (ft)	Profile
Test Pit #1	0-7 1/2	sand, no debris
Test Pit #2	0-8	sand, no debris
Test Pit #3	0-8	sand, no debris
	8	ground water
Test Pit #4	0-2	loam with brick, mortar
	2-8 1/2	sand, no debris
	8 1/2	ground water
Test Pit #5	0-2 1/2	loam with brick, mortar
	2 1/2-8 1/2	sand, no debris
	8 1/2	ground water
Test Pit #6	0-3	loam with cobble, concrete
	3-7	loamy sand, no debris
	7	refusal
	7	ground water
Test Pit #7	0-7	sand, no debris
	7	silt, concrete, ground water
Test Pit #8	0-7	sand, no debris
	7	silt, ground water
Test Pit #9	0-7	sand, no debris
	7	silt, ground water
Test Pit #10	0-5	sand, no debris
	5-5 1/2	silt, no debris
	5 1/2-7	sand, no debris
Test Pit #11	0-4	sand, no debris
	4- 4 2/12	silt
	4 2/12-4 4/12	asphalt
	4 4/12-4 8/12	gravel
	4 8/12-6	sand
	6	ground water

Table 3, cont'd

Test Pit #12	0-4	sand, no debris
	4-4 2/12	silt
	4 2/12-7	sand, no debris
	7	ground water
Test Pit #12	0-1	crushed rock, 6" minus
	1-3	sand, no debris
Test Pit #13	0-4	sand, no debris
	4-4 2/12	silt
	4 2/12-7	sand, no debris
	7	ground water
Test Pit #14	0-7	sand, no debris
Test Pit #15	0-2	sand w/round rock & fines
	2-7 1/4	sand, no debris
	7 1/4-7 1/2	silt, water infiltration at 7 1/4
	7 1/2-9	sand, no ground water
Test Pit #16	0-6	sand, no debris
	6-7	rock, asphalt, brick
	7-8 4/12	sand, no debris
	8 4/12	ground water
Test Pit #17	0-4	sand, no debris
	4-4 4/12	silt
	4 4/12-5	concrete, brick, wood, tile
	5-7	sand
	7	groundwater
Test Pit #18	0-1 1/2	fill, debris
	1 1/2-7	sand, no debris
	7	ground water
Test Pit #19	0-4	wood, asphalt, rock
	4-7	sand, no debris
	7	silt
Test Pit #20	0-8/12	loam, no debris
	8/12-4	sand, no debris

Table 3, cont'd

Test Pit #21	0-1	crushed rock
	1-4	sand, no debris
Test Pit #22	0-7	sand, no debris
Borehole #1	0-1/2	sandy loam, no debris
	1/2-1	silty loam, no debris
	1-3	sandy loam, no debris
	3-5	silt, no debris
	5-6	sand, no debris
	6	ground water, no debris

Table 4
Photoionization Survey—Test Pit Readings[1,2]
Trace Gas in ppm as Benzene at 10.2 eV

Location	Reading (ppm)
Test Pit 1	ND
Test Pit 2	ND
Test Pit 3	ND
Test Pit 4	ND
Test Pit 5	ND
Test Pit 7	ND
Test Pit 8	ND
Test Pit 9	ND
Test Pit 14	ND
Test Pit 16	ND
Test Pit 17	ND
Test Pit 19	ND
Test Pit 20	ND
Test Pit 21	ND

1. ND = not detected, minimum detection 0.1 ppm.

2. All Test Pits surveyed are presented in this table.

Table 5
Photoionization Survey—Surface Grid[1]
Trace Gas in ppm as Benzene at 10.2 eV

EAST LOT (Lot #1)

EAST 1/4 LINE	WEST 1/4 LINE
south boundary	south boundary
ND	ND
ND	1 ppm/ND[2]
ND	1 1/2-2 ppm/ND[2]
ND	ND
ND	ND
3-4 ppm/ND[2]	ND
ND	ND
ND	ND
0.5 ppm/ND[2]	ND
ND	ND
ND	ND
2-3 ppm/ND[2]	ND
north boundary	north boundary

CENTER LOT (Lot #2)

EAST 1/4 LINE	WEST 1/4 LINE
south boundary	south boundary
ND	ND
ND	5-6 PPM/ND[2]
ND	ND

Table 5, cont'd

ND	ND
ND	ND
ND	ND
ND	ND
ND	ND
ND	ND
ND	ND
north boundary	ND
	ND
	north boundary

1. Borehole depth ≥ 8"; ND = not detected, minimum detection 0.1 ppm.
2. Borehole depth increased to 0-36" for second reading.
3. Soil sample collected for VOC analysis, results ND.

Table 5, cont'd

WEST LOT (Lot #3)

EAST 1/4 LINE	WEST 1/4 LINE
south boundary	south boundary
1 ppm/ND[2]	ND
ND	ND
ND	ND
ND	ND
ND	ND
ND	ND
ND	ND
ND	1 ppm/ND[2]
ND	4 ppm/2.5 ppm[2,3]
5-10 ppm/ND[2]	0.5-1 ppm/ND[2]
ND	ND
ND	north boundary
north boundary	

NORTHWEST LOT (Lot #4)

EAST 1/4 LINE	WEST 1/4 LINE
south boundary	south boundary
ND	ND
ND	ND
ND	ND

Table 5, cont'd

ND	ND
ND	5 ppm/ND[2]
ND	ND
ND	ND
ND	ND
ND	ND
ND	ND
ND	ND
north boundary	ND
	ND
	ND
	ND
	north boundary

1. Borehole depth ≥ 8"; ND = not detected, minimum detection 0.1 ppm.
2. Borehole depth increased to 0-36" for second reading.
3. Soil sample collected for VOC analysis, results ND.

Table 5 cont'd

GRAVEL RD. (LF11)

West to east
ND, ND, ND, ND, ND, ND, ND, ND, ND, ND

TRAFFIC TURNAROUND (LF12)

ND, ND, ND, ND, ND, ND, ND, ND, ND, 5-6 ppm/ND[2]

1. Borehole depth ≥ 8"; ND = not detected, minimum detection 0.1 ppm.
2. Borehole depth increased to 0-36" for second reading.
3. Soil sample collected for VOC analysis, results ND.

Table 6
Land Features and Field Observations

Land Feature	Field Observations
LF1	Area of soil mounds/piles. Profiles were cut through 10 of the piles; 9 were sand (debris-free) and 1 was loam (debris-free).
LF2	Area of soil mounds/piles. Profiles were cut through 5 of the piles; 4 were sand (debris-free) and 1 was loam (debris-free).
LF3	Single large mound/pit. The pile was inspected at 10 locations; all indicated sand (debris-free).
LF4	Area of soil mounds/piles. The mounds were inspected at 15 locations; 14 were sand (debris-free) and 1 was 1/4" minus crushed rock (debris-free).
LF5,6,7,8	Debris piles. Piles 5, 7, 8 contain duff (insulation foam, fiberglass), metals, wood. Pile 6 is an area of concrete and asphalt debris.
LF9	Area of surface debris and duff (insulation foam, fiberglass).
LF10	Area of surface debris—principally construction material, some duff.
LF11	Gravel road—crushed rock with fines.
LF12	Traffic turnaround—area actively used by on-road trucks.
LF13	Surface impoundment—bermed area, free draining, no standing winter rain water, sedimented material.
LF14	Drainage way—low trenched area, no standing winter rain water, sedimented material.

Table 7
Laboratory Analysis Summary

Site	Sample #	Depth (ft)	Media	Analysis	Summary Result
TP1	1	7 1/2	soil	VOCs	ND
TP1	2	2 1/2 + 7 1/2	soil	metals	Ba 0.23 ppm; others ND
TP3	3	8	water	VOCs	ND
TP3	4	8	water	TPH	ND
TP3	5	8	water	metals	Methods Error[2]
TP3	5-1	8	water	metals	ND
TP4	6	0-2	soil	metals	Ba 0.98; Cd 0.13; Pb 0.42 ppm; others ND
TP4	7	0-2	soil	PCBs	1260 = 8.6 ppm; others ND[1]
TP7	8	7	water	VOCs	ND
TP7	9	7	water	metals	Methods Error[2]
TP7	9-1	7	water	metals	As 0.006 ppm; others ND
TP7	10	7	water	TPH	ND
TP8	11	7	soil	hold	—
TP10	12	5	soil	VOCs	ND
SL1	13	2 1/2	soil	TPH	84 ppm
SL2	14	2 1/2	soil	TPH	12 ppm
SL2	15	2 1/2	soil	PCBs	1260 = 0.072 ppm; others ND
SL2	16	0-1 1/2	soil	metals	Ba 0.48 ppm; others ND
TP11	17	6	soil	metals	Ba 0.28 ppm; others ND

Table 7

BH1	18 & 19	4	soil	metals	As 0.01; Ba 0.65 ppm; others ND
BH1	18 & 19	4	soil	PCBs	1254 = 0.080 ppm; others ND
BH1	20	6	water	VOCs	ND
BH1	21	6	water	metals	Methods Error[2]
BH1	21-1	6	water	metals	ND
BH1	22	6	water	hold	—
CS1	23 & 24 & 25	0-1 1/2	soil	pesticides	ND
CS1	23 & 24 & 25	0-1 1/2	soil	metals	Ba 0.23 ppm; others ND
CS1	23 & 24 & 25	0-1 1/2	soil	PCBs	ND[1]
CS2	26 & 27 & 28	0-1 1/2	soil	pesticides	ND
CS2	26 & 27 & 28	0-1 1/2	soil	metals	Ba 0.17 ppm; others ND
CS2	26 & 27 & 28	0-1 1/2	soil	PCBs	ND

Table 7, cont'd

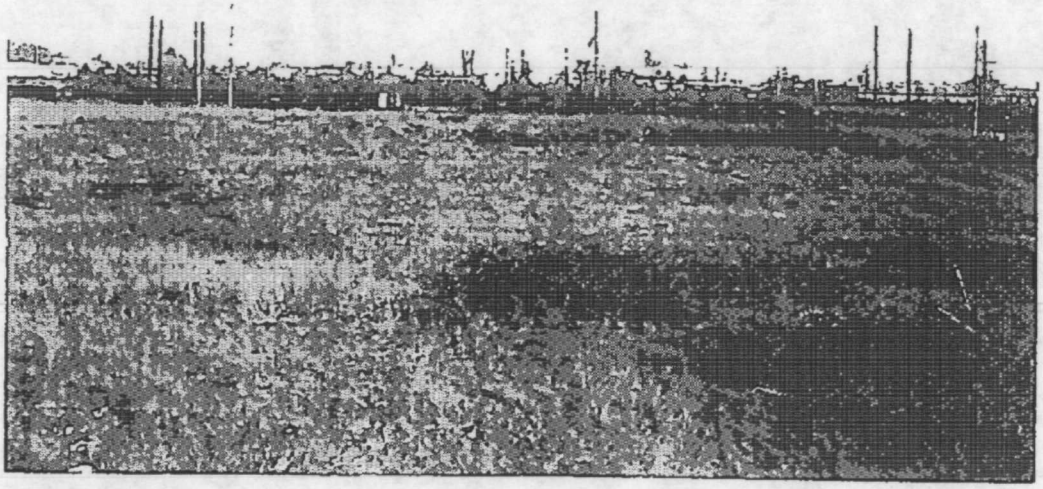
Site	Sample #	Depth (ft)	Media	Analysis	Summary Result
CS3	29 & 30 & 31	0-1 1/2	soil	pesticides	ND
CS3	29 & 30 & 31	0-1 1/2	soil	metals	Ba 0.27 ppm, ND
CS3	29 & 30 & 31	0-1 1/2	soil	PCBs	1260 = 2.8 ppm; others ND[1]
CS4	32 & 33 & 34	0-1 1/2	soil	pesticides	ND
CS4	32 & 33 & 34	0-1 1/2	soil	metals	Ba 0.32 ppm; others ND
CS4	32 & 33 & 34	0-1 1/2	soil	PCBs	1254 = 12 ppm; others ND[1]
SL3	35	0-1 1/2	soil	hold	
SL4	36	0-1 1/2	soil	metals	Ba 2.5; Cd 0.08; Pb 0.39 ppm; others ND
SL4	36	0-1	soil	pesticides	ND
SL4	36	0-1	soil	PCBs	1254 = 6.6 ppm; others ND[1]
SL5	37	0-1/2	soil	PCBs	1260 = 0.063 ppm; others ND
SL6	38	3	soil	VOCs	ND

1. Detection limits greater than typical; see laboratory data sheets.
2. Methods Error. Samples containing substantial sediment were acidified prior to filtering. See sample results 5-1, 9-1, and 21-1 for soluble metals results.

Table 8
Photographs

Photo #	Description
1	Soil mounds at LF1&2, north view
2,3	Close-up of soil mounds, LF1&2
4,5,6	Typical inspection of soil mounds
7,8	Large soil pile and soil mounds at LF3&4
9,10	Impoundment area LF13
11,12	Drainage area LF14
13,14,15	Typical Test Pit showing clean sand and ground water at ±7 ft depth
16	Test Pit 11 showing asphalt paving at ±4 ft depth
17	Test Pit 4 with surface debris, laboratory analysis samples #6&7
18,19,20,21	Debris piles LF5,6,7,8 and close-up photographs
22	Surface debris at LF9&10
23	Test Pit excavation through surface debris LF9&10
24	West to east view of gravel road bed and turnaround LF11&12

#1



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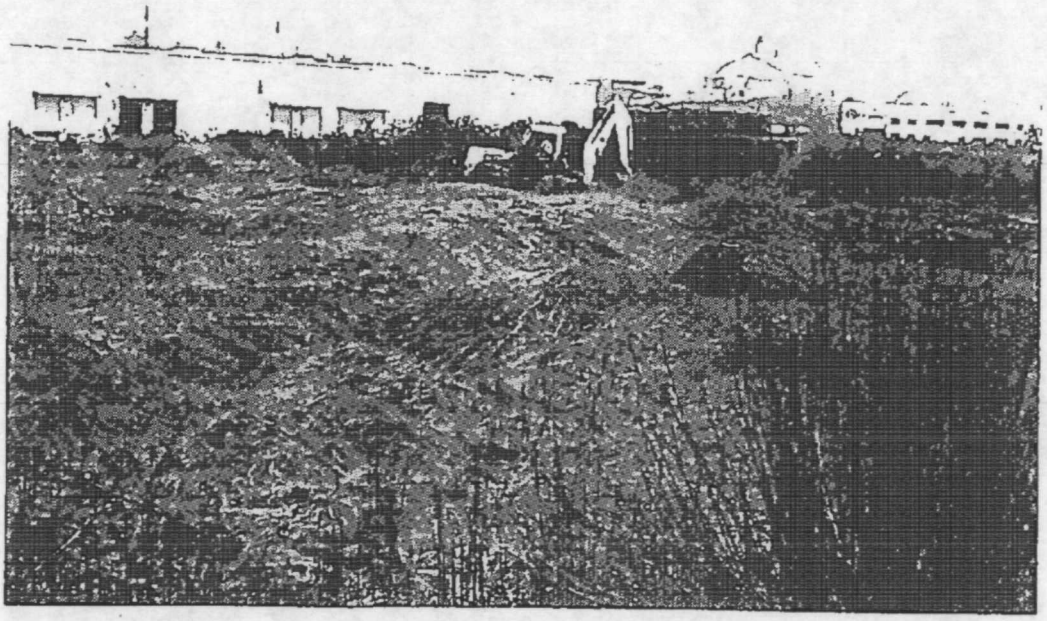

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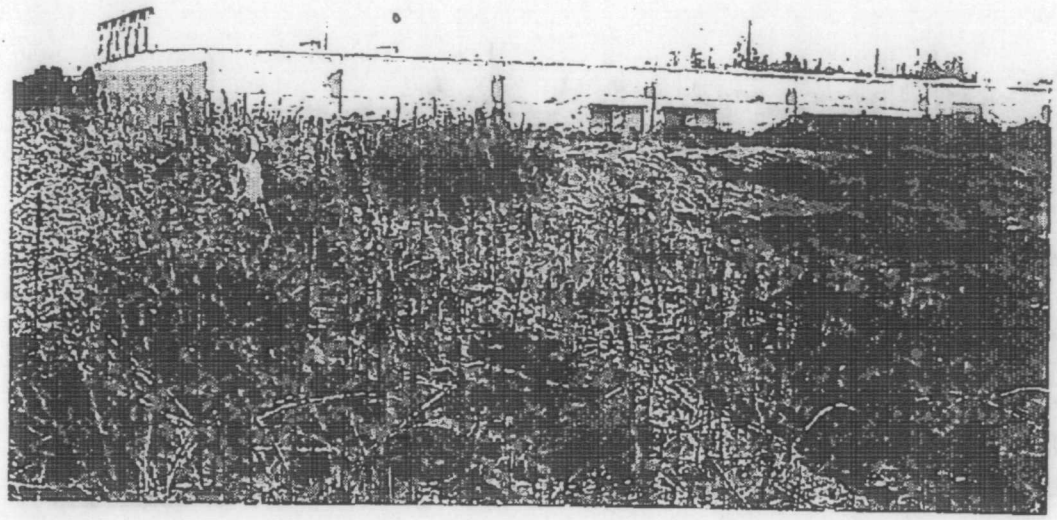

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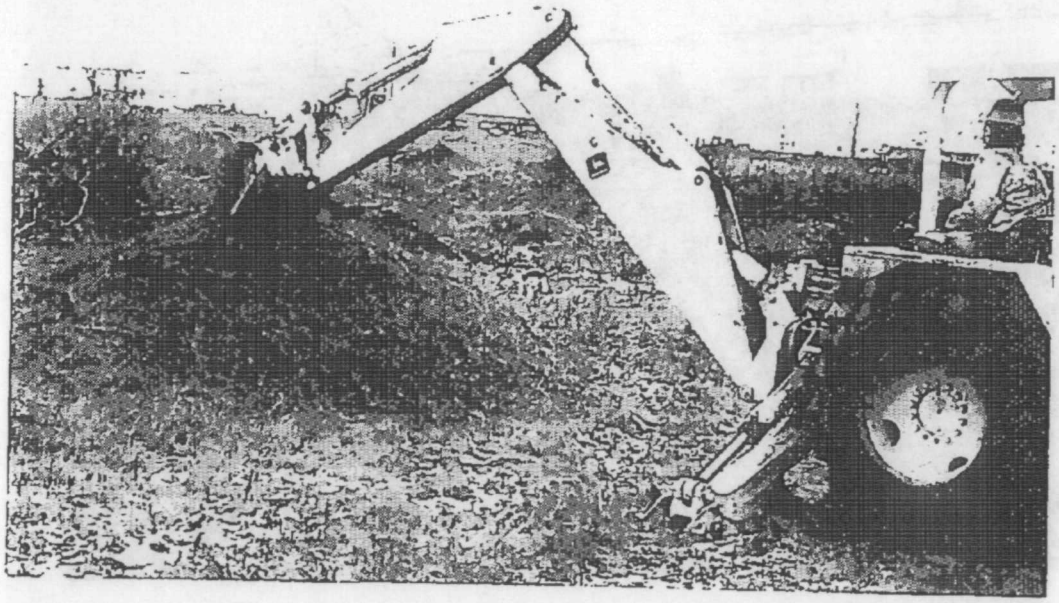

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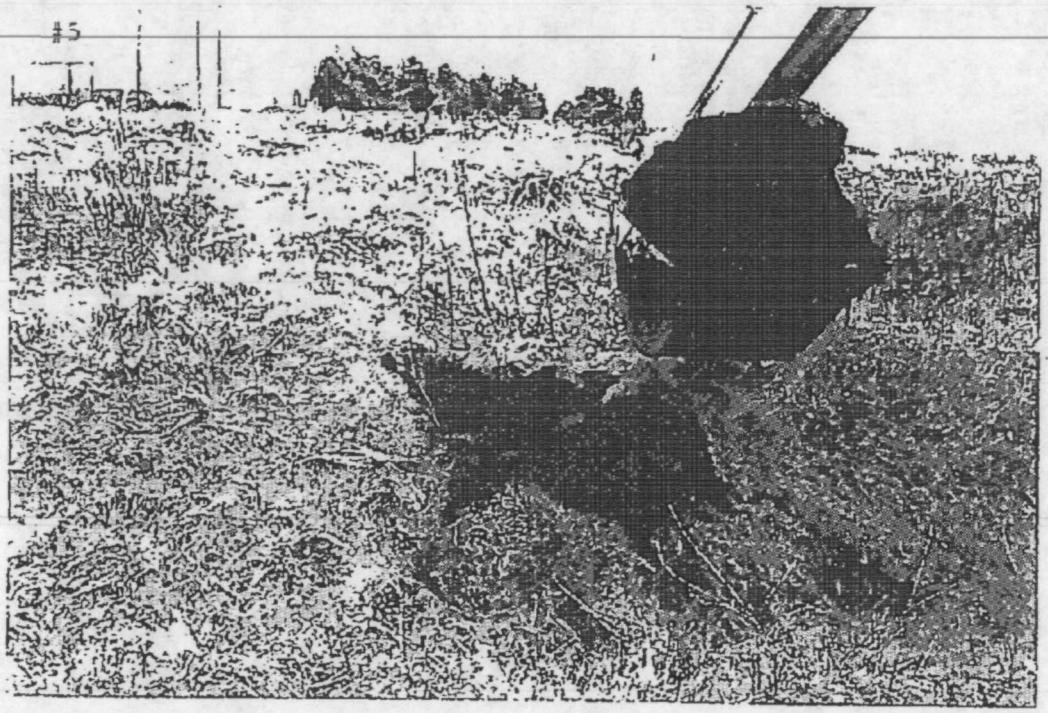

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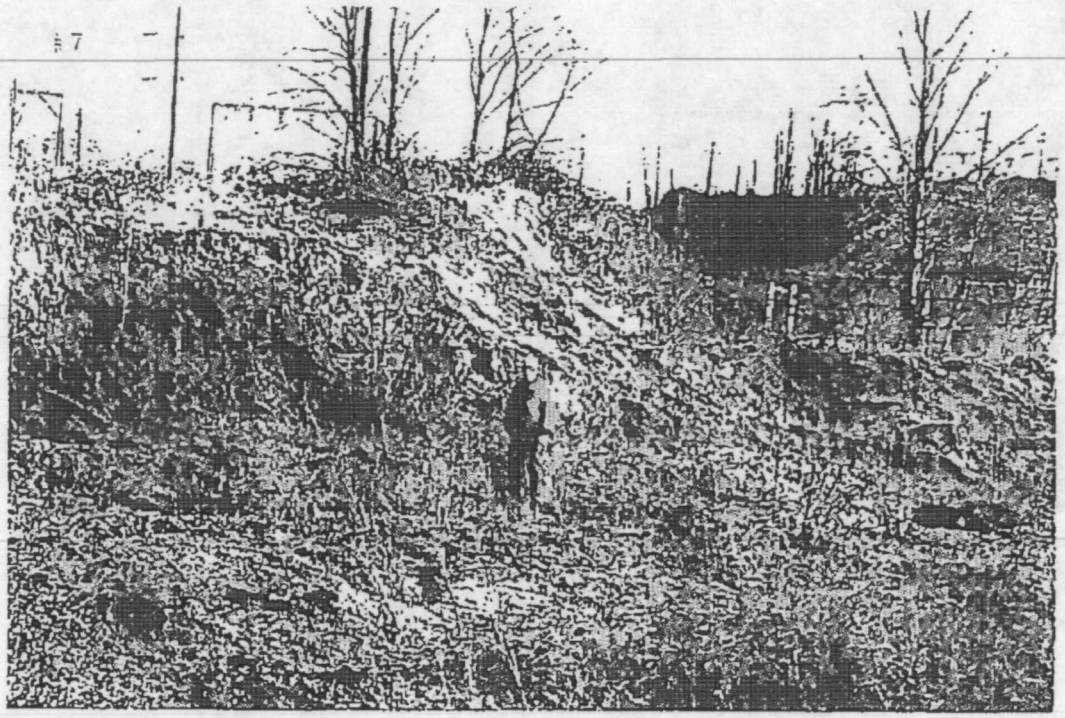

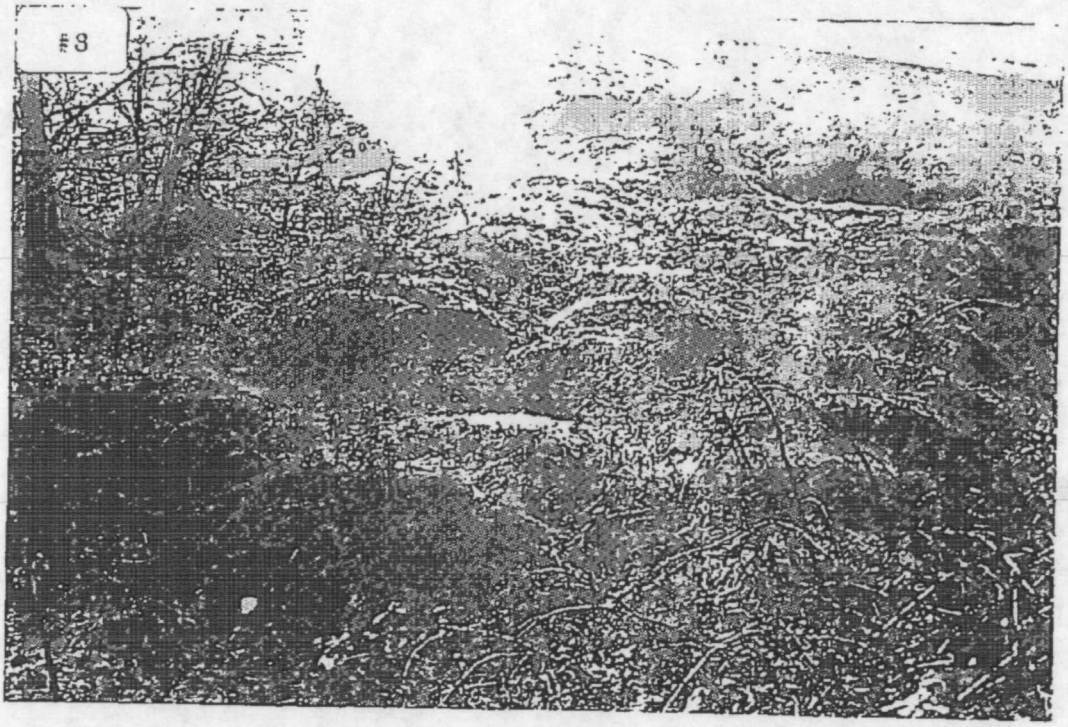

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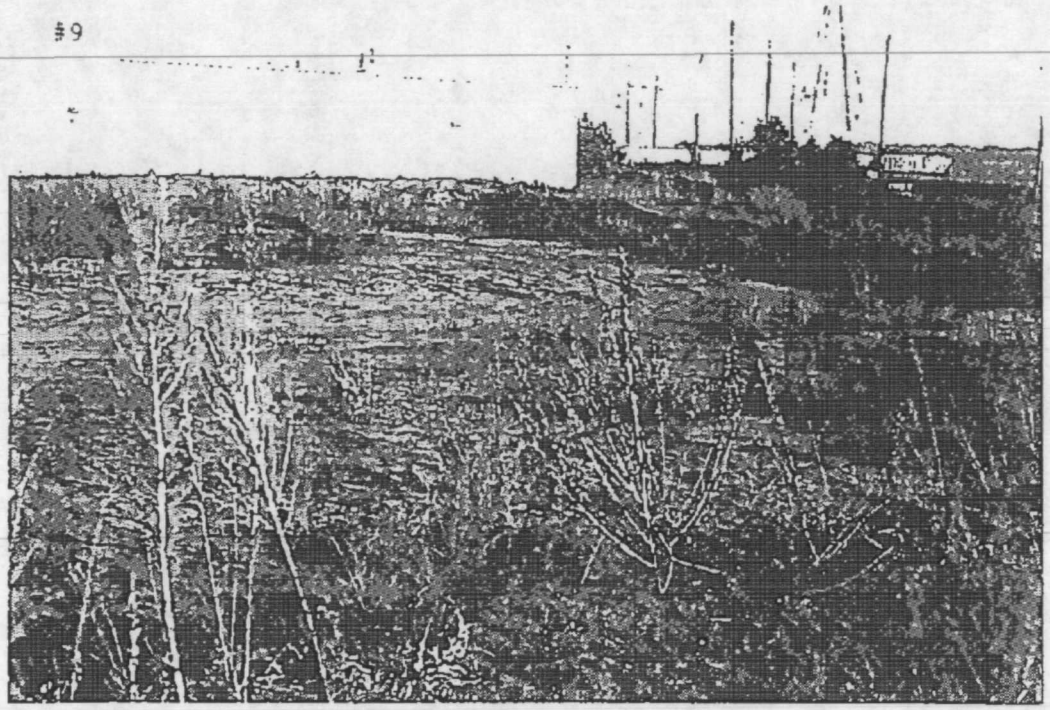

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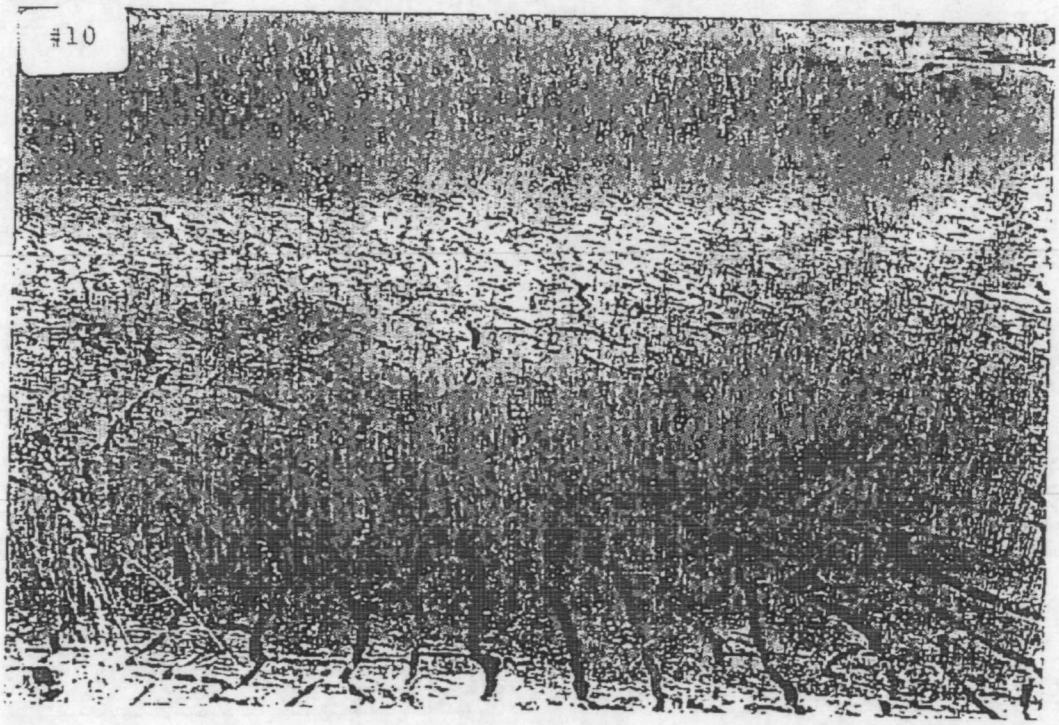

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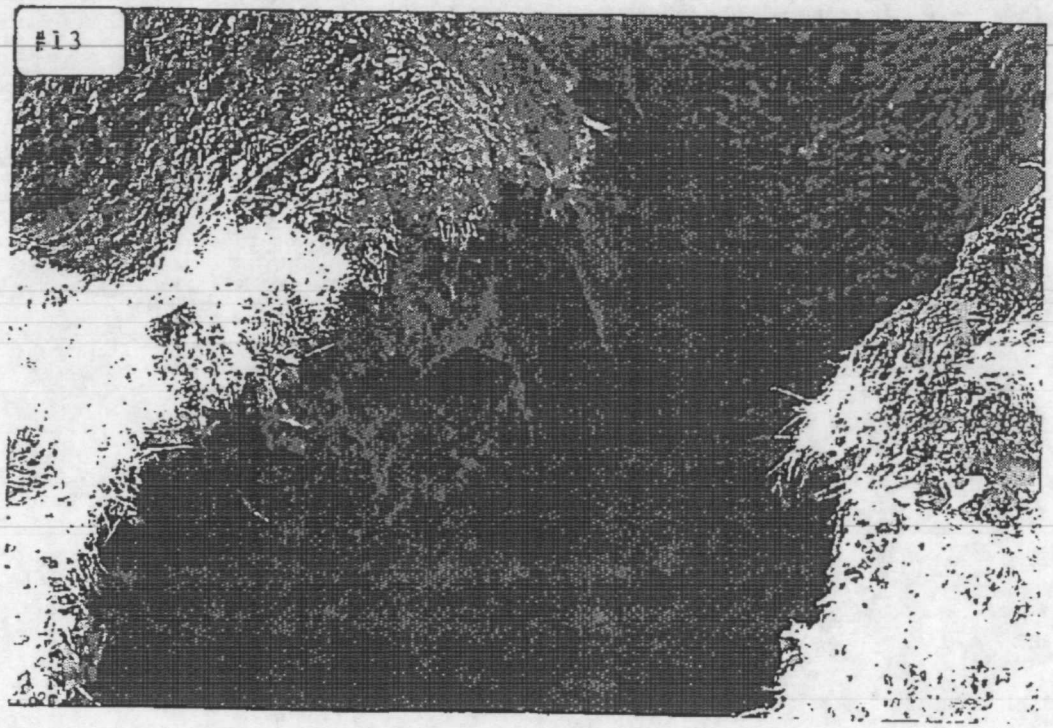

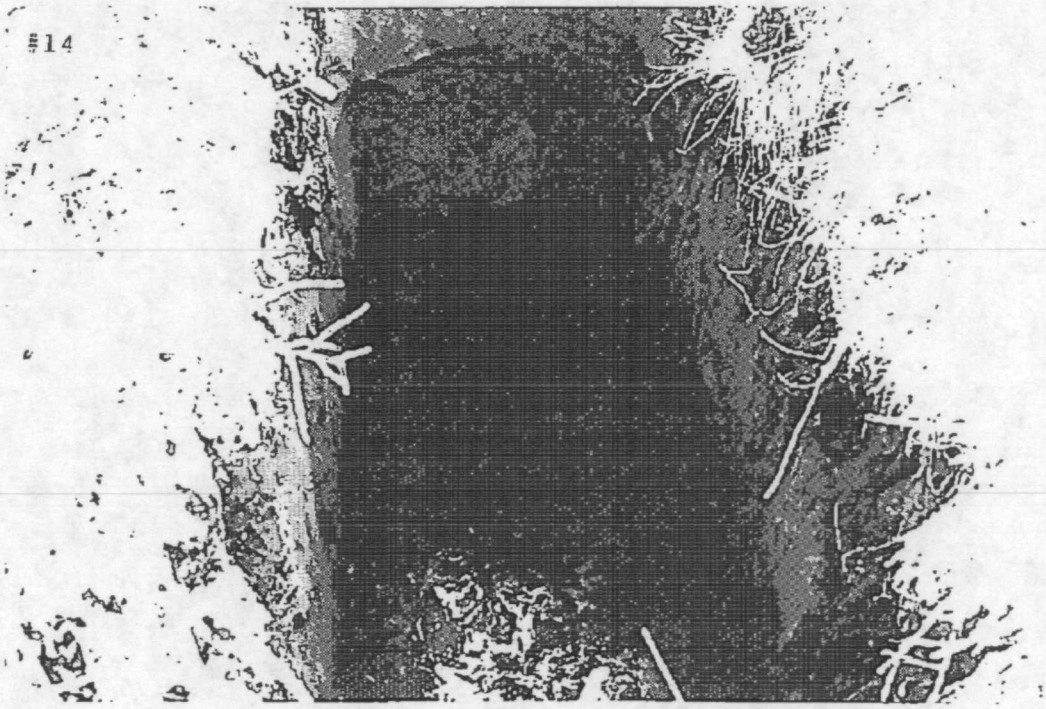

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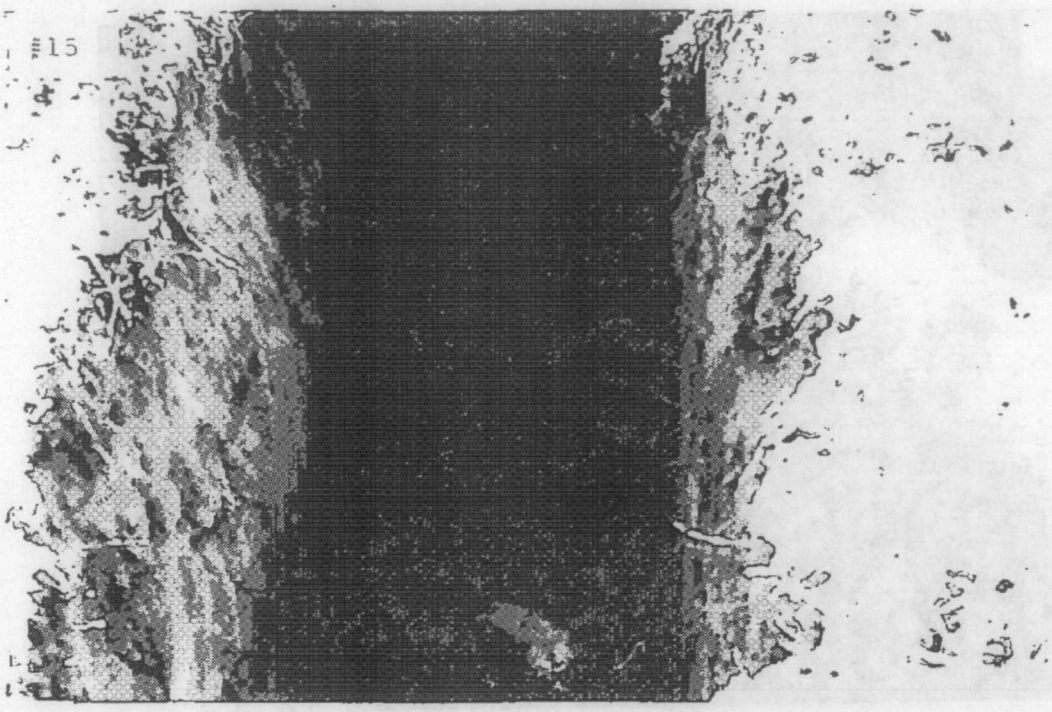

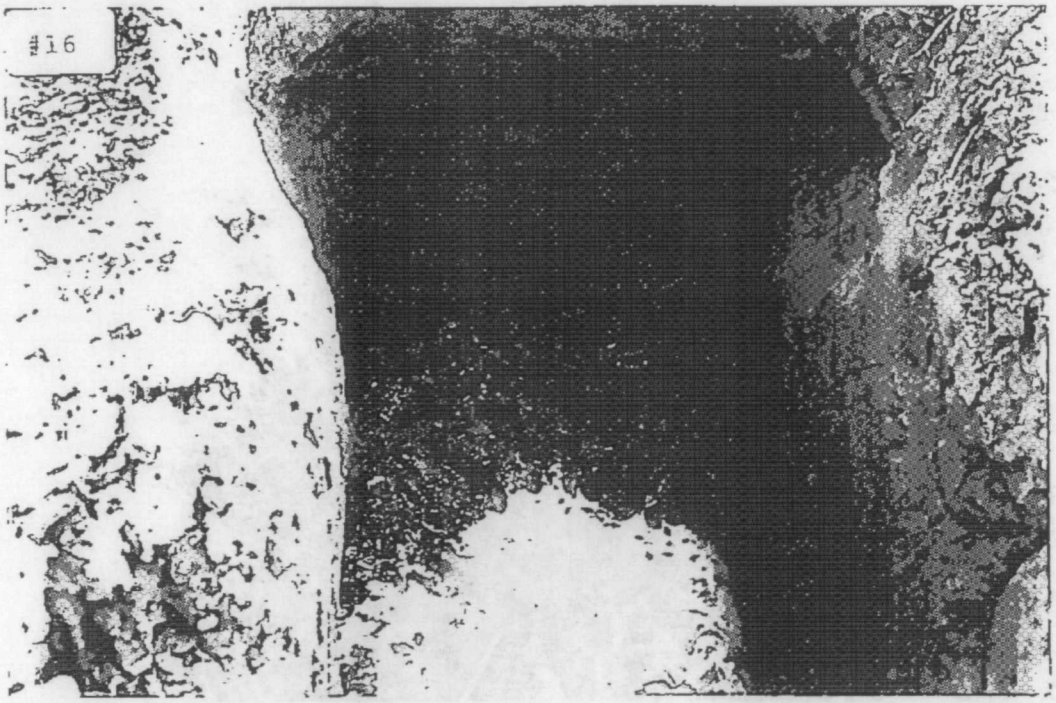

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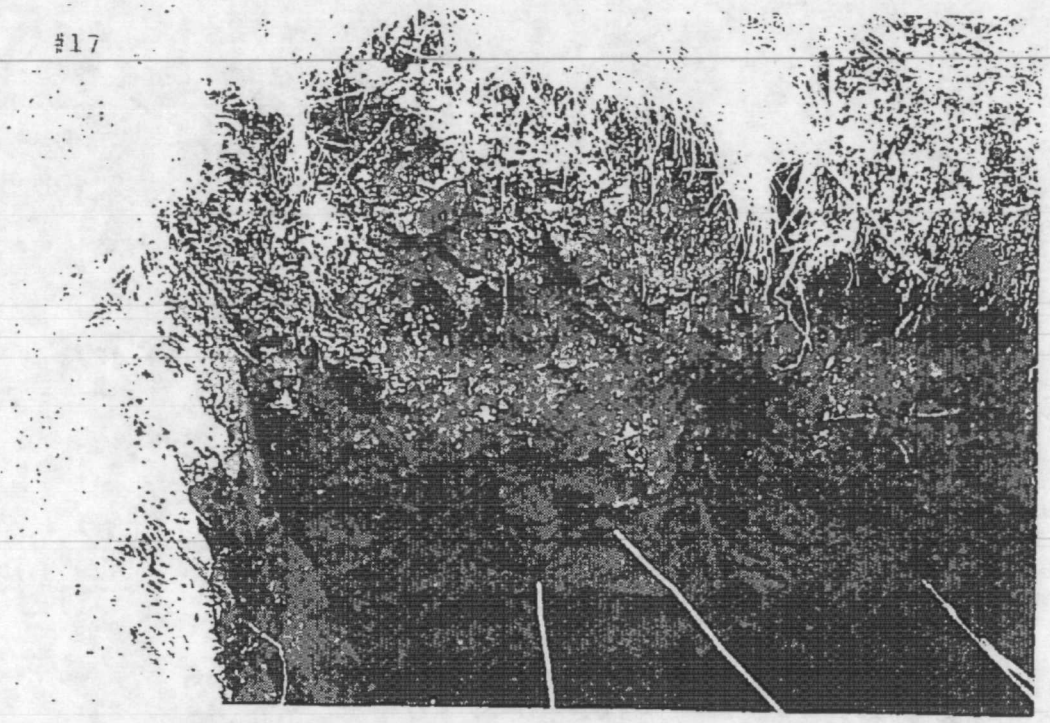

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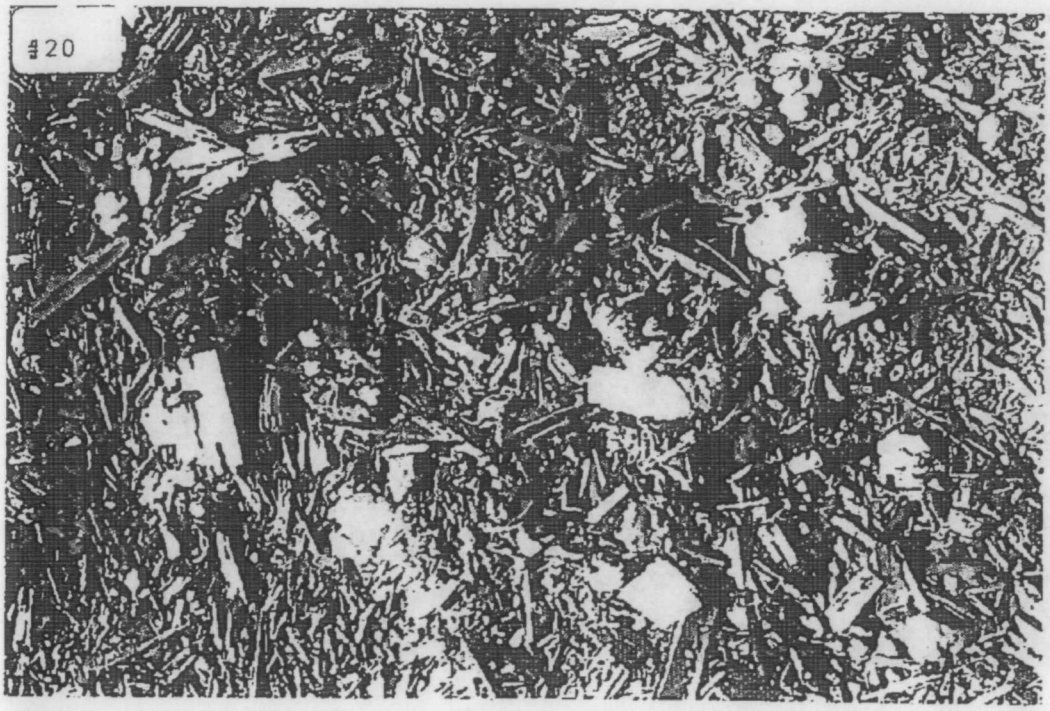

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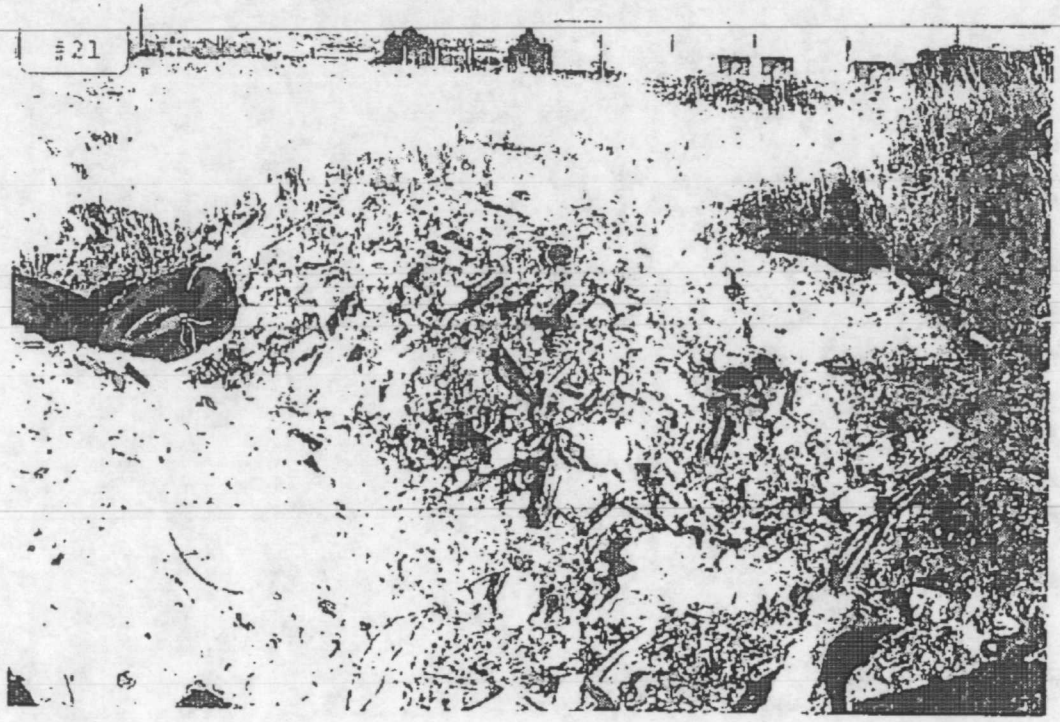

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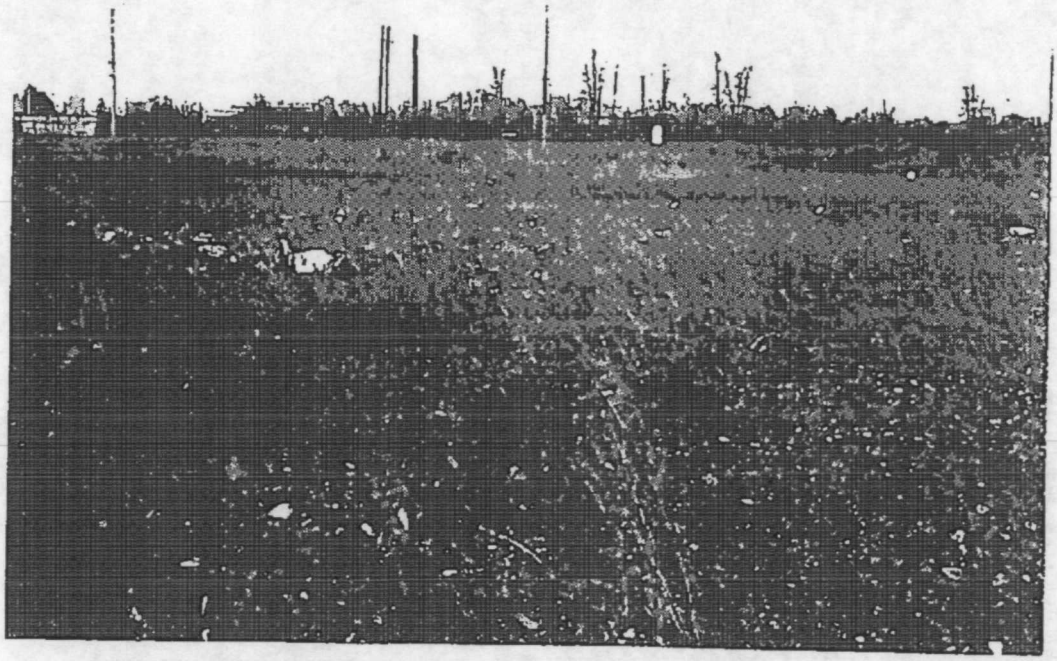

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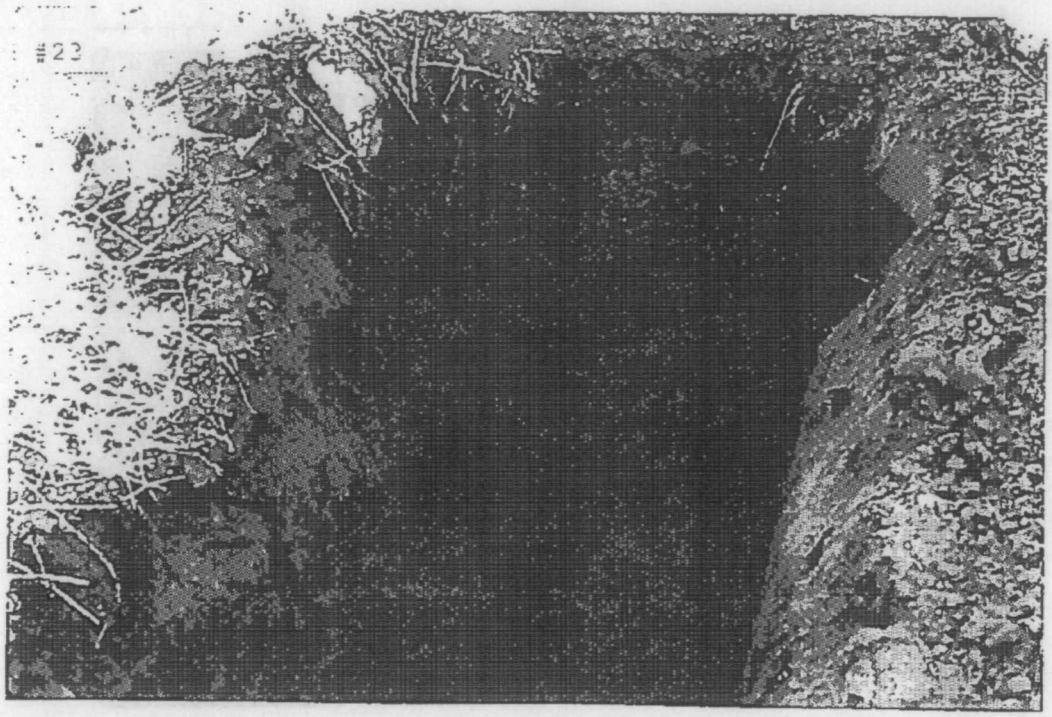

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APPENDIX A:

EXCERPTS FROM 1991 LEVEL I ENVIRONMENTAL ASSESSMENT ON IT TERMINAL LOTS 5,6, & 7

EMS Environmental Management Solutions
1800 SW First Avenue
Suite 610
Portland, Oregon 97201
503-225-9060
FAX: 503-273-8612

October 17, 1991

Mr. Tom Zelenka
Schnitzer Investment Corporation
3200 NW Yeon
Portland, Oregon 97210

RE: Level I Environmental Site Assessment of Real Property located at the IT Terminal in north Portland, Oregon

Dear Mr. Zelenka:

I am pleased to submit the results of our investigation of real property located at the IT Terminal in north Portland, Oregon for evidence of hazardous substance contamination.

Our Level I environmental assessment of the property focused on four areas:

1) A review of historic data, to identify prior ownership and uses that represent a potential threat of contamination of the property.

2) A review of regulatory agency records to identify hazardous waste sites, recorded hazardous substances present, environmental permits, violations, enforcement and remedial actions reported by federal, state, and local agencies.

3) A site reconnaissance of the property to determine whether a hazardous substance release has occurred, or if conditions exist that could result in a hazardous substance release.

4) An evaluation of whether the property poses an immediate or potential threat to public health, safety, or the environment.

The attached report documents our findings in each of the above areas. I would be pleased to provide a briefing at your convenience.

We appreciate the opportunity to be of assistance.

Sincerely,

Dan Saltzman
President

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EMS Environmental Management Solutions
1800 SW First Avenue
Suite 610
Portland, Oregon 97201
503·225-9060
FAX: 503·273-8612

LEVEL I ENVIRONMENTAL SITE ASSESSMENT OF REAL PROPERTY LOCATED AT THE IT TERMINAL IN NORTH PORTLAND, OREGON

OCTOBER 15, 1991

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EXECUTIVE SUMMARY

Environmental Management Solutions conducted a Level I Environmental Site Assessment of real property located at the IT Terminal in north Portland, Oregon.

The assessment included a review of historic land use; a review of regulatory agency and other public information relating to environmental conditions of the subject property and adjacent properties; and a site reconnaissance.

Based upon the results of our Level I Environmental Site Assessment, we find no direct evidence of significant hazardous substance contamination of the subject property. There is, however, a significant potential for the presence of hazardous substances as a result of historical land usage of properties around the subject property.

In addition visual observations of stained and discolored soils on the surface of the subject property, past usage of the property as a storage area for scrap chemical and petroleum tanks, although triple rinsed, suggests the presence of at least slight amounts of hazardous substances.

Further investigation, including soil sampling, would be necessary to determine of the nature and extent of any hazardous substance contamination of the subject property.

Specific findings are:

- Historic land use of the subject property has included a World War II housing project, the property has been vacant from at least the late 1960s.

- The historic land use of land adjacent to the subject property has included shipbuilding facilities and other heavy industrial facilities known to use hazardous substances.

- Visual observation of numerous areas of stained or discolored soils on the subject property indicate the potential for hazardous substance contamination on at least those portions of the property where the stains were observed

- There is no recorded evidence of leaking underground storage tanks, hazardous substance spills, or sewage pipe leaks on the subject property.

- DEQ records show 9 reported leaking underground storage tank incidents, but no hazardous substance spills, within a one-half mile radius of the subject property.

- There are 11 fully regulated hazardous waste generators registered with DEQ within a one-half mile radius of the subject property.

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- There are 10 sites within a one-half mile radius on DEQ's Site Assessment Data Base, an inventory of sites with confirmed or suspected releases of hazardous substances, or on EPA's CERCLIS list.

- There are six facilities registered with DEQ as Large Users of Toxic materials within a one-half mile radius of the subject property.

- None of the hazardous waste generators, large toxic users, or hazardous waste sites appear to pose a threat of contamination of the subject property.

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APPENDIX B:

LABORATORY ANALYSIS AND CHAIN OF CUSTODY DOCUMENTS

NATIONAL ENVIRONMENTAL TESTING, INC.

Portland Division
17400 SW Upper Boones Ferry Rd.
Suite #260
Portland, OR 97224
Tel: (503) 624-5449
Fax: (503) 639-6869

Thor Hinckley
Environmental Management Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

Date: 02/24/1993
NET Account No.: 10460
NET Job Number: 93.00111

Project: Schnitzer IT

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Sample Number	Sample Description	Matrix Type	Date Taken	Date Received
14674	1	SOIL	02/05/1993	02/08/1993
14675	2	SOIL	02/05/1993	02/08/1993
14676	3 A+B	GROUND WATER	02/05/1993	02/08/1993
14677	4	GROUND WATER	02/05/1993	02/08/1993
14678	5	GROUND WATER	02/05/1993	02/08/1993
14679	6	SOIL	02/05/1993	02/08/1993
14680	7	SOIL	02/05/1993	02/08/1993
14681	8 A+B	GROUND WATER	02/05/1993	02/08/1993
14682	9 A+B	GROUND WATER	02/05/1993	02/08/1993
14683	10	GROUND WATER	02/05/1993	02/08/1993
14684	12	SOIL	02/05/1993	02/08/1993
14685	13	SOIL	02/05/1993	02/08/1993
14686	14	SOIL	02/05/1993	02/08/1993
14687	15	SOIL	02/05/1993	02/08/1993
14688	16	SOIL	02/05/1993	02/08/1993
14689	17	SOIL	02/05/1993	02/08/1993
14690	18+19 Comp	SOIL	02/05/1993	02/08/1993
14691	20 A+B	GROUND WATER	02/05/1993	02/08/1993
14692	21	GROUND WATER	02/05/1993	02/08/1993
14694	23,24,25 Comp	SOIL	02/05/1993	02/08/1993
14695	26,27,28 Comp	SOIL	02/05/1993	02/08/1993
14696	29,30,31 Comp	SOIL	02/05/1993	02/08/1993
14697	32,33,34 Comp	SOIL	02/05/1993	02/08/1993
14698	36	SOIL	02/05/1993	02/08/1993
14699	37	SOIL	02/05/1993	02/08/1993

Approved by:

John Swanson

John Swanson
NET, INC. Portland Project Manager

ANALYTICAL REPORT

Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/24/1993
Job No.: 93.00111

Project Name: Schnitzer IT
Date Received: 02/08/1993

Sample Number	Sample Description
14674	1

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
8010 HALOGENATED VOC (S)				
Dilution Factor		1		02/10/1993
Chloromethane	8010	<5	ug/Kg	02/10/1993
Bromomethane	8010	<5	ug/Kg	02/10/1993
Vinyl Chloride	8010	<10	ug/Kg	02/10/1993
Chloroethane	8010	<5	ug/Kg	02/10/1993
Methylene Chloride	8010	<50	ug/Kg	02/10/1993
Trifluorofluoromethane	8010	<5	ug/Kg	02/10/1993
1,1-Dichloroethene	8010	<5	ug/Kg	02/10/1993
1,1-Dichloroethane	8010	<5	ug/Kg	02/10/1993
trans-1,2-Dichloroethene	8010	<5	ug/Kg	02/10/1993
cis-1,2-Dichloroethene	8010	<5	ug/Kg	02/10/1993
Chloroform	8010	<5	ug/Kg	02/10/1993
1,2-Dichloroethane	8010	<5	ug/Kg	02/10/1993
1,1,1-Trichloroethane	8010	<5	ug/Kg	02/10/1993
Carbon Tetrachloride	8010	<5	ug/Kg	02/10/1993
Bromodichloromethane	8010	<5	ug/Kg	02/10/1993
1,2-Dichloropropane	8010	<5	ug/Kg	02/10/1993
trans-1,3-Dichloropropene	8010	<5	ug/Kg	02/10/1993
Trichloroethene	8010	<5	ug/Kg	02/10/1993
Dibromochloromethane	8010	<5	ug/Kg	02/10/1993
1,1,2-Trichloroethane	8010	<5	ug/Kg	02/10/1993
cis-1,3-Dichloropropene	8010	<5	ug/Kg	02/10/1993
2-Chloroethylvinyl ether	8010	<20	ug/Kg	02/10/1993
Bromoform	8010	<5	ug/Kg	02/10/1993
1,1,2,2-Tetrachloroethane	8010	<5	ug/Kg	02/10/1993
Tetrachloroethene	8010	<5	ug/Kg	02/10/1993
Chlorobenzene	8010	<5	ug/Kg	02/10/1993
1,3-Dichlorobenzene	8010	<5	ug/Kg	02/10/1993
1,4-Dichlorobenzene	8010	<5	ug/Kg	02/10/1993
1,2-Dichlorobenzene	8010	<5	ug/Kg	02/10/1993

ANALYTICAL REPORT

Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/24/1993
Job No.: 93.00111

Project Name: Schnitzer IT
Date Received: 02/08/1993

Sample Number 14674 — Sample Description 1

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
EPA 8020 (S)				
Dilution Factor		1		02/10/1993
Benzene	8020	<2.5	ug/Kg	02/10/1993
Chlorobenzene	8020	<5	ug/Kg	02/10/1993
1,2-Dichlorobenzene	8020	<5	ug/Kg	02/10/1993
1,3-Dichlorobenzene	8020	<5	ug/Kg	02/10/1993
1,4-Dichlorobenzene	8020	<5	ug/Kg	02/10/1993
Toluene	8020	<2.5	ug/Kg	02/10/1993
Ethylbenzene	8020	<2.5	ug/Kg	02/10/1993

Sample Number 14675 — Sample Description 2

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP EXTRACTION PREP	1311	-		02/10/1993
TCLP - Arsenic	7060	<0.005	mg/L	02/15/1993
TCLP - Barium	6010	0.23	mg/L	02/12/1993
TCLP - Cadmium	6010	<0.02	mg/L	02/12/1993
TCLP - Chromium	6010	<0.05	mg/L	02/12/1993
TCLP - Lead (GFAA)	7421	<0.2	mg/L	02/12/1993
TCLP - Mercury	7470	<0.0002	mg/L	02/15/1993
TCLP - Selenium	7740	<0.005	mg/L	02/17/1993
TCLP - Silver	6010	<0.05	mg/L	02/12/1993

ANALYTICAL REPORT

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Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/24/1993
Job No.: 93.00111

Project Name: Schnitzer IT
Date Received: 02/08/1993

Sample Number	Sample Description
14676	3 A+B

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
8010 HALOGENATED VOC (W)				
Dilution Factor		1		02/12/1993
Chloromethane	8010	<0.5	ug/L	02/12/1993
Bromomethane	8010	<0.5	ug/L	02/12/1993
Vinyl chloride	8010	<2.0	ug/L	02/12/1993
Chloroethane	8010	<0.5	ug/L	02/12/1993
Methylene chloride	8010	<10	ug/L	02/12/1993
Trichlorofluoromethane	8010	<0.5	ug/L	02/12/1993
1,1-Dichloroethene	8010	<0.5	ug/L	02/12/1993
1,1-Dichloroethane	8010	<0.5	ug/L	02/12/1993
trans-1,2-Dichloroethene	8010	<0.5	ug/L	02/12/1993
cis-1,2-Dichloroethene	8010	<0.5	ug/L	02/12/1993
Chloroform	8010	<0.5	ug/L	02/12/1993
1,2-Dichloroethane	8010	<0.5	ug/L	02/12/1993
1,1,1-Trichloroethane	8010	<0.5	ug/L	02/12/1993
Carbon Tetrachloride	8010	<0.5	ug/L	02/12/1993
Bromodichloromethane	8010	<0.5	ug/L	02/12/1993
1,2-Dichloropropane	8010	<0.5	ug/L	02/12/1993
trans-1,3-Dichloropropene	8010	<0.5	ug/L	02/12/1993
Trichloroethene	8010	<0.5	ug/L	02/12/1993
Dibromochloromethane	8010	<0.5	ug/L	02/12/1993
1,1,2-Trichloroethane	8010	<0.5	ug/L	02/12/1993
cis-1,3-Dichloropropene	8010	<0.5	ug/L	02/12/1993
2-Chloroethylvinyl ether	8010	<1.0	ug/L	02/12/1993
Bromoform	8010	<0.5	ug/L	02/12/1993
1,1,2,2-Tetrachloroethane	8010	<0.5	ug/L	02/12/1993
Tetrachloroethene	8010	<0.5	ug/L	02/12/1993
Chlorobenzene	8010	<0.5	ug/L	02/12/1993
1,3-Dichlorobenzene	8010	<0.5	ug/L	02/12/1993
1,2-Dichlorobenzene	8010	<0.5	ug/L	02/12/1993
1,4-Dichlorobenzene	8010	<0.5	ug/L	02/12/1993

ANALYTICAL REPORT

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Environmental Management
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1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/24/1993
Job No.: 93.00111

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Sample Number 14676 — Sample Description 3 A+B

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
8020 (W)				
Dilution Factor		1		02/12/1993
Benzene	8020	<0.5	ug/L	02/12/1993
Toluene	8020	<0.5	ug/L	02/12/1993
Ethylbenzene	8020	<0.5	ug/L	02/12/1993
Chlorobenzene	8020	<0.5	ug/L	02/12/1993
1,3-Dichlorobenzene	8020	<0.5	ug/L	02/12/1993
1,4-Dichlorobenzene	8020	<0.5	ug/L	02/12/1993
1,2-Dichlorobenzene	8020	<0.5	ug/L	02/12/1993

Sample Number 14677 — Sample Description 4

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
EPA 418.1 (W) PREP	TPH-418.1	-		02/12/1993
EPA 418.1 (W)	TPH-418.1	<1	mg/L	02/12/1993

Sample Number 14678 — Sample Description 5

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
Arsenic, GFAA	7060	<0.005	mg/L	02/15/1993
Barium, ICP	6010	0.08	mg/L	02/12/1993
Cadmium, ICP	6010	<0.02	mg/L	02/12/1993
Chromium, ICP	6010	<0.05	mg/L	02/12/1993
Lead, GFAA (W)	7421	<0.2	mg/L	02/12/1993
Mercury,Cold Vapor	7470	<0.0002	mg/L	02/15/1993
Selenium, GFAA	7740	<0.005	mg/L	02/17/1993
Silver, ICP	6010	<0.05	mg/L	02/12/1993

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Sample Number 14679 — Sample Description 6

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP EXTRACTION PREP	1311	-		02/10/1993
TCLP - Arsenic	7060	<0.005	mg/L	02/15/1993
TCLP - Barium	6010	0.98	mg/L	02/12/1993
TCLP - Cadmium	6010	0.13	mg/L	02/12/1993
TCLP - Chromium	6010	<0.05	mg/L	02/12/1993
TCLP - Lead (GFAA)	7421	0.42	mg/L	02/12/1993
TCLP - Mercury	7470	<0.0002	mg/L	02/15/1993
TCLP - Selenium	7740	<0.005	mg/L	02/17/1993
TCLP - Silver	6010	<0.05	mg/L	02/12/1993

Sample Number 14680 — Sample Description 7

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
PCBs PREP	8080	-		02/11/1993
PCBs - (SOIL)				
Aroclor 1016	8080	<5,000	ug/Kg	02/12/1993
Aroclor 1221	8080	<25,000	ug/Kg	02/12/1993
Aroclor 1232	8080	<10,000	ug/Kg	02/12/1993
Aroclor 1242	8080	<5,000	ug/Kg	02/12/1993
Aroclor 1248	8080	<5,000	ug/Kg	02/12/1993
Aroclor 1254	8080	<2,500	ug/Kg	02/12/1993
Aroclor 1260	8080	8,600	ug/Kg	02/12/1993

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Sample Number	Sample Description
14681	8 A+B

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
8010 HALOGENATED VOC (W)				
Dilution Factor		1		02/12/1993
Chloromethane	8010	<0.5	ug/L	02/12/1993
Bromomethane	8010	<0.5	ug/L	02/12/1993
Vinyl chloride	8010	<2.0	ug/L	02/12/1993
Chloroethane	8010	<0.5	ug/L	02/12/1993
Methylene chloride	8010	<10	ug/L	02/12/1993
Trichlorofluoromethane	8010	<0.5	ug/L	02/12/1993
1,1-Dichloroethene	8010	<0.5	ug/L	02/12/1993
1,1-Dichloroethane	8010	<0.5	ug/L	02/12/1993
trans-1,2-Dichloroethene	8010	<0.5	ug/L	02/12/1993
cis-1,2-Dichloroethene	8010	<0.5	ug/L	02/12/1993
Chloroform	8010	<0.5	ug/L	02/12/1993
1,2-Dichloroethane	8010	<0.5	ug/L	02/12/1993
1,1,1-Trichloroethane	8010	<0.5	ug/L	02/12/1993
Carbon Tetrachloride	8010	<0.5	ug/L	02/12/1993
Bromodichloromethane	8010	<0.5	ug/L	02/12/1993
1,2-Dichloropropane	8010	<0.5	ug/L	02/12/1993
trans-1,3-Dichloropropene	8010	<0.5	ug/L	02/12/1993
Trichloroethene	8010	<0.5	ug/L	02/12/1993
Dibromochloromethane	8010	<0.5	ug/L	02/12/1993
1,1,2-Trichloroethane	8010	<0.5	ug/L	02/12/1993
cis-1,3-Dichloropropene	8010	<0.5	ug/L	02/12/1993
2-Chloroethylvinyl ether	8010	<1.0	ug/L	02/12/1993
Bromoform	8010	<0.5	ug/L	02/12/1993
1,1,2,2-Tetrachloroethane	8010	<0.5	ug/L	02/12/1993
Tetrachloroethene	8010	<0.5	ug/L	02/12/1993
Chlorobenzene	8010	<0.5	ug/L	02/12/1993
1,3-Dichlorobenzene	8010	<0.5	ug/L	02/12/1993
1,2-Dichlorobenzene	8010	<0.5	ug/L	02/12/1993
1,4-Dichlorobenzene	8010	<0.5	ug/L	02/12/1993

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Sample Number 14681 — Sample Description 8 A+B

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
8020 (W)				
Dilution Factor		1		02/12/1993
Benzene	8020	<0.5	ug/L	02/12/1993
Toluene	8020	<0.5	ug/L	02/12/1993
Ethylbenzene	8020	<0.5	ug/L	02/12/1993
Chlorobenzene	8020	<0.5	ug/L	02/12/1993
1,3-Dichlorobenzene	8020	<0.5	ug/L	02/12/1993
1,4-Dichlorobenzene	8020	<0.5	ug/L	02/12/1993
1,2-Dichlorobenzene	8020	<0.5	ug/L	02/12/1993

Sample Number 14682 — Sample Description 9 A+B

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
Arsenic, GFAA	7060	0.019	mg/L	02/15/1993
Barium, ICP	6010	0.20	mg/L	02/12/1993
Cadmium, ICP	6010	<0.02	mg/L	02/12/1993
Chromium, ICP	6010	<0.05	mg/L	02/12/1993
Lead, GFAA (W)	7421	0.08	mg/L	02/12/1993
Mercury,Cold Vapor	7470	0.0005	mg/L	02/15/1993
Selenium, GFAA	7740	<0.005	mg/L	02/17/1993
Silver, ICP	6010	<0.05	mg/L	02/12/1993

Sample Number 14683 — Sample Description 10

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
EPA 418.1 (W) PREP	TPH-418.1	-		02/12/1993
EPA 418.1 (W)	TPH-418.1	<1	mg/L	02/12/1993

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Sample Number	Sample Description
14684	12

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
8010 HALOGENATED VOC (S)				
Dilution Factor		1		02/10/1993
Chloromethane	8010	<5	ug/Kg	02/10/1993
Bromomethane	8010	<5	ug/Kg	02/10/1993
Vinyl Chloride	8010	<10	ug/Kg	02/10/1993
Chloroethane	8010	<5	ug/Kg	02/10/1993
Methylene Chloride	8010	<50	ug/Kg	02/10/1993
Trifluorofluoromethane	8010	<5	ug/Kg	02/10/1993
1,1-Dichloroethene	8010	<5	ug/Kg	02/10/1993
1,1-Dichloroethane	8010	<5	ug/Kg	02/10/1993
trans-1,2-Dichloroethene	8010	<5	ug/Kg	02/10/1993
cis-1,2-Dichloroethene	8010	<5	ug/Kg	02/10/1993
Chloroform	8010	<5	ug/Kg	02/10/1993
1,2-Dichloroethane	8010	<5	ug/Kg	02/10/1993
1,1,1-Trichloroethane	8010	<5	ug/Kg	02/10/1993
Carbon Tetrachloride	8010	<5	ug/Kg	02/10/1993
Bromodichloromethane	8010	<5	ug/Kg	02/10/1993
1,2-Dichloropropane	8010	<5	ug/Kg	02/10/1993
trans-1,3-Dichloropropene	8010	<5	ug/Kg	02/10/1993
Trichloroethene	8010	<5	ug/Kg	02/10/1993
Dibromochloromethane	8010	<5	ug/Kg	02/10/1993
1,1,2-Trichloroethane	8010	<5	ug/Kg	02/10/1993
cis-1,3-Dichloropropene	8010	<5	ug/Kg	02/10/1993
2-Chloroethylvinyl ether	8010	<20	ug/Kg	02/10/1993
Bromoform	8010	<5	ug/Kg	02/10/1993
1,1,2,2-Tetrachloroethane	8010	<5	ug/Kg	02/10/1993
Tetrachloroethene	8010	<5	ug/Kg	02/10/1993
Chlorobenzene	8010	<5	ug/Kg	02/10/1993
1,3-Dichlorobenzene	8010	<5	ug/Kg	02/10/1993
1,4-Dichlorobenzene	8010	<5	ug/Kg	02/10/1993
1,2-Dichlorobenzene	8010	<5	ug/Kg	02/10/1993

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Sample Number 14684 — Sample Description 12

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
EPA 8020 (S)				
Dilution Factor		1		02/10/1993
Benzene	8020	<2.5	ug/Kg	02/10/1993
Chlorobenzene	8020	<5	ug/Kg	02/10/1993
1,2-Dichlorobenzene	8020	<5	ug/Kg	02/10/1993
1,3-Dichlorobenzene	8020	<5	ug/Kg	02/10/1993
1,4-Dichlorobenzene	8020	<5	ug/Kg	02/10/1993
Toluene	8020	<2.5	ug/Kg	02/10/1993
Ethylbenzene	8020	<2.5	ug/Kg	02/10/1993

Sample Number 14685 — Sample Description 13

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
OAR TPH-418.1m (S) PREP		-		02/15/1993
OAR TPH-418.1m (S)	TPH-418.1	84	mg/Kg	02/16/1993

Sample Number 14686 — Sample Description 14

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
OAR TPH-418.1m (S) PREP		-		02/15/1993
OAR TPH-418.1m (S)	TPH-418.1	12	mg/Kg	02/16/1993

Sample Number 14687 — Sample Description 15

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
PCBs PREP	8080	-		02/11/1993
PCBs - (SOIL)				
Aroclor 1016	8080	<100	ug/Kg	02/12/1993
Aroclor 1221	8080	<500	ug/Kg	02/12/1993
Aroclor 1232	8080	<200	ug/Kg	02/12/1993
Aroclor 1242	8080	<100	ug/Kg	02/12/1993
Aroclor 1248	8080	<100	ug/Kg	02/12/1993
Aroclor 1254	8080	<50	ug/Kg	02/12/1993

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Sample Number 14687 — Sample Description 15

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
Aroclor 1260	8080	72	ug/Kg	02/12/1993

Sample Number 14688 — Sample Description 16

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP EXTRACTION PREP	1311	-		02/10/1993
TCLP - Arsenic	7060	<0.005	mg/L	02/15/1993
TCLP - Barium	6010	0.48	mg/L	02/12/1993
TCLP - Cadmium	6010	<0.02	mg/L	02/12/1993
TCLP - Chromium	6010	<0.05	mg/L	02/12/1993
TCLP - Lead (GFAA)	7421	<0.2	mg/L	02/12/1993
TCLP - Mercury	7470	<0.0002	mg/L	02/15/1993
TCLP - Selenium	7740	<0.005	mg/L	02/17/1993
TCLP - Silver	6010	<0.05	mg/L	02/12/1993

Sample Number 14689 — Sample Description 17

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP EXTRACTION PREP	1311	-		02/10/1993
TCLP - Arsenic	7060	<0.005	mg/L	02/15/1993
TCLP - Barium	6010	0.28	mg/L	02/12/1993
TCLP - Cadmium	6010	<0.02	mg/L	02/12/1993
TCLP - Chromium	6010	<0.05	mg/L	02/12/1993
TCLP - Lead (GFAA)	7421	<0.2	mg/L	02/12/1993
TCLP - Mercury	7470	<0.0002	mg/L	02/15/1993
TCLP - Selenium	7740	<0.005	mg/L	02/17/1993
TCLP - Silver	6010	<0.05	mg/L	02/12/1993

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Sample Number	Sample Description
14690	18+19 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP EXTRACTION PREP	1311	-		02/10/1993
TCLP - Arsenic	7060	0.010	mg/L	02/15/1993
TCLP - Barium	6010	0.65	mg/L	02/12/1993
TCLP - Cadmium	6010	<0.02	mg/L	02/12/1993
TCLP - Chromium	6010	<0.05	mg/L	02/12/1993
TCLP - Lead (GFAA)	7421	<0.2	mg/L	02/12/1993
TCLP - Mercury	7470	<0.0002	mg/L	02/15/1993
TCLP - Selenium	7740	<0.005	mg/L	02/17/1993
TCLP - Silver	6010	<0.05	mg/L	02/12/1993
PCBs PREP	8080	-		02/11/1993
PCBs - (SOIL)				
Aroclor 1016	8080	<100	ug/Kg	02/12/1993
Aroclor 1221	8080	<500	ug/Kg	02/12/1993
Aroclor 1232	8080	<200	ug/Kg	02/12/1993
Aroclor 1242	8080	<100	ug/Kg	02/12/1993
Aroclor 1248	8080	<100	ug/Kg	02/12/1993
Aroclor 1254	8080	80	ug/Kg	02/12/1993
Aroclor 1260	8080	<50	ug/Kg	02/12/1993

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Sample Number	Sample Description
14691	20 A+B

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
8010 HALOGENATED VOC (W)				
Dilution Factor		1		02/12/1993
Chloromethane	8010	<0.5	ug/L	02/12/1993
Bromomethane	8010	<0.5	ug/L	02/12/1993
Vinyl chloride	8010	<2.0	ug/L	02/12/1993
Chloroethane	8010	<0.5	ug/L	02/12/1993
Methylene chloride	8010	<10	ug/L	02/12/1993
Trichlorofluoromethane	8010	<0.5	ug/L	02/12/1993
1,1-Dichloroethene	8010	<0.5	ug/L	02/12/1993
1,1-Dichloroethane	8010	<0.5	ug/L	02/12/1993
trans-1,2-Dichloroethene	8010	<0.5	ug/L	02/12/1993
cis-1,2-Dichloroethene	8010	<0.5	ug/L	02/12/1993
Chloroform	8010	<0.5	ug/L	02/12/1993
1,2-Dichloroethane	8010	<0.5	ug/L	02/12/1993
1,1,1-Trichloroethane	8010	<0.5	ug/L	02/12/1993
Carbon Tetrachloride	8010	<0.5	ug/L	02/12/1993
Bromodichloromethane	8010	<0.5	ug/L	02/12/1993
1,2-Dichloropropane	8010	<0.5	ug/L	02/12/1993
trans-1,3-Dichloropropene	8010	<0.5	ug/L	02/12/1993
Trichloroethene	8010	<0.5	ug/L	02/12/1993
Dibromochloromethane	8010	<0.5	ug/L	02/12/1993
1,1,2-Trichloroethane	8010	<0.5	ug/L	02/12/1993
cis-1,3-Dichloropropene	8010	<0.5	ug/L	02/12/1993
2-Chloroethylvinyl ether	8010	<1.0	ug/L	02/12/1993
Bromoform	8010	<0.5	ug/L	02/12/1993
1,1,2,2-Tetrachloroethane	8010	<0.5	ug/L	02/12/1993
Tetrachloroethene	8010	<0.5	ug/L	02/12/1993
Chlorobenzene	8010	<0.5	ug/L	02/12/1993
1,3-Dichlorobenzene	8010	<0.5	ug/L	02/12/1993
1,2-Dichlorobenzene	8010	<0.5	ug/L	02/12/1993
1,4-Dichlorobenzene	8010	<0.5	ug/L	02/12/1993

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PARAMETERS	METHODS	RESULTS		DATE ANALYZED
8020 (W)				
Dilution Factor		1		02/12/1993
Benzene	8020	<0.5	ug/L	02/12/1993
Toluene	8020	<0.5	ug/L	02/12/1993
Ethylbenzene	8020	<0.5	ug/L	02/12/1993
Chlorobenzene	8020	<0.5	ug/L	02/12/1993
1,3-Dichlorobenzene	8020	<0.5	ug/L	02/12/1993
1,4-Dichlorobenzene	8020	<0.5	ug/L	02/12/1993
1,2-Dichlorobenzene	8020	<0.5	ug/L	02/12/1993

Sample Number 14692 — Sample Description 21

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
Arsenic, GFAA	7060	0.100	mg/L	02/15/1993
Barium, ICP	6010	2.7	mg/L	02/12/1993
Cadmium, ICP	6010	0.04	mg/L	02/12/1993
Chromium, ICP	6010	0.32	mg/L	02/12/1993
Lead, GFAA (W)	7421	0.71	mg/L	02/12/1993
Mercury,Cold Vapor	7470	0.0017	mg/L	02/15/1993
Selenium, GFAA	7740	<0.005	mg/L	02/17/1993
Silver, ICP	6010	<0.05	mg/L	02/12/1993

Sample Number 14694 — Sample Description 23,24,25 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP EXTRACTION PREP	1311	-		02/11/1993
TCLP - Arsenic	7060	<0.005	mg/L	02/15/1993
TCLP - Barium	6010	0.23	mg/L	02/12/1993
TCLP - Cadmium	6010	<0.02	mg/L	02/12/1993
TCLP - Chromium	6010	<0.05	mg/L	02/12/1993
TCLP - Lead (GFAA)	7421	<0.2	mg/L	02/12/1993
TCLP - Mercury	7470	<0.0002	mg/L	02/15/1993
TCLP - Selenium	7740	<0.005	mg/L	02/17/1993

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Sample Number	Sample Description
14694	23,24,25 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP - Silver	6010	<0.05	mg/L	02/12/1993
PESTICIDES/PCB'S PREP	8080	-		02/11/1993
PESTICIDES/PCB'S - 8080				
Aldrin	8080	<6	ug/Kg	02/17/1993
alpha-BHC	8080	<1.5	ug/Kg	02/17/1993
beta-BHC	8080	<1.5	ug/Kg	02/17/1993
gamma-BHC	8080	<6	ug/Kg	02/17/1993
delta-BHC	8080	<1.5	ug/Kg	02/17/1993
Chlordane	8080	<125	ug/Kg	02/17/1993
4,4'-DDD	8080	<15	ug/Kg	02/17/1993
4,4'-DDE	8080	<15	ug/Kg	02/17/1993
4,4'-DDT	8080	<15	ug/Kg	02/17/1993
Dieldrin	8080	<15	ug/Kg	02/17/1993
Endosulfan I	8080	<15	ug/Kg	02/17/1993
Endosulfan II	8080	<15	ug/Kg	02/17/1993
Endosulfan Sulfate	8080	<15	ug/Kg	02/17/1993
Endrin	8080	<15	ug/Kg	02/17/1993
Endrin Aldehyde	8080	<15	ug/Kg	02/17/1993
Heptachlor	8080	<15	ug/Kg	02/17/1993
Heptachlor Epoxide	8080	<15	ug/Kg	02/17/1993
Methoxychlor	8080	<25	ug/Kg	02/17/1993
Toxaphene	8080	<300	ug/Kg	02/17/1993
PCB-1016	8080	<500	ug/Kg	02/17/1993
PCB-1221	8080	<2,500	ug/Kg	02/17/1993
PCB-1232	8080	<1,000	ug/Kg	02/17/1993
PCB-1242	8080	<500	ug/Kg	02/17/1993
PCB-1248	8080	<500	ug/Kg	02/17/1993
PCB-1254	8080	<250	ug/Kg	02/17/1993
PCB-1260	8080	<250	ug/Kg	02/17/1993
PESTICIDES EPA 8140 (S) PREP	8140	-		02/17/1993
PESTICIDES EPA 8140 (S)				
Dilution Factor		1		02/23/1993
Dichlorvos	8140	<0.5	mg/Kg	02/23/1993
Mevinphos	8140	<1.0	mg/Kg	02/23/1993
Demeton-O and -S	8140	<2.0	mg/Kg	02/23/1993
Ethoprophos	8140	<1.0	mg/Kg	02/23/1993
Phorate	8140	<0.5	mg/Kg	02/23/1993

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Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

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Project Name: Schnitzer IT
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Sample Number	Sample Description
14694	23,24,25 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
Diazinon	8140	<0.5	mg/Kg	02/23/1993
Disulfoton	8140	<0.5	mg/Kg	02/23/1993
Dimethoate	8140	<2.0	mg/Kg	02/23/1993
Ronnel	8140	<0.5	mg/Kg	02/23/1993
Methyl Parathion	8140	<0.2	mg/Kg	02/23/1993
Chlorpyrifos	8140	<0.5	mg/Kg	02/23/1993
Parathion	8140	<0.5	mg/Kg	02/23/1993
Fenthion	8140	<0.5	mg/Kg	02/23/1993
Malathion	8140	<0.5	mg/Kg	02/23/1993
Tetrachlorvinphos	8140	<0.5	mg/Kg	02/23/1993
Fensulfothion	8140	<0.5	mg/Kg	02/23/1993
Coumaphos	8140	<2.5	mg/Kg	02/23/1993
8150 HERBICIDES (S) PREP	8150	-		02/12/1993
8150 HERBICIDES (S)				
Dalapon	8150	<0.1	mg/Kg	02/15/1993
Dicamba	8150	<0.01	mg/Kg	02/15/1993
MCPA	8150	<5.0	mg/Kg	02/15/1993
MCPP	8150	<5.0	mg/Kg	02/15/1993
Dichloroprop	8150	<0.05	mg/Kg	02/15/1993
2,4-D	8150	<0.05	mg/Kg	02/15/1993
2,4,5-TP (Silvex)	8150	<0.01	mg/Kg	02/15/1993
2,4,5-T	8150	<0.01	mg/Kg	02/15/1993
2,4-DB	8150	<0.05	mg/Kg	02/15/1993
Dinoseb	8150	<0.01	mg/Kg	02/15/1993

Sample Number	Sample Description
14695	26,27,28 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP EXTRACTION PREP	1311	-		02/11/1993
TCLP - Arsenic	7060	<0.005	mg/L	02/15/1993
TCLP - Barium	6010	0.17	mg/L	02/12/1993
TCLP - Cadmium	6010	<0.02	mg/L	02/12/1993
TCLP - Chromium	6010	<0.05	mg/L	02/12/1993

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Sample Number	Sample Description
14695	26,27,28 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP - Lead (GFAA)	7421	<0.2	mg/L	02/12/1993
TCLP - Mercury	7470	<0.0002	mg/L	02/15/1993
TCLP - Selenium	7740	<0.005	mg/L	02/17/1993
TCLP - Silver	6010	<0.05	mg/L	02/12/1993
PESTICIDES/PCB'S PREP	8080	-		02/11/1993
PESTICIDES/PCB'S - 8080				
Aldrin	8080	<1.2	ug/Kg	02/17/1993
alpha-BHC	8080	<0.3	ug/Kg	02/17/1993
beta-BHC	8080	<0.3	ug/Kg	02/17/1993
gamma-BHC	8080	<1.2	ug/Kg	02/17/1993
delta-BHC	8080	<0.3	ug/Kg	02/17/1993
Chlordane	8080	<25	ug/Kg	02/17/1993
4,4'-DDD	8080	<3	ug/Kg	02/17/1993
4,4'-DDE	8080	<3	ug/Kg	02/17/1993
4,4'-DDT	8080	<3	ug/Kg	02/17/1993
Dieldrin	8080	<3	ug/Kg	02/17/1993
Endosulfan I	8080	<3	ug/Kg	02/17/1993
Endosulfan II	8080	<3	ug/Kg	02/17/1993
Endosulfan Sulfate	8080	<3	ug/Kg	02/17/1993
Endrin	8080	<3	ug/Kg	02/17/1993
Endrin Aldehyde	8080	<3	ug/Kg	02/17/1993
Heptachlor	8080	<3	ug/Kg	02/17/1993
Heptachlor Epoxide	8080	<3	ug/Kg	02/17/1993
Methoxychlor	8080	<5	ug/Kg	02/17/1993
Toxaphene	8080	<60	ug/Kg	02/17/1993
PCB-1016	8080	<100	ug/Kg	02/17/1993
PCB-1221	8080	<500	ug/Kg	02/17/1993
PCB-1232	8080	<200	ug/Kg	02/17/1993
PCB-1242	8080	<100	ug/Kg	02/17/1993
PCB-1248	8080	<100	ug/Kg	02/17/1993
PCB-1254	8080	<50	ug/Kg	02/17/1993
PCB-1260	8080	<50	ug/Kg	02/17/1993
PESTICIDES EPA 8140 (S) PREP	8140	-		02/17/1993
PESTICIDES EPA 8140 (S)				
Dilution Factor		1		02/23/1993
Dichlorvos	8140	<0.5	mg/Kg	02/23/1993
Mevinphos	8140	<1.0	mg/Kg	02/23/1993

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Sample Number 14695
Sample Description 26,27,28 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
Demeton-O and -S	8140	<2.0	mg/Kg	02/23/1993
Ethoprophos	8140	<1.0	mg/Kg	02/23/1993
Phorate	8140	<0.5	mg/Kg	02/23/1993
Diazinon	8140	<0.5	mg/Kg	02/23/1993
Disulfoton	8140	<0.5	mg/Kg	02/23/1993
Dimethoate	8140	<2.0	mg/Kg	02/23/1993
Ronnel	8140	<0.5	mg/Kg	02/23/1993
Methyl Parathion	8140	<0.2	mg/Kg	02/23/1993
Chlorpyrifos	8140	<0.5	mg/Kg	02/23/1993
Parathion	8140	<0.5	mg/Kg	02/23/1993
Fenthion	8140	<0.5	mg/Kg	02/23/1993
Malathion	8140	<0.5	mg/Kg	02/23/1993
Tetrachlorvinphos	8140	<0.5	mg/Kg	02/23/1993
Fensulfothion	8140	<0.5	mg/Kg	02/23/1993
Coumaphos	8140	<2.5	mg/Kg	02/23/1993
8150 HERBICIDES (S) PREP	8150	-		02/12/1993
8150 HERBICIDES (S)				
Dalapon	8150	<0.1	mg/Kg	02/15/1993
Dicamba	8150	<0.01	mg/Kg	02/15/1993
MCPA	8150	<5.0	mg/Kg	02/15/1993
MCPP	8150	<5.0	mg/Kg	02/15/1993
Dichloroprop	8150	<0.05	mg/Kg	02/15/1993
2,4-D	8150	<0.05	mg/Kg	02/15/1993
2,4,5-TP (Silvex)	8150	<0.01	mg/Kg	02/15/1993
2,4,5-T	8150	<0.01	mg/Kg	02/15/1993
2,4-DB	8150	<0.05	mg/Kg	02/15/1993
Dinoseb	8150	<0.01	mg/Kg	02/15/1993

Sample Number 14696
Sample Description 29,30,31 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP EXTRACTION PREP	1311	-		02/11/1993
TCLP - Arsenic	7060	<0.005	mg/L	02/15/1993

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Sample Number	Sample Description
14696	29,30,31 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP - Barium	6010	0.27	mg/L	02/12/1993
TCLP - Cadmium	6010	<0.02	mg/L	02/12/1993
TCLP - Chromium	6010	<0.05	mg/L	02/12/1993
TCLP - Lead (GFAA)	7421	<0.2	mg/L	02/12/1993
TCLP - Mercury	7470	<0.0002	mg/L	02/15/1993
TCLP - Selenium	7740	<0.005	mg/L	02/17/1993
TCLP - Silver	6010	<0.05	mg/L	02/12/1993
PESTICIDES/PCB'S PREP	8080	-		02/11/1993
PESTICIDES/PCB'S - 8080				
Aldrin	8080	<1.2	ug/Kg	02/18/1993
alpha-BHC	8080	<0.3	ug/Kg	02/18/1993
beta-BHC	8080	<0.3	ug/Kg	02/18/1993
gamma-BHC	8080	<1.2	ug/Kg	02/18/1993
delta-BHC	8080	<0.3	ug/Kg	02/18/1993
Chlordane	8080	<25	ug/Kg	02/18/1993
4,4'-DDD	8080	<3	ug/Kg	02/18/1993
4,4'-DDE	8080	<3	ug/Kg	02/18/1993
4,4'-DDT	8080	<3	ug/Kg	02/18/1993
Dieldrin	8080	<3	ug/Kg	02/18/1993
Endosulfan I	8080	<3	ug/Kg	02/18/1993
Endosulfan II	8080	<3	ug/Kg	02/18/1993
Endosulfan Sulfate	8080	<3	ug/Kg	02/18/1993
Endrin	8080	<3	ug/Kg	02/18/1993
Endrin Aldehyde	8080	<3	ug/Kg	02/18/1993
Heptachlor	8080	<3	ug/Kg	02/18/1993
Heptachlor Epoxide	8080	<3	ug/Kg	02/18/1993
Methoxychlor	8080	<5	ug/Kg	02/18/1993
Toxaphene	8080	<60	ug/Kg	02/18/1993
PCB-1016	8080	<5,000	ug/Kg	02/18/1993
PCB-1221	8080	<25,000	ug/Kg	02/18/1993
PCB-1232	8080	<10,000	ug/Kg	02/18/1993
PCB-1242	8080	<5,000	ug/Kg	02/18/1993
PCB-1248	8080	<5,000	ug/Kg	02/18/1993
PCB-1254	8080	<2,500	ug/Kg	02/18/1993
PCB-1260	8080	2,800	ug/Kg	02/18/1993
PESTICIDES EPA 8140 (S) PREP	8140	-		02/17/1993
PESTICIDES EPA 8140 (S)				

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Sample Number	Sample Description
14696	29,30,31 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
Dilution Factor		1		02/23/1993
Dichlorvos	8140	<0.5	mg/Kg	02/23/1993
Mevinphos	8140	<1.0	mg/Kg	02/23/1993
Demeton-O and -S	8140	<2.0	mg/Kg	02/23/1993
Ethoprophos	8140	<1.0	mg/Kg	02/23/1993
Phorate	8140	<0.5	mg/Kg	02/23/1993
Diazinon	8140	<0.5	mg/Kg	02/23/1993
Disulfoton	8140	<0.5	mg/Kg	02/23/1993
Dimethoate	8140	<2.0	mg/Kg	02/23/1993
Ronnel	8140	<0.5	mg/Kg	02/23/1993
Methyl Parathion	8140	<0.2	mg/Kg	02/23/1993
Chlorpyrifos	8140	<0.5	mg/Kg	02/23/1993
Parathion	8140	<0.5	mg/Kg	02/23/1993
Fenthion	8140	<0.5	mg/Kg	02/23/1993
Malathion	8140	<0.5	mg/Kg	02/23/1993
Tetrachlorvinphos	8140	<0.5	mg/Kg	02/23/1993
Fensulfothion	8140	<0.5	mg/Kg	02/23/1993
Coumaphos	8140	<2.5	mg/Kg	02/23/1993
8150 HERBICIDES (S) PREP	8150	-		02/12/1993
8150 HERBICIDES (S)				
Dalapon	8150	<0.1	mg/Kg	02/15/1993
Dicamba	8150	<0.01	mg/Kg	02/15/1993
MCPA	8150	<5.0	mg/Kg	02/15/1993
MCPP	8150	<5.0	mg/Kg	02/15/1993
Dichloroprop	8150	<0.05	mg/Kg	02/15/1993
2,4-D	8150	<0.05	mg/Kg	02/15/1993
2,4,5-TP (Silvex)	8150	<0.1	mg/Kg	02/15/1993
2,4,5-T	8150	<0.1	mg/Kg	02/15/1993
2,4-DB	8150	<0.05	mg/Kg	02/15/1993
Dinoseb	8150	<0.01	mg/Kg	02/15/1993

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Sample Number	Sample Description
14697	32,33,34 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP EXTRACTION PREP	1311	-		02/11/1993
TCLP - Arsenic	7060	<0.005	mg/L	02/15/1993
TCLP - Barium	6010	0.32	mg/L	02/12/1993
TCLP - Cadmium	6010	<0.02	mg/L	02/12/1993
TCLP - Chromium	6010	<0.05	mg/L	02/12/1993
TCLP - Lead (GFAA)	7421	<0.2	mg/L	02/12/1993
TCLP - Mercury	7470	<0.0002	mg/L	02/15/1993
TCLP - Selenium	7740	<0.005	mg/L	02/17/1993
TCLP - Silver	6010	<0.05	mg/L	02/12/1993
PESTICIDES/PCB'S PREP	8080	-		02/11/1993
PESTICIDES/PCB'S - 8080				
Aldrin	8080	<1.2	ug/Kg	02/18/1993
alpha-BHC	8080	<0.3	ug/Kg	02/18/1993
beta-BHC	8080	<0.3	ug/Kg	02/18/1993
gamma-BHC	8080	<1.2	ug/Kg	02/18/1993
delta-BHC	8080	<0.3	ug/Kg	02/18/1993
Chlordane	8080	<25	ug/Kg	02/18/1993
4,4'-DDD	8080	<3	ug/Kg	02/18/1993
4,4'-DDE	8080	<3	ug/Kg	02/18/1993
4,4'-DDT	8080	<3	ug/Kg	02/18/1993
Dieldrin	8080	<3	ug/Kg	02/18/1993
Endosulfan I	8080	<3	ug/Kg	02/18/1993
Endosulfan II	8080	<3	ug/Kg	02/18/1993
Endosulfan Sulfate	8080	<3	ug/Kg	02/18/1993
Endrin	8080	<3	ug/Kg	02/18/1993
Endrin Aldehyde	8080	<3	ug/Kg	02/18/1993
Heptachlor	8080	<3	ug/Kg	02/18/1993
Heptachlor Epoxide	8080	<3	ug/Kg	02/18/1993
Methoxychlor	8080	<5	ug/Kg	02/18/1993
Toxaphene	8080	<60	ug/Kg	02/18/1993
PCB-1016	8080	<10,000	ug/Kg	02/18/1993
PCB-1221	8080	<50,000	ug/Kg	02/18/1993
PCB-1232	8080	<20,000	ug/Kg	02/18/1993
PCB-1242	8080	<10,000	ug/Kg	02/18/1993
PCB-1248	8080	<10,000	ug/Kg	02/18/1993
PCB-1254	8080	12,000	ug/Kg	02/18/1993
PCB-1260	8080	<5,000	ug/Kg	02/18/1993

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14697	32,33,34 Comp

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
PESTICIDES EPA 8140 (S) PREP	8140	-		02/17/1993
PESTICIDES EPA 8140 (S)				
Dilution Factor		1		02/23/1993
Dichlorvos	8140	<0.5	mg/Kg	02/23/1993
Mevinphos	8140	<1.0	mg/Kg	02/23/1993
Demeton-O and -S	8140	<2.0	mg/Kg	02/23/1993
Ethoprophos	8140	<1.0	mg/Kg	02/23/1993
Phorate	8140	<0.5	mg/Kg	02/23/1993
Diazinon	8140	<0.5	mg/Kg	02/23/1993
Disulfoton	8140	<0.5	mg/Kg	02/23/1993
Dimethoate	8140	<2.0	mg/Kg	02/23/1993
Ronnel	8140	<0.5	mg/Kg	02/23/1993
Methyl Parathion	8140	<0.2	mg/Kg	02/23/1993
Chlorpyrifos	8140	<0.5	mg/Kg	02/23/1993
Parathion	8140	<0.5	mg/Kg	02/23/1993
Fenthion	8140	<0.5	mg/Kg	02/23/1993
Malathion	8140	<0.5	mg/Kg	02/23/1993
Tetrachlorvinphos	8140	<0.5	mg/Kg	02/23/1993
Fensulfothion	8140	<0.5	mg/Kg	02/23/1993
Coumaphos	8140	<2.5	mg/Kg	02/23/1993
8150 HERBICIDES (S) PREP	8150	-		02/12/1993
8150 HERBICIDES (S)				
Dalapon	8150	<0.1	mg/Kg	02/15/1993
Dicamba	8150	<0.01	mg/Kg	02/15/1993
MCPA	8150	<5.0	mg/Kg	02/15/1993
MCPP	8150	<5.0	mg/Kg	02/15/1993
Dichloroprop	8150	<0.05	mg/Kg	02/15/1993
2,4-D	8150	<0.05	mg/Kg	02/15/1993
2,4,5-TP (Silvex)	8150	<0.01	mg/Kg	02/15/1993
2,4,5-T	8150	<0.01	mg/Kg	02/15/1993
2,4-DB	8150	<0.05	mg/Kg	02/15/1993
Dinoseb	8150	<0.01	mg/Kg	02/15/1993

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Sample Number	Sample Description
14698	36

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
TCLP EXTRACTION PREP	1311	-		02/10/1993
TCLP - Arsenic	7060	<0.005	mg/L	02/15/1993
TCLP - Barium	6010	2.5	mg/L	02/12/1993
TCLP - Cadmium	6010	0.08	mg/L	02/12/1993
TCLP - Chromium	6010	<0.05	mg/L	02/12/1993
TCLP - Lead (GFAA)	7421	0.39	mg/L	02/12/1993
TCLP - Mercury	7470	<0.0002	mg/L	02/15/1993
TCLP - Selenium	7740	<0.005	mg/L	02/17/1993
TCLP - Silver	6010	<0.05	mg/L	02/12/1993
PESTICIDES/PCB'S PREP	8080	-		02/11/1993
PESTICIDES/PCB'S - 8080				
Aldrin	8080	<1.2	ug/Kg	02/18/1993
alpha-BHC	8080	<0.3	ug/Kg	02/18/1993
beta-BHC	8080	<0.3	ug/Kg	02/18/1993
gamma-BHC	8080	<1.2	ug/Kg	02/18/1993
delta-BHC	8080	<0.3	ug/Kg	02/18/1993
Chlordane	8080	<25	ug/Kg	02/18/1993
4,4'-DDD	8080	<3	ug/Kg	02/18/1993
4,4'-DDE	8080	<3	ug/Kg	02/18/1993
4,4'-DDT	8080	<3	ug/Kg	02/18/1993
Dieldrin	8080	<3	ug/Kg	02/18/1993
Endosulfan I	8080	<3	ug/Kg	02/18/1993
Endosulfan II	8080	<3	ug/Kg	02/18/1993
Endosulfan Sulfate	8080	<3	ug/Kg	02/18/1993
Endrin	8080	<3	ug/Kg	02/18/1993
Endrin Aldehyde	8080	<3	ug/Kg	02/18/1993
Heptachlor	8080	<3	ug/Kg	02/18/1993
Heptachlor Epoxide	8080	<3	ug/Kg	02/18/1993
Methoxychlor	8080	<5	ug/Kg	02/18/1993
Toxaphene	8080	<60	ug/Kg	02/18/1993
PCB-1016	8080	<10,000	ug/Kg	02/18/1993
PCB-1221	8080	<50,000	ug/Kg	02/18/1993
PCB-1232	8080	<20,000	ug/Kg	02/18/1993
PCB-1242	8080	<10,000	ug/Kg	02/18/1993
PCB-1248	8080	<10,000	ug/Kg	02/18/1993
PCB-1254	8080	6,600	ug/Kg	02/18/1993
PCB-1260	8080	<5,000	ug/Kg	02/18/1993

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Sample Number	Sample Description
14698	36

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
PESTICIDES EPA 8140 (S) PREP	8140	-		02/17/1993
PESTICIDES EPA 8140 (S)				
Dilution Factor		1		02/23/1993
Dichlorvos	8140	<0.5	mg/Kg	02/23/1993
Mevinphos	8140	<1.0	mg/Kg	02/23/1993
Demeton-O and -S	8140	<2.0	mg/Kg	02/23/1993
Ethoprophos	8140	<1.0	mg/Kg	02/23/1993
Phorate	8140	<0.5	mg/Kg	02/23/1993
Diazinon	8140	<0.5	mg/Kg	02/23/1993
Disulfoton	8140	<0.5	mg/Kg	02/23/1993
Dimethoate	8140	<2.0	mg/Kg	02/23/1993
Ronnel	8140	<0.5	mg/Kg	02/23/1993
Methyl Parathion	8140	<0.2	mg/Kg	02/23/1993
Chlorpyrifos	8140	<0.2	mg/Kg	02/23/1993
Parathion	8140	<0.5	mg/Kg	02/23/1993
Fenthion	8140	<0.5	mg/Kg	02/23/1993
Malathion	8140	<0.5	mg/Kg	02/23/1993
Tetrachlorvinphos	8140	<0.5	mg/Kg	02/23/1993
Fensulfothion	8140	<0.5	mg/Kg	02/23/1993
Coumaphos	8140	<2.5	mg/Kg	02/23/1993
8150 HERBICIDES (S) PREP	8150	-		02/12/1993
8150 HERBICIDES (S)				
Dalapon	8150	<0.1	mg/Kg	02/15/1993
Dicamba	8150	<0.01	mg/Kg	02/15/1993
MCPA	8150	<5.0	mg/Kg	02/15/1993
MCPP	8150	<5.0	mg/Kg	02/15/1993
Dichloroprop	8150	<0.05	mg/Kg	02/15/1993
2,4-D	8150	<0.05	mg/Kg	02/15/1993
2,4,5-TP (Silvex)	8150	<0.01	mg/Kg	02/15/1993
2,4,5-T	8150	<0.01	mg/Kg	02/15/1993
2,4-DB	8150	<0.05	mg/Kg	02/15/1993
Dinoseb	8150	<0.01	mg/Kg	02/15/1993

ANALYTICAL REPORT

Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/24/1993
Job No.: 93.00111

Project Name: Schnitzer IT
Date Received: 02/08/1993

Sample Number	Sample Description
14699	37

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
PCBs PREP	8080	-		02/11/1993
PCBs - (SOIL)				
Aroclor 1016	8080	<100	ug/Kg	02/12/1993
Aroclor 1221	8080	<500	ug/Kg	02/12/1993
Aroclor 1232	8080	<200	ug/Kg	02/12/1993
Aroclor 1242	8080	<100	ug/Kg	02/12/1993
Aroclor 1248	8080	<100	ug/Kg	02/12/1993
Aroclor 1254	8080	<50	ug/Kg	02/12/1993
Aroclor 1260	8080	63	ug/Kg	02/12/1993

SURROGATE REPORT

Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/24/1993
Job No.: 93.00111

Project Name: Schnitzer IT
Date Received: 02/08/1993

SURROGATES	METHODS	RESULTS		DATE ANALYZED
Sample Number 14674	Sample Description 1			
Br,Cl-Propane (Surr.)	8010	88	%	02/10/1993
aaa-Trifluorotoluene (Surr.)	8020	93	%	02/10/1993
Sample Number 14676	Sample Description 3 A+B			
Br,Cl-Propane (Surr.)	8010	98	%	02/12/1993
aaa-Trifluorotoluene (Surr.)	8020	100	%	02/12/1993
Sample Number 14680	Sample Description 7			
Decachlorobiphenyl (Surr.)	8080	M.I.	%	02/12/1993
Sample Number 14681	Sample Description 8 A+B			
Br,Cl-Propane (Surr.)	8010	82	%	02/12/1993
aaa-Trifluorotoluene (Surr.)	8020	106	%	02/12/1993
Sample Number 14684	Sample Description 12			
Br,Cl-Propane (Surr.)	8010	88	%	02/10/1993
aaa-Trifluorotoluene (Surr.)	8020	105	%	02/10/1993
Sample Number 14687	Sample Description 15			
Decachlorobiphenyl (Surr.)	8080	114	%	02/12/1993

SURROGATE REPORT

Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/24/1993
Job No.: 93.00111

Project Name: Schnitzer IT
Date Received: 02/08/1993

SURROGATES	METHODS	RESULTS		DATE ANALYZED
Sample Number 14690 — Sample Description 18+19 Comp				
Decachlorobiphenyl (Surr.)	8080	98	%	02/12/1993
Sample Number 14691 — Sample Description 20 A+B				
Br,Cl-Propane (Surr.)	8010	83	%	02/12/1993
aaa-Trifluorotoluene (Surr.)	8020	104	%	02/12/1993
Sample Number 14694 — Sample Description 23,24,25 Comp				
Tetrachlorometaxylene	8080	70	%	02/17/1993
Decachlorobiphenyl (Surr.)	8080	M.I.	%	02/17/1993
2,4-Dichlorophenylacetic Acid	8150	66	%	02/15/1993
Sample Number 14695 — Sample Description 26,27,28 Comp				
Tetrachlorometaxylene	8080	63	%	02/17/1993
Decachlorobiphenyl (Surr.)	8080	110	%	02/17/1993
2,4-Dichlorophenylacetic Acid	8150	59	%	02/15/1993
Sample Number 14696 — Sample Description 29,30,31 Comp				
Decachlorobiphenyl (Surr.)	8080	M.I.	%	02/12/1993
2,4-Dichlorophenylacetic Acid	8150	78		02/15/1993
Sample Number 14697 — Sample Description 32,33,34 Comp				
Decachlorobiphenyl (Surr.)	8080	M.I.	%	02/18/1993
2,4-Dichlorophenylacetic Acid	8150	107		02/15/1993
Sample Number 14698 — Sample Description 36				
Decachlorobiphenyl (Surr.)	8080	M.I.	%	02/18/1993

SURROGATE REPORT

Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/24/1993
Job No.: 93.00111

Project Name: Schnitzer IT
Date Received: 02/08/1993

SURROGATES	METHODS	RESULTS		DATE ANALYZED
Sample Number 14698	Sample Description 36			
2,4-Dichlorophenylacetic Acid	8150	65	%	02/15/1993
Sample Number 14699	Sample Description 37			
Decachlorobiphenyl (Surr.)	8080	82	%	02/12/1993

Client Acct: 10460
Client Name: Environ. Management Sol.
NET Job No: 93.00111

Date: 02/24/1993

Ref: Schnitzer IT

QUALITY CONTROL DATA - WATER

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Benzene	0.5	ug/L	98	ND	108	111	2.7
Toluene	0.5	ug/L	92	ND	104	106	1.9
1,1-DCE	0.5	ug/L	89	ND	91	85	6.8
1,2-DCA	0.5	ug/L	86	ND	88	80	9.5
TCE	0.5	ug/L	86	ND	93	90	3.3
CL Benzene	0.5	ug/L	97	ND	109	115	5.4
TPH-418.1	1.0	mg/L	102	ND	132	132	<1.0
Arsenic	0.005	mg/L	112	ND	97	101	4.0
Barium	0.02	mg/L	97	ND	99	99	<1.0
Cadmium	0.02	mg/L	97	ND	97	99	2.0
Chromium	0.05	mg/L	95	ND	107	103	3.8
Lead	0.005	mg/L	116	ND	112	124	10.2
Mercury	0.0002	mg/L	131	ND	100	96	4.1
Selenium	0.005	mg/L	89	ND	118	118	<1.0
Silver	0.05	mg/L	89	ND	87	92	5.6

Client Acct: 10460
Client Name: Environ. Management Sol.
NET Job No: 93.00111

Date: 02/24/1993
Page: 30

Ref: Schnitzer IT

QUALITY CONTROL DATA - SOIL

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Benzene	2.5	ug/Kg	97	ND	104	99	4.9
Toluene	2.5	ug/Kg	88	ND	95	90	5.4
1,1-DCE	5	ug/Kg	96	ND	96	101	5.1
1,2-DCA	5	ug/Kg	100	ND	91	97	6.4
TCE	5	ug/Kg	93	ND	88	90	2.2
CL Benzene	5	ug/Kg	103	ND	91	108	17.1
TPH-418.1m	5	mg/Kg	105	ND	110	114	3.6
Lindane	1.2	ug/Kg	101	ND	N/A	N/A	51
Heptachlor	3	ug/Kg	90	ND	75	63	17
Aldrin	1.2	ug/Kg	93	ND	117	145	21
Dieldrin	3	ug/Kg	86	ND	56	41	31
Endrin	3	ug/Kg	94	ND	143	132	8.0
4,4' DDT	3	ug/Kg	118	ND	80	51	44
2,4-D	0.05	mg/Kg	132	ND	97	101	4.0
2,4,5-T	0.01	mg/Kg	69	ND	122	127	4.0
2,4,5-TP	0.01	mg/Kg	102	ND	98	113	14
Aroclor 1260	50	ug/Kg	93	ND	106	98	7.8
TCLP-Arsenic	0.005	mg/L	112	ND	97	101	4.0
TCLP-Barium	0.02	mg/L	97	ND	99	99	<1.0
TCLP-Cadmium	0.02	mg/L	97	ND	97	99	2.0
TCLP-Chromium	0.05	mg/L	95	ND	107	103	3.8
TCLP-Lead	0.2	mg/L	91	ND	103	99	4.0
TCLP-Mercury	0.0002	mg/L	131	ND	100	96	4.1
TCLP-Selenium	0.005	mg/L	89	ND	118	118	<1.0
TCLP-Silver	0.05	mg/L	89	ND	87	92	5.6

NET

KEY TO ABBREVIATIONS AND METHOD REFERENCES

Note	:	Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor, (but do not multiply reported values).
<	:	Less than; When appearing in results column indicate analyte not detected at the value following. This datum supersedes the listed Reporting Limit.
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
umhos/cm	:	Micromhos per centimeter.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
DF	:	Dilution Factor.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluation solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater", 16th Edition, APHA, 1985.

NET® NATIONAL ENVIRONMENTAL TESTING, INC.

PORTLAND DIVISION, 17400 SW UPPER BOONES FERRY RD., SUITE 260, PORTLAND, OR 97224
(503) 624-5449 PHONE (503) 639-6889 FAX

CHAIN OF CUSTODY F

COMPANY Environmental M
ADDRESS 1800 SW 1st
PHONE 225 9066
PROJECT NAME/LOCATION Sch Net
PROJECT NUMBER
PROJECT MANAGER Thor Hinckley

Stu Greenberger

SAMPLED BY Thor Hinckley (PRINT NAME) Thor Hinckley SIGNATURE

(PRINT NAME) SIGNATURE

ANALYSES

DATE	TIME	SAMPLE ID/DESCRIPTION	GRAB	COMP	# OF CONTAINERS	MATRIX	PRESERVED Y/N	VOC's	Metals (8)	TPH 418.1	PCB's	8150 8140 8080	8010 / 8020					
2/5		~~Sat~~ ~~Sat~~ 1			1	S		X										
		~~"~~ 2			1	1			X									
1		~~WA~~ 3A + B			2	W		X										Comp
1		~~"~~ 4			1	1			~~X~~	X								Sample
1		~~"~~ 5			1	1			X									
1		~~Sat~~ 6			1	S			X									
1		~~"~~ 7			1	1					X							
1		~~WA~~ 8A + B			2	W		X										
1		~~"~~ 9A + B			2	1			X									
1		~~"~~ 10			1	1				X								
1		~~S~~ 11			1	S												Hold
1		12			1	1		X	~~X~~									
1		~~"~~ 13			1	1				X								
1		14			1	S				X								
1		15			1	1					X							

RESULTS TO: Thor Hinckley

INVOICE TO: EMS

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME
Thor Hinckley	2/5 4:30	Derek C[illegible]		
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME

METHOD OF SHIPMENT: pick up

REMARKS:

SCHN00206505

NATIONAL ENVIRONMENTAL TESTING, INC.

PORTLAND DIVISION, 17400 SW UPPER BOONES FERRY RD., SUITE 260, PORTLAND, OR 97224
(503) 624-5449 PHONE (503) 639-6889 FAX

CHAIN OF CUSTODY R

COMPANY [illegible]
ADDRESS [illegible]
PHONE [illegible]
PROJECT NAME/LOCATION [illegible]
PROJECT NUMBER
PROJECT MANAGER Thor H[illegible]

Sto [illegible]

SAMPLED BY Thor H[illegible] (PRINT NAME) — Thor H[illegible] SIGNATURE

(PRINT NAME) — SIGNATURE

ANALYSES

DATE	TIME	SAMPLE ID/DESCRIPTION	GRAB	COMP	# OF CONTAINERS	MATRIX	PRESERVED Y/N		VOC - Matrix (S)	HSL	Pesticides	SVOC	SVOC						m
7/8		16			1	S			X										
		17			1				X										
		5+17			2				X		X								composite
		20A+B			2	W		X											
		21			1				X										
		22			1	S						X							
		23, 24, 25			3				X		X	X							Composite
		26, 27, 28			3				X		X	X							"
		29, 30, 31			3				X		X	X							"
		32, 33, 34			3				X		X	X							"
		35			1														Hold
		~~36~~							~~X~~		~~X~~	~~X~~							
		36			1	S			X		X	X							
		37			1						X								

RESULTS TO: Thor Hinckley

INVOICE TO: EMS

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME
Thor Hinckley	7/8 4:[illegible]	Derek [illegible]		
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME

METHOD OF SHIPMENT: pick up

REMARKS:

PT 1 - ORIGINAL - WHITE PT 2 - NET PROJECT MANAGER - YELLOW PT 3 - CUSTOMER COPY - PINK

SCHN00206506

NET ENVIRONMENTAL TESTING, INC.

PORTLAND DIVISION, 17400 SW UPPER BOONES FERRY RD., SUITE 260, PORTLAND, OR 97224
(503) 624-5449 PHONE (503) 639-6889 FAX

CF N CL OL

COMPANY Environmental MAN
ADDRESS 1801 SW 1ST
PHONE 225 ~~[illegible]~~ 906
PROJECT NAME/LOCATION Salmon
PROJECT NUMBER
PROJECT MANAGER

Stu Cranberger

SAMPLED BY: Thor Hendrik (PRINT NAME) — Thor Hendrik SIGNATURE

(PRINT NAME) — SIGNATURE

ANALYSES

DATE	TIME	SAMPLE ID/DESCRIPTION	GRAB	COMP	# OF CONTAINERS	MATRIX	PRESERVED Y/N											
7/5		4 Large plastic Bags				soil												Hold
↓		w/ 4.5 Smaller plastic				↓												"
↓		Bags of Soil				↓												"

RESULTS TO: EMS Thor Hendrik

INVOICE TO: EMS

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME
Thor Hendrik	7/5 1430 pm	Derek C		
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME

METHOD OF SHIPMENT

REMARKS:

PT 1 - ORIGINAL - WHITE PT 2 - NET PROJECT MANAGER - YELLOW PT 3 - CUSTOMER COPY - PINK

SCHN00206507

NATIONAL ENVIRONMENTAL TESTING, INC.

Portland Division
17400 SW Upper Boones Ferry Rd.
Suite #260
Portland, OR 97224
Tel: (503) 624-5449
Fax: (503) 639-6889

Thor Hinckley
Environmental Management Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

Date: 02/19/1993
NET Account No.: 10460
NET Job Number: 93.00126

Project: IT Terminal

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Sample Number	Sample Description	Matrix Type	Date Taken	Date Received
14774	Sample # 38	SOIL	02/13/1993	02/15/1993

Approved by:

John Swanson
NET, INC. Portland Project Manager

ANALYTICAL REPORT

Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/19/1993
Job No.: 93.00126

Project Name: IT Terminal
Date Received: 02/15/1993

Sample Number	Sample Description
14774	Sample # 38

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
8010 HALOGENATED VOC (S)				
Dilution Factor		1		02/18/1993
Chloromethane	8010	<5	ug/Kg	02/18/1993
Bromomethane	8010	<5	ug/Kg	02/18/1993
Vinyl Chloride	8010	<10	ug/Kg	02/18/1993
Chloroethane	8010	<5	ug/Kg	02/18/1993
Methylene Chloride	8010	<50	ug/Kg	02/18/1993
Trifluorofluoromethane	8010	<5	ug/Kg	02/18/1993
1,1-Dichloroethene	8010	<5	ug/Kg	02/18/1993
1,1-Dichloroethane	8010	<5	ug/Kg	02/18/1993
trans-1,2-Dichloroethene	8010	<5	ug/Kg	02/18/1993
cis-1,2-Dichloroethene	8010	<5	ug/Kg	02/18/1993
Chloroform	8010	<5	ug/Kg	02/18/1993
1,2-Dichloroethane	8010	<5	ug/Kg	02/18/1993
1,1,1-Trichloroethane	8010	<5	ug/Kg	02/18/1993
Carbon Tetrachloride	8010	<5	ug/Kg	02/18/1993
Bromodichloromethane	8010	<5	ug/Kg	02/18/1993
1,2-Dichloropropane	8010	<5	ug/Kg	02/18/1993
trans-1,3-Dichloropropene	8010	<5	ug/Kg	02/18/1993
Trichloroethene	8010	<5	ug/Kg	02/18/1993
Dibromochloromethane	8010	<5	ug/Kg	02/18/1993
1,1,2-Trichloroethane	8010	<5	ug/Kg	02/18/1993
cis-1,3-Dichloropropene	8010	<5	ug/Kg	02/18/1993
2-Chloroethylvinyl ether	8010	<20	ug/Kg	02/18/1993
Bromoform	8010	<5	ug/Kg	02/18/1993
1,1,2,2-Tetrachloroethane	8010	<5	ug/Kg	02/18/1993
Tetrachloroethene	8010	<5	ug/Kg	02/18/1993
Chlorobenzene	8010	<5	ug/Kg	02/18/1993
1,3-Dichlorobenzene	8010	<5	ug/Kg	02/18/1993
1,4-Dichlorobenzene	8010	<5	ug/Kg	02/18/1993
1,2-Dichlorobenzene	8010	<5	ug/Kg	02/18/1993

ANALYTICAL REPORT

Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/19/1993
Job No.: 93.00126

Project Name: IT Terminal
Date Received: 02/15/1993

Sample Number	Sample Description
14774	Sample # 38

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
EPA 8020 (S)				
Dilution Factor		1		02/18/1993
Benzene	8020	<5	ug/Kg	02/18/1993
Chlorobenzene	8020	<5	ug/Kg	02/18/1993
1,2-Dichlorobenzene	8020	<5	ug/Kg	02/18/1993
1,3-Dichlorobenzene	8020	<5	ug/Kg	02/18/1993
1,4-Dichlorobenzene	8020	<5	ug/Kg	02/18/1993
Toluene	8020	<5	ug/Kg	02/18/1993
Ethylbenzene	8020	<5	ug/Kg	02/18/1993

SURROGATE REPORT

Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

02/19/1993
Job No.: 93.00126

Project Name: IT Terminal
Date Received: 02/15/1993

SURROGATES	METHODS	RESULTS		DATE ANALYZED
Sample Number 14774	Sample Description Sample # 38			
Br,Cl-Propane (Surr.)	8010	103	%	02/18/1993
aaa-Trifluorotoluene (Surr.)	8020	104	%	02/18/1993

Client Acct: 10460
Client Name: Envir. Management Sol.
NET Job No: 93.00126

Date: 02/19/1993
Page: 5

Ref: IT Terminal

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Benzene	5.0	ug/Kg	95	ND	127	116	9.1
Toluene	5.0	ug/Kg	93	ND	98	98	<1.0
1,1-DCE	5.0	ug/Kg	102	ND	85	110	25.6
1,2-DCA	5.0	ug/Kg	103	ND	89	99	10.6
TCE	5.0	ug/Kg	101	ND	84	108	25.0
CL Benzene	5.0	ug/Kg	103	ND	117	112	4.4

NATIONAL ENVIRONMENTAL TESTING, INC.

00126

PORTLAND DIVISION, 17400 SW UPPER BOONES FERRY RD., SUITE 260, PORTLAND, OR 97224
(503) 624-5449 PHONE (503) 639-6889 FAX

CHAIN OF CUSTODY F

COMPANY Environmental M
ADDRESS 1400 SW First
PHONE 225 9060
PROJECT NAME/LOCATION IT 7
PROJECT NUMBER
PROJECT MANAGER

SAMPLED BY Thor Hinckley (PRINT NAME) Thor E. Hinckley SIGNATURE
(PRINT NAME) SIGNATURE

ANALYSES

DATE	TIME	SAMPLE ID/DESCRIPTION	GRAB	COMP	# OF CONTAINERS	MATRIX	PRESERVED Y/N	8010/8020
3/15		~~Soil~~ Sample #38	✓		1	Soil		X

RESULTS TO: Thor Hinckley 225 9060

INVOICE TO: Environmental Management

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME
Thor Hinckel	3/15 14:11 pm			
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME 3/15/93 4:11

METHOD OF SHIPMENT

REMARKS:

PT 1 ORIGINAL WHITE PT 2 NET PROJECT MANAGER YELLOW PT 3

SCHN00206513

NATIONAL ENVIRONMENTAL TESTING, INC.

Portland Division
17400 SW Upper Boones Ferry Rd.
Suite #260
Portland, OR 97224
Tel: (503) 624-5449
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Thor Hinckley
Environmental Management Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

Date: 03/10/1993
NET Account No.: 10460
NET Job Number: 93.00189

Project: Schnitzer IT

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Sample Number	Sample Description	Matrix Type	Date Taken	Date Received
15046	5-1	GROUND WATER	03/06/1993	03/07/1993
15047	9-1	GROUND WATER	03/06/1993	03/07/1993
15048	21-1	GROUND WATER	03/06/1993	03/07/1993

Approved by:

Marty French
NET, INC. Division Manager

ANALYTICAL REPORT

Thor Hinckley
Environmental Management
Solutions
1800 SW 1st Ave., Ste. 610
Portland, OR 97201

03/10/1993
Job No.: 93.00189

Project Name: Schnitzer IT
Date Received: 03/07/1993

Sample Number 15046 — Sample Description 5-1

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
Arsenic, GFAA	7060	<0.005	mg/L	03/09/1993
Barium, ICP	7080	<0.05	mg/L	03/08/1993
Cadmium, ICP	6010	<0.05	mg/L	03/08/1993
Chromium, ICP	6010	<0.05	mg/L	03/08/1993
Lead, GFAA (W)	7421	<0.005	mg/L	03/08/1993
Mercury - CV	7470	<0.0002	mg/L	03/08/1993
Selenium, GFAA	7740	<0.005	mg/L	03/10/1993
Silver, ICP	6010	<0.05	mg/L	03/08/1993

Sample Number 15047 — Sample Description 9-1

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
Arsenic, GFAA	7060	0.006	mg/L	03/09/1993
Barium, ICP	7080	<0.05	mg/L	03/08/1993
Cadmium, ICP	6010	<0.05	mg/L	03/08/1993
Chromium, ICP	6010	<0.05	mg/L	03/08/1993
Lead, GFAA (W)	7421	<0.005	mg/L	03/08/1993
Mercury - CV	7470	<0.0002	mg/L	03/08/1993
Selenium, GFAA	7740	<0.005	mg/L	03/10/1993
Silver, ICP	6010	<0.05	mg/L	03/08/1993

Sample Number 15048 — Sample Description 21-1

PARAMETERS	METHODS	RESULTS		DATE ANALYZED
Arsenic, GFAA	7060	<0.005	mg/L	03/09/1993
Barium, ICP	7080	<0.05	mg/L	03/08/1993
Cadmium, ICP	6010	<0.05	mg/L	03/08/1993
Chromium, ICP	6010	<0.05	mg/L	03/08/1993
Lead, GFAA (W)	7421	<0.005	mg/L	03/08/1993
Mercury - CV	7470	<0.0002	mg/L	03/08/1993
Selenium, GFAA	7740	<0.005	mg/L	03/10/1993
Silver, ICP	6010	<0.05	mg/L	03/08/1993

Client Acct: 10460
Client Name: Environmental Management
NET Job No: 93.00189

Date: 03/10/1993
Page: 3

Ref: Schnitzer IT

QUALITY CONTROL DATA

arameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
:senic, GFAA	0.005	mg/L	100	ND	101	103	2.0
arium, ICP	0.05	mg/L	89	ND	90	92	2.2
ıdmium, ICP	0.05	mg/L	95	ND	111	118	6.1
ıromium, ICP	0.05	mg/L	94	ND	120	119	<1.0
ead, GFAA	0.005	mg/L	85	ND	71	80	11.9
ercury - CV	0.0002	mg/L	96	ND	128	120	6.5
lenium, GFAA	0.005	mg/L	105	ND	100	87	13.9
.lver, ICP	0.05	mg/L	96	ND	93	86	7.8

NET NATIONAL ENVIRONMENTAL TESTING, INC.

00107

PORTLAND DIVISION, 17400 SW UPPER BOONES FERRY RD., SUITE 260, PORTLAND, OR 97224
(503) 624-5449 PHONE (503) 639-6889 FAX

CHAIN OF CUSTODY

COMPANY EMS
ADDRESS 1800 Sw 1st
PHONE 225 9000
PROJECT NAME/LOCATION Schn
PROJECT NUMBER
PROJECT MANAGER Thor Hind

SAMPLED BY
Stu Greenberg (PRINT NAME)
Stu Greenberg (PRINT NAME)

Thor Hind SIGNATURE
SIGNATURE

ANALYSES

DATE	TIME	SAMPLE ID/DESCRIPTION	GRAB	COMP	# OF CONTAINERS	MATRIX	PRESERVED Y/N	Total Metals (8)										
3/6	12 noon	5-1	✓		1	H2O	N	✓										
3/6	Noon	4-1	✓		1	H2O	N	✓										Rust
3/6	Noon	21-1	✓		1	H2O	N	✓										
																		f
																		pr

RESULTS TO: Thor Hindle 225 9000

INVOICE TO:

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME
Thor Hindle	3/7 12:10 pm			
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME

METHOD OF SHIPMENT

REMARKS:

PT 1 - ORIGINAL - WHITE PT 2 - NET PROJECT MANAGER - YELLOW PT 3 - CUSTOMER COPY - PINK

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Jim J
NW Pipe

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Portland, OR
97232-2146
Tel 503.235.5000
Fax 503.235.2445

SCHNTZIC-INT:BGDOC.1P1

CH2MHILL

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED

February 27, 2001

FEB 27 2001

NORTHWEST REGION

Ms. Alicia C. Voss
Oregon Department of Environmental Quality
Northwest Region
Suite 400
2020 SW Fourth Avenue
Portland, OR 97201

Subject: Northwest Pipe Company

Dear Ms. Voss:

This letter transmits one copy of the Preliminary Assessment Addendum for Northwest Pipe Company, 12005 North Burgard Road, Portland, Oregon.

This report was prepared on behalf of Northwest Pipe in accordance with the August 17, 2000 Voluntary Cleanup Letter Agreement between the Oregon Department of Environmental Quality and Northwest Pipe Company.

Please contact me at 503/235-5022, ext. 4387 if you have questions regarding this report.

Sincerely,

CH2M HILL

Ken Shump

Ken Shump, P.G.
Project Manager

c: Carol Grant, Northwest Pipe Company
Claudia Powers, Ater Wynne LLP

SSI-21

SCHN00206759

DEPT OF ENVIRONMENTAL QUALITY
RECEIVED

FEB 27 2001

NORTHWEST REGION

Preliminary Assessment Addendum

Prepared for

Northwest Pipe Company

12005 North Burgard Road
Portland Oregon
ECSI No. 138

February 2001

Prepared by

CH2MHILL
Portland, Oregon

SCHN00206760

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2 **Production Well Groundwater Sampling Information**

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SCHN00206762

Preliminary Assessment Addendum
Northwest Pipe Company, Portland Oregon

1.0 Introduction

Northwest Pipe Company delivered a Preliminary Assessment to The Oregon Department of Environmental Quality (DEQ) on November 21, 2000. This addendum was prepared in response to the DEQ's comments on the Preliminary Assessment provided in letters dated December 19, 2000 and February 1, 2001, and based on information discussed in a January 18, 2001 meeting between Northwest Pipe, DEQ, Ater Wynne LLP, and CH2M HILL (counsel and consultant, respectively, to Northwest Pipe Company).

The objective of this addendum is to provide additional information to DEQ to satisfy its requirements for a Preliminary Assessment of the Northwest Pipe Company Portland facility. This addendum contains the following sections:

- An expanded description of background information on the Northwest Pipe facility, including a description of current operations (requested in the December 19, 2000 letter and in the January 18 meeting)
- A description of available sampling information and assessment of its sufficiency, with any recommendations for additional sampling (requested in the December 19 letter and discussed in more detail in the January 18 meeting and February 1 letter).
- Information on the status of groundwater monitoring wells at the site, and a description of groundwater flow direction (requested in the December 19 letter).
- A discussion of the hazardous waste generator status of the facility (requested in the December 19 letter)
- A discussion of more recent information on storm water at the site (requested in the December 19 letter)
- Comments and clarifications on information regarding the Northwest Pipe facility contained in reports submitted to DEQ for the Burgard Industrial Park by Schnitzer Investment Corp. (requested in the January 18 meeting).
- Recommendations for further work

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2.0 Northwest Pipe Company Site Background

2.1 Early Industrial Activities

Industrial activities on the land currently owned by Northwest Pipe Company in Portland began during World War II, with the construction of the Oregon Shipbuilding Corporation shipyard. Prior to this time, aerial photographs indicate the property was undeveloped.

The Oregon Historical Society holdings on shipyard operations were reviewed as a source of information on past practices at the Northwest Pipe facility. The principal sources of information reviewed included historical maps, a report by Julia Osborn (1945) entitled *A Story of a Shipyard*, an Oregon Shipbuilding Corporation document entitled *Survey of Shipyard Operations, Vol. 1*, and copies of a shipyard newsletter called *The Bosun's Whistle*. Figure 1 is a copy of an historic map showing the layout of shipyard operations. When the site currently owned by Northwest Pipe was used as part of the Oregon Shipbuilding yard, it was dominated by the Assembly Building. As shown in Figure 2, the footprint of the Assembly Building conforms generally to the present-day footprints of the two buildings containing Bays 1 though 6 and Bay 9. Figure 2 shows the following features from the Oregon Shipbuilding Corporation era within the present-day boundaries of the Northwest Pipe Company facility:

- Assembly Building
- Tool Room and Weld Rod Storage
- Hull Materials Office
- Pipe Shop
- Maintenance Shop
- PFM (undefined)
- Substations (3)
- Lockers (2)
- Toilets
- Offices (2)
- Union Meeting Hall

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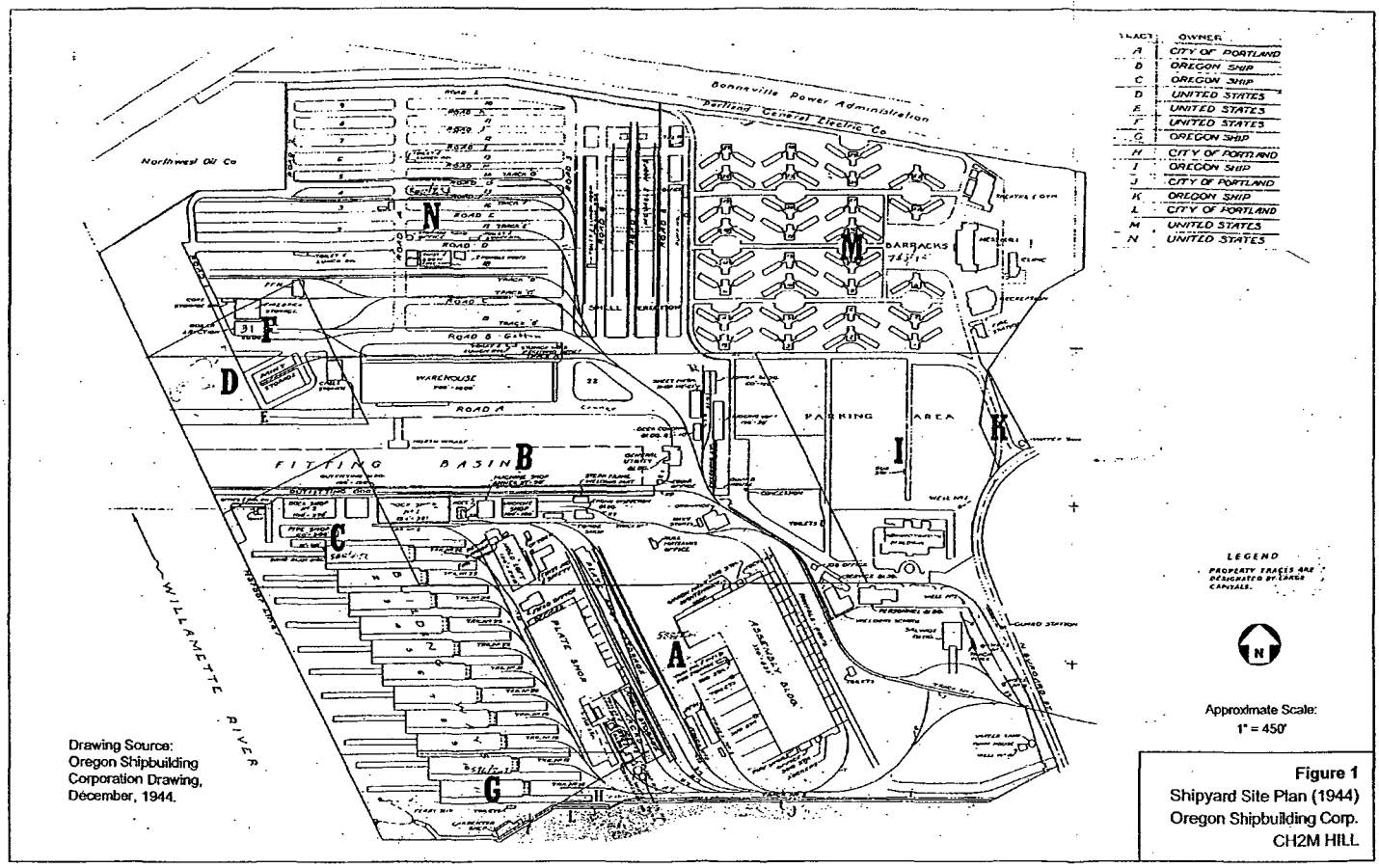

Drawing Source:
Oregon Shipbuilding
Corporation Drawing,
December, 1944.

Figure 1
Shipyard Site Plan (1944)
Oregon Shipbuilding Corp.
CH2M HILL

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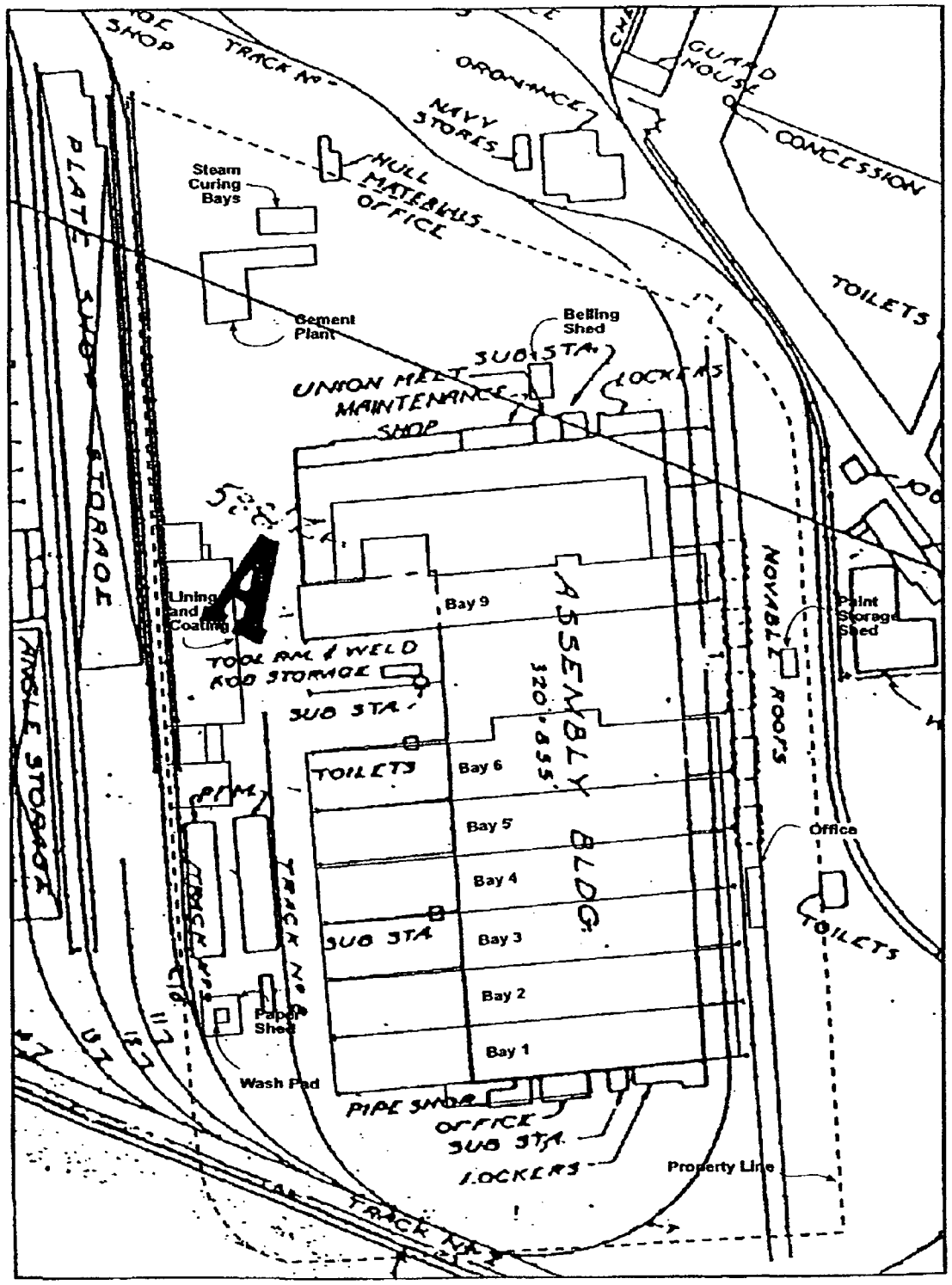

N

0 200'

Approximate Scale

Figure 2

Current Site Features Compared to Historical Features

NORTHWEST PIPE COMPANY
PORTLAND, OREGON

CH2MHILL

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Production at the Oregon Shipbuilding Corporation took place in four general areas: the Plate Shop, the Assembly Building, the Shipbuilding Ways, and the Outfitting Dock. Steel plate was shaped and cut at the Plate Shop, which was located east of the Northwest Pipe property. The shaped steel plate was transported by rail to the Assembly Building where it was welded into large ship sections weighing up to 250 tons. These prefabricated sections were transported by rail to the Shipbuilding Ways (located on the riverfront east of the Northwest Pipe facility) and attached to the hull. Welding was the principal method used for assembly both in the Ways and in the Assembly Building. In addition to welding, some exterior painting also occurred on the Ways. After the major structure of each ship was completed, the ship was launched and final outfitting occurred at the fitting basin and outfitting dock. Final outfitting included electrical, painting, and interior assembly. In summary, the major industrial process that occurred on the Northwest Pipe site during operation of the Oregon Shipbuilding Corporation was welding steel plate in the Assembly Building.

2.2 Post-War Property Use

Based on property ownership records, the property that currently is owned by Northwest Pipe Company passed in ownership from Oregon Shipbuilding Corporation to Surplus Properties Corporation in 1950, and subsequently to Beall Pipe and Tank Corporation in 1950.

Based on interviews with company representatives familiar with the former Beall Pipe and Tank Corporation operations at the property, the major buildings and structures used by Beall are in the same locations and are the same approximate size as those currently used by Northwest Pipe Company. The buildings comprising Bays 1 through 6 and Bay 9 are the same, as are the cement mortar lining facility; the pipe lining and coating facility, the wood
cutting shed, the plant office, the administration office, and the paper storage shed. Similar to Northwest Pipe, Beall manufactured steel pipe; but Beall also manufactured products that Northwest Pipe did not and does not make. For example, Beall Transliner built tanks for tanker trucks in parts of Bay 1 and Bay 2; Beall riveted and spot welded galvanized culvert pipe (it did not manufacture the galvanized steel) in Bay 4; and it applied asphalt wrap in the coating and lining facility and asphalt dip coatings and linings in Bay 9. The asphalt coating material used by Beall Pipe and Tank was manufactured by Shell Oil Company. Beall significantly reduced its asphalt coating and lining operations in the 1970's and by approximately 1976 had discontinued the process altogether. For a short period of time, Beall built and operated a hydrotester in what is now referred to as the paper shed. The hydrotester was subsequently decommissioned by Beall.

Beall's major market was irrigation pipe, both straight-steam and spiral weld pipe. Straight seam steel pipe was made by the electric resistance welding process and the spiral weld was made by the submerged arc welding process. Beall also produced

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pipe by the pyramid roll process. Beall produced potable water pipe, custom-fabricated pipe and tanks, square and rectangular tubing, corrugated culvert, tanks and pressure vessels. During its tenure, Beall leased storage space to American Steel Company. In approximately 1970, a Japanese trading company, Okura, became a co-owner of Beall Pipe and Tank Corporation.

In approximately 1976, Beall Pipe sold its business to L B. Foster Company. L. B. Foster continued to make large water pipe and tubular pipe used for such applications as irrigation pipe, but it discontinued making pipe from pyramid rolls.

2.3 Current Manufacturing Activities

Northwest Pipe Company has owned its Portland Facility since 1997, however, the company began operations at the site in 1983 under a lease from Multnomah Land and Equipment Company. Northwest Pipe manufactures potable water transmission pipe and tubular products that are used in water utility, hydroelectric construction, agricultural, mining, fire protection and industrial applications. Steel pipe is manufactured using both the electric resistance welding and the submerged arc welding processes.

Northwest Pipe operates three spiral weld mills and three straight seam mills to produce welded steel pipe ranging in size from 2 3/8-inch outside diameter through 144-inch outside diameter. If desired by the customer, the facility can produce pipe with coatings and linings, specifically, cement mortar, coal tar enamel, polyethylene tape, rust-inhibitive primers, polyurethane, coal tar epoxy, and specialty paints. A list of chemicals used at the site is provided in Section 3.0 of the URS Letter Report (URS 2000).

Figure 3 is a site map showing the location of Northwest Pipe's production areas. Pipe is welded and cut in Bays 1 though 6. The X-ray area, quality control laboratory, and shipping and receiving area are located adjacent to Bay 1. Pipe fittings such as elbows, tees, manifolds, reducers, and manholes are fabricated in Bay 3. The maintenance area is located in a portion of Bay 4. Sand blasting prior to taping or coating occurs in Bay 9, within the Sand Blast Room. A hydrotest facility is also in Bay 9, and pipe lacquering occurs in the Bay 9 annex.

Cement mortar lining and coating occurs at the Cement Plant in the northeast corner of the facility. During its tenure at the property, Northwest Pipe added the Cement Curing Bays at the north edge of the facility. Paint and coal tar enamel are applied in the Lining and Coating Facility, which is located in a building on the western edge of the site. Solid coal tar enamel is stored outside in an area at the north end of the Lining and Coating Facility. Paint is stored in a contained area under cover in the Paint Storage Shed near the eastern property line. Wood cutting, pipe cutting, and pipe belling occurs in the northeastern part of the site. Also in this area, gasoline and diesel fuel is stored in two above-ground storage tanks with secondary containment. A steam cleaning/hot water wash pad that has a closed sump is

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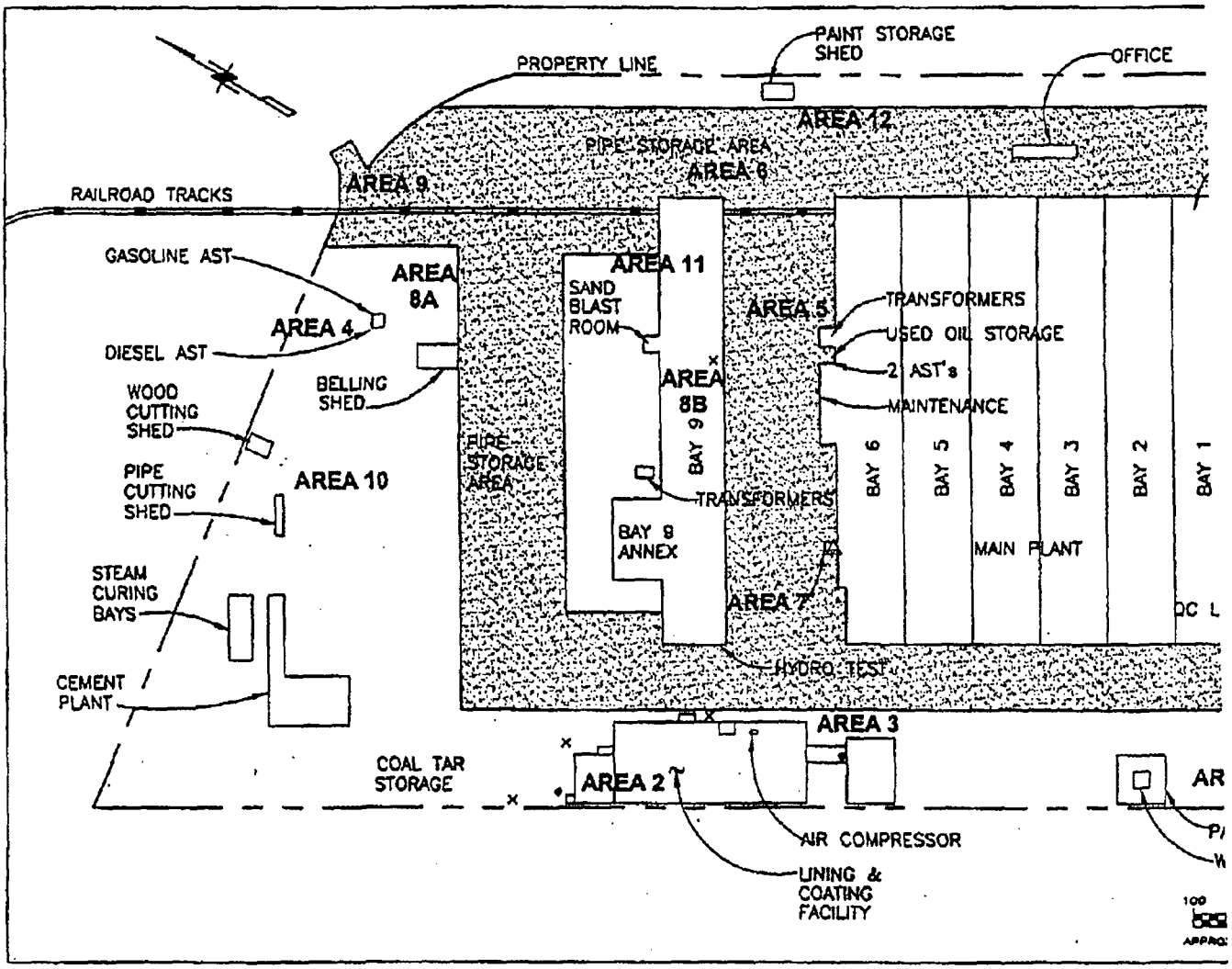

EXPLANATION:

△ WATER WELL

• SUMP

× COAL TAR RECLAMATION BLOWERS

PAVEMENT AREA (APPROXIMATE)

NORT

FIG2.dwg

located under cover within the Paper Shed. The wash pad sump is pumped out as needed by Spencer Environmental. An Office Building containing offices, restrooms, and a meeting room is located east of the building containing Bays 1 through 6. The remainder of the facility is used for storing finished pipe and coiled steel, and for shipping access by rail and truck. As detailed in the URS Letter Report (2000), Northwest Pipe has decommissioned all underground storage tanks, conducted extensive site investigations and cleanup, and has continually improved the existing facilities at the property during its tenure at the site.

Northwest Pipe has upgraded its processes over time to improve efficiency and enhance the environmental benefits of its production processes. Changes to the facility that have occurred since Dames & Moore's Phase I and II Report (1989) include:

- The facility's coal tar vapor reclamation blowers were upgraded in 1995 to a hood and reheating system that filters and condenses the vapor.
- Because of process changes, Northwest Pipe has upgraded Areas 2 and 3 since 1995. The superficially stained surface soil in this area were capped with concrete. Northwest Pipe installed a chiller for the coatings department on part of the concrete cap in late 1999.
- Since the mid 1990s, Northwest Pipe has made a concerted effort and invested a considerable amount of money to induce its suppliers to provide coating products that contain lower levels of volatile organic compounds (VOCs). As a result, the amount of VOCs in coating products used at the facility, and the amount of VOCs emitted during pipe coating have been substantially reduced.
- In 1998, the 207 Mill was constructed at one end of Bay 4 to produce tubular products ranging in diameter from 2 inches to 18 inches. This process employs an ultraviolet light (UV) coating line that eliminates VOC emissions by using UV light to cure the coating.
- An X-ray area was installed adjacent to Bay 1 in 1995 for manufacturing quality assurance.
- Coal tar in solid form formerly was stored in two locations: south-southeast of the Paper Shed and north-northwest of the Lining and Coating Facility. In 1997, solid-form coal tar storage was consolidated in the area adjacent to the Lining and Coating Facility. The area near the Paper Shed no longer is used for solid-form coal tar storage.
- In 1999, the 250-gallon gasoline above ground storage tank was moved into the diesel containment area. The tank and its containment shed currently are located inside the diesel containment area.

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- For information on implemented environmental management activities since 1991, see the URS Letter Report (2000), Section 6.8.

3.0 Available Sampling Information Assessment

DEQ has expressed concern that the existing documentation on sampling and remediation at the site may be inadequate to assess areas of potential concern. DEQ's areas of interest regarding past work are those identified in it its February 1, 2001 letter:

- Potential groundwater contamination at the site; Item 1 in DEQ (2001)
- Insufficient soil sampling in Areas 1, 3, 5, 9, and 12; Item 2 in DEQ (2001)
- VOCs and polynuclear aromatic hydrocarbon (PAH) concentrations potentially present at or below the water table in Areas 1 and 3; Item 3 in DEQ (2001)
- Residual, low level concentrations of polychlorinated biphenyls (PCBs) and total petroleum hydrocarbon (TPH) in Area 5, and concern about historic PCB detection limits above some current action levels; Item 4 in DEQ (2001)
- Potential VOC concentrations in Areas 9 and 12; Item 5 in DEQ (2001)
- Additional information needed on petroleum hydrocarbons in the "plugged storm drain" at Area 14; Item 6 in DEQ (2001)
- Additional information on the site storm water discharge system; Item 7 in DEQ (2001) and also requested in DEQ (2000).
- Additional information on the site's industrial production well; Item 8 in DEQ (2001)

This section responds to these concerns and describes the general scope of proposed sampling and analysis to resolve remaining uncertainties.

3.1 Groundwater

DEQ currently indicates that it is interested in groundwater at the Northwest Pipe facility because groundwater at the site is shallow, because the agency considers the confirmation sampling documentation of past soil remediation activities inconclusive, and because DEQ feels the nature and extent of chlorinated solvents and petroleum products was not adequately defined by past work. Although available documentation on past sampling and analysis is not as detailed as the current standard of practice, extensive sampling and analysis has been completed at the site indicating that the concentrations of constituents in soil were significantly reduced by past remedial efforts. This conclusion was shared by DEQ (1991a) after a review of data generated by Dames & Moore (1989) and Crosby & Overton (1989). Moreover, the materials used or present at the site of most interest in sediment –

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petroleum hydrocarbons and much smaller quantities of PCBs – tend to have low mobility and rarely cause significant or extensive contamination of groundwater unless released in large quantities. Chlorinated solvents that formerly were used in limited quantities at the site have been detected sporadically in site soil. DEQ (1991a), however, observed that concentrations of chlorinated solvents, PCBs, and petroleum hydrocarbons, where detected at all, decrease rapidly with depth. In summary, the available soil sampling data at the site indicates that constituents, where present, occur predominately in near-surface soil. This situation is inconsistent with the distribution of contaminants in soil that would be capable of causing significant groundwater contamination.

To respond to DEQ's current concerns about soil and groundwater at the Northwest Pipe facility, CH2M HILL recommends that a focused soil and groundwater sampling effort be conducted to address specific areas. The scope of this investigation is described below in Section 3.2.

3.2 Areas 1, 3, 5, 9, and 12

These areas were identified in DEQ's February 1, 2001 letter after reviewing both the Preliminary Assessment Report (CH2M HILL 2000) and previous DEQ memoranda describing remaining areas of concern at the site (DEQ 1991a and 1991b). DEQ has requested that the soil sampling data in these areas be re-evaluated, with a recommendation about the need for additional sampling to supplement current information.

3.2.1 Area 1

Area 1 is the site of a former above-ground waste oil tank, drums, and stained soil (Dames & Moore 1989). Northwest Pipe investigated and remediated soil in Area 1 in 1989. The confirmation sampling, however, was not as well documented as DEQ would have preferred. To supplement the current understanding of soil conditions in Area 1, CH2M HILL recommends that a Geoprobe boring be advanced in this area from the ground surface to the water table. Soil samples are recommended to be collected at the surface (i.e., immediately below pavement), 3 feet, and 6 feet (the anticipated depth of groundwater). These soil samples will be analyzed for TPH, PAHs, and VOCs. A groundwater sample is recommended to be collected near the water table and analyzed for TPH and VOCs.

SCHN00206772

3.2.2 Area 3

Area 3 also was remediated in 1989. Although the specific locations of confirmation soil samples are not clearly described in Crosby & Overton's (1989) report, the sample results document the presence of relatively low remaining concentrations of VOCs and TPH that are near or below EPA Region 9 Preliminary Remediation Goals (PRGs) and DEQ's petroleum hydrocarbon criteria for underground storage tanks. Because Area 3 lies inside an active industrial building under a paved floor and under a roof, the risk of exposure is controlled and the potential for leaching to groundwater is minimized. No additional sampling is recommended for Area 3.

3.2.3 Area 5

Sampling and analysis for VOCs, TPH, and PCBs showed that VOCs were not present in soil at Area 5. TPH was present at elevated concentrations on the surface; however, the concentrations of petroleum hydrocarbons decreased significantly with depth to concentrations below potentially applicable criteria for the site. Therefore, the oil staining described in 1989 appeared to be localized, limited to the near-surface, and had decreased to low concentrations at depth. Also in this area, PCB concentrations were found to be below the industrial soil PRG (1.3 mg/kg) in the surface sample at the general plant Maintenance Shop (0.7 mg/kg) and slightly above this level in the surface soil sample in front of the transformers (3.1 mg/kg). In both locations, PCBs were not detected above the detection limit of 0.1 mg/kg at a sample depth of 4 feet.

Because TPH concentrations in soil generally decrease over time due to microbial degradation, it is anticipated that current TPH concentrations are below those documented in 1989. To investigate this possibility, it is recommended that Northwest Pipe collect surface soil samples at two locations (one in front of the transformers and one at the Maintenance Shop) to determine if TPH concentrations remain above potentially applicable criteria. No further PCB analysis is recommended because the existing data show that concentrations were low, near the potentially applicable industrial soil PRG, and limited to the near-surface only.

3.2.4 Area 9

Area 9 was included by Crosby & Overton as part of the underground tank remediation area. As such, it was Northwest Pipe's impression that the "no further action" determination made by DEQ on April 16, 1990 included Area 9. Area 9 originally was identified because stained surficial soil was observed next to the railroad track in this area. Sampling from this area showed the following:

- Surface soil: in a single sample, TPH (22,000 mg/kg) and PCE (0.31 mg/kg) were detected by Dames & Moore (1989); other VOCs were not detected at detection limits ranging from 0.005 to 0.01 mg/kg.

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- 1-foot depth: in two samples, TPH was detected (420 and 530 mg/kg) and VOCs were not detected at detection limits likely ranging from 0.005 to 0.01 mg/kg (based on other samples from the site reported by the same laboratory during the same time period).
- 2-foot depth: in a single sample, 88 mg/kg TPH and 0.2 mg/kg PCE were detected; other VOCs were not detected at detection limits likely ranging from 0.005 to 0.01 mg/kg (based on other samples from the site reported by the same laboratory during the same time period).
- 4-foot depth: in three samples collected after soil was removed from this area, PCE was detected at concentrations ranging from 0.14 to 0.16 mg/kg; other VOCs were not detected at detection limits ranging from 0.005 to 0.01 mg/kg.
- 6-foot depth: in a single sample, no VOCs and no TPH were detected; the VOC detection limit likely ranged from 0.005 to 0.01 mg/kg (based on other samples from the site reported by the same laboratory during the same time period).

None of the detected concentrations of PCE exceed the industrial soil PRG of 16 mg/kg, and no other VOCs were detected; therefore, VOCs are not considered constituents of potential concern in Area 9. DEQ is correct that TPH analysis was not done on soil samples collected after remediation in Area 9 (the samples collected at a 4-foot depth). The mechanism of release of hydrocarbons in this area was considered to be a surface spill from a rail car, according to Dames & Moore's (1989) observations. In other words, it is unlikely that routine or ongoing hydrocarbon releases occurred in Area 9. Hydrocarbons would therefore be expected to be limited to the surficial soil that was removed by Crosby & Overton. This is supported by the low concentration of TPH detected in the sample from a 2-foot depth and the lack of TPH in the sample from the 6-foot depth. For these reasons – no VOCs at concentrations of concern and hydrocarbons only in surficial staining that has been addressed by past remediation – no additional sampling in Area 9 is proposed.

3.2.5 Area 12

Area 12 consists of stained soil adjacent to the paint storage shed. Northwest Pipe investigated and remediated soil in this area in 1989. The confirmation sampling, however, was unclear. To supplement the current understanding of soil conditions in Area 12, a Geoprobe boring is recommended in this area to be advanced from the ground surface to the water table. Soil samples would be collected at the surface, 3 feet, and 6 feet (the anticipated depth of groundwater). These soil samples would be analyzed for TPH and VOCs. To address DEQ's current concern about groundwater quality, a groundwater sample would be collected with the Geoprobe rig and analyzed for VOCs and TPH.

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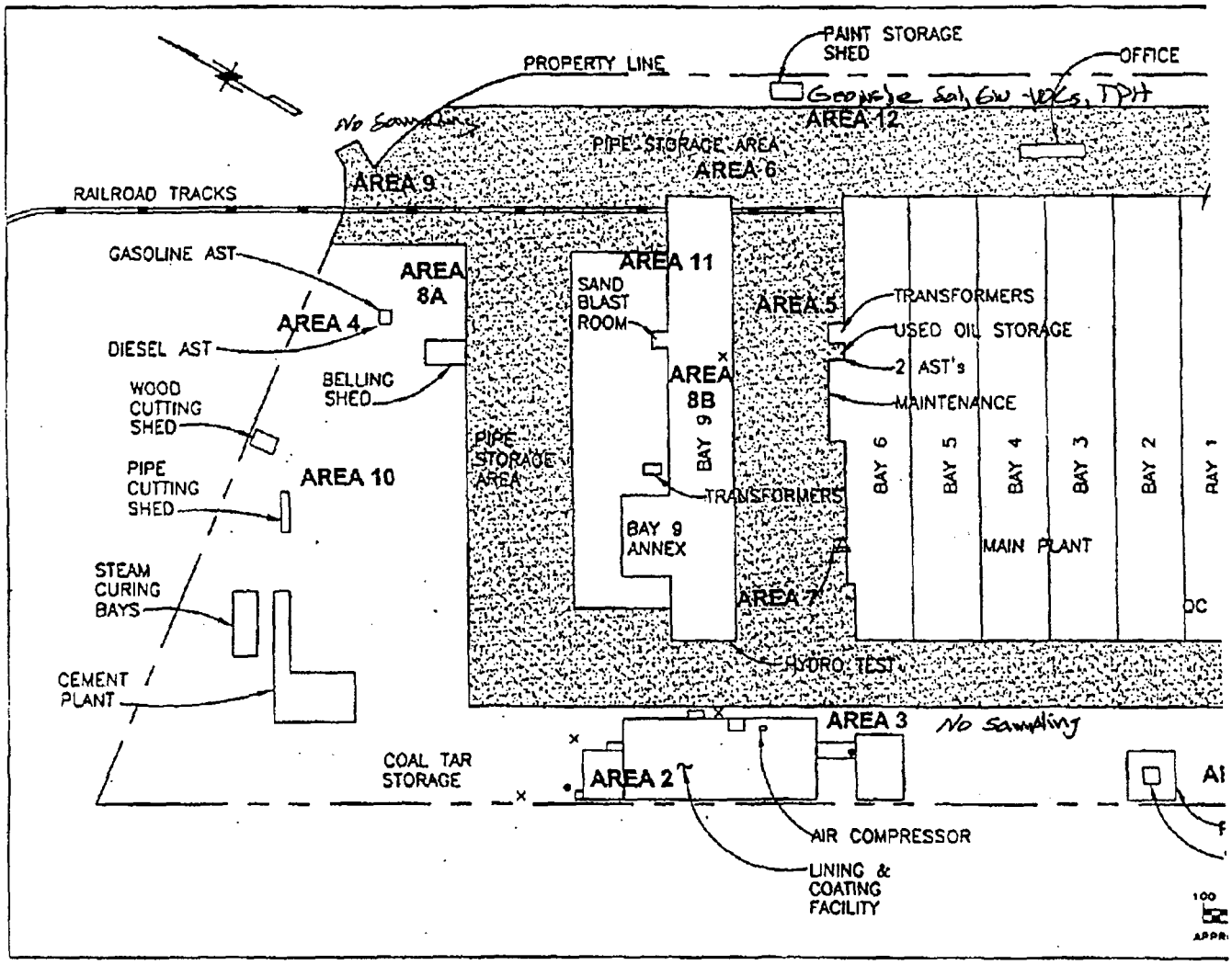

EXPLANATION:

△ WATER WELL

• SUMP

× COAL TAR RECLAMATION BLOWERS

PAVEMENT AREA (APPROXIMATE)

NOR

FIG2.dwg

3.3 Residual, Low Level VOCs and PAHs in Areas 1 and 3

Available sampling data from Areas 1 and 3 are described in Sections 3.2.1 and 3.2.2 of this Addendum, respectively. CH2M HILL has recommended that soil and groundwater samples be collected from Area 1to address the DEQ's current concern. As described in Section 3.2.2, the soil in Area 3 lies under a concrete floor and roof in an active industrial facility. No additional sampling is proposed for this location.

Area 1 and 3 were sampled and remediated by Crosby & Overton in 1989. In Area 1, the concentrations of tetrachloroethene (PCE) documented to be present were low: PCE concentrations ranged from 0.16 milligrams per kilogram (mg/kg) in a composite sample representative of the bottom of the remedial excavation to 0.17 mg/kg in a wall sample. Both of these concentrations are about two orders of magnitude below the PRG for PCE of 16 mg/kg.

3.4 Residual, Low Level PCBs and TPH in Area 5

In its February 1, 2001 letter, DEQ, implies that it had, in the past, recommended that remedial action be taken in Area 5. A review of past agency memoranda (DEQ 1991a and 1991b) suggests that DEQ did not recommend in writing excavation for this area; rather, the agency relates a telephone conversation with a Crosby & Overton staff member who had expressed an opinion about petroleum hydrocarbons being limited only to surface soil in Area 5. DEQ noted that this opinion "was apparently not confirmed by excavation" (DEQ 1991a). DEQ's statement in its 1991 memorandum appears to be a declaration of fact rather than a recommendation for remedial action.

Although Crosby & Overton did not confirm its opinion about surficial contamination by excavating soil, it did collect subsurface soil samples that confirm the elevated TPH and PCB concentrations in Area 5 were limited to surficial soil. These samples show that TPH concentrations at a 5 foot depth inside the Machine Shop, and at a 4 foot depth around the transformers, were either below detection limits or were detected at concentrations below the potentially applicable TPH criterion of 500 mg/kg. Similarly, PCBs, which were detected either below or slightly above the Region 9 PRG for PCB in the near-surface samples in Area 5, were not present in deeper samples. Additional information on Area 5 sampling is provided in Section 3.2.3 of this Addendum.

Note that the detection limit achieved by the laboratory used by Crosby & Overton for this work (0.1 mg/kg) is two orders of magnitude below the detection limit of 10 mg/kg cited by DEQ in its February 1, 2001 letter.

3.5 Residual, Low Level VOCs in Areas 9 and 12

DEQ's comments regarding this area are addressed in Sections 3.2.4 (Area 9) and 3.2.5 (Area 12) of this Addendum.

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3.6 "Storm Drain" Sediment at Area 14

Historical Steam Cleaner Settling Tank?

Area 14 was described erroneously by Dames & Moore (1989) as a "plugged storm drain". Based on additional work by Northwest Pipe and Crosby & Overton, this feature was determined to be a large (approximately six feet deep) underground catch basin that apparently was associated with the former Beall Pipe and Tank Corporation wash pad. It has an outlet near its top that, if the catch basin filled with water, could serve as an overflow outlet. Dames & Moore (2000) indicated that this outlet is connected to the facility storm water system. In 1989, Crosby & Overton removed two feet of sludge from the bottom of the catch basin. The catch basin at Area 14 is not used by any Northwest Pipe process and currently is empty.

3.7 Storm Water Discharge System

Historical mapping that is available for the storm water system indicates that storm water from the northern two-thirds of the Northwest Pipe property discharges to Schnitzer's Slip (formerly the Oregon Shipbuilding Corporation Fitting Basin) via Outfall No. 18 (as numbered on Schnitzer's storm water map contained in the Bridgewater Group Storm Water System Assessment [2000b]). The southern third of the Northwest Pipe property is shown on old Oregon Shipbuilding Corporation maps to discharge to the Willamette River through Outfall No. 1.

Northwest Pipe Company has expended considerable effort during the Winter of 2000-2001 to document its storm water discharge system. During this period, the weather has been unusually dry, preventing direct observation of storm water flow patterns. In an attempt to provide more complete information to DEQ regarding its storm water system, Northwest Pipe conducted two flow tests, both using introduced water to create flow within the facility storm water system.

The first flow test occurred on January 9, 2001. Northwest Pipe staff used a fire hose to introduce approximately 30 gallons per minute (gpm) of flow into a catchbasin near the southeastern corner of Bay 1 (Figure 4). After discharging approximately 500 gallons of water, CH2M HILL began dropping oranges into the catchbasin that was receiving the water flow at a rate of approximately one every thirty seconds. Oranges were selected for use because their subspherical shape precludes "hanging up" on obstructions; their density is only slightly less than water, so that they float with the majority of their bulk below the water surface; and their color makes for easy visual identification. Light rain fell during the early part of the test, adding storm water runoff to the system, but the rain stopped after about a half hour. The fire hose was allowed to discharge into the storm water system for a total duration of approximately 45 minutes.

A CH2M HILL observer was posted at Outfall No. 18 for the duration of the test. In addition, a CH2M HILL observer was escorted to Outfall No. 1 by a Schnitzer Steel Corp. representative. No oranges appeared during the course of the test at either outfall. The Schnitzer Steel Corp. representative commented that Outfall No. 1

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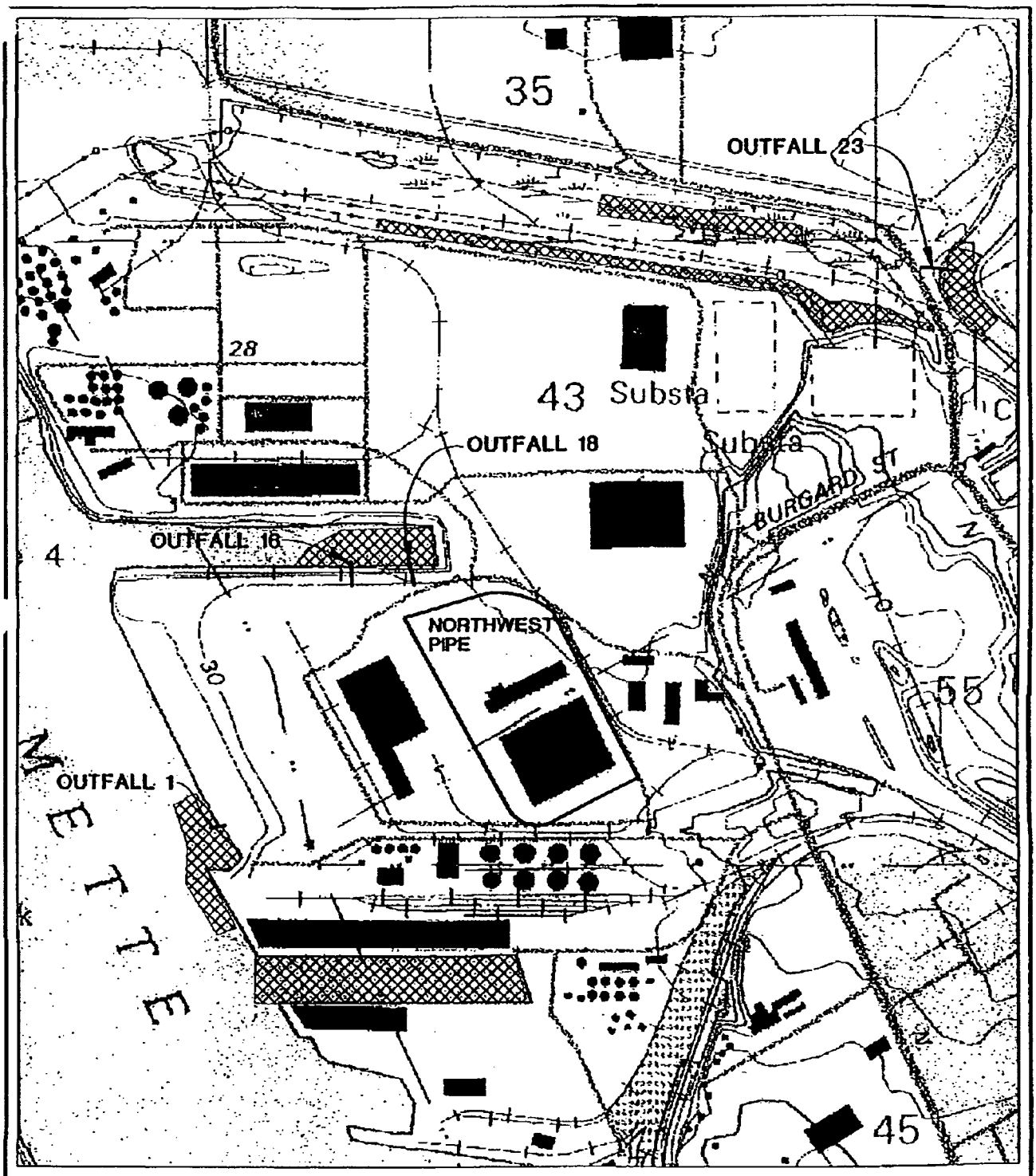

N

0 400 800

SCALE IN FEET

LEGEND

AREAS OBSERVED

Figure 4
DYE TEST OBSERVATION
NORTHWEST PIPE CO.
PORTLAND, OREGON

CH2MHILL

1844G001.DWG

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appears to be plugged and that he had not seen water flow from Outfall No. 1 for at least three years. Schnitzer's storm water maps show that the pipe leading to Outfall No. 1 is plugged on Schnitzer's property between the Northwest Pipe site and the Willamette River. During the week following the storm water flow test, Schnitzer's Slip in the vicinity of Outfall No. 18 and the Columbia Slough in the vicinity of another potential storm water outfall from Burgard Industrial Park were observed with no indication of oranges.

The second flow test was conducted on February 20, 2001. For this test, water was introduced from two sources into catchbasins near the southwest corner of Bay 1. One source was a fire hose flowing at approximately 50 gpm and discharging into the location identified on Figure 4 as Drain No. 2. The second source of water was a 2,200-gallon water truck discharging directly into a second catchbasin (Drain No. 1) and making a total of six rounds over 90 minutes, for an average flow of about 140 gpm from the water truck. The total amount of water introduced during the test is estimated to be 17,700 gallons.

Specially-formulated versions of Rhodamine WT dye (Ben Meadows Corporation FWT Red) and Fluorescein dye (Ben Meadows Corporation FLT Yellow/Green), each certified by the National Sanitation Foundation for use in potable water systems, were used in the dye test. The red dye tablets were introduced at Drain No. 1, along with the water that was being discharged by the water truck (see Figure 4). After the conclusion of the storm water dye test, the FLT Yellow/Green dye was introduced in Drain No. 5 (inside Bay 5) to document the location where water from the northern two thirds of the site discharges.

Dye test observations were made at Outfall No. 18 during and after the storm water dye test, with no indication of red dye or increased flow such as might be attributable to the water introduced at the site. In addition, a manhole located near Outfall No. 18 also was observed periodically for presence of red dye or changes in flow conditions. CH2M HILL also checked Drain No. 3, just outside the Lining and Coating Facility, for increased flow and for presence of dye. Because of information provided by Schnitzer regarding the blockage and lack of flow for a period of years at Outfall No. 1, an observer was not stationed at this location; however, this outfall was checked at the end of the test to determine if it was carrying any flow. Again, no flow was observed.

No red dye was observed to discharge during the storm water-test, and no flow changes that could be attributed to the testing were observed. At the conclusion of the test, CH2M HILL staff observed Outfall Nos. 16 and 18 (at Schnitzer's Slip), Outfall No. 1 (at the Willamette River near the south edge of Schnitzer's property), as well as the slip at Terminal 4 and, the following day, in the Columbia Slough. These locations are shown on Figure 4. No red dye was observed in any of these locations. Yellow/green dye was observed at Outfall No. 18 after it was introduced

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in Bay No. 5, confirming that the storm sewers in this portion of the Northwest Pipe facility discharge to Schnitzer's Slip.

In conclusion, the location where flow from the northern two-thirds of the site discharges was confirmed to be Outfall No. 18 near the east end of Schnitzer's Slip. The location where storm water from the southern third of the Northwest Pipe facility discharges was not confirmed. It is possible, given the storage capacity of the pipes in the drain system, that CH2M HILL was unable to introduce sufficient flow in the absence of any precipitation to cause water to flow all the way to its discharge point. Another dye test under steady rain conditions, when they occur, may provide a more conclusive result.

3.8 Additional Information on the Industrial Production Well

It is not known specifically when the site production well originally was installed. At the time the Oregon Shipbuilding Corporation facility was built, the State of Oregon did not require well logs to be filed with the state. A 1973 copy of State Water Well Report was obtained and reviewed. The log print is of poor quality, but it indicates that the well was deepened in late 1972 and early 1973 from its original depth of 25 feet to a new depth of 258 feet. The original installation date of the well is not noted on the report. According to the report, the well currently has an 8-inch diameter casing to its total depth, has a bentonite seal in a 12-inch borehole from the ground surface to a depth of 30 feet, and is perforated from 195 to 201 feet. A stepped specific capacity test was conducted on the well at the time of deepening, which indicated that the well yielded 204 gpm with 19 feet of drawdown for the first hour; 250 gpm with 28 feet of drawdown for the second; and 440 gpm with 42 feet of drawdown for the third hour. A copy of the 1973 water well report is provided in Attachment 1.

In its February 1, 2001 letter, DEQ requested documentation of the three sampling events at the site water well. This information was provided in Northwest Pipe's November 21, 2000 Preliminary Assessment (Attachment 1 to Appendix A, page 22). This page and the associated laboratory reports have been excerpted and are provided in Attachment 2.

Three samples have been collected from the well. The testing on the industrial production well showed the following results:

- Low concentrations of TPH was detected, ranging in concentration from 0.17 mg/L to 18 mg/L.

- A single non-carcinogenic PAH (fluoranthene) was detected at a concentration of 0.026 micrograms per liter (μg/L). No other PAHs were detected in the sample, with detection limits ranging from 0.028 μg/L to 0.54 μg/L. Although Northwest Pipe's well is not used for drinking water, the concentration of fluoranthene that was detected in one of the production well samples (0.026 μg/L) is approximately five orders of magnitude under the Region 9 PRG for tap water (1,500 μg/L).
- PCBs were not detected in a sample from the well, with a detection limit of 1 μg/L.
- PCE was detected in the first sample from the production well at a concentration of 0.5 μg/L; a concentration equivalent to the detection limit for PCE. This initial result was not repeated in subsequent sampling: neither of the follow-up samples from the production well detected PCE at or above its detection limit of 0.5 μg/L. No other VOCs were detected in these samples, with detection limits ranging from 0.2 μg/L to 2 μg/L (however, the detection limit for the common laboratory contaminant methylene chloride should be adjusted in the first sample to 23 μg/L due to its detection at a concentration of 2.3 μg/L in the blank for this sample [EPA 1999]). Although Northwest Pipe's well is not used for drinking water, the concentration of PCE detected in the first of three samples from the well is an order of magnitude below the maximum contaminant level for drinking water (5 μg/L) and less than one-half the Region 9 PRG for tap water (1.1 μg/L).

In summary, the only constituents detected in the site production well are TPH, fluoranthene at an extremely low concentration, and a single, very low detection of PCE that could not be replicated in follow-up samples.

Water from the site production well is used as non-contact cooling water for pumps, as cement mortar make-up water, and as a source of water for hydrotesting finished pipes. The non-contact cooling water is discharged to Schnitzer's slip via the site storm water system. Given the very low constituent concentrations detected in the well and its use at the site solely for industrial processing, the low level concentrations of these constituents that have been detected do not appear to be significant.

4.0 Groundwater Monitoring Well Status

Six monitoring wells were installed by OMNI Environmental to investigate groundwater conditions around a former underground storage tank area that was undergoing remediation (Area 4). This area received a "No Further Action" determination from DEQ in 1990. A map showing the location of the wells was provided in Figure 2, Attachment 2, of URS (2000).

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The shallow groundwater elevation and the flow direction for shallow groundwater at the site was determined by OMNI Environmental (Preliminary Assessment Report Appendix A, Attachment 2), and briefly addressed in Section 5 of the Preliminary Assessment Report. Based on groundwater measurements made by OMNI Environmental at the site in March 1990, the shallow groundwater at the site ranged in elevation from 15.9 feet to 18.0 feet, which correlates to a depth to water ranging from approximately 6.5 to 7.8 feet. The groundwater gradient appeared to be generally westward and toward the Willamette River.

Three of the monitoring wells (MW1, MW-2, and MW-4) currently are visible at the facility. A fourth well, MW-0, may be present within a steel protective casing under a rack of stored pipe. The remaining two monitoring wells – MW3 and MW-5 – could not be located using close visual observation and use of a metal detector. However, the metal detector may not have not have been reliable due to the amount of steel pipe in the vicinity of the test area. Because the OMNI Environmental wells no longer are needed and because it is not known if they can continue to yield groundwater samples that are representative of the aquifer, CH2M HILL recommends that the location of the remaining two wells be confirmed and that all five wells be decommissioned in accordance with Oregon Water Resources Department regulations.

5.0 Clarification on Hazardous Waste Generator Status

In its December 18, 2000 letter, DEQ noted that in 1999, Northwest Pipe was a large quantity generator of hazardous waste after being a small quantity generator for several years. Northwest Pipe has reviewed its 1999 Waste Generation and Management – Answer Sheets, and identified a reporting error that has since been corrected. In its original version of these sheets, Northwest Pipe inadvertently reported waste "as shipped" rather than "as generated." The sheets have since been corrected, confirming that Northwest Pipe continued to qualify as a small quantity generator of hazardous waste during 1999.

6.0 Comments on Burgard Industrial Park Documents

Schnitzer Investment Corp. has prepared reports related to site conditions at the Burgard Industrial Park, which completely surrounds the Northwest Pipe facility. In a January 18, 2001 meeting, DEQ requested that Northwest Pipe provide comments on these reports.

6.1 Burgard Site History Review

Section 2.6.2.9 of the Site History Review (Bridgewater 2000a) has a description of the Northwest Pipe facility that contains incomplete and potentially misleading information:

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- The Bridgewater report describes an EPA inspection in July 1986 that noted accumulated drums and stained soil. These areas were successfully addressed by Northwest Pipe Company in 1989 and 1990. The Bridgewater report failed to mention the most recent RCRA inspection on February 3, 1998, in which DEQ noted "no violations of the Oregon hazardous waste management statutes and rules" were present at the site.

- The report mentioned that EPA collected soil samples during a August 1986 Toxic Substances Control Act (TSCA) inspection. This area also was remediated by Northwest Pipe during the late 1980s. On September 25, 1991, EPA completed a TSCA inspection and concluded that the site was in compliance with the agency's PCB regulations.

- The Bridgewater report repeats DEQ's (1991b) comment that reporting of site remediation information was not "well documented." Although the reporting prepared by Crosby & Overton was not as detailed as DEQ would have preferred, Northwest Pipe, through preparation of consultant reports by URS (2000), CH2M HILL (2000) and this Addendum, has clarified the characterization and confirmation sampling conducted at the site.

- Bridgewater repeats a DEQ (1991b) comment that "...significant contaminant concentrations levels were detected" in areas where no remediation was performed. This comment relates to Area 5 – the machine shop/transformer area adjacent to Bay 6. As described in Section 3.2.3 of this addendum, elevated concentrations of petroleum hydrocarbons in this area were shown by sampling to be limited to surficial soil. Subsurface soil samples showed that TPH concentrations decreased substantially with depth. The other example provided by DEQ (1991b) relates to "...a small area of stained surface soil in a building", which is a common situation at active industrial sites that is unlikely to pose a significant threat to human health or the environment.

- Bridgewater also cites a DEQ (1991b) comment that Crosby & Overton (1989), at times, did not include an analysis of the constituent for which soil remediation had been conducted. When making this comment, DEQ apparently was referring to a portion of the sampling data for Area 9. Section 3.2.4 of this addendum reviews the sampling data available this area. While it is technically accurate to state that the *confirmation* samples from this area (e.g., samples from the four-foot-depth) were not analyzed for the constituent of interest – TPH – it is more accurate to note that soil sample data collected *prior to remediation* already had documented that the TPH was limited to surficial soil. These pre-remediation samples showed that TPH data exhibited the following trend with depth:

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- Surface – 22,000 mg/kg TPH
- 1-foot depth – 420 and 530 mg/kg TPH
- 2-foot depth – 88 mg/kg TPH
- 6-foot depth – TPH not detected

Given that at 2 feet the TPH concentration already had decreased in concentration well below potentially applicable criteria for TPH, and no TPH was detected at the 6-foot depth, the absence of additional TPH data from the 4-foot depth should be considered insignificant.

- Lastly, the Bridgewater report points out that TPH, fluoranthene, and PCE had been detected in the industrial production well at the site. As described in Section 3.8, the initial detection of PCE at the detection limit of 0.5 $\mu g/L$ could not be repeated in two subsequent samples, both of which did not detect PCE. Also, the concentration of fluoranthene that was detected is extremely low: 0.026 $\mu g/L$, or 26 parts per trillion, which is 5 orders of magnitude below the Region 9 PRG for fluoranthene.

6.2 Burgard Storm Water System Assessment

A description of the Northwest Pipe facility is provided in Section 3.2 of the Storm Water System Assessment for the Burgard Industrial Park (Bridgewater 2000b). The report lists a number of activities and features at the site and could be read to imply that each of these contributes to storm drainage from the site. Such an interpretation would be inaccurate. For example, pipe coating occurs inside buildings (the Lining and Coating Facility and the 207 Mill). The coating process is not exposed to precipitation and therefore does not contribute to storm water runoff. Similarly, the Wash Pad is located inside a building, and consists of a concrete pad with a central collection sump that has no outlet. As with the coating operation, the Wash Pad is not exposed to precipitation and does not contribute to storm water runoff. Finally, the petroleum above ground storage tanks are located within a concrete secondary containment structure that does not contribute to storm water runoff.

Bridgewater describes the cement plant as being located along the southern edge of the Northwest Pipe facility. The cement plant actually is located in the northwest corner of the site. The feature described as "steam cleaner settling tank" appears to be consistent with the catch basin identified as Area 14. As described in Section 3.6, the catch basin is not used by any Northwest Pipe process and currently is empty.

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7.0 Recommendations

This Addendum contains the following recommendations for further work to address DEQ's current concerns:

- Additional sampling in Area 1 (soil and groundwater), Area 5 (soil), and Area 12 (soil and groundwater). A description and rationale for this sampling are provided in Section 3.2.
- Additional work to identify and subsequently decommission monitoring wells installed by OMNI Environmental.

It is recommended that a work plan be prepared that describes sampling and analysis methods, well decommissioning procedures, quality assurance/quality control procedures, reporting, and a proposed schedule.

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8.0 References

Bridgewater Group. 2000a. Site History Review, Burgard Industrial Park. Unpublished consultant's report prepared for Schnitzer Investment Corp. September 25, 2000.

Bridgewater Group. 2000b. Storm Water System Assessment. Unpublished consultant's report prepared for Schnitzer Investment Corp. December 21, 2000.

CH2M HILL. 2000. Preliminary Assessment Report for Northwest Pipe Company, Portland, Oregon. Unpublished consultant's report prepared for Northwest Pipe Company. November 2000.

Crosby & Overton. 1989. Letter report to Bill Dana of Oregon DEQ regarding Northwest Pipe and Casing. August 11, 1989.

Dames & Moore. 1989. Phase I and Phase II Property Transfer Site Assessment. Unpublished consultant's report prepared for Northwest Pipe Company, Portland, Oregon. March 9, 1989.

Department of Environmental Quality. 1990. Letter from Andree Pollock, UST Cleanup Specialist, to John Miller of Northwest Pipe and Casing. April 16, 1990.

Department of Environmental Quality. 1991a. Strategy Recommendation prepared by Bill Dana. October 31, 1991.

Department of Environmental Quality. 1991b. Memorandum from Bill Dana of DEQ to Loretta Pickerell of DEQ. September 3, 1991.

Environmental Protection Agency. 1999. USEPA Contract Laboratory Program. National Functional Guidelines for Organic Data Review. EPA 540/R-99/008. October 1999.

Osborn, Julia. 1945. A Story of a Shipyard. Available at Oregon Historical Society, Portland, Oregon.

URS. 2000. Letter Report. Environmental Review. Northwest Pipe Company North Portland Plant. Unpublished consultant's report prepared for Northwest Pipe Company, Portland, Oregon. November 2000.

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Attachment 1

Production Well Log

of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

WATER WELL REPORT

STATE OF OREGON

(Please type or print)

(Do not write above this line)

State Well No. _____

State Permit No. _____

(1) OWNER:

Name: Peall Pipe & Tank Corp.

Address: 12005 N. Burgard Rd.

Portland, Oregon

(2) TYPE OF WORK (check):

New Well ☐ Deepening ☒ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED: Threaded ☐ Welded ☒

8" Diam. from 0 ft. to 216 ft. Gage .250

" Diam. from _____ ft. to _____ ft. Gage _____

" Diam. from _____ ft. to _____ ft. Gage _____

(6) PERFORATIONS: Perforated? ☒ Yes ☐ No.

Type of perforator used Mills Knife

Size of perforations 1/8 in. by 3 in.

72 perforations from 205 ft. to 209 ft.

perforations from _____ ft. to _____ ft.

perforations from _____ ft. to _____ ft.

(7) SCREENS: Well screen installed? ☒ Yes ☐ No

Manufacturer's Name UOP Johnson

Type Stainless Model No. 304

Diam. 8" Slot size .020 Set from 215 ft. to 220 ft.

Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom?

Yield:	gal./min.	with	ft. drawdown after	hrs.
200		39	1	
250		28	1	
400		43	1	

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Artesian flow _____ g.p.m.

Temperature of water _____ Depth artesian flow encountered _____ ft.

(9) CONSTRUCTION:

Well seal—Material used Bentonite

Well sealed from land surface to 20 ft.

Diameter of well bore to bottom of seal 12" in.

Diameter of well bore below seal 8 in.

Number of sacks of cement used in well seal 0 sacks

Number of sacks of bentonite used in well seal 5 sacks

Brand name of bentonite International Gel

Number of pounds of bentonite per 100 gallons of water 50 lbs./100 gals.

Was a drive shoe used? ☒ Yes ☐ No. Plug: _____ Size: location _____ ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? _____ depth of strata _____

Method of sealing strata off _____

Was well gravel packed? ☐ Yes ☒ No Size of gravel _____

Gravel placed from _____ ft. to _____ ft.

(10) LOCATION OF WELL:

County Multnomah Driller's well number

¼ ¼ Section 35 T. 2S R. 1 W. W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well

Depth at which water was first found 190 ft.

Static level 16 ft. below land surface. Date 1/22/73

Artesian pressure _____ lbs. per square inch. Date _____

(12) WELL LOG: Diameter of well below casing 8"

Depth drilled 220 ft. Depth of completed well 220 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Previously drilled	0	25	
Silty gray clay-soft	25	46	
Fine gray sand	46	64	
Gray silty clay	64	98	
Fine gray sand	98	116	
Gray silty clay	116	122	
Fine gray sand	122	133	
Gray silty clay	133	163	
Fine gray sand	163	174	
Coarse sand	174	198	
Coarse sand & gravel	198	203	
Fine brown sand	203	209	
Fine black sand	209	212	
Med. fine & coarse sand w/some fine gravel	212	221	
Blue silty clay/gravel seams	221	222	
Gray clay (soft)	222	249	
Fine gray-brown clay	249	255	
Soft gray clay	255		

Work started 1/3/73 19 Completed 1/22/73 19

Date well drilling machine moved off of well 1/22/73 19

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] _____ (Drilling Machine Operator) Date 1/26/73 19

Drilling Machine Operator's License No. 751

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name A. H. Jackson Drilling Co. (Person, firm or corporation) (Type or print)

Address 21075 S.W. Tualatin Valley Hwy, Aloha

[Signed] _____ (Water Well Contractor)

Contractor's License No. 79 Date 1/26/73 19

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Attachment 2

Production Well Groundwater Sampling Information

On February 6, 1989, the gap between the asphalt and the concrete foundation was widened. Soils were excavated to a depth of 6 inches until a pipe was encountered. The soils did not exhibit odor or sheen and the HNU did not detect any volatilization of chemicals. Sample 6-S-01 was collected at the six inch depth and tested for chlorinated solvents.

Area 7:

On December 8, 1988, a sample from the on-site industrial water supply well was collected. The well, located outside the northwest portion of the main fabrication building (Figure 5), was purged of approximately 10 - 15 gallons of water before sample W-1 was collected from a small valve located on the well head. Sample W-1 was analyzed for PCBs, TPH, PNA, and chlorinated solvents.

On February 14, 1989, two additional water well samples were collected from the on-site industrial well. A review of the well log indicated that approximately 537 gallons represented one well pore volume. Mr. Vick informed Dames & Moore that daily water use at the facility was significant (over 3000 gallons per day). It was estimated that three well pore volumes or approximately 1620 gallons would be evacuated from the well after three hours of plant operation. On February 14, samples were collected at 14:45 after nearly seven hours of plant operation. Water sample 7-W-01 was retested for chlorinated solvents, PCB, TPH, and PNA. Water sample 7-W-02 acted as a duplicate for 7-W-01 and was only tested for chlorinated solvents.

Area 8A:

During the December sampling program, borehole B-1 was hand augered adjacent to the southern end of the underground gasoline storage tank (Figure

TABLE 7

DETECTED COMPOUNDS FOR AREA 7

NORTHWEST PIPE AND CASING COMPANY

SAMPLE #	DEPTH (FEET)	1,1,1 TRI-CHLOROETHANE	PCE	TCE	TPH	PCB	FLUORANT
W-1	200	<0.2	0.5	<0.2	0.17ppm	<1.0	ND
7-W-01	200	<0.5	<0.5	<0.5	18ppm	<0.15	0.026
7-W-02 (Dup)	200	<0.5	<0.5	<0.5	NT	NT	NT

<0.1 Indicates compound not detected at specified detection limit

ND: Indicates sample not tested for compound

NT: Indicates that sample not tested for compound

Note: All results listed in parts per billion (ppb) unless otherwise noted

WD40/NW.T7

AnalyticalTechnologies,Inc.

ATI I.D. # 8812-046-9

VOLATILE HALOCARBONS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: 12/08/88
PROJECT #	: 18050-002	DATE RECEIVED	: 12/09/88
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-1	DATE ANALYZED	: 12/13/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 601	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.5
CARBON TETRACHLORIDE	<0.2
CHLOROETHANE	<0.5
CHLOROFORM	<0.2
CHLOROMETHANE	<2.0
DIBROMOCHLOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
TRANS-1,2-DICHLOROETHENE	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
METHYLENE CHLORIDE	1.7 B
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE (TCE)	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE	109

B = Also found in blank.

AnalyticalTechnologies,Inc.

ATI I.D. # 8812-046

VOLATILE HALOCARBONS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: N/A
PROJECT #	: 18050-002	DATE RECEIVED	: N/A
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 12/13/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 601	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.5
CARBON TETRACHLORIDE	<0.2
CHLOROETHANE	<0.5
CHLOROFORM	<0.2
CHLOROMETHANE	<2.0
DIBROMOCHLOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
TRANS-1,2-DICHLOROETHENE	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
METHYLENE CHLORIDE	2.3
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE (TCE)	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.5

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE	96

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ATI I.D. # 8812-046

VOLATILE HALOCARBONS
QUALITY CONTROL DATA

CLIENT : DAMES & MOORE
PROJECT # : 18050-002
PROJECT NAME : N.W. PIPE & CASING CO.
EPA METHOD : 601

SAMPLE I.D. : 8812-015-11
DATE ANALYZED : 12/09/88
SAMPLE MATRIX : WATER
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % REC	RPD
CHLOROBENZENE	<0.5	12	11.4	95	11.2	93	2
1,1-DICHLOROETHENE	<0.2	4.0	4.64	116	4.67	117	1
TETRACHLOROETHENE	<0.2	4.0	4.31	108	4.40	110	2
TOLUENE	<0.5	12	12.1	101	13.1	109	8
TRICHLOROETHENE	<0.2	4.0	4.45	111	4.69	117	5
META XYLENE	<0.5	12	12.2	102	11.6	97	5

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

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ATI I.D. # 8812-046

POLYCHLORINATED BIPHENYLS (PCB) ANALYSIS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: N/A
PROJECT #	: 18050-002	DATE RECEIVED	: N/A
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: 12/10/88
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 12/14/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 608	DILUTION FACTOR	: 1

COMPOUND	RESULT
PCB 1016	<1.0
PCB 1221	<1.0
PCB 1232	<1.0
PCB 1242	<1.0
PCB 1248	<1.0
PCB 1254	<1.0
PCB 1260	<1.0

SURROGATE PERCENT RECOVERIES

ISODRIN	85

SCHN00206795

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ATI I.D. # 8812-046-9

POLYNUCLEAR AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: 12/08/88
PROJECT #	: 18050-002	DATE RECEIVED	: 12/09/88
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: 12/10/88
CLIENT I.D.	: W-1	DATE ANALYZED	: 12/14/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 610	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ACENAPHTHENE	<5
ACENAPHTHYLENE	<5
ANTHRACENE	<1
BENZO(a)ANTHRACENE	<1
BENZO(a)PYRENE	<1
BENZO(b)FLUORANTHENE	<1
BENZO(g,h,i)PERYLENE	<1
BENZO(K)FLUORANTHENE	<1
CHRYSENE	<1
DIBENZO(a,h)ANTHRACENE	<5
FLUORANTHENE	<1
FLUORENE	<1
INDENO(1,2,3-cd)PYRENE	<1
NAPHTHALENE	<5
PHENANTHRENE	<1
PYRENE	<1

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ATI I.D. # 8812-046

POLYNUCLEAR AROMATICS ANALYSIS
DATA SUMMARY

CLIENT	: DAMES & MOORE	DATE SAMPLED	: N/A
PROJECT #	: 18050-002	DATE RECEIVED	: N/A
PROJECT NAME	: N.W. PIPE AND CASING CO.	DATE EXTRACTED	: 12/10/88
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 12/14/88
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 610	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ACENAPHTHENE	<5
ACENAPHTHYLENE	<5
ANTHRACENE	<1
BENZO(a)ANTHRACENE	<1
BENZO(a)PYRENE	<1
BENZO(b)FLUORANTHENE	<1
BENZO(g,h,i)PERYLENE	<1
BENZO(K)FLUORANTHENE	<1
CHRYSENE	<1
DIBENZO(a,h)ANTHRACENE	<5
FLUORANTHENE	<1
FLUORENE	<1
INDENO(1,2,3-cd)PYRENE	<1
NAPHTHALENE	<5
PHENANTHRENE	<1
PYRENE	<1

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ATI I.D. # 8812-046

POLYNUCLEAR AROMATICS
QUALITY CONTROL DATA

CLIENT : DAMES & MOORE
PROJECT # : 18050-002
PROJECT NAME : N.W. PIPE AND CASING CO.
EPA METHOD : 610

SAMPLE I.D. : 8812-046-9
DATE ANALYZED : 12/14/88
MATRIX : WATER
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % REC	RPD
ACENAPHTHYLENE	<5	400	300	75	270	68	11
BENZO(K)FLUORANTHENE	<1	20	17	85	17	85	0
DIBENZO(A,H)ANTHRACENE	<5	40	35	88	34	85	3
PHENANTHRENE	<1	20	16	80	15	75	6
PYRENE	<1	20	17	85	16	80	6

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$

SCHN00206798

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ATI I.D. # 8812-046

GENERAL CHEMISTRY RESULTS

CLIENT : DAMES & MOORE
PROJECT # : 18050-002
PROJECT NAME : N.W. PIPE & CASING CO.

SAMPLE MATRIX : WATER

PARAMETER	UNITS	-9
PETROLEUM HYDROCARBONS	mg/L	0.17

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ATI I.D. # 8812-046

GENERAL CHEMISTRY QUALITY CONTROL

CLIENT : DAMES & MOORE
PROJECT # : 18050-002
PROJECT NAME : N.W. PIPE & CASING CO.

SAMPLE MATRIX : WATER

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED CONC	SPIKE ADDED	% REC
PETROLEUM HYDROCARBONS	mg/L	8812-044-1	2.8	2.8	0	N/A	N/A	N/A
PETROLEUM HYDROCARBONS	mg/L	8812-046-9	N/A	N/A	N/A	37.7	51.8	73

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

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3700 Lakeville Highway
Petaluma, CA 94952
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ENVIRONMENTAL LABORATORY

Peter Stroud
Dames & Moore
1220 S.W. Morrison St.
Portland, OR 97205

Client Code: DAMP1
Survey #
NW PIPE18050-002

L A B O R A T O R Y R E S U L T S

Laboratory Job No.: 890597
Date Received: 02/15/89
Date Reported: 03/02/89

Date Collected: 02/14/89
Date Analyzed: 02/18/89

TOTAL PETROLEUM HYDROCARBONS(EPA 418.1)

MATRIX:WATER TOTAL DIGEST

LABNO	SMPLNO	COMPOUND	FOUND mg/lt	DET.LIM. mg/lt
3461	7-W-01	TPH	18	1.0

ANALYST:ROBERT REMLINGER

THIS REPORT HAS BEEN REVIEWED
AND APPROVED FOR RELEASE.

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L A B O R A T O R Y R E S U L T S

Date Collected: 02/14/89
Date Extracted: 02/16/89
Date Analyzed: 02/17/89

Laboratory Job No.: 890597
Date Received: 02/15/89
Date Reported: 03/02/89

ASSAY:PCBS IN WATER (GC/ECD EPA 608)
MATRIX:WATER

LABNO	SMPLNO-ID	RESULTS	DET.LIM
3461	7-W-01		
PCBs		ND	0.15 ug/lt

ND=Not Detected
NOTE: THE RESULTS WERE QUANTITAED FOR PCB'S AS AROCLORS 1242, 1254 AND 1260.
ANALYST:DAVE BUSCH

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ENVIRONMENTAL LABORATORY

LABORATORY RESULTS

Date Collected: 02/14/89
Date Extracted: 02/17/89
Date Analyzed: 02/22/89

Laboratory Job No.: 890597
Date Received: 02/15/89
Date Reported: 03/02/89

ASSAY:POLYNUCLEAR AROMATICS IN WATER (HPLC EPA 8310)
MATRIX:WATER

LABNO	SMPLNO-ID	RESULTS	DET.LIM
3461	7-W-01		
	PHENANTHRENE	ND	0.19 ug/lt
	ANTHRACENE	ND	0.54 ug/lt
	FLUORANTHENE	0.026 ug/lt	0.0096 ug/lt
	PYRENE	ND	0.054 ug/lt
	BENZO(A)ANTHRACENE	ND	0.0037 ug/lt
	CHRYSENE	ND	0.065 ug/lt
	BENZO(B)FLUORANTHENE	ND	0.0071 ug/lt
	BENZO(K)FLUORANTHENE	ND	0.0018 ug/lt
	BENZO(A)PYRENE	ND	0.0031 ug/lt
	DIBENZ(AH)ANTHRACENE	ND	0.0082 ug/lt
	BENZO(GHI)PERYLENE	ND	0.0051 ug/lt
	INDENO(123CD)PYRENE	ND	0.028 ug/lt
3461	7-W-01		
	NAPHTHALENE	ND	0.87 ug/lt
	ACENAPHTHYLENE	ND	1.5 ug/lt
	ACENAPHTHENE	ND	2.2 ug/lt
	FLUORENE	ND	0.20 ug/lt

NOTE: RESULTS FOR EACH SAMPLE ARE REPORTED IN 2 GROUPS WHICH ARE DIVIDED ACCORDING TO THE DETECTOR USED TO QUANTITATE CHROMATOGRAPHIC PEAKS 12 COMPOUNDS ARE QUANTITATED BY FLUORESCENCE, 4 BY UV.

ANALYST:TIM AOKI

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ENVIRONMENTAL LABORATORY

Peter Stroud
Dames & Moore
1220 S.W. Morrison St.
Portland, OR 97205

Client Code: DAMP1
Survey #
NWPIPE 18050-002

L A B O R A T O R Y R E S U L T S

Date Collected: 02/14/89
Date Extracted: 02/15/89
Date Analyzed: 02/15/89

Laboratory Job No.: 890598
Date Received: 02/15/89
Date Reported: 02/21/89

PURGEABLES IN WATER (EPA 5030/601)

COMPOUNDS:	LAB#	3462	DET.	3463	DET.
	SMP#	7-W-01	LIM.	7-W-02	LIM.
PURGEABLES		UG/lt		UG/lt	
BROMODICHLOROMETHANE		ND	0.5	ND	0.5
BROMOFORM		ND	0.5	ND	0.5
BROMOMETHANE		ND	0.5	ND	0.5
CARBON TETRACHLORIDE		ND	0.5	ND	0.5
CHLOROETHANE		ND	0.5	ND	0.5
2-CHLOROETHYLVINYL ETHER		ND	1.0	ND	1.0
CHLOROFORM		ND	0.5	ND	0.5
CHLOROMETHANE		ND	0.5	ND	0.5
DIBROMOCHLOROMETHANE		ND	0.5	ND	0.5
1,4-DICHLOROBENZENE		ND	0.5	ND	0.5
1,1-DICHLOROETHANE		ND	0.5	ND	0.5
1,2-DICHLOROETHANE		ND	0.5	ND	0.5
1,1-DICHLOROETHENE		ND	0.2	ND	0.2
TRANS-1,2-DICHLOROETHENE		ND	0.5	ND	0.5
1,2-DICHLOROPROPANE		ND	0.5	ND	0.5
CIS-1,3-DICHLOROPROPENE		ND	0.5	ND	0.5
TRANS-1,3-DICHLOROPROPENE		ND	0.5	ND	0.5
METHYLENE CHLORIDE		ND	0.5	ND	0.5
1,1,2,2-TETRACHLOROETHANE		ND	0.5	ND	0.5
TETRACHLOROETHENE		ND	0.5	ND	0.5
1,1,1-TRICHLOROETHANE		ND	0.5	ND	0.5
1,1,2-TRICHLOROETHANE		ND	0.5	ND	0.5
TRICHLOROETHENE		ND	0.5	ND	0.5

THIS REPORT HAS BEEN REVIEWED
AND APPROVED FOR RELEASE.

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ENVIRONMENTAL LABORATORY

L A B O R A T O R Y R E S U L T S

Laboratory Job No.: 890598

COMPOUNDS:	LAB#	3462	DET.	3463	DET.
	SMP#	7-W-01	LIM.	7-W-02	LIM.
PURGEABLES		UG/lt		UG/lt	
TRICHLOROFLUOROMETHANE		ND	0.5	ND	0.5
VINYL CHLORIDE		ND	1.0	ND	1.0

ANALYST:MARK VALENTINI