ENVIRONMENTAL PARTNERS INC 295 NE Gilman Boulevard, Suite 201 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

Well Decommissioning Interim Measure - 2010

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number 17512 Phase 15

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, Washington 98027
(425) 395-0010

Table 1: Wells to be Decommissioned			
Well ID	**Total Depth (ft.**	**Screened**	**Location / Comments**
PL2-233A 4.3	26.5	25-Oct 10-25	Near Duwamish Waterway and 16th Ave Bridge
PL2-321A 3.0	18	18-Aug 8-18	Near Building 2-51 (inside)
PL2-425B 7.5	45.5	40-45	SW corner of Building 2-44 (inside)
PL2-425C 13.5	82.5	77-82	SW corner of Building 2-44 (inside)
PL2-002A 13.0	20	4.5-19	South of 2-66 slab
PL2-002B 8.0	49	39-48	South of 2-66 slab
PL2-002C 15.5	94.5	85-94.5	South of 2-66 slab
PL2-018A 3.4	20.5	20-May 5-20	SW corner of 2-66 slab
PL2-019A 3.5	21.37	21-Jun 6-21	SW corner of 2-66 slab
PL2-020A 3.4	20.5	6-20.5	West part of 2-66 slab
PL2-023A 3.4	20.5	5.5-20	SW corner of 2-66 slab
PL2-024A 3.2	19.7	19-Apr 4-19	SW corner of 2-66 slab
PL2-025A 13.0	19.7	4.5-19	South of 2-66 slab
PL2-026A 13.4	20.5	6-19.5	NW corner of 2-66 slab
PL2-026B 8.2	50	40-50	NW corner of 2-66 slab
PL2-026C 14.0	85	75-85	NW corner of 2-66 slab
PL2-033A 4.9	30	25-30	South of 2-66 slab
PL2-033AR 5.	31	25.7-30.2	South of 2-66 slab

12 - A level
3 - B level
3 - C level

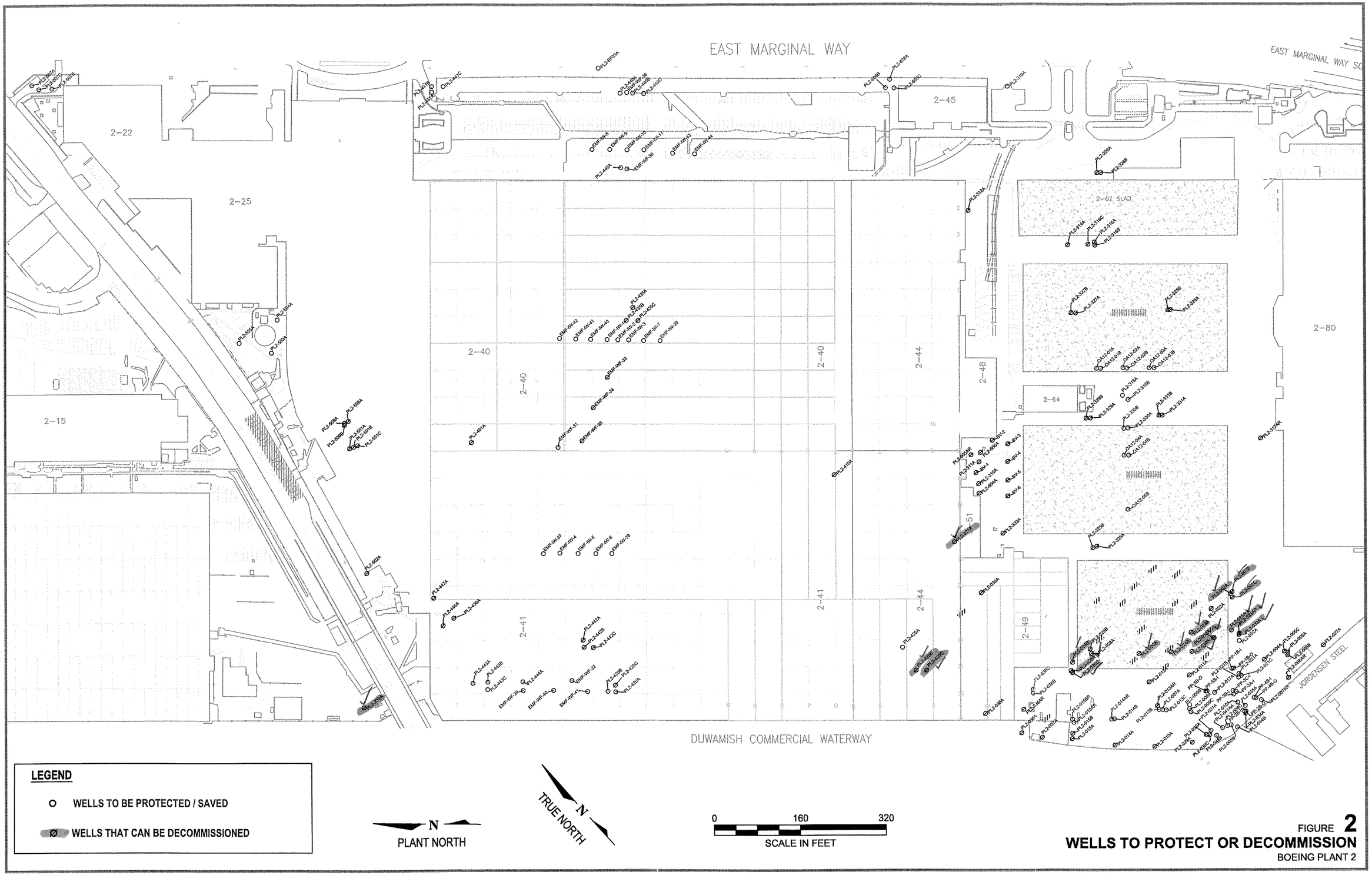


FIGURE **2**

WELLS TO PROTECT OR DECOMMISSION

BOEING PLANT 2

Well Decommissioning Log - Boeing Plant 2

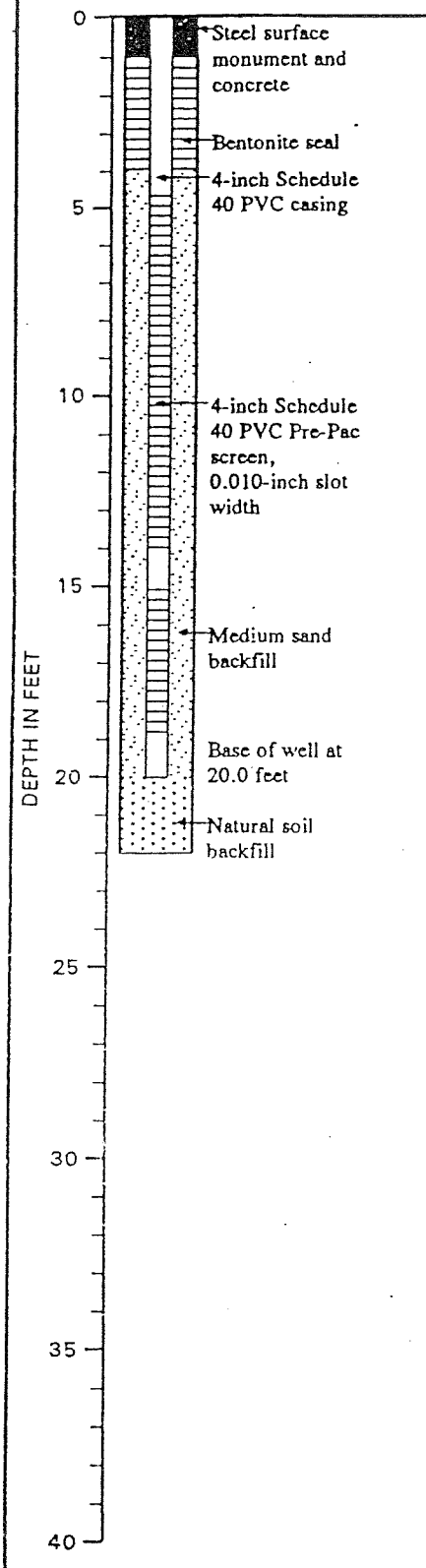
Well Number		
Well Location	Northing	Easting
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout		
Grout Volume		Gallons
Surface Completion		
Drilling Contractor		
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

MONITORING WELL PL2SW-MW2A

PL2-002A

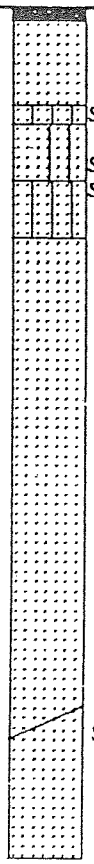
WELL SCHEMATIC

Casing Elevation (ft.): 12.92
Casing Stickup (ft.): -0.16



DESCRIPTION

Surface Elevation (ft.): 13.08



SP 4 inches asphalt concrete

Brown fine to medium sand with a trace of silt (loose, moist)

SM Gray silty fine sand with occasional wood chips (loose, moist)

SP –

SM Rusty brown fine to medium sand with silt and occasional coarse sand, gravel and wood (loose, moist)

SM

SP Gray silty fine sand (loose, moist)

Brown fine to medium sand with varying amounts of silt (very loose, moist)

Grades to wet

Occasional chunks of wood

Water level ranged between 10.0 and 11.8 feet during the 2-week tidal study (12/20/91 through 01/02/92)

SP Gray fine to medium sand with a trace of silt (very loose, wet)

Boring completed at 22.0 feet on 10/30/91

PL2SW-2A is one of a cluster of three separate borings/monitoring wells (PL2SW-2A, -2B, -2C). The soil types encountered in the deepest well, PL2SW-2C, are duplicated on this log because soil samples were not obtained from the shallow and intermediate depth borings in the cluster.

Note: See Figure A-2 for explanation of symbols

See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

:CRW:RHM:PGW:CMS 10/16/92

0120-149-R14

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LOG OF MONITORING WELL

FIGURE A-4

MM 2/18/01

Well Decommissioning Log - Boeing Plant 2

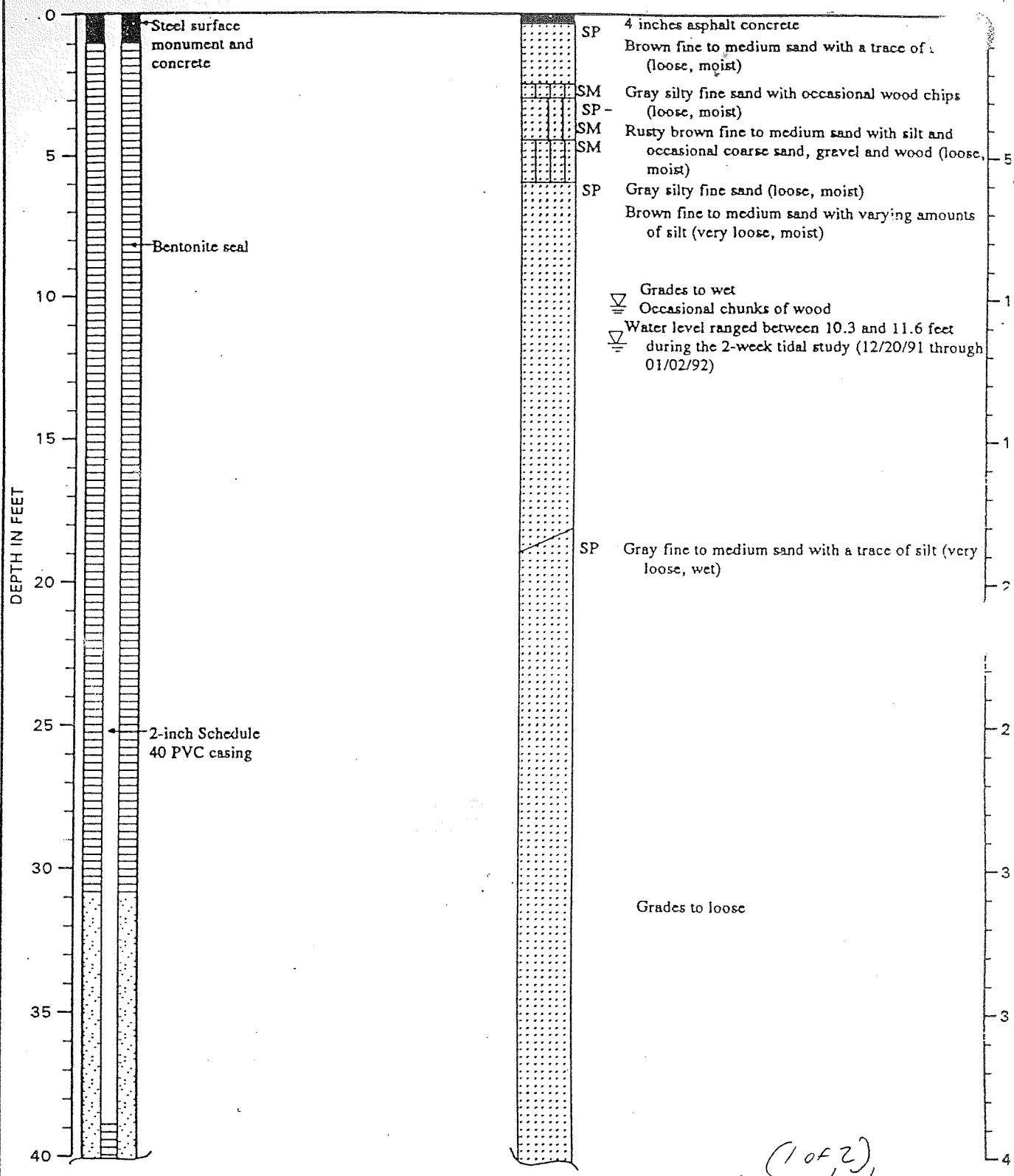
Well Number	PL2-002A		
Well Location	Northing	Easting	
Start (date and time)	5/10/10 1242		
End (date and time)	5/10/10 1250		
Installation Method	Unknown		
Total Well Depth	20.0	feet bgs	
Well Diameter	4"	inches	
Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____
Depth of Screened Interval (ft. bgs)	4.5 - 19	feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*		
	WAC 173-160-460(2) *grout in place*		
Type of Grout	Hydro Plug 3/8" Medium Chip Bentonite		
Grout Volume	13.0	Gallons	
Surface Completion	Flush Monument left in place		
Drilling Contractor	Hokkaido Drilling + Developing		
License Number	1146		
Signature (Driller)	[signature]	5/10/10	
Signature (Engineer or Geologist)	Kristin L. Addis LG	5/10/10	
Additional Information:			

MONITORING WELL PL2SW-MW2B

PL2-002B

WELL SCHEMATIC

Casing Elevation (ft.): 12.72
Casing Stickup (ft.): -0.37



(1 of 2)
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Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical intermediate 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-5a

:CRW:RNM:PGW:CMS 10/16/92

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Well Decommissioning Log - Boeing Plant 2

Well Number: PL2-002B

Well Location: Northing _____ Easting _____

Start (date and time): 5/11/10

End (date and time): 5/11/10

Installation Method: Unknown

Total Well Depth: 49 feet bgs

Well Diameter: 2" inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 39-48 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout: Aqua Guard Bentonite Grout

Grout Volume: 8 Gallons

Surface Completion: flush-mount monument left in place

Drilling Contractor: Hokkaido Drilling

License Number: 1146

Signature (Driller): [signature] 5/11/10

Signature (Engineer or Geologist): [signature] Kristin L. Addis L.G.

Additional Information:

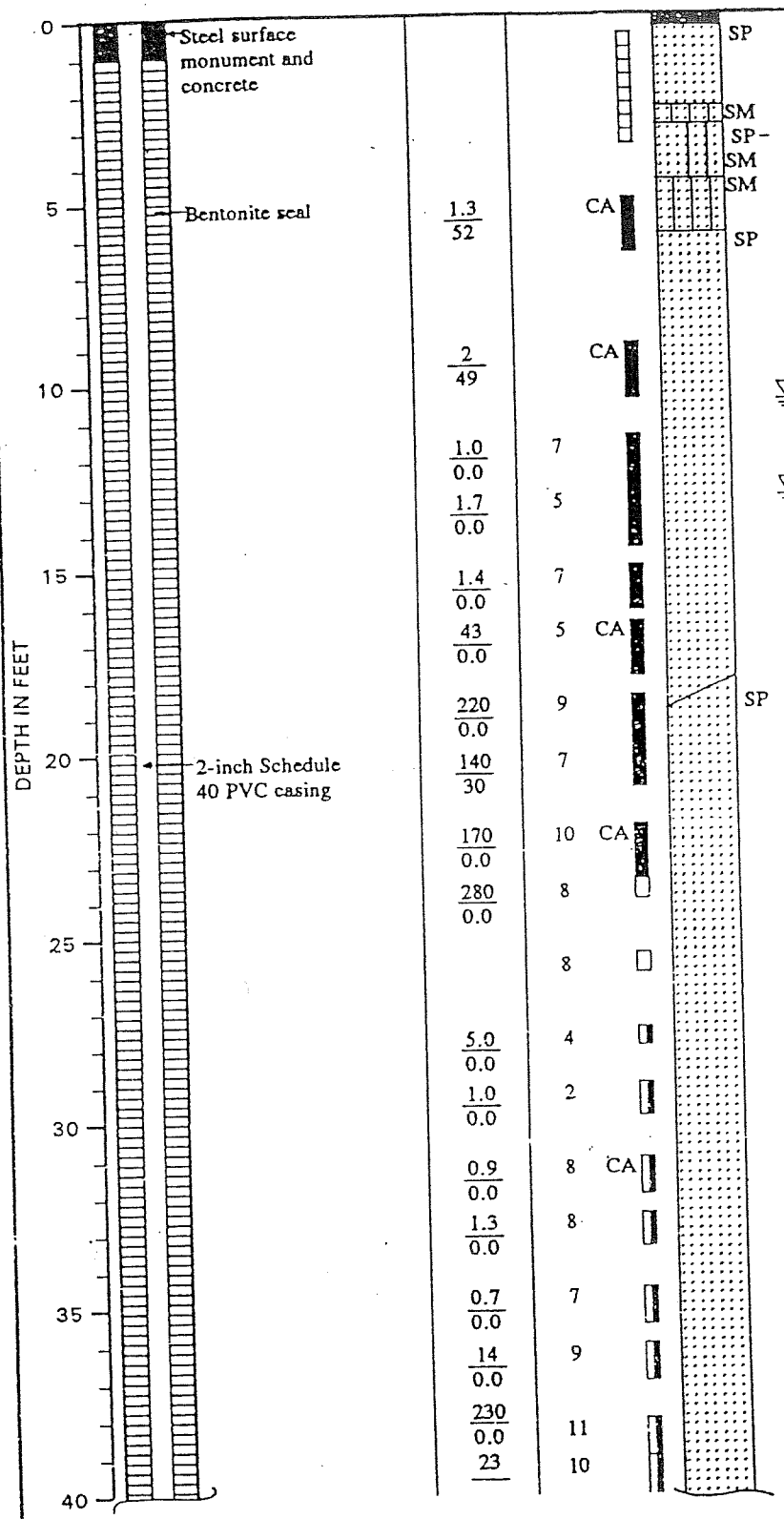
MONITORING WELL PL2SW-MW2C

PL2-00
PL2-002C

WELL SCHEMATIC

Casing Elevation (ft.): 12.34
Casing Stickup (ft.): -0.70

Surface Elevation (ft.): 13.06



Vapor Conc. (ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
			SP	4 inches asphalt concrete
				Brown fine to medium sand with a trace of silt (loose, moist)
			SM	Gray silty fine sand with occasional wood chips (loose, moist)
			SP-SM	Rusty brown fine to medium sand with silt and occasional coarse sand, gravel and wood (loose, moist)
1.3 / 52		CA	SP	Gray silty fine sand (loose, moist) VC = 1.3 ppm at 5 feet
				Brown fine to medium sand with varying amounts of silt (very loose, moist)
2 / 49		CA		Grades to wet Occasional chunks of wood
				Water level ranged between 10.6 and 13.2 feet during the 2-week tidal study (12/20/91 through 01/02/92)
1.0 / 0.0	7			
1.7 / 0.0	5			
1.4 / 0.0	7			VC = 0.2 ppm at 16 feet
43 / 0.0	5	CA		
220 / 0.0	9		SP	Gray fine to medium sand with a trace of silt (very loose, wet)
140 / 30	7			
170 / 0.0	10	CA		
280 / 0.0	8			
	8			
5.0 / 0.0	4			
1.0 / 0.0	2			
0.9 / 0.0	8	CA		Grades to loose
1.3 / 0.0	8			
0.7 / 0.0	7			
14 / 0.0	9			
230 / 0.0	11			
23	10			

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-6a

:CRW:RNM:PGW:CMS 10/16/92

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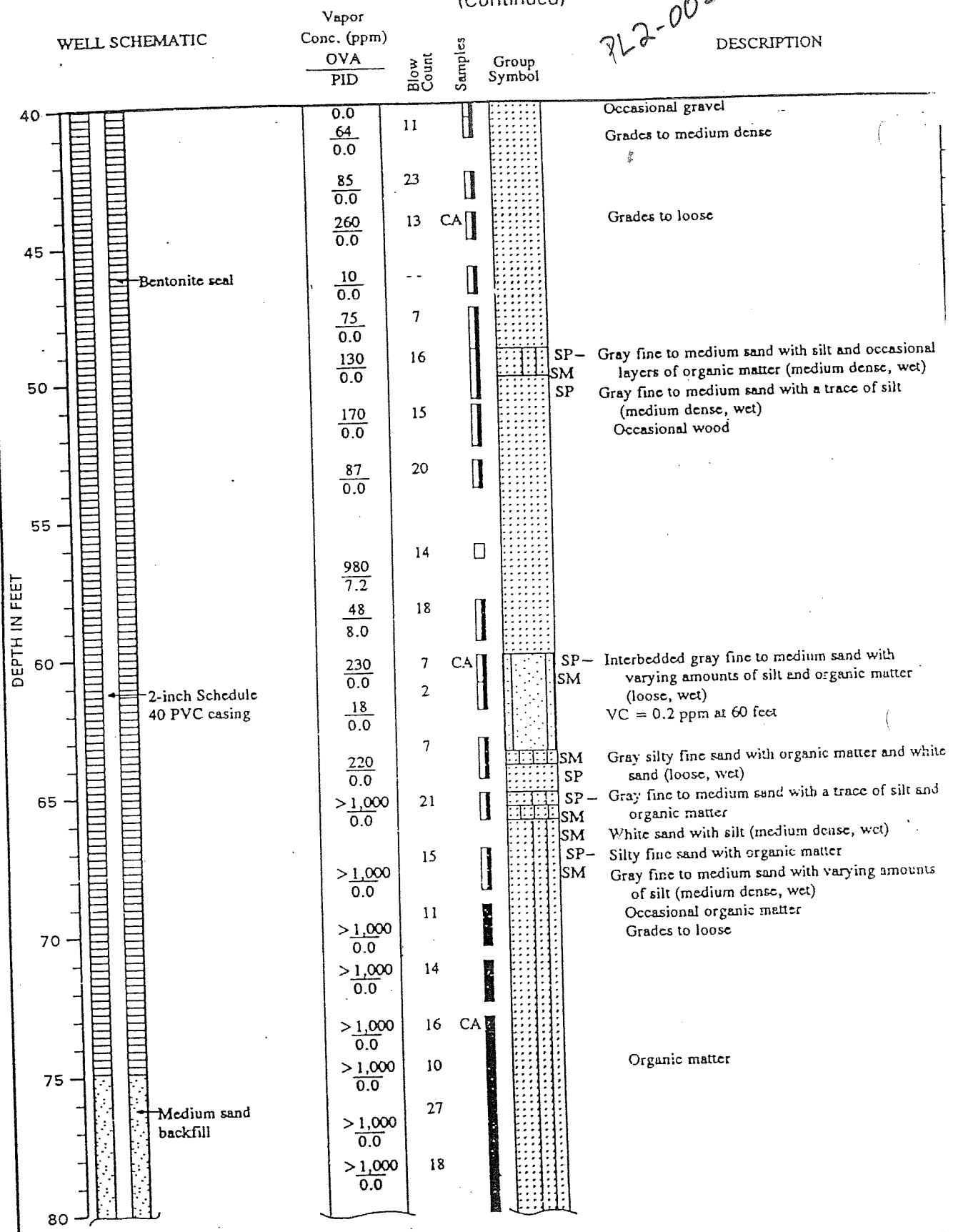
MONITORING WELL PL2SW-MW2C
(Continued)

PL2-002C



Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-6b

:CRW:RNM:PGW:CMS 10/20/92

0120-149-R14

MONITORING WELL PL2SW-MW2C
(Continued)

PL2-002C

WELL SCHEMATIC	Vapor Conc. (ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
	>1,000 / 0.0	30			
	>1,000 / 0.0	17			Occasional organic matter
2-inch Schedule 40 PVC casing	>1,000 / 0.0	23			
	>1,000 / 0.0	13		SW, SM	Interbedded gray fine sand with varying amounts of silt (loose, wet)
	>1,000 / 0.0	17			
2-inch Schedule 40 PVC Pre-Pac screen, 0.010-inch slot width	>1,000 / 0.0	12			
	>1,000 / 0.0	20		ML	Gray sandy silt (stiff, wet)
				SM	Gray silty fine sand (stiff, wet)
Medium sand backfill	>1,000 / 0.0	13		ML	Gray sandy silt (stiff, wet)
				SM	Gray silty fine sand with occasional shells
	>1,000 / 0.0	--	CA		
Base of well at 94.4 feet					

DEPTH IN FEET: 80, 85, 90, 95, 100, 105, 110, 115, 120

Boring completed at 95.5 feet on 10/25/91 and 10/28/91

VC indicated by field screening soil samples from 5, 16, 23 and 60 feet depth

TCE was not indicated by field screening soil samples

Continuous soil sampling was attempted from the surface to the total boring depth

Detection of VC during field screening but not in chemical analysis may reflect a positive interference because of the presence of TCE

Note: See Figure A-2 for explanation of symbols

See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-6c

:GW:HNM:PGW:CMS 10/16/92

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-002C	
Well Location	Northing	Easting
Start (date and time)	5/11/10 1404	
End (date and time)	5/11/10 1412	
Installation Method	Unknown	
Total Well Depth	94.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	85-94.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	Aqua Guard Bentonite Grout	
Grout Volume	15.5	Gallons
Surface Completion	flush-mount monument left in place	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature]	5/11/10
Signature (Engineer or Geologist)	[signature]	Kristen L. Aldis L.G.
Additional Information:		

MONITORING WELL PL2SW-MW18

PL2-0088

WELL SCHEMATIC

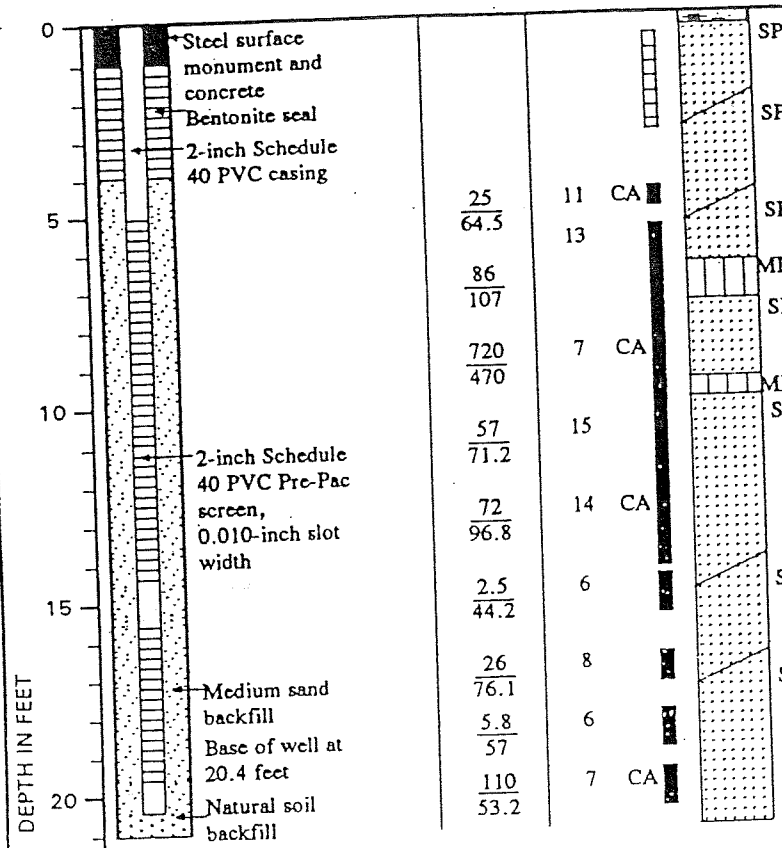
Casing Elevation (ft.): 13.02
Casing Stickup (ft.): -0.23

Vapor Conc.(ppm) OVA / PID

Blow Count | Samples | Group Symbol

DESCRIPTION

Surface Elevation (ft.): 13.25



Vapor Conc. (ppm) OVA / PID	Blow Count	Samples	Group Symbol	Description
			SP	4 inches concrete
			SP	Brown fine to medium sand with a trace of silt and occasional gravel
			SP	Grayish brown fine to medium sand with a trace of silt (loose, moist)
25 / 64.5	11	CA	SP	Grayish brown fine to medium sand with a trace of silt and occasional shells (loose, moist)
86 / 107	13		ML	Dark brown sandy silt (loose, moist)
			SP	Dark gray fine to medium sand with a trace of silt (very loose, wet)
720 / 470	7	CA	ML	Dark gray sandy silt
57 / 71.2	15		SP	Dark gray fine to medium sand with a trace of silt (loose, wet)
72 / 96.8	14	CA		Product level at 11.6 feet on 04/07/92 (at 1600) TCE = 5 ppm, VC = 1.5 ppm at 12 feet
2.5 / 44.2	6		SP	Water level at 15.0 feet on 04/07/92 (at 1600) Dark gray fine to medium sand with occasional organic matter (very loose, wet)
26 / 76.1	8		SP	Grayish brown fine to medium sand with a trace of silt (very loose, wet)
5.8 / 57	6			
110 / 53.2	7	CA		

Boring completed at 21.0 feet on 10/19/91
Petroleum-like odor noted between 8 feet and base of boring
TCE and VC indicated by field screening soil samples from 12 feet depth

8-25-94

Note: See Figure A-2 for explanation of symbols
See Figure A-33 for explanation of typical shallow 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-22

CRW:RNM:PGW:CMS 10/16/92

0120-149-R14

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-018A		
Well Location	Northing	Easting	
Start (date and time)	5/10/10 1028		
End (date and time)	5/10/10 1038		
Installation Method	Unknown		
Total Well Depth	21"	feet bgs	
Well Diameter	2"	inches	
Type of Casing (circle)	(PVC)	Stainless Steel	Other_____
Type of Well Screen	(PVC)	Stainless Steel	Other_____
Depth of Screened Interval (ft. bgs)	5-14.5, 15.5-20	feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*		
	(WAC 173-160-460(2)) *grout in place*		
Type of Grout	Hydro Plug 3/8th Medium Chip Bentonite		
Grout Volume	3.4	Gallons	
Surface Completion	Flush-Monument left in place		
Drilling Contractor	Hokkaido Drilling + Development		
License Number	1146		
Signature (Driller)	[signature]	5/10/10	
Signature (Engineer or Geologist)	Kristen L. Addis	L.G	5/10/10
Additional Information:			

MONITORING WELL ~~PL2SW-MW19~~ GE-MW19

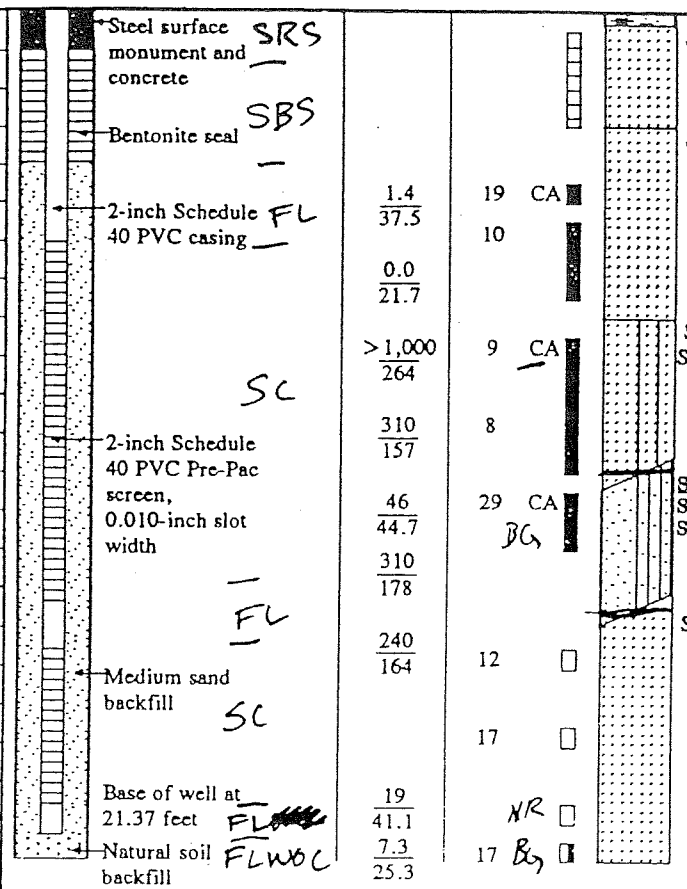
PL8-019A

WELL SCHEMATIC

Casing Elevation (ft.): 13.04

Casing Stickup (ft.): -0.26

Surface Elevation (ft.): 13.30



Vapor Conc.(ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
			SP	4 inches concrete Brown fine to medium sand with a trace of silt (loose, moist)
			SP	Brown fine to medium sand with a trace of silt, occasional coarse sand, shells and occasional gravel (loose, moist)
1.4 / 37.5	19 CA			
	10			
0.0 / 21.7				Grades to very loose
>1,000 / 264	9 CA		SP-SM	VC = 0.3 ppm at 8 feet Black-stained fine to medium sand with varying amounts of silt (very loose, wet)
310 / 157	8			
46 / 44.7	29 CA BG		SP SP-SM	Product level at 11.9 feet on 04/07/92 (at 1755) Interbedded black-stained fine to medium sand with a trace of silt and black-stained fine to medium sand with silt (loose, wet)
310 / 178				VC = 0.4 ppm at 14 feet Water level at 15.2 feet on 04/07/92 (at 1755)
240 / 164	12		SP	Blackish gray fine to medium sand with a trace of silt (very loose, wet)
	17			
19 / 41.1	NR			
7.3 / 25.3	17 BG			

Boring completed at 22.0 feet on 10/19/91

Petroleum-like odor noted between 8 feet and base of boring

VC indicated by field screening soil samples from 8 and 14 feet

TCE not indicated by field screening

QA 8-25-94

Note: See Figure A-2 for explanation of symbols

See Figure A-33 for explanation of typical shallow 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-23

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-019A		
Well Location	Northing	Easting	
Start (date and time)	5/10/10 1040		
End (date and time)	5/10/10 1053		
Installation Method	Unknown		
Total Well Depth	21.0	feet bgs	
Well Diameter	2"	inches	
Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____
Depth of Screened Interval (ft. bgs)	6-15.5, 16.5-20.5	feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*		
	WAC 173-160-460(2) *grout in place*		
Type of Grout	HydroPlug 3/8th Medium Chip		
Grout Volume	3.5	Gallons	
Surface Completion	Flush Monument Left in place		
Drilling Contractor	Hokkaido Drilling		
License Number	1146		
Signature (Driller)	[signature]		5/10/10
Signature (Engineer or Geologist)	Kristin L. Addis	LG	5/10/10

Additional Information:

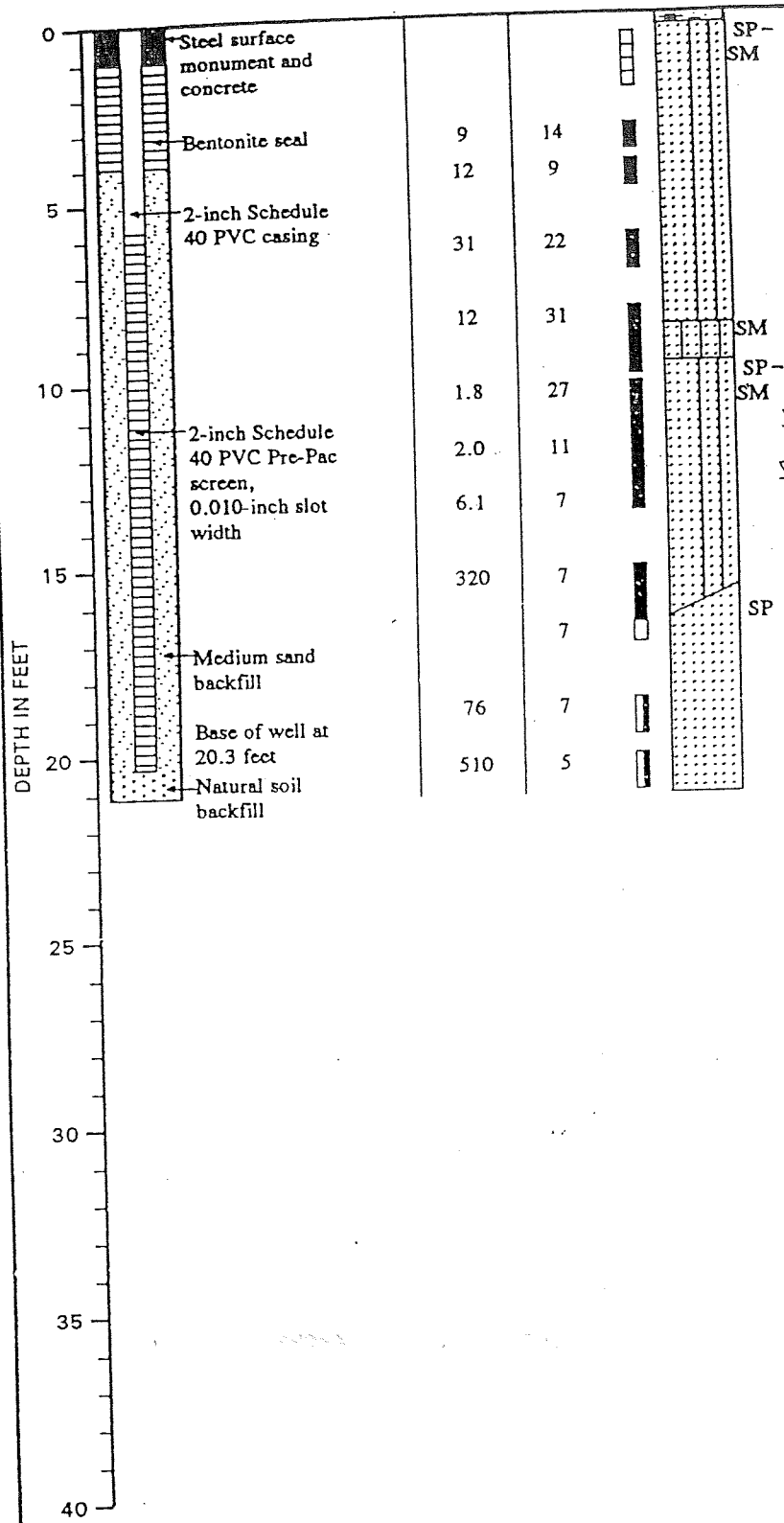
MONITORING WELL PL2SW-MW20

PL2-02cA

WELL SCHEMATIC

Casing Elevation (ft.): 13.08
Casing Stickup (ft.): -0.57

Surface Elevation (ft.): 13.65



Vapor Conc. (ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
			SP-SM	4 inches concrete Brown fine to medium sand with silt, occas. gravel, pieces of asphalt concrete and light blu crystalline material (loose, moist) (fill)
9	14			
12	9			Grades to very loose, occasional fragments of slag
31	22			Grades to loose
12	31		SM	Black-stained silty fine to medium sand (medium dense, moist)
1.8	27		SP-SM	Brown fine to medium sand with silt (medium dense, moist) Water level at 11.4 feet on 12/12/91 (at 1525) Decreasing silt content
2.0	11			Water level at 12.8 feet on 10/30/91 (at 0950)
6.1	7			Grades to very loose, wet
320	7			TCE = 2 ppm, VC = 1.0 ppm at 15 feet
	7		SP	Gray fine to medium sand with a trace of silt (loose, wet)
76	7			
510	5			VC = 0.5 ppm at 20 feet

Boring completed at 21.1 feet on 10/28/9
Petroleum-like odor noted between 13 fe base of boring
VC indicated by field screening soil samples fro 15 and 20 feet
TCE indicated by field screening soil sample fr 15 feet

Note: See Figure A-2 for explanation of symbols
See Figure A-33 for explanation of typical shallow 2-inch diameter monitoring well construction

MR 7/19/94

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LOG OF MONITORING WELL

FIGURE A-24

:CNW:RNM:PGW:CMS 10/16/92

0120-149-R14

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-020A	
Well Location	Northing	Easting
Start (date and time)	5/10/10 1125	
End (date and time)	5/10/10 1140	
Installation Method	Unknown	
Total Well Depth	20.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	5.5 - 20.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	Hydro Plug	
Grout Volume	3.4	Gallons
Surface Completion	Flush Monument left in place	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature] 5/10/10	
Signature (Engineer or Geologist)	Kristin L. Addis LG. 5/10/10	
Additional Information:		

MONITORING WELL PL2SW-MW23

PL2-023A

WELL SCHEMATIC

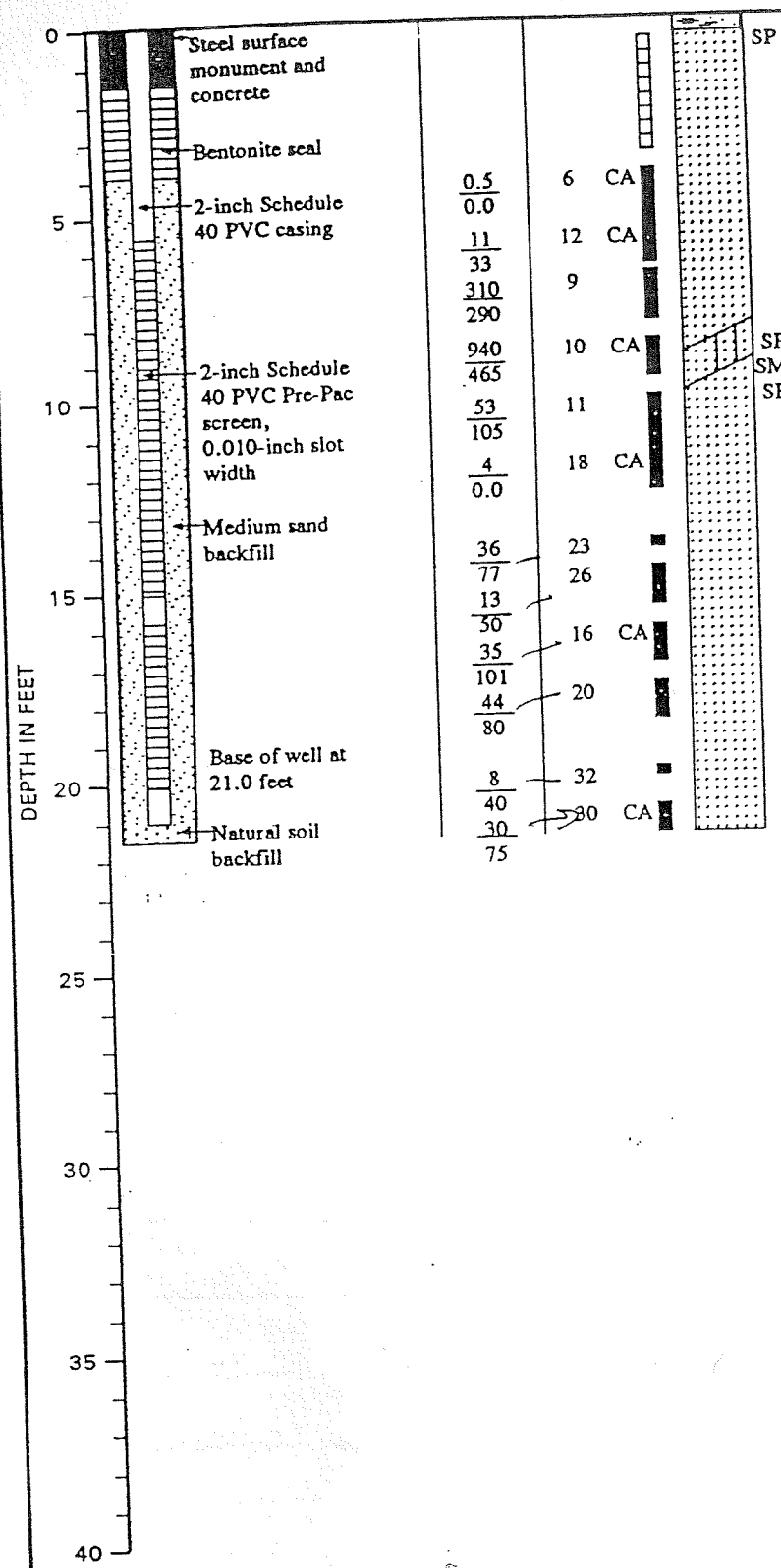
Casing Elevation (ft.): 13.06
Casing Stickup (ft.): -0.40

Vapor Conc.(ppm) OVA / PID

Blow Count | Samples | Group Symbol

DESCRIPTION

Surface Elevation (ft.): 13.46



5 inches concrete

Gray to brown fine to medium sand with a trace of silt and occasional gravel (loose, moist)

Grades to gray, no gravel

Thin gray fine to medium sand with silt layer at 6.5 feet

Brown fine to medium sand with silt, (loose, moist)

Gray fine to medium sand with a trace of silt and occasional gravel (loose, moist)

Water level at 11.95 feet on 08/10/92 (at 1550)

Grades to medium dense, no gravel

Becomes wet, grades to loose

Grades to medium dense

Grades to loose

Grades to medium dense

Boring completed at 21.5 feet on 07/29/92

VC or TCE not indicated by field screening soil samples

Continuous soil sampling was attempted from the surface to the total boring depth

Note: See Figure A-2 for explanation of symbols

See Figure A-33 for explanation of typical shallow 2-inch diameter monitoring well construction

MK 7/19/94

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LOG OF MONITORING WELL

FIGURE A-29

:RNM:WAP:CMS 10/16/92

0120-149-R14

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-023A	
Well Location	Northing	Easting
Start (date and time)	5/10/10 1053	
End (date and time)	5/10/10 1059	
Installation Method	Unknown	
Total Well Depth	21'	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	5.5 - 20	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Hydro Plug 3/8" Medium Chips - Bentonite	
Grout Volume	3.4	Gallons
Surface Completion	Flush-Monument Completion left in place	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature] 5/10/10	
Signature (Engineer or Geologist)	Kristin L. Addis L.G. 5/10/10	
Additional Information:		

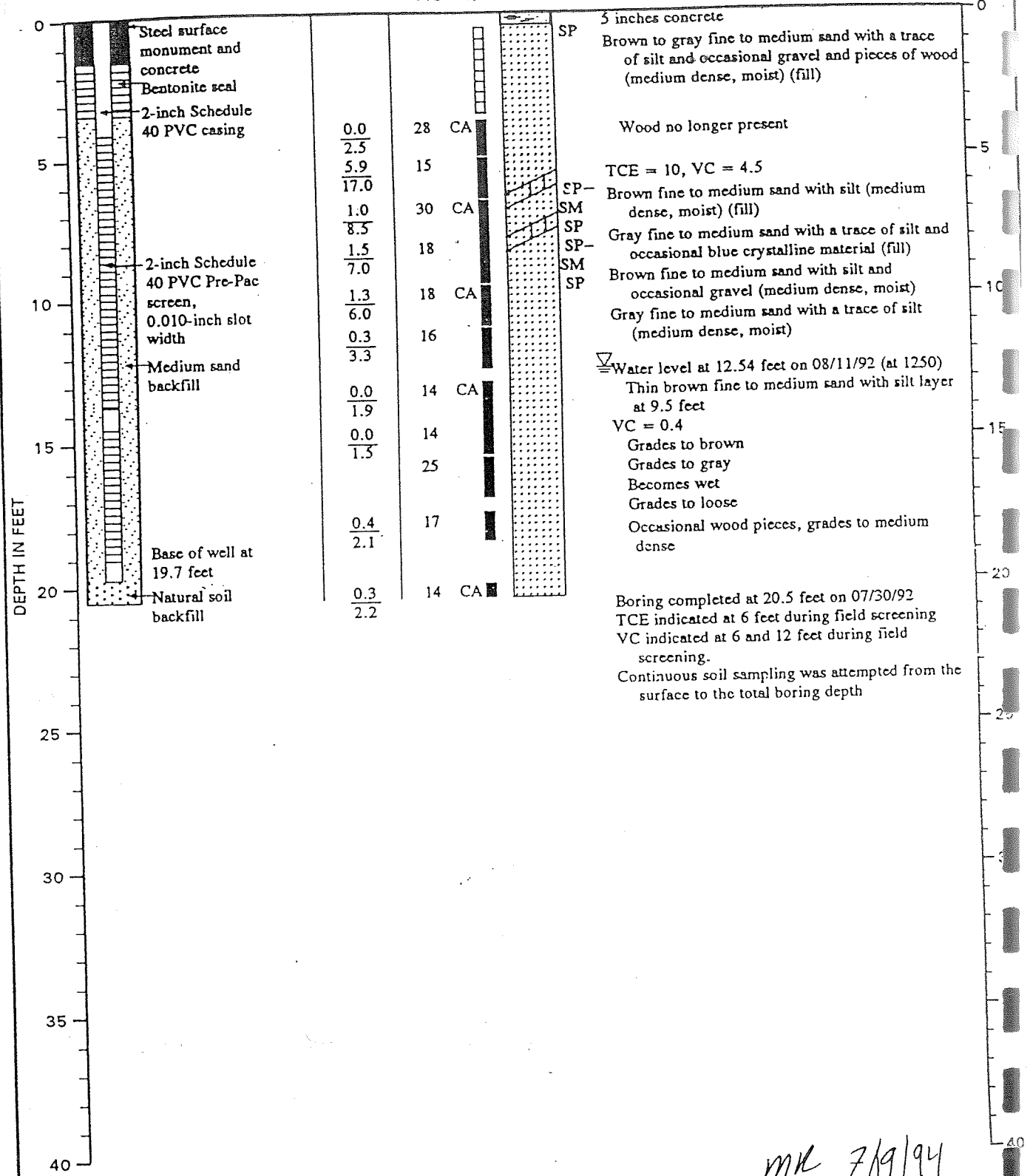
MONITORING WELL PL2SW-MW24

PL2-024 A

WELL SCHEMATIC

Casing Elevation (ft.): 13.17
Casing Stickup (ft.): -0.30

Surface Elevation (ft.): 13.47



DESCRIPTION

5 inches concrete

Brown to gray fine to medium sand with a trace of silt and occasional gravel and pieces of wood (medium dense, moist) (fill)

Wood no longer present

TCE = 10, VC = 4.5

Brown fine to medium sand with silt (medium dense, moist) (fill)

Gray fine to medium sand with a trace of silt and occasional blue crystalline material (fill)

Brown fine to medium sand with silt and occasional gravel (medium dense, moist)

Gray fine to medium sand with a trace of silt (medium dense, moist)

Water level at 12.54 feet on 08/11/92 (at 1250)

Thin brown fine to medium sand with silt layer at 9.5 feet

VC = 0.4

Grades to brown

Grades to gray

Becomes wet

Grades to loose

Occasional wood pieces, grades to medium dense

Boring completed at 20.5 feet on 07/30/92

TCE indicated at 6 feet during field screening

VC indicated at 6 and 12 feet during field screening.

Continuous soil sampling was attempted from the surface to the total boring depth

MK 7/9/94

Note: See Figure A-2 for explanation of symbols

See Figure A-33 for explanation of typical shallow 2-inch diameter monitoring well construction

:RNM:WAP:CMS 10/16/92

:120-149-R14

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-30

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-024A	
Well Location	Northing	Easting
Start (date and time)	5/10/10 1059	
End (date and time)	5/10/10 1120	
Installation Method	Unknown	
Total Well Depth	19.7	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	4-14, 14.5-20	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Hydro Plug 3/8th Medium Clip Bentonite	
Grout Volume	3.2	Gallons
Surface Completion	Flush Mount Monument left in place - ?	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature] 5/10/10	
Signature (Engineer or Geologist)	Kristin L. Addis L.G. 5/10/10	
Additional Information:		

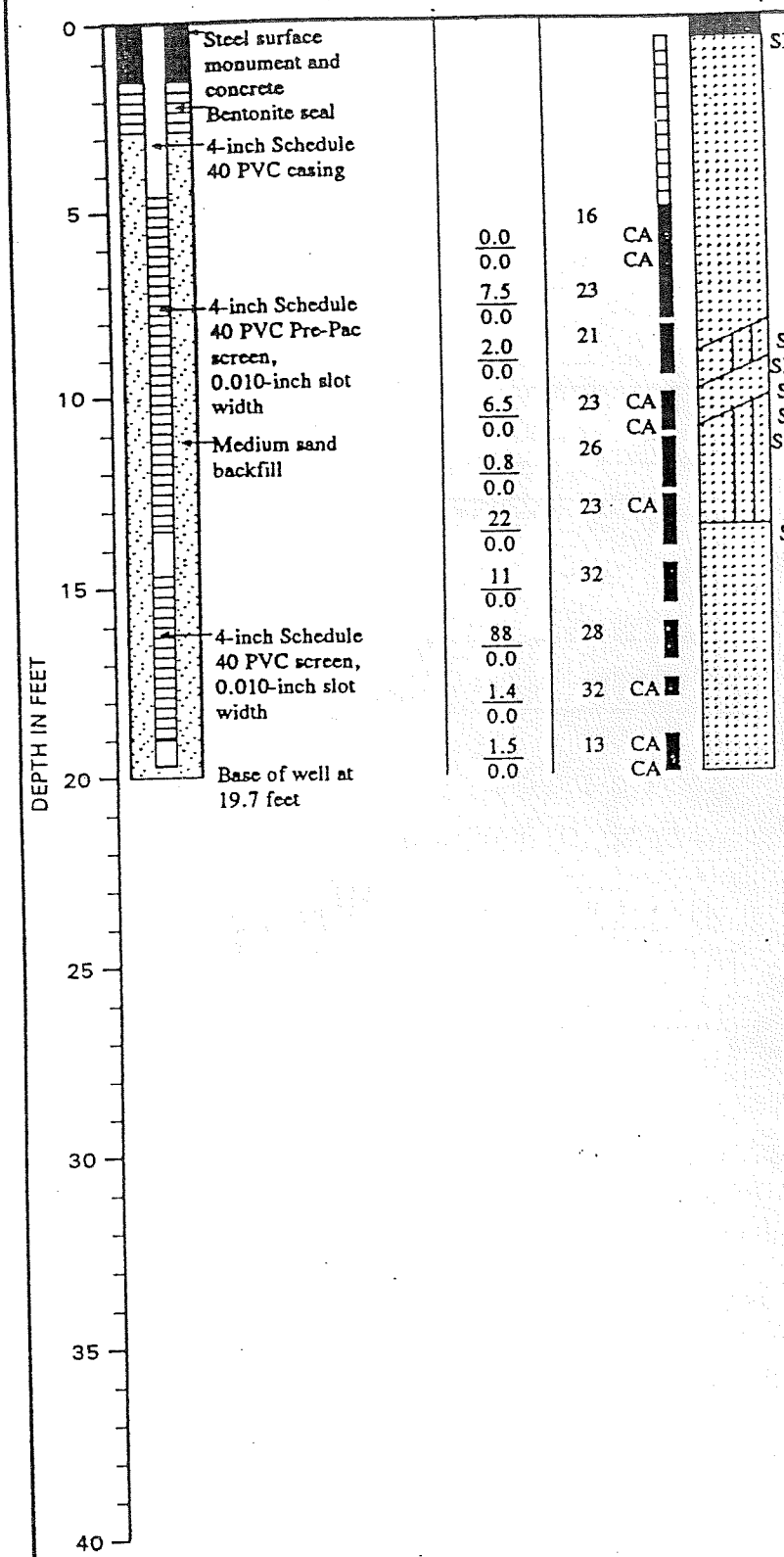
MONITORING WELL PL2SW-MW25

PL2-025A

WELL SCHEMATIC

Casing Elevation (ft.): 12.96
Casing Stickup (ft.): -0.38

Surface Elevation (ft.): 13.34



Vapor Conc. (ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
			SP	6 inches asphalt concrete Brown fine to medium sand with gravel and a trace of silt (medium dense, moist)
0.0 / 0.0	16	CA CA		Occasional gravel
7.5 / 0.0	23			
2.0 / 0.0	21		SP–SM	Brown fine to medium sand with silt and occasional gravel
6.5 / 0.0	23	CA CA	SP–SM	Gray fine to medium sand with a trace of silt (medium dense, moist) TCE = 12, VC = 4.2
0.8 / 0.0	26			Water level at 12.10 feet on 08/10/92 (at 1220)
22 / 0.0	23	CA		Brown fine to medium sand with silt (medium dense, wet)
11 / 0.0	32		SP	Gray fine to medium sand with a trace of silt (medium dense, wet)
88 / 0.0	28			
1.4 / 0.0	32	CA		
1.5 / 0.0	13	CA CA		

Boring completed at 20.0 feet on 07/15/92
TCE indicated at 11 feet while field screenin
VC indicated at 11 feet while field screenin
Continuous soil sampling was attempted fro surface to the total boring depth

MR 7/19/94

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

:RNM:WAP:CMS 10/16/92

0120-149-R14

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-31

Well Decommissioning Log - Boeing Plant 2

Well Number: PL2-025A

Well Location: Northing _____ Easting _____

Start (date and time): 5/10/10 1355 (KA)

End (date and time): 5/10/10 1408

Installation Method: Unknown

Total Well Depth: 20.0 feet bgs

Well Diameter: 4" inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 5-19 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout: Hydro Plug 3/8" Medium Chip - Bentonite

Grout Volume: 13.0 Gallons

Surface Completion: Flush-Mount Monument left in place

Drilling Contractor: Hokkaido Drilling

License Number: 1146

Signature (Driller): [signature] 5/10/10

Signature (Engineer or Geologist): Kristin L. Addis LG 5/10/10

Additional Information:

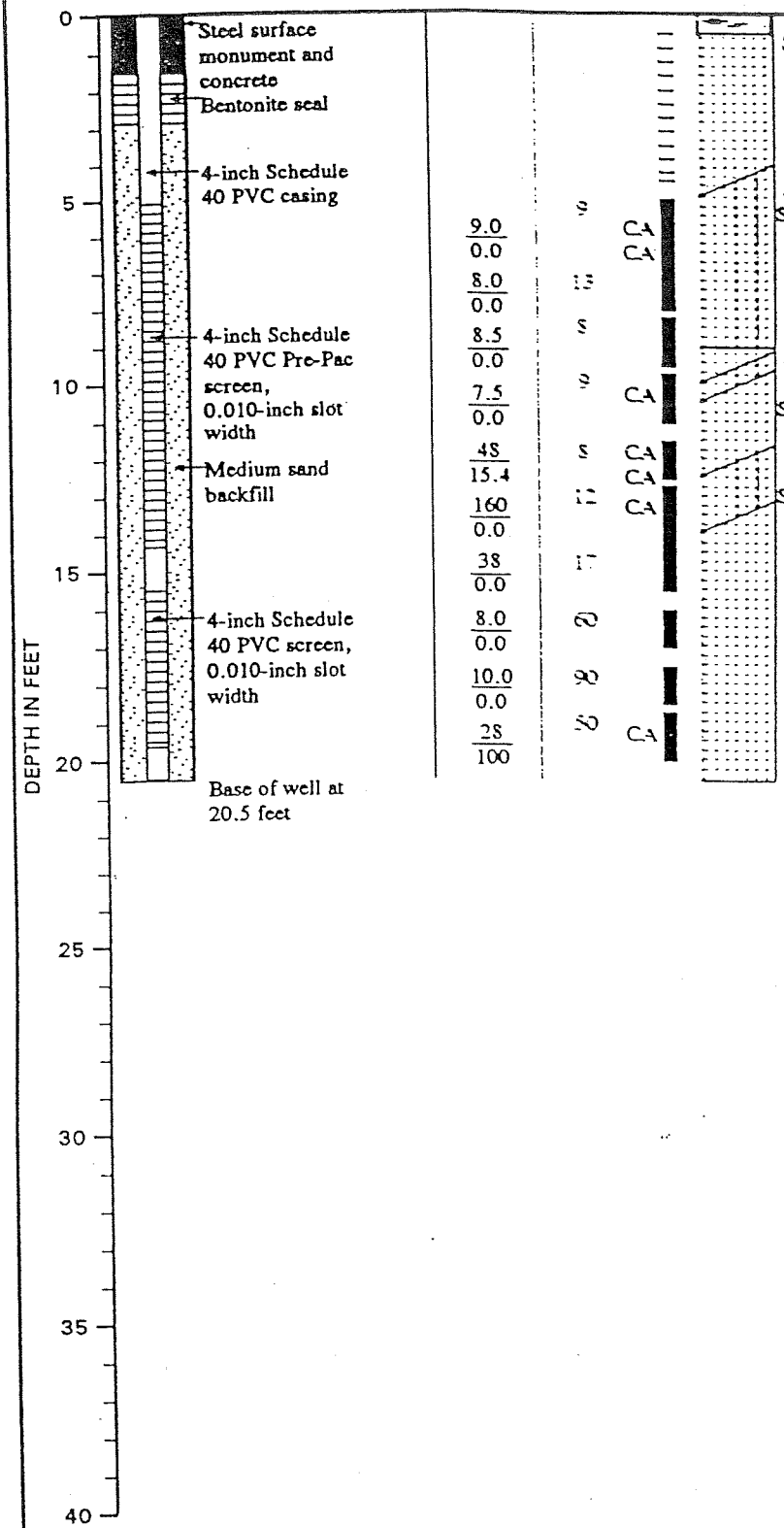
MONITORING WELL PL2SW-MW26

PL2-026A

WELL SCHEMATIC

Casing Elevation (ft.): 12.53
Casing Stickup (ft.): -0.33

Surface Elevation (ft.): 12.86



Vapor Conc. (ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
			SP	6 inches concrete Brown fine to medium sand with occasional gravel and a trace of silt (medium dense, moist)
9.0 / 0.0	9	CA CA	SP–SM	Brown fine to medium sand with silt (loose, moist)
8.0 / 0.0	13			
8.5 / 0.0	8		SP	Occasional thin layers of brown silty fine to medium sand
7.5 / 0.0	9	CA	SP–SM	Gray fine to medium sand with a trace of silt
48 / 15.4	8	CA CA	SP	Brown fine to medium sand with silt (loose, moist)
160 / 0.0	12	CA	SP–SM	Water level at 12.18 feet on 08/11/92 (at 1040) Gray fine to medium sand with a trace of silt (loose, moist)
38 / 0.0	17		SP	TCE = 55, VC = >15 Brown fine to medium sand with silt TCE = >100, VC = >15
8.0 / 0.0	60			Gray fine to medium sand with a trace of silt Occasional thin layers of silty sand
10.0 / 0.0	90			
28 / 100	50	CA		TCE = 7, VC = 3.1

Boring completed at 20.5 feet on 07/15/92
TCE indicated at 12, 14 and 20 feet while field screening
VC indicated at 12, 14 and 20 feet while field screening
Continuous soil sampling was attempted from the surface to the total boring depth

MK
7/20/94

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch monitoring well construction

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-32

:RNM:WAP:CMS 10/16/92

120-149-R14

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-026A	
Well Location	Northing	Easting
Start (date and time)	5/10/10 1215	
End (date and time)	5/10/10 1230	
Installation Method	Unknown	
Total Well Depth	20.5	feet bgs
Well Diameter	4"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	15-20	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Hydro Plug 3/8th Medium Chip	
Grout Volume	13.4	Gallons
Surface Completion	Flush Monument left in place	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature] 5/10/10	
Signature (Engineer or Geologist)	Kristin L. Addis L.G. 5/10/10	
Additional Information:		

Sheet 1 of 3

Boring PL2-026B

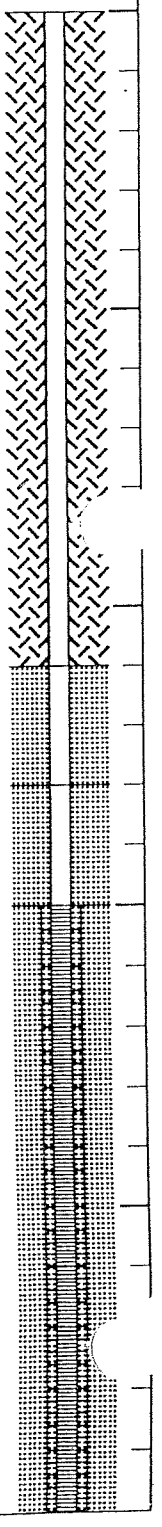
Project	Boeing RFI	Start Date	03/07/95	Finish Date	03/07/95
Location	Plant 2 Seattle, WA	Driller		Drilling Co.	Holt
Project No.	03709-034-300	Drilling Method	Cable Tool		
Contractor	Weston	Sampling Method	2 in. Split Spoon		
Logged by	Fitzgerald/Blanchar	Top of Casing (ft)	12.45	Boring Diam. (in)	6
		Ground Surf. Elev. (ft)		Total Depth (ft)	51.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							GP	Gravelly fill
							SP	Sand (SP), dark gray (10YR4/1), 100% medium to coarse sand, loose to medium dense, moist to wet.
5								
10								
15								
20								

Boring PL2-026B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Fitzgerald/Blanchar

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
30								
35								
40								
45								



Boring PL2-026B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Fitzgerald/Blanchar

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
							SM	Silty sand (SM), very dark gray (7.5YRN3/0), 85% sand 15% silt, medium dense, wet, trace laminations.
55								
60								
65								
70								

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-026B	
Well Location	Northing	Easting
Start (date and time)	5/11/10 0921	
End (date and time)	5/11/10 0938	
Installation Method	HSA	
Total Well Depth	50	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40-50	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	~~Pure Gold~~ AquaGuard Bentonite grout	
Grout Volume	8.2	Gallons
Surface Completion	Flush-mount monument left in place	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature] 5/11/10	
Signature (Engineer or Geologist)	[signature] Kristin L. Addis L.G. 5/11/10	
Additional Information:		

Boring PL2-033A

Sheet 1 of 2

Project	Boeing Plant 2 ICM	Start Date 09/15/94	Finish Date 09/15/94
Location	Plant 2 Seattle, W	Driller	Drilling Co. Cascade Drilling
Project No.	03709-034-401	Drilling Method 4 in ID HSA	
Contractor	Weston	Sampling Method 2 in SS, 140 lb hmr.	
Logged by	Erik Lottsfeldt	Top of Casing (ft) 12.65	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 12.87	Total Depth (ft) 31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
							SP	Asphalt Sand with gravel (SP), light gray (10YR7/1), 85% medium sand, 15% angular gravel, medium dense, dry (fill).
5	BG				16			
10	BG	VOC	SB-06640-0100		25		SP	Sand (SP), dark yellowish brown (10YR4/4), 100% med. sand, med. dense, wet. (fill) @ 15ft. color very dark gray.
15	BG	VOC	SB-06640-0150		22			
20	BG	VOC	SB-06640-0200		25			

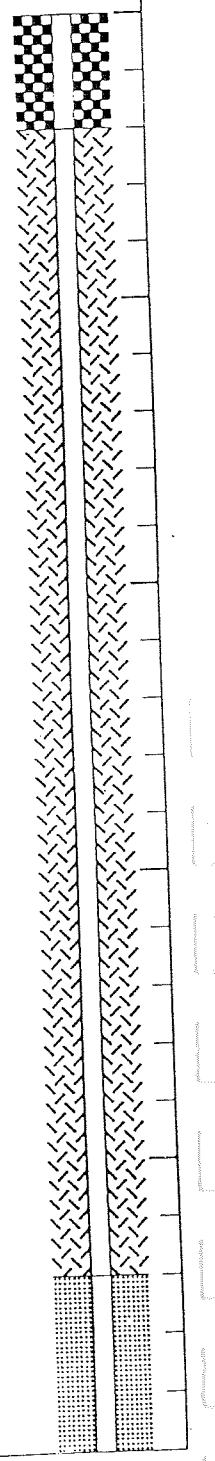


FIGURE A-5

Boring PL2-033A

Project	Boeing Plant 2 ICM	Start Date 09/15/94	Finish Date 09/15/94
Location	Plant 2 Seattle, W	Driller	Drilling Co. Cascade Drilling
Project No.	03709-034-401	Drilling Method 4 in ID HSA	
Contractor	Weston	Sampling Method 2 in SS, 140 lb hmr.	
Logged by	Erik Lottsfeldt	Top of Casing (ft) 12.65	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 12.87	Total Depth (ft) 31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
30	BG	VOC	SB-06640-0300		21			
35								
40								
45								

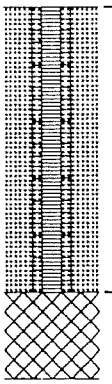


FIGURE
A-5
2 of 2

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-033A		
Well Location	Northing	Easting	
Start (date and time)	5/10/10 1255		
End (date and time)	5/10/10 1310		
Installation Method	HSA		
Total Well Depth	30.0	feet bgs	
Well Diameter	2"	inches	
Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____
Depth of Screened Interval (ft. bgs)	22-30	feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*		
	WAC 173-160-460(2) *grout in place*		
Type of Grout	Hydro Plug 3/8" Med. Chip Bentonite		
Grout Volume	4.9	Gallons	
Surface Completion	Flush Mount left in Place		
Drilling Contractor	Hokkaido Drilling		
License Number	1146		
Signature (Driller)	[signature] 5/10/10		
Signature (Engineer or Geologist)	Kristin L. Addis L.G. 5/10/10		
Additional Information:			

Boring PL2-026C

Project	Boeing RFI	Start Date 03/03/95	Finish Date 03/06/95
Location	Plant 2 Seattle, WA	Driller	Drilling Co. Holt
Project No.	03709-034-300	Drilling Method Cable Tool	
Contractor	Wèston	Sampling Method 2 in. split spoon	
Logged by	Fitzgerald/Hose		Boring Diam. (in) 6
			Total Depth (ft) 86.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							SP	Sand (SP), grayish brn (10YR5/2), 100% med sand, loose, damp.
5								
10								
15								
20								

Boring PL2-026C

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Fitzgerald/Hose

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
30	BKG	Grain size	PL2-028C-0300		42		SP-SM	Sand w/silt (SP-SM), dk gray (10YR4/1), 90% med sand, 10% silt, loose, wet.
35								
40								
45								

Boring PL2-026C

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Fitzgerald/Hose

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
55								
60	BKG				17		SM	Silty sand (SM), dk gray (10YR4/1), 80% med to fine sand, 20% silt, med dense, wet, trace wood fragments
65								
70	BKG	TOC Grain size	PL2-028C-070		14			

Boring PL2-026C

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Fitzgerald/Hose

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
	BKG							
80	BKG	TOC	PL2-028C-0800		33		ML	Silt w/sand (ML), very dk gray (7.5YRN3/0), 80% silt, 20% sand, very stiff, wet
85	BKG	Grain size	PL2-028C-0850		19		ML	Silt (ML), very dk gray (7.5YRN3/0), 100% silt, stiff, wet, shell fragments
90								
95								

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-026C	
Well Location	Northing	Easting
Start (date and time)	5/11/10 1019	
End (date and time)	5/11/10 1032	
Installation Method	Cable Tool	
Total Well Depth	85	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	75-85	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	AquaGuard Bentonite Grout	
Grout Volume	14	Gallons
Surface Completion	flush mount monument left in place	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature] 5/11/10	
Signature (Engineer or Geologist)	[signature] Kristin L Addis 5/11/10	
Additional Information:		

MONITORING WELL PL2-033AR

PROJECT Boeing - Plant 2
DATE COMPLETED 27 March 2001
DRILLING METHOD 8" OD HSA - Cascade Drilling
SAMPLING METHOD
TOP OF CASING
GROUND SURFACE ELEV
LOGGED BY K. Broom - WESTON

Depth (ft)	PID Reading (ppm)	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0						Asphalt
					SW	Gravelly SAND, (SW), light grey, 85% medium sand, 15% angular gravel, medium dense, dry, (fill).
5						
10					SP	SAND, (SP), dark yellowish brown, 100% medium sand, medium dense wet, no odor or sheen, (fill).
15						
20						
25						
30						
35						

BOH @ 31.5 feet bgs

Notes:
BOH = Bottom of hole.
SAA = Same as above.
Soil samples collected for screening purposes only.
No soil samples were collected for laboratory analyses.
Well instaled to replace damaged well PL2-033A. Lithology taken from PL2-033A log.

Well Construction

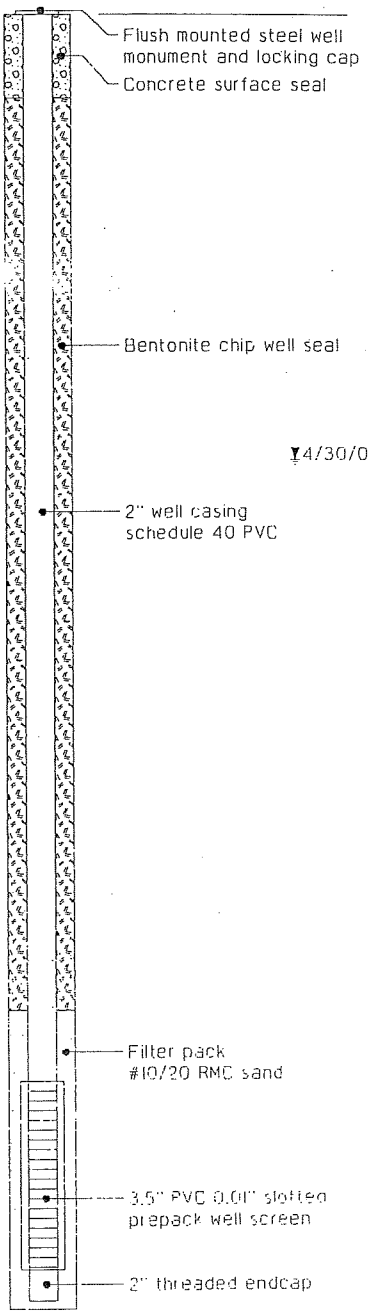


PLATE A-5

JOB NUMBER: 03709-034-600-0002-03 DATE: March 2001

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-033AR	
Well Location	Northing	Easting
Start (date and time)	5/10/10 1340	
End (date and time)	5/10/10 1355	
Installation Method	HSA	
Total Well Depth	30.1	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	25 - 30	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Hydro Plug 3/8th" Med. Chip Bentonite	
Grout Volume	5.0	Gallons
Surface Completion	Flush-Mount Monument left in place	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature] 5/10/10	
Signature (Engineer or Geologist)	Kristin L. Addis L.G. 5/10/10	
Additional Information:		

Sheet 1 of 2

Boring PL2-233A

Project	Boeing RFI 1C	Start Date	07/19/95	Finish Date	07/19/95
Location	Plant 2 Seattle, WA	Driller		Drilling Co.	PTL
Project No.	03709-034-300-3430-	Drilling Method	4 in. ID HSA		
Contractor	Weston	Sampling Method	split spoon		
Logged by	Robbins			Boring Diam. (in)	10
				*Total Depth (ft)	26.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
								Void between slab and soil
5							SP	Sand (SP), very dk gray (10YR3/1), 100% med sand, loose, moist
10							ML	Silt (ML), brn (10YR5/3), 100 %silt, soft to stiff, moist
					17		SP	Sand (SP), very dk gray (10YR3/1), 100% med sand, loose , wet
15					28			
20					28			

Boring_id 20128

Boring PL2-233A

Project	Boeing RFI 1C	Start Date	07/19/95	Finish Date	07/19/95
Location	Plant 2 Seattle, WA	Driller		Drilling Co.	PTL
Project No.	03709-034-300-3430-	Drilling Method	4 in. ID HSA		
Contractor	Weston	Sampling Method	split spoon		
Logged by	Robbins			Boring Diam. (in)	10
				Total Depth (ft)	26.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
								Void between slab and soil
5							SP	Sand (SP), very dk gray (10YR3/1), 100% med sand, loose, moist
10					17		ML	Silt (ML), brn (10YR5/3), 100 %silt, soft to stiff, moist
							SP	Sand (SP), very dk gray (10YR3/1), 100% med sand, loose , wet
15					28			
20					28			

Boring_id 20128

Boring PL2-233A

Project Boeing RFI 1C
Location Plant 2 Seattle, WA
Project No. 03709-034-300-3430-
Contractor Weston
Logged by Robbins

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					36			
30								
35								
40								
45								

Boring_id 20128

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-235A	
Well Location	Northing	Easting
Start (date and time)	5/10/10 0920	
End (date and time)	5/10/10 0950	
Installation Method	HSA	
Total Well Depth	26.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	10 - 26	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Hydro Plug 3/8th Medium Plug Bentonite	
Grout Volume	4.3	Gallons
Surface Completion	Flush	
Drilling Contractor	Hokkaido Drilling & Development	
License Number	1146	
Signature (Driller)	[signature] 5/10/10	
Signature (Engineer or Geologist)	Kristin L. Addis L.G. 5/10/10	

Additional Information:

Hydro Plug 3/8" Medium Chips

1bag ≃ 7 gallons

Boring PL2-233A

Project Boeing RFI 1C
Location Plant 2 Seattle, WA
Project No. 03709-034-300-3430-
Contractor Weston
Logged by Robbins

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					36			
30								
35								
40								
45								

Boring_id 20128

Well Decommissioning Log - Boeing Plant 2

Well Number			
Well Location	Northing	Easting	
Start (date and time)			
End (date and time)			
Installation Method			
Total Well Depth		feet bgs	
Well Diameter		inches	
Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____
Depth of Screened Interval (ft. bgs)		feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*		
	WAC 173-160-460(2) *grout in place*		
Type of Grout			
Grout Volume		Gallons	
Surface Completion			
Drilling Contractor			
License Number	1146		
Signature (Driller)			
Signature (Engineer or Geologist)			
Additional Information:			

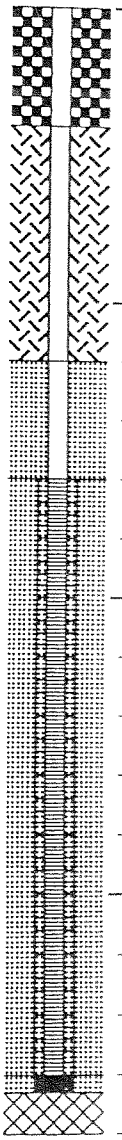
KA 5/11/10

Sheet 1 of 1

Boring PL2-321A

Project	Boeing RFI	Start Date	11/04/94	Finish Date	11/04/94
Location	Plant 2 Seattle, WA	Driller		Drilling Co.	Cascade
Project No.	0370-034-300	Drilling Method	HSA		
Contractor	Weston	Sampling Method	Split spoon		
Logged by	Fitzgerald	Top of Casing (ft)	12.80	Boring Diam. (in)	10
		Ground Surf. Elev. (ft)	13.01	Total Depth (ft)	18.00

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							SP	Sand(SP) brown(10YR5/3) 100% medium sand,medium dense to dense, moist, trace silty. Wet at 12.5 ft bgs.
5	BG				25			
	BG	HCID	SB-04419-0075		25			
10	BG	HCID	SB-04419-0100		19			
	BG	HCID	SB-04419-0125		55			
15	BG				36			
	BG				39			
20								



Boring id 20078

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-321A	
Well Location	Northing	Easting
Start (date and time)	5/10/10 1420	
End (date and time)	5/10/10 1450	
Installation Method	HSA	
Total Well Depth	18.1	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8-18	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Hydro Plug 3/8" Med. Chip Bentonite	
Grout Volume	3.0	Gallons
Surface Completion	Flush-Mount Monument left in place	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature] 5/10/10	
Signature (Engineer or Geologist)	Kristen L. Addis L.G. 5/10/10	

Additional Information:

Last well decommissioning for the day. 10 minutes to decom. well remaining time to load + tie down equipment of truck.

RECORD OF BOREHOLE PL2-425B

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-44

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/14/08
DATE COMPLETED: 7/14/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,340.5 E: 1,275,442.4
GS ELEVATION: 13.6 ft
TOC ELEVATION: 13.3 ft
TEMPERATURE: 72 F

INCLINATION: -90
DEPTH W.L.: 12.4 ft
ELEVATION W.L.: 0.9 ft
DATE W.L.: 8/6/08
TIME W.L.:

SOIL PROFILE					SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	PID (ppm)	NUMBER	TYPE	REC / ATT	PL2-425B
0		0.0 - 0.5 CONCRETE			13.1 / 0.5					Flush-mount
		0.5 - 3.5 Light brown, fine to medium SAND, dry, no odor (SP)	SP		10.1	0.0	1	GRAB	4.5 / 5.0	Cement
	10	3.5 - 4.5 Brown, fine SAND, some Silt, dry, no odor (SM)	SM		3.5 / 9.1					
5		4.5 - 5.0 Gray, poorly graded, fine SAND, dry, no odor (SP)	SP		8.6					
		5.0 - 7.0 Brown, fine to medium SAND, dry, no odor (SP)	SP		5.0 / 6.6					Bentonite chips
		7.0 - 8.5 Dark brown and gray, SILT, little to some fine Sand, dry, organic matter at 8.0-8.5 ft bgs, no odor (ML)	ML		7.0 / 5.1	0.0	2	GRAB	5.0 / 5.0	
	5	8.5 - 10.0 Gray-brown, poorly graded, fine SAND, dry, no odor (SP)	SP		8.5 / 3.6					
10		10.0 - 45.0 Soil logging stopped at 10.0 ft bgs in this borehole. SEE PL2-425C BOREHOLE LOG FOR SOIL LITHOLOGY DESCRIPTION.			10.0					
	0									
15										
	-5									Centralizer
20										
	-10									Bentonite grout
25										
	-15									
30										
	-20									
35										
	-25									Bentonite chips
40										Centralizer

PL2-425B
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-40 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 40-45 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 40-45 ft
Type: 2/12 sand
Quantity: 5 ft
FILTER PACK SEAL
Interval: 38-40 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 3-38 ft
Type: Bentonite grout
Quantity: 35 ft

Log continued on next page

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

RECORD OF BOREHOLE PL2-425B

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-44

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/14/08
DATE COMPLETED: 7/14/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,340.5 E: 1,275,442.4
GS ELEVATION: 13.6 ft
TOC ELEVATION: 13.3 ft
TEMPERATURE: 72 F

INCLINATION: -90
DEPTH W.L.: 12.4 ft
ELEVATION W.L.: 0.9 ft
DATE W.L.: 8/6/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES (PL2-425B)	WELL CONSTRUCTION DETAILS
40		10.0 - 45.0 Soil logging stopped at 10.0 ft bgs in this borehole. SEE PL2-425C BOREHOLE LOG FOR SOIL LITHOLOGY DESCRIPTION. *(Continued)*									**PL2-425B** Borehole Diameter: 8-inch **WELL CASING** Interval: 0-40 ft Material: PVC Diameter: 2-inch Joint Type: Threaded **WELL SCREEN** Interval: 40-45 ft Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: Flush **FILTER PACK** Interval: 40-45 ft Type: 2/12 sand Quantity: 5 ft **FILTER PACK SEAL** Interval: 38-40 ft Type: Bentonite chips Quantity: 2 ft **ANNULUS SEAL** Interval: 3-38 ft Type: Bentonite grout Quantity: 35 ft
	-30									2/12 sand – 10-slot screen	
45		Boring completed at 45.0 ft			-31.4					Centralizer –	
	-35										
50											
	-40										
55											
	-45										
60											
	-50										
65											
	-55										
70											
	-60										
75											
	-65										
80											

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc.
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-425B	
Well Location	Northing	Easting
Start (date and time)	5/11/10 1123	
End (date and time)	5/11/10 1132	
Installation Method	Geoprobe	
Total Well Depth	45.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40-45	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Aquaguard Bentonite Grout	
Grout Volume	7.5	Gallons
Surface Completion	flush-mount monument left in place	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature] 5/11/10	
Signature (Engineer or Geologist)	[signature] Kristin L. Addis 5/11/10	
Additional Information:		

RECORD OF BOREHOLE PL2-425C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-44

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/14/08
DATE COMPLETED: 7/15/08
WEATHER: Inside Bldg

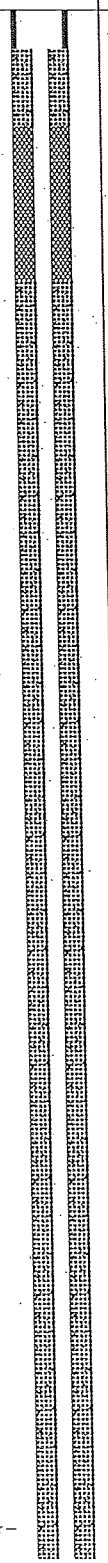
DATUM: Geodetic
COORDS: N: 196,340.3 E: 1,275,437.1
GS ELEVATION: 13.6 ft
TOC ELEVATION: 13.4 ft
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: 10.8 ft
ELEVATION W.L.: 2.6 ft
DATE W.L.: 8/6/08
TIME W.L.:

DESCRIPTION	USCS	ELEV. / DEPTH (ft)	PID (ppm)	NUMBER	TYPE	REC / ATT
0.0 - 0.5 CONCRETE		13.1 / 0.5				
0.5 - 3.5 Light brown, fine to medium SAND, dry, no odor (SP)	SP	10.1	0.0	1	GRAB	5.0/5.0
3.5 - 5.0 Brown, fine SAND, some Silt, dry, no odor (SM)	SM	8.6				
5.0 - 6.0 Light brown, poorly graded, fine SAND, dry, no odor (SP)	SP	7.6				
6.0 - 7.0 Brown, SILTY fine SAND, dry, no odor (SM)	SM	6.6				
7.0 - 8.5 Red-brown and gray, poorly graded, fine SAND, dry, no odor (SP)	SP	5.1	0.0	2	GRAB	5.0/5.0
8.5 - 10.0 Gray, poorly graded, fine SAND, dry, no odor (SP)	SP	3.6				
10.0 - 15.0 Dark gray, fine to medium SAND, wet at 12.5 ft bgs, no odor (SP)	SP	-1.4	0.0	3	GRAB	5.0/5.0
15.0 - 20.0 Dark gray, medium to coarse SAND, wet, no odor (SP)	SP	-6.4	0.0	4	GRAB	5.0/5.0
20.0 - 25.0 Dark gray, poorly graded, medium SAND, wet, no odor (SP)	SP	-11.4	0.0	5	GRAB	5.0/5.0
25.0 - 27.5 Dark gray, poorly graded, medium SAND, wet, no odor (SP)	SP	-13.9				
27.5 - 28.5 Dark gray, fine to medium SAND, wet, some wood fragments, no odor (SP)	SP	-14.9	50.3	6	GRAB	5.0/5.0
28.5 - 29.5 Dark gray, fine to medium SAND, wet, no odor (SP)	SP	-15.9				
29.5 - 30.0 Dark gray, fine SAND, wet, trace wood fragments, no odor (SP)	SP	-16.4				
30.0 - 33.0 Dark gray, fine to medium SAND, wet, no odor (SP)	SP	-19.4	121	7	GRAB	5.0/5.0
33.0 - 33.5 Dark gray, medium to coarse SAND, wet, no odor (SP)	SP	-19.9				
33.5 - 33.8 Dark gray, fine SANDY CLAY, wet, low plasticity, little wood fragments at 33.5 ft bgs, no odor (CL)	CL	33.8				
33.8 - 35.0 Dark gray, medium SAND, wet, no odor (SP)	SP	-21.4				
35.0 - 37.5 Dark gray, fine to medium SAND, wet, little wood fragments at 37.5 ft bgs, no odor (SP)	SP	-23.9	0.0	8	GRAB	5.0/5.0
37.5 - 37.8 Gray, CLAY, wet, low plasticity, no odor (CL)	CL	37.8				
37.8 - 40.0 Dark gray, fine SAND, wet, trace wood fragments, no odor (SP)	SP	-26.4				

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES — PL2-425C



WELL CONSTRUCTION DETAILS

PL2-425C
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-77.5 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 77.5-82.5 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 76-82.5 ft
Type: 2/12 sand
Quantity: 6.5 ft
FILTER PACK SEAL
Interval: 74-76 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 3-74 ft
Type: Bentonite grout
Quantity: 71 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE REC...D BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

RECORD OF BOREHOLE PL2-425C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-44

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/14/08
DATE COMPLETED: 7/15/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,340.3 E: 1,275,437.1
GS ELEVATION: 13.6 ft
TOC ELEVATION: 13.4 ft
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: 10.8 ft
ELEVATION W.L.: 2.6 ft
DATE W.L.: 8/6/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES (PL2-425C)	WELL CONSTRUCTION DETAILS
40		40.0 - 45.0 Dark gray, fine SAND, wet, no odor (SP)	SP		40.0 -31.4	0.0	9	GRAB	5.0/5.0	Bentonite grout	PL2-425C Borehole Diameter: 8-inch WELL CASING Interval: 0-77.5 ft Material: PVC Diameter: 2-inch Joint Type: Threaded WELL SCREEN Interval: 77.5-82.5 ft Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: Flush FILTER PACK Interval: 76-82.5 ft Type: 2/12 sand Quantity: 6.5 ft FILTER PACK SEAL Interval: 74-76 ft Type: Bentonite chips Quantity: 2 ft ANNULUS SEAL Interval: 3-74 ft Type: Bentonite grout Quantity: 71 ft
45	-30	45.0 - 47.5 Dark gray, fine SAND, wet, no odor (SP)	SP		45.0 -33.9	0.0	10	GRAB	5.0/5.0		
50	-35	47.5 - 50.0 Dark gray, SILTY fine SAND, wet, with 1-inch gray Clay at 50 ft bgs, no odor (SM)	SM		47.5 -36.4						
		50.0 - 51.5 Dark gray, CLAYEY fine SAND, wet, no odor (SC)	SC		50.0 -37.9						
		51.5 - 51.8 Gray, CLAY, little fine Sand, wet, low plasticity, no odor (CL)	CL		51.8						
	-40	51.8 - 54.5 Dark gray, poorly graded, fine SAND, wet, no odor (SP)	SP		-40.9	0.0	11	GRAB	5.0/5.0		
55		54.5 - 54.6 Gray, CLAY, wet, low plasticity, no odor (CL)	CL		-41.4						
		54.6 - 55.0 Dark gray, poorly graded, fine SAND, wet, no odor (SP)	SP		55.0						
	-45	55.0 - 60.0 Dark gray, poorly graded, fine SAND, wet, no odor (SP)	SP		-46.4	0.0	12	GRAB	5.0/5.0	Centralizer	
60	-50	60.0 - 65.0 Dark gray to black, fine to medium SAND, wet, no odor (SP)	SP		60.0 -51.4	0.0	13	GRAB	5.0/5.0		
65	-55	65.0 - 70.0 Dark gray to black, fine to medium SAND, wet, no odor (SP)	SP		65.0 -56.4	0.0	14	GRAB	5.0/5.0		
70	-60	70.0 - 73.0 Dark gray to black, fine SAND, little Silt, wet, no odor (SP-SM)	SP-SM		70.0 -59.4	0.0	15	GRAB	5.0/5.0		
		73.0 - 75.0 Dark gray, poorly graded, fine SAND, wet, 1/2-inch gray low plasticity Clay at 74.5 ft bgs, no odor (SP)	SP		73.0 -61.4						
75		75.0 - 77.0 Dark gray, fine to medium SAND, wet, no odor (SP)	SP		75.0 -63.4					Bentonite chips	
		77.0 - 78.5 Dark gray, fine SAND, some coarse Sand, wet, no odor (SP)	SP		77.0 -64.9	0.0	16	GRAB	5.0/5.0	Centralizer	
	-65	78.5 - 80.0 Dark gray, poorly graded, fine SAND, wet, no odor (SP)	SP		78.5 -66.4					2/12 sand 10-slot	
80		Log continued on next page									

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

RECORD OF BOREHOLE PL2-425C

PROJECT: Boeing Plant,II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-44

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/14/08
DATE COMPLETED: 7/15/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,340.3 E: 1,275,437.1
GS ELEVATION: 13.6 ft
TOC ELEVATION: 13.4 ft
TEMPERATURE: 68 F

INCLINATION: -90
DEPTH W.L.: 10.8 ft
ELEVATION W.L.: 2.6 ft
DATE W.L.: 8/6/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
80		80.0 - 82.5 Dark gray, fine SAND, wet, no odor (SP)	SP		80.0					PL2-425C screen	**PL2-425C** Borehole Diameter: 8-inch **WELL CASING** Interval: 0-77.5 ft Material: PVC Diameter: 2-inch Joint Type: Threaded **WELL SCREEN** Interval: 77.5-82.5 ft Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: Flush **FILTER PACK** Interval: 76-82.5 ft Type: 2/12 sand Quantity: 6.5 ft **FILTER PACK SEAL** Interval: 74-76 ft Type: Bentonite chips Quantity: 2 ft. **ANNULUS SEAL** Interval: 3-74 ft Type: Bentonite grout Quantity: 71 ft
					-68.9	0.0	17	GRAB	5.0 / 5.0		
	-70	82.5 - 82.8 Dark gray, fine SANDY CLAY, wet, low plasticity, no odor (CL)	CL		82.8						
85		82.8 - 85.0 Dark gray, SILTY fine SAND, wet, some shell fragments and organic matter at 84 ft bgs, no odor (SM)	SM		-71.4					Heave	
		Boring completed at 85.0 ft									

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-425C	
Well Location	Northing	Easting
Start (date and time)	5/11/10 1143	
End (date and time)	5/11/10 1150	
Installation Method	Geoprobe	
Total Well Depth	82.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	77-82	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	Aqua Guard Bentonite Grout	
Grout Volume	13.5	Gallons
Surface Completion	flush-mount monument left in place	
Drilling Contractor	Hokkaido Drilling	
License Number	1146	
Signature (Driller)	[signature] 5/11/10	
Signature (Engineer or Geologist)	[signature] Kristen L. Addis 5/11/10	
Additional Information:		

ENVIRONMENTAL PARTNERS INC 295 NE Gilman Boulevard, Suite 201 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

Well Decommissioning Interim Measure - 2010 Book #2

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number 17512.0.15

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, Washington 98027
(425) 395-0010

Wells to be Decommissioned

Well ID	Total Depth (ft. bgs)	Screened Interval (ft. bgs)	Casing Diameter and Type	Location / Comments
Duct Bank Excavation Wells				
EW-1	20	9-19	4-inch PVC	Product recovery well. Southwest corner of 2-66 slab
PL2-011A	21.1	5.5-20	4 2-inch PVC	Building 2-66 slab
PL2-012A	21.5	6-20.5	4~~2~~-inch PVC	Building 2-66 slab
PL2-022A	20	6-19.5	2-inch PVC	Building 2-66 slab
PL2-028A	17.5	7.5-17.5	2-inch PVC	Building 2-66 slab
PL2-028B	49.5	39.5-49.5	2-inch PVC	Building 2-66 slab
PL2-430A	25	15-25	2-inch PVC	Inside Building 2-41
PL2-446A	18.5	8-18	2-inch PVC	Inside Building 2-41 AHE 616
PL2-447A	18.5	8-18	2-inch PVC	Inside Building 2-41 AHE 614
Building 2-44 and 2-49 Demolition Wells				
PL2-038A	23.5	13.5-23.5	2-inch PVC	Inside location, Building 2-49 west end
PL2-039A	20	10-20	2-inch PVC	Inside location, Building 2-49 east end
PL2-310A	19	9-19	2-inch PVC	East of Building 2-49. Part of OA-9 IM monitoring network
PL2-311A	18	8-18	2-inch PVC	East of Building 2-49. Part of OA-9 IM monitoring network
PL2-312A	18	8-18	2-inch PVC	Outside location east of Building ~~2-49~~ 2-44
PL2-332A	18.5	8-18	2-inch PVC	Outside location, east of Building 2-49 AHE 881
PL2-604A	21.5	6-21	2-inch PVC	East of Building 2-49. Part of OA-9 IM monitoring network
PL2-605AR	21.5	6-21	2-inch PVC	East of Building 2-49. Part of OA-9 IM monitoring network
PL2-606A	21.5	6-21	2-inch PVC	East of Building 2-49. Part of OA-9 IM monitoring network
BV-01	10.5	3-10	2-inch PVC	East of Building 2-49. Part of OA-9 IM bioventing system.
BV-02	10.5	3-10	2-inch PVC	East of Building 2-49. Part of OA-9 IM bioventing system.
BV-03	10.5	3-10	2-inch PVC	East of Building 2-49. Part of OA-9 IM bioventing system.
BV-04	10.5	3-10	2-inch PVC	East of Building 2-49. Part of OA-9 IM bioventing system.
BV-05	10.5	3-10	2-inch PVC	East of Building 2-49. Part of OA-9 IM bioventing system.
BV-06	10.5	3-10	2-inch PVC	East of Building 2-49. Part of OA-9 IM bioventing system.

Wells to be Remove Cover and Concrete

Well ID	Location / Comments	Completed?
PL2-233A	Near Duwamish Waterway and 16th Ave Bridge	6/17/10
PL2-321A	Near Building 2-51 (inside)	6/17/10
PL2-425B	SW corner of Building 2-44 (inside)	6/17/10
PL2-425C	SW corner of Building 2-44 (inside)	6/17/10
PL2-002A	South of 2-66 slab	6/17/10
PL2-002B	South of 2-66 slab	6/17/10
PL2-002C	South of 2-66 slab	6/17/10
PL2-018A	SW corner of 2-66 slab	6/17/10
PL2-019A	SW corner of 2-66 slab	6/17/10
PL2-020A	West part of 2-66 slab	6/17/10
PL2-023A	SW corner of 2-66 slab	6/17/10
PL2-024A	SW corner of 2-66 slab	6/17/10
PL2-025A	South of 2-66 slab	6/17/10
PL2-026A	NW corner of 2-66 slab	6/17/10
PL2-026B	NW corner of 2-66 slab	6/17/10
PL2-026C	NW corner of 2-66 slab	6/17/10
PL2-033A	South of 2-66 slab	6/17/10
PL2-033AR	South of 2-66 slab	6/17/10

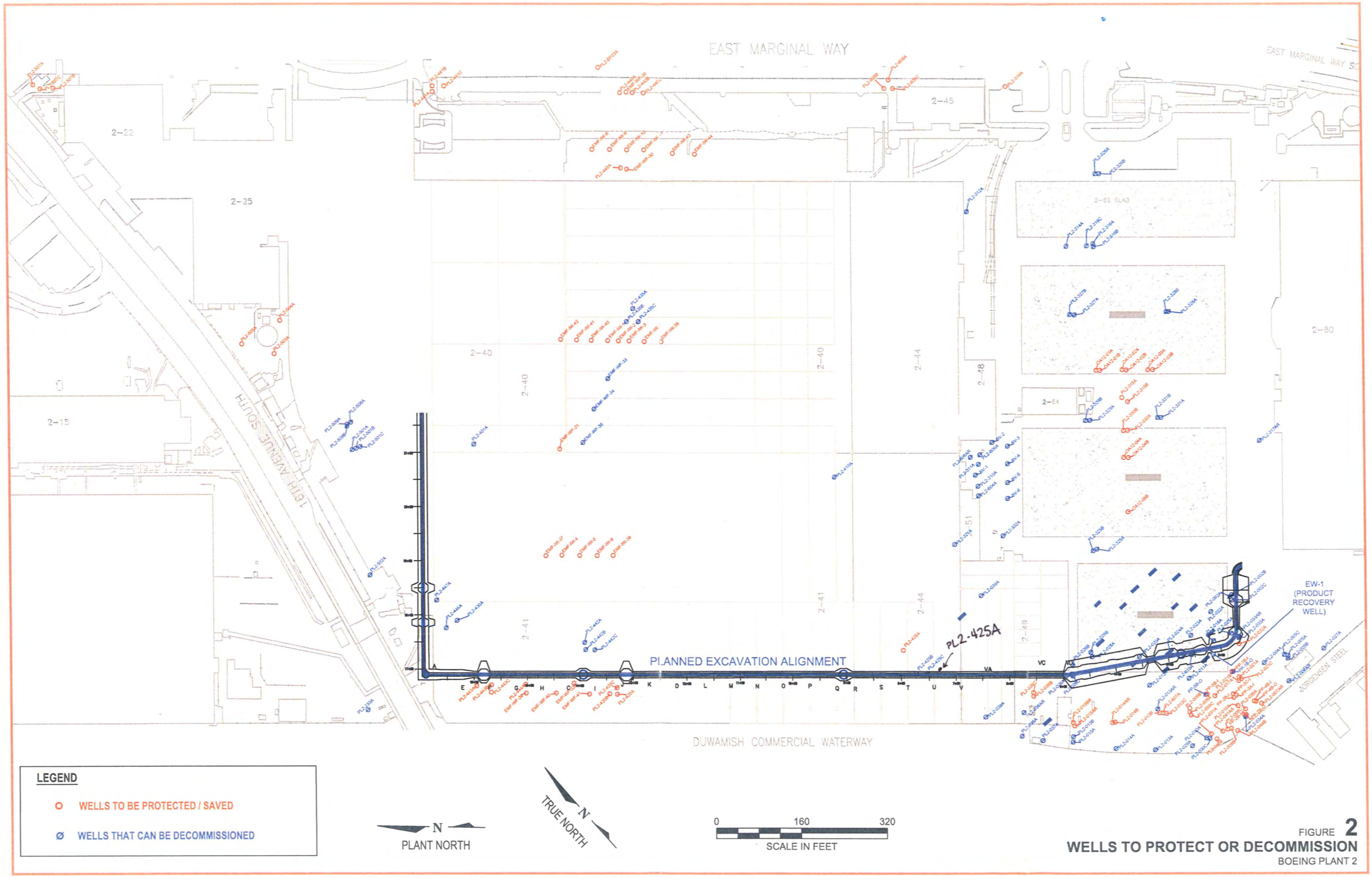


FIGURE 2

WELLS TO PROTECT OR DECOMMISSION

BOEING PLANT 2

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-28B	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10 09:57	
Installation Method	4" ID HSA	
Total Well Depth	49.5	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	39.5-49.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Volclay HighSolids Grout	
Grout Volume	20	Gallons
Surface Completion	cement	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	~~PL2-002A~~ EW-1 MH 6/17/10	
Well Location	Northing	Easting
Start (date and time)	6/17/10 0845	
End (date and time)	6/17/10	
Installation Method		
Total Well Depth		feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco PureGold Medium Chips	
Grout Volume		Gallons
Surface Completion	cement	
Drilling Contractor	Cascade ~~Engineering~~ Drilling MH 6/17/10	
License Number	2501	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-~~002B~~ 11A MH 6/17/10	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10	
Installation Method		
Total Well Depth	21.1	feet bgs
Well Diameter	4"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	6-15 and 16-20	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco Puregold Medium Chips	
Grout Volume		Gallons
Surface Completion	cement	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number: PL2-012A

Well Location: Northing _____ Easting _____

Start (date and time): 6/17/10

End (date and time): 6/17/10

Installation Method: _____

Total Well Depth: 21.5 feet bgs

Well Diameter: 4" inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 6-15 and 16.5-20.5 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout: Cetco chips

Grout Volume: _____ Gallons

Surface Completion: Cement

Drilling Contractor: Cascade Drilling

License Number: 2501

Signature (Driller): [signature]

Signature (Engineer or Geologist): _____

Additional Information: _____

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-022A	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10	
Installation Method		
Total Well Depth	20.4	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	5-14.5 and 15.5-19.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	cement	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-28A	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10	
Installation Method	4" ID HSA	
Total Well Depth	17.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	7.5 - 17.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	cement	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-38A	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10	
Installation Method	4 in ID HSA	
Total Well Depth	24.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	13.5 - 24	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-39A	
	Northing	Easting
Well Location		
Start (date and time)	6/17/10	
End (date and time)	6/17/10	
Installation Method	4 in ID HSA	
Total Well Depth	21.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	(PVC)	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2 332A	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10	
Installation Method	8" OD HSA	
Total Well Depth	18.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	10.5-19.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-312A	
Well Location	Northing:	Easting:
Start (date and time)	6/17/10 12:00	
End (date and time)	6/17/10	
Installation Method		
Total Well Depth		feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-447A	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10 1243	
Installation Method		
Total Well Depth		feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-430A	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10	
Installation Method		
Total Well Depth		feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-446A	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10	
Installation Method		
Total Well Depth		feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	BV-1	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10	
Installation Method	HSA	
Total Well Depth	10.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	3-10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)		

Additional Information:

Valve turned off first.

Well Decommissioning Log - Boeing Plant 2

Well Number: PL2-604A

Well Location: Northing _____ Easting _____

Start (date and time): 6/17/10

End (date and time): 6/17/10

Installation Method: HSA

Total Well Depth: 21.5 feet bgs

Well Diameter: 2" inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 6 - 20.5 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout: Cetco chips

Grout Volume: _____ Gallons

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: 2501

Signature (Driller): [signature]

Signature (Engineer or Geologist): _____

Additional Information:

Valve turned off first.

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-310A	
Well Location	Northing	Easting
Start (date and time)	6/17/10 13:34	
End (date and time)	6/17/10	
Installation Method	4" ID HSA	
Total Well Depth	19.0	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	9-19	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-311A	
Well Location	Northing	Easting
Start (date and time)	6/17/10	
End (date and time)	6/17/10	
Installation Method	4" ID HSA/Air Rotary	
Total Well Depth	18	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8-18	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number: PL2-605AR

Well Location: Northing _____ Easting _____

Start (date and time): 6/17/10

End (date and time): 6/17/10

Installation Method: HSA

Total Well Depth: 21 feet bgs

Well Diameter: 2" inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 6-21 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout: Cetco chips

Grout Volume: _____ Gallons

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: 2501

Signature (Driller): [signature]

Signature (Engineer or Geologist) _____

Additional Information:

Closed valve first.

Well Decommissioning Log - Boeing Plant 2

Well Number: PL2 606A

Well Location: Northing _____ Easting _____

Start (date and time): 6/17/10

End (date and time): 6/17/10

Installation Method: HSA

Total Well Depth: 21.5 feet bgs

Well Diameter: 2" inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 6.5 - 20.5 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout: Cetco chips

Grout Volume: _____ Gallons

Surface Completion: Concrete

Drilling Contractor: Case cade Drilling

License Number: 2501

Signature (Driller): [signature]

Signature (Engineer or Geologist) _____

Additional Information:

Closed Valve first.

Well Decommissioning Log - Boeing Plant 2

Well Number	BV 2	
Well Location	Northing	Easting
Start (date and time)	6/18/10	
End (date and time)	6/18/10	
Installation Method	HSA	
Total Well Depth	3-10	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	3-10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	Coteco Chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)		
Signature (Engineer or Geologist)		

Additional Information:

Turned off valve first

Well Decommissioning Log - Boeing Plant 2

Well Number: BV 3

Well Location: Northing _____ Easting _____

Start (date and time): 6/18/10

End (date and time): 6/18/10

Installation Method: HSA

Total Well Depth: 11.5 feet bgs

Well Diameter: 2 inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 3-10 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout: Cetco Chips

Grout Volume: _____ Gallons

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: 2501

Signature (Driller): [signature]

Signature (Engineer or Geologist): [signature]

Additional Information:

Turned off valve first

Well Decommissioning Log - Boeing Plant 2

Well Number	BV 4	
Well Location	Northing	Easting
Start (date and time)	6/18/10	
End (date and time)	6/18/10	
Installation Method	HSA	
Total Well Depth	10.5	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	3-10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Cetco Chips	
Grout Volume		Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)		
Signature (Engineer or Geologist)		

Additional Information:

Turned off valve first

Well Decommissioning Log - Boeing Plant 2

Well Number: BV5

Well Location: Northing _____ Easting _____

Start (date and time): 6/18/10

End (date and time): 6/18/10

Installation Method: HSA

Total Well Depth: 10.5 feet bgs

Well Diameter: 2 inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 3-10 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout: Cetco chips

Grout Volume: _____ Gallons

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: 2501

Signature (Driller): [signature]

Signature (Engineer or Geologist): [signature]

Additional Information:

Turned off valve first

Well Decommissioning Log - Boeing Plant 2

Well Number: BV6

Well Location: Northing _____ Easting _____

Start (date and time): 6/18/10

End (date and time): 6/18/10

Installation Method: HSA

Total Well Depth: 10.5 feet bgs

Well Diameter: 2 inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 3-10 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout: Cetco chips

Grout Volume: _____ Gallons

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: 2501

Signature (Driller): [signature]

Signature (Engineer or Geologist): [signature]

Additional Information:

Valve turned off first

Well Decommissioning Log - Boeing Plant 2

Well Number

	Northing	Easting
Well Location		

Start (date and time)

End (date and time)

Installation Method

Total Well Depth feet bgs

Well Diameter inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout

Grout Volume Gallons

Surface Completion

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

_____

Well Decommissioning Log - Boeing Plant 2

Well Number

	Northing	Easting
Well Location		

Start (date and time)

End (date and time)

Installation Method

Total Well Depth feet bgs

Well Diameter inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout

Grout Volume Gallons

Surface Completion

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

_____

WAC 173-160-420

What are the general construction requirements for resource protection wells?

(1) No resource protection well or soil boring excavation may be used to withdraw or inject water for domestic, industrial, municipal, commercial, or agricultural purposes.

(2) No resource protection well or soil boring excavation may interconnect aquifers.

(3) Nested resource protection wells are prohibited.

(4) Cuttings, development water, and other investigation derived waste from resource protection well construction or geotechnical soil borings shall be managed in a manner consistent with the intent and purposes of the Water Pollution Control Act, chapter 90.48 RCW, the Hazardous Waste Management Act, chapter 70.105 RCW, and implementing regulations.

(5) Well tagging:

(a) It shall be the driller's responsibility to place a well identification tag with a unique identification number on every resource protection well that they construct or alter within thirty days of completion of the well. Uncased geotechnical soil borings and environmental investigation wells are exempt from the tagging requirements of this chapter.

(i) The alpha-numeric number shall be recorded on the drilling report in the space provided.

(ii) The driller shall remove the well identification tag on all resource protection wells they decommission and shall attach the tag to the decommissioning well report.

(b) It shall be the well owner's responsibility to place a well identification tag with a unique identification number on every resource protection well they own and which was completed prior to the effective date of this regulation.

(i) Upon request, the department shall furnish the well owner with a well tag and tagging instructions.

(ii) The well owner shall tag their well(s) and submit a completed tagging report to the department.

(c) The well tag shall be permanently attached to:

(i) The well casing and be visible above land surface for all wells which have been completed above land surface.

(ii) The well casing or to any permanent and protected portion of the vault for wells completed below land surface.

(iii) A prominent system component visible above land surface for ground source heat pump borings.

(d) All well identification tags shall be supplied by the department.

(e) It is unlawful for a person to tamper with or remove a well identification tag except during well alteration.

(6) All resource protection wells will be sealed in accordance with WAC 173-160-450 regardless of the method of installation. Except, resource protection wells that are properly decommissioned prior to the removal of any drilling equipment from the well location are

exempted from the surface sealing requirements of this chapter. Provided the decommissioning process includes the removal of any conduit, tubing, probe, or other items inserted into the ground.

(7) All geotechnical soil borings shall be decommissioned under the terms of this chapter.

(8) Except as provided in RCW 18.104.180, all construction, alteration, reconstruction, and decommissioning of resource protection wells and geotechnical soil borings shall be done by an individual licensed under the provisions of chapter 173-162 WAC.

(9) A notice of intent to construct or decommission a resource protection well and a geotechnical soil boring shall be filed with the department a minimum of seventy-two hours prior to initiating construction or decommissioning of the well(s) or boring(s). A fee must accompany each notice of intent to construct or decommission a resource protection well.

(a) The fee for a resource protection well, except for an environmental investigation well, a ground source heat pump boring, or a grounding well, is forty dollars for each well.

(b) The fee for an environmental investigation well in which ground water is sampled or measured is forty dollars for the construction of up to four environmental investigation wells per project, and ten dollars for each additional environmental investigation well constructed on a project with more than four wells. There is no fee for soil or vapor sampling purposes.

(c) The fee for a ground source heat pump boring or a grounding well is forty dollars for construction of up to four ground source heat pump borings or grounding wells per project and ten dollars for each additional ground source heat pump boring or grounding well constructed on a project with more than four wells.

(d) The fee to decommission a resource protection well, except for an environmental investigation well, is twenty dollars per well. There is no fee to decommission an environmental investigation well or a geotechnical soil boring.

(e) The fee to decommission a ground source heat pump boring or a grounding well is twenty dollars per well.

(f) Under some circumstances, it may be necessary to construct more resource protection wells or geotechnical soil borings than originally anticipated. When additional resource protection wells are constructed on a site for which a notice of intent and fee were submitted, a second notice and fee shall be submitted within twenty-four hours after all wells have been completed or as soon as the final number of wells to be constructed is determined, whichever is sooner. When additional geotechnical soil borings are needed, the borings may be completed. A follow-up notice of intent shall be submitted to the department within twenty-four hours after all borings are constructed. Notification to construct multiple wells or geotechnical soil borings within the same quarter/quarter section, township, and range may be submitted on one notice form.

(10) Resource protection well reports.

(a) Anyone who constructs or decommissions a well is required to submit a complete well report on the construction or decommissioning of all resource protection wells and geotechnical soil borings. Reports must be submitted to the water resources program within thirty days after completion of construction or decommissioning. Submission of a well report to consulting firms does not meet the requirement of this section. The report must be an accurate summation of data collected in the field taken from field notes written as the well was constructed or decommissioned. Field notes must be available at all times during construction or decommissioning for review by state and local inspectors and kept until the well report is submitted.

(b) The resource protection well report must be made on a form provided by the department, or a reasonable facsimile of the form, as approved by the department.

(c) Where applicable the report shall include the following information:

(i) Owner's name; operator/trainee name; operator/trainee license number; contractor registration number, drilling company name;

(ii) Tax parcel number;

(iii) Well location address;

(iv) Location of the well to at least 1/4, 1/4 section or smallest legal subdivision;

(v) Unique well identification tag number;

(vi) Construction date;

(vii) Start notification number;

(viii) Intended use of well;

(ix) The well depth, diameter, and general specifications of each well;

(x) Total depth of casing;

(xi) Well head elevation;

(xii) Drilling method;

(xiii) Seal material, seal location and type of placement used;

(xiv) Filter pack location; filter pack material used;

(xv) The thickness and character of each bed, stratum or formation penetrated by each well including identification of each water bearing zone;

(xvi) Casing gauge, diameter, stickup, type of material, and length, also of each screened interval or perforated zone in the casing;

(xvii) The depth to the static water level, as measured below the land surface; and

(xviii) Such additional factual information as may be required by the department.

(d) The well report must include one of the following:

(i) The license number and signature of the person who constructed or decommissioned the well;

(ii) The license number and signature of the trainee and the licensed operator under chapter 18.104 RCW; or

(iii) The license number and signature of an exempted individual as defined under RCW 18.104.180(3).

(e) This rule shall allow an individual to submit electronic reports in accordance with department procedures. The use of a digital signature in the electronic reports will be authorized as a substitute for an original signature under (d) of this subsection.

What are the surface protection requirements?

(11) All resource protection wells shall be capped and protected using one of the following methods:

(a) If the well is cased with metal and completed above the ground surface, you must attach a watertight cap with a lock to the top of the casing.

(b) If the well is not cased with metal and completed above the land surface, you must install a protective metal casing over and around the well. The protective casing shall extend at least six inches above the top of the well casing and be cemented at least two feet into the ground. A cap with lock shall be attached to the top of the protective casing.

(12) You shall protect the well(s) completed above ground from damage by:

(a) Cementing three metal posts, at least three inches in diameter, in a triangular array around the casing and at least two feet from it. Each post shall extend at least three feet above and below the land surface.

(b) A reinforced concrete pad may be installed to protect against and prevent frost heave. If installed, the concrete pad shall extend to a depth equal to anticipated frost depth. When a concrete pad is used, the well seal may be part of the concrete pad.

(13) If the well is completed below land surface, a watertight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent the inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The cover must be designed to withstand the maximum expected loading.

(14) The protective measures may be waived or modified upon written approval from the department (a variance).

(15) If the well is damaged, the well protection measures and casing shall be repaired to meet the requirements of this chapter. If the well is damaged beyond repair, it shall be decommissioned in accordance with WAC 173-160-460.

WAC 173-160-460

What is the decommissioning process for resource protection wells?
(1) For resource protection wells and geotechnical soil borings that were not constructed in accordance with these regulations, or for which a drilling report required under this section is missing, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers, and decommission in one of the following ways:

(a) Perforate the casing from the bottom to land surface and pressure grout the casing.

(i) Perforations shall be at least four equidistant cuts per row, and one row per foot. Each cut shall be at least one and one-half inches long.

(ii) Apply enough pressure to force the sealing material through the perforations, filling any voids on the outside of the casing.

(iii) The remainder of the casing shall be filled with neat cement grout, neat cement, or bentonite slurry; or

(b) Withdraw the casing and fill the bore hole with neat cement grout, neat cement, bentonite or bentonite slurry as the casing is being withdrawn.

(2) For resource protection wells and geotechnical soil borings that were constructed in accordance with these regulations, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers and then decommission in one of the following ways:

(a) Wells with an inside casing diameter equal to or greater than one inch and constructed in accordance with these regulations as verified through a field examination and review of the drilling report shall be decommissioned by filling the casing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement.

(b) Wells with an inside casing diameter less than one inch shall be decommissioned by pressure grouting the entire casing length with bentonite slurry, neat cement grout, or neat cement.

(c) Vibrating wire piezometers installed to meet or exceed the sealing requirements of WAC 173-160-450, 173-160-457, and 173-160-458 are exempt from the decommissioning procedures and decommissioning reporting requirements provided here.

(d) Direct push wells shall be decommissioned in accordance with this section.

(e) Geotechnical soil borings, or boring, shall be decommissioned by sealing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement. Sealing material placed below the static water level shall be piped directly to the point of application or placed by means of a dump bailer or pumped through a tremie tube. If bentonite slurry, neat cement grout or neat cement is used to seal below the water level in the well, the material shall be placed from the bottom up by methods that avoid segregation or dilution of the material. When used to place bentonite slurry, neat cement or neat cement grout, the discharge end of the tremie tube shall be submerged in the bentonite slurry, neat cement or neat cement grout to avoid breaking the seal while filling the annular space. Provided the material does not dilute or segregate and the resulting seal is free of voids, sealing material may be hand poured above the static water level.

MONITORING WELL PL2SW-MW11

PL2-011A

WELL SCHEMATIC

Casing Elevation (ft.): 13.04
Casing Stickup (ft.): -0.24

Surface Elevation (ft.): 13.28

Vapor Conc. (ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
			SP–SM	4 inches asphalt concrete Brown fine to medium sand with silt (moist)
			SP–SM	Blackish brown fine to medium sand with silt
				Water level ranged between 9.9 and 13.1 feet during the 2-week tidal study (12/20/91 through 01/02/92)
			SP	Black fine to medium sand with a trace of silt, filter pack sand and pieces of PVC pipe (loose, wet)
51 / 65.5	15	CA	SP	Blackish brown fine to medium sand with a trace of silt and occasional pieces of PVC pipe (loose, wet)
21 / 37.5	17	CA		

DEPTH IN FEET

0, 5, 10, 15, 20, 25, 30, 35, 40

Steel surface monument and concrete

Bentonite seal

4-inch Schedule 40 PVC casing

4-inch Schedule 40 PVC Pre-Pac screen, 0.010-inch slot width

Medium sand backfill

Base of well at 21.1 feet

Natural soil backfill

Boring completed at 22.5 feet on 10/14/91
Petroleum-like odor detected at 7.5 feet
Overdrilled existing piezometer and installed a 4-inch monitoring well
VC or TCE not indicated by field screening soil samples, but VC field screening was done incorrectly

MN 7/19/94

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

:CRW:RNM:PGW:CMS 10/20/92

0120-149-R14

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-15

MONITORING WELL PL2SW-MW12

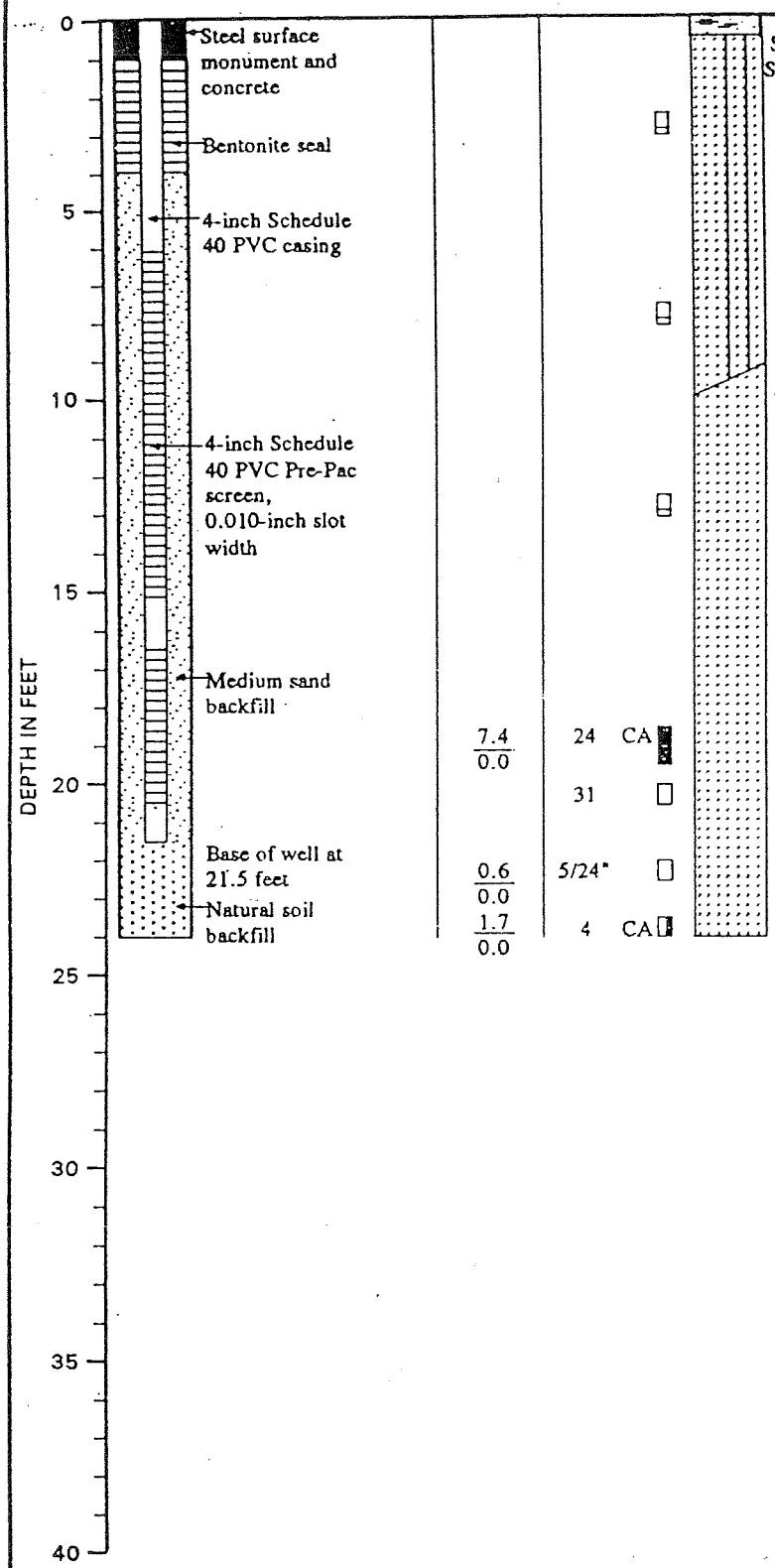
PL2-012A

A" PVC

WELL SCHEMATIC

Casing Elevation (ft.): 12.73
Casing Stickup (ft.): -0.57

Surface Elevation (ft.): 13.30



Vapor Conc.(ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
			SP–SM	6 inches concrete Brown fine to medium sand with silt (moist)
			SP	Brown fine to medium sand with a trace of silt (medium dense, wet) Water level ranged between 9.8 and 13.4 feet during the 2-week tidal study (12/20/91 thro 01/02/92)
7.4 / 0.0	24	CA		Occasional filter pack sand, bentonite and pieces of PVC pipe
	31			
0.6 / 0.0	5/24"			Grades to very loose
1.7 / 0.0	4	CA		Boring completed at 24.0 feet on 10/11/91 Overdrilled existing piezometer and installed a 4-inch monitoring well VC or TCE not indicated by field screening soil samples, but VC field screening was done incorrectly

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

MN 7/19

:CRW:RNM:PGW:CMS 10/20/92

0120-149-R14

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-16

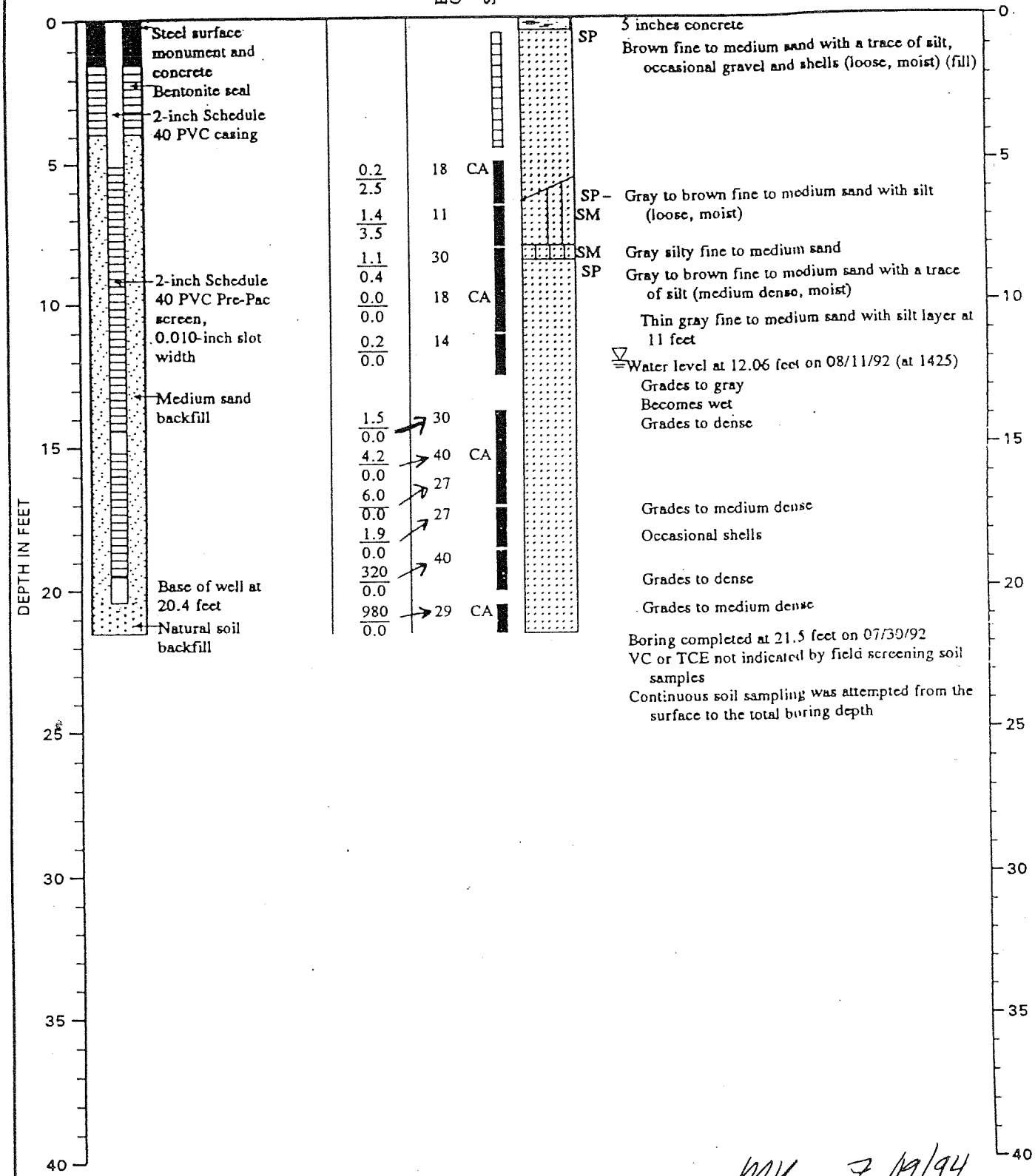
MONITORING WELL PL2SW-MW22

PL2-022A

WELL SCHEMATIC

Casing Elevation (ft.): 13.17
Casing Stickup (ft.): -0.34

Surface Elevation (ft.): 13.51



MK 7/19/94

Note: See Figure A-2 for explanation of symbols
See Figure A-33 for explanation of typical shallow 2-inch diameter monitoring well construction

:RNM:WAP:CMS 10/16/92

)120-149-R14

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-28

WELL PL2-028A (SB-06601)

PROJECT BOEING ZONE 1 PRE-CONSTRUCTION
DATE COMPLETED 02 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 13.09
GROUND SURFACE ELEV 13.38
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
						SP	No samples collected, refer to Well PL2-026B
		No analytics					SAND (SP), Dark grayish brown (7.5YR3/2), 90% medium sand, 10% gravel, medium dense, dry, (fill)
5							Grades to 100% medium sand
							Damp
10						SM	SILTY SAND (SM), Dark brown (7.5YR3/2), 80% fine sand, 20% silt, medium dense, moist
							Wet
15						SP	SAND (SP), Very dark gray (7.5YRN3/), 100% medium sand, medium dense, wet
							BOH @ 19'
20							
25							

12/21/93
12/01/93

PLATE A-4

JOB NUMBER: 03709-036-001-4010 DATE: January 1994

WELL PL2-028B (SB-06601)

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
30						SP	
			37				No recovery
	BG	SB-06601-0325 VOC, TPH-418.1					Grades to coarse sand, very dense, trace gravel, occasional wood fragments
			81				
35	BG						Grades to 95% coarse sand, 5% gravel
			42				
	BG						Grades to medium sand, occasional wood fragments, .25-inch silt interbed
			79				
40	BG	SB-06601-0400 VOC, TPH-418.1					One 2-inch wood fragment
			41				
	BG						One 1-inch silt interbed
			62				
45	BG						Three .25-inch silt interbeds, grades to fine sand, mild sulfur odor
			50/6				
	BG						Three .5-inch organic rich interbeds
			68				
50	BG	SB-06601-0500 VOC, TPH-418.1					One 2-inch organic interbed
			24			SM	SILTY SAND (SM), Very dark gray (7.5YRN3/), 85% fine sand, 15% silt, medium dense
							BOH @ 51.5'
55							
60							

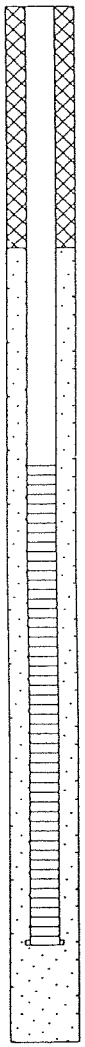


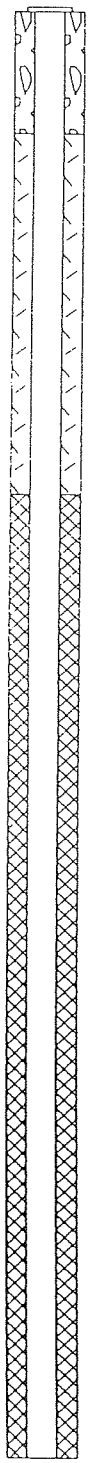
PLATE A-5

JOB NUMBER: 03709-036-001-4010 DATE: January 1994

WELL PL2-028B (SB-06601)

PROJECT BOEING ZONE 1 PRE-CONSTRUCTION
DATE COMPLETED 1 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 12.89
GROUND SURFACE ELEV 13.36
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
						SP	SAND (SP), Dark grayish brown (7.5YR3/2), 90% medium sand, 10% gravel, medium dense, dry, (fill)
5	35	SB-06601-0050 VOC, TPH-418.1					Grades to 100% medium sand
	12		16				Damp
			12				
10	18					SM	SILTY SAND (SM), Dark brown (7.5YR3/2), 80% fine sand, 20% silt, medium dense, moist
			23				
	18	SB-06601-0125 VOC, TPH-418.1					Wet
			36				
15	5					SP	SAND (SP), Very dark gray (7.5YRN3/), 100% medium sand, medium dense, wet
			32				
	BG						Dense
			50				
20	BG	SB-06601-0200 VOC, TPH-418.1					Grades to medium-coarse sand, occasional twigs and organic fragments, dense
			43				
	BG						Medium dense, trace shell fragments
			13				
25	BG						
			28				
	BG						
			50/6				
	BG						



12/21/93
12/01/93

PAGE 1 of 2

JOB NUMBER: 03709-036-001-4010

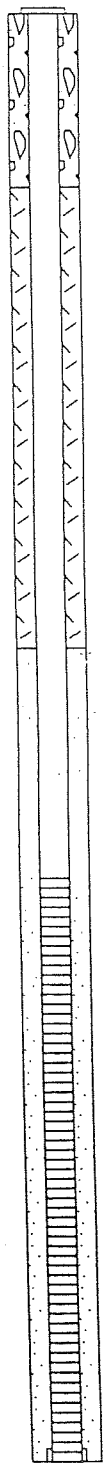
DATE: January 1994

PLATE A-5

WELL PL2-430A (SB-04103)

PROJECT BOEING SUSPECT AREAS
DATE COMPLETED 1 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 13.14
GROUND SURFACE ELEV 13.47
LOGGED BY Tim Fitzgerald

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
	BG					SP	
5	BG	SB-04103-0050 VOC, PPMETALS+Ba Cr (VI),Cn	8				POORLY GRADED SAND (SP), Yellow brown (10YR5/4), 100% medium sand, loose, dry to damp, (fill)
	BG		5				
10	BG	SB-04103-0100 VOC, PPMETALS+Ba Cr (VI),Cn	3			MH	ELASTIC SILT (MH), Dark gray (10YR5/1), 100% silt, soft, damp to moist at 11.5-feet, trace of black organic fragments, (native soil)
	BG	SB-04103-0125 VOC, PPMETALS+Ba Cr (VI), Cn	5			SP	POORLY GRADED SAND (SP), Dark gray (10YR3/1), 100% fine sand, loose, saturated
15	BG		4				Coarse sand
	BG		10				
20							
	BG						
25							



12/15/93

12/1/93

PLATE A-13

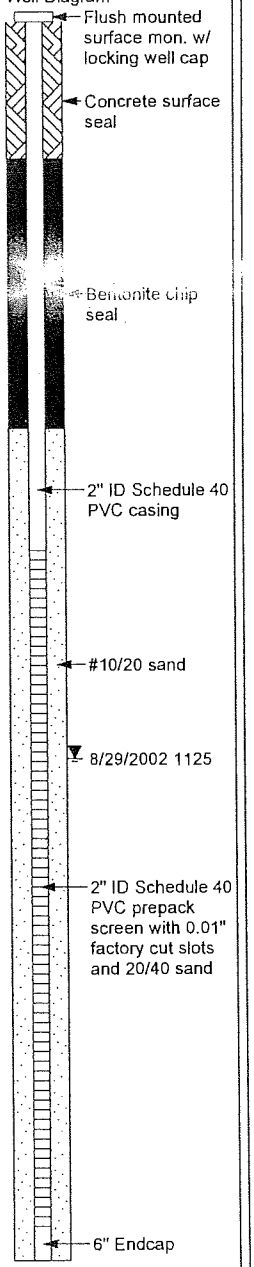
JOB NUMBER: 03709-038-001-4010 DATE: January 1994

Monitoring Well PL2-446A

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 12, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 12.80
GROUND SURFACE ELEV (ft): 13.48
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							9" Concrete.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5			50			SW	SAND (SW), Brown, 60% fine sand, 35% medium sand, 5% silt, dry, no odor or stain, (fill).
10			6			ML	Sandy SILT (ML), Gray, 85% silt, 15% fine sand, moist, no odor or sheen, (alluvium).
15			29			SW	SAND (SW), Black, 60% fine sand, 30% medium sand, 10% silt, wet, no odor or sheen, (alluvium).
						ML	Sandy SILT (ML), Gray, 85% silt, 15% fine sand, wet, no odor or sheen, (alluvium).
						SW	SAND (SW), Black, 65% medium sand, 30% fine sand, 5% silt, wet, no odor or sheen, (alluvium).
20							Bottom of hole @ 18.5 feet

Well Diagram



Notes:
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Plate
A-17

Weston Solutions, Inc.

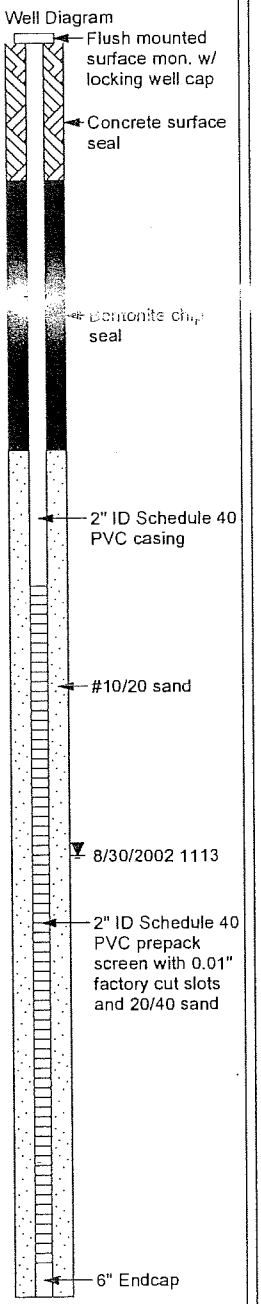
BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:39

Monitoring Well PL2-447A

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 12, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.46
GROUND SURFACE ELEV (ft): 13.73
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							9" Concrete.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5			4			SW	SAND (SW), Brown, 75% fine sand, 20% medium sand, 5% medium gravel, dry, no odor or stain, (fill).
						SW	SAND (SW), Black, 70% fine sand, 20% clay, 5% medium sand, 5% medium gravel, moist, no odor or sheen, (alluvium).
10			15				
15			19				SAA, 70% fine sand, 20% silt, 5% medium sand, 5% medium gravel, wet, no odor or sheen, (alluvium).
							SAA, 60% fine sand, 35% medium sand, 5% silt, wet, no odor or sheen, (alluvium).
20							Bottom of hole @ 18.5 feet

Well Diagram



Notes:
SAA: Same as Above.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Plate
A-18

Weston Solutions, Inc.

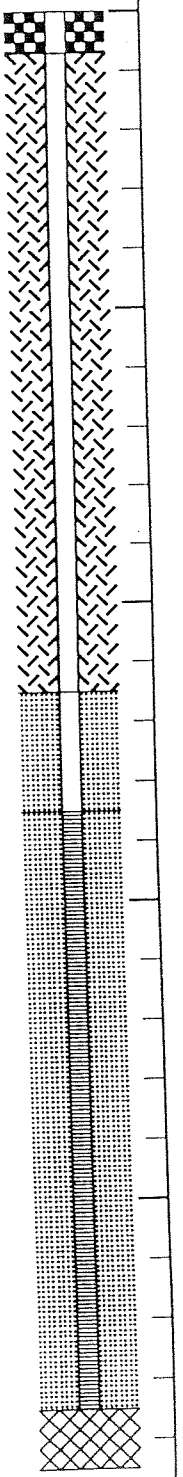
BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:40

Sheet 1 of 1

Boring PL2-038A

Project	Boeing RFI	Start Date 02/20/95	Finish Date 02/21/95
Location	Plant 2 Seattle, WA	Driller	Drilling Co. PTL
Project No.	03709-034-300	Drilling Method 4in ID HSA	
Contractor	Weston	Sampling Method split spoon	
Logged by	Fitzgerald/Stoopes	Top of Casing (ft) 12.99	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 13.20	Total Depth (ft) 24.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							ND	Vacant space, 4 ft between floor slab and ground surface.
5							SM	Silty sand with fill (SM), brn (10YR5/3), 80% sand, 20% silt, med dense, moist. Large fragements of concretefrom 12- to 14 ft bgs. Wet at 12 ft. bgs.
10								
15							SP	Sand (SP), dk gray (10YR4/1), 90% med sand, 10% silt, loose, wet. trace pea gravel.
	Bg	PCB HCID	SD-04918-0185		21			
20								
	BG	PCB HCID	SD-04918-0230		14			



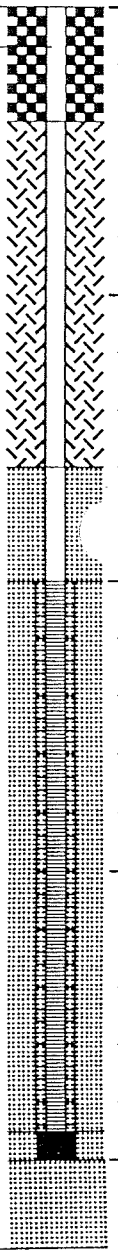
Boring id 20001

Sheet 1 of 1

Boring PL2-039A

Project	Boeing RFI 1C	Start Date	07/19/95	Finish Date	07/19/95
Location	Plant 2 Seattle, WA	Driller		Drilling Co.	PTL
Project No.	03709-034-300-3430-	Drilling Method	4 in. ID HSA		
Contractor	Weston	Sampling Method	split spoon		
Logged by	Robbins			Boring Diam. (in)	10
				Total Depth (ft)	21.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							SP	Sand (SP), very dk gray (10YR3/1), 100% med sand, loose, moist; @5', med dense; @11.5', wet
5					21			
10	0.0				17			
15					32			
20					23			

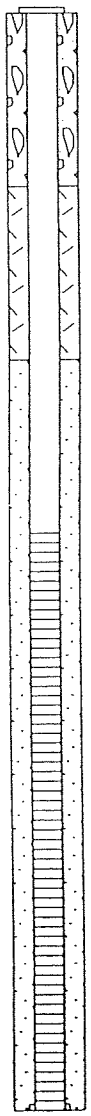


Boring_id 20127

WELL PL2-310A (SB-04407)

PROJECT BOEING ZONE 1 PRE-CONSTRUCTION
DATE COMPLETED 19 November 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 12.65
GROUND SURFACE ELEV 13.13
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Asphalt
						SP	SAND with GRAVEL (SP), Grayish brown (10YR4/1), 80% medium sand, 20 % gravel, medium dense, dry (fill)
5	BG		67				Grades to 90% medium sand, 10% gravel, one wood fragment with black staining (fill)
	713	SB-04407-0075 HCID, TPH-G (ARCHIVE)	26				Grades to 80% medium sand, 20% gravel, medium dense, damp, volatile chemical odor
10	1830	SB-04407-0100 HCID, TPH-G (ARCHIVE)	11				Volatile chemical odor
	1465	SB-04407-0125 TPH-G (ARCHIVE)	11				Color change to Very dark gray (7.5YRN3/), 100% medium to coarse sand, wet, volatile chemical odor
15	1225	SB-04407-0150 HCID	10				2-inch silt interbed
	1282		12				BOH @ 19.0'
20							
25							



12/22/93

11/19/93

JOB NUMBER: 03709-036-001-4010 DATE: January 1994

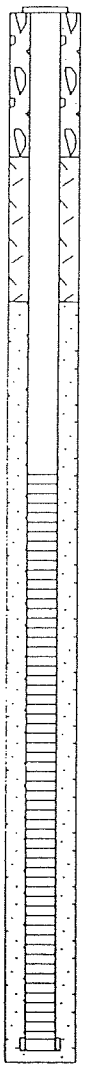
PLATE A-7

WELL PL2-MW311A (SB-04903)

PL2-311A

PROJECT BOEING ZONE 1 PRE-CONSTRUCTION
DATE COMPLETED 15 December 1993
DRILLING METHOD 4" ID HSA/Air Rotary
TOP OF CASING 12.88
GROUND SURFACE ELEV 13.26
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
						SP	SAND (SP), Dark grayish brown (10YR4/2), 90% medium sand, 10% gravel, dense, dry (fill)
							Concrete
5	1148	SB-04903-0050 VOC, BNA, PCB, PPMETALS, HCID, Cr (VI), TPH-G (ARCHIVE)	13			SM	SILTY SAND (SM), Very dark gray (10YR3/1), 85% fine sand, 15% silt, medium dense, damp, volatile chemical odor
	1119	SB-04903-0075 VOC, BNA, PCB, PPMETALS, HCID, Cr (VI), TPH-G (ARCHIVE)	9			SP	SAND (SP), Very dark gray (10YR3/1), 100% fine sand, trace silt, damp, volatile chemical odor
	1224	SB-04903-0100 VOC, BNA, PCB, PPMETALS, HCID, Cr (VI), TPH-G (ARCHIVE)	12				SAA, volatile chemical odor, wet @ 11'
	853	SB-04903-0125 VOC, BNA, PCB, PPMETALS, HCID, Cr (VI), TPH-G (ARCHIVE)	11				SAA, volatile chemical odor
15	148					ML	SILT (ML), Brown (10YR5/3), 100% silt, medium dense, wet volatile chemical odor, trace organic fragments
	30	SB-04903-0165 VOC, BNA, PCB, PPMETALS, HCID, Cr (VI), TPH-G (ARCHIVE)	11			SP	SAND (SP), Very dark gray (7.5YRN3/), 100% medium sand, medium dense, wet, volatile chemical odor
							BOH @ 18'
20							
25							



12/15/93
12/22/93

PLATE A-8

JOB NUMBER: 03709-036-001-4010 DATE: February 1994

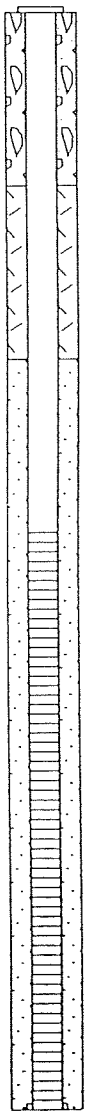
WELL PL2-310A (SB-04407)

PROJECT BOEING ZONE 1 PRE-CONSTRUCTION
DATE COMPLETED 19 November 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 12.65
GROUND SURFACE ELEV 13.13
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Asphalt
						SP	SAND with GRAVEL (SP), Grayish brown (10YR4/1), 80% medium sand, 20 % gravel, medium dense, dry (fill)
5	86		67				Grades to 90% medium sand, 10% gravel, one wood fragment with black staining (fill)
	713	SB-04407-0075 HCID, TPH-G (ARCHIVE)	26				Grades to 80% medium sand, 20% gravel, medium dense, damp, volatile chemical odor
10	1830	SB-04407-0100 HCID, TPH-G (ARCHIVE)	11				Volatile chemical odor
	1465	SB-04407-0125 TPH-G (ARCHIVE)	11				Color change to Very dark gray (7.5YRN3/), 100% medium to coarse sand, wet, volatile chemical odor
15	1225	SB-04407-0150 HCID	10				2-inch silt interbed
	1282		12				
							BOH @ 19.0'
20							
25							

12/22/93

11/19/93



JOB NUMBER: 03709-036-001-4010 DATE: January 1994

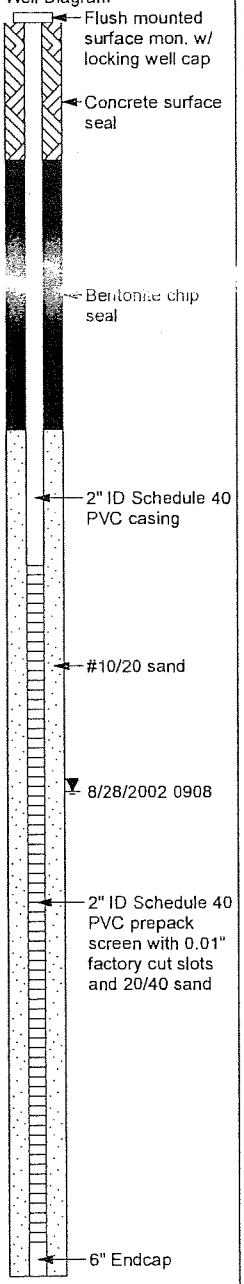
PLATE A-7

Monitoring Well PL2-332A

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 5, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 12.76
GROUND SURFACE ELEV (ft): 13.14
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							8" Concrete.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5			9			SM	Silty SAND (SM), Dark brown, occasional fine gravel, moist, no odor or stain.
10			7			SW / SM	SAND (SW), Black, 70% medium sand, 25% fine sand, 5% silt, wet, no odor or sheen. Silty SAND (SM), Black, 65% fine sand, 35% silt, wet, no odor or sheen.
15			11			SW	SAA. SAND (SW), Black, 75% medium sand, 20% fine sand, 5% silt, wet, no odor or sheen.
20							Bottom of hole @ 18.5 feet

Well Diagram



Notes:
SAA: Same as Above.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Plate
A-16

Weston Solutions, Inc.

BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:39

RECORD OF BOREHOLE PL2-604A

SHEET 1 of 1

PROJECT: Boeing Plant 2
PROJECT NUMBER: 013-1646-002.200
LOCATION: 2-60s Area

DRILLING METHOD: HSA
DRILLING DATE: 08/19/2005
DRILL RIG: CME 75

DATUM: NAD83(91)/NGVD29
AZIMUTH: N/A
COORDINATES: N: 196,456.05000 E: 1,275,743.69000

ELEVATION: 12.91
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft (10 20 30 40)	WATER CONTENT (PERCENT) W_p W W_l	NOTES WATER LEVELS / GRAPHIC
0		0.0 - 0.3 Asphalt			0.3	1	CORE	4-4-4	8	0.4/1.5			Concrete Surface Seal
		0.3 - 4.0 Loose, dark yellowish brown, SAND and PEA GRAVEL, dry. (Chemical odor or staining observations not recorded at time of drilling)			8.9								Hydrated Bentonite Chips
5		4.0 - 9.0 Compact, moderate brown (5YR 4/4), unstratified, fine to coarse SAND, some gravel, some silt.			4.0 / 3.9	2	CORE	12-14-14	28	1.0/1.5			20x40 CSSI Sand Filter Pack; 2-in Standard Schedule 40 PVC Well Casing
10		9.0 - 10.5 NR			9.0 / 2.4	3	CORE	2-6-8	14	–/1.5			
		10.5 - 14.0 Loose, medium dark gray, structureless, very fine SILT, wet.			10.5 / -1.1	4	CORE	3-4-4	8	0.4/1.5			10-slot Schedule 40 PVC Well Screen
15		14.0 - 20.5 Compact, dark gray (N3), structureless, medium SAND, wet. (ALLUVIUM)			14.0	5	CORE	6-12-13	25	1.5/1.5			Stainless Steel Centralizers located at 5.5' and 21 BGS
20					-7.6	6	CORE	5-6-6	12	1.0/1.5			Flush Threaded PVC End Cap
		Boring completed at 21.5 ft.			20.5								
25													
30													
35													
40													

1 in to 5 ft
DRILLING CONTRACTOR: Cascade Drilling
DRILLER: Scott

LOGGED: DTB
CHECKED: T. Norton
DATE: 4/11/2007

Golder Associates

BOREHOLE REC ...P2 CMS 2-60S IV BORING & WELL LOGS.GPJ GLDR_WA.GDT 4/11/07

RECORD OF BOREHOLE PL2-605A

SHEET 1 of 1

PROJECT: Boeing Plant 2
PROJECT NUMBER: 013-1646-002.200
LOCATION: 2-60s Area

DRILLING METHOD: HSA
DRILLING DATE: 08/19/2005
DRILL RIG: CME 75

DATUM: NAD83(91)/NGVD29
AZIMUTH: N/A
COORDINATES: N: 196,517.40000 E: 1,275,780.24000

ELEVATION: 12.67
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft (10 20 30 40) / WATER CONTENT (PERCENT) W_P W W_L	NOTES WATER LEVELS / GRAPHIC
0		0.0 - 0.3 Concrete			0.3							Concrete Surface Seal
		0.3 - 6.0 Loose, dark yellowish brown (10YR 4/2), unstratified, fine to medium SAND, damp. (FILL) (Chemical odor or staining observations not recorded at time of drilling)				1	CORE	7-7-8	15	1.5/1.5		Hydrated Bentonite Chips
5					6.7							
		6.0 - 7.0 Concrete			6.0 / 5.7							20x40 CSSI Sand Filter Pack
		7.0 - 9.5 Very loose, dark yellowish brown (10YR 4/2), unstratified, fine to medium SAND, damp. (FILL?)			7.0	2	CORE	2-2-2	4	1.5/1.5		2-in Standard Schedule 40 PVC Well Casing
					3.2							
		9.5 - 10.0 Very loose, dark yellowish brown, mottled fine to medium SAND, FeOx staining, wet. (ALLUVIUM?)			2.7	3	CORE	1-1-1	2	1.5/1.5		
10		10.0 - 14.0 Very loose, medium gray (N4), unstratified, very fine SAND to SILT. (ALLUVIUM)			10.0							10-slot Schedule 40 PVC Well Screen
					-1.3							
		14.0 - 20.5 Loose, dark gray (N3), unstratified, medium SAND, wet. (ALLUVIUM)			14.0	4	CORE	5-6-7	13	1.5/1.5		Stainless Steel Centralizers located at 5.5' and 21 BGS
15												
20					-7.8	5	CORE	3-8-9	17	1.3/1.5		Flush Threaded PVC End Cap
					20.5							
		Boring completed at 21.5 ft.										
25												
30												
35												
40												

1 in to 5 ft

DRILLING CONTRACTOR: Cascade Drilling
DRILLER: Scott

LOGGED: DTB
CHECKED: T. Norton
DATE: 4/11/2007

Golder Associates

BOREHOLE RECORD - BP2 CMS 2-60S IV BORING & WELL LOGS.GPJ GLDR_WA.GDT 4/11/07

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PL2-605AR

Client: The Boeing Company
Logged By: J. Bernthal
Date of Drilling: 11/20/08
Location: Plant 2 2-60s Area
Drilling Contractor: Cascade Drilling, Inc.
Drill Rig: CME-75
Method: Hollow Stem Auger
Borehole: 9" Borehole, 2" PVC

Site Representation:

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Blows per 6"	Sample	PID (ppm)	Well Data	Comments
0			Ground Surface							Lockable water tight well cap
			Concrete							
1–2		SP	***Poorly-Graded Sand*** Dark yellowish-brown; Damp; Medium dense; fine to medium sand; Fill Material			7, 7, 8		0		Flush monument set in concrete surface seal
3–4										Hydrated bentonite chips
5										Stainless Steel Centralizer
6			***Concrete-buried slab***							
7–8		SP	***Poorly-Graded Sand*** Dark yellowish-brown, Damp; Very loose; Fine to medium sand; Fill Material			2, 2, 2		0		
9										
10		SM	***Silty Sand*** Medium to dark gray; Wet, Loose; Very fine sand and silt; Alluvium			1, 1, 1		0		20x40 CSSI Sand Filter Pack
11–12										
13										10-Slot, Sch. 40 PVC Well Screen
14–15		SP	***Poorly-Graded Sand*** Dark gray; Wet; Loose; medium sand			5, 6, 7		0		
16–18										
19										Stainless Steel Centralizer
20		SP	***Poorly-Graded Sand*** Dark gray; Wet; Loose; medium sand			7, 8, 9		0		
21										Flush-Threaded PVC End
22			End of Borehole							

Project No. 17507.2 (OA-9 IM)

RECORD OF BOREHOLE PL2-606A

SHEET 1 of 1

PROJECT: Boeing Plant 2
PROJECT NUMBER: 013-1646-002.200
LOCATION: 2-60s Area

DRILLING METHOD: HSA
DRILLING DATE: 08/19/2005
DRILL RIG: CME 75

DATUM: NAD83(91)/NGVD29
AZIMUTH: N/A
COORDINATES: N: 196,508.55000 E: 1,275,796.81000

ELEVATION: 12.82
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft (10 20 30 40) / WATER CONTENT (PERCENT) W_p W W_l	NOTES WATER LEVELS / GRAPHIC
0		0.0 - 0.5 Concrete			12.3							Concrete Surface Seal
		0.5 - 3.0 Loose, dark yellowish brown (10YR 4/2), structureless, medium SAND, damp. (FILL) (Chemical odor or staining observations not recorded at time of drilling)			0.5	1	CORE	7-8-8	16	1.5/1.5		Hydrated Bentonite Chips
		3.0 - 4.0 Concrete			9.8 / 3.0 / 8.8							
5		4.0 - 9.3 Loose, dark yellowish brown, structureless, very fine SAND, damp. (FILL)			4.0	2	CORE	5-6-6	12	1.2/1.5		20x40 CSSI Sand Filter Pack; 2-in Standard Schedule 40 PVC Well Casing
10		9.3 - 19.0 Very loose, dark gray (N3), very fine SAND and SILT with bedded fine SAND lenses, moist. (ALLUVIUM) Strong odor (MS/MSD)			3.5 / 9.3	3	CORE	2-2-2	4	1.5/1.5		10-slot Schedule 40 PVC Well Screen
15						4	CORE	3-4-4	8	–/1.5		Stainless Steel Centralizers located at 5.5' and 21 BGS
20		19.0 - 21.5 Loose, dark gray (N3), unstratified, medium SAND. (ALLUVIUM) Very slight odor.			-6.2 / 19.0	5	CORE	6-6-9	15	–/1.5		Flush Threaded PVC End Cap
		Boring completed at 21.5 ft.			-8.7 / 21.5							
25												
30												
35												
40												

1 in to 5 ft
DRILLING CONTRACTOR: Cascade Drilling
DRILLER: Scott

LOGGED: DTB
CHECKED: T. Norton
DATE: 4/11/2007

Golder Associates

P2 CMS 2-60S IV BORING & WELL LOGS.GPJ GLDR_WA.GDT 4/11/07
BOREHOLE REC

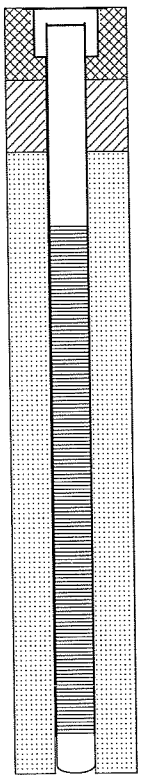
ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: OA9-BV1

Client: Boeing
Logged By: J. Bernthal
Date of Drilling: 9/22/08
Location: 7555 East Marginal Way, Seattle, WA
Drilling Contractor: Boart Longyear
Drill Rig: Foremost Mobile Model B-59
Method: Hollow Stem Auger (HSA)
Borehole: 9" Borehole, 2" PVC

Site Representation:

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Blows per 6"	Sample	PID (ppm)	Well Data	Comments
			Ground Surface							
0–3		GP	***Poorly-Graded Gravel with sand*** Brown; Dry; Medium dense; Mostly coarse gravel with little sand			10, 12, 10		0.0		
3–10		SP	***Poorly-Graded Sand with gravel*** Brown; Dry; Very loose; Mostly coarse sand with little gravel; petroleum odor			2, 2, 2	OA9-BV-1	NA		
8–10		SM	***Silty Sand*** Dark brown; Slightly moist; Very loose; Mostly fine sand with some silt; strong petroleum odor			2, 1, 1		866		
			End of Borehole							



Project No. 17510.2 (OA-9 IM)

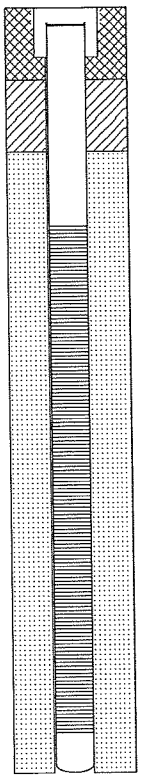
ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: OA9-BV2

Client: Boeing
Logged By: J. Bernthal
Date of Drilling: 9/23/08
Location: 7555 East Marginal Way, Seattle, WA
Drilling Contractor: Boart Longyear
Drill Rig: Foremost Mobile Model B-59
Method: Hollow Stem Auger (HSA)
Borehole: 9" Borehole 2" PVC

Site Representation:

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Blows per 6"	Sample	PID (ppm)	Well Data	Comments
			Ground Surface							
0–1		SP	***Poorly-Graded sand with gravel*** Light brown; Dry; Medium dense; Mostly medium to coarse sand with some gravel			7, 8, 7		0.2		Lockable Water Tight Well Cap; Flush Monument Set in Concrete Surface Seal; Hydrated Bentonite Chips
1–2										
2–3										
3–4										2" PVC Well Casing; 10x12 CSSI Sand Filter Pack
4–5										
5–6			Gravel content decreasing with depth			5, 5, 6	OA9-BV-2	54.6		
6–7										
7–8										20 Slot, SCH 40 PVC Screen
8–9		SM	***Silty Sand*** Light brown; Slightly moist; Very loose; Mostly fine sand with some silt and little gravel							
9–10						4, 1, 1		93.1		
10–11			End of Borehole							Flush Threaded PVC End Cap
11–12										
12–13										
13–14										
14–15										



Project No. 17510.2 (OA-9 IM)

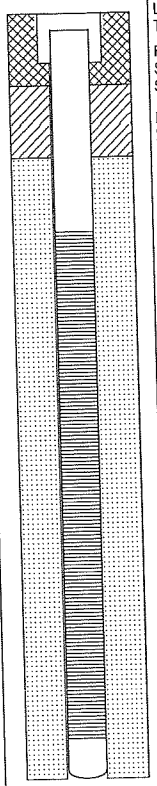
ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: OA9-BV3

Client: Boeing
Logged By: J. Bernthal
Date of Drilling: 9/22/08
Location: 7555 East Marginal Way, Seattle, WA
Drilling Contractor: Boart Longyear
Drill Rig: Foremost Mobile Model B-59
Method: Hollow Stem Auger (HSA)
Borehole: 9" Borehole. 2" PVC

Site Representation:

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Blows per 6"	Sample	PID (ppm)	Well Data	Comments
			Ground Surface							
0–1		SP	***Poorly-Graded Sand with gravel*** Light brown; Dry; Loose; Mostly medium to coarse sand with some gravel			5, 4, 4		51.6		Lockable Water Tight Well Cap; Flush Monument Set in Concrete Surface Seal; Hydrated Bentonite Chips
2–4										2" PVC Well Casing
5–6			Grades to brown, very loose, mostly medium to coarse sand with little gravel			4, 1, 1	OA9-BV-3	NA		10x12 CSSI Sand Filter Pack
7										20 Slot, Sch 40 PVC Screen
8–10		SM	***Silty Sand*** Light brown; Slightly moist; Very loose; Mostly fine sand with some silt			1, 1, 1		42.5		Flush Threaded PVC End Cap
11–15			End of Borehole							



Project No. 17510.2 (OA-9 IM)

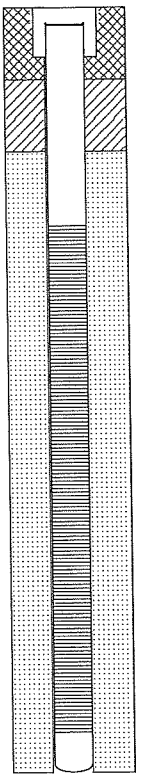
ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: OA9-BV4

Client: Boeing
Logged By: J. Bernthal
Date of Drilling: 9/22/08
Location: 7555 East Marginal Way, Seattle, WA
Drilling Contractor: Boart Longyear
Drill Rig: Foremost Mobile Model B-59
Method: Hollow Stem Auger (HSA)
Borehole: 9" Borehole, 2" PVC

Site Representation:

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Blows per 6"	Sample	PID (ppm)	Well Data	Comments
			Ground Surface							
0–1		SP	***Poorly-Graded Sand with gravel*** Light brown; Dry; Loose; Mostly medium to coarse sand with some gravel			5, 4, 3		0.0		Lockable Water Tight Well Cap; Flush Monument Set in Concrete Surface Seal; Hydrated Bentonite Chips
1–5										2" PVC Well Casing
5–8			Grades to brown, very loose, mostly medium to coarse sand with little gravel			1, 1, 1	OA9-BV-4	NA		10x12 CSSI Sand Filter Pack; 20 Slot, SCH 40 PVC Screen
8–10		SM	***Silty Sand*** Light brown; Slightly moist; Very loose; Mostly fine sand with some silt			2, 1, 1		20.0		Flush Threaded PVC End Cap
			End of Borehole							



Project No. 17510.2 (OA-9 IM)

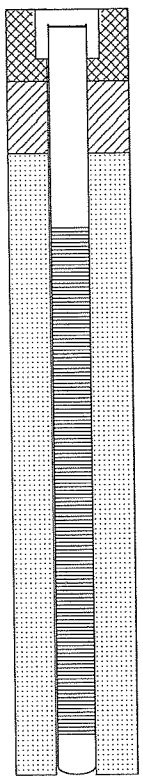
ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: OA9-BV5

Client: Boeing
Logged By: J. Bernthal
Date of Drilling: 9/22/08
Location: 7555 East Marginal Way, Seattle, WA
Drilling Contractor: Boart Longyear
Drill Rig: Foremost Mobile Model B-59
Method: Hollow Stem Auger (HSA)
Borehole: 9" Borehole, 2" PVC

Site Representation:

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Blows per 6"	Sample	PID (ppm)	Well Data	Comments
			Ground Surface							
0–1		SP	***Poorly-Graded Sand with gravel*** Light brown; Dry; Loose; Mostly medium to coarse sand with some gravel			5, 5, 5		0.6		
5–6			Grades to brown, loose, mostly medium to coarse sand with little gravel			1, 2, 3	OA9-BV-5	42.1		
8–10		SM	***Silty Sand*** Light brown; Slightly moist; Very loose; Mostly fine sand with some silt			4, 1, 1		51.7		
			End of Borehole							



Lockable Water Tight Well Cap
Flush Monument Set in Concrete Surface Seal
Hydrated Bentonite Chips
2" PVC Well Casing
10x12 CSSI Sand Filter Pack
20 Slot, SCH 40 PVC Screen
Flush Threaded PVC End Cap

Project No. 17510.2 (OA-9 IM)

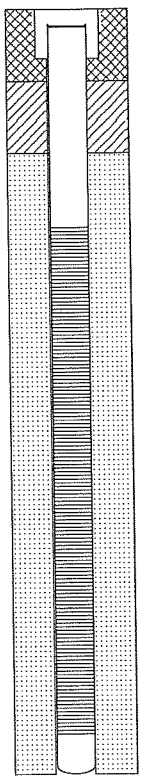
ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: OA9-BV6

Client: Boeing
Logged By: J. Bernthal
Date of Drilling: 9/22/08
Location: 7555 East Marginal Way, Seattle, WA
Drilling Contractor: Boart Longyear
Drill Rig: Foremost Mobile Model B-59
Method: Hollow Stem Auger (HSA)
Borehole: 9" Borehole, 2" PVC

Site Representation:

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Blows per 6"	Sample	PID (ppm)	Well Data	Comments
			Ground Surface							
0–1		SP	***Poorly-Graded Sand with gravel*** Light brown; Dry; Loose; Mostly medium to coarse sand with some gravel			6, 5, 5		0.0		
5–6			Grades to brown, loose, mostly medium to coarse sand with little gravel			3, 2, 3	OA9-BV-6	43.6		
8–10		SM	***Silty Sand*** Light brown; Slightly moist; Very loose; Mostly fine sand with some silt			1, 0, 1		26.1		
			End of Borehole							



Lockable Water Tight Well Cap
Flush Monument Set in Concrete Surface Seal
Hydrated Bentonite Chips
2" PVC Well Casing
10x12 CSSI Sand Filter Pack
20 Slot, SCH 40 PVC Screen
Flush Threaded PVC End Cap

Project No. 17510.2 (OA-9 IM)

2" well diameter		
depth in feet	gallons	cubic feet
	x 0.163	x 0.134
10	1.6	0.22
11	1.8	0.24
12	2.0	0.26
13	2.1	0.28
14	2.3	0.31
15	2.4	0.33
16	2.6	0.35
17	2.8	0.37
18	2.9	0.39
19	3.1	0.41
20	3.3	0.44
21	3.4	0.46
22	3.6	0.48
23	3.7	0.50
24	3.9	0.52
25	4.1	0.55
26	4.2	0.57
27	4.4	0.59
28	4.6	0.61
29	4.7	0.63
30	4.9	0.66
31	5.1	0.68
32	5.2	0.70
33	5.4	0.72
34	5.5	0.74
35	5.7	0.76
36	5.9	0.79
37	6.0	0.81
38	6.2	0.83
39	6.4	0.85
40	6.5	0.87
41	6.7	0.90
42	6.8	0.92
43	7.0	0.94
44	7.2	0.96
45	7.3	0.98
46	7.5	1.00
47	7.7	1.03
48	7.8	1.05
49	8.0	1.07
50	8.2	1.09

4" well diameter		
depth in feet	gallons	cubic feet
	x 0.653	x 0.134
10	6.5	0.88
11	7.2	0.96
12	7.8	1.05
13	8.5	1.14
14	9.1	1.23
15	9.8	1.31
16	10.4	1.40
17	11.1	1.49
18	11.8	1.58
19	12.4	1.66
20	13.1	1.75
21	13.7	1.84
22	14.4	1.93
23	15.0	2.01
24	15.7	2.10
25	16.3	2.19
26	17.0	2.28
27	17.6	2.36
28	18.3	2.45
29	18.9	2.54
30	19.6	2.63
31	20.2	2.71
32	20.9	2.80
33	21.5	2.89
34	22.2	2.98
35	22.9	3.06
36	23.5	3.15
37	24.2	3.24
38	24.8	3.33
39	25.5	3.41
40	26.1	3.50
41	26.8	3.59
42	27.4	3.68
43	28.1	3.76
44	28.7	3.85
45	29.4	3.94
46	30.0	4.03
47	30.7	4.11
48	31.3	4.20
49	32.0	4.29
50	32.7	4.38

ENVIRONMENTAL PARTNERS INC 295 NE Gilman Boulevard, Suite 201 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

Well Decommissioning Interim Measure – October 2010 Book #3

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number 17512.0.15

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, Washington 98027
(425) 395-0010

Wells to be Decommissioned - October 12, 2010

Well ID	Total Depth (ft.)	Screened Interval (ft. bgs)	Casing Diameter and Material	Decommissioning Method	Location /Comments
PL2-401A	23	12-22	2-inch PVC	Chip in place per WAC 173-160-460	Inside Building 2-41, northeast corner
PL2-410A	21.5	11-21	2-inch PVC	Chip in place per WAC 173-160-460	Inside Building 2-41, southeast corner
PL2-442A	18	8-18	2-inch PVC	Chip in place per WAC 173-160-460	Inside Building 2-41, northwest part of building
PL2-442B	45.5	35-45	2-inch PVC	Grout per WAC 173-160-460	
PL2-442C	80.5	75-80	2-inch PVC	Grout per WAC 173-160-460	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-410A	
Well Location	Northing: 196612.479	Easting: 1275866.394
Start (date and time)	10/12/10 @ 0820	
End (date and time)	10/12/10 @ 0835	
Installation Method	Hollow-Stem Auger	
Total Well Depth	21.5 feet bgs	
Well Diameter	2 inches	
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	11-21 feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Bentonite	
Grout Volume	1/2 Gallons	
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling Inc	
License Number	CASCADL91508	
Signature (Driller)	Lynn Noble #2982	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-401A	
	Northing	Easting
Well Location	197159.0309	1275105.281
Start (date and time)	10/12/10 0850	
End (date and time)	10/12/10 0905	
Installation Method	Hollow Stem Auger	
Total Well Depth	23	feet bgs
Well Diameter	2	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs)	12-22	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout	Bentonite	
Grout Volume	1/2	Gallons
Surface Completion	Concrete	
Drilling Contractor	Casade Drilling Inc	
License Number	# 2982	CASCADL91508
Signature (Driller)	Lynn Zahl	
Signature (Engineer or Geologist)		

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-442A	
	Northing	Easting
Well Location	196748.5543	1275013.196
Start (date and time)	10/12/10 @ 1120	
End (date and time)	10/12/10 @ 1145	
Installation Method	Hollow Stem Auger	
Total Well Depth	8-18	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8-18	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Bentonite	
Grout Volume	1/2	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling Inc.	
License Number	#2982	CASCADL91508
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-442B	
Well Location	Northing: 196749.5	Easting: 1275014.00
Start (date and time)	10/12/10 0930	
End (date and time)	10/12/10 0955	
Installation Method	Geoprobe	
Total Well Depth	45.5	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	35-45	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Pressurized Grout	
Grout Volume	17	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling Inc.	~~Bas~~ JB
License Number	#2482	CASCADI91508
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-442C	
Well Location	Northing: 196751.7	Easting: 1275609.7
Start (date and time)	10/12/10 @ 1000	
End (date and time)	10/12/10 @ 1050	
Installation Method	Geoprobe	
Total Well Depth	80.5	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	75-80	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Pressurized Grout	
Grout Volume	33	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling Inc	
License Number	#2982	CASCADL9158K
Signature (Driller)	Lyon Gable	
Signature (Engineer or Geologist)		

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number		
	Northing	Easting
Well Location		
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout		
Grout Volume		Gallons
Surface Completion		
Drilling Contractor		
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

WELL PL2-401A (SB-04001)

PROJECT BOEING SUSPECT AREAS
DATE COMPLETED 6 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 13.07
GROUND SURFACE ELEV 13.41
LOGGED BY Mark Pugh

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
						SW	WELL GRADED SAND (SW), Dark grayish brown (2.5Y4/2), 95% medium to fine sand, 5% silt, (fill)
5	BG					ML	SILT with SAND (ML), Very dark gray (5Y4/1), 85% silt, 15% sand, firm/stiff, moist, (native soil)
	BG	SB-04001-0065 VOC, HCID	8			SP	POORLY GRADED SAND (SP), Very dark gray (5Y4/1), 100% medium sand, very loose/loose, moist
	BG	SB-04001-0080 VOC, HCID,	4			MH	ELASTIC SILT (MH), Black (7.5YR2/1), 100% silt, soft, moist, color change to dark olive gray (5Y3/2) at 9.25-feet, trace of root fragments
10	BG		3				
	BG		2				
	BG	SB-04001-0125 VOC, HCID,	3			SW-SM	WELL GRADED SAND (SW-SM), Very dark gray (10YR3/1), 90% fine to medium sand, 10% silt, loose, saturated, sandy silt interbeds
	BG		8			SP	POORLY GRADED SAND (SP), Black (2.5YR7.5/0), 100% medium sand, loose/medium dense, saturated
15	BG		10				
	BG		13				5% Coarse sand
	BG		8				
20	BG		10				
	BG		9				Wood obstacle at 22-feet
	BG		>50				BOH @ 23.0'
25							

12/16/
12/6/93

PLATE A-10

JOB NUMBER: 03709-038-001-4010 DATE: January 1994

WEL PL2-410A (SB-04002)

PROJECT BOEING SUSPECT AREAS
DATE COMPLETED 2 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 13.20
GROUND SURFACE ELEV 13.42
LOGGED BY Tim Fitzgerald

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
						SP	
	BG						
5	BG	SB-04002-0050 VOC, HCID, TPH-G (ARCHIVE)	6 8				POORLY GRADED SAND (SP) Yellow brown (10YR5/4), 100% medium to fine sand, loose, dry, (fill)
	BG	SB-04002-0080 VOC, HCID, TPH-G (ARCHIVE)	6			ML	SILT (ML) Very dark gray (10YR3/2), 100% silt, firm, damp, 1-inch black organic seam, (native soil)
7						SP	
	BG	SB-04002-0110 VOC, HCID, TPH-G (ARCHIVE)	7				POORLY GRADED SAND (SP) Very dark gray (10YR3/2), 100% medium to fine sand, loose, saturated
	BG		6				
	BG		6				
15	BG		9				Grading to coarse sand
	BG		20				Two-feet of sand heave, driller adds water
	BG		7				
	BG		9				
20	BG		8				
							BOH @ 21.5'
5							

Depth scale: 0, 5, 10, 15, 20, 25

12/12/93
12/16/93

PLATE A-11

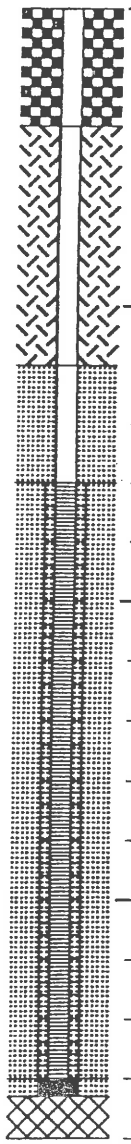
JOB NUMBER: 03709-038-001-4010 DATE: January 1994

Sheet 1 of 1

Boring PL2-442A

Project	Boeing RFI	Start Date	11/23/94	Finish Date	11/23/94
Location	Plant 2 Seattle, WA	Driller		Drilling Co.	Cascade
Project No.	03709-034-300	Drilling Method	HSA		
Contractor	Weston	Sampling Method	Split spoon		
Logged by	Fitzgerald	Top of Casing (ft)	12.47	Boring Diam. (in)	10
		Ground Surf. Elev. (ft)	12.47	Total Depth (ft)	18.00

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							SP	Sand (SP) brownish gray (10YR5/2) 100% medium sand, medium dense, moist, trace silty. Wet with product staining at 12 ft bgs.
	BG				6			
5	BG				5			
	BG	HCID PCB	SB-04126-0075		4			
10	1	HCID PCB	SB-04126-0100		4			
	17	HCID PCB	SB-04126-0125		10			
15	.5				10			
	BG				27			
20								



RECORD OF BOREHOLE PL2-442B

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/14/08
DATE COMPLETED: 7/14/08
WEATHER: Inside Bldg

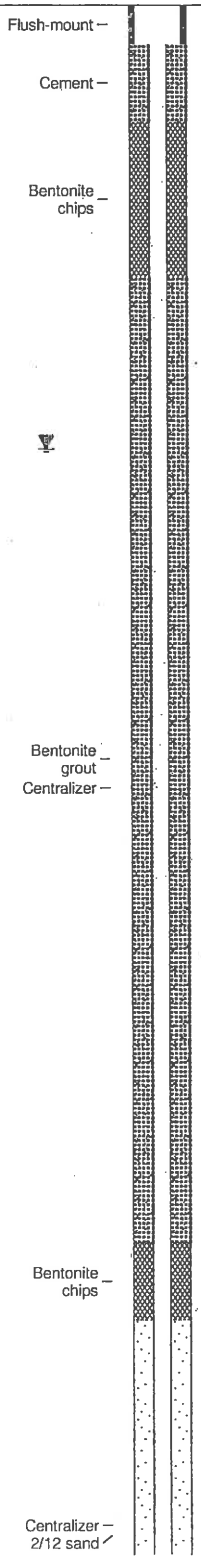
DATUM: Geodetic
COORDS: N: 196,749.5 E: 1,275,014.0
GS ELEVATION: 12.9 ft
TOC ELEVATION: 12.5 ft
TEMPERATURE: 76 F

INCLINATION: -90
DEPTH W.L.: 11.4 ft
ELEVATION W.L.: 1.1 ft
DATE W.L.: 10/23/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES PID (ppm)	NUMBER	TYPE	REC / ATT
0		0.0 - 0.5 CONCRETE			12.4 / 0.5				
		0.5 - 3.0 Light brown, fine to medium SAND, dry, no odor (SP)	SP		9.9	0.0	1	GRAB	4.5 / 5.0
10		3.0 - 4.0 Gray-brown, SILT, little to some fine Sand, dry, no odor (ML)	ML		3.0 / 8.9				
		4.0 - 4.5 Gray and brown mottled, CLAY, dry, low plasticity, no odor (CL)	CL / SP-SM		8.4 / 7.9				
5		4.5 - 5.0 Red-brown, fine SAND, little Silt, dry, no odor (SP-SM)	SP / CL		6.9				
		5.0 - 5.3 Light brown, fine to medium SAND, dry, no odor (SP)	SP / CL		6.3				
		5.3 - 5.4 Gray-brown, CLAY, dry, low plasticity, no odor (CL)	CL			0.0	2	GRAB	5.0 / 5.0
5		5.4 - 6.0 Light brown, fine to medium SAND, dry, no odor (SP)							
		6.0 - 6.3 Gray and brown mottled, CLAY, some fine Sand, dry, low plasticity, no odor (CL)	SP / CL		3.4				
10		6.3 - 9.5 Red-brown fine SAND and gray CLAY, rhythmic laminations, dry, low plasticity, no odor (CL)			10.0				
		9.5 - 9.8 Dark gray, poorly graded, fine SAND, moist, no odor (SP)							
0		9.8 - 10.0 Dark gray, CLAY, moist, low plasticity, no odor (CL)							
15		10.0 - 45.0 Soil logging stopped at 10.0 ft bgs in this borehole. SEE PL2-442C BOREHOLE LOG FOR SOIL LITHOLOGY DESCRIPTION.							
-5									
20									
-10									
25									
-15									
30									
-20									
35									
-25									
40									

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-442B
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-35 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 35-45 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 34-45 ft
Type: 2/12 sand
Quantity: 11 ft
FILTER PACK SEAL
Interval: 32-34 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 3-32 ft
Type: Bentonite grout
Quantity: 28 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

RECORD OF BOREHOLE PL2-442B

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/14/08
DATE COMPLETED: 7/14/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,749.5 E: 1,275,014.0
GS ELEVATION: 12.9 ft
TOC ELEVATION: 12.5 ft
TEMPERATURE: 76 F

INCLINATION: -90
DEPTH W.L.: 11.4 ft
ELEVATION W.L.: 1.1 ft
DATE W.L.: 10/23/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		10.0 - 45.0 Soil logging stopped at 10.0 ft bgs in this borehole. SEE PL2-442C BOREHOLE LOG FOR SOIL LITHOLOGY DESCRIPTION. *(Continued)*								PL2-442B 10-slot screen	**PL2-442B** Borehole Diameter: 8-inch **WELL CASING** Interval: 0-35 ft Material: PVC Diameter: 2-inch Joint Type: Threaded **WELL SCREEN** Interval: 35-45 ft Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: Flush **FILTER PACK** Interval: 34-45 ft Type: 2/12 sand Quantity: 11 ft **FILTER PACK SEAL** Interval: 32-34 ft Type: Bentonite chips Quantity: 2 ft **ANNULUS SEAL** Interval: 3-32 ft Type: Bentonite grout Quantity: 28 ft
	-30										
45		Boring completed at 45.0 ft			-32.1						
	-35										
50											
	-40										
55											
	-45										
60											
	-50										
65											
	-55										
70											
	-60										
75											
	-65										
80											

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

RECORD OF BOREHOLE PL2-442C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/14/08
DATE COMPLETED: 7/14/08
WEATHER: Inside Bldg

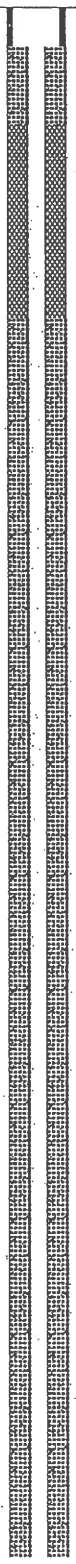
DATUM: Geodetic
COORDS: N: 196,751.7 E: 1,275,009.7
GS ELEVATION: 13.0 ft
TOC ELEVATION: 12.4 ft
TEMPERATURE: 76 F

INCLINATION: -90
DEPTH W.L.: 10.9 ft
ELEVATION W.L.: 1.5 ft
DATE W.L.: 8/6/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (ft)	SAMPLES PID (ppm)	NUMBER	TYPE	REC / ATT
0		0.0 - 0.5 CONCRETE		12.5 / 0.5				
		0.5 - 2.9 Light brown, SILTY fine SAND, dry, no odor (SM)	SM	10.1	0.0	1	GRAB	4.5 / 5.0
10		2.9 - 3.0 Very light brown, medium SAND, dry, no odor (SP)	SP	9.5				
		3.0 - 3.5 Red-brown, SILTY fine SAND, dry, no odor (SM)	SM / SP	3.5 / 8.0				
5		3.5 - 5.0 Red-brown, fine SAND, dry, Silty fine Sand lense at 4.75 ft bgs, no odor (SP)	SM	5.0				
		5.0 - 7.5 Brown, fine SAND, some Silt, dry, no odor (SM)		5.5	0.0	2	GRAB	5.0 / 5.0
5		7.5 - 8.0 Brown, fine SANDY CLAY, dry, low plasticity, no odor (CL)	CL	5.0				
		8.0 - 9.0 Brown, SILTY fine SAND, dry, no odor (SM)	SM	8.0 / 4.0				
10		9.0 - 9.3 Gray, fine SANDY CLAY, dry, low plasticity, no odor (CL)	CL	3.0				
		9.3 - 10.0 Gray-brown, CLAY, dry, low plasticity, no odor (CL)	SM	10.0				
		10.0 - 12.0 Brown, fine SAND, little to some Silt, dry, no odor (SM)		0.9				
0		12.0 - 17.0 Gray, fine SAND, wet at 14 ft bgs, sheen, strong diesel odor (SP)	SP	12.0 / -4.1	80.3	3	GRAB	5.0 / 5.0
-5		17.0 - 20.0 Gray, fine to medium SAND, wet, sheen, strong diesel odor (SP)	SP	17.0 / -7.1	246	4	GRAB	5.0 / 5.0
-10		20.0 - 25.0 Gray, fine to medium SAND, wet, no sheen, strong diesel odor (SP)	SP	20.0 / -12.1	48.4	5	GRAB	5.0 / 5.0
-15		25.0 - 30.0 Dark gray to black, medium to coarse SAND, wet, slight diesel odor (SP)	SP	25.0 / -17.1	0.0	6	GRAB	5.0 / 5.0
-20		30.0 - 35.0 Dark gray to black, medium to coarse SAND, wet, slight diesel odor (SP)	SP	30.0 / -22.1	2.6	7	GRAB	5.0 / 5.0
-25		35.0 - 40.0 Dark gray to black, medium to coarse SAND, wet, slight diesel odor (SP)	SP	35.0 / -27.1	26.2	8	GRAB	5.0 / 5.0

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-442C
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-75.5 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 75.5-80.5 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 73-80.5 ft
Type: 2/12 sand
Quantity: 7.5 ft
FILTER PACK SEAL
Interval: 70-73 ft
Type: Bentonite chips
Quantity: 3 ft
ANNULUS SEAL
Interval: 3-70 ft
Type: Bentonite grout
Quantity: 67 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

RECORD OF BOREHOLE PL2-442C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/14/08
DATE COMPLETED: 7/14/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,751.7 E: 1,275,009.7
GS ELEVATION: 13.0 ft
TOC ELEVATION: 12.4 ft
TEMPERATURE: 76 F

INCLINATION: -90
DEPTH W.L.: 10.9 ft
ELEVATION W.L.: 1.5 ft
DATE W.L.: 8/6/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT
40		40.0 - 43.0 Dark gray to black, medium to coarse SAND, wet, no odor (SP)	SP		40.0 / -30.1	0.0	9	GRAB	5.0 / 5.0
	-30	43.0 - 45.0 Dark gray, SILTY fine SAND, wet, no odor (SM)	SM		43.0 / -32.1				
45		45.0 - 48.0 Gray, fine SANDY CLAY, wet, low plasticity, no odor (CL)	CL		45.0 / -35.1	0.0	10	GRAB	5.0 / 5.0
	-35	48.0 - 50.0 Dark gray, poorly graded, fine SAND, wet, 1-inch gray low plasticity Clay at 49 ft bgs, no odor (SP)	SP		48.0 / -37.1				
50		50.0 - 52.5 Gray, CLAY, some fine SAND, wet, low plasticity, no odor (CL)	CL		50.0 / -39.6	0.0	11	GRAB	5.0 / 5.0
	-40	52.5 - 55.0 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		52.5 / -42.1				
55	-45	55.0 - 60.0 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		55.0 / -47.1	0.0	12	GRAB	5.0 / 5.0
60		60.0 - 63.0 Dark gray, SILTY fine SAND, wet, no odor (SM)	SM		60.0 / -50.1	0.0	13	GRAB	5.0 / 5.0
	-50	63.0 - 65.0 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		63.0 / -52.1				
65		65.0 - 67.0 Gray, SILTY fine SAND, wet, no odor (SM)	SM		65.0 / -54.1				
	-55	67.0 - 70.0 Dark gray to black, fine SAND, wet, 1-inch Sandy Clay at 69 ft bgs, no odor (SP)	SP		67.0 / -57.1	0.0	14	GRAB	5.0 / 5.0
70		70.0 - 73.0 Dark gray, SILTY fine SAND, wet, no odor (SM)	SM		70.0 / -60.1	0.0	15	GRAB	5.0 / 5.0
	-60	73.0 - 75.0 Dark gray to black, fine SAND, wet, no odor (SP)	SP		73.0 / -62.1				
75	-65	75.0 - 80.0 Dark gray to black, fine to medium SAND, wet, no odor (SP) (PROBABLE SLOUGH/HEAVE)	SP		75.0 / -67.1	0.0	16	GRAB	5.0 / 5.0
80									

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

WELL CONSTRUCTION DETAILS

PL2-442C
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-75.5 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 75.5-80.5 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 73-80.5 ft
Type: 2/12 sand
Quantity: 7.5 ft
FILTER PACK SEAL
Interval: 70-73 ft
Type: Bentonite chips
Quantity: 3 ft
ANNULUS SEAL
Interval: 3-70 ft
Type: Bentonite grout
Quantity: 67 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

RECORD OF BOREHOLE PL2-442C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/14/08
DATE COMPLETED: 7/14/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,751.7 E: 1,275,009.7
GS ELEVATION: 13.0 ft
TOC ELEVATION: 12.4 ft
TEMPERATURE: 76 F

INCLINATION: -90
DEPTH W.L.: 10.9 ft
ELEVATION W.L.: 1.5 ft
DATE W.L.: 8/6/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES (PL2-442C)	WELL CONSTRUCTION DETAILS
80		80.0 - 85.0 Dark gray to black, fine to medium SAND, wet, no odor (SP) (PROBABLE SLOUGH/HEAVE)	SP		80.0 -72.1	0.0	17	GRAB	5.0 / 5.0	Heave	**PL2-442C** Borehole Diameter: 8-inch **WELL CASING** Interval: 0-75.5 ft Material: PVC Diameter: 2-inch Joint Type: Threaded **WELL SCREEN** Interval: 75.5-80.5 ft Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: Flush **FILTER PACK** Interval: 73-80.5 ft Type: 2/12 sand Quantity: 7.5 ft **FILTER PACK SEAL** Interval: 70-73 ft Type: Bentonite chips Quantity: 3 ft **ANNULUS SEAL** Interval: 3-70 ft Type: Bentonite grout Quantity: 67 ft
85		Boring completed at 85.0 ft									

Depth scale: 80, 85, 90, 95, 100, 105, 110, 115, 120
Elevation scale: -70, -75, -80, -85, -90, -95, -100, -105

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

WAC 173-160-420

What are the general construction requirements for resource protection wells?

(1) No resource protection well or soil boring excavation may be used to withdraw or inject water for domestic, industrial, municipal, commercial, or agricultural purposes.

(2) No resource protection well or soil boring excavation may interconnect aquifers.

(3) Nested resource protection wells are prohibited.

(4) Cuttings, development water, and other investigation derived waste from resource protection well construction or geotechnical soil borings shall be managed in a manner consistent with the intent and purposes of the Water Pollution Control Act, chapter 90.48 RCW, the Hazardous Waste Management Act, chapter 70.105 RCW, and implementing regulations.

(5) Well tagging:

(a) It shall be the driller's responsibility to place a well identification tag with a unique identification number on every resource protection well that they construct or alter within thirty days of completion of the well. Uncased geotechnical soil borings and environmental investigation wells are exempt from the tagging requirements of this chapter.

(i) The alpha-numeric number shall be recorded on the drilling report in the space provided.

(ii) The driller shall remove the well identification tag on all resource protection wells they decommission and shall attach the tag to the decommissioning well report.

(b) It shall be the well owner's responsibility to place a well identification tag with a unique identification number on every resource protection well they own and which was completed prior to the effective date of this regulation.

(i) Upon request, the department shall furnish the well owner with a well tag and tagging instructions.

(ii) The well owner shall tag their well(s) and submit a completed tagging report to the department.

(c) The well tag shall be permanently attached to:

(i) The well casing and be visible above land surface for all wells which have been completed above land surface.

(ii) The well casing or to any permanent and protected portion of the vault for wells completed below land surface.

(iii) A prominent system component visible above land surface for ground source heat pump borings.

(d) All well identification tags shall be supplied by the department.

(e) It is unlawful for a person to tamper with or remove a well identification tag except during well alteration.

(6) All resource protection wells will be sealed in accordance with WAC 173-160-450 regardless of the method of installation. Except, resource protection wells that are properly decommissioned prior to the removal of any drilling equipment from the well location are

exempted from the surface sealing requirements of this chapter. Provided the decommissioning process includes the removal of any conduit, tubing, probe, or other items inserted into the ground.

(7) All geotechnical soil borings shall be decommissioned under the terms of this chapter.

(8) Except as provided in RCW 18.104.180, all construction, alteration, reconstruction, and decommissioning of resource protection wells and geotechnical soil borings shall be done by an individual licensed under the provisions of chapter 173-162 WAC.

(9) A notice of intent to construct or decommission a resource protection well and a geotechnical soil boring shall be filed with the department a minimum of seventy-two hours prior to initiating construction or decommissioning of the well(s) or boring(s). A fee must accompany each notice of intent to construct or decommission a resource protection well.

(a) The fee for a resource protection well, except for an environmental investigation well, a ground source heat pump boring, or a grounding well, is forty dollars for each well.

(b) The fee for an environmental investigation well in which ground water is sampled or measured is forty dollars for the construction of up to four environmental investigation wells per project, and ten dollars for each additional environmental investigation well constructed on a project with more than four wells. There is no fee for soil or vapor sampling purposes.

(c) The fee for a ground source heat pump boring or a grounding well is forty dollars for construction of up to four ground source heat pump borings or grounding wells per project and ten dollars for each additional ground source heat pump boring or grounding well constructed on a project with more than four wells.

(d) The fee to decommission a resource protection well, except for an environmental investigation well, is twenty dollars per well. There is no fee to decommission an environmental investigation well or a geotechnical soil boring.

(e) The fee to decommission a ground source heat pump boring or a grounding well is twenty dollars per well.

(f) Under some circumstances, it may be necessary to construct more resource protection wells or geotechnical soil borings than originally anticipated. When additional resource protection wells are constructed on a site for which a notice of intent and fee were submitted, a second notice and fee shall be submitted within twenty-four hours after all wells have been completed or as soon as the final number of wells to be constructed is determined, whichever is sooner. When additional geotechnical soil borings are needed, the borings may be completed. A follow-up notice of intent shall be submitted to the department within twenty-four hours after all borings are constructed. Notification to construct multiple wells or geotechnical soil borings within the same quarter/quarter section, township, and range may be submitted on one notice form.

(10) Resource protection well reports.

(a) Anyone who constructs or decommissions a well is required to submit a complete well report on the construction or decommissioning of all resource protection wells and geotechnical soil borings. Reports must be submitted to the water resources program within thirty days after completion of construction or decommissioning. Submission of a well report to consulting firms does not meet the requirement of this section. The report must be an accurate summation of data collected in the field taken from field notes written as the well was constructed or decommissioned. Field notes must be available at all times during construction or decommissioning for review by state and local inspectors and kept until the well report is submitted.

(b) The resource protection well report must be made on a form provided by the department, or a reasonable facsimile of the form, as approved by the department.

(c) Where applicable the report shall include the following information:

(i) Owner's name; operator/trainee name; operator/trainee license number; contractor registration number, drilling company name;

(ii) Tax parcel number;

(iii) Well location address;

(iv) Location of the well to at least 1/4, 1/4 section or smallest legal subdivision;

(v) Unique well identification tag number;

(vi) Construction date;

(vii) Start notification number;

(viii) Intended use of well;

(ix) The well depth, diameter, and general specifications of each well;

(x) Total depth of casing;

(xi) Well head elevation;

(xii) Drilling method;

(xiii) Seal material, seal location and type of placement used;

(xiv) Filter pack location; filter pack material used;

(xv) The thickness and character of each bed, stratum or formation penetrated by each well including identification of each water bearing zone;

(xvi) Casing gauge, diameter, stickup, type of material, and length, also of each screened interval or perforated zone in the casing;

(xvii) The depth to the static water level, as measured below the land surface; and

(xviii) Such additional factual information as may be required by the department.

(d) The well report must include one of the following:

(i) The license number and signature of the person who constructed or decommissioned the well;

(ii) The license number and signature of the trainee and the licensed operator under chapter 18.104 RCW; or

(iii) The license number and signature of an exempted individual as defined under RCW 18.104.180(3).

(e) This rule shall allow an individual to submit electronic reports in accordance with department procedures. The use of a digital signature in the electronic reports will be authorized as a substitute for an original signature under (d) of this subsection.

What are the surface protection requirements?

(11) All resource protection wells shall be capped and protected using one of the following methods:

(a) If the well is cased with metal and completed above the ground surface, you must attach a watertight cap with a lock to the top of the casing.

(b) If the well is not cased with metal and completed above the land surface, you must install a protective metal casing over and around the well. The protective casing shall extend at least six inches above the top of the well casing and be cemented at least two feet into the ground. A cap with lock shall be attached to the top of the protective casing.

(12) You shall protect the well(s) completed above ground from damage by:

(a) Cementing three metal posts, at least three inches in diameter, in a triangular array around the casing and at least two feet from it. Each post shall extend at least three feet above and below the land surface.

(b) A reinforced concrete pad may be installed to protect against and prevent frost heave. If installed, the concrete pad shall extend to a depth equal to anticipated frost depth. When a concrete pad is used, the well seal may be part of the concrete pad.

(13) If the well is completed below land surface, a watertight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent the inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The cover must be designed to withstand the maximum expected loading.

(14) The protective measures may be waived or modified upon written approval from the department (a variance).

(15) If the well is damaged, the well protection measures and casing shall be repaired to meet the requirements of this chapter. If the well is damaged beyond repair, it shall be decommissioned in accordance with WAC 173-160-460.

WAC 173-160-460

What is the decommissioning process for resource protection wells?

(1) For resource protection wells and geotechnical soil borings that were not constructed in accordance with these regulations, or for which a drilling report required under this section is missing, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers, and decommission in one of the following ways:

(a) Perforate the casing from the bottom to land surface and pressure grout the casing.

(i) Perforations shall be at least four equidistant cuts per row, and one row per foot. Each cut shall be at least one and one-half inches long.

(ii) Apply enough pressure to force the sealing material through the perforations, filling any voids on the outside of the casing.

(iii) The remainder of the casing shall be filled with neat cement grout, neat cement, or bentonite slurry; or

(b) Withdraw the casing and fill the bore hole with neat cement grout, neat cement, bentonite or bentonite slurry as the casing is being withdrawn.

(2) For resource protection wells and geotechnical soil borings that were constructed in accordance with these regulations, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers and then decommission in one of the following ways:

(a) Wells with an inside casing diameter equal to or greater than one inch and constructed in accordance with these regulations as verified through a field examination and review of the drilling report shall be decommissioned by filling the casing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement.

(b) Wells with an inside casing diameter less than one inch shall be decommissioned by pressure grouting the entire casing length with bentonite slurry, neat cement grout, or neat cement.

(c) Vibrating wire piezometers installed to meet or exceed the sealing requirements of WAC 173-160-450, 173-160-457, and 173-160-458 are exempt from the decommissioning procedures and decommissioning reporting requirements provided here.

(d) Direct push wells shall be decommissioned in accordance with this section.

(e) Geotechnical soil borings, or boring, shall be decommissioned by sealing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement. Sealing material placed below the static water level shall be piped directly to the point of application or placed by means of a dump bailer or pumped through a tremie tube. If bentonite slurry, neat cement grout or neat cement is used to seal below the water level in the well, the material shall be placed from the bottom up by methods that avoid segregation or dilution of the material. When used to place bentonite slurry, neat cement or neat cement grout, the discharge end of the tremie tube shall be submerged in the bentonite slurry, neat cement or neat cement grout to avoid breaking the seal while filling the annular space. Provided the material does not dilute or segregate and the resulting seal is free of voids, sealing material may be hand poured above the static water level.

ENVIRONMENTAL PARTNERS INC 295 NE Gilman Boulevard, Suite 201 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

Well Decommissioning Interim Measure – April 2011 Book #4

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number ~~17512.0.15~~
17513.6

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, Washington 98027
(425) 395-0010

Well Information for Driller (No. 1)

Owner Name: The Boeing Company, Plant 2
Owner Address: Property Tax Dept., PO Box 3707 M/C 20-00, Seattle, WA 98124
Telephne Number: 425-891-7724 (William Ernst, Boeing Environmental)

Site Address: 7755 East Marginal Way South, Seattle, WA 98124
Tax Parcel Number: 0001600020 (for all except PL2-233A - tax parcel is 3324049002)

Table 1: Wells to be Decommissioned

Well ID	Total Depth (ft. bgs)	Screened Interval (ft. bgs)	Northing	Easting	Township	Range	Section	Quarter	Quarter - Quarter
PL2-501A	20.5	10 to 20	197303.3024	1274930.303	24N	04E	33	NW	NW
PL2-501B	50.5	40 to 50	197300.3464	1274937.211	24N	04E	33	NW	NW
PL2-501C	78.5	68 to 78	197297.6254	1274944.929	24N	04E	33	NW	NW
PL2-502A	18	8 to 18	197110.8655	1274798.368	24N	04E	33	NW	NW
PL2-508A	19	9 to 19	197342.6062	1274962.046	24N	04E	33	NW	NW
PL2-509A	18.9	8 to 18	197344.644	1274954.656	24N	04E	33	NW	NW
PL2-509B	50.5	40 to 50	197342.06	1274952.296	24N	04E	33	NW	NW
PL2-435A	19	8 to 18	197142.8391	1275496.11	24N	04E	33	NW	NW
PL2-435B	45	39.5 to 44.5	197136	1275491.6	24N	04E	33	NW	NW
PL2-435C	84	78.5 to 83.5	197135.1	1275498.2	24N	04E	33	NW	NW
PL2-314A	18.5	8.5 to 18.5	196685.1499	1276175.829	24N	04E	33	NW	NE
PL2-316A	18	8 to 18	196655.2527	1276215.709	24N	04E	33	NW	NE
PL2-316B	50	40 to 50	196650.2538	1276213.034	24N	04E	33	NW	NE
PL2-316C	85	75 to 85	196660.2758	1276204.581	24N	04E	33	NW	NE
PL2-317AR	18	8 to 18	196178.782	1276200.795	24N	04E	33	NW	SE
PL2-325A	18	8 to 18	196235.2995	1275841.271	24N	04E	33	NW	NW
PL2-325B	50	45 to 50	196237.4115	1275832.947	24N	04E	33	NW	NW
PL2-326A	18.5	8 to 18	196747.296	1276306.189	24N	04E	33	NW	NE
PL2-326B	50.5	40 to 50	196742.764	1276311.532	24N	04E	33	NW	NE
PL2-327A	19	8.5 to 18.5	196581.34	1276101.59	24N	04E	33	NW	NE
PL2-327B	50.5	40 to 50	196587.606	1276095.551	24N	04E	33	NW	NE
PL2-328A	18.5	8 to 18	196467.832	1276236.195	24N	04E	33	NW	NE
PL2-328B	50.5	40 to 50	196470.705	1276232.987	24N	04E	33	NW	NE
PL2-329A	18.5	8 to 18	196418.579	1275991.348	24N	04E	33	NW	NW
PL2-329B	50.5	40 to 50	196424.067	1275984.836	24N	04E	33	NW	NW
PL2-331A	18.5	8 to 18	196333.318	1276093.248	24N	04E	33	NW	SE
PL2-331B	50.5	40 to 50	196337.412	1276088.981	24N	04E	33	NW	SE
PL2-004A	16.9	6.5 to 16.5	195870.7879	1275929.813	24N	04E	33	NW	SW
PL2-005A	17.1	7 to 16.7	195850.9588	1275970.933	24N	04E	33	NW	SW
PL2-005B	51.4	41 to 50.5	195847.2878	1275967.803	24N	04E	33	NW	SW
PL2-005C	93.1	83 to 92	195856.7848	1275967.736	24N	04E	33	NW	SW
PL2-006AR	16.5	6 to 16	195814.993	1275941.14	24N	04E	33	NW	SW
PL2-013AR	24	14.7 to 23.3	195888.4881	1275670.694	24N	04E	33	NW	SW
PL2-014A	21.1	5.5 to 20	195939.4403	1275617.631	24N	04E	33	NW	SW
PL2-027A	18	8 to 18	195816.1686	1276029.596	24N	04E	33	NW	SW
PL2-029A	18	8 to 18	195847.056	1275726.971	24N	04E	33	NW	SW
PL2-034A	30	25 to 30	195820.339	1275837.069	24N	04E	33	NW	SW
PL2-037A	18	8 to 18	196041.0265	1275526.895	24N	04E	33	NW	SW
PP-1B-O	50.5	48 to 50	195898.850	1275873.976	24N	04E	33	NW	SW
PP-5B-O	50.5	48 to 50	195900.664	1275809.547	24N	04E	33	NW	SW

— Done
o Deep

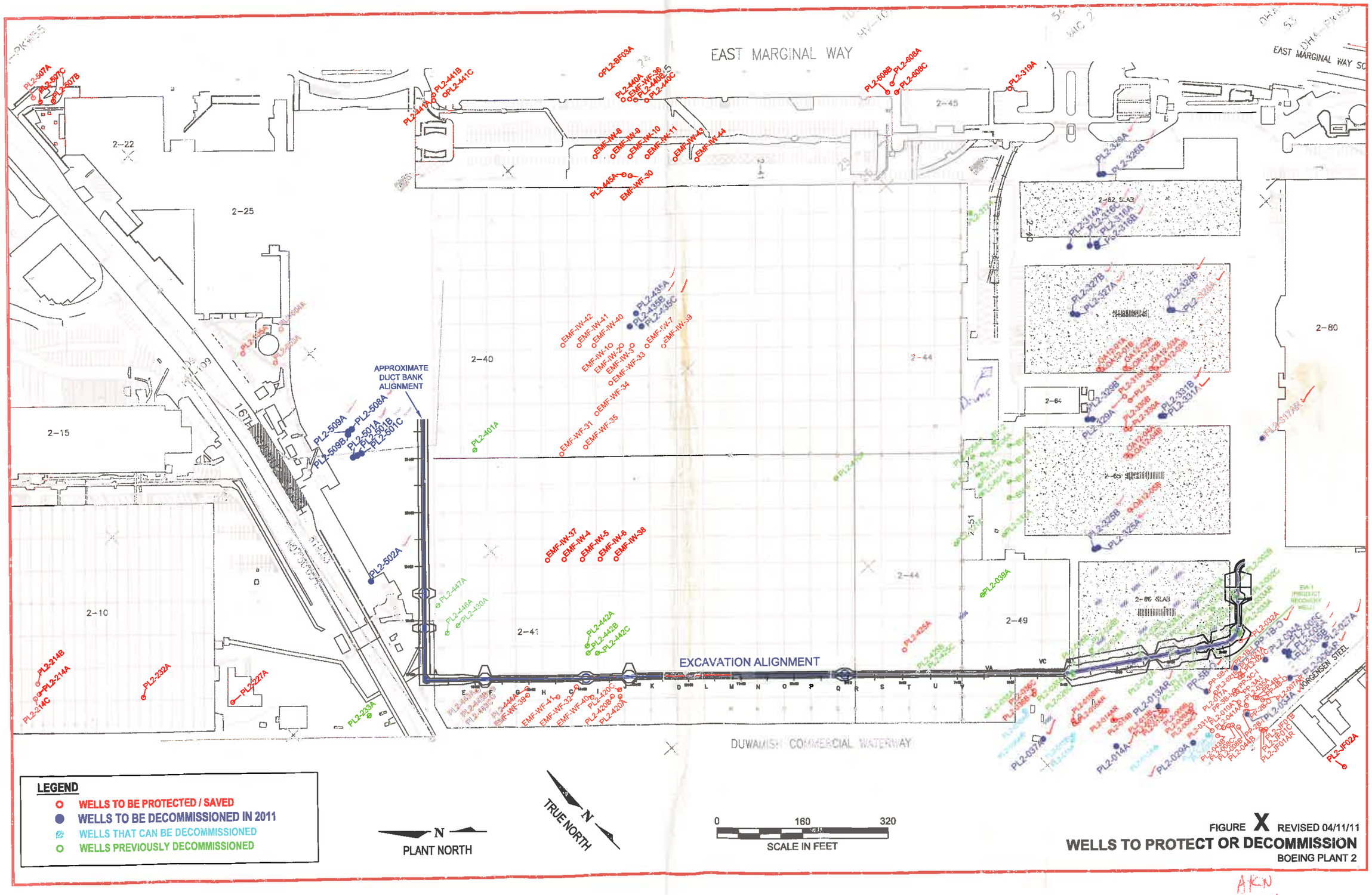


FIGURE X REVISED 04/11/11

WELLS TO PROTECT OR DECOMMISSION

BOEING PLANT 2

AKN
49A 486

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2 - 435B	
	Northing	Easting
Well Location	197136	1275491.6
Start (date and time)	4/25/11	0930
End (date and time)	4/25/11 1015	
Installation Method	Geoprobe	
Total Well Depth	45.0'	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	5' (40'-45')	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	10 ~~[illegible]~~ gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-435A	
	Northing	Easting
Well Location	197142.8391	1275496.11
Start (date and time)	4/25/11 1005	
End (date and time)	4/25/11 1015	
Installation Method	HSA	
Total Well Depth	19.00	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	5'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Bentonite chips in place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	[illegible]	
Signature (Driller)	2761	
Signature (Engineer or Geologist)	[illegible]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-435C	
Well Location	Northing: 197135.1	Easting: 1275498.2
Start (date and time)	4/25/11-1025	
End (date and time)	4/25/11-1040	
Installation Method	HSA	
Total Well Depth	84 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	78.5-83.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	15 gallon	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-501A	
	Northing	Easting
Well Location	197303.3024	1274930.303
Start (date and time)	4/25/11 1045	
End (date and time)	4/25/11 1100	
Installation Method		
Total Well Depth	21.5'	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)	10-20	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout	Bentonite chip in place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	
Additional Information:	No well tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-508A	
Well Location	Northing: 197342.6062	Easting: 1274962.046
Start (date and time)	4/25/11 1045	
End (date and time)	4/25/11 1100	
Installation Method	HSA	
Total Well Depth	21.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	9-19'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Bentonite chips in place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	
Additional Information:	No well tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-314A	
	Northing	Easting
Well Location	196685.1499	1276175.829
Start (date and time)	4/25/11 1145	
End (date and time)	4/25/11	
Installation Method	HSA	
Total Well Depth	18.5	feet bgs
Well Diameter	2 inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8.5-18.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in place (Bentonite)	
Grout Volume	N/A	Gallons
Surface Completion		
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:	Old well tag very corroded	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-316A	
	Northing	Easting
Well Location	196655.2527	1276215.709
Start (date and time)	1145 - 4/25/11	
End (date and time)	4/25/11 1215	
Installation Method	HSA	
Total Well Depth	18	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8-18	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:	No well tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2- 316B	
	Northing	Easting
Well Location	196650.2538	1276213.034
Start (date and time)	4/25/11 12:20	
End (date and time)	4/25/11	
Installation Method	HSA	
Total Well Depth	50.5 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40'-50'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	10 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:	Old well tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-316C	
	Northing	Easting
Well Location	196660.2758	1276204.581
Start (date and time)	4/25/11	
End (date and time)	4/25/11	
Installation Method	HSA	
Total Well Depth	85	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	75-85	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	15 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-326A	
	Northing	Easting
Well Location	196747.296	1276306.189
Start (date and time)	4/25/11 12:55	
End (date and time)	4/25/11 13:10	
Installation Method	HSA	
Total Well Depth	18.5	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs)	8-18	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	[illegible]	
Signature (Driller)	2767	
Signature (Engineer or Geologist)	[illegible]	

Additional Information: Well tag retrieved

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-326B	
	Northing	Easting
Well Location	196742.764	1276311.552
Start (date and time)	4/25/11 1255	
End (date and time)	4/25/11 1310	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40'-50'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	10 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:	well tag retrieved	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-327A	
	Northing	Easting
Well Location	196581.34	1276101.59
Start (date and time)	4/25/11 - 1425	
End (date and time)	4/25/11 - 1500	
Installation Method	HSA	
Total Well Depth	19.0	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8.5-18.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	[illegible]	
Signature (Driller)	2761	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:	well tag retrieved	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-327B	
	Northing	Easting
Well Location	196587.606	1276095.551
Start (date and time)	4/25/11 - 1430	
End (date and time)	4/25/11 - 1500	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)	40'-50'	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout	Sodium Bentonite
Grout Volume	10 gallons Gallons
Surface Completion	Concrete
Drilling Contractor	Cascade Drilling
License Number	2761
Signature (Driller)	[illegible]
Signature (Engineer or Geologist)	[illegible]
Additional Information:	well tag retrieved

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-328A	
	Northing	Easting
Well Location	196467.832	1276236.195
Start (date and time)	4/26/11	
End (date and time)	4/26/11	
Installation Method	HSA	
Total Well Depth	18.5	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs)	8'-18'	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout	Chip in Place	
Grout Volume		Gallons
Surface Completion		
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information: well cap Allen bolts are rusted on. One removed

well Tag AHE-890 retrieved

Well Decommissioning Log - Boeing Plant 2

Well Number	PC D-328B	
	Northing	Easting
Well Location	196470.705	1276232.987
Start (date and time)	4/26/11	
End (date and time)	4/26/11	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs)	40'-50'	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout	Sodium Bentonite	
Grout Volume		Gallons
Surface Completion		
Drilling Contractor	Cascade Drilling	
License Number	7762	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information: well cap Allen bolts are rusted in. Two removed. well tag HHE 553 retrieved.

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2- 509A	
	Northing	Easting
Well Location	197344.644	1274954.656
Start (date and time)	4/26/11-0920	
End (date and time)	4/26/11-	
Installation Method	HSA	
Total Well Depth	18.9	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) 8'-18' feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout	Chip in Place
Grout Volume	~~Concrete~~ N/A Gallons
Surface Completion	Concrete
Drilling Contractor	Cascade Drilling
License Number	2761
Signature (Driller)	[illegible]
Signature (Engineer or Geologist)	T M Pomil

Additional Information: Retrieved well tag AHE 615

Well Decommissioning Log - Boeing Plant 2

Well Number	P1-2-509B	
Well Location	Northing: 197342.06	Easting: 1274952.296
Start (date and time)	4/26/11	
End (date and time)	4/26/11	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	40'-50'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	12 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	#761	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information: Removed well tag AHE 617

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-501B	
	Northing	Easting
Well Location	197300.3461	1274937.211
Start (date and time)	4/26/11 - 1000	
End (date and time)	4/26/11 - 1030	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40'-50'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	10 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	
Additional Information:	No well tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	Pl2- S01C	
Well Location	Northing: 197297.6254	Easting: 1274944.929
Start (date and time)	4/26/11 -0945	
End (date and time)	4/26/11 -1045	
Installation Method	HSA	
Total Well Depth	78.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	68-78	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	15 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:	No well tags	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2 - S02A	
	Northing	Easting
Well Location	197110.8655	1274798.368
Start (date and time)	4/26/11 - ~~1100~~ 1050 gmc	
End (date and time)	4/26/11 - 1105	
Installation Method	HSA	
Total Well Depth	18 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8-18'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	3767	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information: ~~No well tag~~
well tag retrieved

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2 - 331A	
	Northing	Easting
Well Location	196333.318	1276093.248
Start (date and time)	4/26/11 - 1150	
End (date and time)	4/26/11 - 1230	
Installation Method	HSA	
Total Well Depth	18.5	feet bgs
Well Diameter	2 inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8'-18'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information: well tag AHE 887 retrieved

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2- 331B	
	Northing	Easting
Well Location	196337.412	1276088.981
Start (date and time)	4/26/11 1145	
End (date and time)	4/26/11 1230	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40'-50'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	10 gallons	Gallons
Surface Completion	~~Sodium Bentonite~~ Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:	Well Tag Retrieved	

AHE 888

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2 - 329A	
	Northing	Easting
Well Location	196918.579	1275991.348
Start (date and time)	4/26/11 - 1245	
End (date and time)	4/26/11 - 1320	
Installation Method	HSA	
Total Well Depth	18.5	feet bgs
Well Diameter	2 inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8'-18'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	4763	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information: well Tag AHE 886 retrieved

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2 - 329B	
	Northing	Easting
Well Location	196424.067	1275984.836
Start (date and time)	4/26/11 1245	
End (date and time)	4/26/11 1320	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40'-50'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	11 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information: Well tag AHE 885 retrieved

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-325A	
	Northing	Easting
Well Location	196235.2995	1275841.271
Start (date and time)	4/26/11 - 1330	
End (date and time)	4/26/11	
Installation Method	HSA	
Total Well Depth	18 feet	feet bgs
Well Diameter	2 inch	inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)	8'-18'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)		
Signature (Engineer or Geologist)		

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-325B	
	Northing	Easting
Well Location	196237.4115	1275832.947
Start (date and time)	4/26/11 - 1330	
End (date and time)	4/26/11 - 1355	
Installation Method	HSA	
Total Well Depth	50	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	48'-50	feet bgs
Decommissioning Procedure (circle)	GMC WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	10 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-317AR	
Well Location	Northing: 196178.782	Easting: 1276200.795
Start (date and time)	4/27/11 - 07:35	
End (date and time)	4/27/11 - 0755	
Installation Method	HSA	
Total Well Depth	18 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	8-18	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)		
Additional Information:	Well tag MHE 852 retrieved	

Well Decommissioning Log - Boeing Plant 2

Well Number	PP-SB-0	
	Northing	Easting
Well Location	195900.664	1275809.547
Start (date and time)	4/27/11 - 0815	
End (date and time)	4/27/11 - 0845	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	48'-50'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	12 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:	No well tag retrieved	

Well Decommissioning Log - Boeing Plant 2

Well Number	PP-18-0	
	Northing	Easting
Well Location	195898.850	1275873.976
Start (date and time)	4/27/11 - 0855	
End (date and time)	4/27/11 - 0920	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	48'-50'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	10 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2261	
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information: well tag AHN 191 retrieved

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-005A	
	Northing	Easting
Well Location	195850.9588	1275970.933
Start (date and time)	4/27/11 - 0925	
End (date and time)	4/27/11 - 0940	
Installation Method	HSA	
Total Well Depth	17.1 feet	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____
Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs)	7'-16.7'	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information: No well tag retrieved

Forklift
(206)655-3266

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-005B	
	Northing	Easting
Well Location	195847.2878	1275967.803
Start (date and time)	4/27/11 - 0930	
End (date and time)	4/27/11 - 0945	
Installation Method	HSA	
Total Well Depth	51.4	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) 41-50.5 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout: Sodium Bentonite

Grout Volume: 10 gallons Gallons

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: 2761

Signature (Driller): _____

Signature (Engineer or Geologist): [signature]

Additional Information: _____

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-005C	
Well Location	Northing: 195856.7848	Easting: 1275967.736
Start (date and time)	4/27/11 - 0935	
End (date and time)	4/27/11 - 0955	
Installation Method	HSA	
Total Well Depth	93.1	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	83'-92'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	15 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)		
Signature (Engineer or Geologist)	J M Lomit	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-034A	
	Northing	Easting
Well Location	195820.339	1275837.069
Start (date and time)	4/27/11 -1025	
End (date and time)	4/27/11 -1050	
Installation Method	HSA	
Total Well Depth	30'	feet bgs
Well Diameter	2 inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	25-30'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Sodium Bentonite	
Grout Volume	10 gallons	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)		
Signature (Engineer or Geologist)	[signature]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-006AR	
Well Location	Northing: 195814.993	Easting: 127594.14
Start (date and time)	4/27/11	
End (date and time)	4/27/11	
Installation Method	HSA	
Total Well Depth	16.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	6'-16'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)		
Signature (Engineer or Geologist)	D M Pond	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-037A	
	Northing	Easting
Well Location	196041.0265	1275526.895
Start (date and time)	4/27/11 - 1200	
End (date and time)	4/27/11 - 1220	
Installation Method	HSA	
Total Well Depth	18 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8'-18'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	~~N/A~~ Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)		
Signature (Engineer or Geologist)	[signature]	
Additional Information:	No well Tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-014A	
	Northing	Easting
Well Location	195939.4403	1275617.631
Start (date and time)	4/27/11 - 1220	
End (date and time)	4/27/11 - 1235	
Installation Method	HSA	
Total Well Depth	21.1	feet bgs
Well Diameter	4-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	5.5-20	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)		
Signature (Engineer or Geologist)	[signature]	
Additional Information:	No well tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-029A	
	Northing	Easting
Well Location	195847.056	1275726.971
Start (date and time)	4/27/11 - 1235	
End (date and time)	4/27/11 - 1250	
Installation Method	HSA	
Total Well Depth	18 feet	feet bgs
Well Diameter	2 inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 8'-18' feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout	Chip in Place
Grout Volume	N/A Gallons
Surface Completion	Concrete
Drilling Contractor	Cascade Drilling
License Number	2761
Signature (Driller)	
Signature (Engineer or Geologist)	[illegible]
Additional Information:	No well tag

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-013AR	
	Northing	Easting
Well Location	195888.4881	1275670.694
Start (date and time)	4/27/11 - 1240	
End (date and time)	4/27/11 - 1255	
Installation Method	HSA	
Total Well Depth	24'	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs)	14.7 - 23.3	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout in place*

Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)	P M Carr	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-004A	
	Northing	Easting
Well Location	195870.7879	1275929.813
Start (date and time)	4/27/11 - 1255	
End (date and time)	4/27/11 - 1315	
Installation Method	HSA	
Total Well Depth	16.9 feet	feet bgs
Well Diameter	4-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	6.5 - 16.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)		
Signature (Engineer or Geologist)	J M Lamb	
Additional Information:	No well tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-027A	
	Northing	Easting
Well Location	195816.1686	1276029.596
Start (date and time)	4/27/11 - 1315	
End (date and time)	4/27/11 - 1335	
Installation Method	HSA	
Total Well Depth	18 feet	feet bgs
Well Diameter	~~8~~ ~~4~~ ~~18~~ 2-	inch inches
Type of Casing (circle)	GMC PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8'-18'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout in place*	
Type of Grout	Chip in Place	
Grout Volume	N/A	Gallons
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number	2761	
Signature (Driller)		
Signature (Engineer or Geologist)	[signature]	

Additional Information:

No well Tag

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF IW-4	
Well Location	Northing: not surveyed	Easting:
Start (date and time)	6/17/11 1230	
End (date and time)	6/17/11 1330	
Installation Method	HSA	
Total Well Depth	41'	feet bgs
Well Diameter	4"	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	30-40	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Cetco	
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion	Chip to grade.	
Drilling Contractor	Cascade Drilling Inc	
License Number	~~AZ882~~ 2842	
Signature (Driller)	Elijah Floyd	Elijah Floyd COLP
Signature (Engineer or Geologist)	Kristin L Addis L.G.	
Additional Information:		

WAC 173-160-420

What are the general construction requirements for resource protection wells?

(1) No resource protection well or soil boring excavation may be used to withdraw or inject water for domestic, industrial, municipal, commercial, or agricultural purposes.

(2) No resource protection well or soil boring excavation may interconnect aquifers.

(3) Nested resource protection wells are prohibited.

(4) Cuttings, development water, and other investigation derived waste from resource protection well construction or geotechnical soil borings shall be managed in a manner consistent with the intent and purposes of the Water Pollution Control Act, chapter 90.48 RCW, the Hazardous Waste Management Act, chapter 70.105 RCW, and implementing regulations.

(5) Well tagging:

(a) It shall be the driller's responsibility to place a well identification tag with a unique identification number on every resource protection well that they construct or alter within thirty days of completion of the well. Uncased geotechnical soil borings and environmental investigation wells are exempt from the tagging requirements of this chapter.

(i) The alpha-numeric number shall be recorded on the drilling report in the space provided.

(ii) The driller shall remove the well identification tag on all resource protection wells they decommission and shall attach the tag to the decommissioning well report.

(b) It shall be the well owner's responsibility to place a well identification tag with a unique identification number on every resource protection well they own and which was completed prior to the effective date of this regulation.

(i) Upon request, the department shall furnish the well owner with a well tag and tagging instructions.

(ii) The well owner shall tag their well(s) and submit a completed tagging report to the department.

(c) The well tag shall be permanently attached to:

(i) The well casing and be visible above land surface for all wells which have been completed above land surface.

(ii) The well casing or to any permanent and protected portion of the vault for wells completed below land surface.

(iii) A prominent system component visible above land surface for ground source heat pump borings.

(d) All well identification tags shall be supplied by the department.

(e) It is unlawful for a person to tamper with or remove a well identification tag except during well alteration.

(6) All resource protection wells will be sealed in accordance with WAC 173-160-450 regardless of the method of installation. Except, resource protection wells that are properly decommissioned prior to the removal of any drilling equipment from the well location are

exempted from the surface sealing requirements of this chapter. Provided the decommissioning process includes the removal of any conduit, tubing, probe, or other items inserted into the ground.

(7) All geotechnical soil borings shall be decommissioned under the terms of this chapter.

(8) Except as provided in RCW 18.104.180, all construction, alteration, reconstruction, and decommissioning of resource protection wells and geotechnical soil borings shall be done by an individual licensed under the provisions of chapter 173-162 WAC.

(9) A notice of intent to construct or decommission a resource protection well and a geotechnical soil boring shall be filed with the department a minimum of seventy-two hours prior to initiating construction or decommissioning of the well(s) or boring(s). A fee must accompany each notice of intent to construct or decommission a resource protection well.

(a) The fee for a resource protection well, except for an environmental investigation well, a ground source heat pump boring, or a grounding well, is forty dollars for each well.

(b) The fee for an environmental investigation well in which ground water is sampled or measured is forty dollars for the construction of up to four environmental investigation wells per project, and ten dollars for each additional environmental investigation well constructed on a project with more than four wells. There is no fee for soil or vapor sampling purposes.

(c) The fee for a ground source heat pump boring or a grounding well is forty dollars for construction of up to four ground source heat pump borings or grounding wells per project and ten dollars for each additional ground source heat pump boring or grounding well constructed on a project with more than four wells.

(d) The fee to decommission a resource protection well, except for an environmental investigation well, is twenty dollars per well. There is no fee to decommission an environmental investigation well or a geotechnical soil boring.

(e) The fee to decommission a ground source heat pump boring or a grounding well is twenty dollars per well.

(f) Under some circumstances, it may be necessary to construct more resource protection wells or geotechnical soil borings than originally anticipated. When additional resource protection wells are constructed on a site for which a notice of intent and fee were submitted, a second notice and fee shall be submitted within twenty-four hours after all wells have been completed or as soon as the final number of wells to be constructed is determined, whichever is sooner. When additional geotechnical soil borings are needed, the borings may be completed. A follow-up notice of intent shall be submitted to the department within twenty-four hours after all borings are constructed. Notification to construct multiple wells or geotechnical soil borings within the same quarter/quarter section, township, and range may be submitted on one notice form.

(10) Resource protection well reports.

(a) Anyone who constructs or decommissions a well is required to submit a complete well report on the construction or decommissioning of all resource protection wells and geotechnical soil borings. Reports must be submitted to the water resources program within thirty days after completion of construction or decommissioning. Submission of a well report to consulting firms does not meet the requirement of this section. The report must be an accurate summation of data collected in the field taken from field notes written as the well was constructed or decommissioned. Field notes must be available at all times during construction or decommissioning for review by state and local inspectors and kept until the well report is submitted.

(b) The resource protection well report must be made on a form provided by the department, or a reasonable facsimile of the form, as approved by the department.

(c) Where applicable the report shall include the following information:

(i) Owner's name; operator/trainee name; operator/trainee license number; contractor registration number, drilling company name;

(ii) Tax parcel number;

(iii) Well location address;

(iv) Location of the well to at least 1/4, 1/4 section or smallest legal subdivision;

(v) Unique well identification tag number;

(vi) Construction date;

(vii) Start notification number;

(viii) Intended use of well;

(ix) The well depth, diameter, and general specifications of each well;

(x) Total depth of casing;

(xi) Well head elevation;

(xii) Drilling method;

(xiii) Seal material, seal location and type of placement used;

(xiv) Filter pack location; filter pack material used;

(xv) The thickness and character of each bed, stratum or formation penetrated by each well including identification of each water bearing zone;

(xvi) Casing gauge, diameter, stickup, type of material, and length, also of each screened interval or perforated zone in the casing;

(xvii) The depth to the static water level, as measured below the land surface; and

(xviii) Such additional factual information as may be required by the department.

(d) The well report must include one of the following:

(i) The license number and signature of the person who constructed or decommissioned the well;

(ii) The license number and signature of the trainee and the licensed operator under chapter 18.104 RCW; or

(iii) The license number and signature of an exempted individual as defined under RCW 18.104.180(3).

(e) This rule shall allow an individual to submit electronic reports in accordance with department procedures. The use of a digital signature in the electronic reports will be authorized as a substitute for an original signature under (d) of this subsection.

What are the surface protection requirements?

(11) All resource protection wells shall be capped and protected using one of the following methods:

(a) If the well is cased with metal and completed above the ground surface, you must attach a watertight cap with a lock to the top of the casing.

(b) If the well is not cased with metal and completed above the land surface, you must install a protective metal casing over and around the well. The protective casing shall extend at least six inches above the top of the well casing and be cemented at least two feet into the ground. A cap with lock shall be attached to the top of the protective casing.

(12) You shall protect the well(s) completed above ground from damage by:

(a) Cementing three metal posts, at least three inches in diameter, in a triangular array around the casing and at least two feet from it. Each post shall extend at least three feet above and below the land surface.

(b) A reinforced concrete pad may be installed to protect against and prevent frost heave. If installed, the concrete pad shall extend to a depth equal to anticipated frost depth. When a concrete pad is used, the well seal may be part of the concrete pad.

(13) If the well is completed below land surface, a watertight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent the inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The cover must be designed to withstand the maximum expected loading.

(14) The protective measures may be waived or modified upon written approval from the department (a variance).

(15) If the well is damaged, the well protection measures and casing shall be repaired to meet the requirements of this chapter. If the well is damaged beyond repair, it shall be decommissioned in accordance with WAC 173-160-460.

WAC 173-160-460

What is the decommissioning process for resource protection wells?
(1) For resource protection wells and geotechnical soil borings that were not constructed in accordance with these regulations, or for which a drilling report required under this section is missing, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers, and decommission in one of the following ways:

(a) Perforate the casing from the bottom to land surface and pressure grout the casing.

(i) Perforations shall be at least four equidistant cuts per row, and one row per foot. Each cut shall be at least one and one-half inches long.

(ii) Apply enough pressure to force the sealing material through the perforations, filling any voids on the outside of the casing.

(iii) The remainder of the casing shall be filled with neat cement grout, neat cement, or bentonite slurry; or

(b) Withdraw the casing and fill the bore hole with neat cement grout, neat cement, bentonite or bentonite slurry as the casing is being withdrawn.

(2) For resource protection wells and geotechnical soil borings that were constructed in accordance with these regulations, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers and then decommission in one of the following ways:

(a) Wells with an inside casing diameter equal to or greater than one inch and constructed in accordance with these regulations as verified through a field examination and review of the drilling report shall be decommissioned by filling the casing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement.

(b) Wells with an inside casing diameter less than one inch shall be decommissioned by pressure grouting the entire casing length with bentonite slurry, neat cement grout, or neat cement.

(c) Vibrating wire piezometers installed to meet or exceed the sealing requirements of WAC 173-160-450, 173-160-457, and 173-160-458 are exempt from the decommissioning procedures and decommissioning reporting requirements provided here.

(d) Direct push wells shall be decommissioned in accordance with this section.

(e) Geotechnical soil borings, or boring, shall be decommissioned by sealing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement. Sealing material placed below the static water level shall be piped directly to the point of application or placed by means of a dump bailer or pumped through a tremie tube. If bentonite slurry, neat cement grout or neat cement is used to seal below the water level in the well, the material shall be placed from the bottom up by methods that avoid segregation or dilution of the material. When used to place bentonite slurry, neat cement or neat cement grout, the discharge end of the tremie tube shall be submerged in the bentonite slurry, neat cement or neat cement grout to avoid breaking the seal while filling the annular space. Provided the material does not dilute or segregate and the resulting seal is free of voids, sealing material may be hand poured above the static water level.

WELL PL2-501A (SB-03101)

PROJECT BOEING SUSPECT AREAS
DATE COMPLETED 3 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 12.98
GROUND SURFACE ELEV 13.32
LOGGED BY Tim Fitzgerald

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
						SP	POORLY GRADED SAND (SP), Yellow brown (10YR5/4), 100% medium sand, loose, dry, no odor or stain (fill)
5							
	BG		8				Damp
	BG	SB-03101-0080 VOC, HCID, WTPH-G (ARCHIVE)	5			MH	ELASTIC SILT (MH) Dark gray (10YR3/1), 5% fine sand, 95% silt, very soft, damp to moist, fibrous organic fragments, no odor or stain (native soil)
			1				
10							Wet at 10.5-feet, no sand
	BG		9				
	BG	SB-03101-0120 VOC, HCID, WTPH-G (ARCHIVE)	8			SP	POORLY GRADED SAND (SP), Dark gray (10YR3/1), 100% medium to fine sand, loose, moist, no stain or odor
							Saturated
	BG		8				Fine to medium sand
15	BG		10				Driller adding water to suppress heave
	BG		6				
	BG	SB-03101-0180 VOC, HCID, WTPH-G (ARCHIVE)	10				
20							BOH @ 21.5'
25							

12/16/93
12/3/93

PLATE A-14

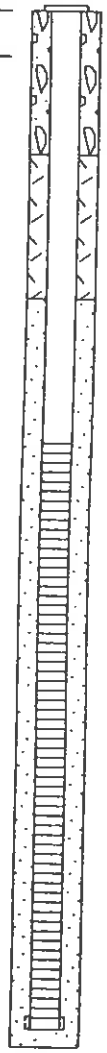
 JOB NUMBER: 03709-038-001-4010 DATE: January 1993

WELL PL2-502A

PROJECT BOEING BLDG 2-31 RCRA CLOSURE
DATE COMPLETED 09 March 1994
DRILLING METHOD 4" ID HSA
TOP OF CASING NA
GROUND SURFACE ELEV NA
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
	BG	No Analytics				SP	No samples taken. Lithology interperted from drill cuttings.
							SAND (SP), Grayish brown (10YR5/2), 90% medium sand, 10% gravel, medium dense, dry (fill)
5	BG						Grades to 100% medium sand, color change to Dark grayish brown (10YR4/2) (native)
							Silty sand in cuttings
10	BG						Color change to Very dark gray (10YR3/1)
15	BG						
	BG						
20							
25							

BOH @ 18.0'



5

10

20

03/09/94

03/1

PLA

JOB NUMBER: 03709-040-001-6000 DATE: April 1994

Boring PL2-501B

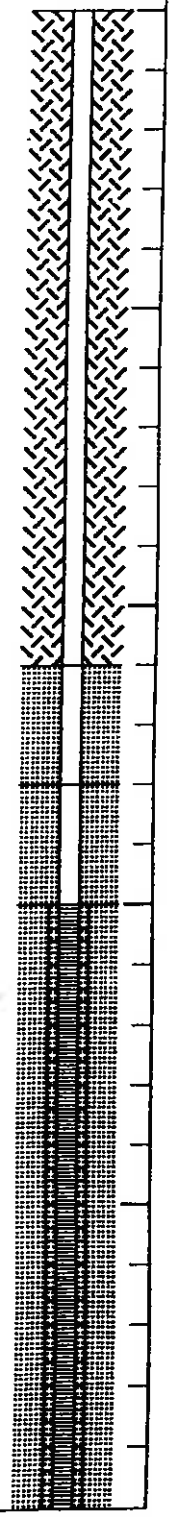
Project	Boeing RFI	Start Date 03/02/95	Finish Date 03/02/95
Location	Plant 2 Seattle, WA	Driller	Drilling Co. PTL
Project No.	03709-034-300	Drilling Method HSA	
Contractor	Weston	Sampling Method 2 in. Split Spoon	
Logged by	Stoopes	Top of Casing (ft) 12.75	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 13.35	Total Depth (ft) 51.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							SP	Sand (SP), brown (10YR5/3), 95% medium sand, 5% silt, trace gravel, medium dense, dry (fill).
5					17		SP	Sand (SP), grayish brown (10YR5/2), 100% fine to medium sand, medium dense, damp.
10					9		ML	Silt with sand (ML), gray (10YR5/1), 80% silt, 20% fine sand, soft, moist, trace twigs and organic fragments.
							SM	Silty sand (SM), grayish brown (10YR5/2), 70% fine sand, 30% silt, wet.
15					11		SP-SM	Sand with silt (SP-SM), grayish brown (10YR5/2), 90% fine to medium sand, 10% silt, medium dense, wet. 6 in.silt interbed @ 35.5 ft..
20					24			

Boring PL2-501B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					24			
30					15			
35					8			
40					27		SM	Silty sand (SM), grayish brown (10YR5/2), 85% fine to medium sand, 15% silt, medium dense, wet.
45					22			



Boring PL2-501B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					30		SP-SM	Sand with silt (SP-SM), (10YR5/2), 90% fine to medium sand, 10% silt, medium dense, wet. 6 in. silt interbed @ 55 ft.
55								
60								
65								
70								

Boring PL2-501C

Project	Boeing RFI	Start Date	03/08/95	Finish Date	03/08/95
Location	Plant 2 Seattle, WA	Driller		Drilling Co.	Cascade
Project No.	03709-034-300	Drilling Method	4 in. ID HSA		
Contractor	Weston	Sampling Method	2 in. split spoon		
Logged by	Stoopes			Boring Diam. (in)	10
				Total Depth (ft)	80.00

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							ND	See PL2-501B for lithologic description to 30 ft.
5								
10								
15								
20								

Boring PL2-501C

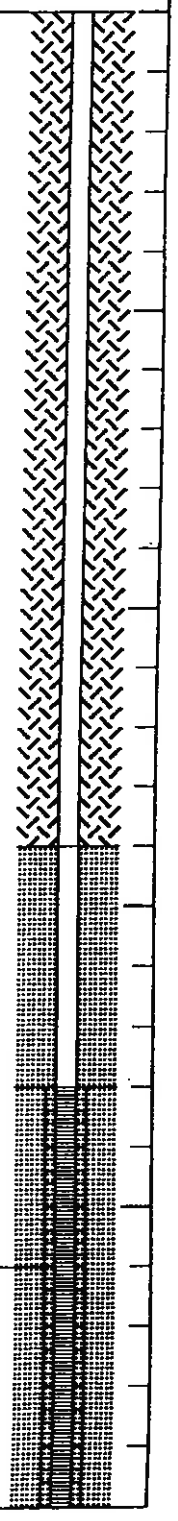
Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
30		Grain size	PL2-501C-300		50		SM	Silty sand (SM), grayish brn (10YR5/2), 60% fine to med sand, 40% silt, dense, wet, trace gravel
35								
40								
45								

Boring PL2-501C

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
55				66				
60				56				
65				50				
70		TOC	PL2-501C-0705	6/6			GM	Silty sand w/gravel (GM), grayish brn (10YR5/2), 50% coarse to med sand, 30% rounded gravel, 20% silt, very dense, wet



Boring PL2-501C

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

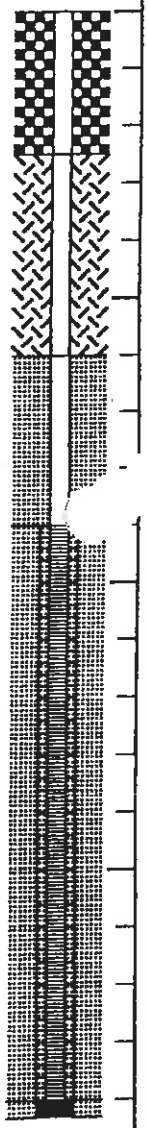
Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
		Grain size	PL2-501C-0750		66		ML	Silt (ML), olive gray (5Y5/2), 100% silt, stiff to hard, damp to dry, trace fine bedding, (till)
		Grain size	PL2-501C-0800		6/1			
80								
85								
90								
95								

Sheet 1 of 1

Boring PL2-508A

Project	Boeing RFI	Start Date 03/21/95	Finish Date 03/21/95
Location	Plant 2 Seattle, WA	Driller	Drilling Co. Cascade
Project No.	03709-034-300	Drilling Method HSA	
Contractor	Weston	Sampling Method 2 in. Split Spoon	
Logged by	Lottsfeldt	Top of Casing (ft) 13.04	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 13.42	Total Depth (ft) 21.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							SP	Sand with gravel (SP), light yellowish brown (10YR6/4), 85% medium sand, 15% angular gravel to 1 in., dense, damp (fill).
5	BG				13		SP	Sand (SP), yellowish brown (10YR5/4), 100% medium sand, medium dense, moist (native).
10	4				11			
	4				11		ML	Silt (ML), very dark gray (10YR3/1), 100% silt, firm, moist, black organic layer @ 11 ft. Sand content increases @ 11.5 ft.
							SM	Silty sand (SM), very dark gray (10YR3/1), 85% fine sand, 15% silt, medium dense, wet.
15	BG				33			
20	BG				25		SP	Sand (SP), very dark gray (10YR3/1), 100% medium sand, medium dense, wet.

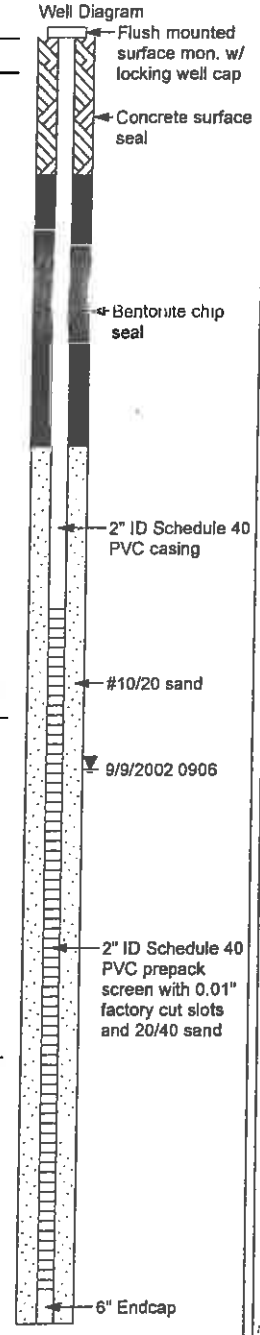


Monitoring Well PL2-509A

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 12, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 12.76
GROUND SURFACE ELEV (ft): 13.36
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							9" Concrete.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5						SW	SAND (SW), Brown, 70% fine sand, 30% medium sand, dry, no odor or stain, (fill).
10						ML	SILT (ML), Gray, 100% silt, wet, no odor or sheen, (alluvium).
15						SW	SAND (SW), Black, 60% fine sand, 35% medium sand, 5% silt, wet, no odor or sheen, (alluvium).
20							Bottom of hole @ 18.9 feet

Well Diagram



Notes:
No samples collected. Lithology based on PL2-509B.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Plate
A-19

Weston Solutions, Inc.

BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:40

Monitoring Well PL2-509B

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 15, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 12.86
GROUND SURFACE ELEV (ft): 13.34
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							9" Concrete. SAND (SW), Brown, dry, no odor or stain, (fill).
5			20			SW	SAND (SW), Brown, 70% fine sand, 30% medium sand, dry, no odor or stain, (fill).
10			2			ML	SILT (ML), Gray, 100% silt, wet, no odor or sheen, (alluvium).
15			26			SW	SAND (SW), Black, 60% fine sand, 35% medium sand, 5% silt, wet, no odor or sheen, (alluvium).
20			33				SAA.
25			50				
30							Unable to collect samples below 30 feet due to sand heaving in auger.
35							
40							
45							
50							
55							

Bottom of hole @ 52.5 feet

Notes:
SAA: Same as Above.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Well Diagram

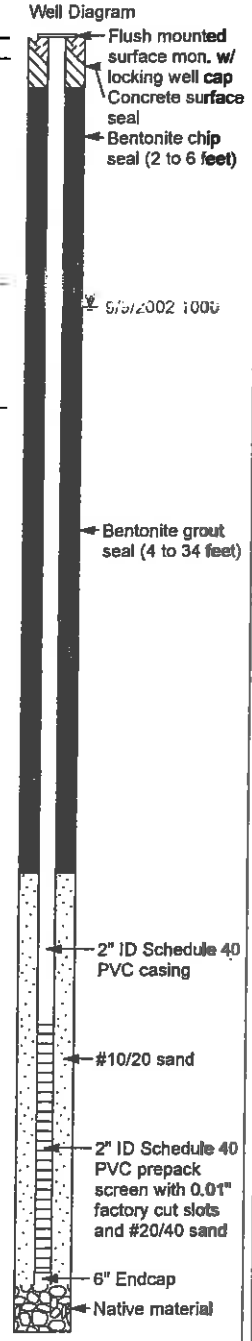


Plate
A-20

Weston Solutions, Inc.

BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:40

Sheet 1 of 1

Boring PL2-435A

Project	Boeing Plant 2 RFI	Start Date 09/22/94	Finish Date 09/22/94
Location	Plant 2 Seattle, WA	Driller Rodney LaBrasse	Drilling Co. Cascade Drilling
Project No.	03709-034-300	Drilling Method 4 in ID HSA	
Contractor	Weston	Sampling Method 2 in SS, 140 lb hmr.	
Logged by	Erik Lottsfeldt	Top of Casing (ft) 13.00	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 13.50	Total Depth (ft) 19.00

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							SP	Sand (SP), yellowish brown (10YR5/4), 100% med. sand, loose, dry. (FILL)
	BG	PCB	PL2-435A-020					
5	BG				12			
	BG	PCB	PL2-435A-075		6		ML	Silt (ML), black (10YR2/1), 100% silt, stiff, moist, very plastic, trace twigs/wood fragments. @ 10ft color light olive grey
10	BG				16			
	BG						SM	Silty sand (SM), gray (10Y5/0), 65% sand, 35% silt, med. dense, wet.
	BG				25			
							SP	Sand (SP), very dark gray (10YR3/2), 100% fine sand, trace silt, med. dense, wet. @15 ft grades to fine/med. sand.
15	BG				25			
	BG				27			
20								

Boring_id 10001

RECORD OF BOREHOLE PL2-435B

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-40

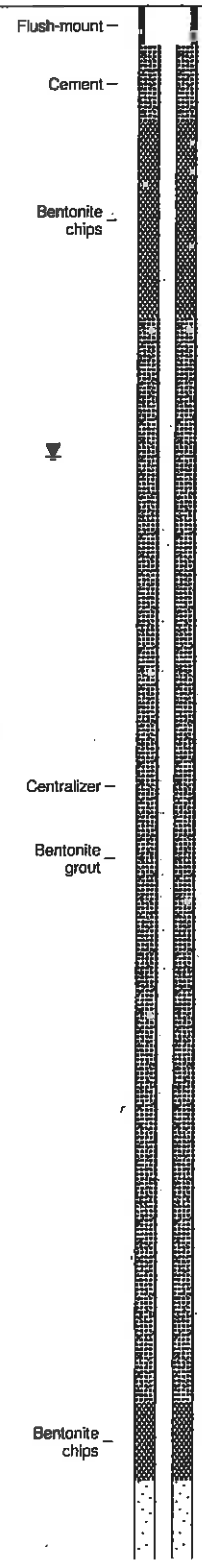
DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/11/08
DATE COMPLETED: 7/11/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 197,136.0 E: 1,275,491.6
GS ELEVATION: 13.5 ft
TOC ELEVATION: 13.1 ft
TEMPERATURE: 76 F

INCLINATION: -90
DEPTH W.L.: 11.6 ft
ELEVATION W.L.: 1.5 ft
DATE W.L.: 8/7/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES PID (ppm)	NUMBER	TYPE	REC / ATT
0		0.0 - 1.0 CONCRETE			12.5				
		1.0 - 4.8 Light brown, fine to medium SAND, dry, trace fine gravel from 1 - 1.5 ft bgs, no odor (SP)	SP		1.0 / 8.7	0.0	1	GRAB	5.0 / 5.0
5		4.8 - 5.0 Red-brown, fine SAND, some Silt. dry, no odor (SM)	SM		5.0				
		5.0 - 8.0 Brown, fine to medium SAND, dry, 1-inch of brown fine Sandy Clay at 6.75 ft bgs, no odor (SP)	SP		5.5	0.0	2	GRAB	5.0 / 5.0
		8.0 - 8.3 Dark brown, SILTY fine SAND, dry, no odor (SM)	SM		8.3				
		8.3 - 10.0 Dark gray to black, CLAY, moist, low plasticity, no odor (CL)	CL		3.5				
10		10.0 - 45.0 Soil logging stopped at 10.0 ft bgs in this borehole. SEE PL2-435C BOREHOLE LOG FOR SOIL LITHOLOGY DESCRIPTION.			10.0				

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-435B
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-40 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 40-45 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 38-45 ft
Type: 2/12 Sand
Quantity: 7 ft
FILTER PACK SEAL
Interval: 36-38 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 0-36 ft
Type: Bentonite grout
Quantity: 36 ft

Log continued on next page

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

RECORD OF BOREHOLE PL2-435B

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-40

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/11/08
DATE COMPLETED: 7/11/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 197,136.0 E: 1,275,491.6
GS ELEVATION: 13.5 ft
TOC ELEVATION: 13.1 ft
TEMPERATURE: 76 F

INCLINATION: -90
DEPTH W.L.: 11.6 ft
ELEVATION W.L.: 1.5 ft
DATE W.L.: 8/7/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		10.0 - 45.0 Soil logging stopped at 10.0 ft bgs in this borehole. SEE PL2-435C BOREHOLE LOG FOR SOIL LITHOLOGY DESCRIPTION. *(Continued)*								PL2-435B 2/12 sand 10-slot screen Centralizer	PL2-435B Borehole Diameter: 8-inch **WELL CASING** Interval: 0-40 ft Material: PVC Diameter: 2-inch Joint Type: Threaded **WELL SCREEN** Interval: 40-45 ft Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: Flush **FILTER PACK** Interval: 38-45 ft Type: 2/12 Sand Quantity: 7 ft **FILTER PACK SEAL** Interval: 36-38 ft Type: Bentonite chips Quantity: 2 ft **ANNULUS SEAL** Interval: 0-36 ft Type: Bentonite grout Quantity: 36 ft
	-30										
45		Boring completed at 45.0 ft			-31.5						
	-35										
50											
	-40										
55											
	-45										
60											
	-50										
65											
	-55										
70											
	-60										
75											
	-65										
80											

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

RECORD OF BOREHOLE PL2-435C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-40

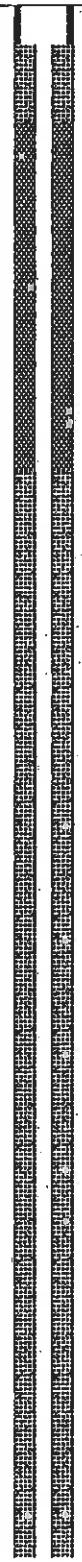
DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/11/08
DATE COMPLETED: 7/11/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 197,135.1 E: 1,275,498.2
GS ELEVATION: 13.5 ft
TOC ELEVATION: 13.1 ft
TEMPERATURE: 76 F

INCLINATION: -90
DEPTH W.L.: 11.2 ft
ELEVATION W.L.: 1.9 ft
DATE W.L.: 8/11/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES PID (ppm)	NUMBER	TYPE	REC / ATT
0		0.0 - 1.0 CONCRETE			12.5				
		1.0 - 5.0 Brown, fine to medium SAND, trace fine Gravel from 1 - 1.5 ft bgs, dry, no odor (SP)	SP		1.0 / 8.5	0.0	1	GRAB	4.0 / 5.0
5		5.0 - 8.0 Light brown, poorly graded, fine SAND, dry, 1-inch brown Silt at 7.5 ft bgs, no odor (SP)	SP		5.0 / 5.5	0.0	2	GRAB	5.0 / 5.0
		8.0 - 9.0 Brown, fine SANDY SILT, dry, no odor (ML)	ML		8.0 / 4.5				
		9.0 - 10.0 Dark gray to black, CLAY, moist at 10 ft bgs, low plasticity, no odor (CL)	CL		9.0 / 3.5				
10		10.0 - 12.0 Dark gray to black, CLAY, wet at 12 ft bgs, low plasticity, no odor (CL)	CL		10.0 / 1.5				
		12.0 - 13.0 Light gray, fine SANDY CLAY, wet, low plasticity, no odor (CL)	CL		12.0 / 0.5	0.0	3	GRAB	5.0 / 5.0
		13.0 - 13.5 Dark gray, CLAYEY fine SAND, wet, no odor (SC)	SC		0.0				
		13.5 - 14.0 Gray, poorly graded, fine SAND, wet, no odor (SP)	SP		-0.5				
15		14.0 - 20.0 Dark gray, fine to medium SAND, wet, no odor (SP)	SP		14.0 / -6.5	0.0	4	GRAB	5.0 / 5.0
20		20.0 - 23.0 Dark gray, poorly graded, fine SAND, wet, no odor (SP)	SP		20.0 / -9.5	0.0	5	GRAB	5.0 / 5.0
		23.0 - 25.0 Dark gray to black, fine to medium SAND, wet, no odor (SP)	SP		23.0 / -11.5				
25		25.0 - 27.5 Dark gray to black, poorly graded, medium SAND, wet, no odor (SP)	SP		25.0 / -14.0	0.0	6	GRAB	5.0 / 5.0
		27.5 - 30.0 Dark gray to black, medium to coarse SAND, wet, no odor (SP)	SP		27.5 / -16.5				
30		30.0 - 33.5 Dark gray to black, medium SAND, wet, no odor (SP)	SP		30.0 / -20.0	0.0	7	GRAB	5.0 / 5.0
35		33.5 - 38.0 Dark gray to black, coarse SAND, wet, no odor (SP)	SP		33.5 / -24.5	0.0	8	GRAB	5.0 / 5.0
		38.0 - 40.0 Dark gray to black, medium SAND, wet, no odor (SP)	SP		38.0 / -26.5				
40		Log continued on next page							

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-435C
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-79 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 79-84 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 77-84 ft
Type: 2/12 sand
Quantity: 2 ft
FILTER PACK SEAL
Interval: 75-77 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 0-75 ft
Type: Bentonite grout
Quantity: 75 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

RECORD OF BOREHOLE PL2-435C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-40

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/11/08
DATE COMPLETED: 7/11/08
WEATHER: Inside Bldg

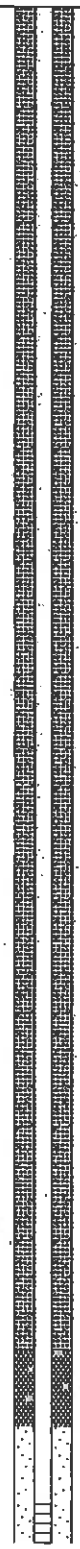
DATUM: Geodetic
COORDS: N: 197,135.1 E: 1,275,498.2
GS ELEVATION: 13.5 ft
TOC ELEVATION: 13.1 ft
TEMPERATURE: 76 F

INCLINATION: -90
DEPTH W.L.: 11.2 ft
ELEVATION W.L.: 1.9 ft
DATE W.L.: 8/11/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT
40		40.0 - 42.0 Dark gray to black, fine SAND, some Silt, wet, no odor (SM)	SM		40.0 / -26.5				
	-30	42.0 - 45.0 Dark gray to black, fine SAND, wet, no odor (SP)	SP		42.0 / -31.5	0.0	9	GRAB	5.0 / 5.0
45		45.0 - 50.0 Dark gray to black, fine SAND, wet, no odor (SP)	SP		45.0 / -36.5	0.0	10	GRAB	5.0 / 5.0
50	-35	50.0 - 55.0 Dark gray to black, fine SAND, wet, no odor (SP)	SP		50.0 / -41.5	0.0	11	GRAB	5.0 / 5.0
55	-40	55.0 - 59.5 Dark gray to black, fine SAND, wet, no odor (SP)	SP		55.0 / -46.0	0.0	12	GRAB	5.0 / 5.0
60	-45	59.5 - 59.8 Light gray, CLAY, wet, low plasticity, no odor (CL)	CL						
		59.8 - 60.0 Dark gray to black, fine SAND, wet, no odor (SP)	SP		60.0				
		60.0 - 64.0 Dark gray to black, fine to medium SAND, wet, 2-inch wood fragment at 63 ft bgs, no odor (SP)	SP		-50.5	0.0	13	GRAB	5.0 / 5.0
65	-50	64.0 - 65.0 Dark gray to black, rhythmic SAND and SILT, wet, no odor (SM)	SM		64.0 / -51.5				
		65.0 - 69.3 Dark gray to black, fine SAND, wet, no odor (SP)	SP		65.0 / -55.8	0.0	14	GRAB	5.0 / 5.0
70	-55	69.3 - 69.5 Dark gray to black, fine SANDY CLAY, wet, low plasticity, no odor (CL)	CL		-56.5				
		69.5 - 70.0 Dark gray to black, fine SAND, wet, no odor (SP)	SP		70.0 / -58.5				
		70.0 - 72.0 Dark gray, fine SAND, wet, no odor (SP)	CL		-59.0	0.0	15	GRAB	5.0 / 5.0
	-60	72.0 - 72.5 Dark gray, fine SANDY CLAY, wet, low plasticity, no odor (CL)	ML		72.5 / -60.0				
		72.5 - 73.5 Dark gray, fine SANDY SILT, wet, no odor (ML)	CL						
75		73.5 - 73.8 Light gray, CLAY, wet, low plasticity, no odor (CL)	SC		73.8 / -61.5				
		73.8 - 75.0 Dark gray, CLAYEY fine SAND, wet, no odor (SC)			75.0				
		75.0 - 78.0 NO RECOVERY			-64.5	0.0	16	GRAB	3.0 / 5.0
	-65	78.0 - 79.5 Dark gray, fine SANDY CLAY, wet, low plasticity, no odor (CL)	CL		78.0 / -66.0				
80		79.5 - 80.0	SC		-66.5				

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-435C
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-79 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 79-84 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 77-84 ft
Type: 2/12 sand
Quantity: 2 ft
FILTER PACK SEAL
Interval: 75-77 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 0-75 ft
Type: Bentonite grout
Quantity: 75 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

RECORD OF BOREHOLE PL2-435C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-40

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/11/08
DATE COMPLETED: 7/11/08
WEATHER: Inside Bldg

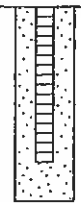
DATUM: Geodetic
COORDS: N: 197,135.1 E: 1,275,498.2
GS ELEVATION: 13.5 ft
TOC ELEVATION: 13.1 ft
TEMPERATURE: 76 F

INCLINATION: -90
DEPTH W.L.: 11.2 ft
ELEVATION W.L.: 1.9 ft
DATE W.L.: 8/11/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES PID (ppm)	NUMBER	TYPE	REC / ATT
80		Dark gray, fine SAND, little to some Clay, wet, no odor (SC)			80.0				
		80.0 - 82.0 Dark gray, CLAYEY fine SAND, wet, no odor (SC)	SC		-68.5				
	-70	82.0 - 85.0 Dark gray, fine SAND, wet, 1-inch fo gray Clay at 82.5 and 84 ft bgs, no odor (SP)	SP		82.0 / -71.5	0.0	17	GRAB	5.0 / 5.0
85		Boring completed at 85.0 ft							
	-75								
90									
	-80								
95									
	-85								
100									
	-90								
105									
	-95								
110									
	-100								
115									
	-105								
120									

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

PL2-435C



WELL CONSTRUCTION DETAILS

PL2-435C
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-79 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 79-84 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 77-84 ft
Type: 2/12 sand
Quantity: 2 ft
FILTER PACK SEAL
Interval: 75-77 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 0-75 ft
Type: Bentonite grout
Quantity: 75 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

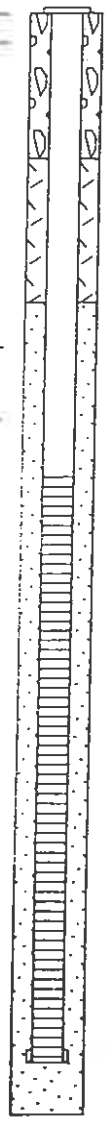
GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

WELL PL2-314A (SB-06201)

PROJECT BOEING ZONE 1 PRE-CONSTRUCTION
DATE COMPLETED 7 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 13.09
GROUND SURFACE ELEV 13.46
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Asphalt
						SP	SAND with GRAVEL (SP), Brownish gray (10YR4/1), 80% medium sand, 20% gravel, medium dense, dry (fill)
5	BG	SB-06201-0050 VOC, BNA, PPMETALS, TPH-418.1					SAND (SP), Dark grayish brown (10YR4/2), 100% medium sand, loose, dry
			9			ML	SILT with SAND (ML), Very dark gray (7.5YRN3/), 80% silt, 20% fine sand, loose, damp
	BG					SP	SAND (SP), Very dark gray (7.5YRN3/), 100% medium sand, medium dense, damp
			20				
	BG	SB-06201-0100 VOC, BNA, PPMETALS, TPH-418.1					Moist
						SM	SILTY SAND (SM), Very dark grayish brown (10YR3/2), 80% fine sand, 20% silt, medium dense, moist
			11				
	BG					SP	SAND (SP), Very dark grayish brown (10YR3/2), 100% medium sand, dense, wet
			50				
15	BG	SB-06201-0150 VOC, BNA, PPMETALS, TPH-418.1					Medium dense, iron oxide staining
			37				
	BG						Color change to Very dark gray (2.5YRN3/), very dense
			50/6				
20							BOH @ 19.0'



12/21/93
12/07/93

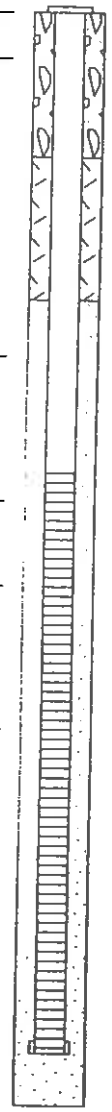
PLATE A-10

JOB NUMBER: 03709-036-001-4010 DATE: January 1994

WELL PL2-315A (SB-06303)

PROJECT BOEING ZONE 1 PRE-CONSTRUCTION
DATE COMPLETED 8 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 13.28
GROUND SURFACE ELEV 13.45
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
	BG	SB-06303-0020 VOC, PCB, BNA, PPMETALS, Cn, TPH-418.1				SP	SAND with GRAVEL (SP), Grayish brown (10YR5/2), 85% medium sand, 15% rounded gravel, medium dense, dry (fill)
5	BG	SB-06303-0050 VOC, PPMETALS, Cn, TPH-416.1					SAND (SP), Very dark grayish brown (10YR3/2), 100% medium sand, trace silt, medium dense, dry (fill)
			29			ML	SILT (ML), Light olive brown (2.5Y5/4), 95% silt, 5% fine sand, medium dense, dry, abundant organic fragments
	BG						
			29			SP	SAND (SP), Very dark grayish brown (10YR3/2), 100% medium, sand, medium dense, damp
10	BG						
			14			SP SM	SAND with SILT (SM-SM), Very dark grayish brown (10YR3/2), 90% fine sand, 10% silt, medium dense, moist, 6-inch silt interbed
	BG	SB-06303-0125 VOC, PPMETALS, Cn, TPH-416.1				SP	SAND (SP), Very dark grayish brown (10YR3/2), 100% medium sand, medium dense, wet
			30				
15	BG						Coarse sand fraction increases
			50/6				
	BG						
			50/5				
20							BOH @ 19.0'
25							



12/21

12/08/93

JOB NUMBER: 03709-036-001-4010 DATE: January 1994

PLATE A-11

WELL PL2-316A (SB-06207)

PROJECT BOEING ZONE 1 PRE-CONSTRUCTION
DATE COMPLETED 7 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 13.07
GROUND SURFACE ELEV 13.66
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
							SAND (SP), Dark grayish brown (10YR4/2), 100% medium sand, trace gravel, medium dense, dry (fill)
5	BG					SM	SILTY SAND (SM), Very dark grayish brown (10YR3/2), 70% fine sand, 30% silt, medium dense, damp
			14				
	BG	SB-06207-0075 VOC, HCID, TPH-G (ARCHIVE)				ML	SILT (ML), Light olive brown (2.5Y5/3), 90% silt, 10% fine sand, medium dense, abundant organic fragments, damp
			17				
	BG	SB-06207-0100 VOC, HCID, TPH-G (ARCHIVE)				SP/SM	SAND with SILT (SP-SM), Very dark grayish brown (10YR3/2), 90% fine sand, 10% silt, dense, moist, trace organic fragments
			43				
	BG	SB-06207-0125 VOC, HCID, TPH-G (ARCHIVE)				SP	SAND (SP), Very dark gray (10YR3/1), 100% fine sand, trace silt, medium dense, wet
			34				
15	BG						Grades to medium sand, color change to Very dark gray (7.5YRN3/)
			33				
	BG						Very dense
			50/6				BOH @ 19.0'
20							
25							

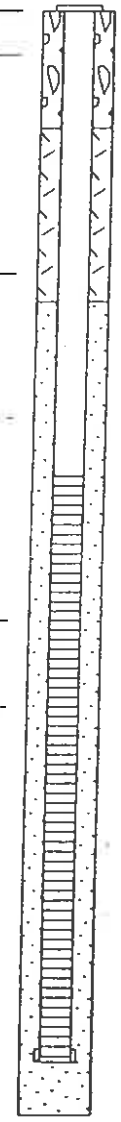


PLATE A-12

JOB NUMBER: 03709-036-001-4010 DATE: January 1994

Boring PL2-316B

Project	Boeing RFI	Start Date	02/21/95
Location	Plant 2 Seattle, WA	Finish Date	02/21/95
Project No.		Driller	
Contractor	Weston	Drilling Co.	PTL
Logged by	Stoopes/Fitzgerald	Drilling Method	4in ID HSA
		Sampling Method	2in split spoon
		Top of Casing (ft)	13.34
		Ground Surf. Elev. (ft)	13.64
		Boring Diam. (in)	10
		Total Depth (ft)	51.50

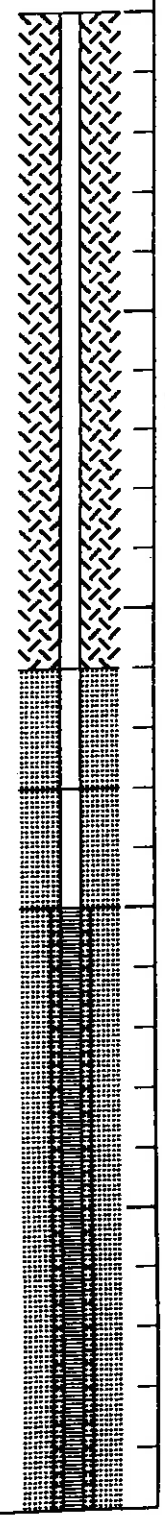
Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Asphalt
							SP	Sand with gravel (SP), dark grayish brown (10YR4/2), 70% medium sand, 30% angular gravel, dense, dry (fill).
5	BG				7		SM	Silty sand (SM), dark brown (10YR3/3), 70% fine sand, 30% silt, loose, moist, tan mottling.
10	BG				15		SP-SM	Sand with silt (SP-SM), grayish brown (10YR5/2), 90% sand, 10% silt, medium dense, wet, .25 in. silt lense @ 11.0 ft.
15	BG				38		SP	Sand (SP), dark gray (10YR4/1), 95% medium sand, 5% silt, dense, wet, .25 in. silt lense, 4 in. iron-oxide stain @ 15.5 ft., grades to 100% medium sand @ 16 ft.. Wood & twig fragments @ 35 ft.. Grades to 95% medium sand,*i**Sand (SP), dark gray (10YR4/1), 95%
20	BG				20			

Sheet 2 of 3

Boring PL2-316B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No.
Contractor Weston
Logged by Stoopes/Fitzgerald

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
	BG				21			
30	BG				11			
35	BG				24			
40	BG				20			
45					26			



Boring PL2-316B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No.
Contractor Weston
Logged by Stoopes/Fitzgerald

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
55								
60								
65								
70								

Boring PL2-316C

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

Start Date 03/03/95
Driller
Drilling Method 4 in. ID HSA
Sampling Method 2 in. split spoon

Finish Date 03/03/95
Drilling Co. PTL

Boring Diam. (in) 10
Total Depth (ft) 90.00

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
							SP	Asphalt Gravelly sand w/pieces of concrete (SP), (fill)
5					12		SP	Sand (SP), brn (10YR5/3), 95% medium sand, 5% silt, medium dense, dry to wet: @11', one foot silt interbed: @15', grades to 100% sand
10					10			
15					36			
20					24			

Boring PL2-316C

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					29			
30		Grain size	PL2-316C-0300		27		SP-SM	Sand w/silt (SP-SM), brn (10YR5/3), 90% med to fine sand, 10% silt, medium dense, wet
35							ML	Sandy silt (ML), brn (10YR5/3), 70% silt, 30% med to fine sand, stiff, wet
							SP-SM	Sand w/silt (SP-SM), brn (10YR5/3), 90% med to fine sand, 10% silt, medium dense, wet
40								
45								

Boring PL2-316C

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
55					47		SM	Silty sand (SM), grayish brn (10YR5/2), 80% fine to medium sand, 20% silt, medium dense, wet
60		TOC Grain size	PL2-316C-0600		17			
65		Permeability	PL2-316C-0650				ML	Silt w/sand (ML), grayish brn (10YR5/2), 80% silt, 20% fine to medium sand, firm, wet
							SM	Silty sand (SM), grayish brn (10YR5/2), 80% fine sand, 20% silt, loose, wet.
70					17			

Boring PL2-316C

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

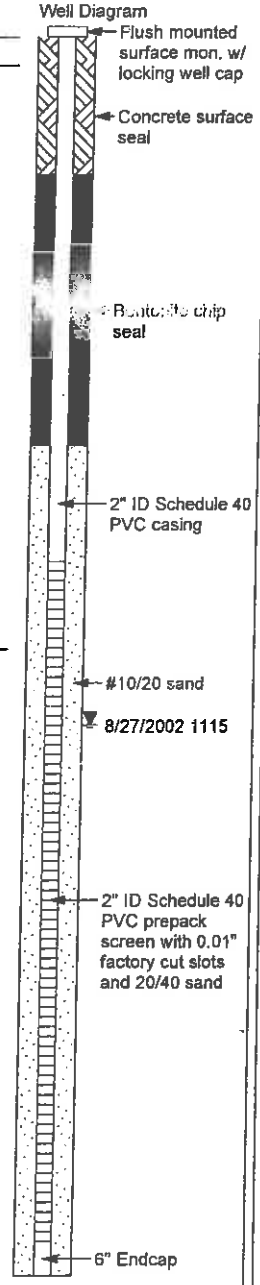
Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					41			
80					7			
85					10		ML	Sandy silt (ML), very dk gray (10YR3/1), 60% silt, 40% fine sand, loose, wet.
90								
95								

Monitoring Well PL2-317AR

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 5, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 12.15
GROUND SURFACE ELEV (ft): 12.45
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							5" Asphalt.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5			20			SW	SAND (SW), Brown, 60% medium sand, 30% fine sand, 5% silt, 5% gravel, dry, no odor or stain. Contained fragments of brick, (fill).
						SW	SAND (SW), Black. 70% medium sand, 25% fine sand, 5% silt, moist, no odor or sheen, (alluvium).
10			9				
15			13				SAA, wet.
20							Bottom of hole @ 18.5 feet

Well Diagram



Notes:
SAA: Same as Above.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

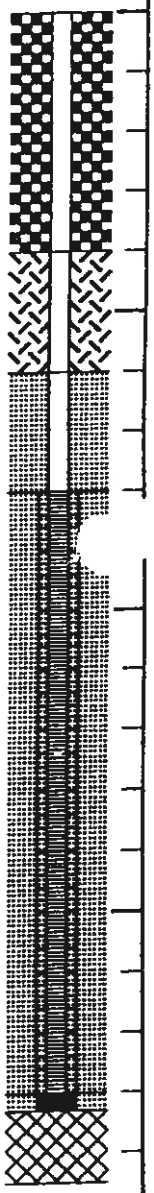
Plate
A-3

Sheet 1 of 1

Boring PL2-325A

Project	Boeing RFI	Start Date 02/22/95	Finish Date 02/22/95
Location	Plant 2 Seattle, WA	Driller	Drilling Co. PTL
Project No.		Drilling Method 4in ID HSA	
Contractor	Weston	Sampling Method 2in split spoon	
Logged by	Stoopes	Top of Casing (ft) 12.29	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 12.76	Total Depth (ft) 18.00

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete roadway.
							SP	See Boring PL2-325B for lithologic description to depth.
5								
10								
15								
20								



Boring PL2-325B

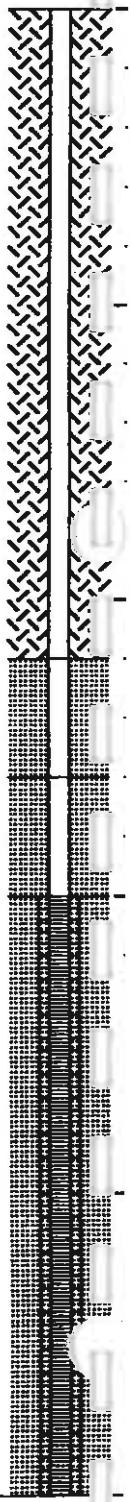
Project	Boeing RFI	Start Date 02/23/95	Finish Date 02/23/95
Location	Plant 2 Seattle, WA	Driller	Drilling Co. PTL
Project No.	03709-034-300	Drilling Method 4in ID HSA	
Contractor	Weston	Sampling Method 2in split spoon	
Logged by	Stoopes	Top of Casing (ft) 12.41	Boring Diam. (in) 10.0
		Ground Surf. Elev. (ft) 12.68	Total Depth (ft) 51.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							SP	Sand with gravel (SP), dark grayish brown (10YR4/2), 70% medium sand, 30 % angular gravel, dense, dry (fill).
5					6		SP-SM	Sand with silt (SP), dark brown (10YR4/3), 90% medium sand, 10 % silt, loose, moist. Grades to wet @ 10 ft..
10					7			
15					6			
20					10		SP	Sand (SP), grayish brown (10YR5/2), 95% medium sand, 5% silt, medium dense, wet.

Boring PL2-325B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
		Grain size	PL2-325B-0250		21			
30					21			
35					31			
40					27			
45					30			



Boring PL2-325B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

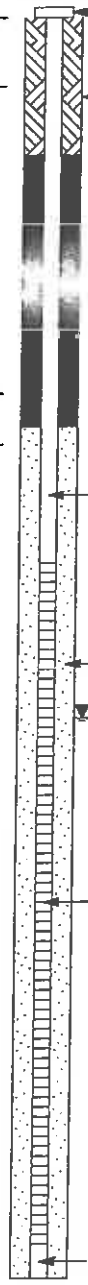
Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					33			
55								
60								
65								
70								

Monitoring Well PL2-326A

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 7, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.17
GROUND SURFACE ELEV (ft): 13.53
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							12" Concrete.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5						ML	Clayey SILT (ML), Dark brown, 70% silt, 30% clay, dry, no odor or stain, (alluvium).
						SM	Silty SAND (SM), Grayish brown, 60% fine sand, 30% silt, 10% medium sand, dry, no odor or stain, (alluvium).
10							SAA, wet, no odor or sheen.
15							SAA, 55% fine sand, 40% silt, 5% medium sand, occasional wood debris.
20							Bottom of hole @ 18.5 feet

Well Diagram



Notes:
SAA: Same as Above.
No samples collected. Lithology based on PL2-326B.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Plate
A-4

Weston Solutions, Inc.

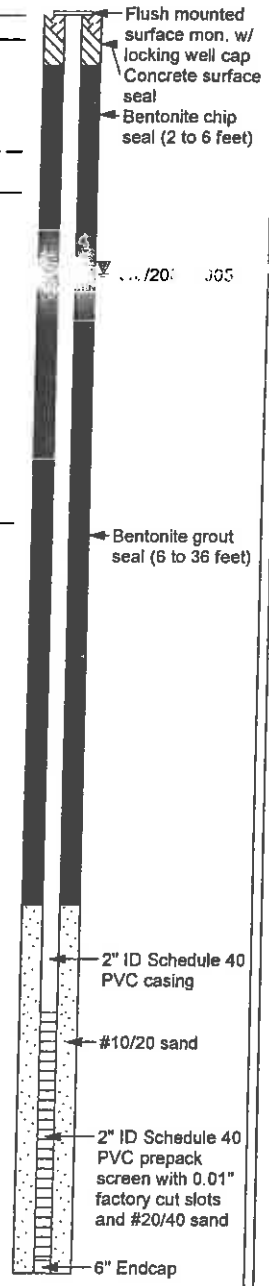
BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:36

Monitoring Well PL2-326B

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 7, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.26
GROUND SURFACE ELEV (ft): 13.52
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							12" Concrete.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5			8			ML / SM	Clayey SILT (ML), Dark brown, 55% silt, 35% clay, 10% fine sand, dry, no odor or stain, (alluvium).
							Silty SAND (SM), Grayish brown, 60% fine sand, 30% silt, 10% medium sand, dry, no odor or stain, (alluvium).
10			11				SAA, wet, no odor or sheen.
15			16				occasional wood debris.
20			28			SW	SAND (SW), Black, 55% fine sand, 35% medium sand, 10% silt, wet, no odor or sheen, (alluvium).
25			26				SAA.
30			14				SAA.
35			16				SAA, 50% medium sand, 35% fine sand, 10% silt, 5% coarse sand.
40			20				SAA, 60% fine sand, 25% medium sand, 10% silt, 5% coarse sand.
45			19				SAA.
50			17				SAA.
							Bottom of hole @ 51.5 feet
55							

Well Diagram



Notes:
SAA: Same as Above.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Plate
A-5

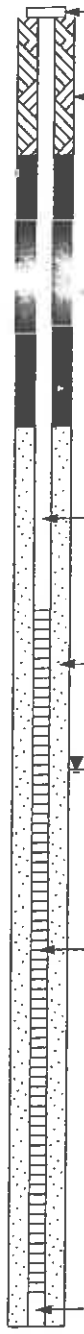
BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:36

Monitoring Well PL2-327A

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 13, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.59
GROUND SURFACE ELEV (ft): 13.94
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							6" Concrete.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5						ML	Clayey SILT (ML), Grayish brown, 70% silt, 30% clay, dry, no odor or stain, (alluvium).
						SW	SAND (SW), Black, 80% fine sand, 10% medium sand, 10% silt, dry, no odor or stain, (alluvium).
10						ML	Clayey SILT with SAND (ML), Grayish brown, 55% silt, 25% clay, 20% fine sand, wet, no odor or sheen, (alluvium).
15						SW	SAND (SW), Black, 60% medium sand, 25% fine sand, 15% silt, 5% fine gravel, wet, no odor or sheen, (alluvium).
20							Bottom of hole @ 19.2 feet

Well Diagram



Notes:
SAA: Same as Above.
No samples collected. Lithology based on PL2-327B.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Plate
A-6

Weston Solutions, Inc.

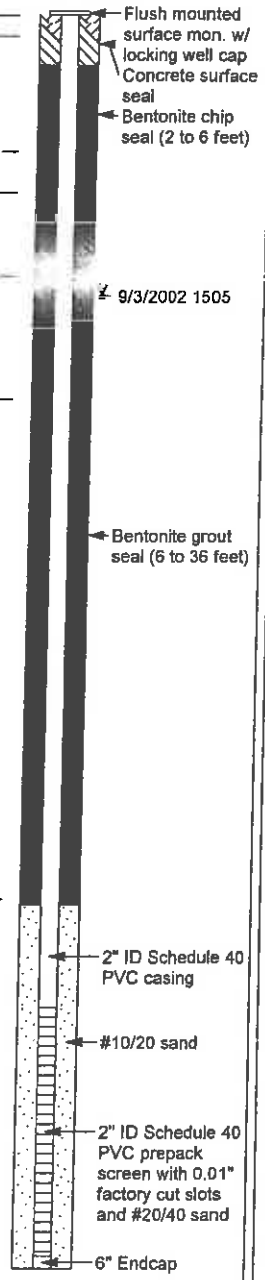
BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:37

Monitoring Well PL2-327B

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 7, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.63
GROUND SURFACE ELEV (ft): 13.91
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							6" Concrete. SAND (SW), Brown, dry, no odor or stain, (fill).
5			8			ML / SW	Clayey SILT (ML), Grayish brown, 70% silt, 30% clay, dry, no odor or stain, (alluvium). SAND (SW), Black, 80% fine sand, 10% medium sand, 10% silt, dry, no odor or stain, (alluvium).
10			10			ML	Clayey SILT with SAND (ML), Grayish brown, 55% silt, 25% clay, 20% fine sand, wet, no odor or sheen, (alluvium).
15			34			SW	SAND (SW), Black, 60% medium sand, 25% fine sand, 15% silt, 5% fine gravel, wet, no odor or sheen, (alluvium).
20			13				SAA.
25			13				SAA.
30			13				SAA.
35			15			SM	Silty SAND (SM), Black, 60% fine sand, 30% silt, 10% medium sand, wet, no odor or sheen, (alluvium).
40			38			SW	SAND (SW), Black, 65% fine sand, 20% medium sand, 10% silt, 5% coarse sand, wet, no odor or sheen, (alluvium).
45			33			SM	Silty SAND (SM), Black, 75% fine sand, 15% silt, 5% silt, 5% medium sand, wet, no odor or sheen, (alluvium).
50			23			SW	SAND (SW), Black, 75% fine sand, 20% medium sand, 5% silt, wet, no odor or sheen, (alluvium). Bottom of hole @ 51.5 feet
55							

Well Diagram



Notes:
SAA: Same as Above.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Plate
A-7

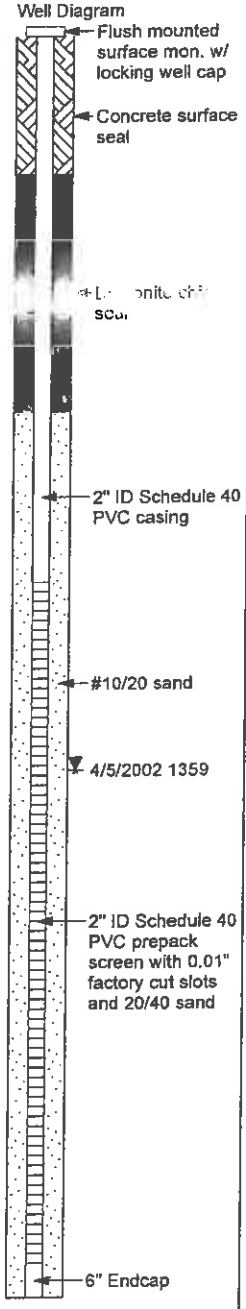
BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:37

Monitoring Well PL2-328A

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 13, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.32
GROUND SURFACE ELEV (ft): 13.70
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							6" Concrete.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5						SW	SAND (SW), Light brown, 70% medium sand, 20% coarse sand, 10% silt, dry, no odor or stain, (fill).
						SM	Silty SAND (SM), Brown, 55% fine sand, 30% silt, 15% medium sand, dry, no odor or stain, (fill).
10							Grayish brown, SAA, Grayish brown, 60% fine sand, 40% silt, wet, no odor or sheen, (alluvium).
15						SW	SAND (SW), Black, 65% fine sand, 25% medium sand, 5% coarse sand, 5% silt, wet, (alluvium).
20							Bottom of hole @ 18.5 feet

Well Diagram



Notes:
SAA: Same as Above.
No samples collected. Lithology based on PL2-328B.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Plate
A-8

Weston Solutions, Inc.

BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:37

Monitoring Well PL2-328B

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 7, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.33
GROUND SURFACE ELEV (ft): 13.77
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							6" Concrete. SAND (SW), Brown, dry, no odor or stain, (fill).
5			12			SW / SM	SAND (SW), Light brown, 70% medium sand, 20% coarse sand, 10% silt, dry, no odor or stain, (fill). Silty SAND (SM), Brown, 55% fine sand, 30% silt, 15% medium sand, dry, no odor or stain, (fill).
10			6				SAA, Grayish brown, 60% fine sand, 40% silt, wet, no odor or sheen, (alluvium).
15			7			SW	SAA. SAND (SW), Black, 65% fine sand, 25% medium sand, 5% coarse sand, 5% silt, wet, 1" thick iron stain at 16 feet, no odor or sheen, (alluvium).
20			18				SAA, no odor, stain, or sheen.
25			18				SAA, 60% medium sand, 30% fine sand, 10% silt.
30			5				SAA.
35			14				SAA, 55% fine sand, 25% medium sand, 10% clay, 10% silt), occasional wood fragments.
40			26				SAA, 65% medium sand, 30% fine sand, 5% silt.
45			18				SAA, occasional wood fragments.
50			10				SAA. Bottom of hole @ 51.5 feet
55							

Notes:
SAA: Same as Above.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Well Diagram

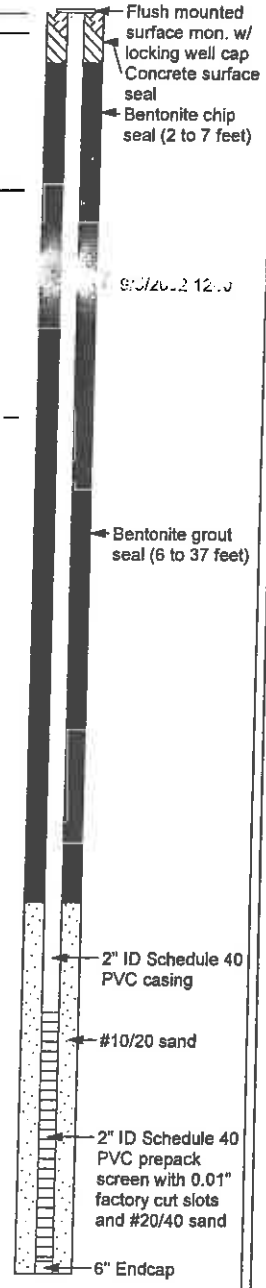


Plate
A-9

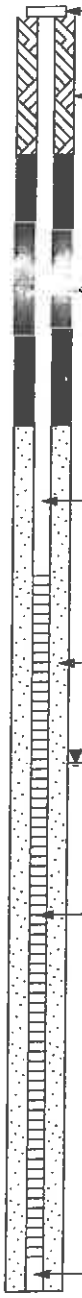
BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:37

Monitoring Well PL2-329A

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 6, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.26
GROUND SURFACE ELEV (ft): 13.58
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							7" Concrete.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5						SM	Silty SAND (SM), Brown, 65% fine sand, 20% silt, 15% medium sand, moist, no odor or stain, (fill).
						ML	Clayey SILT (ML), Light brown, 70% silt, 30% clay, moist, no odor or stain, (alluvium).
						SM	Silty SAND (SM), Black, 55% fine sand, 30% medium sand, 15% silt, moist, no odor or stain, (alluvium).
10							SAA, grayish brown, 60% fine sand, 40% silt, wet, no odor of sheen.
15						SW	SAND (SW), Black, 65% fine sand, 25% medium sand, 5% coarse sand, 5% silt, wet, (alluvium).
20							Bottom of hole @ 18.7 feet

Well Diagram



Notes:
SAA: Same as Above.
No samples collected. Lithology based on PL2-329B.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Plate
A-10

Weston Solutions, Inc.

BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:38

Monitoring Well PL2-329B

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 6, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.24
GROUND SURFACE ELEV (ft): 13.26
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							7" Concrete. SAND (SW), Brown, dry, no odor or stain, (fill).
5			7			SM	Silty SAND (SM), Brown, 65% fine sand, 20% silt, 15% medium sand, moist, no odor or stain, (fill).
						ML	Clayey SILT (ML), Light brown, 70% silt, 30% clay, moist, no odor or stain, (alluvium).
						SM	Silty SAND (SM), Black, 55% fine sand, 30% medium sand, 15% silt, moist, no odor or stain, (alluvium).
10			8				S/ gre. h.ow 50% fin. sand 40% silt, wet, no odor of sheen.
15			24			SW	SAND (SW), Black, 65% fine sand, 25% medium sand, 5% coarse sand, 5% silt, wet, (alluvium).
20			20				SAA, Trace fine gravel.
25			29				
30			26				SAA.
35			32				SAA, 50% fine sand, 30% medium sand, 15% silt, 5% fine gravel.
40			28				
45			10				SAA.
50			17				SAA.
55							Bottom of hole @ 51.5 feet

Notes:
SAA: Same as Above.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Well Diagram

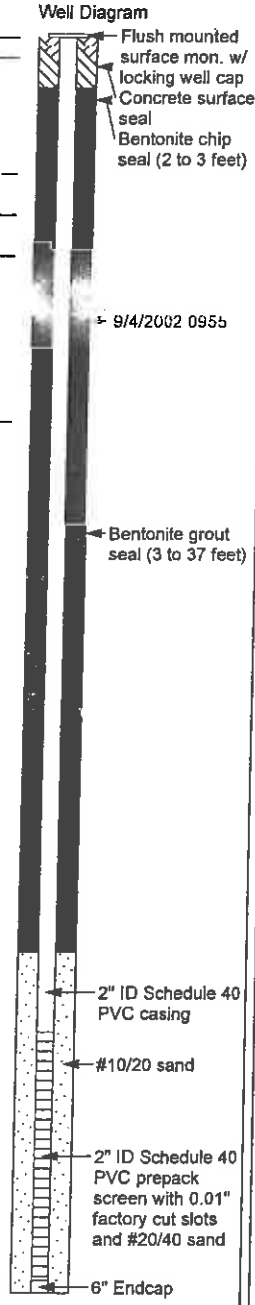


Plate
A-11

BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:38

Monitoring Well PL2-331A

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 6, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.05
GROUND SURFACE ELEV (ft): 13.36
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							6" Concrete.
							SAND (SW), Brown, dry, no odor or stain, (fill).
5						SM	Silty SAND (SM), Grayish brown, 60% fine sand, 35% silt, 5% medium sand, moist, 3" thick clay lens at 6', no odor or stain, (alluvium).
10							SAA, wood fragment at 11.25', 2" thick clay lens at 10.75', no odor or stain.
15							SAA, scattered roots, no odor or stain, wet.
20							

Bottom of hole @ 18.7 feet

Notes:
SAA: Same as Above.
No samples collected. Lithology based on PL2-331B.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Well Diagram

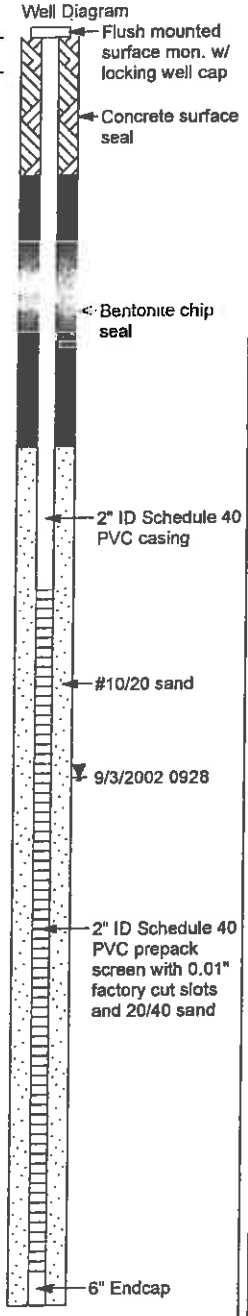


Plate
A-14

Weston Solutions, Inc.

BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:39

Monitoring Well PL2-331B

PROJECT: Boeing Plant 2 - Upland Area Well Installation
JOB NUMBER: 03709-034-600-0002-05
DATE COMPLETED: August 6, 2002
DRILLING METHOD: 8" OD HSA - Cascade Drilling
TOP OF CASING ELEV (ft): 13.08
GROUND SURFACE ELEV (ft): 13.45
LOGGED BY: K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							6" Concrete. SAND (SW), Brown, dry, no odor or stain, (fill).
5			7			SM	Silty SAND (SM), Grayish brown, 60% fine sand, 35% silt, 5% medium sand, moist, 3" thick clay lens at 6', no odor or stain, (alluvium).
			6				SAA, wood fragment at 11.25', 2" thick clay lens at 10.75'.
15			5				SAA, wet, scattered roots.
20			10				SAA, no root fragments.
25			27			SW	SAA. SAND (SW), Black, 60% fine sand, 35% medium sand, 5% clay, wet, no odor or sheen.
30			32				SAA.
35			26				SAA.
40			27				SAA.
45			22				SAA.
50			25				SAA. Bottom of hole @ 51.5 feet
55							

Notes:
SAA: Same as Above.
Sampling method with 2" splitspoon, 140lb hammer, with 30" drop.

Well Diagram

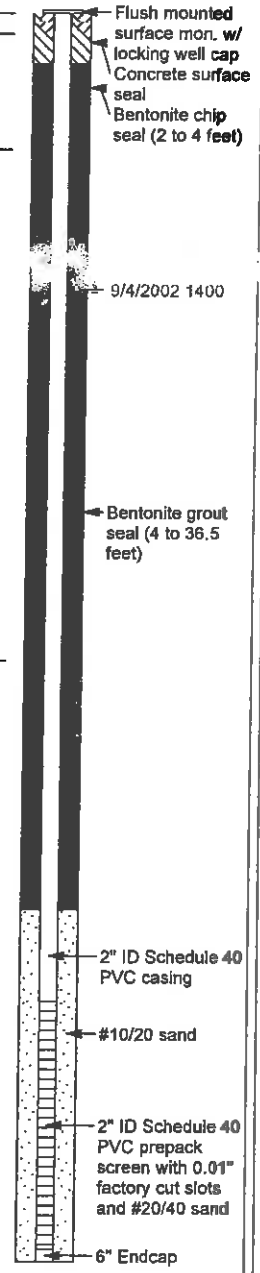


Plate
A-15

BOREHOLE LOG BOEING PL2 (AUGUST 2002).GPJ WSI SEATTLE.GDT 11/8/02 11:39

Monitoring Well PL2SW-MW4

PL2-004A

Soil Profile

Depth (feet)

0, 5, 10, 15, 20

Elevation = 13.2 Feet (NGVD)

Asphalt paving

GW — Medium yellow-brown, sandy, fine to medium GRAVEL (medium dense, moist) (tank excavation backfill)

SP — Dark yellow-brown, fine SAND with some medium gravel (very loose to loose, moist)

(grades to gravelly, medium sand)

ATD (2/5/91)

SP — Dark brown, fine SAND (loose, wet)

24, 10, 7, 3, 5 C, 5 C

Boring Completed 2/5/91
Total Depth = 16.9 Feet

Comments	PID[1]
No Comments	1.8
	0.7
	1.0
	0.3
Hydrocarbon Odor In Borehole	0.9
Strong Hydrocarbon Odor In Sample	24.2

Well Detail

12"

Depth (feet): 1.5, 3.5, 6.5, 16.5, 16.9

- Locking Cap
- Flush-Mounted Monument Cover
- Concrete
- Silica Sand
- Bentonite Chips
- 4-In. I.D. Schedule 40 PVC Well Casing
- #10-20 Colorado Silica Sand
- 4-In. I.D. Schedule 40 PVC Screen (0.02-In. slotted interval)
- Threaded End Cap

Well Completed 2/6/91
Top of Monument Rim Elevation = 13.28 Feet
Top of PVC Elevation = 12.86 Feet

Notes:
1. PID = Maximum photoionization detector reading when held adjacent to freshly split sample, in ppm.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Key and Soil Classification System" figure for explanation of graphics and symbols.

Mar 7, '91

Monitoring Well PL2SW-MW5

PL2-005A

Soil Profile

Depth (feet)

0, 5, 10, 15, 20

Elevation = 13.2 Feet (NGVD)

Concrete pavement

SP — Medium brown, fine SAND with trace silt (loose, moist) (possible fill)

ML — Dark yellow-brown, finely laminated SILT with trace organic matter (soft, moist)

SP — Dark brown, fine SAND with trace coarse sand and shells (loose, moist)

Some silt and organic matter (moist to wet)

(grades to dark brown, fine to very fine sand (wet))

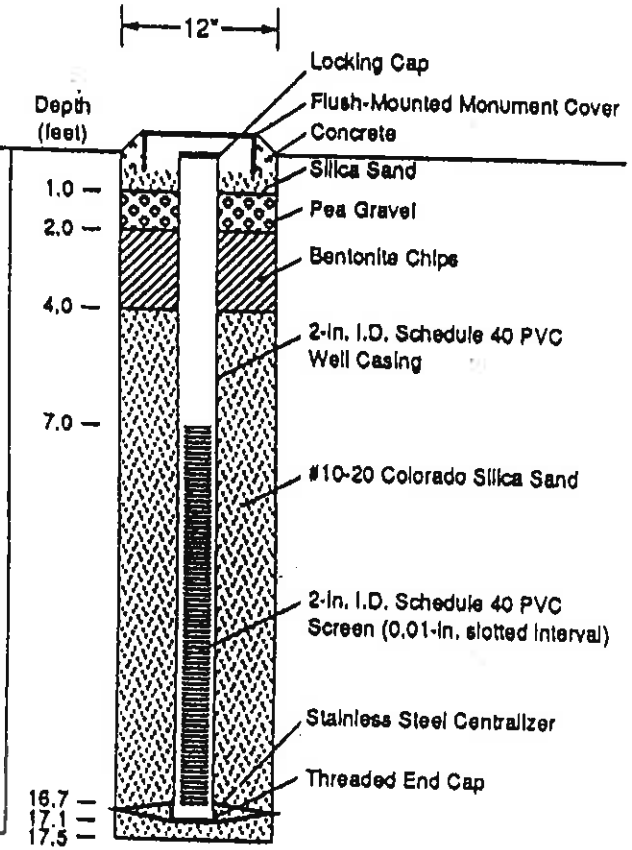
ATD (2/5/91)

Samples: 6, 7, 3 C, 8, 6 C, 2

Boring Completed 2/5/91
Total Depth = 17.5 Feet

Comments	PID[1]
Potential Perched Ground Water Zone between 7 and 9 Feet	0.0
	1.6
	1.0
	1.0
	1.1
	1.5

Well Detail



Well Completed 2/5/91
Top of Monument Rim Elevation = 13.28 Feet
Top of PVC Elevation = 13.02 Feet

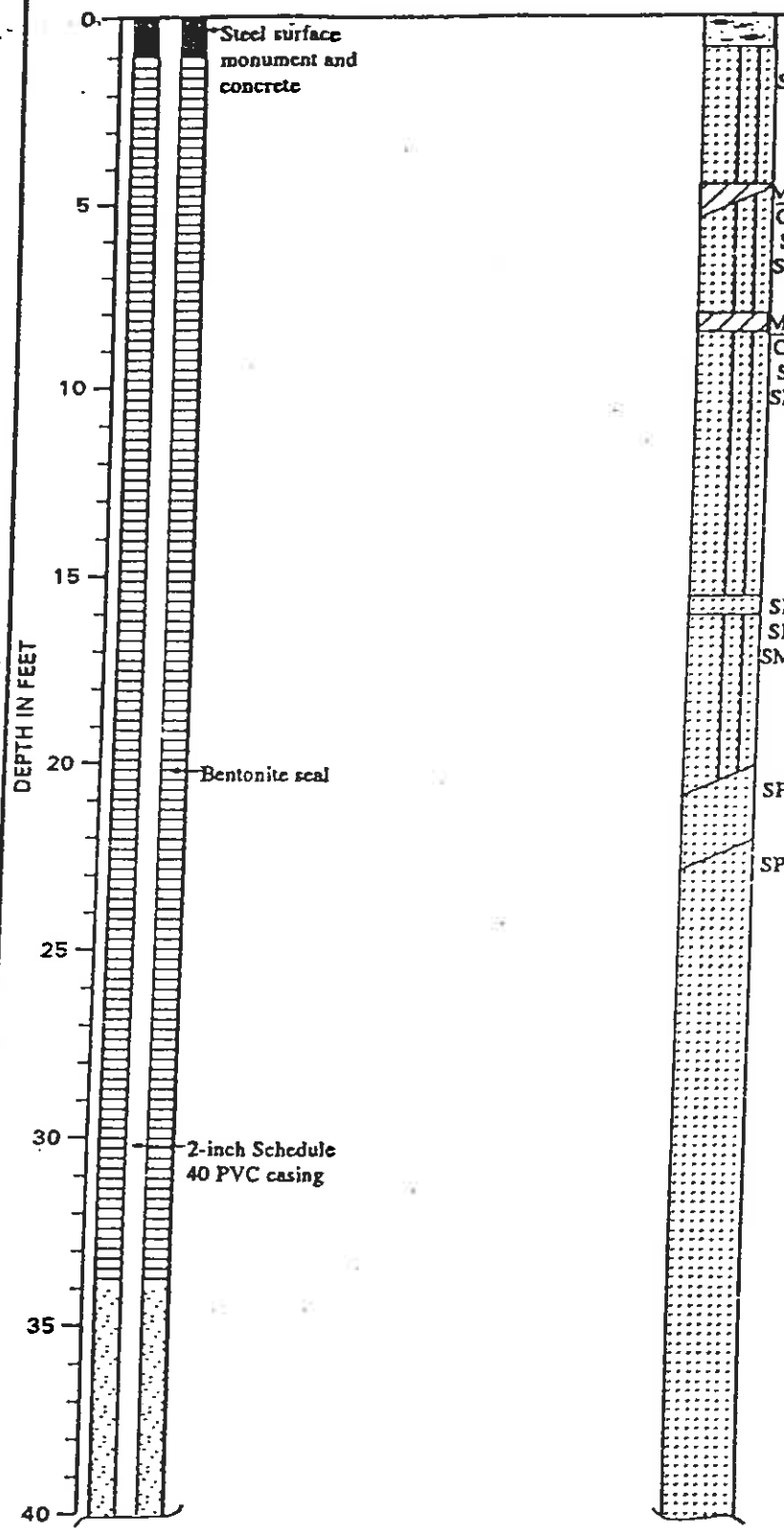
Notes:
1. PID = Maximum photoionization detector reading when held adjacent to freshly split sample, in ppm.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Key and Soil Classification System" figure for explanation of graphics and symbols.

MONITORING WELL PL2SW-MW5B

PL2-00

WELL SCHEMATIC

Casing Elevation (ft.): 12.50
Casing Stickup (ft.): -0.78



DESCRIPTION

Surface Elevation (ft.): 13.28

Group Symbol	Description
	8 inches concrete
SP-SM	Brown fine to medium sand with silt (loose
ML CL	Brown clayey silt with a trace of sand (loos moist)
SP-SM	Brown fine to medium sand with silt (very l moist)
ML CL	Brown clayey silt with a trace of sand
SP-SM	Gray fine to medium sand with silt (loose, n Water level ranged between 9.3 and 13.8 fe during the 2-week tidal study (12/20/91 t 01/02/92)
SP SP-SM	Gray fine to medium sand with a trace of silt loose, wet) Gray fine to medium sand with silt (very loo wet) Occasional wood fibers
SP	Grayish brown fine to medium sand with silt occasional wood fibers (very loose, wet)
SP	Grayish brown fine to medium sand with a tr of silt (very loose, wet)

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical intermediate 2-inch diameter monitoring well construction

1 of 2
MK 7/18/94

:CRW:RNM:PGW:CMS 10/15/92

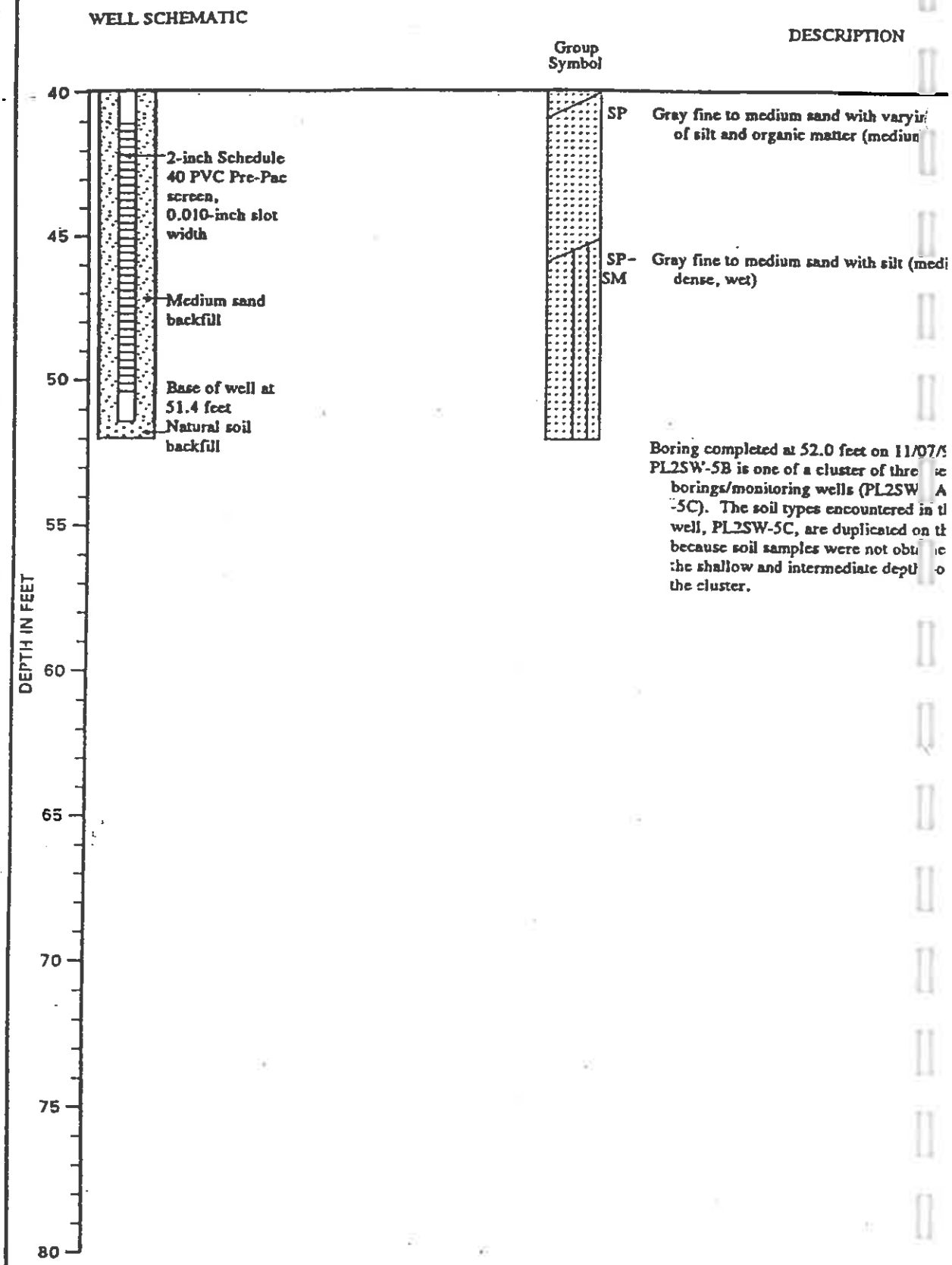
0120-149-R14

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-7a

MONITORING WELL PL2SW-MW5B
(Continued)



Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical intermediate 2-inch diameter monitoring well construction

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-7b

:CNW:RNM:PGW:CMS 10/15/92

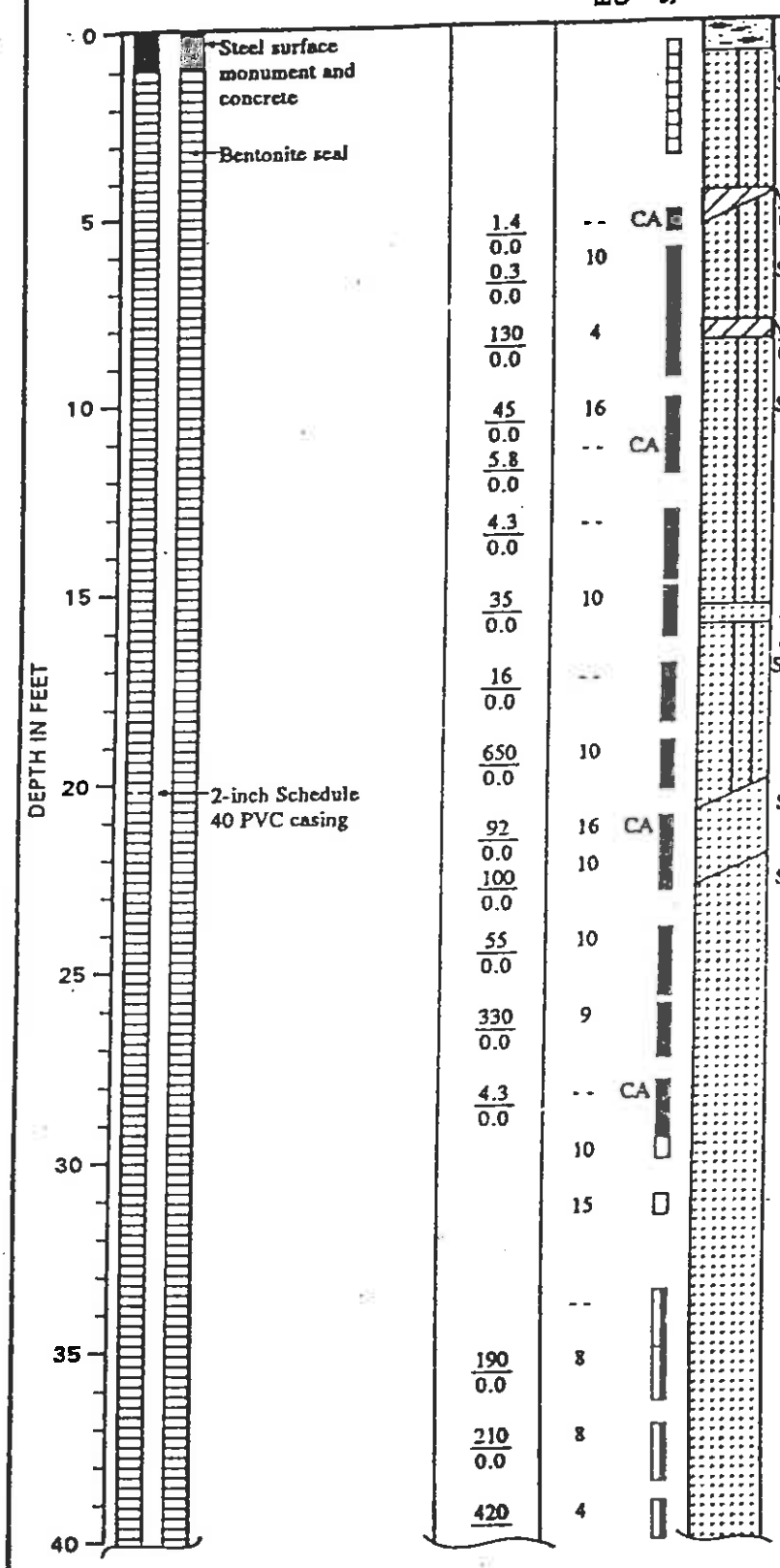
0120-149-014

PL2-0 005C

WELL SCHEMATIC

Casing Elevation (ft.): 12.98
Casing Stickup (ft.): -0.32

Surface Elevation (ft.): 13.30



DESCRIPTION

8 inches concrete

Brown fine to medium sand with silt (loose,

Brown clayey silt with a trace of sand (loose, moist)

Brown fine to medium sand with silt (very loo moist)

Brown clayey silt with a trace of sand
VC = 0.3 ppm at 8 feet

Gray fine to medium sand with silt (loose, mo
Water level ranged between 9.9 and 14.1 feet during the 2-week tidal study (12/20/91 th 01/02/92)

Gray fine to medium sand with a trace of silt loose, wet)

Gray fine to medium sand with silt (very loos wet)
Occasional wood fibers

Grayish brown fine to medium sand with a tra of silt and occasional wood fibers (very lo wet)

Grayish brown fine to medium sand with a tra of silt (very loose, wet)

1 of 3
mk 7/18/9

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

Geo Engineers

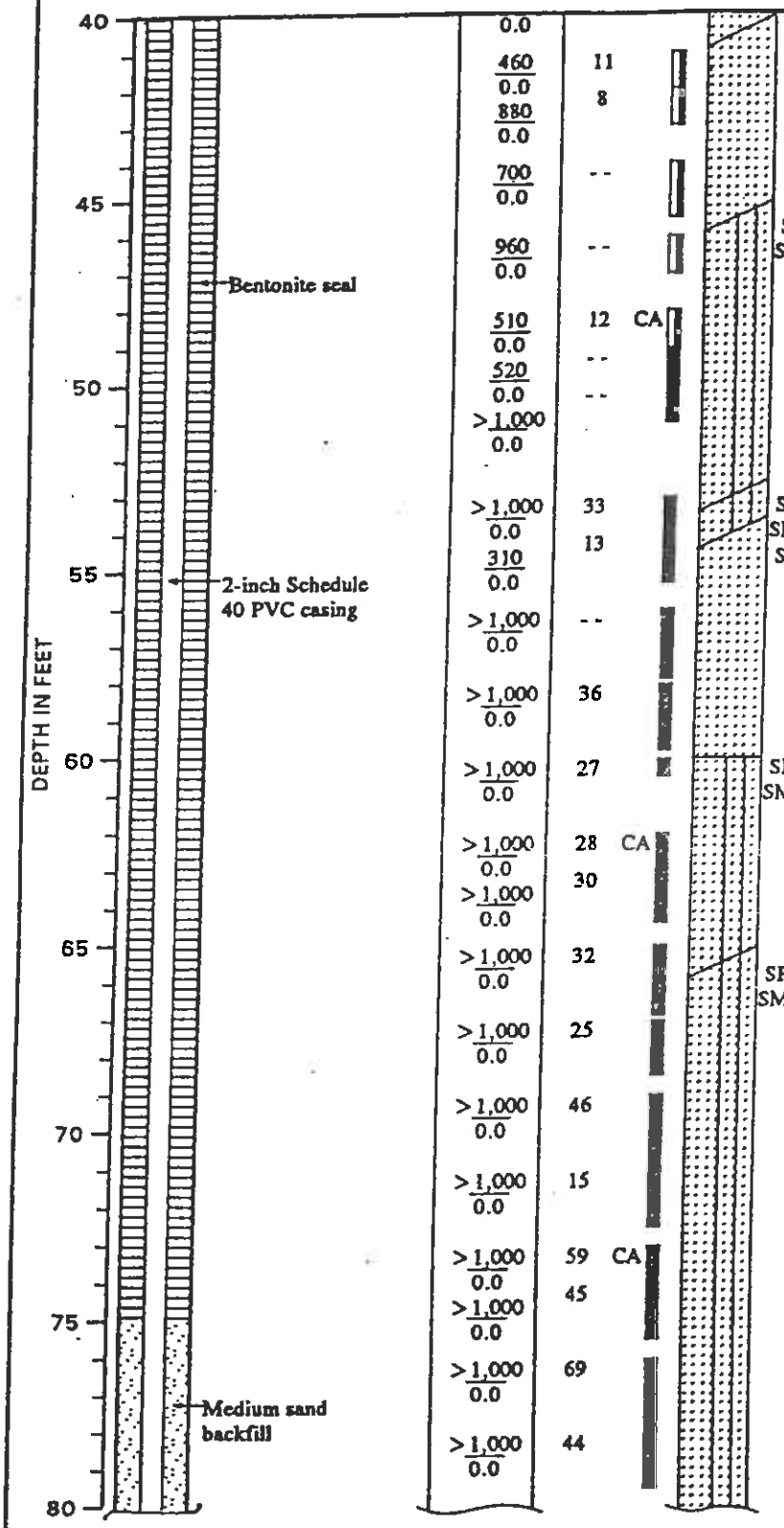
LOG OF MONITORING WELL

FIGURE A-8a

:CRW:RNM:PGW:CMS 10/15/92

0120-149-R14

(Continued)



DESCRIPTION

SP — Gray fine to medium sand with varying amounts of silt and organic matter (medium dense, wet)

SP-SM — Gray fine to medium sand with silt (medium dense, wet)

SP-SM — Gray fine to medium sand with silt and occasional wood (loose, wet)

SP — Gray fine to medium sand with a trace of silt (medium dense, wet)

Occasional wood chunks

SP-SM — Gray fine to medium sand with varying amounts of silt and occasional organic matter (medium dense, wet)

SP-SM — Gray fine to medium sand with varying amounts of silt (loose, wet)

Grades to medium dense

Grades to loose

Grades to medium dense

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

2 of 3
MK 7/18/94

Geo Engineers

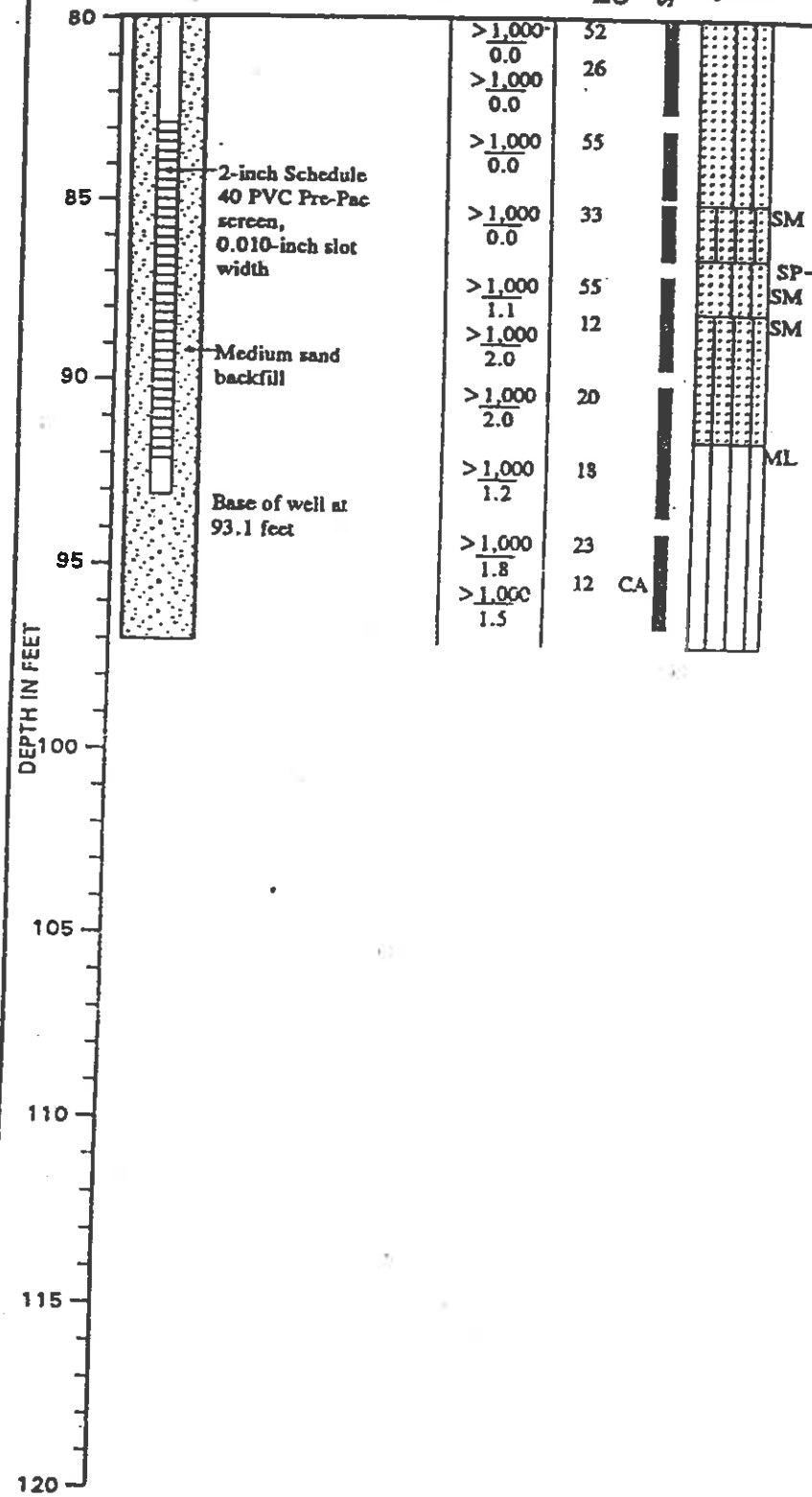
LOG OF MONITORING WELL

FIGURE A-8b

:CRW:RNM:PGW:CMS 10/15/92

0120-149-R14

MONITORING WELL PZ3W-MW3C
(Continued)



Boring completed at 97.0 feet on 10/22/91
VC indicated by field screening soil samples fro 8 feet
TCE was not indicated by field screening so samples
Continuous soil sampling was attempted from th surface to the total boring depth

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

3 of 3

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-8c

:CRW:RNM:PGW:CMS 10/15/92

0120-149-R14

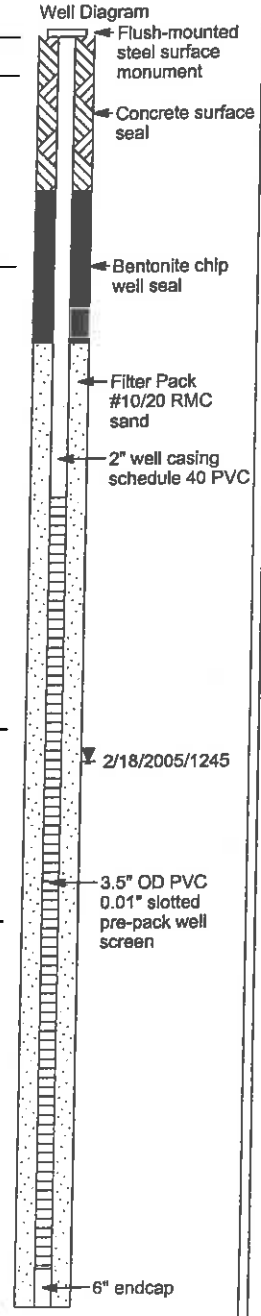
Monitoring Well PL2-006AR

PROJECT Phase II PCB Transformer Investigation
JOB NUMBER 03709-079-001-0004
DATE COMPLETED February 16, 2005
DRILLING METHOD Hollow Stem Auger
TOP OF CASING ELEV (ft) 12.86 feet NGVD29
GROUND SURFACE ELEV (ft) -
LOGGED BY K. Broom (Weston)

Depth (ft)	PID Reading (ppm)	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USCS Classification	Lithologic Description
0							6" Concrete.
						SM	Silty SAND (SM), Brown, dry, (fill).
						SM	Silty SAND (SM), Dark brown, petroleum odor, (alluvium).
			31				
5	225	P2ST-SB-MW006AR-0080 PCBs	37				75% sand, 25% fines.
							60% sand, 40% fines, damp.
	366		26				
	447	P2ST-SB-MW006AR-0100 PCBs	20				
						ML	Sandy SILT (ML), Black, 35% sand, 65% fines, damp.
10	1282	P2ST-SB-MW006AR-0120 PCBs	10				
	303		11			SM	Silty SAND (SM), Black, 70% sand, 30% fines, wet.
		P2ST-SB-MW006AR-0140 PCBs					
	1383		15				
	670	P2ST-SB-MW006AR-0160 PCBs	14				Petroleum sheen.
15							
	66.1		39				

Bottom of hole @ 16.5 feet

Well Diagram



Notes:
Replaces monitoring well PL2-006A.

Plate
A-1

Weston Solutions, Inc. · 190 Queen Anne Avenue North, Suite 200 · Seattle, WA 98109

BOREHOLE LOG BOEING PL2 PII TRANSFORMER.GPJ RFW SEATTLE.GDT 5/31/05 12:32

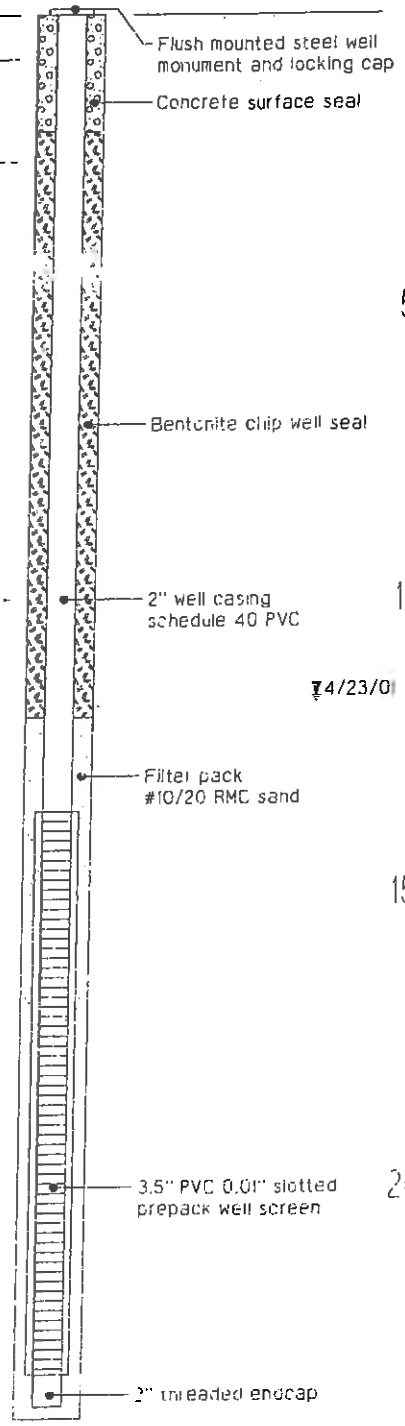
MONITORING WELL PL2-013AR

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT Boeing - Plant 2
DATE COMPLETED 29 March 2001
DRILLING METHOD 8" OD HSA - Cascade Drilling
SAMPLING METHOD 3" OD Split Spoon, 300lb Hammer
TOP OF CASING
GROUND SURFACE ELEV
LOGGED BY K. Broom - WESTON

Depth (ft)	PID Reading (ppm)	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0						8" Concrete
	2.0	HA			GW	Sandy GRAVEL, (GW), grey, blue crystals present, dry, metal and organic debris, no odor or staining, (fill).
	1.9	11			SW	SAND, (SW), brown, fine to medium grained, medium dense, damp, metal debris, no odor or staining, (fill).
5	6.7	11				SAA, charcoal debris.
	2.0	8				SAA, loose, no debris.
10	2.3	10			SP	SAND, (SW), brown, fine to medium grained, loose, wet, metal debris, no odor or staining, (fill).
	1.1	33				SAA, black, no debris, dense, (alluvium).
15	0.5	27				SAA, medium dense.
20	0.5	13				SAA
25						BOH @ 24 feet bgs

Well Construction



Notes:
BOH = Bottom of hole.
SAA = Same as above.
HA = Hand grab sample.
No soil samples were collected for laboratory analysis.

PLATE A-2

JOB NUMBER: 03709-034-000-0002-03 DATE: March 2001

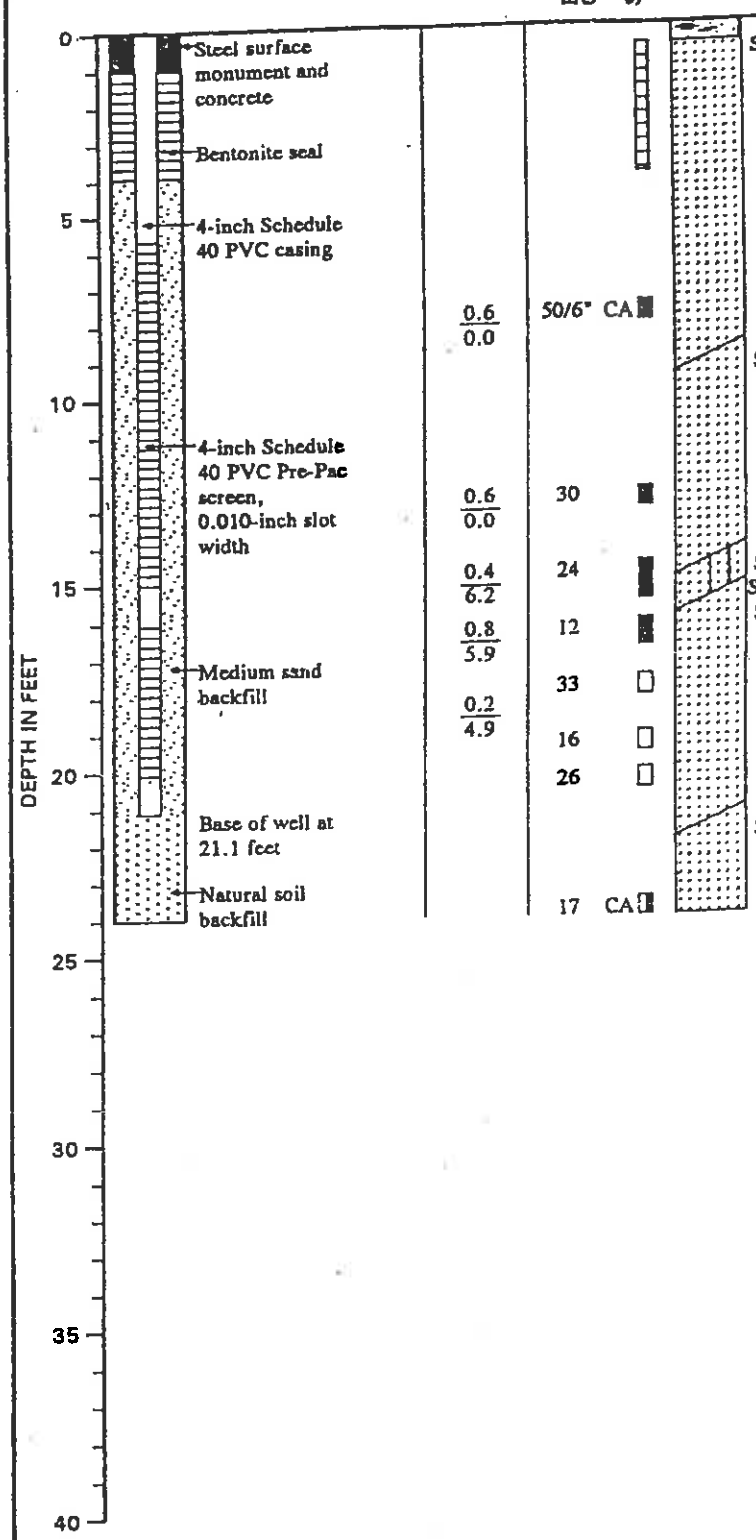
PL2-014A

MONITORING WELL PL2SW-MW14

WELL SCHEMATIC

Casing Elevation (ft.): 11.01
Casing Stickup (ft.): -0.36

Surface Elevation (ft.): 11.37



DESCRIPTION

6 inches concrete

Brown fine to medium sand with a trace occasional gravel and concrete chunks (fill)

Water level ranged between 5.6 and 14.7 feet during the 2-week tidal study (12/20/91 through 01/02/92)

Brown fine to medium sand with silt and concrete chunks (medium dense, wet) (fill)

Blackish brown fine to medium sand with silt

Blackish brown fine to medium sand with a trace of silt and occasional organic matter (loose, wet)

Dark brown fine to medium sand, a trac with occasional wood pieces and twig dense, wet)

Boring completed at 24.0 feet on 10/08/91
Soil samples not field screened for VC or TCE

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

MVL 7/19/94

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-18

:CRW:RNM:PGW:CMS 10/16/92

0120-149-R14

WELL PL2-027A (SB-07801)

PROJECT BOEING ZONE 1 PRE-CONSTRUCTION
DATE COMPLETED 7 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 13.64
GROUND SURFACE ELEV 14.03
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
	BG					SP	SAND (SP), Very dark gray (5Y3/1), 90% medium sand, 10% gravel, medium dense, dry (fill)
5	BG	SB-07801-0050 VOC, BNA, PPMETALS, HCID, TPH-G (ARCHIVE)	6				Grades to medium sand, trace silt, loose, damp, volatile chemical odor
	BG		14			ML	SILT with SAND (ML), Dark olive gray (5Y3/3), 85% silt, 15% fine sand, medium dense, moist, chemical odor
10	BG	SB-07801-0100 VOC, BNA, PPMETALS, HCID, TPH-G (ARCHIVE)	12			SM	SILTY SAND (SM), Very dark grayish brown (10YR3/2), 80% fine sand, 20% silt, medium dense, moist
	BG	SB-07801-0125 VOC, BNA, PPMETALS, HCID, TPH-G (ARCHIVE)	29				SAND (SP), Dark brown (7.5YR3/2), 90% medium sand, 10% silt, medium dense, wet
15	BG		41				
	BG		50/6				Grades to 100% medium sand, color change to Very dark gray (7.5YRN3/), very dense
20							BOH @ 19.0'

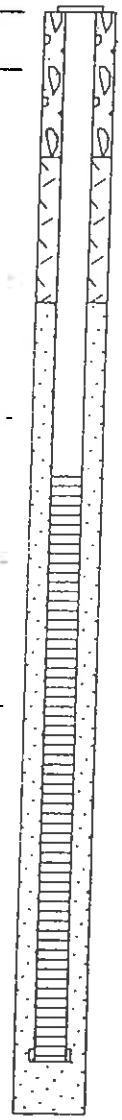


PLATE A-3

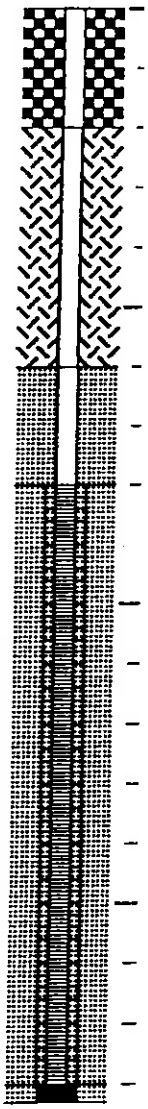
JOB NUMBER: 03709-036-001-4010 DATE: February 1994

Sheet 1 of 1

Boring PL2-029A

Project	Boeing RFI	Start Date 08/15/94	Finish Date 08/15/94
Location	Plant 2 Seattle, WA	Driller	Drilling Co. Cascade
Project No.	03709-034-300	Drilling Method HSA	
Contractor	Weston	Sampling Method 2 in. Split Spoon	
Logged by	Lottsfeldt	Top of Casing (ft) 0.00	Boring Diam. (in) 10
		Ground Surf. Elev. (ft)	Total Depth (ft) 18.00

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Asphalt
							SP	Sand(SP) brownish gray (10YR5/2) 100% medium sand, loose, damp to wet at 12 ft bgs.
5								
10								
15								
20								



Boring PL2-034A

Project	Boeing Plant 2 ICM	Start Date 09/15/94	Finish Date 09/15/94
Location	Plant 2 Seattle, W	Driller	Drilling Co. Cascade Drilling
Project No.	03709-034-401	Drilling Method 4 in ID HSA	
Contractor	Weston	Sampling Method 2 in SS, 140 lb hmr.	
Logged by	Erik Lottsfeldt	Top of Casing (ft) 12.33	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 12.83	Total Depth (ft) 31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
							GP	Asphalt Gravelly fill.
5	BG				23		SP	Sand with gravel (SP), very dark brown (10YR2/2), 85% medium sand, 15% gravel, medium dense, moist.
10	BG	VOC	SB-06643-0100 SB-06643-0110		56		SP	Sand (SP), very dark gray (10YR3/1), 95% medium sand, 5% silt, very dense, wet.
							SP-SM	Sand with silt (SP-SM), very dark gray (10YR3/1), 90% fine sand, 10% silt, medium dense, wet.
15	BG	VOC	SB-06643-0150		20			
20	BG	VOC	SB-06643-0200		27		SP	Sand (SP), very dark gray (10YR3/1), 100% med. sand, med. dense, wet. @ 25ft very dense.

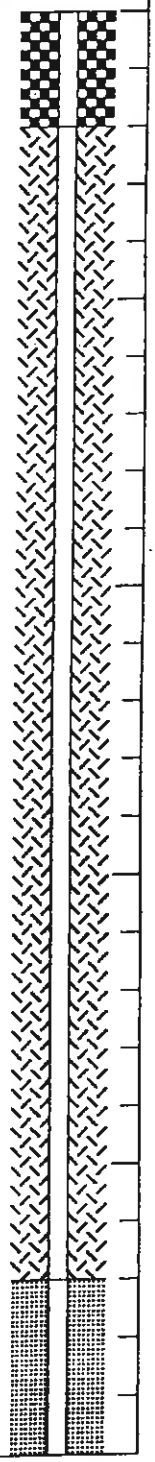


FIGURE
A-6
1 of 2

Boring PL2-034A

Project	Boeing Plant 2 ICM	Start Date	09/15/94	Finish Date	09/15/94
Location	Plant 2 Seattle, W	Driller		Drilling Co.	Cascade Drilling
Project No.	03709-034-401	Drilling Method	4 in ID HSA		
Contractor	Weston	Sampling Method	2 in SS, 140 lb hmr.		
Logged by	Erik Lottsfeldt	Top of Casing (ft)	12.33	Boring Diam. (in)	10
		Ground Surf. Elev. (ft)	12.83	Total Depth (ft)	31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
	BG				50			
30	BG	VOC	SB-06643-0300		60			
35								
40								
45								

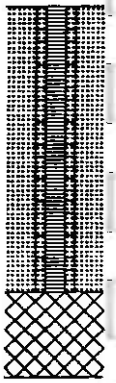


FIGURE A-(
2 of

Sheet 1 of 1

Boring PL2-037A

Project	Boeing Plant 2 RFI 1B	Start Date	10/26/94
Location	Plant 2 Seattle, WA	Finish Date	10/26/94
Project No.	03709-034-300	Driller	
Contractor	Weston	Drilling Co.	Cascade Drilling
Logged by	Tim Fitzgerald	Drilling Method	4 in ID HSA
		Sampling Method	2 in SS, 140 lb hmr.
		Top of Casing (ft)	12.00
		Boring Diam. (in)	10
		Ground Surf. Elev. (ft)	
		Total Depth (ft)	19.00

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							GP	Sandy gravel (GP), dark brown (10YR4/3), 50% coarse sand, 50% gravel, very dense, moist, concrete fragments.
	BG	VOC-PCB	SB-06629-0020					
5								
								Concrete
	BG	VOC-PCB	SB-06629-0070		18		SP	Sand with gravel (SP), very dark brown (10YR4/3), 80% coarse med. sand, 20% pea gravel, dense, rock fragments. @ 18ft 2 in. brown
10	BG	VOC-PCB	SB-06629-0100		25			
15								
	BG				26			
20								

Boring_id 10020

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-1B-O

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/12/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
31			Dark-gray, wet, dense; mostly coarse sand							2" Schedule 40 flush-threaded PVC well casing
32										
33										Bentonite grout well seal
34		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				0	No		
35										
36										
37										
38										
39		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				0	No		
40										
41										
42										
43										
44		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				0	No		Bentonite chip well seal
45										
46										10 X 20 CSSI sand filter pack
47										
48										10-slot machine-cut PVC well screen
49		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				0	No		
50										Flush-threaded PVC end cap
51			End of Borehole							Centralizers located @ 24' & 47' & 50' depths.
52										
53										
54										
55										
56										
57										
58										
59										
60										

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-1B-O

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/12/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface							
			Asphalt Surfacing							2" Schedule 40 flush-threaded PVC well casing
1–3			***Poorly-Graded Sand with Silt*** Brown, dry, medium dense; mostly fine sand with some silt and little gravel							Bentonite grout well seal
4–5		SP-SM					0	No		Gray, coarse sand with some silt at 6'
6–8										
9–10		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt				38.3	No		Strong odor in soil; Water level ATD
11–13										
14–15		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly fine sand				0	No		Strong odor in soil
16–18										
19–20		SP	Dark-gray, wet, medium dense; mostly fine sand				0	Yes		Strong odor in soil Sheen noted @ 20 feet bgs.
21–23										
24–25		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand				0	No		Odor in soil
26–28										
29–30		SP	Dark-gray, wet, dense; mostly coarse sand				0	No		

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-5B-O

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/11/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface							
			Asphalt Surfacing							
1–3			***Poorly-Graded Sand with Silt*** Brown, moist, medium dense; mostly fine sand							2" Schedule 40 flush-threaded PVC well casing; Bentonite grout well seal
4–8		SP-SM					0.0	No		
9–13		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, moist, medium dense; mostly fine sand with some silt				95.8	Yes		Water level ATD; Strong odor noted
14–18		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt				123.0	Yes		Strong odor noted
19–23		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt			PP-5B-O (20')	26.5	Yes		Strong odor noted; Sample analyzed Method:HCID
24–28		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand				11.4	Yes		Strong odor noted
29–30		SP	***Poorly-Graded Sand***				25.5	Yes		Strong odor noted

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-5B-O

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/11/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval / Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
31			Dark-gray, wet, dense; mostly coarse sand						2" Schedule 40 flush-threaded PVC well casing
32									
33									Bentonite grout well seal
34									
35		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand			0	Yes		Strong odor noted
36									
37									
38									
39									
40		SP	Dark-gray, wet, dense; mostly coarse sand			3.3	Yes		Strong odor noted
41									
42									
43									
44									
45		SP	Dark-gray, wet, dense; mostly coarse sand			17.4	Yes		Bentonite chip well seal
46									
47									10 X 20 CSSI sand filter pack
48									10-slot machine-cut PVC well screen
49									Strong odor noted
50		SP-SM	***Poorly-Graded Sand with Silt*** Brownish-gray, wet, dense; mostly fine sand with some silt			13.5	Yes		
51			End of Borehole						Flush-threaded PVC end cap
52									Centralizers located @ 25' & 47' & 50' depths
53									
54									
55									
56									
57									
58									
59									
60									

Project No.: 17503.2

2" well diameter		
depth in feet	gallons	cubic feet
	x 0.163	x 0.134
10	1.6	0.22
11	1.8	0.24
12	2.0	0.26
13	2.1	0.28
14	2.3	0.31
15	2.4	0.33
16	2.6	0.35
17	2.8	0.37
18	2.9	0.39
19	3.1	0.41
20	3.3	0.44
21	3.4	0.46
22	3.6	0.48
23	3.7	0.50
24	3.9	0.52
25	4.1	0.55
26	4.2	0.57
27	4.4	0.59
28	4.6	0.61
29	4.7	0.63
30	4.9	0.66
31	5.1	0.68
32	5.2	0.70
33	5.4	0.72
34	5.5	0.74
35	5.7	0.76
36	5.9	0.79
37	6.0	0.81
38	6.2	0.83
39	6.4	0.85
40	6.5	0.87
41	6.7	0.90
42	6.8	0.92
43	7.0	0.94
44	7.2	0.96
45	7.3	0.98
46	7.5	1.00
47	7.7	1.03
48	7.8	1.05
49	8.0	1.07
50	8.2	1.09

4" well diameter		
depth in feet	gallons	cubic feet
	x 0.653	x 0.134
10	6.5	0.88
11	7.2	0.96
12	7.8	1.05
13	8.5	1.14
14	9.1	1.23
15	9.8	1.31
16	10.4	1.40
17	11.1	1.49
18	11.8	1.58
19	12.4	1.66
20	13.1	1.75
21	13.7	1.84
22	14.4	1.93
23	15.0	2.01
24	15.7	2.10
25	16.3	2.19
26	17.0	2.28
27	17.6	2.36
28	18.3	2.45
29	18.9	2.54
30	19.6	2.63
31	20.2	2.71
32	20.9	2.80
33	21.5	2.89
34	22.2	2.98
35	22.9	3.06
36	23.5	3.15
37	24.2	3.24
38	24.8	3.33
39	25.5	3.41
40	26.1	3.50
41	26.8	3.59
42	27.4	3.68
43	28.1	3.76
44	28.7	3.85
45	29.4	3.94
46	30.0	4.03
47	30.7	4.11
48	31.3	4.20
49	32.0	4.29
50	32.7	4.38

ENVIRONMENTAL PARTNERS INC 295 NE Gilman Boulevard, Suite 201 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

Well Decommissioning Interim Measure – August 2011 Book #5

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number 17513.0.6

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, Washington 98027
(425) 395-0010

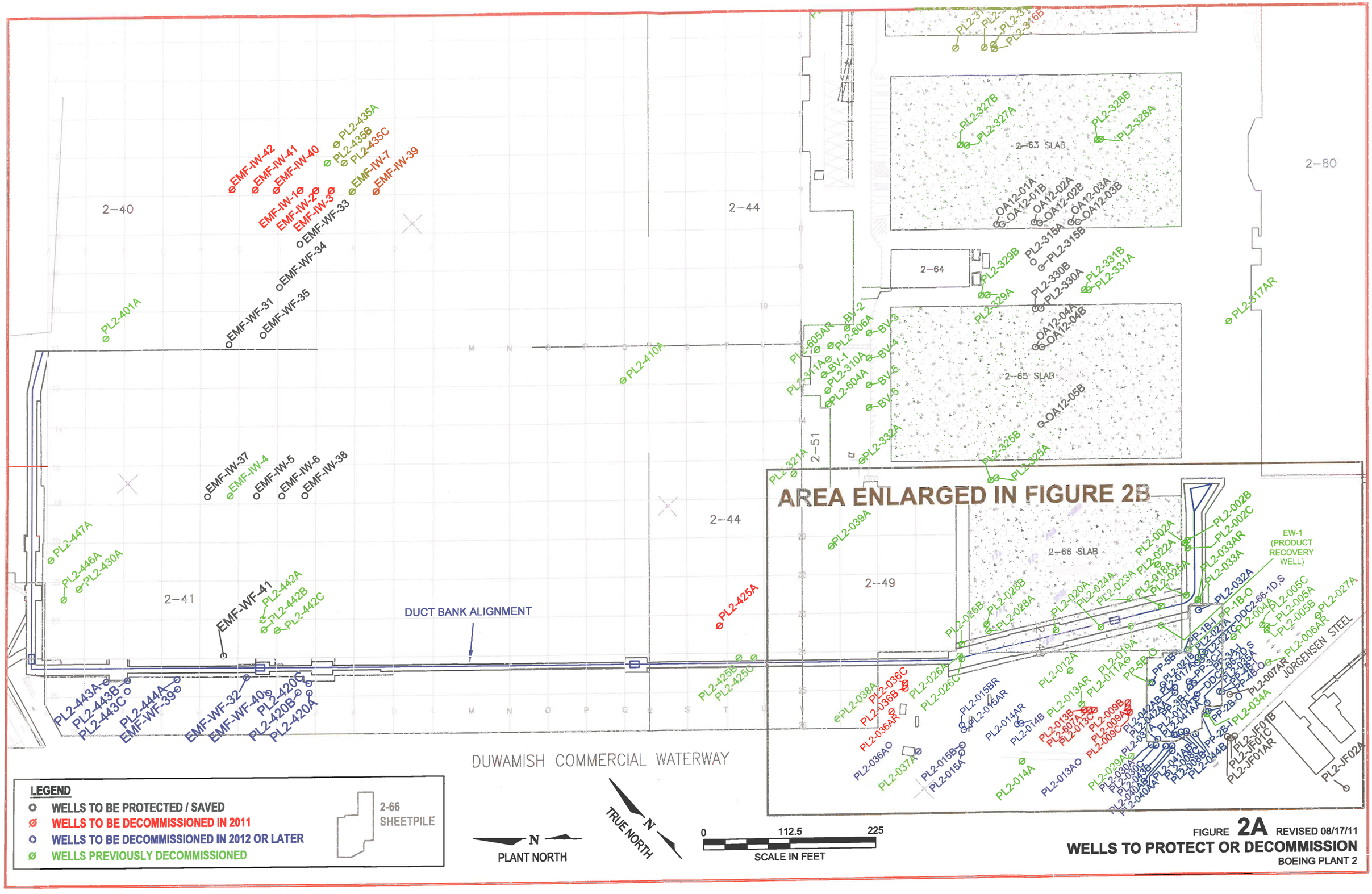


FIGURE **2A** REVISED 08/17/11

WELLS TO PROTECT OR DECOMMISSION

BOEING PLANT 2

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF-IW-39	
Well Location	Northing: 197,063.0	Easting: 1,275,493.4
Start (date and time)	8/19/11 0830	
End (date and time)	8/19/11 0836	
Installation Method	HSA	
Total Well Depth	50	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quik-Grout Pumpable Bentonite	
Grout or Chip Volume	60	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF-IW-7	
Well Location	Northing: 197084.2	Easting: 1275470.3
Start (date and time)	8/19/11 0856	
End (date and time)	8/19/11 0858	
Installation Method	HSA	
Total Well Depth	40	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quik-Grout Pumpable bentonite	
Grout or Chip Volume	35	Gallons or Cubic Feet
Surface Completion	concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF IW-3	
	Northing	Easting
Well Location	197103.5	1275450.3
Start (date and time)	8/19/11 0921	
End (date and time)	8/19/11 0927	
Installation Method	HSA	
Total Well Depth	45	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quik-Grout Pumpable bentonite	
Grout or Chip Volume	40	Gallons or Cubic Feet
Surface Completion	concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	Scott	
Signature (Engineer or Geologist)	CSG	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF-IW-2	
	Northing	Easting
Well Location	197117.3	1275435.7
Start (date and time)	8/19/11 ~~0830~~ 0942	
End (date and time)	8/19/11 0944	
Installation Method	HSA	
Total Well Depth	45	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quik-Grout Pumpable bentonite	
Grout or Chip Volume	40	Gallons or Cubic Feet
Surface Completion	concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF-IW-1	
	Northing	Easting
Well Location	197130.9	1275421.0
Start (date and time)	8/19/11 1001	
End (date and time)	8/19/11 1003	
Installation Method	HSA	
Total Well Depth	45	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quik-Grout Pumpable bentonite	
Grout or Chip Volume	35	Gallons or Cubic Feet
Surface Completion	concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	Scott Kur	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF-IW-40	
	Northing	Easting
Well Location	197,152.0	1,275,398.5
Start (date and time)	8/19/11 1030	
End (date and time)	8/19/11 1033	
Installation Method	HSA	
Total Well Depth	47	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quik-Grout Pumpable Bentonite	
Grout or Chip Volume	45	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF-IW-41	
Well Location	Northing: 197,171.0	Easting: 1,275,378.5
Start (date and time)	8/19/11 1142	
End (date and time)	8/19/11 1144	
Installation Method	HSA	
Total Well Depth	50	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quik-Grout Pumpable Bentonite	
Grout or Chip Volume	50	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	Scott K	
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF-IW-42	
	Northing	Easting
Well Location	197,192.0	1,275,356.5
Start (date and time)	8/19/11 1204	
End (date and time)	8/19/11 1206	
Installation Method	HSA	
Total Well Depth	50	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quik-Grout Pumpable Bentonite	
Grout or Chip Volume	45	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number

	Northing	Easting
Well Location		

Start (date and time)

End (date and time)

Installation Method

Total Well Depth feet bgs

Well Diameter inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips

Grout or Chip Volume Gallons or Cubic Feet

Surface Completion

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

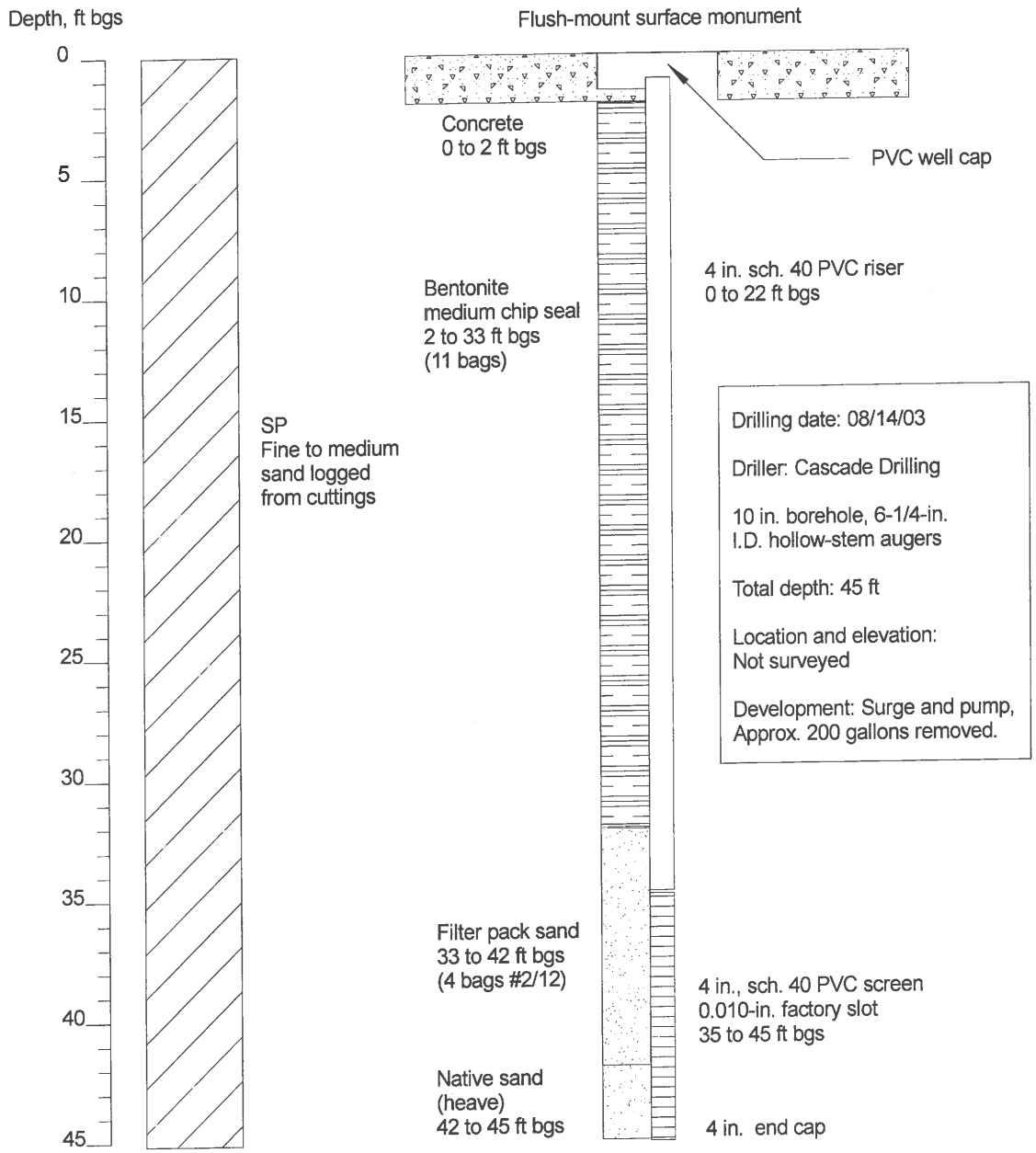
_____

Well Decommissioning Log - Boeing Plant 2

Well Number		
	Northing	Easting
Well Location		
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1)	*perforate or overdrill then grout*
	WAC 173-160-460(2)	*grout or chip in place*
Type of Grout or Chips		
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion		
Drilling Contractor		
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

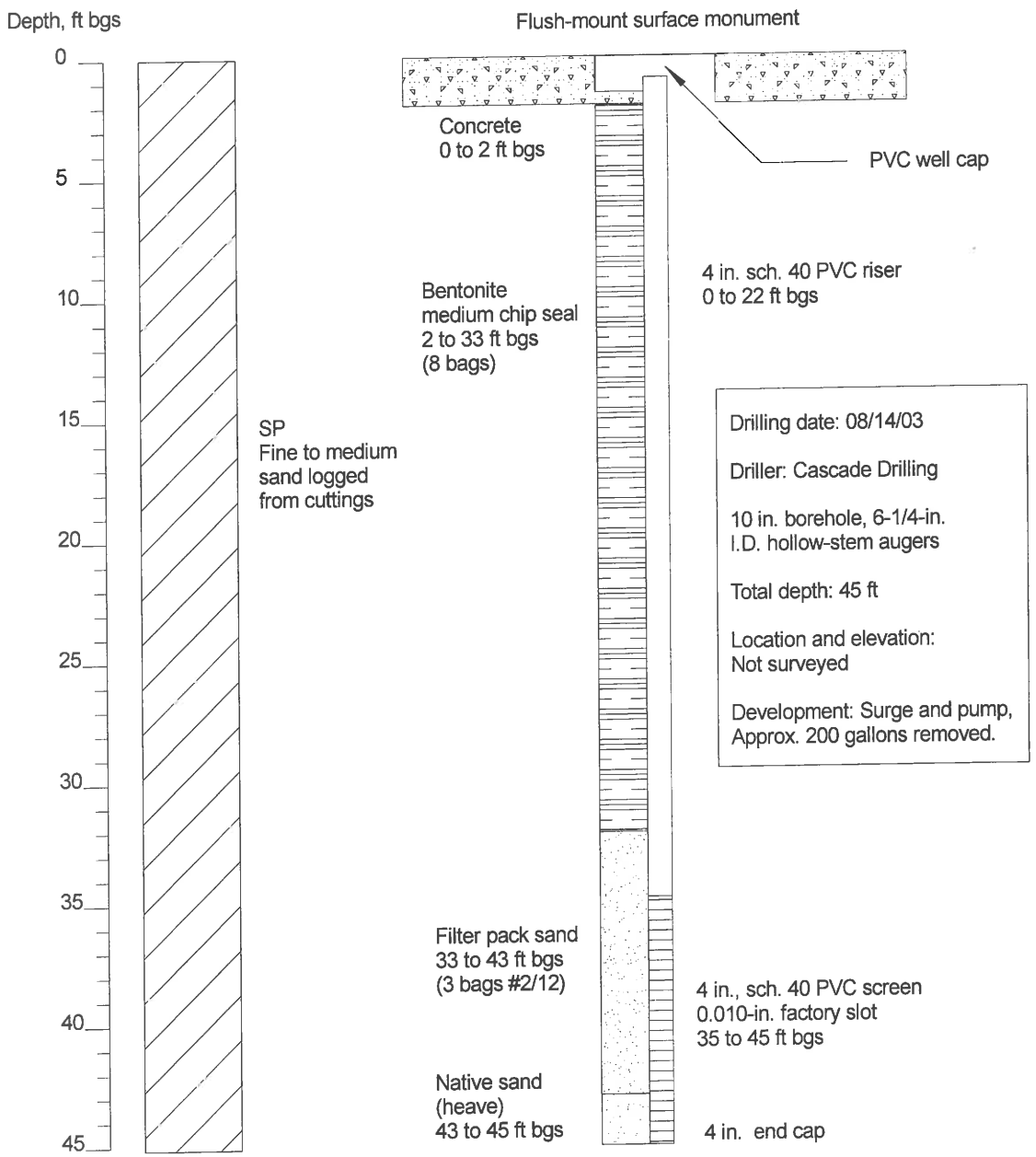


Project Performance Corporation
16935 SE 39th St.
Bellevue, WA 98008
(425) 643-4634 fax (425) 649-0643

REVISION NO.:	DATE:	ACAD FILE:
0	08/19/03	IW-1.SKF

Injection Well 1 (EMF IW-1)

DRAWN:	CLIENT:	PROJECT NO.:
JJD	Boeing	1214-310
CHECKED:	LOCATION:	FIGURE:
TJM	EMF Plume Boeing Plant 2	

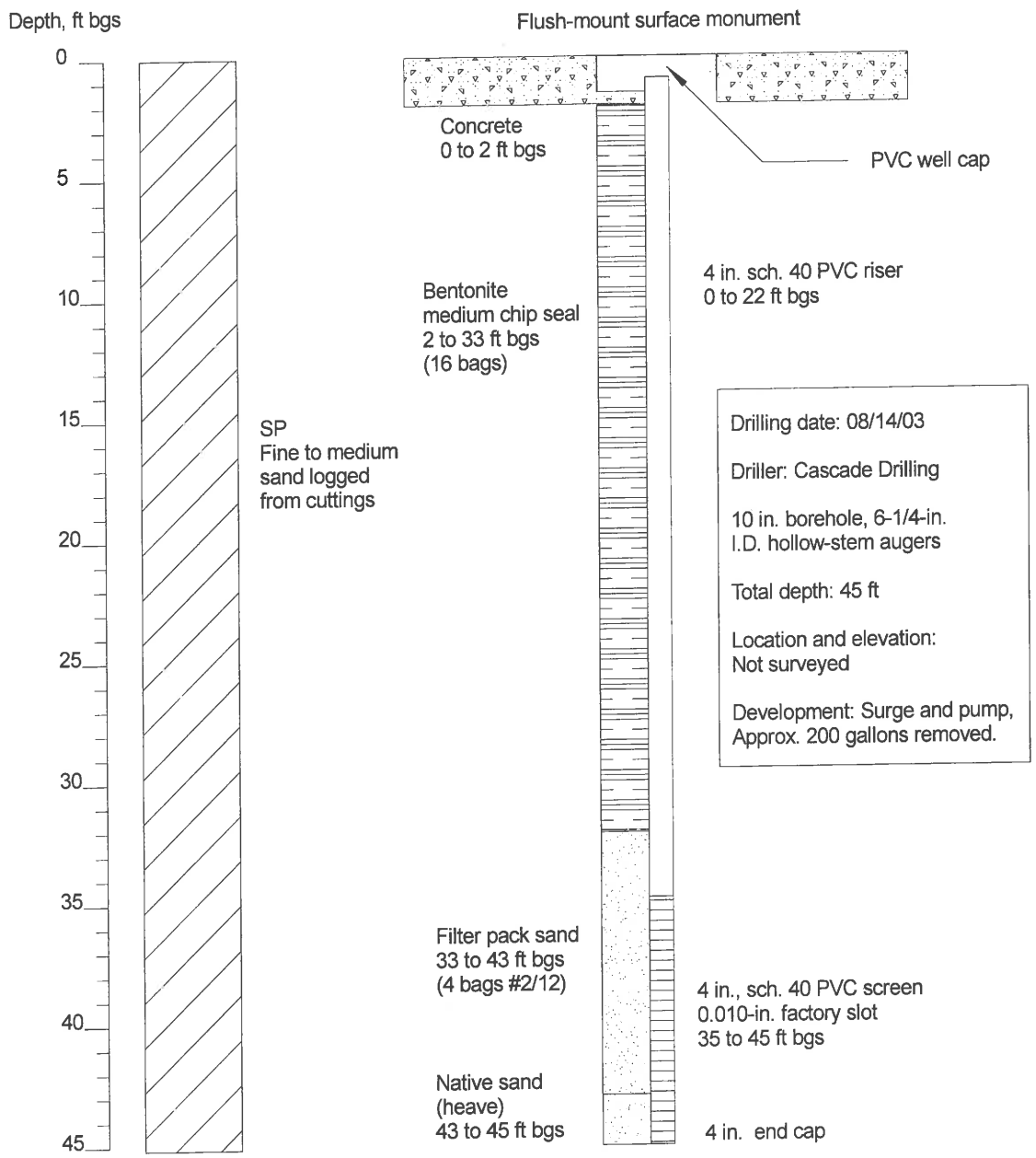


Project Performance Corporation
16935 SE 39th St.
Bellevue, WA 98008
(425) 643-4634 fax (425) 649-0643

REVISION NO.:	DATE:	ACAD FILE:
0	08/19/03	IW-2.SKF

Injection Well 2 (EMF IW-2)

DRAWN:	CLIENT:	PROJECT NO.:
JJD	Boeing	1214-310
CHECKED:	LOCATION:	FIGURE:
TJM	EMF Plume Boeing Plant 2	

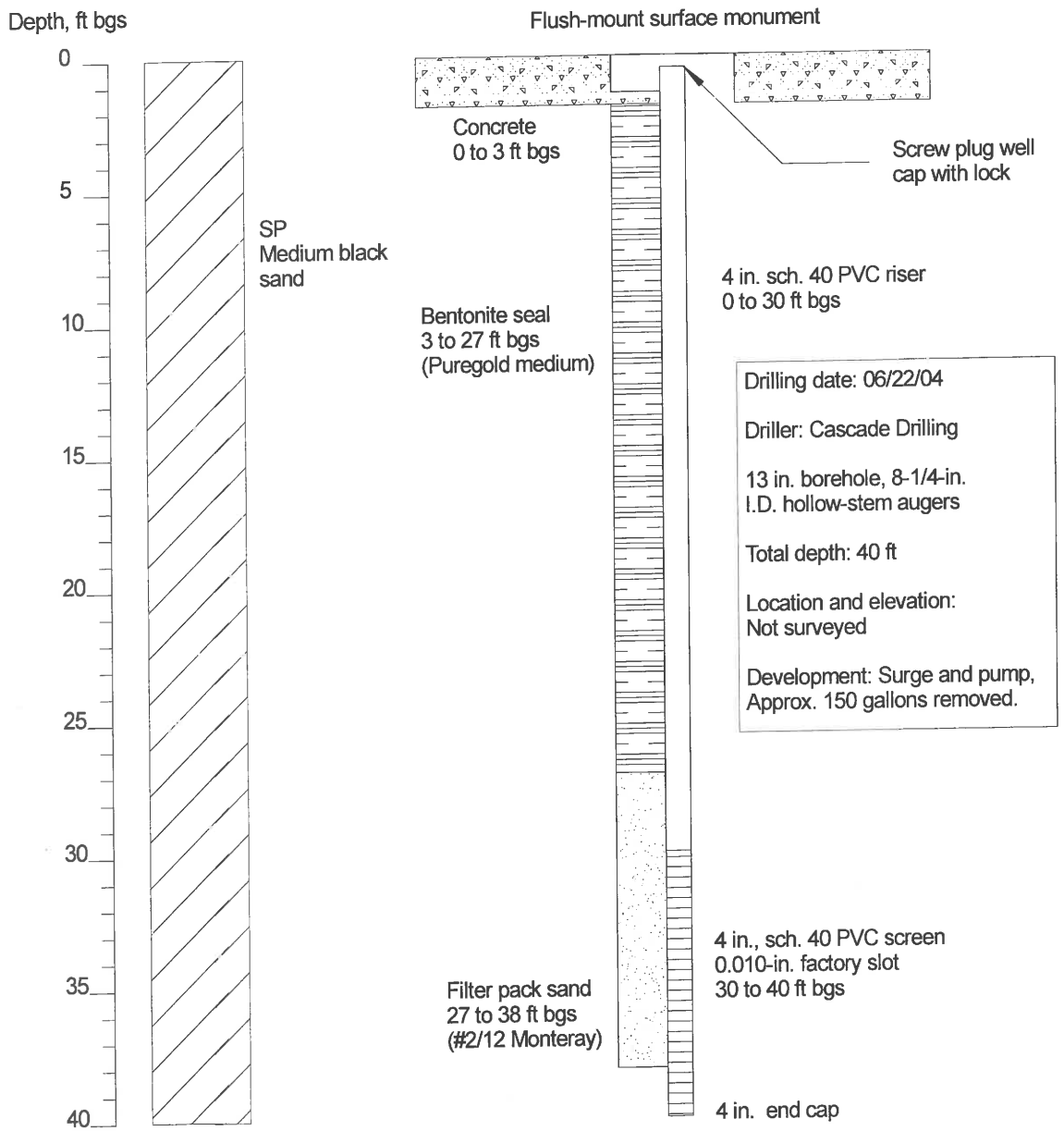


Project Performance Corporation
16935 SE 39th St.
Bellevue, WA 98008
(425) 643-4634 fax (425) 649-0643

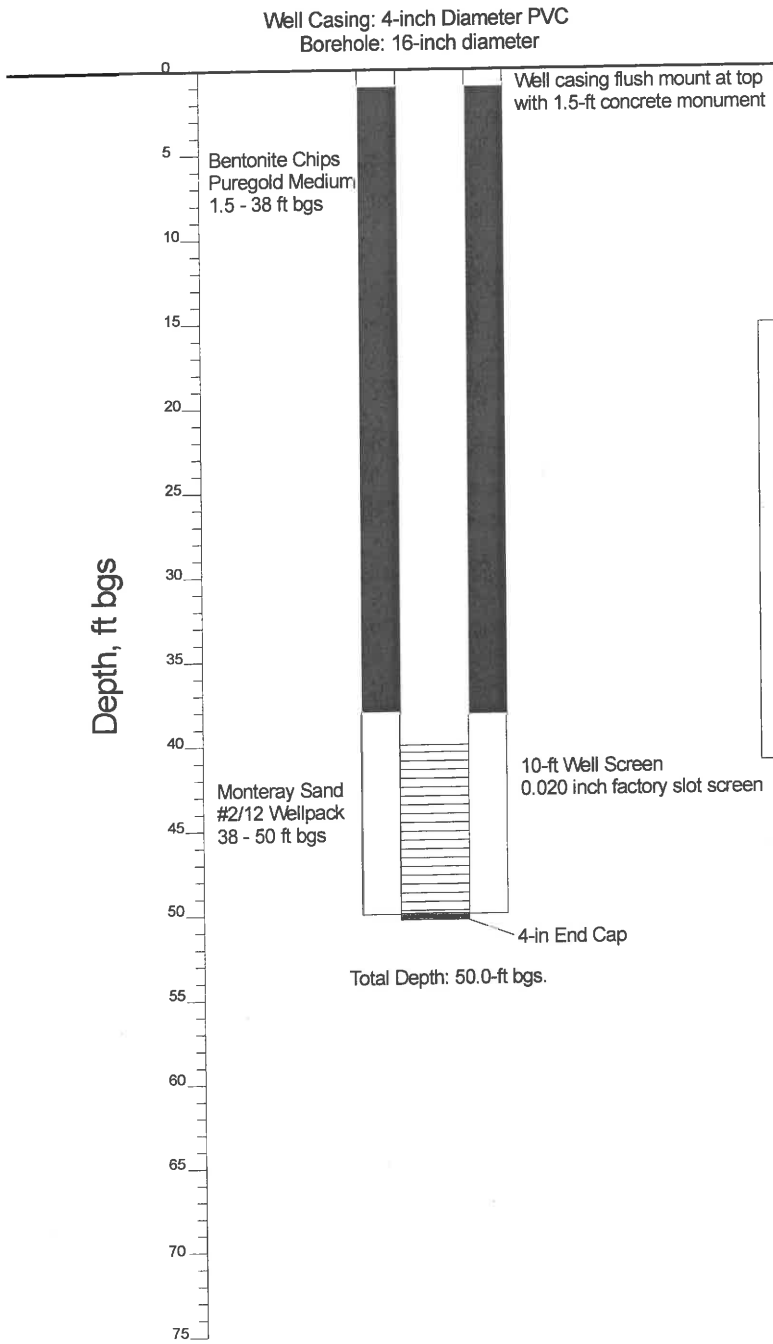
REVISION NO.:	DATE:	ACAD FILE:
0	08/19/03	IW-3.SKF

Injection Well 3 (EMF IW-3)

DRAWN:	CLIENT:	PROJECT NO.:
JJD	Boeing	1214-310
CHECKED:	LOCATION:	FIGURE:
TJM	EMF Plume Boeing Plant 2	



CALIBRE	Calibre Systems 16935 SE 39th St Bellevue, WA 98008	
REVISION NO.: 0	DATE: 09/20/04	ACAD FILE: IW-7.SKF
Injection Well 7 (EMF IW-7)		
DRAWN: GWD	CLIENT: BOEING	PROJECT NO.: K502001
CHECKED: TJM	LOCATION: WELL EMF IW-7	FIGURE: 1



Drilling Date: 1/15/09

Driller: Cascade Drilling - Andy Flagan

16 inch Borehole, 8-1/4-in ID hollow-stem augers

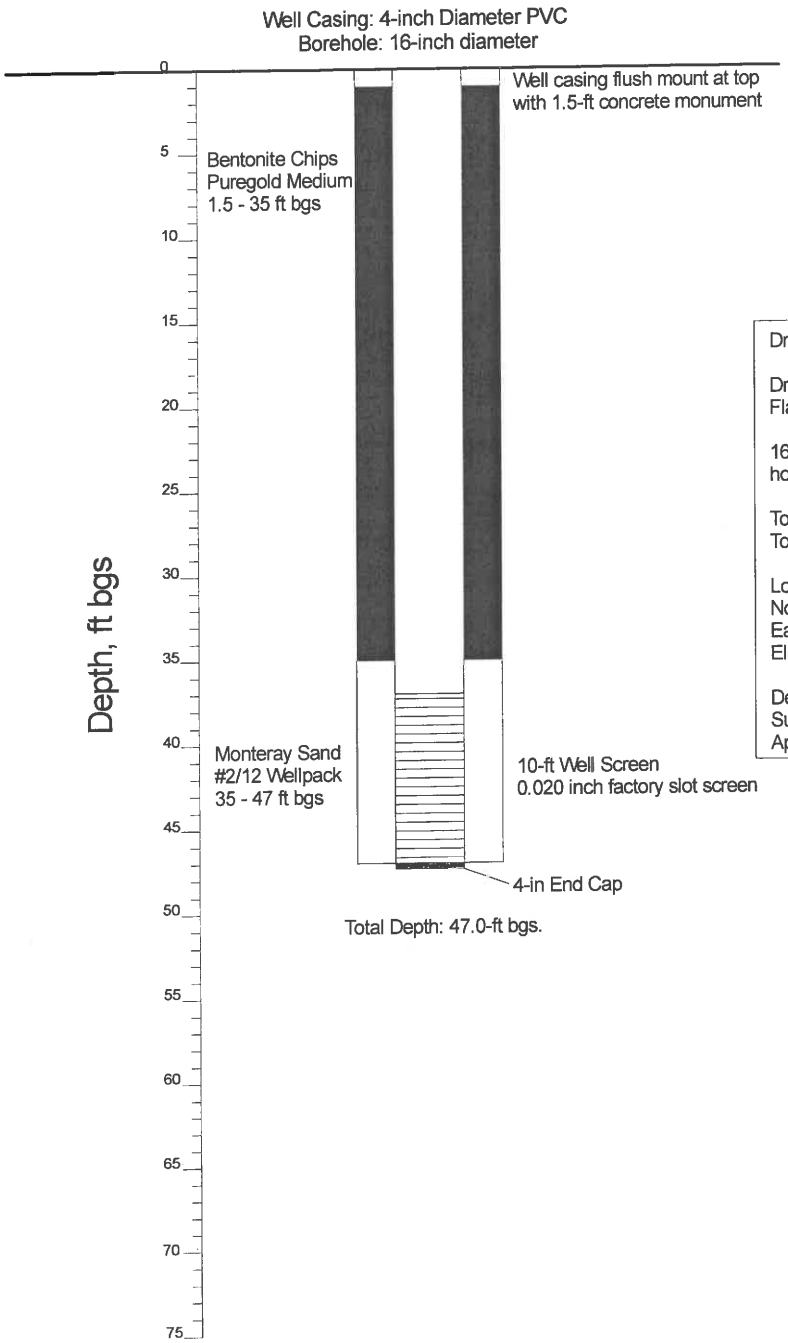
Total Well Depth 50 ft
Total Geoprobe Depth 41 ft

Location and Elevation:
Northing: 197,063.0
Easting: 1,275,493.4
Elevation: 13.50

Development: 1/20/09
Surge and pump,
Approx. 200 gallons removed

Reference Geoprobe Boring: EMF GP-71

BOEING® CALIBRE	Injection Well Completion Boeing EMF Project Seattle, WA	**Injection Well: EMF-IW-39**



Drilling Date: 1/15/09

Driller: Cascade Drilling - Andy Flagan

16 inch Borehole, 8-1/4-in ID hollow-stem augers

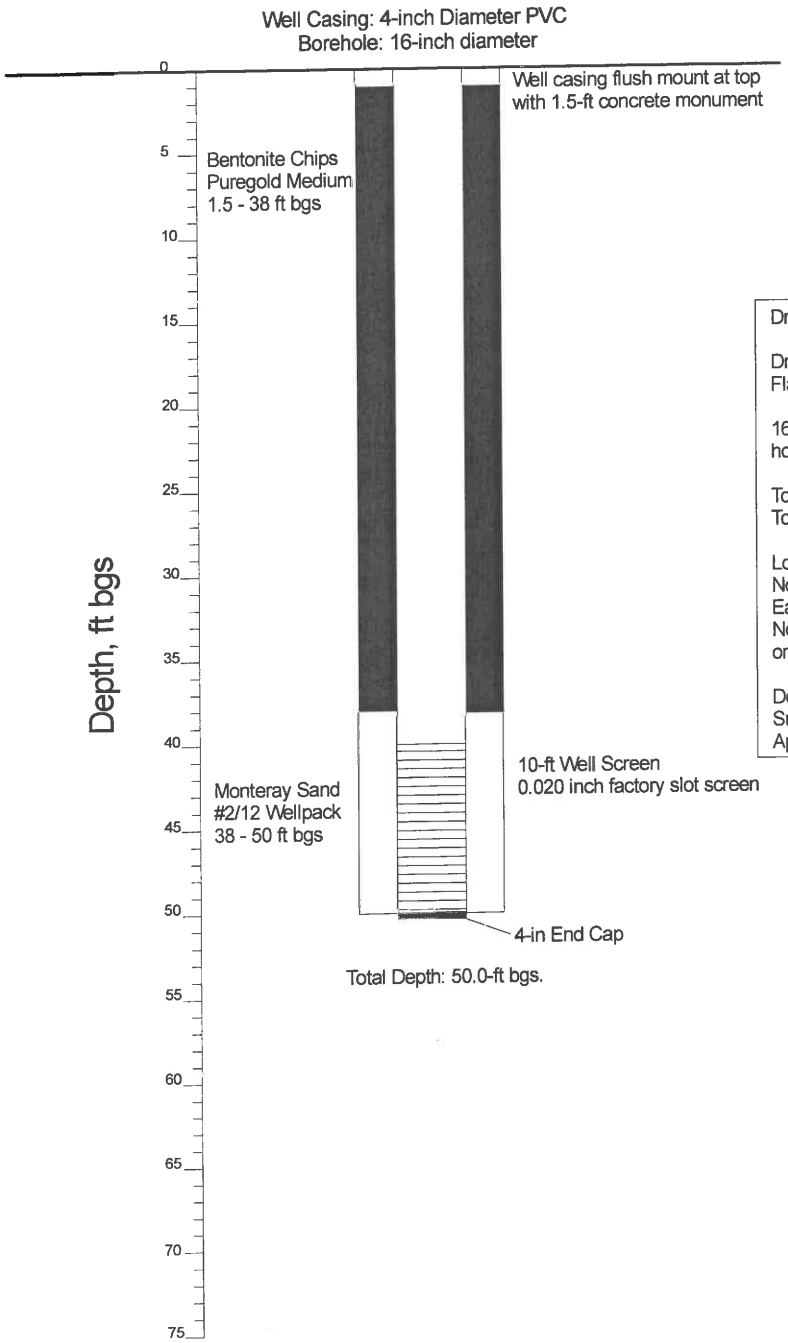
Total Well Depth 47 ft
Total Geoprobe Depth 61 ft

Location and Elevation:
Northing: 197,152.0
Easting: 1,275,398.5
Elevation: 13.49

Development: 1/20/09
Surge and pump,
Approx. 200 gallons removed

Reference Geoprobe Boring: EMF GP-72

BOEING® CALIBRE	Injection Well Completion Boeing EMF Project Seattle, WA	**Injection Well: EMF-IW-40**



Drilling Date: 1/14/09

Driller: Cascade Drilling - Andy Flagan

16 inch Borehole, 8-1/4-in ID hollow-stem augers

Total Well Depth 50 ft
Total Geoprobe Depth 61 ft

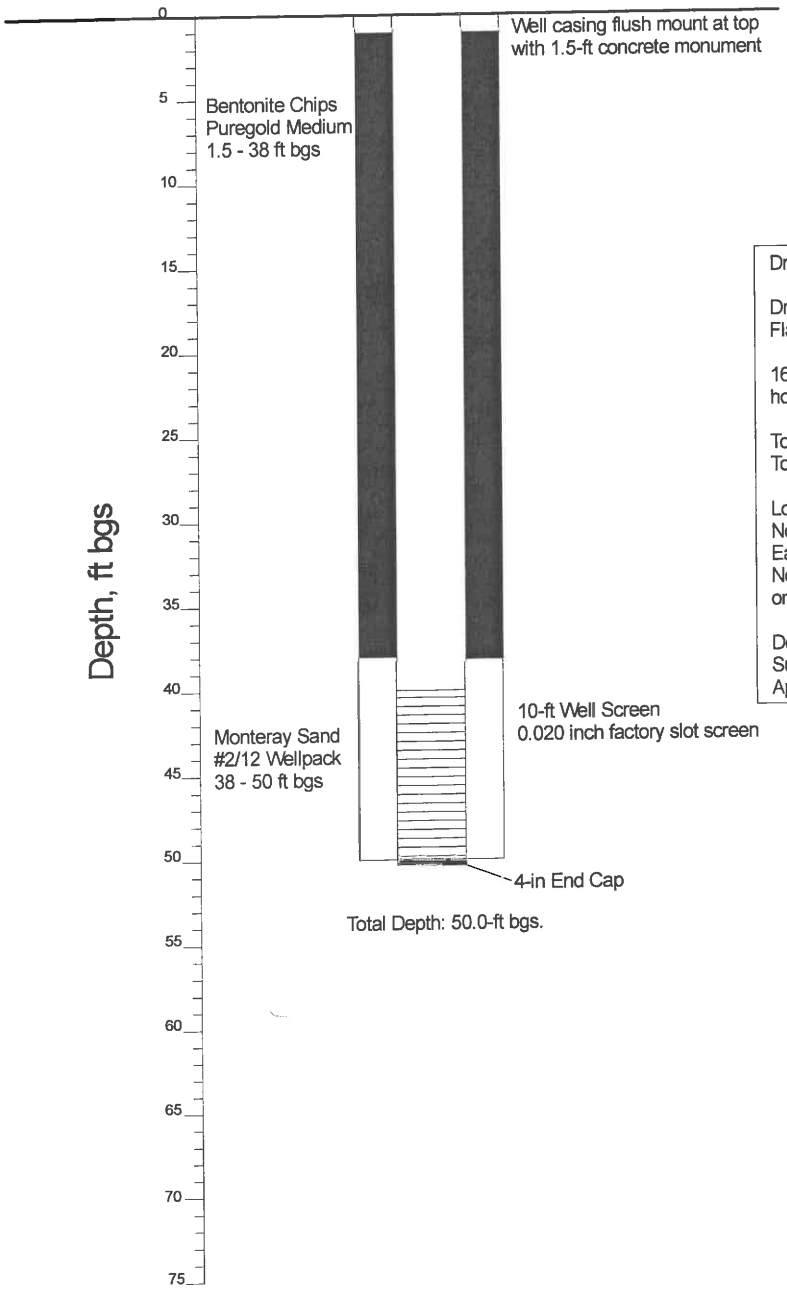
Location and Elevation:
Northing: 197,171.0
Easting: 1,275,378.5
Not surveyed, estimations based on other surveyed points.

Development: 1/19/09
Surge and pump,
Approx. 200 gallons removed

Reference Geoprobe Boring: EMF GP-72

BOEING® CALIBRE	**Injection Well Completion** **Boeing EMF Project** **Seattle, WA**	**Injection Well: EMF-IW-41**

Well Casing: 4-inch Diameter PVC
Borehole: 16-inch diameter



Drilling Date: 1/14/09

Driller: Cascade Drilling - Andy Flagan

16 inch Borehole, 8-1/4-in ID hollow-stem augers

Total Well Depth 50 ft
Total Geoprobe Depth 61 ft

Location and Elevation:
Northing: 197,192.0
Easting: 1,275,356.5
Not surveyed, estimations based on other surveyed points.

Development: 1/19/09
Surge and pump,
Approx. 200 gallons removed

Reference Geoprobe Boring: EMF GP-72

BOEING® CALIBRE	Injection Well Completion Boeing EMF Project Seattle, WA	**Injection Well: EMF-IW-42**

WAC 173-160-420

What are the general construction requirements for resource protection wells?

(1) No resource protection well or soil boring excavation may be used to withdraw or inject water for domestic, industrial, municipal, commercial, or agricultural purposes.

(2) No resource protection well or soil boring excavation may interconnect aquifers.

(3) Nested resource protection wells are prohibited.

(4) Cuttings, development water, and other investigation derived waste from resource protection well construction or geotechnical soil borings shall be managed in a manner consistent with the intent and purposes of the Water Pollution Control Act, chapter 90.48 RCW, the Hazardous Waste Management Act, chapter 70.105 RCW, and implementing regulations.

(5) Well tagging:

(a) It shall be the driller's responsibility to place a well identification tag with a unique identification number on every resource protection well that they construct or alter within thirty days of completion of the well. Uncased geotechnical soil borings and environmental investigation wells are exempt from the tagging requirements of this chapter.

(i) The alpha-numeric number shall be recorded on the drilling report in the space provided.

(ii) The driller shall remove the well identification tag on all resource protection wells they decommission and shall attach the tag to the decommissioning well report.

(b) It shall be the well owner's responsibility to place a well identification tag with a unique identification number on every resource protection well they own and which was completed prior to the effective date of this regulation.

(i) Upon request, the department shall furnish the well owner with a well tag and tagging instructions.

(ii) The well owner shall tag their well(s) and submit a completed tagging report to the department.

(c) The well tag shall be permanently attached to:

(i) The well casing and be visible above land surface for all wells which have been completed above land surface.

(ii) The well casing or to any permanent and protected portion of the vault for wells completed below land surface.

(iii) A prominent system component visible above land surface for ground source heat pump borings.

(d) All well identification tags shall be supplied by the department.

(e) It is unlawful for a person to tamper with or remove a well identification tag except during well alteration.

(6) All resource protection wells will be sealed in accordance with WAC 173-160-450 regardless of the method of installation. Except, resource protection wells that are properly decommissioned prior to the removal of any drilling equipment from the well location are

exempted from the surface sealing requirements of this chapter. Provided the decommissioning process includes the removal of any conduit, tubing, probe, or other items inserted into the ground.

(7) All geotechnical soil borings shall be decommissioned under the terms of this chapter.

(8) Except as provided in RCW 18.104.180, all construction, alteration, reconstruction, and decommissioning of resource protection wells and geotechnical soil borings shall be done by an individual licensed under the provisions of chapter 173-162 WAC.

(9) A notice of intent to construct or decommission a resource protection well and a geotechnical soil boring shall be filed with the department a minimum of seventy-two hours prior to initiating construction or decommissioning of the well(s) or boring(s). A fee must accompany each notice of intent to construct or decommission a resource protection well.

(a) The fee for a resource protection well, except for an environmental investigation well, a ground source heat pump boring, or a grounding well, is forty dollars for each well.

(b) The fee for an environmental investigation well in which ground water is sampled or measured is forty dollars for the construction of up to four environmental investigation wells per project, and ten dollars for each additional environmental investigation well constructed on a project with more than four wells. There is no fee for soil or vapor sampling purposes.

(c) The fee for a ground source heat pump boring or a grounding well is forty dollars for construction of up to four ground source heat pump borings or grounding wells per project and ten dollars for each additional ground source heat pump boring or grounding well constructed on a project with more than four wells.

(d) The fee to decommission a resource protection well, except for an environmental investigation well, is twenty dollars per well. There is no fee to decommission an environmental investigation well or a geotechnical soil boring.

(e) The fee to decommission a ground source heat pump boring or a grounding well is twenty dollars per well.

(f) Under some circumstances, it may be necessary to construct more resource protection wells or geotechnical soil borings than originally anticipated. When additional resource protection wells are constructed on a site for which a notice of intent and fee were submitted, a second notice and fee shall be submitted within twenty-four hours after all wells have been completed or as soon as the final number of wells to be constructed is determined, whichever is sooner. When additional geotechnical soil borings are needed, the borings may be completed. A follow-up notice of intent shall be submitted to the department within twenty-four hours after all borings are constructed. Notification to construct multiple wells or geotechnical soil borings within the same quarter/quarter section, township, and range may be submitted on one notice form.

(10) Resource protection well reports.

(a) Anyone who constructs or decommissions a well is required to submit a complete well report on the construction or decommissioning of all resource protection wells and geotechnical soil borings. Reports must be submitted to the water resources program within thirty days after completion of construction or decommissioning. Submission of a well report to consulting firms does not meet the requirement of this section. The report must be an accurate summation of data collected in the field taken from field notes written as the well was constructed or decommissioned. Field notes must be available at all times during construction or decommissioning for review by state and local inspectors and kept until the well report is submitted.

(b) The resource protection well report must be made on a form provided by the department, or a reasonable facsimile of the form, as approved by the department.

(c) Where applicable the report shall include the following information:

(i) Owner's name; operator/trainee name; operator/trainee license number; contractor registration number, drilling company name;

(ii) Tax parcel number;

(iii) Well location address;

(iv) Location of the well to at least 1/4, 1/4 section or smallest legal subdivision;

(v) Unique well identification tag number;

(vi) Construction date;

(vii) Start notification number;

(viii) Intended use of well;

(ix) The well depth, diameter, and general specifications of each well;

(x) Total depth of casing;

(xi) Well head elevation;

(xii) Drilling method;

(xiii) Seal material, seal location and type of placement used;

(xiv) Filter pack location; filter pack material used;

(xv) The thickness and character of each bed, stratum or formation penetrated by each well including identification of each water bearing zone;

(xvi) Casing gauge, diameter, stickup, type of material, and length, also of each screened interval or perforated zone in the casing;

(xvii) The depth to the static water level, as measured below the land surface; and

(xviii) Such additional factual information as may be required by the department.

(d) The well report must include one of the following:

(i) The license number and signature of the person who constructed or decommissioned the well;

(ii) The license number and signature of the trainee and the licensed operator under chapter 18.104 RCW; or

(iii) The license number and signature of an exempted individual as defined under RCW 18.104.180(3).

(e) This rule shall allow an individual to submit electronic reports in accordance with department procedures. The use of a digital signature in the electronic reports will be authorized as a substitute for an original signature under (d) of this subsection.

What are the surface protection requirements?

(11) All resource protection wells shall be capped and protected using one of the following methods:

(a) If the well is cased with metal and completed above the ground surface, you must attach a watertight cap with a lock to the top of the casing.

(b) If the well is not cased with metal and completed above the land surface, you must install a protective metal casing over and around the well. The protective casing shall extend at least six inches above the top of the well casing and be cemented at least two feet into the ground. A cap with lock shall be attached to the top of the protective casing.

(12) You shall protect the well(s) completed above ground from damage by:

(a) Cementing three metal posts, at least three inches in diameter, in a triangular array around the casing and at least two feet from it. Each post shall extend at least three feet above and below the land surface.

(b) A reinforced concrete pad may be installed to protect against and prevent frost heave. If installed, the concrete pad shall extend to a depth equal to anticipated frost depth. When a concrete pad is used, the well seal may be part of the concrete pad.

(13) If the well is completed below land surface, a watertight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent the inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The cover must be designed to withstand the maximum expected loading.

(14) The protective measures may be waived or modified upon written approval from the department (a variance).

(15) If the well is damaged, the well protection measures and casing shall be repaired to meet the requirements of this chapter. If the well is damaged beyond repair, it shall be decommissioned in accordance with WAC 173-160-460.

WAC 173-160-460

What is the decommissioning process for resource protection wells?

(1) For resource protection wells and geotechnical soil borings that were not constructed in accordance with these regulations, or for which a drilling report required under this section is missing, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers, and decommission in one of the following ways:

(a) Perforate the casing from the bottom to land surface and pressure grout the casing.

(i) Perforations shall be at least four equidistant cuts per row, and one row per foot. Each cut shall be at least one and one-half inches long.

(ii) Apply enough pressure to force the sealing material through the perforations, filling any voids on the outside of the casing.

(iii) The remainder of the casing shall be filled with neat cement grout, neat cement, or bentonite slurry; or

(b) Withdraw the casing and fill the bore hole with neat cement grout, neat cement, bentonite or bentonite slurry as the casing is being withdrawn.

(2) For resource protection wells and geotechnical soil borings that were constructed in accordance with these regulations, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers and then decommission in one of the following ways:

(a) Wells with an inside casing diameter equal to or greater than one inch and constructed in accordance with these regulations as verified through a field examination and review of the drilling report shall be decommissioned by filling the casing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement.

(b) Wells with an inside casing diameter less than one inch shall be decommissioned by pressure grouting the entire casing length with bentonite slurry, neat cement grout, or neat cement.

(c) Vibrating wire piezometers installed to meet or exceed the sealing requirements of WAC 173-160-450, 173-160-457, and 173-160-458 are exempt from the decommissioning procedures and decommissioning reporting requirements provided here.

(d) Direct push wells shall be decommissioned in accordance with this section.

(e) Geotechnical soil borings, or boring, shall be decommissioned by sealing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement. Sealing material placed below the static water level shall be piped directly to the point of application or placed by means of a dump bailer or pumped through a tremie tube. If bentonite slurry, neat cement grout or neat cement is used to seal below the water level in the well, the material shall be placed from the bottom up by methods that avoid segregation or dilution of the material. When used to place bentonite slurry, neat cement or neat cement grout, the discharge end of the tremie tube shall be submerged in the bentonite slurry, neat cement or neat cement grout to avoid breaking the seal while filling the annular space. Provided the material does not dilute or segregate and the resulting seal is free of voids, sealing material may be hand poured above the static water level.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Boeing	Phone:	Date: 8/19/11	Ice Present? Y
Client Contact: MaryJo Donnelly + Doug Kunkel		No. of Coolers: 1	Cooler Temps: 10.8
Client Project Name: EMF Well Decommissioning			
Client Project #: 17513.0.6	Samplers: M. Mogy		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	WCS	F							Notes/Comments
WD-DRUM1	8/19/11	0939	H2O	4	X	X							
WD-DRUM2	↓	1010	↓	4	X	X							

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature)	(Signature)	(Signature)	(Signature)
	Printed Name: Monica Mogy	Printed Name: A. Volgardson	Printed Name:	Printed Name:
	Company: EPI	Company: ARI	Company:	Company:
	Date & Time: 8/19/11 1402	Date & Time: 8/19/11 1402	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

ENVIRONMENTAL PARTNERS INC 295 NE Gilman Boulevard, Suite 201 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

Well Decommissioning Interim Measure – October 2011 Book #6

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number 17513.1.Task 500.04

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, Washington 98027
(425) 395-0010

Completed
10/6/11
-GMC

EMF- WF-31

IMG_2855.JPG

IMG_2856.JPG

IMG_2857.JPG

IMG_2858.JPG

IMG_2859.JPG

EMF- WF-31 J plug and Broken section

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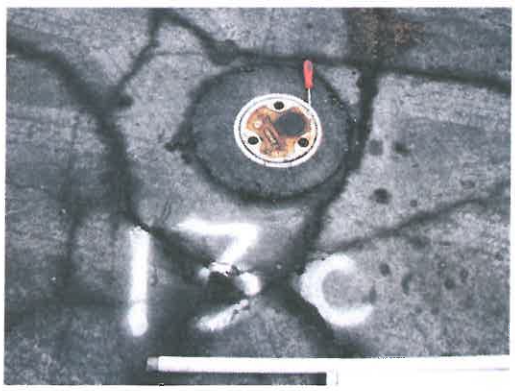
IMG_2861.JPG

IMG_2862.JPG

IMG_2863.JPG

IMG_2864.JPG



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Well Decommissioning - 10/6/11

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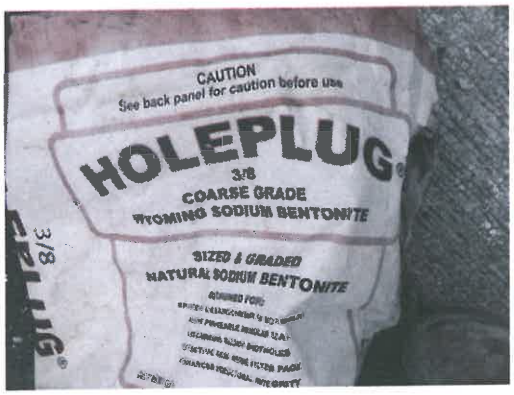
IMG_2868.JPG

IMG_2869.JPG

IMG_2870.JPG

IMG_2871.JPG



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IMG_2874.JPG

Drm

IMG_2875.JPG

IMG_2876.JPG

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: EPI / Boeing	Phone: (425) 395-0010
Client Contact: Doug Kunkel	
Client Project Name: Well Decommissioning Interim Measures	
Client Project #: Task 17513.1 500.04	Samplers:

Page: 1	of 1
Date: 10/6/11	Ice Present? Y
No. of Coolers: 1	Cooler Temps: 16.1

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	PCBs MTCA	VOCs	Total Metals	pH	Set Solids	NWTPH Dx			Notes/Comments
Well Decommissioning Drum #1	10/6/11	1635	W		X	X	X	X	X	X			

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Greg McCormick	Printed Name: Taylor Greeley	Printed Name:	Printed Name:
	Company: EPI	Company: ARI	Company:	Company:
	Date & Time: 10/6/11 1635	Date & Time: 10-6-11 1635	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

MAJOR

Partners on the Ground

230 Frontage Road South
Pacific, Washington 98047
Office: (253) 333-6671
www.majordrilling.com

Client: Environmental Partners	Project No: Boeing Plant 42 Decom	Date: 10/1/11	Day: TUES.
Job Location: 6 Marginal Way S. Seattle		Major Job# 240 214	

Hours Start	Hours Stop	Description of Work — Please Explain Down or Stand-by Time	Hole #	Foot-age	Drill Time	Travel Time	Other Time	Standby Time	Non Chargable Down	Non Chargable Shop
9:15	9:30	On site Safety meeting Sign in								
9:30	9:45	Well chip Well #								
9:45	10:45	Monument Repair								
10:45	12:15	Grout set of three wells								
12:15	1:15	Grout set of three wells								
1:15	2:00	Grout set of three wells cleanup								
2:00	3:15	Day off decom								
		Decom Repairs								
		PL2 607A								
		PL2 036AR EMT-WF-31								
		PL2-425A								
		PL2-009A								
		PL2-009B								
		PL2-009C								
		PL2 013B								
		PL2 013C								
		PL2-036B								
		PL2-036C								
		Total Chargable Rig Hours								

Equipment					
Drill Rig #			# Core Cuts		
Support Truck #			# Saw Cuts		
Support Truck #			# Service Runs		
Trailer #			Hydro Punch		
Bobcat #			Compressor		
Forklift #					
Pump #					

Labor						
# Crew Perdiem						
Name	Start Time	End Time	Shop Hrs	Drill Hrs	Other Hrs	Total Hrs

Casing	Dia. 2	Dia. 4	
20' Screen			
10' Screen			
5' Screen			
5' PP Screen			
20' Blank			
10' Blank			
5' Blank			
Slip Caps			
Locking caps			
Threaded Caps			
Left On Site			
Cones			
Hole Plates			

Materials Used Item	Qty.	Item	Qty.
Sand /		Bollards	
Concrete		Drums	
Quickset		Core Boxes	
Asphalt		Plastic Sheets	
Bentonite Chips		4" Probe Liners	
Bentonite Grout		Shelby Tubes	
Bent. Granular		Quick Gel	
Bent. Pellets			
Portland			
Probe Points___ "			
GW Points			
Macro Liners		Extra Soil Samples	
Flush Box___ "		# Water	
Monument Casing		# Hydropunch	

Remarks

Dig Alert #	Depth To Water

Client Signature [signature] Operator Signature [signature]

Wells to be Decommissioned

Well	Northing	Easting	Total Depth (ft. bgs)	Screened Interval (ft. bgs)	Area	Year to be Decommissioned	Notes
PL2-607A	195924.5	1275731.9	21	6-21	2-66	2011	Will be decommissioned for stormwater system excavation.
PL2-036AR	196103	1275536	20.5	10.5-20	2-66	2011	Will be decommissioned for fireline and vault removal in 2011
PL2-425A	196339.1102	1275445.826	18	8-18	2-40s	2011	Will be decommissioned for stormwater system
PL2-009A	195896.6187	1275765.326	21.54	6-21	2-66	2011	Will be decommissioned for stormwater system excavation.
PL2-009B	195901.9486	1275770.198	50.59	41-50	2-66		
PL2-009C	195890.9527	1275763.525	95.11	85-95	2-66		
PL2-013B	195933.4	1275722.6	45	39-44	2-66		
PL2-013C	195924.2	12275731.9	85	80-85	2-66		
PL2-036B	196113.2	1275569.5	45	40-45	2-66	2011	Will be decommissioned for stormwater system excavation.
PL2-036C	198618.3	1275475	85.31	80-85	2-66		

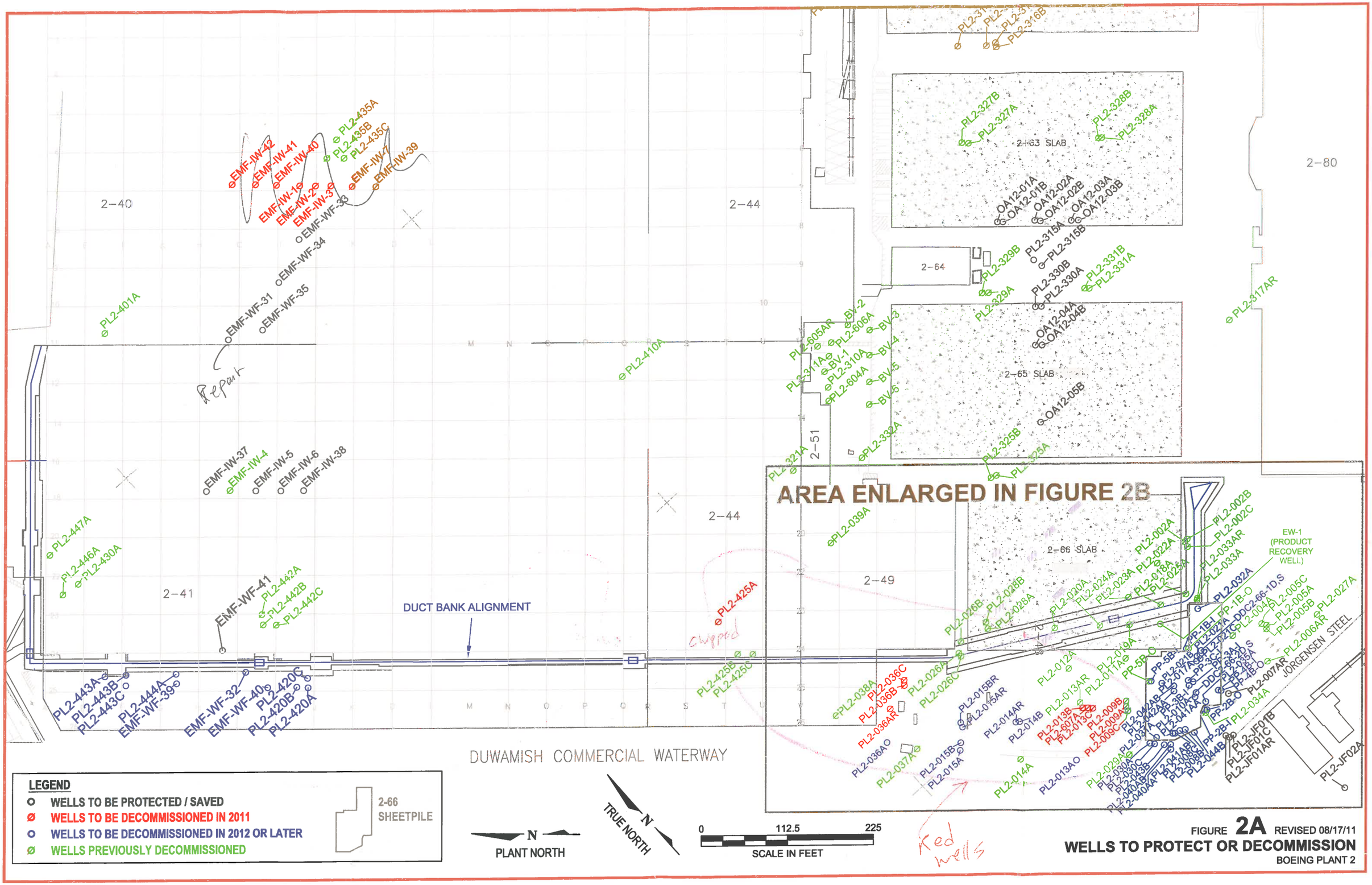


FIGURE **2A** REVISED 08/17/11

WELLS TO PROTECT OR DECOMMISSION

BOEING PLANT 2

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-425A	
	Northing	Easting
Well Location	196339.1102	1275445.826
Start (date and time)	9:55 10/6/11	
End (date and time)	10:15 10/6/11	
Installation Method		
Total Well Depth	18 feet	feet bgs
Well Diameter	2 inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs)	8-18'	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips GMC ~~Quick Crete~~ Hole Plug Sodium Bentonite

Grout or Chip Volume 1 Bag Gallons or Cubic Feet

Surface Completion Box remains filled with concrete

Drilling Contractor Major Drilling

License Number

Signature (Driller)

Signature (Engineer or Geologist) [signature]

Additional Information: No Tag

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-009A	
Well Location	Northing: 195896.6187	Easting: 1275765.326
Start (date and time)	10/6/11 11:20	
End (date and time)	10/6/11 11:35	
Installation Method		
Total Well Depth	21.54'	feet bgs
Well Diameter	4-inch GMC	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	6-21'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Hole Plug Sodium Bentonite	
Grout or Chip Volume	≈ 1 Bag	Gallons or Cubic Feet
Surface Completion	Box remains filled with concrete	
Drilling Contractor	Major Drilling	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)	J M Ponist	
Additional Information:	No Tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-009B	
	Northing	Easting
Well Location	195901.9486	1275770.198
Start (date and time)	10/6/11 11:25	
End (date and time)	10/6/11 12:05	
Installation Method	HSA	
Total Well Depth	50.59	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs)	41-50'	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips	Quik Grout Bentonite Grout	
Grout or Chip Volume	10 gals	Gallons or Cubic Feet
Surface Completion	Box remains filled with concrete	
Drilling Contractor	Major Drilling	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)	[signature]	
Additional Information:	Tags collected	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-009C	
	Northing	Easting
Well Location	195890.9527	1275763.525
Start (date and time)	10/6/11 12:05	
End (date and time)	10/6/11 12:20	
Installation Method	HSA	
Total Well Depth	95.11	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	85-95'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Quik Grout Bentonite Grout	
Grout or Chip Volume	~~[illegible]~~ gals (GMC 20)	Gallons or Cubic Feet
Surface Completion	Box remains - filled with concrete	
Drilling Contractor	Major Drilling	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)	[signature]	
Additional Information:	No Tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-607A	
	Northing	Easting
Well Location	195924.5	1275731.9
Start (date and time)	10/6/11 12:25	
End (date and time)	10/6/11 12:30	
Installation Method	HSA	
Total Well Depth	21 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	6-21	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Hole Plug Sodium Bentonite	
Grout or Chip Volume	Approx 1 Bag	Gallons or Cubic Feet
Surface Completion	Box remains filled with concrete	
Drilling Contractor	Major Drilling	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)	J M Lamont	
Additional Information:	No Tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-013B	
	Northing	Easting
Well Location	195933.4	1275722.6
Start (date and time)	10/6/11 12:35	
End (date and time)	10/6/11 1:05	
Installation Method	HSA	
Total Well Depth	45 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	39-44	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Quik Grout Sodium Bentonite	
Grout or Chip Volume	10 gallons	Gallons or Cubic Feet
Surface Completion	Box remains filled with concrete	
Drilling Contractor	Major Drilling	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)	J M Lamont	
Additional Information:	No Tag	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-013C	
	Northing	Easting
Well Location	195924.2	1275731.9
Start (date and time)	10/6/11 12:40	
End (date and time)	10/6/11 1:20	
Installation Method	HSA	
Total Well Depth	85 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	80-85	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Quik Grout Sodium Bentonite	
Grout or Chip Volume	20 gallons	Gallons or Cubic Feet
Surface Completion	Box remains filled with concrete	
Drilling Contractor	Major Drilling	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)	[signature]	
Additional Information:	Tag Collected	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-036B	
Well Location	Northing: 196113.2	Easting: 1275569.5
Start (date and time)	10/16/11	
End (date and time)	10/16/11	
Installation Method	HSA	
Total Well Depth	45	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40-45	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Quik Grout	
Grout or Chip Volume	10 gallons	Gallons or Cubic Feet
Surface Completion	Box remains filled with concrete	
Drilling Contractor	Major Drilling	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)	[illegible]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-036AR	
Well Location	Northing: 196103	Easting: 1275536
Start (date and time)	1:40 10/6/11	
End (date and time)	1:50 10/6/11	
Installation Method	HSA	
Total Well Depth	20.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	10.5 - 20'	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Hole Plug Bentonite	
Grout or Chip Volume	1 Bag	Gallons or Cubic Feet
Surface Completion	Box remains ~~con~~filled with concrete	
Drilling Contractor	Major Drilling	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)	J M Bond	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-036C	
	Northing	Easting
Well Location	198618.3	1275475
Start (date and time)	10/6/11 1:55	
End (date and time)	10/6/11	
Installation Method	HSA	
Total Well Depth	85.31 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	80-85	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Quik Grout	
Grout or Chip Volume	20 gallons	Gallons or Cubic Feet
Surface Completion	Box remains filled in place	
Drilling Contractor	Major Drilling	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)	[signature]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number		
	Northing	Easting
Well Location		
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips		
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion		
Drilling Contractor		
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number		
	Northing	Easting
Well Location		
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips		
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion		
Drilling Contractor		
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number		
	Northing	Easting
Well Location		
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips		
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion		
Drilling Contractor		
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number		
	Northing	Easting
Well Location		
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1)	*perforate or overdrill then grout*
	WAC 173-160-460(2)	*grout or chip in place*
Type of Grout or Chips		
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion		
Drilling Contractor		
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number		
	Northing	Easting
Well Location		
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)		feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips		
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion		

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

_____

Well Decommissioning Log - Boeing Plant 2

Well Number		
	Northing	Easting
Well Location		
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1)	*perforate or overdrill then grout*
	WAC 173-160-460(2)	*grout or chip in place*
Type of Grout or Chips		
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion		
Drilling Contractor		
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

WAC 173-160-420

What are the general construction requirements for resource protection wells?

(1) No resource protection well or soil boring excavation may be used to withdraw or inject water for domestic, industrial, municipal, commercial, or agricultural purposes.

(2) No resource protection well or soil boring excavation may interconnect aquifers.

(3) Nested resource protection wells are prohibited.

(4) Cuttings, development water, and other investigation derived waste from resource protection well construction or geotechnical soil borings shall be managed in a manner consistent with the intent and purposes of the Water Pollution Control Act, chapter 90.48 RCW, the Hazardous Waste Management Act, chapter 70.105 RCW, and implementing regulations.

(5) Well tagging:

(a) It shall be the driller's responsibility to place a well identification tag with a unique identification number on every resource protection well that they construct or alter within thirty days of completion of the well. Uncased geotechnical soil borings and environmental investigation wells are exempt from the tagging requirements of this chapter.

(i) The alpha-numeric number shall be recorded on the drilling report in the space provided.

(ii) The driller shall remove the well identification tag on all resource protection wells they decommission and shall attach the tag to the decommissioning well report.

(b) It shall be the well owner's responsibility to place a well identification tag with a unique identification number on every resource protection well they own and which was completed prior to the effective date of this regulation.

(i) Upon request, the department shall furnish the well owner with a well tag and tagging instructions.

(ii) The well owner shall tag their well(s) and submit a completed tagging report to the department.

(c) The well tag shall be permanently attached to:

(i) The well casing and be visible above land surface for all wells which have been completed above land surface.

(ii) The well casing or to any permanent and protected portion of the vault for wells completed below land surface.

(iii) A prominent system component visible above land surface for ground source heat pump borings.

(d) All well identification tags shall be supplied by the department.

(e) It is unlawful for a person to tamper with or remove a well identification tag except during well alteration.

(6) All resource protection wells will be sealed in accordance with WAC 173-160-450 regardless of the method of installation. Except, resource protection wells that are properly decommissioned prior to the removal of any drilling equipment from the well location are

exempted from the surface sealing requirements of this chapter. Provided the decommissioning process includes the removal of any conduit, tubing, probe, or other items inserted into the ground.

(7) All geotechnical soil borings shall be decommissioned under the terms of this chapter.

(8) Except as provided in RCW 18.104.180, all construction, alteration, reconstruction, and decommissioning of resource protection wells and geotechnical soil borings shall be done by an individual licensed under the provisions of chapter 173-162 WAC.

(9) A notice of intent to construct or decommission a resource protection well and a geotechnical soil boring shall be filed with the department a minimum of seventy-two hours prior to initiating construction or decommissioning of the well(s) or boring(s). A fee must accompany each notice of intent to construct or decommission a resource protection well.

(a) The fee for a resource protection well, except for an environmental investigation well, a ground source heat pump boring, or a grounding well, is forty dollars for each well.

(b) The fee for an environmental investigation well in which ground water is sampled or measured is forty dollars for the construction of up to four environmental investigation wells per project, and ten dollars for each additional environmental investigation well constructed on a project with more than four wells. There is no fee for soil or vapor sampling purposes.

(c) The fee for a ground source heat pump boring or a grounding well is forty dollars for construction of up to four ground source heat pump borings or grounding wells per project and ten dollars for each additional ground source heat pump boring or grounding well constructed on a project with more than four wells.

(d) The fee to decommission a resource protection well, except for an environmental investigation well, is twenty dollars per well. There is no fee to decommission an environmental investigation well or a geotechnical soil boring.

(e) The fee to decommission a ground source heat pump boring or a grounding well is twenty dollars per well.

(f) Under some circumstances, it may be necessary to construct more resource protection wells or geotechnical soil borings than originally anticipated. When additional resource protection wells are constructed on a site for which a notice of intent and fee were submitted, a second notice and fee shall be submitted within twenty-four hours after all wells have been completed or as soon as the final number of wells to be constructed is determined, whichever is sooner. When additional geotechnical soil borings are needed, the borings may be completed. A follow-up notice of intent shall be submitted to the department within twenty-four hours after all borings are constructed. Notification to construct multiple wells or geotechnical soil borings within the same quarter/quarter section, township, and range may be submitted on one notice form.

(10) Resource protection well reports.

(a) Anyone who constructs or decommissions a well is required to submit a complete well report on the construction or decommissioning of all resource protection wells and geotechnical soil borings. Reports must be submitted to the water resources program within thirty days after completion of construction or decommissioning. Submission of a well report to consulting firms does not meet the requirement of this section. The report must be an accurate summation of data collected in the field taken from field notes written as the well was constructed or decommissioned. Field notes must be available at all times during construction or decommissioning for review by state and local inspectors and kept until the well report is submitted.

(b) The resource protection well report must be made on a form provided by the department, or a reasonable facsimile of the form, as approved by the department.

(c) Where applicable the report shall include the following information:

(i) Owner's name; operator/trainee name; operator/trainee license number; contractor registration number, drilling company name;

(ii) Tax parcel number;

(iii) Well location address;

(iv) Location of the well to at least 1/4, 1/4 section or smallest legal subdivision;

(v) Unique well identification tag number;

(vi) Construction date;

(vii) Start notification number;

(viii) Intended use of well;

(ix) The well depth, diameter, and general specifications of each well;

(x) Total depth of casing;

(xi) Well head elevation;

(xii) Drilling method;

(xiii) Seal material, seal location and type of placement used;

(xiv) Filter pack location; filter pack material used;

(xv) The thickness and character of each bed, stratum or formation penetrated by each well including identification of each water bearing zone;

(xvi) Casing gauge, diameter, stickup, type of material, and length, also of each screened interval or perforated zone in the casing;

(xvii) The depth to the static water level, as measured below the land surface; and

(xviii) Such additional factual information as may be required by the department.

(d) The well report must include one of the following:

(i) The license number and signature of the person who constructed or decommissioned the well;

(ii) The license number and signature of the trainee and the licensed operator under chapter 18.104 RCW; or

(iii) The license number and signature of an exempted individual as defined under RCW 18.104.180(3).

(e) This rule shall allow an individual to submit electronic reports in accordance with department procedures. The use of a digital signature in the electronic reports will be authorized as a substitute for an original signature under (d) of this subsection.

What are the surface protection requirements?

(11) All resource protection wells shall be capped and protected using one of the following methods:

(a) If the well is cased with metal and completed above the ground surface, you must attach a watertight cap with a lock to the top of the casing.

(b) If the well is not cased with metal and completed above the land surface, you must install a protective metal casing over and around the well. The protective casing shall extend at least six inches above the top of the well casing and be cemented at least two feet into the ground. A cap with lock shall be attached to the top of the protective casing.

(12) You shall protect the well(s) completed above ground from damage by:

(a) Cementing three metal posts, at least three inches in diameter, in a triangular array around the casing and at least two feet from it. Each post shall extend at least three feet above and below the land surface.

(b) A reinforced concrete pad may be installed to protect against and prevent frost heave. If installed, the concrete pad shall extend to a depth equal to anticipated frost depth. When a concrete pad is used, the well seal may be part of the concrete pad.

(13) If the well is completed below land surface, a watertight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent the inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The cover must be designed to withstand the maximum expected loading.

(14) The protective measures may be waived or modified upon written approval from the department (a variance).

(15) If the well is damaged, the well protection measures and casing shall be repaired to meet the requirements of this chapter. If the well is damaged beyond repair, it shall be decommissioned in accordance with WAC 173-160-460.

WAC 173-160-460

What is the decommissioning process for resource protection wells?

(1) For resource protection wells and geotechnical soil borings that were not constructed in accordance with these regulations, or for which a drilling report required under this section is missing, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers, and decommission in one of the following ways:

(a) Perforate the casing from the bottom to land surface and pressure grout the casing.

(i) Perforations shall be at least four equidistant cuts per row, and one row per foot. Each cut shall be at least one and one-half inches long.

(ii) Apply enough pressure to force the sealing material through the perforations, filling any voids on the outside of the casing.

(iii) The remainder of the casing shall be filled with neat cement grout, neat cement, or bentonite slurry; or

(b) Withdraw the casing and fill the bore hole with neat cement grout, neat cement, bentonite or bentonite slurry as the casing is being withdrawn.

(2) For resource protection wells and geotechnical soil borings that were constructed in accordance with these regulations, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers and then decommission in one of the following ways:

(a) Wells with an inside casing diameter equal to or greater than one inch and constructed in accordance with these regulations as verified through a field examination and review of the drilling report shall be decommissioned by filling the casing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement.

(b) Wells with an inside casing diameter less than one inch shall be decommissioned by pressure grouting the entire casing length with bentonite slurry, neat cement grout, or neat cement.

(c) Vibrating wire piezometers installed to meet or exceed the sealing requirements of WAC 173-160-450, 173-160-457, and 173-160-458 are exempt from the decommissioning procedures and decommissioning reporting requirements provided here.

(d) Direct push wells shall be decommissioned in accordance with this section.

(e) Geotechnical soil borings, or boring, shall be decommissioned by sealing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement. Sealing material placed below the static water level shall be piped directly to the point of application or placed by means of a dump bailer or pumped through a tremie tube. If bentonite slurry, neat cement grout or neat cement is used to seal below the water level in the well, the material shall be placed from the bottom up by methods that avoid segregation or dilution of the material. When used to place bentonite slurry, neat cement or neat cement grout, the discharge end of the tremie tube shall be submerged in the bentonite slurry, neat cement or neat cement grout to avoid breaking the seal while filling the annular space. Provided the material does not dilute or segregate and the resulting seal is free of voids, sealing material may be hand poured above the static water level.

Table 1: Proposed Status of Plant 2 Wells South of the New South Park (16th Avenue) Bridge

Well to be decommissioned in fall 2011

Well to be decommissioned in 2012 or later

Green Text Well already decommissioned

Well	Northing	Easting	Total Depth (ft. bgs)	Screened Interval (ft. bgs)	Area	Year to be Decommissioned[1,2]	Notes[2]
Existing Shoreline Monitoring Wells							
PL2-013A	195888.4881	1275670.6940	20.82	6-20	2-66	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-607A	195924.5	1275731.9	21	6-21	2-66	2011	Will be decommissioned for stormwater system excavation.
PL2-015A	196001.6284	1275566.773	20.88	6-20.5	2-66	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-015AR	196022	1275589	19.5	9.4-19	2-66		
PL2-015B	196008.4253	1275573.957	50	40-50	2-66		
PL2-030A	195840.127	1275756.423	30	25-30	2-66		
PL2-030C	195835.404	1275760.301	81.5	75.5-80	2-66		
PL2-036A	196072.6405	1275503.495	20.41	8-18	2-66		
PL2-036AR	196103	1275536	20.5	10.5-20	2-66	2011	Will be decommissioned for fireline and vault removal in 2011
PL2-043B	195825.948	1275769.123	56.5	50.5-55.2	2-66	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-044B	195811.313	1275808.371	57	51.7-56	2-66		
PL2-214A	197378.5128	1274203.75	30.15	15-30	2-10	NA	Protected during demolition and construction.
PL2-214B	197394.4537	1274214.747	60.08	45-60	2-10		
PL2-214C	197377	1274193	82	75.5-80	2-10		
PL2-227A	197122.1031	1274457.353	16.5	6-16.5	2-10		
PL2-232A	197241.7314	1274341.943	21.03	5-20	2-10		
PL2-233A	196929.8837	1274627.577	26.5	10-25	2-31	2010	Decommissioned May 2010 for bridge construction. May be replaced with a new 3-level well cluster in an EPA-approved location following construction.
PL2-258A	197722.453	1273786.284	23.02	8-23	2-10	NA	Protected during demolition and construction.
PL2-258B	197715.527	1273794.851	51.5	40-50	2-10		
PL2-258C	197708.6909	1273802.422	106.5	92-102	2-10		
PL2-420A	196637.0977	1274993.975	29	14-29	2-40s	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-425A	196339.1102	1275445.826	18	8-18	2-40s	2011	Will be decommissioned for stormwater system
PL2-443A	196826.6461	1274807.579	23	8-23	2-40s	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-JF01AR	195768.3965	1275853.797	28	23.2-27	JF	NA	On Jorgensen Forge property, not in planned demolition or construction area
PL2-JF01B	195774.446	1275844.117	51.5	40-50	JF		
PL2-JF01C	195775.795	1275838.557	79	74-78.5	JF		
PL2-JF02A	198707.0644	1274675.733	18	8-18	JF		
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
Potential Future Shoreline Monitoring Wells (excluding 2-10, North, and South Yard Areas)							
PL2-009A	195896.6187	1275765.326	21.54	6-21	2-66	2011	Will be decommissioned for stormwater system excavation.
PL2-009B	195901.9486	1275770.198	50.59	41-50	2-66		
PL2-009C	195890.9527	1275763.525	95.11	85-95	2-66		
PL2-013B	195933.4	1275722.6	45	39-44	2-66		
PL2-013C	195924.2	12275731.9	85	80-85	2-66		
PL2-014AR	195979.4	1275645.1	21	6-21	2-66		Will be decommissioned for sediment / habitat bank construction work

PL2-014B	195976.5	1275649/1	45.5	40.5-45.5	2-66	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-015BR	196028	1275591.2	45	40-45	2-66		
PL2-036B	196113.2	1275569.5	45	40-45	2-66	2011	Will be decommissioned for stormwater system excavation.
PL2-036C	198618.3	1275475	85.31	80-85	2-66		
PL2-420B	196340.5	1275442.4	45.5	35-45	2-40s	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-420C	196645.4	1275001.3	80.5	75-80	2-40s		
PL2-443B	196832.6	1274801	45.5	35-45	2-40s		
PL2-443C	196836.8	1274797.4	75.5	70-75	2-40s		
PL2-444A	196767	1274878	26.5	10-25	2-40s		
Interim Measures Wells							
OA-11 FCMS							
PL2-007AR	195818.774	1275875.321	17.5	7-17	2-66	NA	Will be protected. Potential OA-11 monitoring well.
OA-12 IM							
OA-12-01A	196479.000	1276061.800	25.5	15-25	2-60s	Pending	Will be evaluated and addressed in subsequent submittal prior to construction affecting that area in 2012.
OA-12-01B	196474.200	1276067.100	45.5	35-45	2-60s		
OA-12-02A	196447.000	1276099.000	25.5	15-25	2-60s		
OA-12-02B	196441.500	1276104.000	45.5	35-45	2-60s		
OA-12-03A	196414.500	1276134.700	25.5	15-25	2-60s		
OA-12-03B	196408.500	1276141.700	45.5	35-45	2-60s		
PL2-315A	196409.346	1276063.685	19	8.5-18.5	2-60s		
PL2-315B	196396.8971	1276066.426	51.5	40-50	2-60s		
PL2-330A	196357.767	1276030.701	18	8-18	2-60s		
PL2-330B	196362.736	1276024.686	50	40-50	2-60s		
OA-12-04A	196325.700	1275991.500	25.5	15-25	2-60s		
OA-12-04B	196319.900	1275998.000	45.5	35-45	2-60s		
OA-12-05B	196246.600	1275929.700	45.5	35-45	2-60s		
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
2-66 Sheetpile ERD IM							
PL2-008A PL2-041AA)	NA	NA	18	15-18	2-66	2012	Will be decommissioned as needed based on excavation work within the 2-66 sheetpile
PL2-008B	195822.133	1275802.376	50.7	40.5-50	2-66		
PL2-008C	195825.943	1275796.396	96	80.5-95	2-66		
PL2-010A	195845.345	1275839.895	21.2	6-20	2-66		
PL2-017A	195887.459	1275820.158	21.5	6-20.5	2-66		
PL2-021A	195882.699	1275877.112	19.9	4.5-19	2-66		
PL2-021B	195878.277	1275872.293	49	38.5-48	2-66		
PL2-021C	195877.234	1275878.079	92.1	81.5-91	2-66		
PL2-031A	195840.042	1275768.031	30	25-30	2-66		
PL2-032A	195927.783	1275918.744	30	25-30	2-66		
PL2-035A	195831.094	1275846.311	30	25-30	2-66		
PP-1B-I	195897.325	1275875.908	50.5	48-50	2-66		
PP-2B-I	195824.129	1275837.947	50.5	48-50	2-66		
PP-2B-O	195822.301	1275840.300	50.5	48-50	2-66		
PP-3A-I	195861.505	1275851.046	20.5	18-20	2-66		
PP-3B-I	195861.413	1275844.443	50.5	48-50	2-66		
PP-3C-I	195866.991	1275847.643	90.5	88-90	2-66		

PP-4B-I	195830.968	1275868.308	50.5	48-50	2-66		
PP-4B-O	195828.348	1275870.456	50.5	48-50	2-66		
PP-5B-I	195899.058	1275811.196	50.5	48-50	2-66		
OA-9 IM							
PL2-310A	196467.5884	1275754.609	19	9-19	2-60s	2010	Decommissioned June 2010 prior to Building 2-44, Building 2-49 demolition. The need for further remediation will be evaluated as part of CMS.
PL2-311A	196497.6732	1275782.804	18	8-18	2-60s		
PL2-604A	196456.05	1275743.69	21.5	6-21	2-60s		
PL2-605AR	196517.4	1275780.24	21.5	6-21	2-60s		
PL2-606A	196508.55	1275796.81	21.5	6-21	2-60s		
BV-01	196486.9	1275765.2	10.5	3-10	2-60s		
BV-02	196511.1	1275828.3	10.5	3-10	2-60s		
BV-03	196486.7	1275845.1	10.5	3-10	2-60s		
BV-04	196462.6	1275823.2	10.5	3-10	2-60s		
BV-05	196436.9	1275800.0	10.5	3-10	2-60s		
BV-06	196415.2	1275780.2	10.5	3-10	2-60s		
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
EMF Plume IM (2-40s Area Parking Lot)							
EMF-IW-8	197411.2	1275637.1	49	39-49	2-40s	NA	Protected during demolition and construction.
EMF-IW-9	197388.8	1275661.9	49	39-49	2-40s		
EMF-IW-10	197367.0	1275685.1	50	40-50	2-40s		
EMF-IW-11	197345.9	1275708.4	50	40-50	2-40s		
EMF-IW-43	197304.8	1275744.2	50	40-50	2-40s		
EMF-IW-44	197276.4	1275773.7	50	40-50	2-40s		
EMF-WF-30	197340.7	1275660.8	50	40-50	2-40s		
EMF-WF-36	197446.4	1275756.3	50	40-50	2-40s		
PL2-440A	197453.6322	1275746.487	18.5	8-18	2-40s		
PL2-440B	197450	1275746	45.5	40-45	2-40s		
PL2-440C	197451.1	1275749.2	85	79.5-84.5	2-40s	NA	Potential future upgradient monitoring location, not in planned demo area
PL2-441A	197690.4469	1275487.108	19	8-18	2-40s	NA	Protected during demolition and construction.
PL2-441BR	197674.8	1275481.3	45.5	40.5- 45.5	2-40s		
PL2-441C	197678.6	1275478.1	82	76.5-81.5	2-40s	NA	Potential future upgradient monitoring location, not in planned demo area.
PL2-608A	197129.3	1276102.8	21	6-21	2-40s	NA	Potential future upgradient monitoring location, not in planned demo area.
PL2-608B	197125.1	1276107.4	45.5	40.5-45.5	2-40s		
PL2-608C	197122.5	1276101.6	84	79-84	2-40s		
EMF Plume IM (2-40 Building)							
EMF-IW-1	197130.9	1275421.0	45	35-45	2-40s	2011	Decommissioned August 2011 for Tunnel A excavation
EMF-IW-2	197117.3	1275435.7	45	35-45	2-40s		
EMF-IW-3	197103.5	1275450.3	45	35-45	2-40s		
EMF-IW-7	197084.2	1275470.3	40	30-40	2-40s		
EMF-IW-39	197063.0	1275493.4	50	40-50	2-40s		
EMF-IW-40	197152.0	1275398.5	47	37-47	2-40s		
EMF-IW-41	197171.0	1275378.5	50	40-50	2-40s		
EMF-IW-42	197192.0	1275356.5	50	40-50	2-40s		
EMF-WF-31	197044.3	1275218.7	39	29-39	2-40s		

EMF-WF-33	197079.2	1275374.6	45	35-45	2-40s	NA	Requires concurrence from EPA RPM for EMF plume. Protected during demolition and construction
EMF-WF-34	197055.1	1275317.2	45	35-45	2-40s		
EMF-WF-35	197023.4	1275260.0	45	35-45	2-40s		
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
EMF Plume IM (2-41 Building)							
EMF-IW-4	196897.1	1275089.6	45	35-45	2-40s	2011	Decommissioned June 2011 following damage during tunnel removal
EMF-IW-5	196874.0	1275114.0	40	30-40	2-40s	NA	Protected during demolition and construction.
EMF-IW-6	196851.7	1275138.5	40	30-40	2-40s		
EMF-IW-38	196831.8	1275161.0	50	40-50	2-40s		
EMF-IW-37	196916.7	1275066.2	50	40-50	2-40s		
EMF-WF-32	196707.4	1274946.9	35	25-35	2-40s	2012	Will be decommissioned for sediment / habitat bank construction work in 2012
PL2-442A	196748.5543	1275013.196	18	8-18	2-40s	2010	Decommissioned October 2010 for planned stormwater swale placement
PL2-442B	196749.5	1275014	45.5	35-45	2-40s		
PL2-442C	196751.7	1275009.7	80.5	75-80	2-40s		
EMF-WF-39			45	35-45	2-40s	2012	Will be decommissioned for sediment / habitat bank construction work in 2012
EMF-WF-40			32	22-32	2-40s		
EMF-WF-41			70	60-70	2-40s	NA	Protect during demolition.
2-31 Area Wells Not Currently Used or Planned for Use							
PL2-501A	197303.3024	1274930.303	20.5	10-20	2-31	2011	Decommissioned April 2011 for Building 2-31 demolition.
PL2-501B	197300.3464	1274937.211	50.5	40-50	2-31		
PL2-501C	197297.6254	1274944.929	78.5	68-78	2-31		
PL2-502A	197110.8655	1274798.368	18	8-18	2-31		
PL2-503A	197531.7809	1274941.327	17.5	7-17.5	2-31	NA	Not in planned demolition area.
PL2-504A	197570.0865	1274990.552	14.7	4.2-14.7	2-31		
PL2-505A	197585.3839	1274908.443	24.5	9-24.5	2-31		
PL2-507A	198199.8943	1274944.021	18	8-18	2-31		
PL2-507B	198169.6	1274967.6	45.5	35-45	2-31		
PL2-507C	198185.4	1274948.6	75.5	65-75	2-31		
PL2-508A	197342.6062	1274962.046	19	9-19	2-31	2011	Decommissioned April 2011 for AOC 2-31.21 excavation.
PL2-509A	197344.644	1274954.656	18.9	8-18	2-31		
PL2-509B	197342.06	1274952.296	50.5	40-50	2-31		
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
2-40s Area Wells Not Currently Used or Planned for Use							
PL2-321A	196419.014	1275649.363	18	8-18	2-40s	2010	Decommissioned May 2010 prior to demolition.
PL2-401A	197159.0309	1275105.281	23	12-22	2-40s	2010	Decommissioned October 2010 for planned stormwater swale placeme
PL2-410A	196661.3479	1275566.594	21.5	11-21	2-40s		
PL2-425B	196340.5	1275442.4	45.5	40-45	2-40s	2010	Decommissioned May 2010 prior to duct bank excavation
PL2-425C	196340.3	1275437.1	82.5	77-82	2-40s		
PL2-430A	196940.2226	1274862.459	25	15-25	2-40s	2010	Decommissioned June 2010 prior to duct bank excavation
PL2-435A	197142.8391	1275496.11	19	8-18	2-40s	2011	Decommissioned April 2011 prior to demolition.
PL2-435B	197136	1275491.6	45	39.5-44.5	2-40s		
PL2-435C	197135.1	1275498.2	84	78.5-83.5	2-40s		
PL2-445A	197350	1275654	20	10-20	2-40s	NA	Not in planned demolition area.
PL2-446A	196943.045	1274838.135	18.5	8-18	2-40s	2010	Decommissioned June 2010 prior to duct bank excavation

PL2-447A	196992.86	1274859.891	18.5	8-18	2-40s	2010	Decommissioned June 2010 prior to duct bank excavation
2-60s Area Wells Not Currently Used or Planned for Use							
PL2-312A	196856.6879	1276081.086	18	8-18	2-60s	2010	Decommissioned June 2010 prior to demolition of 2-44 and 2-49 Buildings.
PL2-314A	196685.1499	1276175.829	18.5	8.5-18.5	2-60s	2011	Decommissioned April 2011 prior to demolition.
PL2-316A	196655.2527	1276215.709	18	8-18	2-60s		
PL2-316B	196650.2538	1276213.034	50	40-50	2-60s		
PL2-316C	196660.2758	1276204.581	85	75-85	2-60s		
PL2-317AR	196178.782	1276200.795	18	8-18	2-60s		
PL2-319A	196978.7256	1276290.399	18	8-18	2-60s	NA	Potential future upgradient monitoring location, not in planned demo area
PL2-325A	196235.2995	1275841.271	18	8-18	2-60s	2011	Decommissioned April 2011 prior to demolition.
PL2-325B	196237.4115	1275832.947	50	45-50	2-60s		
PL2-326A	196747.296	1276306.189	18.5	8-18	2-60s		
PL2-326B	196742.764	1276311.532	50.5	40-50	2-60s		
PL2-327A	196581.34	1276101.59	19	8.5-18.5	2-60s		
PL2-327B	196587.606	1276095.551	50.5	40-50	2-60s		
PL2-328A	196467.832	1276236.195	18.5	8-18	2-60s		
PL2-328B	196470.705	1276232.987	50.5	40-50	2-60s		
PL2-329A	196418.579	1275991.348	18.5	8-18	2-60s		
PL2-329B	196424.067	1275984.836	50.5	40-50	2-60s		
PL2-331A	196333.318	1276093.248	18.5	8-18	2-60s		
PL2-331B	196337.412	1276088.981	50.5	40-50	2-60s		
PL2-332A	196370.431	1275726.922	18.5	8-18	2-60s	2010	Decommissioned June 2010 prior to demolition of 2-44 and 2-49 Buildings.
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
2-66 Area Wells Not Currently Used or Planned for Use							
EW-1			20	9-19	2-66	2010	Decommissioned June 2010 prior to demolition of 2-44 and 2-49 Buildings.
PL2-002A	196003.2285	1275964.947	20	4.5-19	2-66	2010	Decommissioned May 2010 prior to duct bank excavation.
PL2-002B	196003.7534	1275969.569	49	39-48	2-66		
PL2-002C	195996.4235	1275963.1	94.5	85-94.5	2-66		
PL2-004A	195870.7879	1275929.813	16.9	6.5-16.5	2-66	2011	Decommissioned April 2011 prior to demolition.
PL2-005A	195850.9588	1275970.933	17.1	7-16.7	2-66		
PL2-005B	195847.2878	1275967.803	51.4	41-50.5	2-66		
PL2-005C	195856.7848	1275967.736	93.1	83-92	2-66		
PL2-006AR	195814.993	1275941.14	16.5	6-16	2-66		
PL2-011A	195943.1434	1275806.756	21.1	5.5-20	2-66	2010	Decommissioned June 2010 prior to duct bank excavation.
PL2-012A	195983.6846	1275743.224	21.5	6-20.5	2-66		
PL2-013AR	195941	1275725	24	14.7-23.3	2-66	2011	Decommissioned April 2011 prior to demolition.
PL2-014A	195939.4403	1275617.631	21.1	5.5-20	2-66		
PL2-018A	195963.8149	1275887.254	20.5	5-20	2-66	2010	Decommissioned May 2010 prior to duct bank excavation.
PL2-019A	195972.2121	1275839.907	21.37	6-21	2-66		
PL2-020A	196035.3143	1275764.668	20.5	6-20.5	2-66		
PL2-022A	196006.8587	1275919.88	20	6-19.5	2-66	2010	Decommissioned June 2010 prior to duct bank excavation.
PL2-023A	195999.621	1275862.699	20.5	5.5-20	2-66	2010	Decommissioned May 2010 prior to duct bank excavation.
PL2-024A	195997.4332	1275810.671	19.7	4-19	2-66		
PL2-025A	195952.1428	1275920.886	19.7	4.5-19	2-66		

PL2-026A	196096.4948	1275649.56	20.5	6-19.5	2-66	2010	Decommissioned May 2010 prior to duct bank excavation.
PL2-026B	196106.0307	1275661.82	50	40-50	2-66		
PL2-026C	196091.5168	1275649.094	85	75-85	2-66		
PL2-027A	195816.1686	1276029.596	18	8-18	2-66	2011	Decommissioned April 2011 prior to demolition.
PL2-028A	196094.4235	1275699.1	17.5	7.5-17.5	2-66	2010	Decommissioned June 2010 prior to duct bank excavation.
PL2-028B	196102.1615	1275702.996	49.5	39.5-49.5	2-66		
PL2-029A	195847.056	1275726.971	18	8-18	2-66	2011	Decommissioned April 2011 prior to demolition.
PL2-033A	195936.4248	1275926.056	30	25-30	2-66	2010	Decommissioned May 2010 prior to duct bank excavation.
PL2-033AR	195938	1275928	31	25.7-30.2	2-66		
PL2-034A	195820.339	1275837.069	30	25-30	2-66	2011	Decommissioned April 2011 prior to demolition.
PL2-037A	196041.0265	1275526.895	18	8-18	2-66		
PL2-038A	196144.5745	1275477.836	23.5	13.5-23.5	2-66	2010	Decommissioned June 2010 prior to demolition of 2-44 and 2-49 Buildings.
PL2-039A	196315.5624	1275622.664	20	10-20	2-66		
PP-1B-O	195898.850	1275873.976	50.5	48-50	2-66	2011	Decommissioned April 2011 prior to demolition.
PP-5B-O	195900.664	1275809.547	50.5	48-50	2-66		
DDC-2-66-1D	195878.100	1275885.630	32	25-30	2-66	2012	Will be decommissioned as needed based on excavation work within the 2-66 sheetpile
DDC-2-66-1S	195878.100	1275885.630	10	8-10	2-66		
DDC-2-66-2D	195845.830	1275827.110	32	24-29	2-66		
DDC-2-66-2S	195845.830	1275827.110	10	8-10	2-66		

South Yard Area Wells Not Currently Used or Planned for Use
Not included because demolition is not currently planned for this area

2-10 Area Wells Not Currently Used or Planned for Use
Not included because demolition is not currently planned for this area

North Area Wells Not Currently Used or Planned for Use
Not included because demolition is not currently planned for this area

Notes:
[1]Wells retained within the construction area (see Figure) have the potential to be damaged accidentally during demolition or construction activities. Wells
[2] Dates provided are approximate and subject to change to accommodate project schedule requirements

MONITORING WELL PL2SW-MW9A

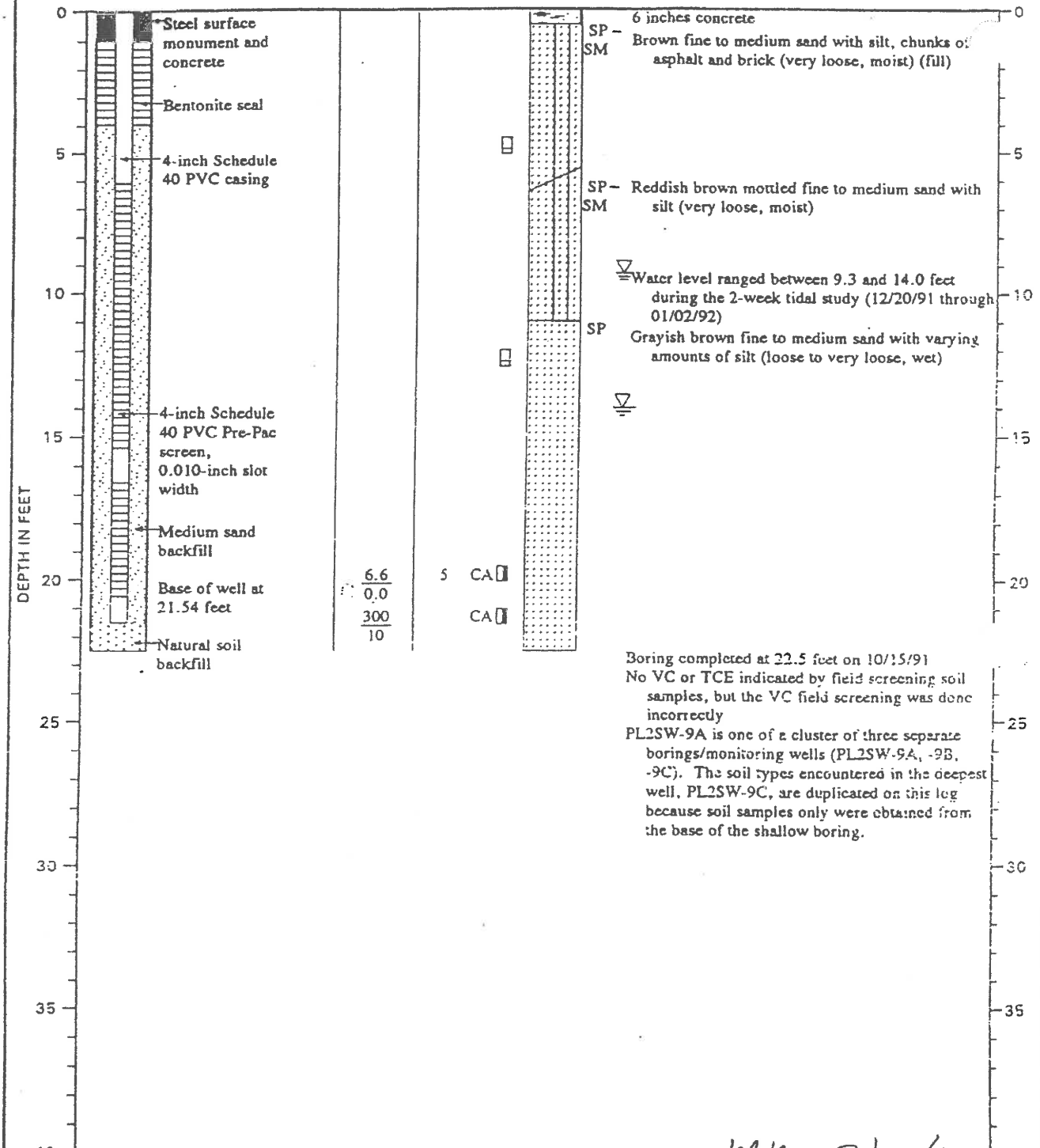
PL2-009A

WELL SCHEMATIC

Casing Elevation (ft.): 12.68
Casing Stickup (ft.): -0.58

Vapor Conc.(ppm) OVA / PID | Blow Count | Samples | Group Symbol | DESCRIPTION

Surface Elevation (ft.): 13.26



Boring completed at 22.5 feet on 10/15/91
No VC or TCE indicated by field screening soil samples, but the VC field screening was done incorrectly
PL2SW-9A is one of a cluster of three separate borings/monitoring wells (PL2SW-9A, -9B, -9C). The soil types encountered in the deepest well, PL2SW-9C, are duplicated on this log because soil samples only were obtained from the base of the shallow boring.

MR 7/20/94

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-11

:CIW:RMM:PGW:CMS 10/20/92

0120-149-R14

MONITORING WELL PL2SW-MW9B

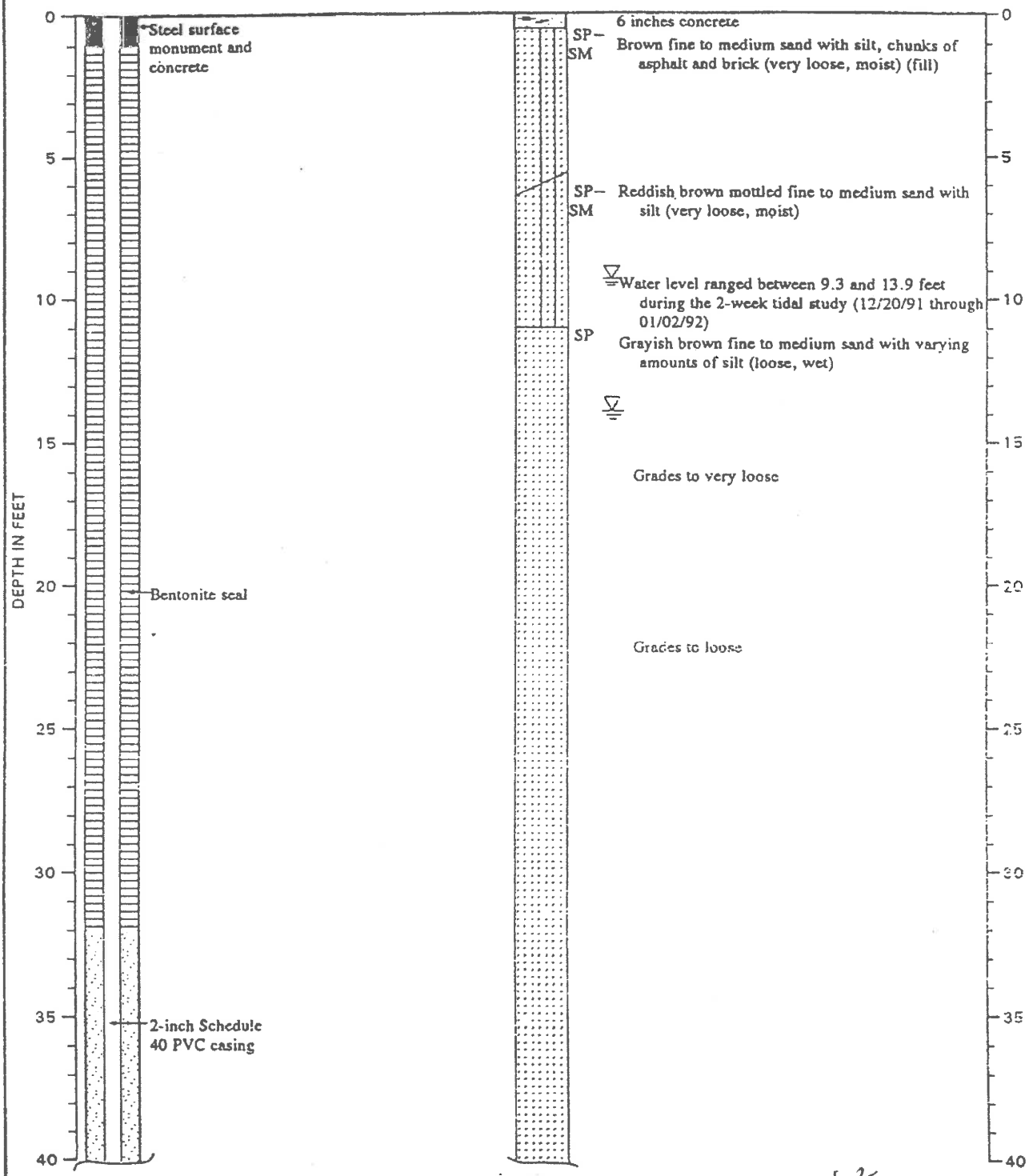
PL2-009B

WELL SCHEMATIC

Casing Elevation (ft.): 12.56
Casing Stickup (ft.): -0.62

DESCRIPTION

Surface Elevation (ft.): 13.18



Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical intermediate 2-inch diameter monitoring well construction

1 of 2 MK 7/20/94

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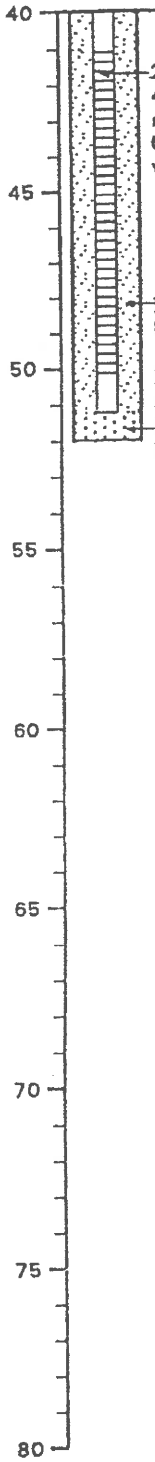
LOG OF MONITORING WELL

FIGURE A-12a

MONITORING WELL PL2SW-MW9B
(Continued)

WELL SCHEMATIC



DESCRIPTION

Group Symbol	Description
	Grades to very loose
SP	Grayish brown fine to medium sand with a trace of silt (loose, wet)
SP-SM/SP	Interbedded grayish brown fine to medium sand with silt and fine to medium sand with a trace of silt with occasional coarse sand and organic matter (medium dense, wet)

Boring completed at 52.0 feet on 11/07/91
PL2SW-9B is one of a cluster of three separate borings/monitoring wells (PL2SW-9A, -9B, -9C). The soil types encountered in the deepest well, PL2SW-9C, are duplicated on this log because soil samples were not obtained from the intermediate depth boring in the cluster.

2 of 2
MW 7/20/94

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical intermediate 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-12b

MONITORING WELL PL2SW-MW9C

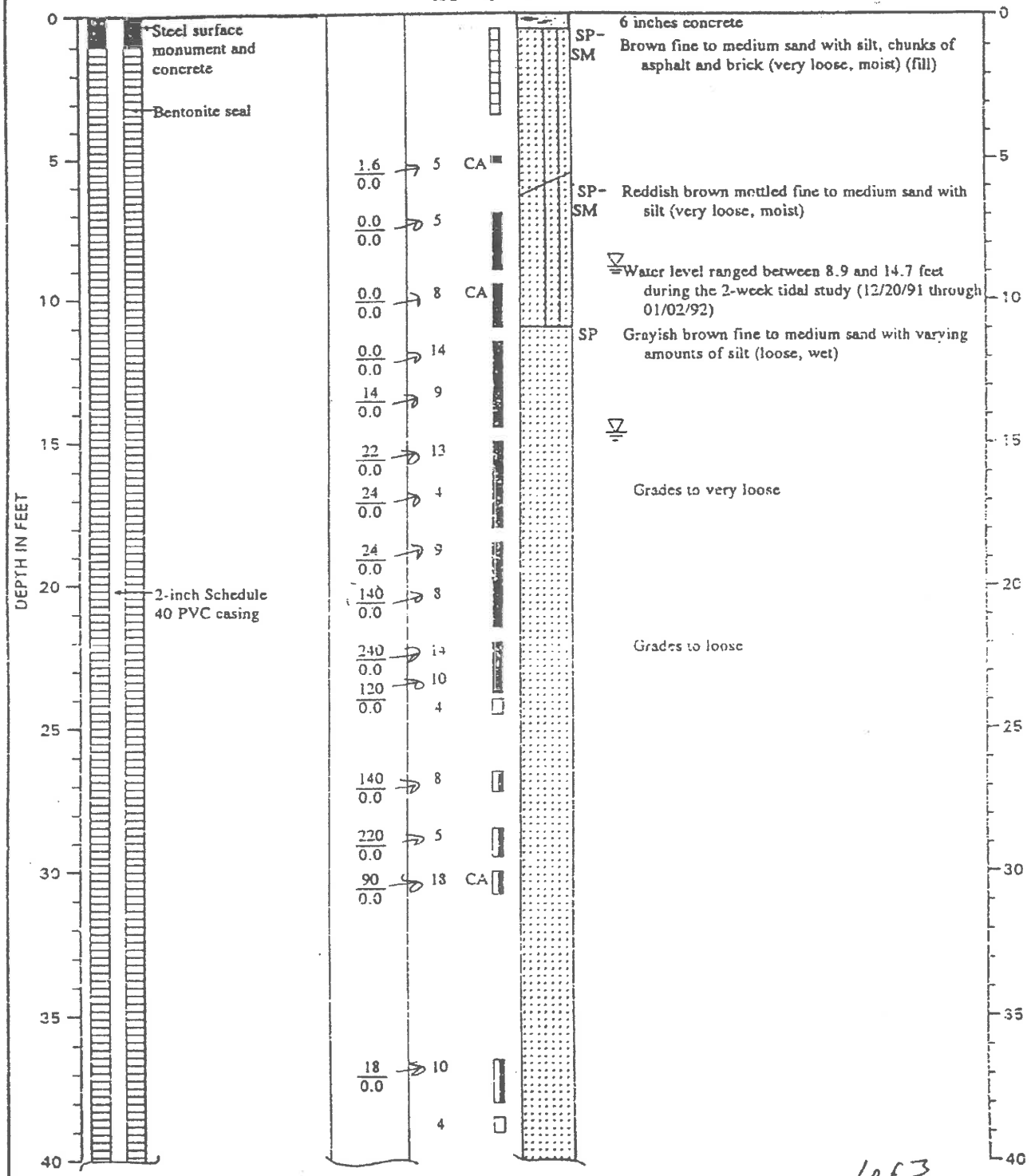
PL2-009C

WELL SCHEMATIC

Casing Elevation (ft.): 13.02
Casing Stickup (ft.): -0.16

Vapor Conc. (ppm) OVA / PID | Blow Count | Samples | Group Symbol | DESCRIPTION

Surface Elevation (ft.): 13.18



Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

1 of 3

MK 7/18/94

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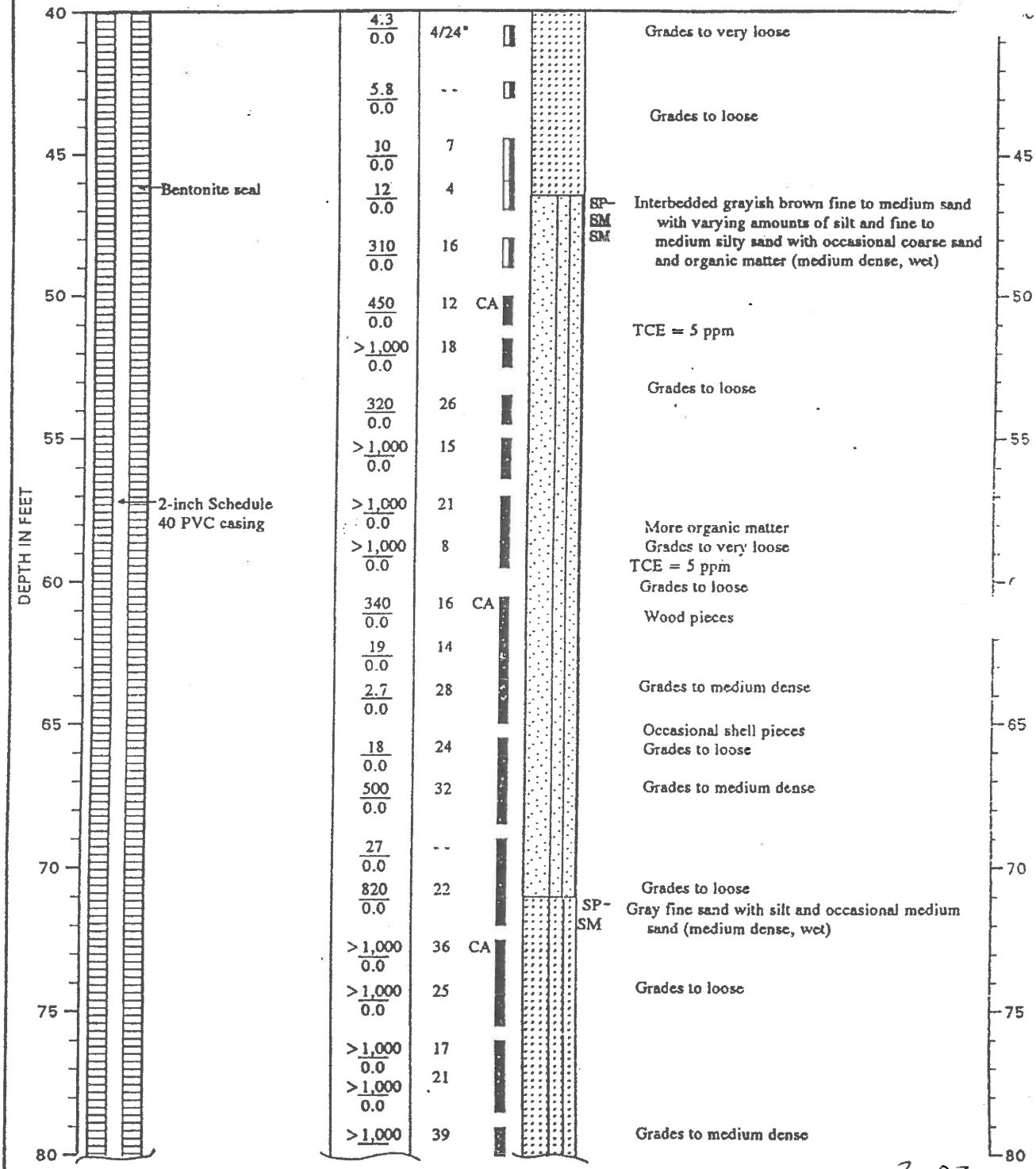
LOG OF MONITORING WELL

FIGURE A-13a

:\HW.RMM.PGW:CMS 10/16/92

0120-149-014

MONITORING WELL PL2SW-MW9C
(Continued)



Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

2 of 3

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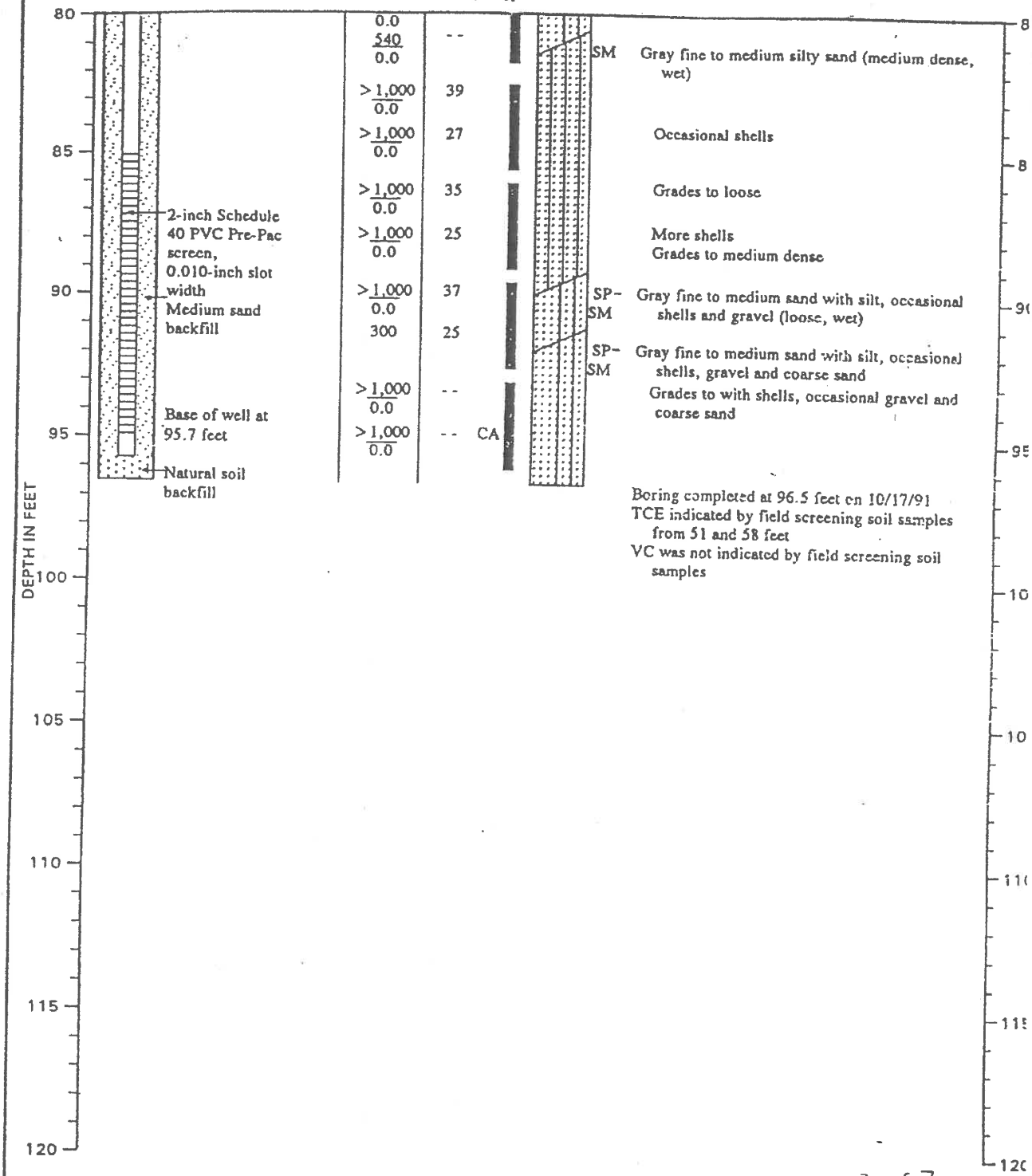
LOG OF MONITORING WELL

FIGURE A-13b

:CRW:RNM:PGW:CMS 10/16/92

0120-148-R14

MONITORING WELL PL2SW-MW9C
(Continued)



Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

3 of 3
MVR 7/18/9

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LOG OF MONITORING WELL

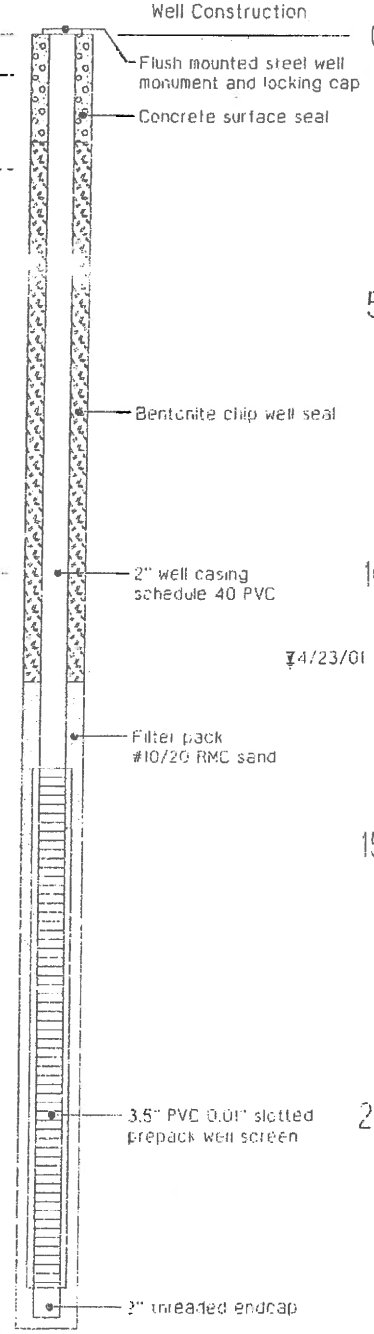
FIGURE A-13c

MONITORING WELL PL2-013AR

PROJECT Boeing - Plant 2
DATE COMPLETED 29 March 2001
DRILLING METHOD 8" OD HSA - Cascade Drilling
SAMPLING METHOD 3" OD Split Spoon, 300lb Hammer
TOP OF CASING
GROUND SURFACE ELEV
LOGGED BY K. Broom - WESTON

Depth (ft)	PID Reading (ppm)	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0						8" Concrete
	2.0	HA			GW	Sandy GRAVEL, (GW), grey, blue crystals present, dry, metal and organic debris, no odor or staining, (fill)
	1.9	11			SW	SAND, (SW), brown, fine to medium grained, medium dense, damp, metal debris, no odor or staining, (fill).
5	6.7	11				SAA, charcoal debris.
	2.0	8				SAA, loose, no debris.
10	2.3	10				SAND, (SW), brown, fine to medium grained, loose, wet, metal debris, no odor or staining, (fill).
	1.1	33				SAA, black, no debris, dense, (alluvium).
15	0.5	27				SAA, medium dense.
20	0.5	13				SAA.
25						BOH @ 24 feet bgs

Well Construction



Notes:
BOH = Bottom of hole.
SAA = Same as above.
HA = Hand grab sample.
No soil samples were collected for laboratory analysis.

PLATE A-2

JOB NUMBER: 03709-034-000-0002-03 DATE: March 2001

RECORD OF BOREHOLE 2-66-PL2-013B

PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

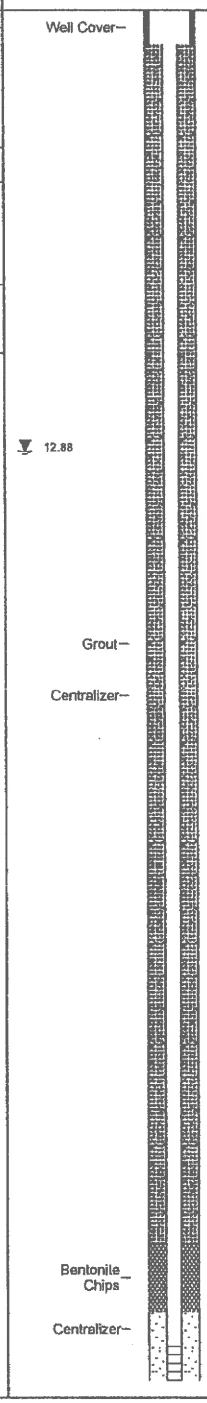
DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 7/31/06
DATE COMPLETED: 7/31/06
WEATHER: Overcast

DATUM: NGVD 29
COORDS: N: 1,275,722.6 E: 195,933.4
GS ELEVATION: 13.0 ft
TOC ELEVATION: 12.5 ft
TEMPERATURE: 58 F

INCLINATION: 90
DEPTH W.L.: 12.9 ft
ELEVATION W.L.: -0.4 ft
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT
0		0.0 - 0.5 Concrete slab			13.5 / 14.0	0.0	1	GRAB	N/A		
	15	0.5 - 1.0 Brown fine SAND with little Silt, Brick and Concrete fragments, and fine to medium Gravel (FILL)	SP		1.0						
		1.0 - 5.0 Brown fine SAND with little Silt, some fine to medium Gravel (SP)			18.0	0.0	2	GRAB	N/A		
5		5.0 - 8.0 AUGER; presumed fine SAND			5.0 / 21.0						
	20	8.0 - 10.0 Brown fine SAND with little Silt, rare fine Gravel (SP)	SP		8.0 / 23.0	0.0	3	SS	2 -2 -3 -3		2.0 / 2.0
10		10.0 - 40.0 AUGER; Brown fine SAND in cuttings			10.0						
	25										
15											
	30										
20											
	35										
25											
	40										
30											
	45										
35											
	50										
40		Log continued on next page			53.0						

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

2-66-PL2-013B
Borehole Diameter: 6.0-in
WELL CASING
Interval: 0-40 ft
Material: PVC
Diameter: 2.0-in
Joint Type: Threaded
WELL SCREEN
Interval: 40-45 ft
Material: PVC
Diameter: 2.0-in
Slot Size: 0.010-in
End Cap:
FILTER PACK
Interval: 39-45 ft
Type: Silica Sand
Quantity: 6.0 ft
FILTER PACK SEAL
Interval: 37-39 ft
Type: Bentonite Chips
Quantity: 2.0 ft
ANNULUS SEAL
Interval: 0-37 ft
Type: Grout
Quantity: 37 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: F. Scott

GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

RECORD OF BOREHOLE 2-66-PL2-013B

PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 7/31/06
DATE COMPLETED: 7/31/06
WEATHER: Overcast

DATUM: NGVD 29
COORDS: N: 1,275,722.6 E: 195,933.4
GS ELEVATION: 13.0 ft
TOC ELEVATION: 12.5 ft
TEMPERATURE: 58 F

INCLINATION: 90
DEPTH W.L.: 12.9 ft
ELEVATION W.L.: -0.4 ft
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES (2-66-PL2-013B)	WELL CONSTRUCTION DETAILS
40		40.0 - 45.0 AUGER; Brown fine SAND with little Silt in cuttings			40.0							Silica Sand– 10-slot/ screen Centralizer–	**2-66-PL2-013B** Borehole Diameter: 6.0-in **WELL CASING** Interval: 0-40 ft Material: PVC Diameter: 2.0-in Joint Type: Threaded **WELL SCREEN** Interval: 40-45 ft Material: PVC Diameter: 2.0-in Slot Size: 0.010-in End Cap: **FILTER PACK** Interval: 39-45 ft Type: Silica Sand Quantity: 6.0 ft **FILTER PACK SEAL** Interval: 37-39 ft Type: Bentonite Chips Quantity: 2.0 ft **ANNULUS SEAL** Interval: 0-37 ft Type: Grout Quantity: 37 ft
45		Boring completed at 45.0 ft			58.0								

Depth scale: 40, 45, 50, 55, 60, 65, 70, 75, 80
Elevation scale: 55, 60, 65, 70, 75, 80, 85, 90

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: F. Scott

GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

AA BOREHOLE RECORD BOEING PL2 2-66.GPJ GOLDER NJ-PA 05-24-06.GDT 6/12/07

RECORD OF BOREHOLE 2-66-PL2-013C

PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

DRILL METHOD: Sonic
DRILL RIG: RTT Sonic
DATE STARTED: 8/3/06
DATE COMPLETED: 8/3/06
WEATHER: Clear, Sunny

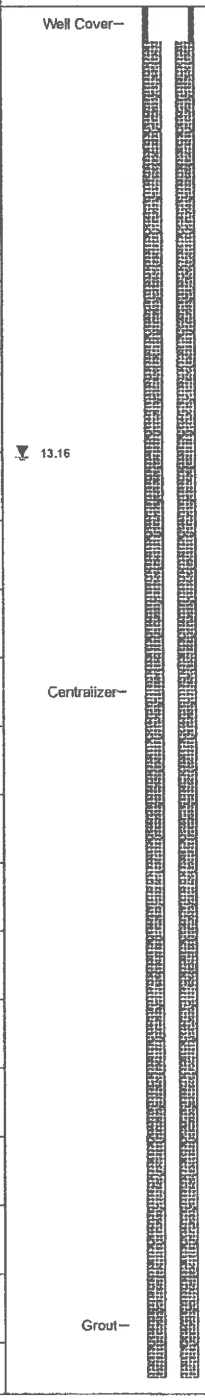
DATUM: NGVD 29
COORDS: N: 1,275,731.9 E: 195,924.2
GS ELEVATION: 13.1 ft
TOC ELEVATION: 12.8 ft
TEMPERATURE: 78 F

INCLINATION: 90
DEPTH W.L.: 13.2 ft
ELEVATION W.L.: -0.4 ft
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT
0		0.0 - 0.5 Concrete slab			13.6 / 0.5	0.0	1		0.5 / 0.5
	15	0.5 - 2.0 Brown fine SAND, Brick, Concrete, and Rock fragments, fine to medium Gravel (FILL)			15.1 / 2.0				
		2.0 - 4.0 NO RECOVERY; presumed fine SAND with Gravel, Brick, and Concrete fragments (FILL)			17.1 / 4.0				
5		4.0 - 8.0 Brown medium SAND with Brick fragments, some fine to medium Gravel, dry (FILL)				37.2	2		2.0 / 2.0
	20				21.1 / 8.0	370	3		2.0 / 2.0
		8.0 - 10.0 Brown Silty CLAY with fine Sand, moist (CL-ML)	CL-ML		23.1 / 10.0	64.8	4		2.0 / 2.0
10	25	10.0 - 13.0 NO RECOVERY; presumed Brown medium SAND			26.1 / 13.0				
		13.0 - 21.0 Brown medium SAND, wet (SP)	SP			129	5		2.0 / 2.0
15						49.7	6		2.0 / 2.0
	30					16.6	7		2.0 / 2.0
20					34.1 / 21.0	0.0	8		2.0 / 2.0
	35	21.0 - 23.0 Brown medium SAND, saturated (SP)	SP		36.1 / 23.0	0.0	9		2.0 / 2.0
		23.0 - 24.0 Brown Silty fine SAND, with rare metal debris (SM)	SM		37.1 / 24.0	0.0	10		2.0 / 2.0
25		24.0 - 27.0 Brown fine SAND, slight petroleum odor, saturated (SP)	SP		40.1 / 27.0	0.0	11		2.0 / 2.0
	40	27.0 - 33.0 NO RECOVERY; presumed Brown medium SAND				0.0	12		2.0 / 2.0
30						0.0	13		2.0 / 2.0
	45				46.1 / 33.0				
		33.0 - 60.0 Brown medium SAND, saturated (SP)	SP			0.0	14		2.0 / 2.0
35						0.0	15		2.0 / 2.0
	50					0.0	16		2.0 / 2.0
40						0.0	17		

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES — 2-66-PL2-013C



WELL CONSTRUCTION DETAILS

2-66-PL2-013C
Borehole Diameter: 4.0-in
WELL CASING
Interval: 0-80 ft
Material: PVC
Diameter: 2.0-in
Joint Type: Threaded
WELL SCREEN
Interval: 80-85 ft
Material: PVC
Diameter: 2.0-in
Slot Size: 0.010-in
End Cap:
FILTER PACK
Interval: 79-85 ft
Type: Silica Sand
Quantity: 6.0 ft
FILTER PACK SEAL
Interval: 76-79
Type: Bentonite Chips
Quantity: 3.0 ft
ANNULUS SEAL
Interval: 0-76 ft
Type: Grout
Quantity: 76.0 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: R. LaBrosse

GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

RECORD OF BOREHOLE 2-66-PL2-013C

PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

DRILL METHOD: Sonic
DRILL RIG: RTT Sonic
DATE STARTED: 8/3/06
DATE COMPLETED: 8/3/06
WEATHER: Clear, Sunny

DATUM: NGVD 29
COORDS: N: 1,275,731.9 E: 195,924.2
GS ELEVATION: 13.1 ft
TOC ELEVATION: 12.8 ft
TEMPERATURE: 78 F

INCLINATION: 90
DEPTH W.L.: 13.2 ft
ELEVATION W.L.: -0.4 ft
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES (2-66-PL2-013C)	WELL CONSTRUCTION DETAILS
40		33.0 - 60.0 Brown medium SAND, saturated (SP)*(Continued)*				0.0	17		2.0/2.0	Centralizer–	**2-66-PL2-013C** Borehole Diameter: 4.0-in **WELL CASING** Interval: 0-80 ft Material: PVC Diameter: 2.0-in Joint Type: Threaded **WELL SCREEN** Interval: 80-85 ft Material: PVC Diameter: 2.0-in Slot Size: 0.010-in End Cap: **FILTER PACK** Interval: 79-85 ft Type: Silica Sand Quantity: 6.0 ft **FILTER PACK SEAL** Interval: 76-79 Type: Bentonite Chips Quantity: 3.0 ft **ANNULUS SEAL** Interval: 0-76 ft Type: Grout Quantity: 76.0 ft
	55					0.0	18		2.0/2.0		
						0.0	19		2.0/2.0		
45											
	60					12.3	20		3.0/3.0		
						5.4	21		2.0/2.0		
50			SP								
	65										
						2.9	22		2.0/2.0		
55						6.3	23		2.0/2.0		
	70					1.8	24		2.0/2.0		
						0.7	25		2.0/2.0		
60					73.1					Centralizer–	
		60.0 - 62.0 Brown Silty fine SAND, saturated (SM)	SM		60.0 / 75.1	0.0	26		2.0/2.0		
	75	62.0 - 66.0 Brown fine SAND, saturated (SP)	SP		62.0	0.0	27		2.0/2.0		
65						0.0	28		2.0/2.0		
					79.1						
	80	66.0 - 68.0 Brown fine SAND with trace Silt (SP)	SP		66.0 / 81.1	0.0	29		2.0/2.0		
		68.0 - 70.0 Brown fine SAND and SILT, saturated (SP-SM)	SP-SM		68.0 / 83.1	0.0	30		2.0/2.0		
70		70.0 - 72.0 Gray-brown Silty CLAY with fine Sand, saturated (CL-ML)	CL-ML		70.0 / 85.1	0.0	31		2.0/2.0		
	85	72.0 - 76.0 Gray-Brown Silty CLAY and fine SAND, saturated (CL)	CL		72.0	0.4	32		2.0/2.0		
75						0.0	33		2.0/2.0		
					89.1						
	90	76.0 - 86.0 Gray-brown Silty fine SAND, saturated (SM)	SM		76.0					Bentonite Chips	
80										Centralizer–	

Log continued on next page

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: R. LaBrosse

GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

RECORD OF BOREHOLE 2-66-PL2-013C

PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

DRILL METHOD: Sonic
DRILL RIG: RTT Sonic
DATE STARTED: 8/3/06
DATE COMPLETED: 8/3/06
WEATHER: Clear, Sunny

DATUM: NGVD 29
COORDS: N: 1,275,731.9 E: 195,924.2
GS ELEVATION: 13.1 ft
TOC ELEVATION: 12.8 ft
TEMPERATURE: 78 F

INCLINATION: 90
DEPTH W.L.: 13.2 ft
ELEVATION W.L.: -0.4 ft
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES (2-66-PL2-013C)	WELL CONSTRUCTION DETAILS
80		76.0 - 86.0 Gray-brown Silty fine SAND, saturated (SM)*(Continued)*	SM							Silica Sand– 10-slot/ Screen Centralizer–	**2-66-PL2-013C** Borehole Diameter: 4.0-in **WELL CASING** Interval: 0-80 ft Material: PVC Diameter: 2.0-in Joint Type: Threaded **WELL SCREEN** Interval: 80-85 ft Material: PVC Diameter: 2.0-in Slot Size: 0.010-in End Cap: **FILTER PACK** Interval: 79-85 ft Type: Silica Sand Quantity: 6.0 ft **FILTER PACK SEAL** Interval: 76-79 Type: Bentonite Chips Quantity: 3.0 ft **ANNULUS SEAL** Interval: 0-76 ft Type: Grout Quantity: 76.0 ft
85					99.1						
		Boring completed at 85.0 ft			86.0						

Depth scale: 80, 85, 90, 95, 100, 105, 110, 115, 120
Elevation scale: 95, 100, 105, 110, 115, 120, 125, 130

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: R. LaBrosse

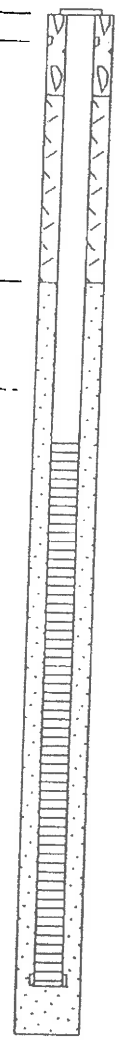
GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

WELL PL2-425A (SB-04401)

PROJECT BOEING ZONE 1 PRE-CONSTRUCTION
DATE COMPLETED 3 December 1993
DRILLING METHOD 4" ID HSA
TOP OF CASING 12.98
GROUND SURFACE ELEV 13.47
LOGGED BY Erik Lottsfeldt

Depth (ft)	PID Reading	Sample No.	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0							Concrete
	BG	SB-04401-0020 VOC, BNA, PCB, PPMETALS, Cn, TPH-418.1 (Comp. 2'- 4')				SP	SAND (SP), Dark yellowish brown (10YR4/4), 100% medium sand, loose, dry (fill)
5	BG	SB-04401-0050 VOC, PPMETALS, Cn TPH-418.1 (Comp. 5'- 9')	19			SM	SILTY SAND (SM), Dark brown (10YR3/3), 85% fine sand, 15% silt, medium dense, dry (fill)
	BG	SB-04401-0070 VOC				SP	SAND (SP), Dark yellowish brown (10YR4/4), 100% medium sand, medium dense, dry (fill)
			25				
10	BG						Damp
			27				
	BG	SB-04401-0125 VOC, PPMETALS, Cn, TPH-418.1					Wet, color grades to Very dark gray (2.5YRN3/) (native soil) very dense
			51				
15	BG						
			50/6				
	BG						
			51				
20							BOH @ 19.0'



12/20/93

12/03/93

PAGE 1 of 1

JOB NUMBER: 03709-036-001-4010

DATE: February 1994

PLATE A-15

RECORD OF BOREHOLE 2-66-PL2-607A

SHEET 1 of 1

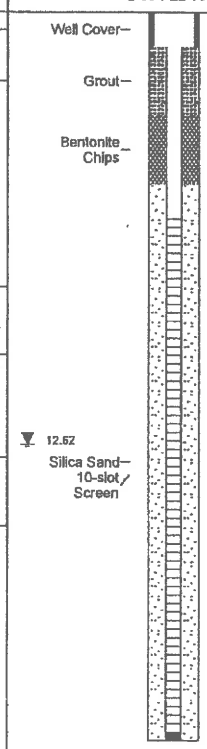
PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 21.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 7/31/06
DATE COMPLETED: 7/31/06
WEATHER: Cloudy

DATUM: NGVD 29
COORDS: N: 1,275,727.5 E: 195,929.0
GS ELEVATION: 13.0 ft
TOC ELEVATION: 12.5 ft
TEMPERATURE: 78 F

INCLINATION: 90
DEPTH W.L.: 12.6 ft
ELEVATION W.L.: -0.2 ft
DATE W.L.:
TIME W.L.:

SOIL PROFILE					SAMPLES						MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	PID (ppm)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	2-66-PL2-607A
0		0.0 - 0.5 Concrete slab			13.5 / 0.5							
	15	0.5 - 5.0 Brown fine SAND, some Silt, with fine to medium Gravel and large Brick, Concrete, and Rock fragments (FILL)			18.0	0.0	1	GRAB	N/A			
5	20	5.0 - 8.0 AUGER; Brown medium SAND with fine to medium Gravel, Concrete, Brick, and Rock fragments in cuttings (FILL)			5.0 / 21.0							
10		8.0 - 10.0 Brown medium SAND with some medium to coarse Gravel and small Brick fragments (FILL)			8.0 / 23.0	0.0	2	SS	2 -2 -3 -2		2.0 / 2.0	
	25	10.0 - 13.0 Brown medium SAND (SP)	SP		10.0 / 26.0							
15		13.0 - 15.0 Brown fine to medium SAND, moist (SP)	SP		13.0 / 28.0	0.0	3	SS	1 -1 -2 -4		2.0 / 2.0	
	30	15.0 - 21.0 AUGER; Brown fine to medium SAND in cuttings, moist to saturated			15.0 / 34.0							
20	35	Boring completed at 21.0 ft										
25	40											
30	45											
35	50											
40												



2-66-PL2-607A
Borehole Diameter: 6.0-in
WELL CASING
Interval: 0-6 ft
Material: PVC
Diameter: 2.0-in
Joint Type: Threaded
WELL SCREEN
Interval: 6-21 ft
Material: PVC
Diameter: 2.0-in
Slot Size: 0.010-in
End Cap:
FILTER PACK
Interval: 5-21 ft
Type: Silica Sand
Quantity: 16.0 ft
FILTER PACK SEAL
Interval: 3-5 ft
Type: Bentonite Chips
Quantity: 2.0 ft
ANNULUS SEAL
Interval: 0-3 ft
Type: Grout
Quantity: 3.0 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: F. Scott

GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

AA BOREHOLE RECORD BOEING PL2 2-66.GPJ GOLDER NJ-PA 05-24-06.GDT 6/12/07

2" well diameter		
depth in feet	gallons	cubic feet
	x 0.163	x 0.134
10	1.6	0.22
11	1.8	0.24
12	2.0	0.26
13	2.1	0.28
14	2.3	0.31
15	2.4	0.33
16	2.6	0.35
17	2.8	0.37
18	2.9	0.39
19	3.1	0.41
20	3.3	0.44
21	3.4	0.46
22	3.6	0.48
23	3.7	0.50
24	3.9	0.52
25	4.1	0.55
26	4.2	0.57
27	4.4	0.59
28	4.6	0.61
29	4.7	0.63
30	4.9	0.66
31	5.1	0.68
32	5.2	0.70
33	5.4	0.72
34	5.5	0.74
35	5.7	0.76
36	5.9	0.79
37	6.0	0.81
38	6.2	0.83
39	6.4	0.85
40	6.5	0.87
41	6.7	0.90
42	6.8	0.92
43	7.0	0.94
44	7.2	0.96
45	7.3	0.98
46	7.5	1.00
47	7.7	1.03
48	7.8	1.05
49	8.0	1.07
50	8.2	1.09

4" well diameter		
depth in feet	gallons	cubic feet
	x 0.653	x 0.134
10	6.5	0.88
11	7.2	0.96
12	7.8	1.05
13	8.5	1.14
14	9.1	1.23
15	9.8	1.31
16	10.4	1.40
17	11.1	1.49
18	11.8	1.58
19	12.4	1.66
20	13.1	1.75
21	13.7	1.84
22	14.4	1.93
23	15.0	2.01
24	15.7	2.10
25	16.3	2.19
26	17.0	2.28
27	17.6	2.36
28	18.3	2.45
29	18.9	2.54
30	19.6	2.63
31	20.2	2.71
32	20.9	2.80
33	21.5	2.89
34	22.2	2.98
35	22.9	3.06
36	23.5	3.15
37	24.2	3.24
38	24.8	3.33
39	25.5	3.41
40	26.1	3.50
41	26.8	3.59
42	27.4	3.68
43	28.1	3.76
44	28.7	3.85
45	29.4	3.94
46	30.0	4.03
47	30.7	4.11
48	31.3	4.20
49	32.0	4.29
50	32.7	4.38

ENVIRONMENTAL PARTNERS INC

Well Decommissioning Interim Measures - January 2012 Book #7

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number 17513.1 task 500.04

Prepared For:

The Boeing Company
P.O. Box 3707
M/C 1W-12
Seattle/Tukwila, WA 98124

Prepared By:

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, WA 98027
(425) 395-0010

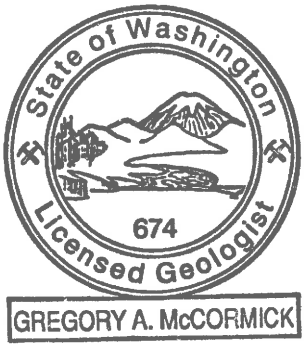


Table 1: Boeing Plant 2 Wells to be Decommissioned				
Well ID	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Well Diameter and Material**	**Decommissioning Method**
PL2-DDC2-66-1	32	25-30	6-inch PVC	Grout
PL2-DDC2-66-2	31.5	25-30	6-inch PVC	Grout
PL2-DDC2-66-1D	28	26-28	2-inch PVC	Chip
PL2-DDC2-66-1S	10	8-10	1-inch PVC	Chip
PL2-DDC2-66-2D	29	26-28	2-inch PVC	Chip
PL2-DDC2-66-2S	10	8-10	1-inch PVC	Chip
PL2-041AA	18	15-18	2-inch steel	Chip
PL2-008B	50.7	40.5-50	2-inch PVC	Grout
PL2-008C	96	80.5-95	2-inch PVC	Grout
PL2-010A	21.2	6-20	2-inch PVC	Chip
PL2-017A	21.5	6-20.5	2-inch PVC	Chip
PL2-021A	19.9	4.5-19	2-inch PVC	Chip
PL2-021B	49	38.5-48	2-inch PVC	Grout
PL2-021C	92.1	81.5-91	2-inch PVC	Grout
PL2-031A	30	25-30	2-inch PVC	Chip
PL2-032A	30	25-30	2-inch PVC	Chip
PL2-035A	30	25-30	2-inch ~~PVC~~ Steel	Chip
PP-1B-I	50.5	48-50	2-inch PVC	Grout
PP-2B-I	50.5	48-50	2-inch PVC	Grout
PP-2B-O	50.5	48-50	2-inch PVC	Grout
PP-3A-I	20.5	18-20	2-inch PVC	Chip
PP-3B-I	50.5	48-50	2-inch PVC	Grout
PP-3C-I	90.5	88-90	2-inch PVC	Grout
PP-4B-I	50.5	48-50	2-inch PVC	Grout
PP-4B-O	50.5	48-50	2-inch PVC	Grout
PP-5B-I	50.5	48-50	2-inch PVC	Grout

1/12/12

PL2-010A is 4" well
PL2-021A is 4" well
PL2-017A is 4" well

AA and AB are stainless steel

Done 1/11/12

• PL2-042-AA ?
• PL2-042-AB ?
• PL2-41-AB ?

Decommission AA and AB

all wells pes. Doug 1/11/12 BMC

Well Location Figure

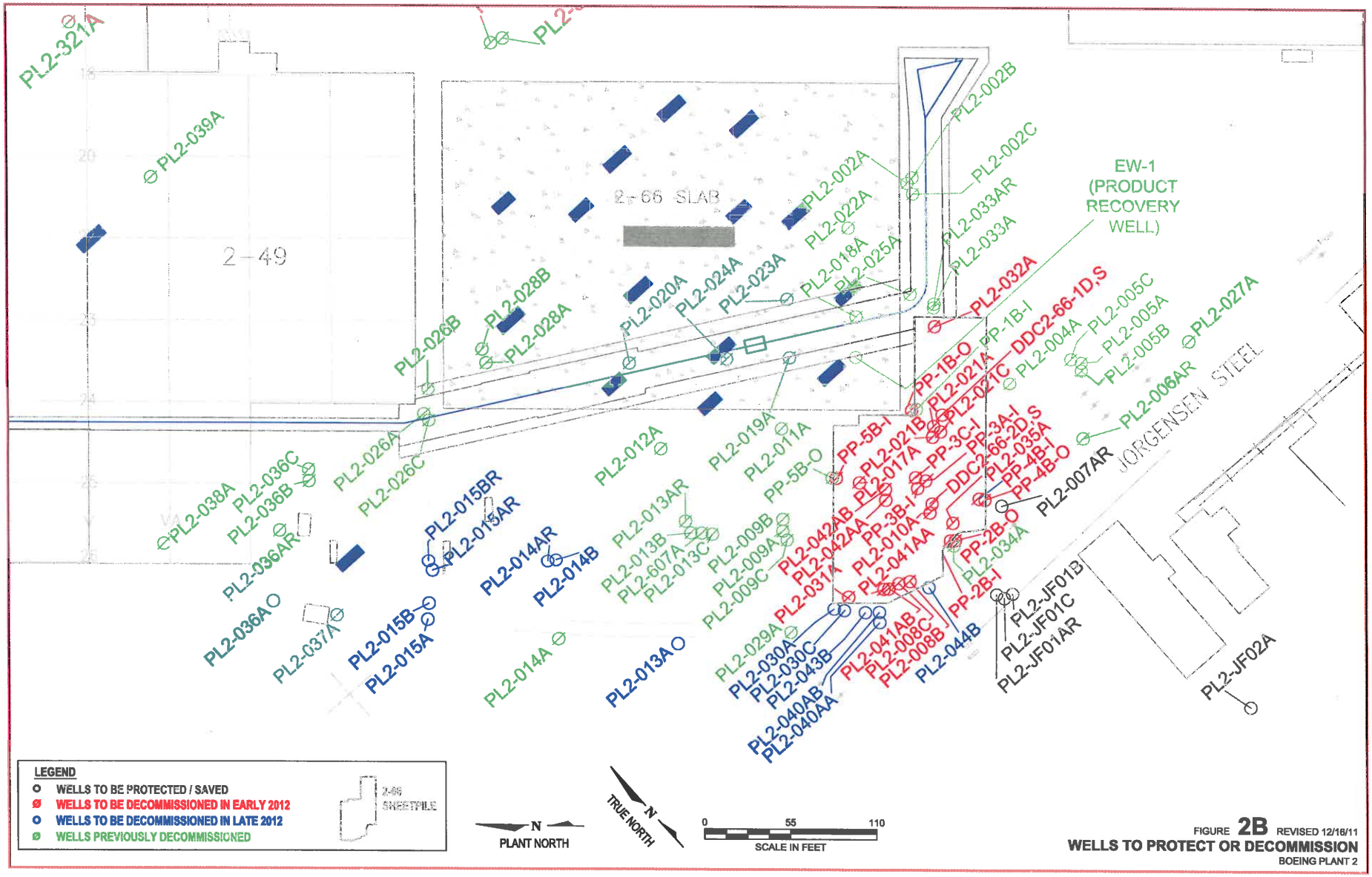


FIGURE **2B** REVISED 12/16/11

WELLS TO PROTECT OR DECOMMISSION

BOEING PLANT 2

Table 1: Proposed Status of Plant 2 Wells South of the New South Park (16th Avenue) Bridge

	Well to be decommissioned in fall 2011
	Well to be decommissioned in 2012 or later
Green Text	Well already decommissioned

Well	Northing	Easting	Total Depth (ft. bgs)	Screened Interval (ft. bgs)	Area	Year to be Decommissioned[1,2]	Notes[2]
Existing Shoreline Monitoring Wells							
PL2-013A	195888.4881	1275670.6940	20.82	6-20	2-66	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-607A	195924.5	1275731.9	21	6-21	2-66	2011	Will be decommissioned for stormwater system excavation.
PL2-015A	196001.6284	1275566.773	20.88	6-20.5	2-66	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-015AR	196022	1275589	19.5	9.4-19	2-66		
PL2-015B	196008.4253	1275573.957	50	40-50	2-66		
PL2-030A	195840.127	1275756.423	30	25-30	2-66		
PL2-030C	195835.404	1275760.301	81.5	75.5-80	2-66		
PL2-036A	196072.6405	1275503.495	20.41	8-18	2-66		
PL2-036AR	196103	1275536	20.5	10.5-20	2-66	2011	Will be decommissioned for fireline and vault removal in 2011
PL2-043B	195825.948	1275769.123	56.5	50.5-55.2	2-66	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-044B	195811.313	1275808.371	57	51.7-56	2-66		
PL2-214A	197378.5128	1274203.75	30.15	15-30	2-10	NA	Protected during demolition and construction.
PL2-214B	197394.4537	1274214.747	60.08	45-60	2-10		
PL2-214C	197377	1274193	82	75.5-80	2-10		
PL2-227A	197122.1031	1274457.353	16.5	6-16.5	2-10		
PL2-232A	197241.7314	1274341.943	21.03	5-20	2-10		
PL2-233A	196929.8837	1274627.577	26.5	10-25	2-31	2010	Decommissioned May 2010 for bridge construction. May be replaced with a new 3-level well cluster in an EPA-approved location following construction.
PL2-258A	197722.453	1273786.284	23.02	8-23	2-10	NA	Protected during demolition and construction.
PL2-258B	197715.527	1273794.851	51.5	40-50	2-10		
PL2-258C	197708.6909	1273802.422	106.5	92-102	2-10		
PL2-420A	196637.0977	1274993.975	29	14-29	2-40s	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-425A	196339.1102	1275445.826	18	8-18	2-40s	2011	Will be decommissioned for stormwater system
PL2-443A	196826.6461	1274807.579	23	8-23	2-40s	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-JF01AR	195768.3965	1275853.797	28	23.2-27	JF	NA	On Jorgensen Forge property, not in planned demolition or construction area
PL2-JF01B	195774.446	1275844.117	51.5	40-50	JF		
PL2-JF01C	195775.795	1275838.557	79	74-78.5	JF		
PL2-JF02A	198707.0644	1274675.733	18	8-18	JF		
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
Potential Future Shoreline Monitoring Wells (excluding 2-10, North, and South Yard Areas)							
PL2-009A	195896.6187	1275765.326	21.54	6-21	2-66	2011	Will be decommissioned for stormwater system excavation.
PL2-009B	195901.9486	1275770.198	50.59	41-50	2-66		
PL2-009C	195890.9527	1275763.525	95.11	85-95	2-66		
PL2-013B	195933.4	1275722.6	45	39-44	2-66		
PL2-013C	195924.2	12275731.9	85	80-85	2-66		
PL2-014AR	195979.4	1275645.1	21	6-21	2-66		Will be decommissioned for sediment / habitat bank construction work

PL2-014B	195976.5	1275649/1	45.5	40.5-45.5	2-66	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-015BR	196028	1275591.2	45	40-45	2-66		
PL2-036B	196113.2	1275569.5	45	40-45	2-66	2011	Will be decommissioned for stormwater system excavation.
PL2-036C	198618.3	1275475	85.31	80-85	2-66		
PL2-420B	196340.5	1275442.4	45.5	35-45	2-40s	2012	Will be decommissioned for sediment / habitat bank construction work in 2012.
PL2-420C	196645.4	1275001.3	80.5	75-80	2-40s		
PL2-443B	196832.6	1274801	45.5	35-45	2-40s		
PL2-443C	196836.8	1274797.4	75.5	70-75	2-40s		
PL2-444A	196767	1274878	26.5	10-25	2-40s		
Interim Measures Wells							
OA-11 FCMS							
PL2-007AR	195818.774	1275875.321	17.5	7-17	2-66	NA	Will be protected. Potential OA-11 monitoring well.
OA-12 IM							
OA-12-01A	196479.000	1276061.800	25.5	15-25	2-60s	Pending	Will be evaluated and addressed in subsequent submittal prior to construction affecting that area in 2012.
OA-12-01B	196474.200	1276067.100	45.5	35-45	2-60s		
OA-12-02A	196447.000	1276099.000	25.5	15-25	2-60s		
OA-12-02B	196441.500	1276104.000	45.5	35-45	2-60s		
OA-12-03A	196414.500	1276134.700	25.5	15-25	2-60s		
OA-12-03B	196408.500	1276141.700	45.5	35-45	2-60s		
PL2-315A	196409.346	1276063.685	19	8.5-18.5	2-60s		
PL2-315B	196396.8971	1276066.426	51.5	40-50	2-60s		
PL2-330A	196357.767	1276030.701	18	8-18	2-60s		
PL2-330B	196362.736	1276024.686	50	40-50	2-60s		
OA-12-04A	196325.700	1275991.500	25.5	15-25	2-60s		
OA-12-04B	196319.900	1275998.000	45.5	35-45	2-60s		
OA-12-05B	196246.600	1275929.700	45.5	35-45	2-60s		
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
2-66 Sheetpile ERD IM							
PL2-008A PL2-041AA)	NA	NA	18	15-18	2-66	2012	Will be decommissioned as needed based on excavation work within the 2-66 sheetpile
PL2-008B	195822.133	1275802.376	50.7	40.5-50	2-66		
PL2-008C	195825.943	1275796.396	96	80.5-95	2-66		
PL2-010A	195845.345	1275839.895	21.2	6-20	2-66		
PL2-017A	195887.459	1275820.158	21.5	6-20.5	2-66		
PL2-021A	195882.699	1275877.112	19.9	4.5-19	2-66		
PL2-021B	195878.277	1275872.293	49	38.5-48	2-66		
PL2-021C	195877.234	1275878.079	92.1	81.5-91	2-66		
PL2-031A	195840.042	1275768.031	30	25-30	2-66		
PL2-032A	195927.783	1275918.744	30	25-30	2-66		
PL2-035A	195831.094	1275846.311	30	25-30	2-66		
PP-1B-I	195897.325	1275875.908	50.5	48-50	2-66		
PP-2B-I	195824.129	1275837.947	50.5	48-50	2-66		
PP-2B-O	195822.301	1275840.300	50.5	48-50	2-66		
PP-3A-I	195861.505	1275851.046	20.5	18-20	2-66		
PP-3B-I	195861.413	1275844.443	50.5	48-50	2-66		
PP-3C-I	195866.991	1275847.643	90.5	88-90	2-66		

PP-4B-I	195830.968	1275868.308	50.5	48-50	2-66		
PP-4B-O	195828.348	1275870.456	50.5	48-50	2-66		
PP-5B-I	195899.058	1275811.196	50.5	48-50	2-66		
OA-9 IM							
PL2-310A	196467.5884	1275754.609	19	9-19	2-60s	2010	Decommissioned June 2010 prior to Building 2-44, Building 2-49 demolition. The need for further remediation will be evaluated as part of CMS.
PL2-311A	196497.6732	1275782.804	18	8-18	2-60s		
PL2-604A	196456.05	1275743.69	21.5	6-21	2-60s		
PL2-605AR	196517.4	1275780.24	21.5	6-21	2-60s		
PL2-606A	196508.55	1275796.81	21.5	6-21	2-60s		
BV-01	196486.9	1275765.2	10.5	3-10	2-60s		
BV-02	196511.1	1275828.3	10.5	3-10	2-60s		
BV-03	196486.7	1275845.1	10.5	3-10	2-60s		
BV-04	196462.6	1275823.2	10.5	3-10	2-60s		
BV-05	196436.9	1275800.0	10.5	3-10	2-60s		
BV-06	196415.2	1275780.2	10.5	3-10	2-60s		
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
EMF Plume IM (2-40s Area Parking Lot)							
EMF-IW-8	197411.2	1275637.1	49	39-49	2-40s	NA	Protected during demolition and construction.
EMF-IW-9	197388.8	1275661.9	49	39-49	2-40s		
EMF-IW-10	197367.0	1275685.1	50	40-50	2-40s		
EMF-IW-11	197345.9	1275708.4	50	40-50	2-40s		
EMF-IW-43	197304.8	1275744.2	50	40-50	2-40s		
EMF-IW-44	197276.4	1275773.7	50	40-50	2-40s		
EMF-WF-30	197340.7	1275660.8	50	40-50	2-40s		
EMF-WF-36	197446.4	1275756.3	50	40-50	2-40s		
PL2-440A	197453.6322	1275746.487	18.5	8-18	2-40s		
PL2-440B	197450	1275746	45.5	40-45	2-40s		
PL2-440C	197451.1	1275749.2	85	79.5-84.5	2-40s	NA	Potential future upgradient monitoring location, not in planned demo area
PL2-441A	197690.4469	1275487.108	19	8-18	2-40s	NA	Protected during demolition and construction.
PL2-441BR	197674.8	1275481.3	45.5	40.5- 45.5	2-40s		
PL2-441C	197678.6	1275478.1	82	76.5-81.5	2-40s	NA	Potential future upgradient monitoring location, not in planned demo area.
PL2-608A	197129.3	1276102.8	21	6-21	2-40s	NA	Potential future upgradient monitoring location, not in planned demo area.
PL2-608B	197125.1	1276107.4	45.5	40.5-45.5	2-40s		
PL2-608C	197122.5	1276101.6	84	79-84	2-40s		
EMF Plume IM (2-40 Building)							
EMF-IW-1	197130.9	1275421.0	45	35-45	2-40s	2011	Decommissioned August 2011 for Tunnel A excavation
EMF-IW-2	197117.3	1275435.7	45	35-45	2-40s		
EMF-IW-3	197103.5	1275450.3	45	35-45	2-40s		
EMF-IW-7	197084.2	1275470.3	40	30-40	2-40s		
EMF-IW-39	197063.0	1275493.4	50	40-50	2-40s		
EMF-IW-40	197152.0	1275398.5	47	37-47	2-40s		
EMF-IW-41	197171.0	1275378.5	50	40-50	2-40s		
EMF-IW-42	197192.0	1275356.5	50	40-50	2-40s		
EMF-WF-31	197044.3	1275218.7	39	29-39	2-40s		

EMF-WF-33	197079.2	1275374.6	45	35-45	2-40s	NA	Requires concurrence from EPA RPM for EMF plume. Protected during demolition and construction
EMF-WF-34	197055.1	1275317.2	45	35-45	2-40s		
EMF-WF-35	197023.4	1275260.0	45	35-45	2-40s		
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
EMF Plume IM (2-41 Building)							
EMF-IW-4	196897.1	1275089.6	45	35-45	2-40s	2011	Decommissioned June 2011 following damage during tunnel removal
EMF-IW-5	196874.0	1275114.0	40	30-40	2-40s	NA	Protected during demolition and construction.
EMF-IW-6	196851.7	1275138.5	40	30-40	2-40s		
EMF-IW-38	196831.8	1275161.0	50	40-50	2-40s		
EMF-IW-37	196916.7	1275066.2	50	40-50	2-40s		
EMF-WF-32	196707.4	1274946.9	35	25-35	2-40s	2012	Will be decommissioned for sediment / habitat bank construction work in 2012
PL2-442A	196748.5543	1275013.196	18	8-18	2-40s	2010	Decommissioned October 2010 for planned stormwater swale placement
PL2-442B	196749.5	1275014	45.5	35-45	2-40s		
PL2-442C	196751.7	1275009.7	80.5	75-80	2-40s		
EMF-WF-39			45	35-45	2-40s	2012	Will be decommissioned for sediment / habitat bank construction work in 2012
EMF-WF-40			32	22-32	2-40s		
EMF-WF-41			70	60-70	2-40s	NA	Protect during demolition.
2-31 Area Wells Not Currently Used or Planned for Use							
PL2-501A	197303.3024	1274930.303	20.5	10-20	2-31	2011	Decommissioned April 2011 for Building 2-31 demolition.
PL2-501B	197300.3464	1274937.211	50.5	40-50	2-31		
PL2-501C	197297.6254	1274944.929	78.5	68-78	2-31		
PL2-502A	197110.8655	1274798.368	18	8-18	2-31		
PL2-503A	197531.7809	1274941.327	17.5	7-17.5	2-31	NA	Not in planned demolition area.
PL2-504A	197570.0865	1274990.552	14.7	4.2-14.7	2-31		
PL2-505A	197585.3839	1274908.443	24.5	9-24.5	2-31		
PL2-507A	198199.8943	1274944.021	18	8-18	2-31		
PL2-507B	198169.6	1274967.6	45.5	35-45	2-31		
PL2-507C	198185.4	1274948.6	75.5	65-75	2-31		
PL2-508A	197342.6062	1274962.046	19	9-19	2-31	2011	Decommissioned April 2011 for AOC 2-31.21 excavation.
PL2-509A	197344.644	1274954.656	18.9	8-18	2-31		
PL2-509B	197342.06	1274952.296	50.5	40-50	2-31		
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
2-40s Area Wells Not Currently Used or Planned for Use							
PL2-321A	196419.014	1275649.363	18	8-18	2-40s	2010	Decommissioned May 2010 prior to demolition.
PL2-401A	197159.0309	1275105.281	23	12-22	2-40s	2010	Decommissioned October 2010 for planned stormwater swale placemei
PL2-410A	196661.3479	1275566.594	21.5	11-21	2-40s		
PL2-425B	196340.5	1275442.4	45.5	40-45	2-40s	2010	Decommissioned May 2010 prior to duct bank excavation
PL2-425C	196340.3	1275437.1	82.5	77-82	2-40s		
PL2-430A	196940.2226	1274862.459	25	15-25	2-40s	2010	Decommissioned June 2010 prior to duct bank excavation
PL2-435A	197142.8391	1275496.11	19	8-18	2-40s	2011	Decommissioned April 2011 prior to demolition.
PL2-435B	197136	1275491.6	45	39.5-44.5	2-40s		
PL2-435C	197135.1	1275498.2	84	78.5-83.5	2-40s		
PL2-445A	197350	1275654	20	10-20	2-40s	NA	Not in planned demolition area.
PL2-446A	196943.045	1274838.135	18.5	8-18	2-40s	2010	Decommissioned June 2010 prior to duct bank excavation

PL2-447A	196992.86	1274859.891	18.5	8-18	2-40s	2010	Decommissioned June 2010 prior to duct bank excavation
2-60s Area Wells Not Currently Used or Planned for Use							
PL2-312A	196856.6879	1276081.086	18	8-18	2-60s	2010	Decommissioned June 2010 prior to demolition of 2-44 and 2-49 Buildings.
PL2-314A	196685.1499	1276175.829	18.5	8.5-18.5	2-60s	2011	Decommissioned April 2011 prior to demolition.
PL2-316A	196655.2527	1276215.709	18	8-18	2-60s		
PL2-316B	196650.2538	1276213.034	50	40-50	2-60s		
PL2-316C	196660.2758	1276204.581	85	75-85	2-60s		
PL2-317AR	196178.782	1276200.795	18	8-18	2-60s		
PL2-319A	196978.7256	1276290.399	18	8-18	2-60s	NA	Potential future upgradient monitoring location, not in planned demo area
PL2-325A	196235.2995	1275841.271	18	8-18	2-60s	2011	Decommissioned April 2011 prior to demolition.
PL2-325B	196237.4115	1275832.947	50	45-50	2-60s		
PL2-326A	196747.296	1276306.189	18.5	8-18	2-60s		
PL2-326B	196742.764	1276311.532	50.5	40-50	2-60s		
PL2-327A	196581.34	1276101.59	19	8.5-18.5	2-60s		
PL2-327B	196587.606	1276095.551	50.5	40-50	2-60s		
PL2-328A	196467.832	1276236.195	18.5	8-18	2-60s		
PL2-328B	196470.705	1276232.987	50.5	40-50	2-60s		
PL2-329A	196418.579	1275991.348	18.5	8-18	2-60s		
PL2-329B	196424.067	1275984.836	50.5	40-50	2-60s		
PL2-331A	196333.318	1276093.248	18.5	8-18	2-60s		
PL2-331B	196337.412	1276088.981	50.5	40-50	2-60s		
PL2-332A	196370.431	1275726.922	18.5	8-18	2-60s	2010	Decommissioned June 2010 prior to demolition of 2-44 and 2-49 Buildings.
Well	**Northing**	**Easting**	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Area**	**Year to be Decommissioned[1,2]**	**Notes[2]**
2-66 Area Wells Not Currently Used or Planned for Use							
EW-1			20	9-19	2-66	2010	Decommissioned June 2010 prior to demolition of 2-44 and 2-49 Buildings.
PL2-002A	196003.2285	1275964.947	20	4.5-19	2-66	2010	Decommissioned May 2010 prior to duct bank excavation.
PL2-002B	196003.7534	1275969.569	49	39-48	2-66		
PL2-002C	195996.4235	1275963.1	94.5	85-94.5	2-66		
PL2-004A	195870.7879	1275929.813	16.9	6.5-16.5	2-66	2011	Decommissioned April 2011 prior to demolition.
PL2-005A	195850.9588	1275970.933	17.1	7-16.7	2-66		
PL2-005B	195847.2878	1275967.803	51.4	41-50.5	2-66		
PL2-005C	195856.7848	1275967.736	93.1	83-92	2-66		
PL2-006AR	195814.993	1275941.14	16.5	6-16	2-66		
PL2-011A	195943.1434	1275806.756	21.1	5.5-20	2-66	2010	Decommissioned June 2010 prior to duct bank excavation.
PL2-012A	195983.6846	1275743.224	21.5	6-20.5	2-66		
PL2-013AR	195941	1275725	24	14.7-23.3	2-66	2011	Decommissioned April 2011 prior to demolition.
PL2-014A	195939.4403	1275617.631	21.1	5.5-20	2-66		
PL2-018A	195963.8149	1275887.254	20.5	5-20	2-66	2010	Decommissioned May 2010 prior to duct bank excavation.
PL2-019A	195972.2121	1275839.907	21.37	6-21	2-66		
PL2-020A	196035.3143	1275764.668	20.5	6-20.5	2-66		
PL2-022A	196006.8587	1275919.88	20	6-19.5	2-66	2010	Decommissioned June 2010 prior to duct bank excavation.
PL2-023A	195999.621	1275862.699	20.5	5.5-20	2-66	2010	Decommissioned May 2010 prior to duct bank excavation.
PL2-024A	195997.4332	1275810.671	19.7	4-19	2-66		
PL2-025A	195952.1428	1275920.886	19.7	4.5-19	2-66		

PL2-026A	196096.4948	1275649.56	20.5	6-19.5	2-66	2010	Decommissioned May 2010 prior to duct bank excavation.
PL2-026B	196106.0307	1275661.82	50	40-50	2-66		
PL2-026C	196091.5168	1275649.094	85	75-85	2-66		
PL2-027A	195816.1686	1276029.596	18	8-18	2-66	2011	Decommissioned April 2011 prior to demolition.
PL2-028A	196094.4235	1275699.1	17.5	7.5-17.5	2-66	2010	Decommissioned June 2010 prior to duct bank excavation.
PL2-028B	196102.1615	1275702.996	49.5	39.5-49.5	2-66		
PL2-029A	195847.056	1275726.971	18	8-18	2-66	2011	Decommissioned April 2011 prior to demolition.
PL2-033A	195936.4248	1275926.056	30	25-30	2-66	2010	Decommissioned May 2010 prior to duct bank excavation.
PL2-033AR	195938	1275928	31	25.7-30.2	2-66		
PL2-034A	195820.339	1275837.069	30	25-30	2-66	2011	Decommissioned April 2011 prior to demolition.
PL2-037A	196041.0265	1275526.895	18	8-18	2-66		
PL2-038A	196144.5745	1275477.836	23.5	13.5-23.5	2-66	2010	Decommissioned June 2010 prior to demolition of 2-44 and 2-49 Buildings.
PL2-039A	196315.5624	1275622.664	20	10-20	2-66		
PP-1B-O	195898.850	1275873.976	50.5	48-50	2-66	2011	Decommissioned April 2011 prior to demolition.
PP-5B-O	195900.664	1275809.547	50.5	48-50	2-66		
DDC-2-66-1D	195878.100	1275885.630	32	25-30	2-66	2012	Will be decommissioned as needed based on excavation work within the 2-66 sheetpile
DDC-2-66-1S	195878.100	1275885.630	10	8-10	2-66		
DDC-2-66-2D	195845.830	1275827.110	32	24-29	2-66		
DDC-2-66-2S	195845.830	1275827.110	10	8-10	2-66		

South Yard Area Wells Not Currently Used or Planned for Use
Not included because demolition is not currently planned for this area

2-10 Area Wells Not Currently Used or Planned for Use
Not included because demolition is not currently planned for this area

North Area Wells Not Currently Used or Planned for Use
Not included because demolition is not currently planned for this area

Notes:
[1]Wells retained within the construction area (see Figure) have the potential to be damaged accidentally during demolition or construction activities. Wells
[2] Dates provided are approximate and subject to change to accommodate project schedule requirements

Well Decommissioning Logs

Well Decommissioning Log - Boeing Plant 2

Well Number: PL2-21A

	Northing	Easting
Well Location	195882.699	1275877.112

Start (date and time): 0920 1/11/12

End (date and time): 0940 1/11/12

Installation Method: HSA

Total Well Depth: 19.9 feet bgs

Well Diameter: 4-inch inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 4.5-19 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: Pelletized Bentonite - Puregold Medium Cetco Chips

Grout or Chip Volume: 3/4 bag Gallons or Cubic Feet

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: _____

Signature (Driller): [signature]

Signature (Engineer or Geologist): [signature]

Additional Information: _____

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-21B	
	Northing	Easting
Well Location	195878.277	1275872.293
Start (date and time)	0910 1/11/12	
End (date and time)	1000 1/11/12	
Installation Method	HSA	
Total Well Depth	49'	feet bgs
Well Diameter	2 inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 38.5-48 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: powdered bentonite grout

Grout or Chip Volume: 10 gallons Gallons or Cubic Feet

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: _____

Signature (Driller): [signature]

Signature (Engineer or Geologist): [signature]

Additional Information: _____

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-21C	
	Northing	Easting
Well Location	195877.234	1275878.079
Start (date and time)	0900 1/11/12	
End (date and time)	0945 1/11/12	
Installation Method	HSA	
Total Well Depth	92.1'	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	81.5-91	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	~~WAC 173-160-460(2)~~ *grout or chip in place*	
Type of Grout or Chips	Cetco High Solids Powdered Bentonite Grout	
Grout or Chip Volume	25 gallons	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PP-1B-I	
	Northing	Easting
Well Location	195897.325	1275875.908
Start (date and time)	0950 1/11/12	
End (date and time)	1030 1/11/12	
Installation Method	HSA	
Total Well Depth	50.5 feet	feet bgs
Well Diameter	~~8 or 6~~ 2 inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	48-50	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Powdered Bentonite Grout	
Grout or Chip Volume	20 gallons	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PP-5B-I	
	Northing	Easting
Well Location	195899.058	1275811.196
Start (date and time)	1030 1/11/12	
End (date and time)	1055 1/11/12	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) 48-50 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips	Powdered Bentonite Grout	
Grout or Chip Volume	10 ~~[illegible]~~ gallons	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PP-3A-I	
	Northing	Easting
Well Location	195861.505	1275851.046
Start (date and time)	1100 1/11/12	
End (date and time)	1145 1/11/12	
Installation Method	HSA	
Total Well Depth	20.5	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs)	18-20	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips	Med. bentonite Chips (Cetco)	
Grout or Chip Volume	3/4 bag	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PP-3B-I	
	Northing	Easting
Well Location	195861.413	1275844.443
Start (date and time)	1100 1/11/12	
End (date and time)	1145 1/11/12	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	48-50	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Powdered bentonite grout	
Grout or Chip Volume	15 gallons	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	JM Comb	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PP-3C-I	
	Northing	Easting
Well Location	195866.991	1275847.643
Start (date and time)	1100 1/11/12	
End (date and time)		
Installation Method	HSA	
Total Well Depth	90.5	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	88-90	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Powdered Bentonite Grout	
Grout or Chip Volume	20 gallons	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-008B	
	Northing	Easting
Well Location	195822.133	1275802.376
Start (date and time)	1145 1/11/12	
End (date and time)	1250 1/11/12	
Installation Method	HSA	
Total Well Depth	50.7	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) ~~50.7~~ 40.5-50 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips	Powdered bentonite grout
Grout or Chip Volume	10 gallons Gallons or Cubic Feet
Surface Completion	Concrete
Drilling Contractor	Cascade Drilling
License Number	
Signature (Driller)	[illegible]
Signature (Engineer or Geologist)	[illegible]

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number: PL2-008C

	Northing	Easting
Well Location	195825.943	1275796.396

Start (date and time): 1200 1/11/12

End (date and time): 1230 1/11/12

Installation Method: HSA

Total Well Depth: 96 feet bgs

Well Diameter: 2-inch inches

Broke grout fitting will finish tomorrow

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 80.5-95 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: Powdered bentonite grout

Grout or Chip Volume: 130 gallons Gallons or Cubic Feet

Surface Completion:

Drilling Contractor: _____

License Number: _____

Signature (Driller): _____

Signature (Engineer or Geologist): _____

Additional Information: _____

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-042 AA	
Well Location	Northing: N/A	Easting: N/A
Start (date and time)	1330 1/11/12	
End (date and time)	1405 1/11/12	
Installation Method	HSA	
Total Well Depth	~~90~~ 16.5	feet bgs
Well Diameter	2 inch	inches
Type of Casing (circle)	PVC	Stainless Steel (circled) Other_____
Type of Well Screen	PVC	Stainless Steel (circled) Other_____
Depth of Screened Interval (ft. bgs)	unknown	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place* (circled)	
Type of Grout or Chips	Med. bentonite chips	
Grout or Chip Volume	50 lbs	Gallons or Cubic Feet Approx 3/4 Bag
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-042AB	
	Northing	Easting
Well Location	N/A	N/A
Start (date and time)	0925 1/12/12	Next to PL2-042AA. NW of DDC2 Vault
End (date and time)		
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2 inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	unknown	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Powdered bentonite grout	
Grout or Chip Volume	20 gallons	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	D M Comil	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-041AA	
Well Location	Northing: N/A	Easting: N/A
Start (date and time)	1315 1/11/12	
End (date and time)	1400 1/11/12	
Installation Method	HSA	
Total Well Depth	16 feet	feet bgs
Well Diameter	2 inch	inches
Type of Casing (circle)	PVC	Stainless Steel (circled) Other_____
Type of Well Screen	PVC	Stainless Steel (circled) Other_____
Depth of Screened Interval (ft. bgs)	unknown	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place* (circled)	
Type of Grout or Chips	Med. Bentonite Chips	
Grout or Chip Volume	3/4 bag	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-031A	
	Northing	Easting
Well Location	195840.042	1275768.031
Start (date and time)	1315 1/11/12	
End (date and time)	1540 1/11/12	
Installation Method	HSA	
Total Well Depth	30 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	25-30	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Med. Bentonite chips	
Grout or Chip Volume	3/4 bag	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-035A	
	Northing	Easting
Well Location	195831.094	1275846.311
Start (date and time)	1330 1/11/12	
End (date and time)	1400 1/11/12	
Installation Method	HSA	
Total Well Depth	30	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	~~Stainless Steel~~ Other_____
Type of Well Screen	PVC	~~Stainless Steel~~ Other_____
Depth of Screened Interval (ft. bgs)	25-30	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Med. Bentonite Chips	
Grout or Chip Volume	3/4 bag	Gallons or Cubic Feet
Surface Completion	~~Med. Bentonite Chips~~ Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	~~PL2-042AB~~	
	Northing	Easting
Well Location	N/A	N/A
Start (date and time)	~~1400 1/11/12~~	
End (date and time)	~~1430 1/11/12~~	
Installation Method	~~HSA~~	
Total Well Depth		feet bgs
Well Diameter	2 inch	inches

Pugh 1/12/12

Type of Casing (circle)	PVC	~~Stainless Steel~~	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)		feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips		
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion		
Drilling Contractor	Cascade	
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2- 041AA	
Well Location	Northing: N/A	Easting: N/A
Start (date and time)	0825 1/12/12	
End (date and time)	0915 1/12/12	
Installation Method	HSA	
Total Well Depth	50.1 feet bgs	
Well Diameter	2-inch inches	
Type of Casing (circle)	PVC ~~Stainless Steel~~ Other_____	
Type of Well Screen	PVC ~~Stainless Steel~~ Other_____	
Depth of Screened Interval (ft. bgs)	unknown feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Powdered bentonite grout	
Grout or Chip Volume	3/4 bag Gallons or Cubic Feet	
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Next to PL2-041AA

Additional Information:

PVC well

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Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-008C	
	Northing	Easting
Well Location	195825.943	127596.396
Start (date and time)	0830 1/12/11	
End (date and time)	~~96~~ feet 0915 1/12/12	
Installation Method	HSA	
Total Well Depth	96 feet	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	80.5 - 95	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Powdered bentonite grout	
Grout or Chip Volume	30 gallons	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	~~PA~~ - PP-4B-0	
	Northing	Easting
Well Location	195828.348	1275870.456
Start (date and time)	1030 1/12/12	ARN 184
End (date and time)	1050 1/12/12	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) 48-50 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: Powdered bentonite grout

Grout or Chip Volume: 15 gallons Gallons or Cubic Feet

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: _____

Signature (Driller): [signature]

Signature (Engineer or Geologist): [signature]

Additional Information: _____

Well Decommissioning Log - Boeing Plant 2

Well Number	PP-4B-I	
	Northing	Easting
Well Location	195830.968	1275868.308
Start (date and time)	1030 1/12/11	AH N187
End (date and time)	1050 1/12/11	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) ~~50.5~~ 48-50 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips	Powdered bentonite grout
Grout or Chip Volume	15 gallons Gallons or Cubic Feet
Surface Completion	Concrete
Drilling Contractor	Cascade Drilling
License Number	
Signature (Driller)	[illegible]
Signature (Engineer or Geologist)	[illegible]

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number: PP-2B-0

	Northing	Easting
Well Location	195822.301	1275840.300

Start (date and time): ~~10~~1100 1/12/12 ARN183

End (date and time): 1130 1/12/12

Installation Method: HSA

Total Well Depth: 50.5 feet bgs

Well Diameter: 2-inch inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 48-50 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: Powdered bentonite grout

Grout or Chip Volume: 15 gallons Gallons or Cubic Feet

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: _____

Signature (Driller): [signature]

Signature (Engineer or Geologist): [signature]

Additional Information: _____

Well Decommissioning Log - Boeing Plant 2

Well Number	PP-2B-1	
	Northing	Easting
Well Location	195824.129	1275837.947
Start (date and time)	1100 1/12/12	AHN 185
End (date and time)	1130 1/12/12	
Installation Method	HSA	
Total Well Depth	50.5	feet bgs
Well Diameter	2-inch	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) 48-50 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: Powdered bentonite grout

Grout or Chip Volume: approx 15 gals Gallons or Cubic Feet

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number:

Signature (Driller):

Signature (Engineer or Geologist):

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number: PL2-032A

	Northing	Easting
Well Location	195927.783	1275918.744

Start (date and time): 1430 1/11/12

No Tag

End (date and time): 1500 1/11/12

Installation Method: HSA

Total Well Depth: 30 feet feet bgs

Well Diameter: 2-inch inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 25-30 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: Med. bentonite chips

Grout or Chip Volume: 3/4 bag Gallons or Cubic Feet

Surface Completion: Concrete

Drilling Contractor: Cascade Drilling

License Number: _____

Signature (Driller): [signature]

Signature (Engineer or Geologist): [signature]

Additional Information: _____

Well Decommissioning Log - Boeing Plant 2

Well Number PL2-DDC2-66-2

	Northing	Easting
Well Location	195845.830	1275827.110

Start (date and time) 1145 1/12/12

End (date and time) 1245 1/12/12

Installation Method HSA

Total Well Depth 32 feet bgs

Well Diameter 6-inch inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) 25-30 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips powdered bentonite

Grout or Chip Volume 10 gallons Gallons or Cubic Feet

Surface Completion Concrete plug within vault

Drilling Contractor Cascade Drilling

License Number

Signature (Driller)

Signature (Engineer or Geologist)

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-DDC2-66-~~[illegible]~~ 3 D	
	Northing	Easting
Well Location	195845.830	1275827.110
Start (date and time)	1145 1/12/12	
End (date and time)	1215 1/12/12	
Installation Method	HSA	
Total Well Depth	~~[illegible]~~ 28 feet bgs	
Well Diameter	2-inch inches	
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	26-28 feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Med. bentonite chips	
Grout or Chip Volume	3/4 bag Gallons or Cubic Feet	
Surface Completion	Concrete within vault	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-DDC2-66-25	
	Northing	Easting
Well Location	195845.830	1275827.110
Start (date and time)	1145 1/12/11	
End (date and time)	1215 1/12/11	
Installation Method	HSA	
Total Well Depth	10	feet bgs
Well Diameter	1-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8-10	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Med. bentonite chips	
Grout or Chip Volume	1/4 bag	Gallons or Cubic Feet
Surface Completion	Concrete within vault	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number PL2 DDC2-66-1

	Northing	Easting
Well Location	195878.100	1275885.630

Start (date and time) 1230 1/12/11

End (date and time) 1330 1/12/11

Installation Method HSA

Total Well Depth 32 feet bgs

Well Diameter 6-inch inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) 25-30 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips Powdered bentonite grout

Grout or Chip Volume _____ Gallons or Cubic Feet

Surface Completion Concrete cap within vault

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2 DDC2-66-1D	
	Northing	Easting
Well Location	195878.100	1275885.630
Start (date and time)	1245 1/12/12	
End (date and time)	1330 1/12/12	
Installation Method	HSA	
Total Well Depth	28	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	26-28	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Med. Bentonite Chips	
Grout or Chip Volume	3/4 bag	Gallons or Cubic Feet
Surface Completion	Concrete cap within vault	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[illegible]	
Signature (Engineer or Geologist)	[illegible]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number: PL2-DDX2-66-15

	Northing	Easting
Well Location	195878.100	1275885.630

Start (date and time): 1245 1/12/12

End (date and time): 1330 1/12/12

Installation Method: HSA

Total Well Depth: 10 feet bgs

Well Diameter: ~~2~~ 1-inch inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 8-10 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: Med. Bentonite Chips

Grout or Chip Volume: ¼ bag Gallons or Cubic Feet

Surface Completion: Concrete plug inside vault

Drilling Contractor: Cascade Drilling

License Number: _____

Signature (Driller): [signature]

Signature (Engineer or Geologist): [signature]

Additional Information: _____

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-017A	
	Northing	Easting
Well Location	195887.459	1275820.158
Start (date and time)	1100 1/11/12	
End (date and time)	1130 1/11/12	
Installation Method	HSA	
Total Well Depth	21.5	feet bgs
Well Diameter	4-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	6-20.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Med bentonite chips	
Grout or Chip Volume	3/4 bag	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-010A	
	Northing	Easting
Well Location	195845.345	1275839.895
Start (date and time)	1230 1/11/12	
End (date and time)	1245 1/11/12	
Installation Method	HSA	
Total Well Depth	21.2	feet bgs
Well Diameter	2-inch	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	6-20	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Med. bentonite chips	
Grout or Chip Volume	3/4 bag	Gallons or Cubic Feet
Surface Completion	Concrete	
Drilling Contractor	Cascade Drilling	
License Number		
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number

	Northing	Easting
Well Location		

Start (date and time)

End (date and time)

Installation Method

Total Well Depth feet bgs

Well Diameter inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips

Grout or Chip Volume Gallons or Cubic Feet

Surface Completion

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

_____

Cascade Drilling Bid Request

ENVIRONMENTAL PARTNERS INC 295 NE Gilman Blvd., Suite 201 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

December 28, 2011

Brian Gose
Cascade Drilling Inc.
PO Box 1184
Woodinville, WA 98072

Re: Request for Bid for Well Decommissioning Services
Boeing Plant 2, Seattle/Tukwila, WA

EPI Project No. 17513.0.500.04

Dear Brian:

The following is a Scope of Work (SOW) for monitoring well decommissioning planned for early January 2012 at Boeing Plant 2 in Seattle/Tukwila, WA. The site location is shown in Figure 1.

Please prepare a bid to reflect implementation of the scope of work contained herein. Unit costs for items such mobilization, decommissioning by chipping or grouting in place, over-drilling or perforating casing (if needed), and preparation and submittal of Ecology notice of intent to decommission a well forms should be specified in the cost estimate. We request that you provide this cost estimate and anticipated availability to perform the work specified herein no later than close of business on December 22, 2011.

Cascade will be under subcontract to Environmental Partners, Inc. (EPI) and all invoices must be mailed to Mr. Tom Elsemore. In addition, Douglas Kunkel at EPI shall receive copies of the invoices and daily driller's logs to confirm quantities and unit costs for the work performed.

SCOPE OF WORK

The drilling subcontractor shall decommission the 26 resource protection wells and two Density-Driven Convection (DDC) wells noted in Table 1. The locations of wells scheduled for decommissioning are presented in Figure 2. Wells scheduled for decommissioning shall be decommissioned by a Washington State-licensed driller according to WAC 173-160-460 "Decommissioning Process for Resource Protection Wells." An EPI geologist or engineer licensed by the State of Washington will supervise the driller and document the well decommissioning process.

The decommissioning process will begin by reviewing the well construction logs for the wells to be decommissioned. This review step will determine if the well was constructed according to WAC 173-160-420 "General Construction Requirements for Resource Protection Wells". Wells constructed according to WAC 173-160-420 specifications shall be decommissioned following the procedures specified in WAC 173-160-460(2). Wells not constructed according to WAC 173-160-420 specifications shall be decommissioned according to WAC 173-160-460(1). Applicable well construction and well decommissioning regulations are presented in Attachment A.

Well logs are available for all 26 wells scheduled for decommissioning and listed in Table 1. Based on our review of the well construction logs all wells were constructed according to WAC 173-160-420 specifications. Shallower A level wells may be chipped in place per WAC 173-160-460(2). Deeper B and C levels wells shall be grouted with Bentonite grout and using a tremie pipe to place the grout from the bottom of the well to the surface. There are 12 A level wells to be chipped and 14 B and C level wells to be grouted included in this scope of work and summarized in Table 1. Following decommissioning each well monument will be filled with concrete and completed flush to the surrounding surface.

Water displaced during the grouting process used in B and C level wells shall be captured and retained by the drilling subcontractor using DOT-approved 55-gallon drums, or equivalent, provided by Boeing. The drums shall be placed on pallets following Boeing waste handling specifications. Drums must be placed on pallets prior to filling so they can be secured for transport by forklift. Boeing will be responsible for waste characterization, drum handling, and disposal of investigation derived waste (IDW).

Table 1: Boeing Plant 2 Wells to be Decommissioned

Well ID	Total Depth (ft. bgs)	Screened Interval (ft. bgs)	Well Diameter and Material	Decommissioning Method
PL2-DDC2-66-1	32	25-30	6-inch PVC	Grout
PL2-DDC2-66-2	31.5	25-30	6-inch PVC	Grout
PL2-DDC2-66-1D	28	26-28	2-inch PVC	Chip
PL2-DDC2-66-1S	10	8-10	1-inch PVC	Chip
PL2-DDC2-66-2D	29	26-28	2-inch PVC	Chip
PL2-DDC2-66-2S	10	8-10	1-inch PVC	Chip
PL2-041AA	18	15-18	2-inch steel	Chip
PL2-008B	50.7	40.5-50	2-inch PVC	Grout
PL2-008C	96	80.5-95	2-inch PVC	Grout
PL2-010A	21.2	6-20	2-inch PVC	Chip
PL2-017A	21.5	6-20.5	2-inch PVC	Chip
PL2-021A	19.9	4.5-19	2-inch PVC	Chip
PL2-021B	49	38.5-48	2-inch PVC	Grout
PL2-021C	92.1	81.5-91	2-inch PVC	Grout
PL2-031A	30	25-30	2-inch PVC	Chip
PL2-032A	30	25-30	2-inch PVC	Chip
PL2-035A	30	25-30	2-inch PVC	Chip
PP-1B-I	50.5	48-50	2-inch PVC	Grout
PP-2B-I	50.5	48-50	2-inch PVC	Grout
PP-2B-O	50.5	48-50	2-inch PVC	Grout
PP-3A-I	20.5	18-20	2-inch PVC	Chip
PP-3B-I	50.5	48-50	2-inch PVC	Grout
PP-3C-I	90.5	88-90	2-inch PVC	Grout
PP-4B-I	50.5	48-50	2-inch PVC	Grout
PP-4B-O	50.5	48-50	2-inch PVC	Grout
PP-5B-I	50.5	48-50	2-inch PVC	Grout

Decontamination

The Subcontractor shall decontaminate downhole equipment prior to use and between well locations by pressure washing with a detergent and potable water solution followed by a potable water rinse. Decontamination water will be retained in DOT-approved 55-gallon drums, or equivalent, provided by Boeing. Drums shall be placed on pallets following Boeing waste handling specifications. Drums must be placed on pallets prior to filling so they can be secured for transport by forklift. Boeing will be responsible for waste characterization, drum handling, and disposal of IDW.

The successful bidder must have or obtain current Boeing security badges for all onsite personnel used for the well decommissioning task. EPI can assist with the badge process if needed.

Please feel free to contact us at (425) 396-0016 (office) or (425) 241-8170 (cell) if you have any questions regarding this scope of work or the technical specifications associated with this work.

Sincerely,

Submitted Electronically

Doug Kunkel, L.G., L.H.G.
Principal Hydrogeologist
Environmental Partners, Inc.

Enc: Figures 1 and 2
Attachment A
cc: file

Attachment A

WAC 173-160-420

What are the general construction requirements for resource protection wells?

(1) No resource protection well or soil boring excavation may be used to withdraw or inject water for domestic, industrial, municipal, commercial, or agricultural purposes.

(2) No resource protection well or soil boring excavation may interconnect aquifers.

(3) Nested resource protection wells are prohibited.

(4) Cuttings, development water, and other investigation derived waste from resource protection well construction or geotechnical soil borings shall be managed in a manner consistent with the intent and purposes of the Water Pollution Control Act, chapter 90.48 RCW, the Hazardous Waste Management Act, chapter 70.105 RCW, and implementing regulations.

(5) Well tagging:

(a) It shall be the driller's responsibility to place a well identification tag with a unique identification number on every resource protection well that they construct or alter within thirty days of completion of the well. Uncased geotechnical soil borings and environmental investigation wells are exempt from the tagging requirements of this chapter.

(i) The alpha-numeric number shall be recorded on the drilling report in the space provided.

(ii) The driller shall remove the well identification tag on all resource protection wells they decommission and shall attach the tag to the decommissioning well report.

(b) It shall be the well owner's responsibility to place a well identification tag with a unique identification number on every resource protection well they own and which was completed prior to the effective date of this regulation.

(i) Upon request, the department shall furnish the well owner with a well tag and tagging instructions.

(ii) The well owner shall tag their well(s) and submit a completed tagging report to the department.

(c) The well tag shall be permanently attached to:

(i) The well casing and be visible above land surface for all wells which have been completed above land surface.

(ii) The well casing or to any permanent and protected portion of the vault for wells completed below land surface.

(iii) A prominent system component visible above land surface for ground source heat pump borings.

(d) All well identification tags shall be supplied by the department.

(e) It is unlawful for a person to tamper with or remove a well identification tag except during well alteration.

(6) All resource protection wells will be sealed in accordance with WAC 173-160-450 regardless of the method of installation. Except, resource protection wells that are properly decommissioned prior to the removal of any drilling equipment from the well location are

exempted from the surface sealing requirements of this chapter. Provided the decommissioning process includes the removal of any conduit, tubing, probe, or other items inserted into the ground.

(7) All geotechnical soil borings shall be decommissioned under the terms of this chapter.

(8) Except as provided in RCW 18.104.180, all construction, alteration, reconstruction, and decommissioning of resource protection wells and geotechnical soil borings shall be done by an individual licensed under the provisions of chapter 173-162 WAC.

(9) A notice of intent to construct or decommission a resource protection well and a geotechnical soil boring shall be filed with the department a minimum of seventy-two hours prior to initiating construction or decommissioning of the well(s) or boring(s). A fee must accompany each notice of intent to construct or decommission a resource protection well.

(a) The fee for a resource protection well, except for an environmental investigation well, a ground source heat pump boring, or a grounding well, is forty dollars for each well.

(b) The fee for an environmental investigation well in which ground water is sampled or measured is forty dollars for the construction of up to four environmental investigation wells per project, and ten dollars for each additional environmental investigation well constructed on a project with more than four wells. There is no fee for soil or vapor sampling purposes.

(c) The fee for a ground source heat pump boring or a grounding well is forty dollars for construction of up to four ground source heat pump borings or grounding wells per project and ten dollars for each additional ground source heat pump boring or grounding well constructed on a project with more than four wells.

(d) The fee to decommission a resource protection well, except for an environmental investigation well, is twenty dollars per well. There is no fee to decommission an environmental investigation well or a geotechnical soil boring.

(e) The fee to decommission a ground source heat pump boring or a grounding well is twenty dollars per well.

(f) Under some circumstances, it may be necessary to construct more resource protection wells or geotechnical soil borings than originally anticipated. When additional resource protection wells are constructed on a site for which a notice of intent and fee were submitted, a second notice and fee shall be submitted within twenty-four hours after all wells have been completed or as soon as the final number of wells to be constructed is determined, whichever is sooner. When additional geotechnical soil borings are needed, the borings may be completed. A follow-up notice of intent shall be submitted to the department within twenty-four hours after all borings are constructed. Notification to construct multiple wells or geotechnical soil borings within the same quarter/quarter section, township, and range may be submitted on one notice form.

(10) Resource protection well reports.

(a) Anyone who constructs or decommissions a well is required to submit a complete well report on the construction or decommissioning of all resource protection wells and geotechnical soil borings. Reports must be submitted to the water resources program within thirty days after completion of construction or decommissioning. Submission of a well report to consulting firms does not meet the requirement of this section. The report must be an accurate summation of data collected in the field taken from field notes written as the well was constructed or decommissioned. Field notes must be available at all times during construction or decommissioning for review by state and local inspectors and kept until the well report is submitted.

(b) The resource protection well report must be made on a form provided by the department, or a reasonable facsimile of the form, as approved by the department.

(c) Where applicable the report shall include the following information:

(i) Owner's name; operator/trainee name; operator/trainee license number; contractor registration number, drilling company name;

(ii) Tax parcel number;

(iii) Well location address;

(iv) Location of the well to at least 1/4, 1/4 section or smallest legal subdivision;

(v) Unique well identification tag number;

(vi) Construction date;

(vii) Start notification number;

(viii) Intended use of well;

(ix) The well depth, diameter, and general specifications of each well;

(x) Total depth of casing;

(xi) Well head elevation;

(xii) Drilling method;

(xiii) Seal material, seal location and type of placement used;

(xiv) Filter pack location; filter pack material used;

(xv) The thickness and character of each bed, stratum or formation penetrated by each well including identification of each water bearing zone;

(xvi) Casing gauge, diameter, stickup, type of material, and length, also of each screened interval or perforated zone in the casing;

(xvii) The depth to the static water level, as measured below the land surface; and

(xviii) Such additional factual information as may be required by the department.

(d) The well report must include one of the following:

(i) The license number and signature of the person who constructed or decommissioned the well;

(ii) The license number and signature of the trainee and the licensed operator under chapter 18.104 RCW; or

(iii) The license number and signature of an exempted individual as defined under RCW 18.104.180(3).

(e) This rule shall allow an individual to submit electronic reports in accordance with department procedures. The use of a digital signature in the electronic reports will be authorized as a substitute for an original signature under (d) of this subsection.

What are the surface protection requirements?

(11) All resource protection wells shall be capped and protected using one of the following methods:

(a) If the well is cased with metal and completed above the ground surface, you must attach a watertight cap with a lock to the top of the casing.

(b) If the well is not cased with metal and completed above the land surface, you must install a protective metal casing over and around the well. The protective casing shall extend at least six inches above the top of the well casing and be cemented at least two feet into the ground. A cap with lock shall be attached to the top of the protective casing.

(12) You shall protect the well(s) completed above ground from damage by:

(a) Cementing three metal posts, at least three inches in diameter, in a triangular array around the casing and at least two feet from it. Each post shall extend at least three feet above and below the land surface.

(b) A reinforced concrete pad may be installed to protect against and prevent frost heave. If installed, the concrete pad shall extend to a depth equal to anticipated frost depth. When a concrete pad is used, the well seal may be part of the concrete pad.

(13) If the well is completed below land surface, a watertight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent the inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The cover must be designed to withstand the maximum expected loading.

(14) The protective measures may be waived or modified upon written approval from the department (a variance).

(15) If the well is damaged, the well protection measures and casing shall be repaired to meet the requirements of this chapter. If the well is damaged beyond repair, it shall be decommissioned in accordance with WAC 173-160-460.

WAC 173-160-460

What is the decommissioning process for resource protection wells?

(1) For resource protection wells and geotechnical soil borings that were not constructed in accordance with these regulations, or for which a drilling report required under this section is missing, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers, and decommission in one of the following ways:

(a) Perforate the casing from the bottom to land surface and pressure grout the casing.

(i) Perforations shall be at least four equidistant cuts per row, and one row per foot. Each cut shall be at least one and one-half inches long.

(ii) Apply enough pressure to force the sealing material through the perforations, filling any voids on the outside of the casing.

(iii) The remainder of the casing shall be filled with neat cement grout, neat cement, or bentonite slurry; or

(b) Withdraw the casing and fill the bore hole with neat cement grout, neat cement, bentonite or bentonite slurry as the casing is being withdrawn.

(2) For resource protection wells and geotechnical soil borings that were constructed in accordance with these regulations, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers and then decommission in one of the following ways:

(a) Wells with an inside casing diameter equal to or greater than one inch and constructed in accordance with these regulations as verified through a field examination and review of the drilling report shall be decommissioned by filling the casing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement.

(b) Wells with an inside casing diameter less than one inch shall be decommissioned by pressure grouting the entire casing length with bentonite slurry, neat cement grout, or neat cement.

(c) Vibrating wire piezometers installed to meet or exceed the sealing requirements of WAC 173-160-450, 173-160-457, and 173-160-458 are exempt from the decommissioning procedures and decommissioning reporting requirements provided here.

(d) Direct push wells shall be decommissioned in accordance with this section.

(e) Geotechnical soil borings, or boring, shall be decommissioned by sealing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement. Sealing material placed below the static water level shall be piped directly to the point of application or placed by means of a dump bailer or pumped through a tremie tube. If bentonite slurry, neat cement grout or neat cement is used to seal below the water level in the well, the material shall be placed from the bottom up by methods that avoid segregation or dilution of the material. When used to place bentonite slurry, neat cement or neat cement grout, the discharge end of the tremie tube shall be submerged in the bentonite slurry, neat cement or neat cement grout to avoid breaking the seal while filling the annular space. Provided the material does not dilute or segregate and the resulting seal is free of voids, sealing material may be hand poured above the static water level.

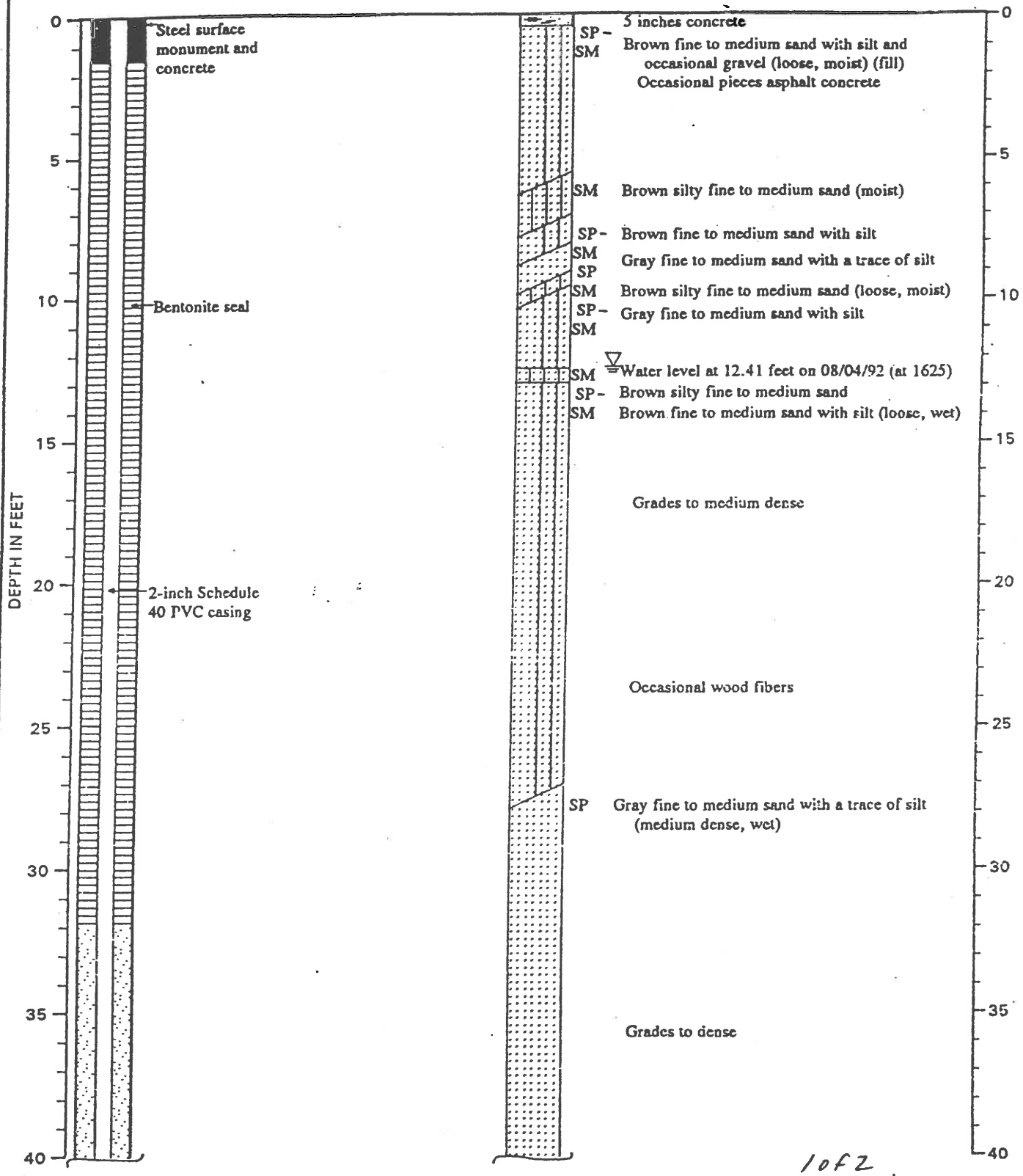
Well Logs

MONITORING WELL PL2SW-MW8B

PL2-00-V

WELL SCHEMATIC

Casing Elevation (ft.): 12.63
Casing Stickup (ft.): -0.30



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mk 7/18/94

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical intermediate 2-inch diameter monitoring well construction

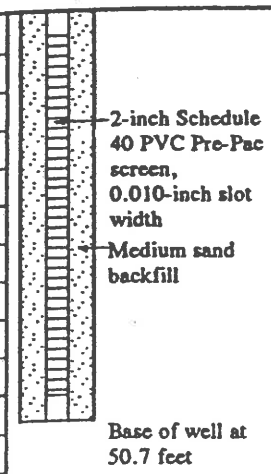
Geo Engineers

LOG OF MONITORING WELL

FIGURE A-9a

MONITORING WELL PL2SW-MW8B
(Continued)

WELL SCHEMATIC



DEPTH IN FEET

40 45 50 55 60 65 70 75 80

DESCRIPTION

Group Symbol	Description
SP–SM	Gray fine to medium sand with silt and wood fibers (dense, wet)
SP	Gray fine to medium sand with a trace of silt (v dense, wet)
SP–SM	Gray fine to medium sand with silt (very den wet)
SP	Gray fine to medium sand with a trace of silt (v dense, wet)
SP–SM	Gray fine to medium sand with silt (very dense, wet)
SP	Gray fine to medium sand with a trace of silt dense, wet)

Boring completed at 50.7 feet on 07/20/92

PL2SW-8B is one of a cluster of three separate borings/monitoring wells (PL2SW-8A, -8 -8C). The soil types encountered in the d well, PL2SW-8C, are duplicated on this log because soil samples were not obtained from the intermediate depth boring in the cluste

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical intermediate 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-9b

:RNM:WAP:CMS 10/20/92

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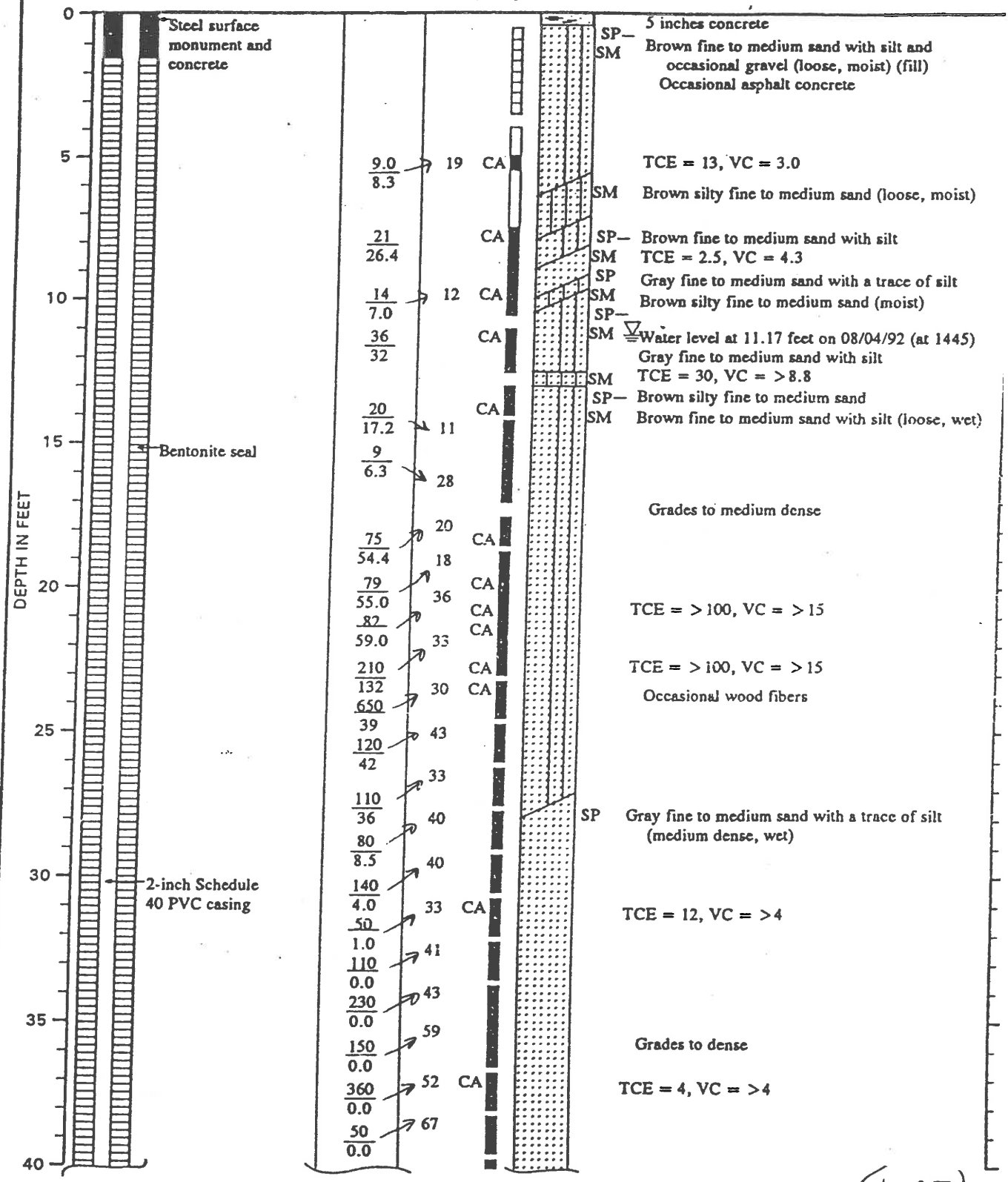
MONITORING WELL PL2SW-MW8C

PL2-008C

WELL SCHEMATIC

Casing Elevation (ft.): 12.47
Casing Stickup (ft.): -0.36

Surface Elevation (ft.): 12.83



Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-10a

:RNM:WAP:CMS 10/23/92

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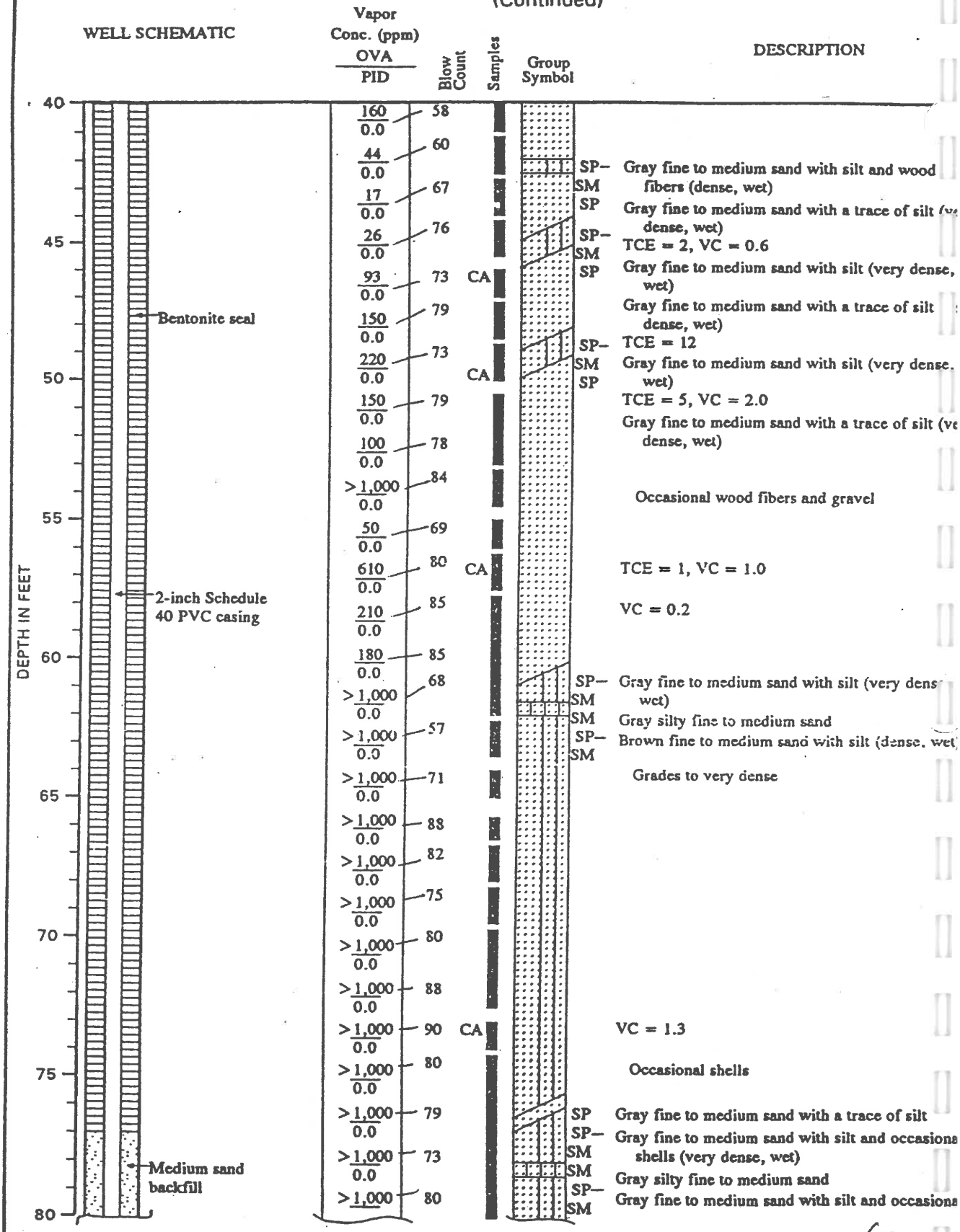
MONITORING WELL PL2SW-MW8C
(Continued)



Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

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:RNM:WAP:CMS 10/16/92

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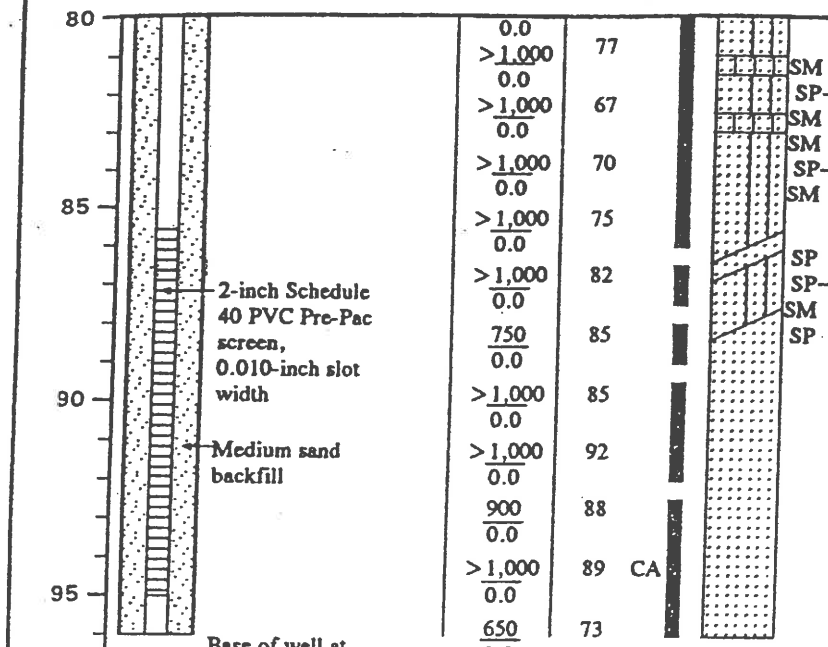
Geo Engineers

LOG OF MONITORING WELL

FIGURE A-10b

MONITORING WELL PL2SW-MW8C
(Continued)



Depth in feet	Vapor Conc. (ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
80	0.0				shells (very dense, wet)
	>1,000 / 0.0	77		SM	Gray silty fine to medium sand (very dense, wet)
	>1,000 / 0.0	67		SP–SM	Gray fine to medium sand with silt (very dense, wet)
	>1,000 / 0.0	70		SM	Gray silty fine to medium sand and occasional shells
85	>1,000 / 0.0	75		SP–SM	Gray fine to medium sand with silt (very dense, wet)
	>1,000 / 0.0	82		SP	TCE = 2, VC = 1.0
	750 / 0.0	85		SP–SM	Gray fine to medium sand, a trace of silt and occasional shells
90	>1,000 / 0.0	85		SP	Gray fine to medium sand with silt and occasional shells
	>1,000 / 0.0	92			Gray fine to medium sand, a trace of silt and occasional shells (very dense, wet)
	900 / 0.0	88			VC = 0.2
	>1,000 / 0.0	89	CA		Finer at 92 feet, fewer shells
95	650 / 0.0	73			More medium sand at 93 feet
					VC = 1.0
100					
105					
110					
115					
120					

Boring completed at 96.0 feet on 07/14/92
TCE indicated by field screening at 5, 8, 11, 21, 23, 31, 38, 44, 47, 50, 57 and 86 feet
VC indicated by field screening at 5, 8, 11, 21, 23, 31, 38, 44, 50, 57, 59, 74, 86, 92 and 96 feet
Continuous soil sampling was attempted from the surface to the total boring depth

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

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Geo Engineers

LOG OF MONITORING WELL

FIGURE A-10c

:RNM:WAP:CMS 10/16/92

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MONITORING WELL PL2SW-MW9A

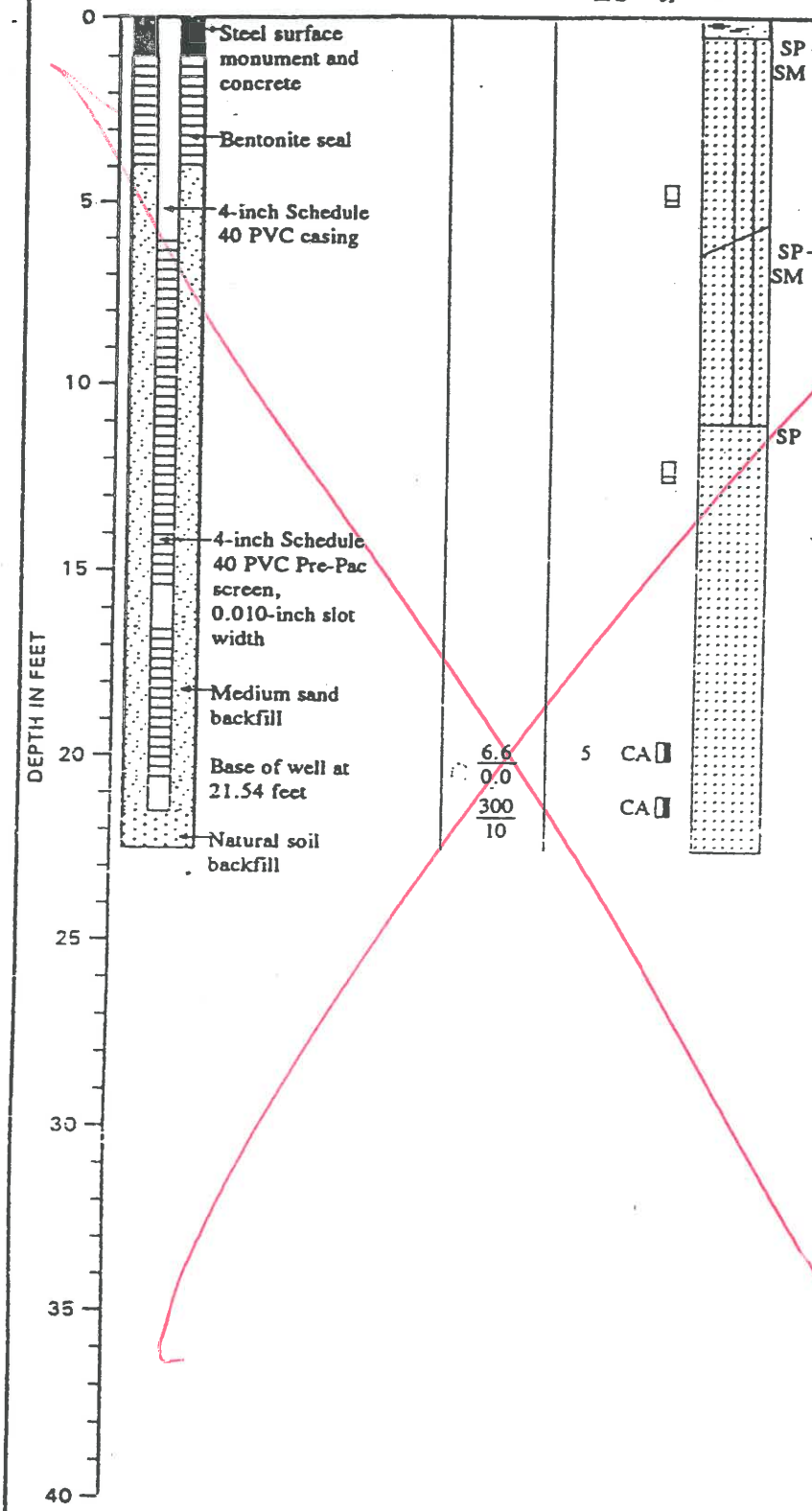
PL2-009A

WELL SCHEMATIC

Casing Elevation (ft.): 12.68
Casing Stickup (ft.): -0.58

Vapor Conc. (ppm) OVA / PID | Blow Count | Samples | Group Symbol | DESCRIPTION

Surface Elevation (ft.): 13.26



6 inches concrete

Brown fine to medium sand with silt, chunks of asphalt and brick (very loose, moist) (fill)

Reddish brown mottled fine to medium sand with silt (very loose, moist)

Water level ranged between 9.3 and 14.0 feet during the 2-week tidal study (12/20/91 throug 01/02/92)

Grayish brown fine to medium sand with varying amounts of silt (loose to very loose, wet)

Boring completed at 22.5 feet on 10/15/91

No VC or TCE indicated by field screening soil samples, but the VC field screening was done incorrectly

PL2SW-9A is one of a cluster of three separate borings/monitoring wells (PL2SW-9A, -9B, -9C). The soil types encountered in the deepest well, PL2SW-9C, are duplicated on this log because soil samples only were obtained from the base of the shallow boring.

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Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

:C/IW:RNM:PGW:CMS 10/20/92

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LOG OF MONITORING WELL

FIGURE A-11

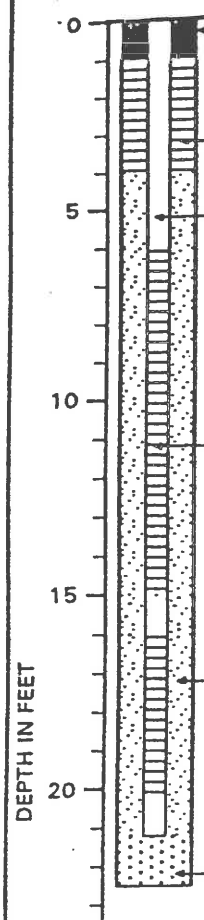
MONITORING WELL PL2SW-MW10

PL2-010A

WELL SCHEMATIC

Casing Elevation (ft.): 12.18
Casing Stickup (ft.): -0.29

Vapor Conc.(ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
				Surface Elevation (ft.): 12.47
				6 inches concrete
			SP-SM	Brown fine to medium sand with silt and occasional ceramic pieces (moist) (fill)
			SM	Brown silty fine to medium sand (moist)
				Water level at 10.0 feet on 12/11/91 (at 1250)
				Water level at 10.8 feet on 12/03/91 (at 1025)
				Grades to wet
			SP	Grayish brown fine to medium sand with a trace of silt (loose, wet)
150 / 50	8	CA		TCE = 15 ppm



Boring completed at 22.5 feet on 10/11/91
Overdrilled existing piezometer and installed a 4-inch monitoring well
TCE indicated by field screening soil samples from 21 feet
VC was not indicated by field screening soil samples, but the VC field screening was done incorrectly

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

MM 7/18/94

:CNW:RNM:PGW:CMS 10/20/92

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LOG OF MONITORING WELL

FIGURE A-14

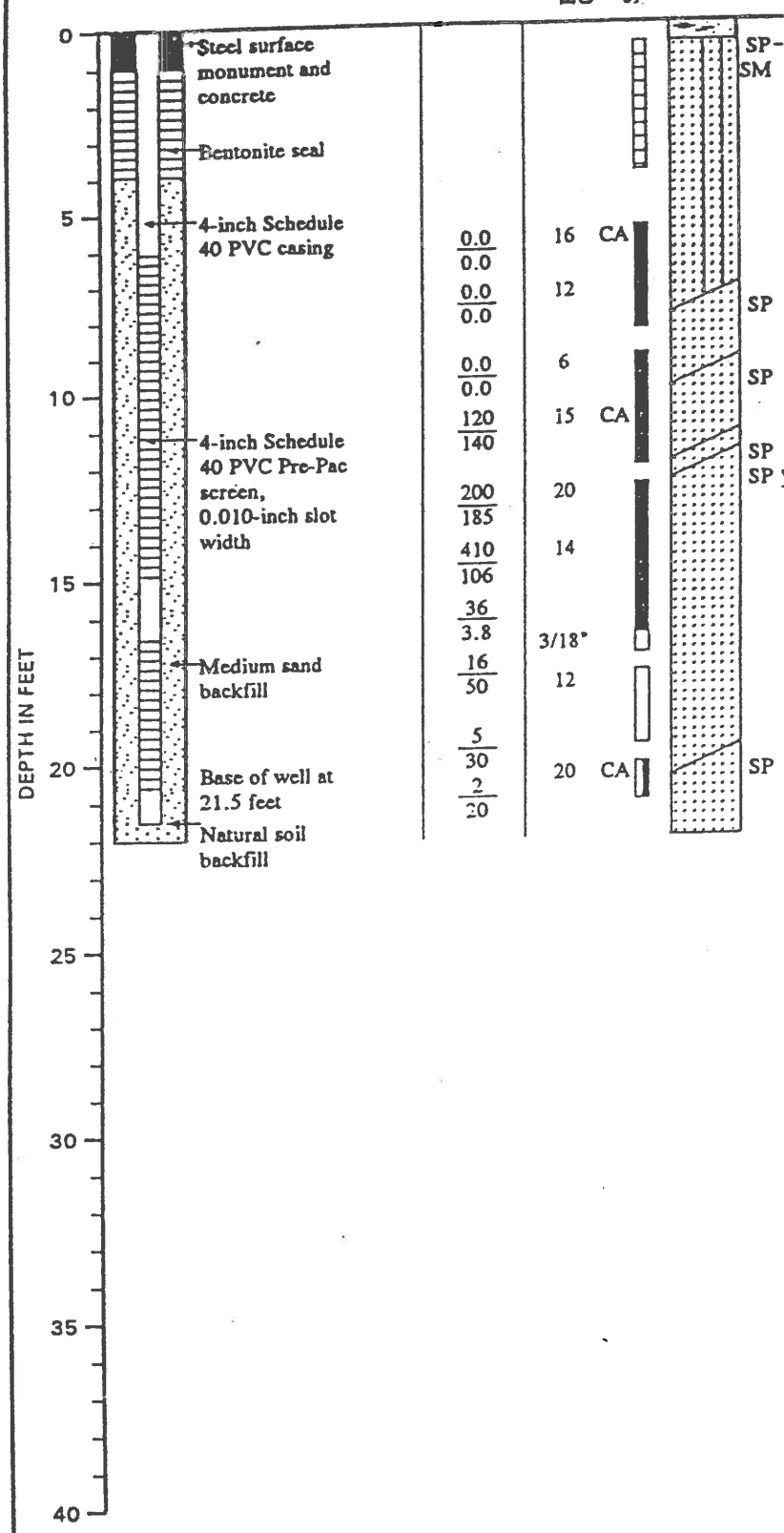
MONITORING WELL PL2SW-MW17

PL2-017A

WELL SCHEMATIC

Casing Elevation (ft.): 11.96
Casing Stickup (ft.): -0.59

Surface Elevation (ft.): 12.55



Vapor Conc. (ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION
				6 inches concrete
			SP-SM	Brown fine to medium sand with silt (loose, moist) (fill)
0.0 / 0.0	16	CA		
0.0 / 0.0	12		SP	Brown fine to medium sand with a trace of silt (very loose, moist)
0.0 / 0.0	6		SP	Water level ranged between 8.8 and 12.8 feet during the 2-week tidal study (12/20/91 through 01/02/92)
120 / 140	15	CA		Black-stained fine to medium sand with a trace of silt and occasional gravel (loose, wet)
200 / 185	20		SP	Brown fine to medium sand with a trace of silt (loose, wet)
410 / 106	14			Black-stained fine to medium sand with a trace of silt (loose, wet)
36 / 3.8	3/18"			Grades to very loose
16 / 50	12			
5 / 30	20	CA	SP	Blackish brown fine to medium sand with a trace of silt (very loose, wet)
2 / 20				

Boring completed at 22.0 feet on 10/10/91
Petroleum-like odor noted between 10 and 20 feet
Soil samples not field screened for VC or TCE

mr 7/19/94

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-21

:CRW:RNM:PGW:CMS 10/15/92

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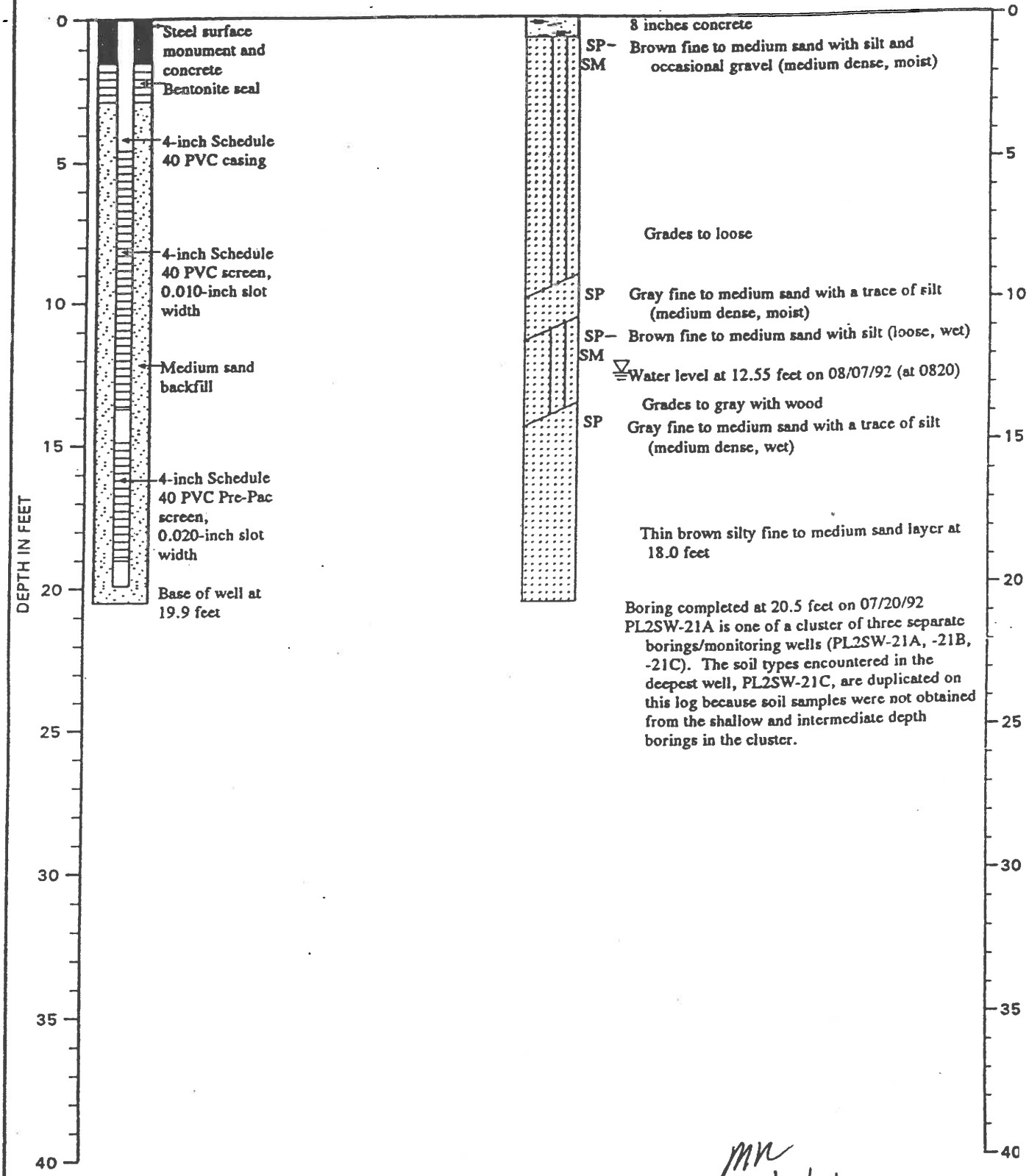
MONITORING WELL PL2SW-MW21A

PL2-021A

WELL SCHEMATIC

Casing Elevation (ft.): 12.81
Casing Stickup (ft.): -0.27



MN 7/19/94

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

:RNM:WAP:CMS 10/16/92

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LOG OF MONITORING WELL

FIGURE A-25

MONITORING WELL PL2SW-MW21B

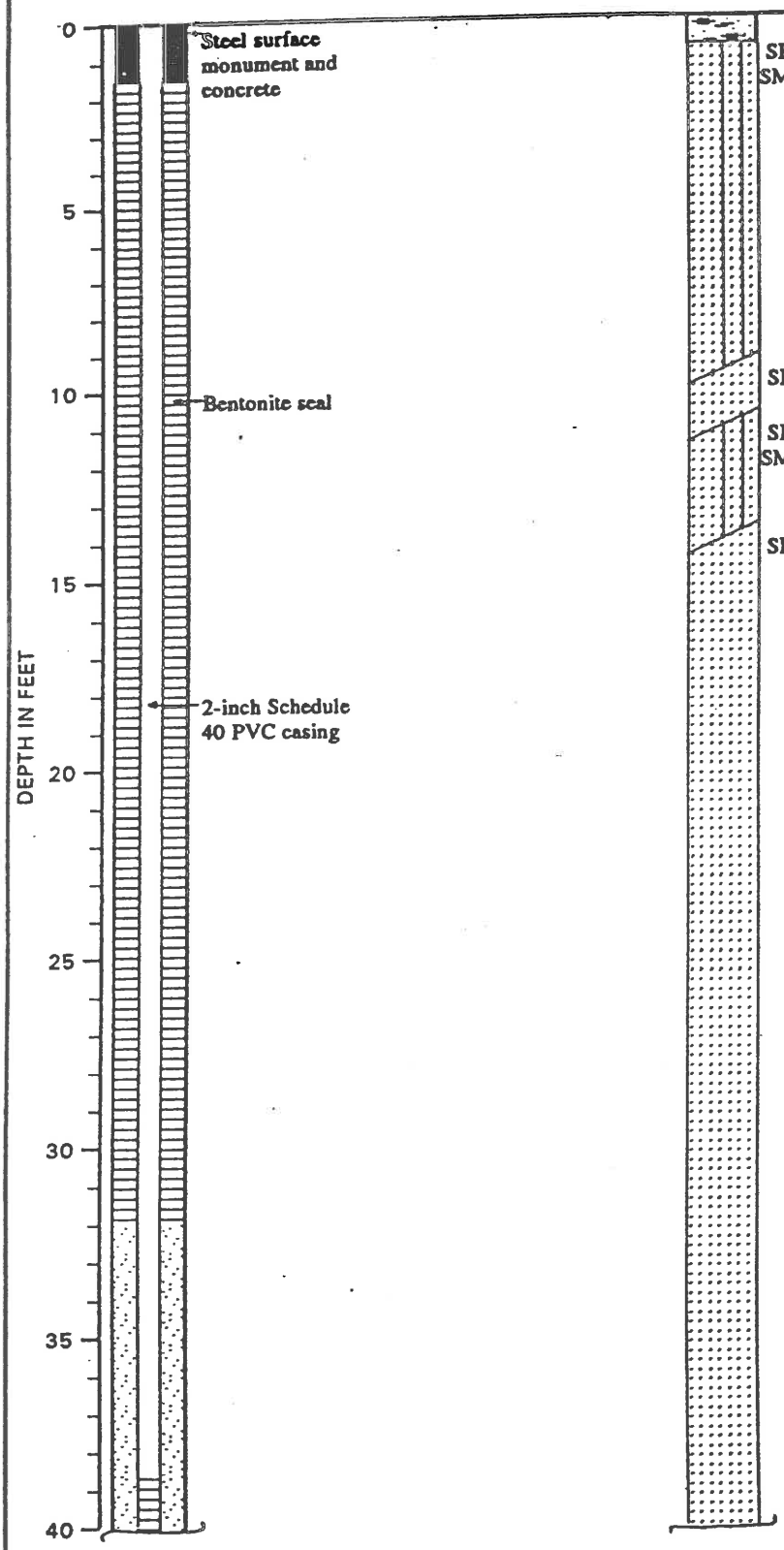
PL2-021B

WELL SCHEMATIC

Casing Elevation (ft.): 12.70
Casing Stickup (ft.): -0.27

DESCRIPTION

Surface Elevation (ft.): 12.97



Group Symbol	Description
	8 inches concrete
SP–SM	Brown fine to medium sand with silt and occasional gravel (medium dense, moist)
	Grades to loose
SP	Gray fine to medium sand with a trace of silt (medium dense, moist)
SP–SM	Brown fine to medium sand with silt (loose, wet)
	▽ Water level at 12.38 feet on 08/07/92 (at 0700)
	Gray with wood
SP	Gray fine to medium sand with a trace of silt (medium dense, wet)
	Thin brown silty fine to medium sand layer at 18.0 feet
	Grades to dense
	Occasional organic matter
	6-inch piece of wood at 32.0 feet

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical intermediate 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-26a

:RNM:WAP:CMS 10/16/92

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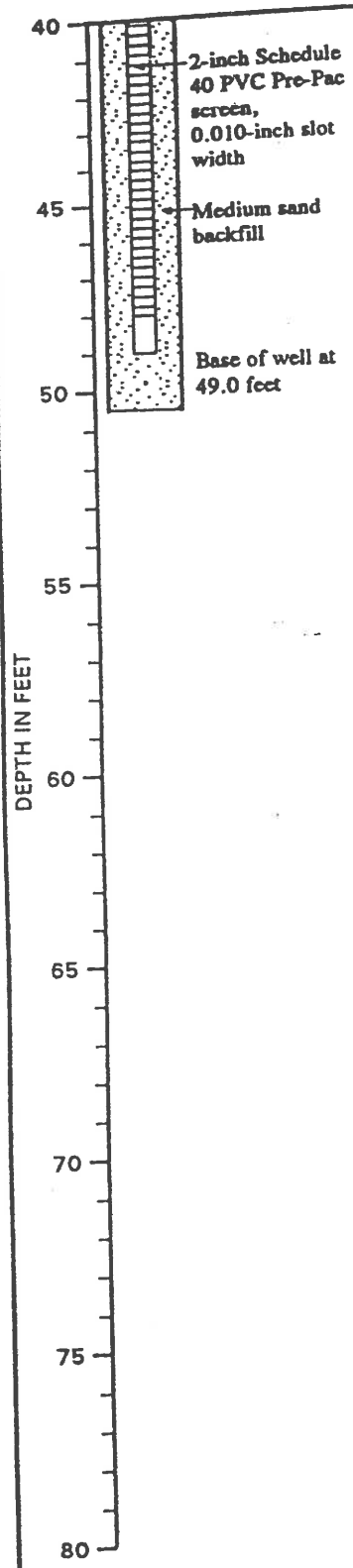
MONITORING WELL PL2SW-MW21B
(Continued)

WELL SCHEMATIC



Group Symbol	DESCRIPTION
	Grades to very dense
	Occasional coarse sand
SP-SM	Brown fine to medium sand with silt (very dense, wet)
	Thin gray silty fine to medium sand layers at 48 feet
SP	Gray fine to medium sand with a trace of silt (very dense, wet)
SP-SM	Brown fine to medium sand with silt and occasional wood

Boring completed at 50.5 feet on 07/20/92

PL2SW-21B is one of a cluster of three separate borings/monitoring wells (PL2SW-21A, -21B, -21C). The soil types encountered in the deepest well, PL2SW-21C, are duplicated on this log because soil samples were not obtained from the shallow and intermediate depth borings in the cluster.

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical intermediate 2-inch diameter monitoring well construction

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LOG OF MONITORING WELL

FIGURE A-26b

:RNM:WAP:CMS 10/16/92

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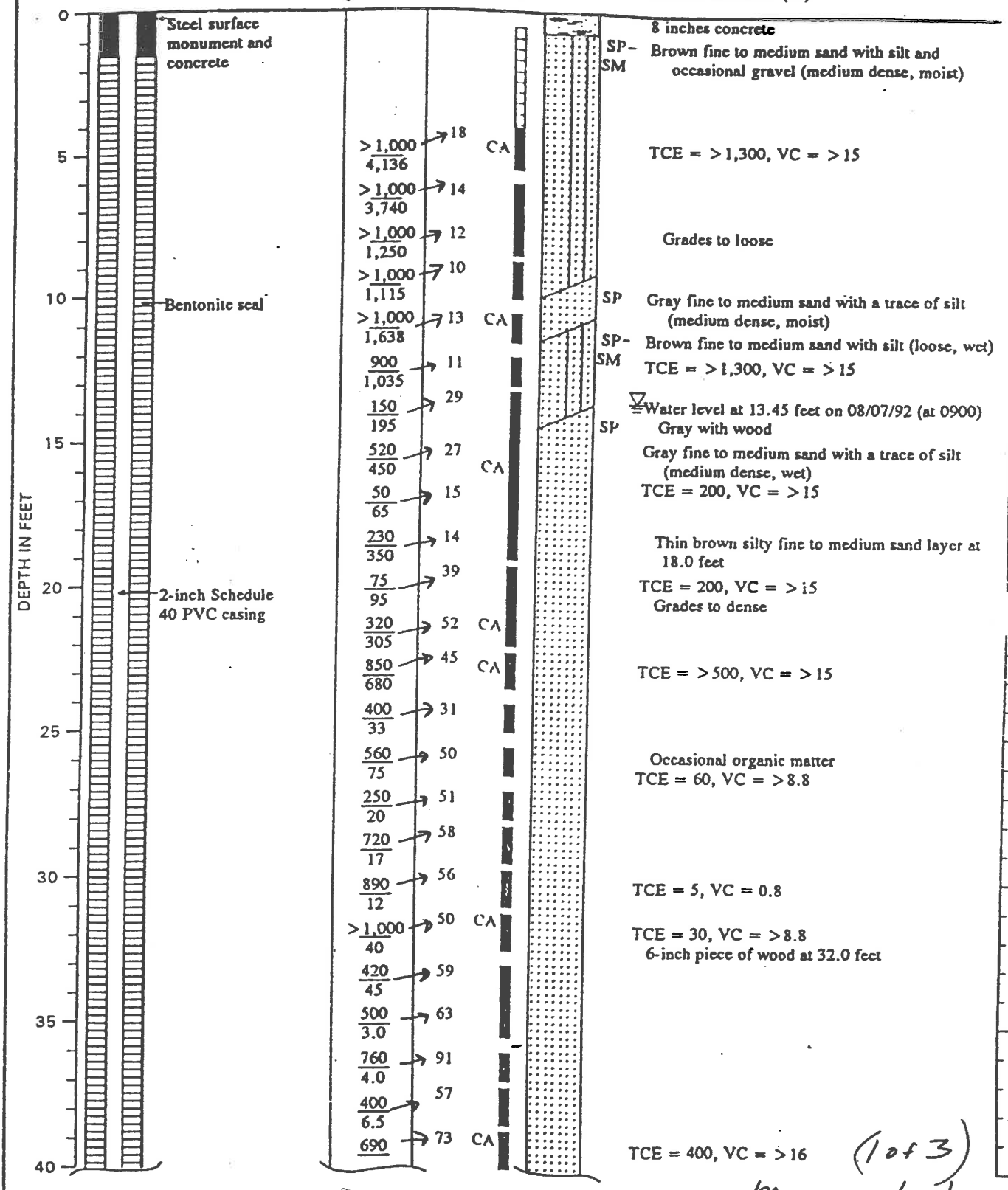
MONITORING WELL PL2SW-MW21C

PL2-021C

WELL SCHEMATIC

Casing Elevation (ft.): 12.67
Casing Stickup (ft.): -0.33

Surface Elevation (ft.):



(1 of 3)

Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

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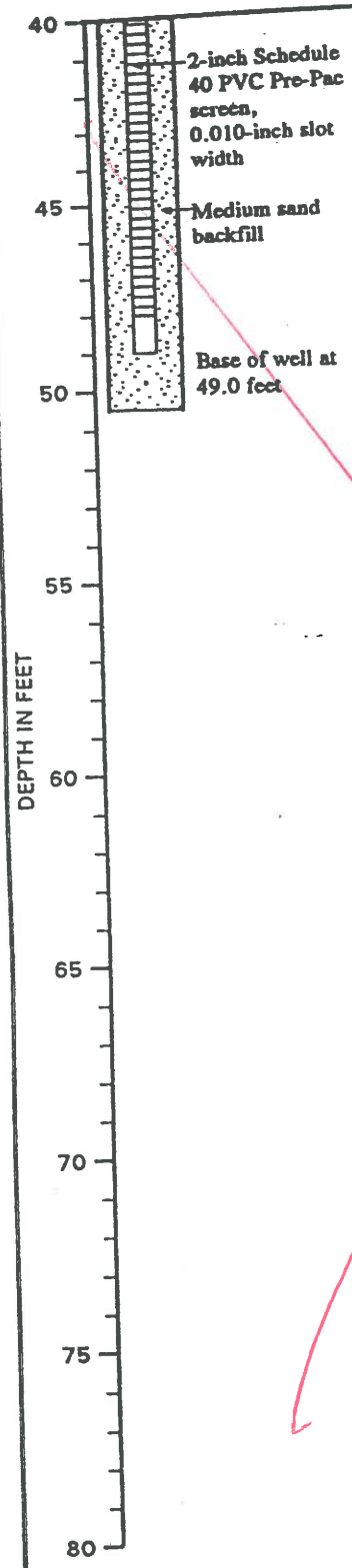
Geo Engineers

LOG OF MONITORING WELL

FIGURE A-27a

MONITORING WELL PL2SW-MW21B
(Continued)

WELL SCHEMATIC



Group Symbol	DESCRIPTION
	Grades to very dense
	Occasional coarse sand
SP-SM	Brown fine to medium sand with silt (very dense, wet)
	Thin gray silty fine to medium sand layers at 48 feet
SP	Gray fine to medium sand with a trace of silt (very dense, wet)
SP-SM	Brown fine to medium sand with silt and occasional wood

Boring completed at 50.5 feet on 07/20/92

PL2SW-21B is one of a cluster of three separate borings/monitoring wells (PL2SW-21A, -21B, -21C). The soil types encountered in the deepest well, PL2SW-21C, are duplicated on this log because soil samples were not obtained from the shallow and intermediate depth borings in the cluster.

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Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical intermediate 2-inch diameter monitoring well construction

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-26b

:RNM:WAP:CMS 10/16/92

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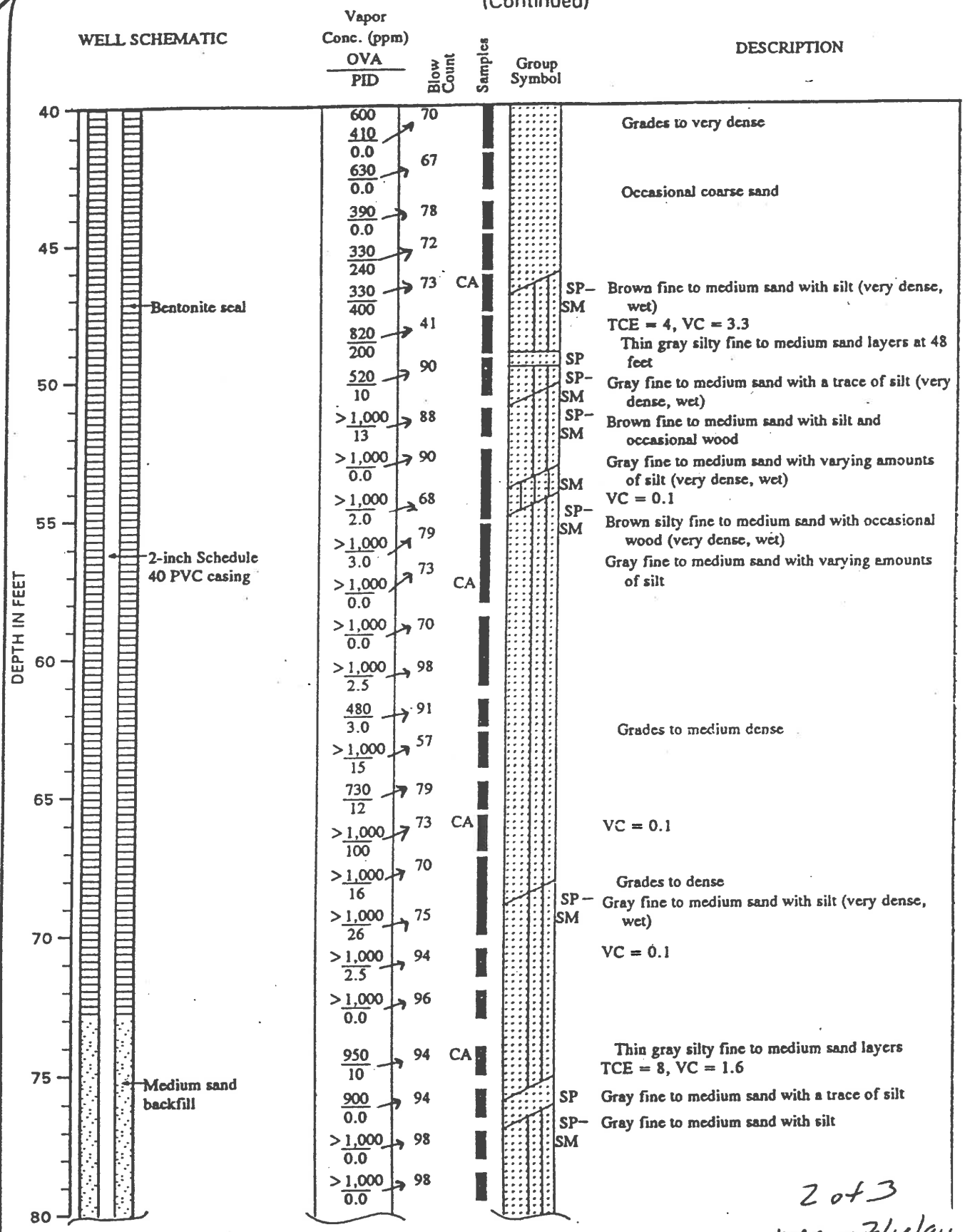
MONITORING WELL PL2SW-MW21C
(Continued)



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Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-27b

RNM:WAP:CMS 10/20/92

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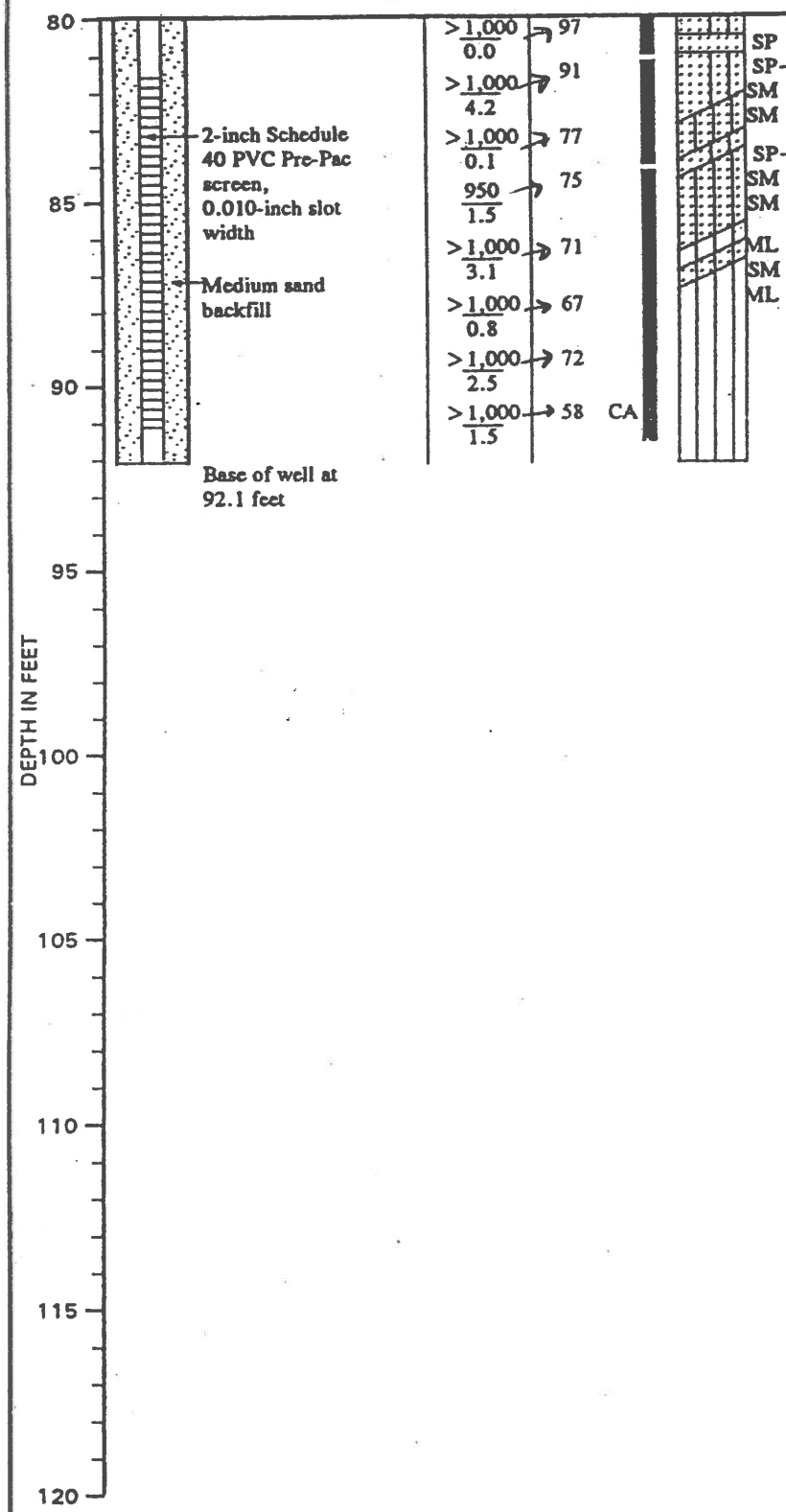
MONITORING WELL PL2SW-MW21C
(Continued)



DESCRIPTION

Gray fine to medium sand with a trace of silt
Gray fine to medium sand with silt, occasional shells and organic matter (very dense, wet)
TCE = 4, VC = 0.6
Gray silty fine to medium sand (very dense, wet)
Gray fine to medium sand with silt
Gray silty fine to medium sand
Gray sandy silt (hard, wet)
VC = 0.2
Gray silty fine to medium sand
Gray silt with sand (hard, wet)
Thin gray silty fine to medium sand layer at 89 feet
TCE = 1
VC = 0.2

Boring completed at 92.1 feet on 07/17/92
TCE indicated by field screening at 5, 11, 16, 20, 23, 26, 30, 32, 40, 47, 70, 75, 82 and 90 feet
VC indicated by field screening at 5, 11, 16, 20, 23, 26, 30, 32, 40, 47, 52, 64, 67, 75, 82, 87 and 91 feet
Continuous soil sampling was attempted from the surface to the total boring depth
Detection of VC during field screening but not in chemical analysis may reflect a positive interference because of the presence of TCE

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Note: See Figure A-2 for explanation of symbols
See Figure A-35 for explanation of typical deep 2-inch diameter monitoring well construction

:RNM:WAP:CMS 10/20/92

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LOG OF MONITORING WELL

FIGURE A-27c

Boring PL2-031A

Project	Boeing Plant 2 ICM	Start Date 09/15/94	Finish Date 09/15/94
Location	Plant 2 Seattle, W	Driller	Drilling Co. Cascade Drilling
Project No.	03709-034-401	Drilling Method 4 in ID HSA	
Contractor	Weston	Sampling Method Not Sampled	
Logged by	Erik Lottsfeldt	Top of Casing (ft) 11.46	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 11.73	Total Depth (ft) 31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Asphalt
							SP	Sand with gravel (SP), light grayish brown, 85% medium sand, 15% angular gravel, medium dense, dry. (fill)
5								
10							SP	Sand (SP), v. dk. brn. (10YR2/2), 100% med. sand, dense, moist, wet in shoe @ 15ft wet, 21ft yell.brn.(10YR5/4), 25ft v.dk.grey
15								
20								

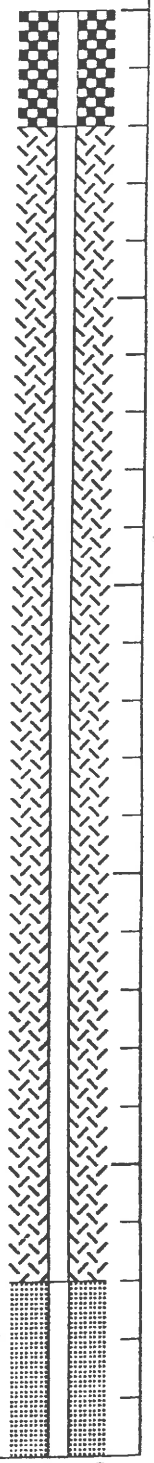
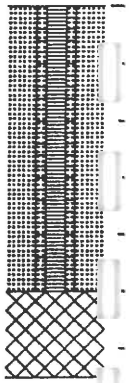


FIGURE
A-3
1 of 2

Boring PL2-031A

Project	Boeing Plant 2 ICM	Start Date	09/15/94	Finish Date	09/15/94
Location	Plant 2 Seattle, W	Driller		Drilling Co.	Cascade Drilling
Project No.	03709-034-401	Drilling Method	4 in ID HSA		
Contractor	Weston	Sampling Method	Not Sampled		
Logged by	Erik Lottsfeldt	Top of Casing (ft)	11.46	Boring Diam. (in)	10
		Ground Surf. Elev. (ft)	11.73	Total Depth (ft)	31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
30								
35								
40								
45								



FIGU
A

Boring PL2-032A

Project	Boeing Plant 2 ICM	Start Date 09/15/94	Finish Date 09/15/94
Location	Plant 2 Seattle, W	Driller	Drilling Co. Cascade Drilling
Project No.	03709-034-401	Drilling Method 4 in ID HSA	
Contractor	Weston	Sampling Method Not Sampled	
Logged by	Erik Lottsfeldt	Top of Casing (ft) 12.46	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 12.74	Total Depth (ft) 31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Asphalt
							SP	Sand with gravel (SP), light gray (10YR7/1), 85% medium sand, 15% angular gravel, medium dense, dry (fill).
5								
10							SP	Sand (SP), dark yellowish brown (10YR4/4), 100% med. sand, med. dense, wet. (fill) @ 15ft. color very dark gray.
15								
20								

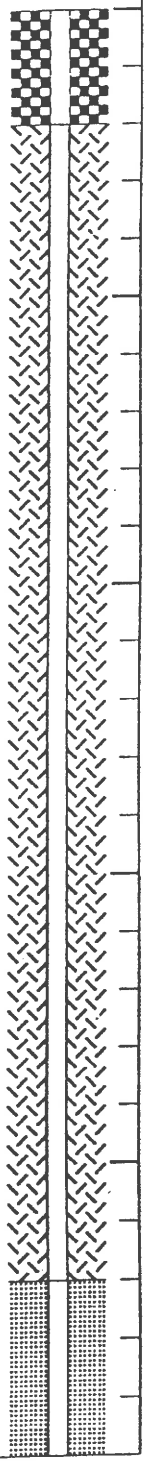
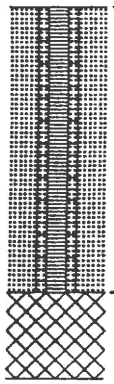


FIGURE A-4

Boring PL2-032A

Project	Boeing Plant 2 ICM	Start Date	09/15/94	Finish Date	09/15/94
Location	Plant 2 Seattle, W	Driller		Drilling Co.	Cascade Drilling
Project No.	03709-034-401	Drilling Method	4 in ID HSA		
Contractor	Weston	Sampling Method	Not Sampled		
Logged by	Erik Lottsfeldt	Top of Casing (ft)	12.46	Boring Diam. (in)	10
		Ground Surf. Elev. (ft)	12.74	Total Depth (ft)	31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
30								
35								
40								
45								



Sheet 1 of 2

Boring PL2-035A

Project	Boeing Plant 2 ICM	Start Date 09/15/94	Finish Date 09/15/94
Location	Plant 2 Seattle, W	Driller	Drilling Co. Cascade Drilling
Project No.	03709-034-401	Drilling Method 4 in ID HSA	
Contractor	Weston	Sampling Method Not Sampled	
Logged by	Erik Lottsfeldt	Top of Casing (ft) 12.28	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 12.53	Total Depth (ft) 31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Asphalt
							GP	Gravelly fill.
5							SP	Sand with gravel (SP), very dark brown (10YR2/2), 85% medium sand, 15% gravel, medium dense, moist.
10							SP	Sand (SP), very dark gray (10YR3/1), 95% medium sand, 5% silt, very dense, wet.
15							SP-SM	Sand with silt (SP-SM), very dark gray (10YR3/1), 90% fine sand, 10% silt, medium dense, wet.
20							SP	Sand (SP), very dark gray (10YR3/1), 100% med. sand, med. dense, wet. @ 25ft very dense.

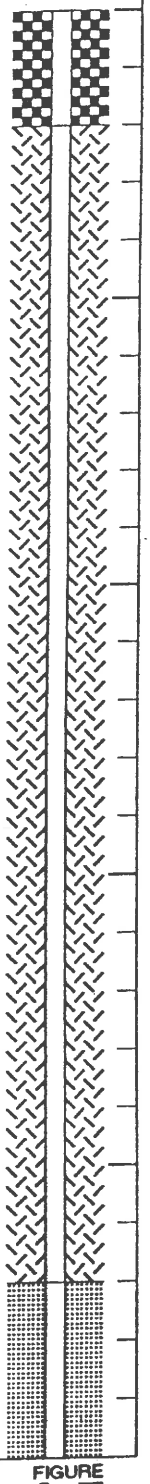


FIGURE A-7 1 of 2

Boring PL2-035A

Project	Boeing Plant 2 ICM	Start Date	09/15/94	Finish Date	09/15/94
Location	Plant 2 Seattle, W	Driller		Drilling Co.	Cascade Drilling
Project No.	03709-034-401	Drilling Method	4 in ID HSA		
Contractor	Weston	Sampling Method	Not Sampled		
Logged by	Erik Lottsfeldt	Top of Casing (ft)	12.28	Boring Diam. (in)	10
		Ground Surf. Elev. (ft)	12.53	Total Depth (ft)	31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
30								
35								
40								
45								

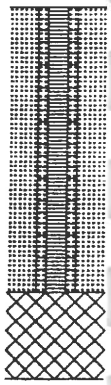


FIGURE A-7

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-1B-I

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/12/03
Location: Boeing Plant 2

Drilling Contractor: Cascade Drilling, Inc.
Method: Direct push/Hollow stem auger
Drill Rig: Probe/CME 75
Borehole: 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface							
			Asphalt Surfacing							2-inch Schedule, 40 flush-threaded PVC well casing
1–3			***Poorly-Graded Sand with Silt*** Brown, slightly moist, medium dense; mostly fine sand with some silt and trace of gravel							
4–8		SP-SM					21.5	No		Bentonite grout well seal
9–13		SP-SM	Brown and dark-gray, wet, medium dense; mostly fine sand with some silt			PP-1B-I (10')	65.0	No		Water level ATD Odor in soil Pea gravel layer at 11' Soil analyzed Method: 8260B
14–18		SP-SM	Dark-gray, wet, medium dense; mostly fine sand with some silt				0	No		Strong odor in soil
19–23		SP-SM	Wood debris layer mixed with dark-gray wet sand				0	No		Poor soil recovery due to wood layer
24–28		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand				29.4	No		Odor in soil Some wood debris at 24'
29–30		SP	Dark-gray, wet, dense; mostly coarse sand				22.0	No		

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-1B-I

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/12/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
31			Dark-gray, wet, dense; mostly coarse sand							2-inch Schedule, 40 flush-threaded PVC well casing
32										
33										
34		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand with some wood debris				0	No		
35										
36										
37										Bentonite grout well seal
38										
39		SP	Dark-gray, wet, dense; mostly coarse sand				0	No		
40										
41										
42										
43										
44		SP	Dark-gray, wet, dense; mostly coarse sand				0	No		Bentonite chip well seal
45										
46										10X20 CSSI sand filter pack
47										
48										10-slot machine-cut PVC well screen
49		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, dense; mostly fine sand with some silt				0	No		
50										Flush-threaded PVC end cap
51			End of Borehole							
52										Centralizers located @ 24' & 47' & 50' depths
53										
54										
55										
56										
57										
58										
59										
60										

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-1B-O

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/12/03
Location: Boeing Plant 2

Drilling Contractor: Cascade Drilling, Inc.
Method: Direct push/Hollow stem auger
Drill Rig: Probe/CME 75
Borehole: 8"

Depth	Log	USCS Code	Description	Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
			Ground Surface							
0			***Asphalt Surfacing***							2" Schedule 40 flush-threaded PVC well casing
1–3			***Poorly-Graded Sand with Silt*** Brown, dry, medium dense; mostly fine sand with some silt and little gravel							Bentonite grout well seal
4–8		SP-SM					0	No		Gray, coarse sand with some silt at 6'
9–13		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt				38.3	No		Strong odor in soil; Water level ATD
14–18		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly fine sand				0	No		Strong odor in soil
19–23		SP	Dark-gray, wet, medium dense; mostly fine sand				0	Yes		Strong odor in soil Sheen noted @ 20 feet bgs.
24–28		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand				0	No		Odor in soil
29–30		SP	Dark-gray, wet, dense; mostly coarse sand				0	No		

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-1B-O

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/12/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
31			Dark-gray, wet, dense; mostly coarse sand							2" Schedule 40 flush-threaded PVC well casing
32										
33										
34										Bentonite grout well seal
35		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				0	No		
36										
37										
38										
39										
40		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				0	No		
41										
42										
43										
44										
45		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				0	No		Bentonite chip well seal
46										
47										10 X 20 CSSI sand filter pack
48										
49										10-slot machine-cut PVC well screen
50		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				0	No		Flush-threaded PVC end cap
51										
52			End of Borehole							Centralizers located @ 24' & 47' & 50' depths.
53										
54										
55										
56										
57										
58										
59										
60										

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-2B-I

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/11/03
Location: Boeing Plant 2

Drilling Contractor: Cascade Drilling, Inc.
Method: Direct push/Hollow stem auger
Drill Rig: Probe/CME 75
Borehole: 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface							
			Asphalt Surfacing							Bentonite grout well seal
1–3			***Poorly-Graded Sand with Silt*** Brown, moist, medium dense; mostly fine sand with some silt							2" Schedule 40 flush-threaded PVC well casing
4–5		SP-SM					8.9	No		
6–8										
9										Water level ATD
9–10		SP-SM	Brown, wet, medium dense; mostly fine sand with some silt				16.5	No		
11–13										
14–15		SP-SM	Dark-gray, wet, medium dense; mostly fine sand with some silt				24.5	No		
16–18										
19–20		SP-SM	Dark yellowish gray, wet, medium dense; mostly fine sand				5.7	No		
21–23										
24–25		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand			PP-2B-I (25')	39.1	No		Soil analyzed method: 8260B
26–28										
29–30		SP	Dark-gray, wet, dense; mostly coarse sand				16.6	No		

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-2B-I

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/11/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
31–33			Dark-gray, wet, dense; mostly coarse sand					No		2" Schedule 40 flush-threaded PVC well casing
34–36		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				0	No		Bentonite grout well seal
37–39										
39–43		SP	Dark-gray, wet, dense; mostly coarse sand				0	No		
44–48		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, dense; mostly fine sand with some silt				0	No		Bentonite chip well seal; 10 X 20 CSSI sand filter pack
49–51		SP-SM	Dark-gray, wet, dense; mostly fine sand with some silt				0	No		10-slot machine-cut PVC well screen; Flush-threaded PVC end cap
52–60			End of Borehole							Centralizers located @ 24' & 47' & 50' depths.

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-2B-O

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/10/03
Location: Boeing Plant 2

Drilling Contractor: Cascade Drilling, Inc.
Method: Hollow stem auger
Drill Rig: CME 75
Borehole: 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface							
			Asphalt Surfacing							
1–3			***Poorly-Graded Sand with Silt*** Brown, slightly moist, medium dense; mostly fine sand with some silt and trace gravel							2" Schedule 40 flush-threaded PVC well casing
4–5		SP-SM					11	No		
8										Water level ATD
9–13		SP-SM	Brown, slightly moist, medium dense; mostly fine sand with some silt and trace gravel				0	No		
14–18		SP-SM	***Poorly-Graded Sand with Silt*** Gray, moist, medium dense; mostly fine sand with some silt				0	No		
19–23		SP-SM	***Poorly-Graded Sand with Silt*** Brown, slightly moist, medium dense; mostly fine sand with some silt				5.0	No		
24–28		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, dense; mostly fine sand with some silt				0	No		
29–30		SP-SM	Dark-gray, wet, medium dense; mostly fine sand with some silt				0	No		

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-2B-O

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Hollow stem auger
Date of Drilling: 11/10/03	***Drill Rig:*** CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
31–33			Dark-gray, wet, medium dense; mostly fine sand with some silt					No		2" Schedule 40 flush-threaded PVC well casing
34–38		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, very dense; mostly fine sand with some silt				0	No		Bentonite grout well seal
39–43		SP-SM	Dark-gray, wet, very dense; mostly fine sand with some silt				1.6	No		
44–48		SP-SM	***Poorly-Graded Sand with Silt*** Gray, moist, very dense; mostly fine sand with some silt				8.2	No		Bentonite chip well seal; 10 X 20 CSSI sand filter pack
49–51		SP-SM	***Poorly-Graded Sand with Silt*** Gray, moist, dense; mostly fine sand with some silt				21.2	No		10-slot machine-cut PVC well screen; Flush-threaded PVC end cap
52–60			End of Borehole							Centralizers located @ 24' & 47' & 50' depths.

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-3A-I

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/12/03
Location: Boeing Plant 2

Drilling Contractor: Cascade Drilling, Inc.
Method: Hollow stem auger
Drill Rig: CME 75
Borehole: 8"

Depth	Log	USCS Code	Description	Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface							
			Asphalt Surfacing							
1			***Poorly-Graded Sand with Silt*** Brown, dry, medium dense; mostly fine sand with some silt							2" Schedule 40 flush-threaded PVC well casing
2										
3										Bentonite grout well seal
4										
5		SP-SM					106	No		
6										
7										
8										
9										Water level ATD
10		SP-SM	Brown, wet, loose; mostly fine sand with some silt				24.0	No		
11										
12										Bentonite chip well seal
13										
14										10 X 20 CSSI sand filter pack
15		SP-SM	***Poorly-Graded Sand with Silt*** Dark-brown to dark-gray, wet, medium dense; mostly fine sand with some silt				0	No		
16										
17										
18										10-slot machine-cut PVC well screen
19										
20		SP-SM	Dark-gray, wet, medium dense; mostly fine sand with some silt				0.5	No		Flush-threaded PVC end cap
21			End of Borehole							
22										
23										
24										
25										

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-3B-I

Client: Boeing	***Drilling Contractor:*** Boart Longyear/Cascade Drilling
Logged By: Tatsu Komada	***Method:*** Sonicator/Hollow stem auger
Date of Drilling: 11/12/03	***Drill Rig:*** Sonic/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface							
			Asphalt Surfacing							
1–4			***Poorly-Graded Sand with Silt*** Brown, dry, medium dense; mostly fine sand with some silt							2" Schedule 40 flush-threaded PVC well casing
5		SP-SM					106	No		
9										Water level ATD
10		SP-SM					24.0	No		
14–15		SP-SM	***Poorly-Graded Sand with Silt*** Dark-brown to dark-gray, wet, medium dense; mostly fine sand				0	No		
19–20		SP-SM	Dark-gray, wet, medium dense; mostly fine sand				0.5	No		
21–30		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand					No		

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-3B-I

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/12/03
Location: Boeing Plant 2

Drilling Contractor: Boart Longyear/Cascade Drilling
Method: Sonicator/Hollow stem auger
Drill Rig: Sonic/CME 75
Borehole: 8"

Depth	Log	USCS Code	Description	Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
31		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand							2" Schedule 40 flush-threaded PVC well casing
32							0	No		Bentonite grout well seal
33			Dark-gray, wet, medium dense; mostly coarse sand							
34										First sample interval stopped at 35'
35			Same as 32.5-35' Wood debris at 35'							
36										
37										
38			Same as 32.5-35'							
39										
40		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray to brown, wet, medium dense; mostly fine sand with some silt				0	No		
41										
42							0	No		Second sample interval stopped at 45'
43			Brown, wet, medium dense; mostly fine sand silt layer at 42.5-43.5' Brown to dark-gray, wet, medium dense; mostly fine sand with some silt at 43.5-45'							
44										Bentonite chip well seal
45			Gray, wet, medium dense; mostly fine sand with some silt							
46										10 X 20 CSSI sand filter pack
47										
48										10-slot machine-cut PVC well screen
49										
50							0	No		Flush-threaded PVC end cap
51			End of Borehole							Centralizers located at 24' & 47' & 50' depths
52										
53										
54										
55										
56										
57										
58										
59										
60										

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-3C-I

Client: Boeing	***Drilling Contractor:*** Boart Longyear
Logged By: Tatsu Komada	***Method:*** Sonicator
Date of Drilling: 11/14/03	***Drill Rig:*** Sonic
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface							
			Asphalt Surfacing							
1–4			***Poorly-Graded Sand with Silt*** Brown, dry, medium dense; mostly fine sand with some silt							2" Schedule 40 flush-threaded PVC well casing; Bentonite grout well seal
5–8		SP-SM				PP-3C-I (5')	106	No		Soil analyzed method: 8260B
9–14		SP-SM	Brown,wet, loose; mostly fine sand with some silt				24.0	No		Water level ATD
15–19		SP-SM	***Poorly-Graded Sand with Silt*** Dark-brown to dark-gray, wet, medium dense; mostly fine sand				0	No		
20		SP-SM	Dark-gray, wet, medium dense; mostly fine sand			PP-3C-I (20')	0.5	No		Soil analyzed for TOC and grain size
21–30		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand			PP-3C-I(25-27.5')		No		Soil analyzed for vertical hydraulic conductivity (Shelby tube 25-27.5')
30–35		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand; Dark-gray, wet, medium dense; mostly coarse sand				0	No		First sample interval stopped at 35'

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-3C-I

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/14/03
Location: Boeing Plant 2

Drilling Contractor: Boart Longyear
Method: Sonicator
Drill Rig: Sonic
Borehole: 8"

Depth	Log	USCS Code	Description	Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
36			Same as 32.5-35' Wood debris at 35'							2" Schedule 40 flush-threaded PVC well casing
37										
38			Same as 32.5-35'							Bentonite grout well seal
39										
40		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray to brown, wet, medium dense; mostly fine sand with some silt				0	No		
41										
42							0	No		Second sample interval stopped at 45'
43		SP-SM	Brown, wet, medium dense; mostly fine silt layer (42.5-43.5') Brown to dark-gray, wet, medium dense; mostly fine sand with some silt (43.5-45')			PP-3C-I (43')				
44										
45			Gray, wet, medium dense; mostly fine sand with some silt							Soil analyzed for TOC & grain size at 43' and for vertical hydraulic conductivity at 43.5-46' (Shelby tube)
46										
47										
48						PP-3C-I(43.5-46')				
49										
50							0	No		
51			Few large gravel noted							
52										
53										
54										
55			Same as 51-55'				0	No		Soil analyzed for TOC & grain size at 57'
56						PP-3C-I (57')				
57										
58			Increasing silt, no gravel							Soil analyzed for vertical hydraulic conductivity at 57.5-60' (Shelby tube)
59						PP-3C-I(57.5-60')				
60			Poor recovery between 60' and 67.5'				0	No		
61										
62										
63										
64										
65										
66										
67										
68		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt							
69										
70										

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-3C-I

Client: Boeing	***Drilling Contractor:*** Boart Longyear
Logged By: Tatsu Komada	***Method:*** Sonicator
Date of Drilling: 11/14/03	***Drill Rig:*** Sonic
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
71–91		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt							2" Schedule 40 flush-threaded PVC well casing
			Decreasing silt with depth							Bentonite grout well seal
80–85			Dark-gray, wet, medium dense; mostly fine sand with some silt			PP-3C-I (85')		No		Soil analyzed for TOC & grain size at 85'
										Bentonite chip well seal
85–87			Not sampled							10 X 20 CSSI sand filter pack
88–91		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt			PP-3C-I(87.5-90')		No		10-slot machine-cut PVC well screen
										Flush-threaded PVC end cap
										Soil analyzed for vertical hydraulic conductivity at 87.5-90' (Shelby tube)
91–105			End of Borehole							Centralizers located at 25' & 87' & 90' depths

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-4B-I

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/11/03
Location: Boeing Plant 2

Drilling Contractor: Cascade Drilling, Inc.
Method: Direct push/Hollow stem auger
Drill Rig: Probe/CME 75
Borehole: 8"

Depth	Log	USCS Code	Description	Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
			Ground Surface							
0			***Asphalt Surfacing***							
1–3			***Poorly-Graded Sand*** Yellowish gray, dry, medium dense;coarse sand with few gravel							2" Schedule 40 flush-threaded PVC well casing; Bentonite grout well seal
4–8		SP					9.1	No		
9–13		SP-SM	***Poorly-Graded Sand with Silt*** Brown, wet, medium dense; mostly fine sand with some silt			PP-4B-I (10')	119	No		Water level ATD; Re-sampled due to poor recovery Sample analyzed method: 8260B
14–18		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand				3.9	No		
19–23		SP-SM	Dark-gray, wet, medium dense; mostly fine sand				0	No		
24–28		SP-SM	Dark-gray, wet, medium dense; mostly fine sand				0	No		
29–30		SP	***Poorly-Graded Sand***				1.5	No		

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-4B-I

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/11/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
31			Dark-gray, wet, dense; mostly coarse sand							2" Schedule 40 flush-threaded PVC well casing
32										
33										Bentonite grout well seal
34		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				34.5	No		
35										
36										
37										
38										
39		SP	Dark-gray, wet, dense; mostly coarse sand				16.5	No		
40										
41										
42										
43										
44		SP	Dark-gray, wet, dense; mostly coarse sand				0	No		Bentonite chip well seal
45										
46										10 X 20 CSSI sand filter pack
47										
48										10-slot machine-cut PVC well screen
49		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, dense; mostly fine sand with some silt				0	No		
50										
51			End of Borehole							Flush-threaded PVC end cap
52										Centralizers located @ 25' & 47' & 50' depths
53										
54										
55										
56										
57										
58										
59										
60										

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-4B-O

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/10/03
Location: Boeing Plant 2

Drilling Contractor: Cascade Drilling, Inc.
Method: Direct push/Hollow stem auger
Drill Rig: Probe/CME 75
Borehole: 8"

Depth	Log	USCS Code	Description	Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface							
			Asphalt Surfacing							2" Schedule 40 flush-threaded PVC well casing
1–8		SP	***Poorly-Graded Sand*** Light brown, dry, medium dense; fine sand with trace gravel				0.0	No		Bentonite grout well seal; Water level ATD
9–13		SP-SM	***Poorly-Graded Sand with Silt*** Brown, moist, medium dense; mostly fine sand with some silt				7.9	No		
14–18		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt				0	No		
19–23		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt				0	No		
24–28		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt				0	No		
29–30		SP	***Poorly-Graded Sand***				0	No		Hit wood debris

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-4B-O

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/10/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
31–33			Dark-gray, wet, dense; mostly coarse sand; wood debris noted at 29-30' bgs							2" Schedule 40 flush-threaded PVC well casing; Bentonite grout well seal
34–36		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand				0	No		
37–39										
39–43		SP	Dark-gray, wet, dense; mostly coarse sand				2.7	No		
44–46		SP	Dark-gray, wet, dense; mostly coarse sand				0	No		Bentonite chip well seal; 10 X 20 CSSI sand filter pack
47–49										10-slot machine-cut PVC well screen
49–51		SP	Dark-gray, wet, dense; mostly coarse sand				0	No		Flush-threaded PVC end cap
51			End of Borehole							Centralizers located @ 25' & 47' & 50' depths
52–60										

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-5B-I

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/12/03
Location: Boeing Plant 2

Drilling Contractor: Cascade Drilling, Inc.
Method: Direct push/Hollow stem auger
Drill Rig: Probe/CME 75
Borehole: 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval / Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface						
			Asphalt Surfacing						
1–8		SP-SM	***Poorly-Graded Sand with Silt*** Brown, moist, medium dense; mostly fine sand with some silt.			0.0	No		2" Schedule 40 flush-threaded PVC well casing; Bentonite grout well seal
9–13		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt			16.3	Yes		Water level ATD; Strong odor noted
14–18		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt		PP-5B-I (15')	53.7	Yes		Strong odor noted; Sample analyzed Method: 8260B
19–23		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand			0	Yes		Strong odor noted
24–28		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand			0	Yes		Strong odor noted
29–30		SP	***Poorly-Graded Sand***			0	Yes		Strong odor noted

Project No.: 17503.2

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: PP-5B-I

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/12/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 8"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval / Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
31			Dark-gray, wet, dense; mostly coarse sand						2" Schedule 40 flush-threaded PVC well casing
32									
33									Bentonite grout well seal
34		SP	***Poorly-Graded Sand*** Dark-gray, wet, dense; mostly coarse sand			0	Yes		Odor noted
35									
36									
37									
38									
39		SP	Dark-gray, wet, dense; mostly coarse sand			0	Yes		Odor noted
40									
41									
42									
43									
44		SP	Dark-gray, wet, dense; mostly coarse sand			0	Yes		Bentonite chip well seal
45									
46									10 X 20 CSSI sand filter pack
47									
48									10-slot machine-cut PVC well screen
49		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, dense; mostly fine sand with some silt			0	Yes		
50									Flush-threaded PVC end cap
51			End of Borehole						Centralizers located @ 25' & 47' & 50' depths
52									
53									
54									
55									
56									
57									
58									
59									
60									

Project No.: 17503.2

DDC2 Stripping Well Log

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: DDC2-66-1

Client: Boeing
Logged By: Tatsu Komada
Date of Drilling: 11/12/03
Location: Boeing Plant 2

Drilling Contractor: Cascade Drilling, Inc.
Method: Direct push/Hollow stem auger
Drill Rig: Probe/CME 75
Borehole: 10"

Depth	Log	USCS Code	Description	Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
			Ground Surface							
0			***Asphalt Surfacing***							See attached sheet for detailed well specifications
1–3			***Poorly-Graded Sand with Silt*** Brown, moist, medium dense; mostly fine sand with some silt							
4–5		SP-SM					562	No		
6–8										
9										Water level ATD
9–10		SP-SM	Brown, wet, medium dense; mostly fine sand with some silt			DDC2-66-1 (10')	713	No		
11–13										
14–15		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt				698	No		Soil analyzed Method: 8260B
16–18										
19–20		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand				94.1	No		
21–23										
24–25		SP	Dark-gray, wet, medium dense; mostly coarse sand				88.8	No		
26–28										
29–30		SP	Dark-gray, wet, dense; mostly coarse sand				135	No		
31–32										
			End of Borehole							
33–35										

Project No.: 17503.2

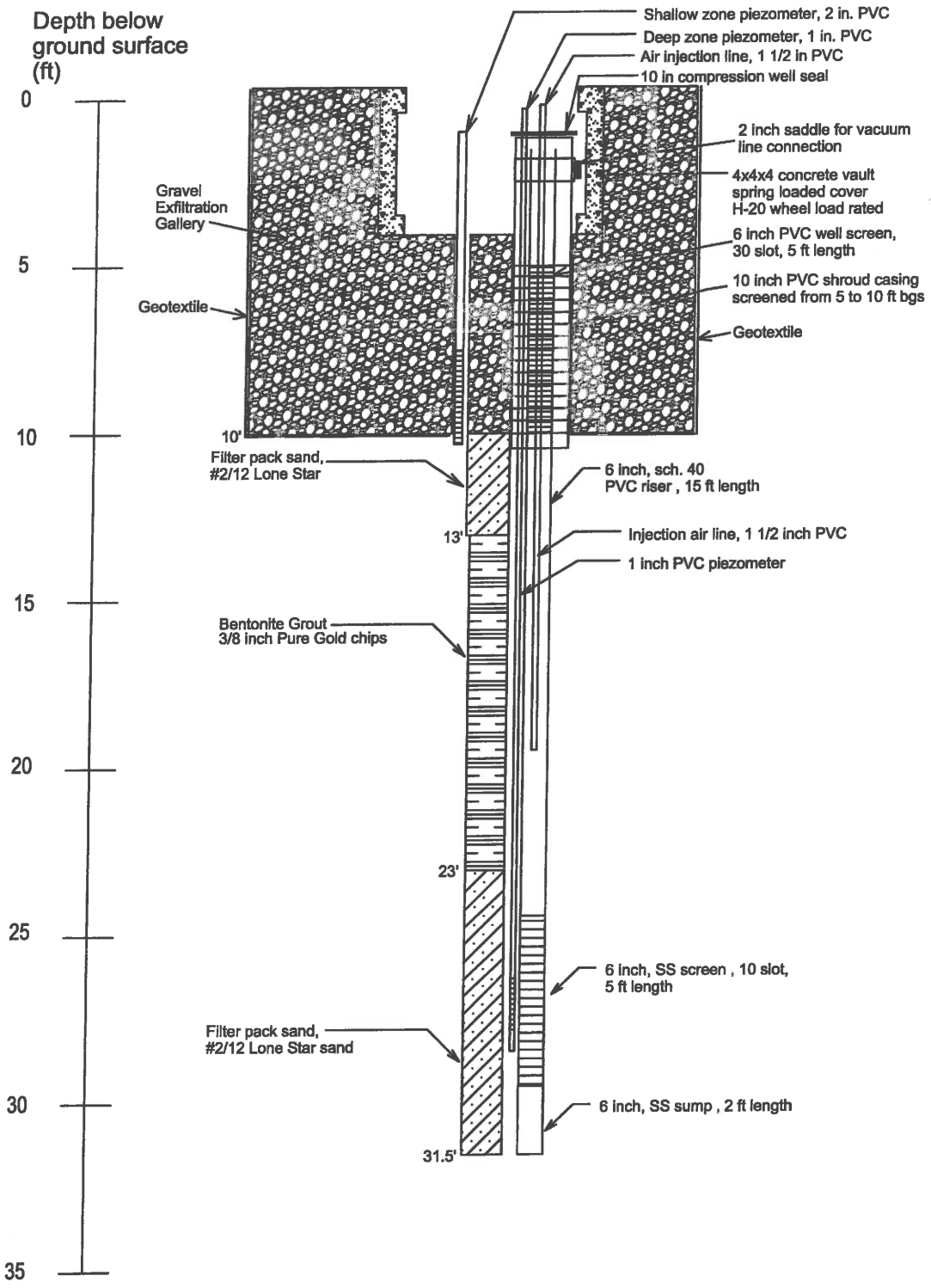
ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: DDC2-66-2

Client: Boeing	***Drilling Contractor:*** Cascade Drilling, Inc.
Logged By: Tatsu Komada	***Method:*** Direct push/Hollow stem auger
Date of Drilling: 11/12/03	***Drill Rig:*** Probe/CME 75
Location: Boeing Plant 2	***Borehole:*** 10"

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Sample	PID (ppm)	Sheen	Well Data	Comments
0			Ground Surface							
			Asphalt Surfacing							See attached sheet for detailed well specifications
1–3			***Poorly-Graded Sand with Silt*** Brown, dry, medium dense; mostly fine sand with some silt							
4–8		SP-SM					1.1	No		Water level ATD
9–13		SP-SM	Brown, wet, medium dense; mostly fine sand with some silt				18.8	No		
14–18		SP-SM	***Poorly-Graded Sand with Silt*** Dark-gray, wet, medium dense; mostly fine sand with some silt			DDC2-66-2 (15')	84.2	No		Soil analyzed Method: 8260B
19–23		SP	***Poorly-Graded Sand*** Dark-gray, wet, medium dense; mostly coarse sand				28.0	No		
24–28		SP	Dark-gray, wet, medium dense; mostly coarse sand				3.8	No		
29–31		SP	Dark-gray, wet, dense; mostly coarse sand				2.1	No		
32–35			End of Borehole							

Project No.: 17503.2



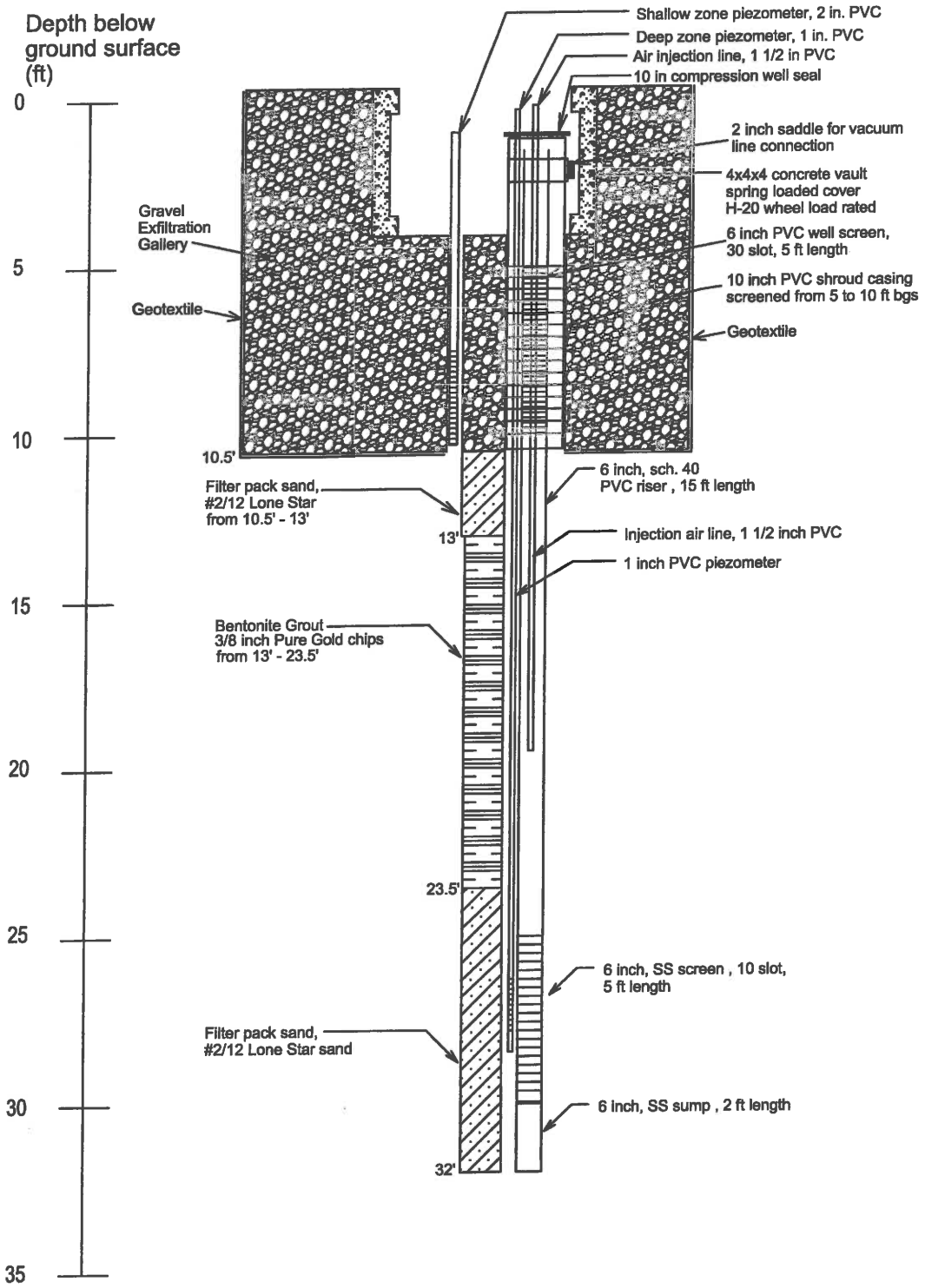
KEY:

ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 5

CONSTRUCTION DIAGRAM OF DDC2-66-2 STRIPPING WELL

PROJECT	BUILDING 2-66 SHEETPILE INTERIM MEASURE		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	BOEING PLANT 2 SEATTLE / TUKWILA, WA		
SHEET 1 of 1	DRAWN BY TK	REVIEWED BY JD	DATE 10/18/04



KEY:

ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 4

CONSTRUCTION DIAGRAM OF DDC2-66-1 STRIPPING WELL

PROJECT	BUILDING 2-66 SHEETPILE INTERIM MEASURE
PREPARED FOR	THE BOEING COMPANY
LOCATION	BOEING PLANT 2 SEATTLE / TUKWILA, WA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	TK	JD	10/18/04

2" well diameter		
depth in feet	gallons	cubic feet
	x 0.163	x 0.134
10	1.6	0.22
11	1.8	0.24
12	2.0	0.26
13	2.1	0.28
14	2.3	0.31
15	2.4	0.33
16	2.6	0.35
17	2.8	0.37
18	2.9	0.39
19	3.1	0.41
20	3.3	0.44
21	3.4	0.46
22	3.6	0.48
23	3.7	0.50
24	3.9	0.52
25	4.1	0.55
26	4.2	0.57
27	4.4	0.59
28	4.6	0.61
29	4.7	0.63
30	4.9	0.66
31	5.1	0.68
32	5.2	0.70
33	5.4	0.72
34	5.5	0.74
35	5.7	0.76
36	5.9	0.79
37	6.0	0.81
38	6.2	0.83
39	6.4	0.85
40	6.5	0.87
41	6.7	0.90
42	6.8	0.92
43	7.0	0.94
44	7.2	0.96
45	7.3	0.98
46	7.5	1.00
47	7.7	1.03
48	7.8	1.05
49	8.0	1.07
50	8.2	1.09

4" well diameter		
depth in feet	gallons	cubic feet
	x 0.653	x 0.134
10	6.5	0.88
11	7.2	0.96
12	7.8	1.05
13	8.5	1.14
14	9.1	1.23
15	9.8	1.31
16	10.4	1.40
17	11.1	1.49
18	11.8	1.58
19	12.4	1.66
20	13.1	1.75
21	13.7	1.84
22	14.4	1.93
23	15.0	2.01
24	15.7	2.10
25	16.3	2.19
26	17.0	2.28
27	17.6	2.36
28	18.3	2.45
29	18.9	2.54
30	19.6	2.63
31	20.2	2.71
32	20.9	2.80
33	21.5	2.89
34	22.2	2.98
35	22.9	3.06
36	23.5	3.15
37	24.2	3.24
38	24.8	3.33
39	25.5	3.41
40	26.1	3.50
41	26.8	3.59
42	27.4	3.68
43	28.1	3.76
44	28.7	3.85
45	29.4	3.94
46	30.0	4.03
47	30.7	4.11
48	31.3	4.20
49	32.0	4.29
50	32.7	4.38

Health and Safety Plan

ENVIRONMENTAL PARTNERS INC

Health and Safety Plan for Boeing Plant 2

Boeing Plant 2
Seattle/Tukwila, Washington

Prepared For:

The Boeing Company
P.O. Box 3707
M/C 1W-12
Seattle/Tukwila, WA 98124

December 28, 2011

Prepared By:

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, WA 98027
(425) 395-0010

Greg McCormick, LG
Senior Geologist

BOEING CONTACTS

Jennifer Parsons: ..... **(206) 715-7981 (cell)**
Will Ernst: ..... **(425) 891-7724 (cell)**
Mike Gleason: ..... **(206) 290-6576**

EPI CONTACTS

Greg McCormick: ..... **(425) 922-6392 (cell) (425) 395-0028 (office)**
Doug Kunkel: ..... **(425) 241-8170 (cell) (425) 395-0016 (office)**

GOLDER CONTACT

Ted Norton ..... **(206) 755-4970 (cell) (425) 885-7648 (office)**

EMERGENCY CONTACTS AND EMERGENCY INFORMATION

****Boeing Emergency Number: ..... 206-655-2222 Call First****
POLICE: **911**
FIRE: **911**
FIRST AID: **911**

In the event of an emergency, be prepared to give the following information:

- Location of Emergency

  Site Location: ..... **The Boeing Company**
  7755 East Marginal Way South
  Seattle, Washington 98108
  Landmarks: ..... **West of Boeing Field and East of the Duwamish Waterway**
  Nearest Cross Street: ..... **South of 16th Ave South**

- Phone Number That You Are Calling From: ..... **LOOK ON PHONE**

- What Happened?
  * Type of Accident
  * Type(s) of Injuries
- How Many People Need Help?

Additional Emergency Information:

- **Boeing Emergency Number: 206-655-2222**

- Hospital Name: ..... **Harborview Medical Center**
  Address: ..... **325 9th Avenue (Map in Figures Section)**
  City, State, Zip Code: ..... **Seattle, Washington 98104**
  Phone Number: ..... **(206) 731-3000**

- Contact a Principal at Environmental Partners, Inc. after Emergency Services have been called.
  Environmental Partners, Inc. ..... **(425) 395-0010 (office)**
  Thom Morin (Principal) ..... **(206) 342-6957 (cell)**
  Doug Kunkel (Principal) ..... **(425) 241-8170 (cell)**

1.0 PLAN OBJECTIVES AND APPLICABILITY

This Health and Safety Plan has been written to comply with the standards prescribed by the Occupational Safety and Health Act (OSHA) and the Washington Industrial Safety and Health Act (WISHA).

The purpose of this health and safety plan is to establish protection standards and mandatory safe practices and procedures for all personnel involved with field activities associated with the North Area Data Gap Investigation at the Boeing Plant 2. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may occur during field activities. The plan consists of site and facility descriptions, a summary of work activities, an identification and evaluation of chemical and physical hazards, monitoring procedures, personnel responsibilities, a description of site zones, decontamination and disposal practices, emergency procedures, and administrative requirements.

Mr. Greg McCormick, of Environmental Partners, Inc. (EPI) is the designated Site Health and Safety Officer. Mr. Doug Kunkel and Mr. Ted Norton are designated as alternate Site Health and Safety Officers. As Site Health and Safety Officer, Mr. McCormick has total responsibility for ensuring that the provisions outlined herein adequately protect worker health and safety and that the procedures outlined by this Health and Safety Plan are properly implemented. In this capacity, Mr. McCormick will conduct ongoing oversight and site inspections to ensure that this Health and Safety Plan remains current with potentially changing site conditions. Mr. McCormick has the authority to make health and safety decisions that may not be specifically outlined in this plan, should site conditions warrant such actions. In the event that Mr. McCormick leaves the site while work is in progress, an alternate Site Health and Safety Officer will be designated.

The provisions and procedures outlined by this Health and Safety Plan apply to all contractors, subcontractors, owner's representatives, oversight personnel, and any other persons involved with the field activities described herein. All such persons are required to read this Health and Safety Plan and indicate that they understand its contents by signing the Site Health and Safety Officer's copy of the Plan. In addition, all such persons are required to provide documentation of their current certification under Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation, 29 CFR 1910.120. Copies of this Health and Safety Plan have been distributed to a designated representative of the following companies and/or organizations:

- The Boeing Company

This Health and Safety Plan is based on information that was available as of the date indicated on the Title Page. It is possible that additional hazards that are not specifically addressed by this Health and Safety Plan may exist at the work-site, or may be created as a result of on-site activities. It is EPI's firm belief that active participation in health and safety procedures and acute awareness of on-site conditions by all site workers is crucial to the health and safety of everyone involved. If you identify a site condition that is not addressed by this Health and Safety Plan, or if you have any questions or concerns about site conditions or this Plan, immediately notify the Site Health and Safety Officer.

2.0 BACKGROUND INFORMATION

The work site is located at: The Boeing Company, Plant 2
7755 East Marginal Way South
Seattle, Washington 98108

2.1 Site History

This Health and Safety Plan relates specifically to data gap investigation and interim measure work that may be performed in any area of the Facility. Figure 2-1 shows the general outline and boundaries of Boeing Plant 2. The original buildings of the Plant were constructed in the mid and late 1930s. Building construction accelerated in the 1950s and 1960s. The facility is almost entirely paved or covered by buildings limiting the potential for incidental exposure to contaminated soil and groundwater. Portions of the facility bordering Slip 4 and the Duwamish Waterway are unpaved and there is the opportunity to access potentially contaminated soil, groundwater, sediment, and surface water in those areas.

2.2 Scope of Work

Following is a brief summary of the on-site work activities that are covered by this Health and Safety Plan:

Task 1 – Monitoring well installation and development
Task 2 – Soil and groundwater sampling using direct-push probes
Task 3 – Groundwater sampling in monitoring wells
Task 4 – Surveying well and probe locations
Task 5 – Construction or demolition oversight

3.0 HAZARD EVALUATION AND RISK ANALYSIS

In general, there are three broad hazard categories that may be encountered during site work; Chemical Exposure Hazards, Fire/Explosion Hazards, and Physical Hazards. Sections 3.1 through 3.3 deal with specific hazards falling within each of these broad categories.

3.1 Chemical Exposure Hazards

Table 1 presents chemical-specific data regarding permissible exposure levels (PELs), likely pathways of exposure, target organs that will likely be affected by exposure, and likely symptoms of exposure for hazardous substances that are potentially present at the site. Table 1 data were compiled from the NIOSH Pocket Guide to Chemical Hazards, June 2007 edition. It should be noted that the PELs are the regulated limits; Recommended Exposure Limits (RELs) by NIOSH are guidance but are listed as a reference.

Table 1: Chemical-Specific Exposure Data

Chemical Name	REL*	PEL*	IDLH*	Exposure Route	Target Organs	Symptoms
Acetone	250 ppm	1000 ppm	2,500 ppm	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system	Irritation of eyes, nose, throat; headache; dizziness; dermatitis
Arsenic (elemental)	0.002 mg/m^3	0.010 mg/m^3	5 mg/m^3	Inhalation; ingestion; skin/eye contact	Skin; respiratory system; kidneys; central nervous system; liver; GI tract; respiratory system	Irritation of skin; dermatitis; respiratory distress; diarrhea; kidney damage; muscle tremor; convulsions; GI tract; reproductive effects; lover damage
Benzene	0.1 ppm	10 ppm (Table Z-2 1910.1000)	500 ppm	Inhalation; ingestion; skin/eye contact	Blood, central nervous system; skin; bone marrow; eyes; respiratory system	Irritation of eyes, nose, respiratory; giddiness; headache; nausea; staggered gait; fatigue; anorexia; lassitude; dermatitis; bone marrow; depression
cis-1,2-Dichloroethene	200 ppm	200 ppm	1000 ppm	Inhalation; ingestion; skin/eye contact	Eyes, respiratory system, central nervous system	Irritation of eyes and respiratory system, central nervous system depression.
Copper	0.1 mg/m^3	0.1 mg/m^3	100 mg/m^3	Inhalation; ingestion; skin/eye contact	Eyes, skin, respiratory system, (increased risk with Wilson's disease)	Irritation eyes, upper respiratory system; metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough, lassitude (weakness, exhaustion); metallic or sweet taste; discoloration skin, hair
Cyanide	5 mg/m^3	5 mg/m^3	25 mg/m^3	Inhalation, ingestion, skin absorption, skin/eye contact	Eyes, skin, respiratory system, central nervous system, thyroid, blood, cardiovascular system	Irritation of eyes, skin; upper respiratory system; asphyxia; weakness; headache; confusion; nausea; vomiting; increased respiration rate; slow gasping respiration; thyroid, blood changes
Ethyl benzene	100 ppm	100 ppm	800 ppm	Inhalation; ingestion; skin/eye contact	Eyes; upper respiratory system; skin; central nervous system	Irritation of eyes, mucous membrane; headache; dermatitis; narcosis; coma

Table 1: Chemical-Specific Exposure Data (continued)

Chemical Name	REL*	PEL*	IDLH*	Exposure Route	Target Organs	Symptoms
Ethylene Dichloride (1,2-dichloroethane)	1 ppm	50 ppm	50 ppm	Inhalation; ingestion; skin/eye contact	Eyes; skin; kidneys, liver, central nervous system; cardiovascular system	Irritation of eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage
Heptane	85 ppm	500 ppm	750 ppm	Inhalation; ingestion; skin/eye contact	Skin; respiratory system; central nervous system	Lightheadedness, vertigo; loss of appetite, nausea; unconsciousness
Hexane	50 ppm	500 ppm	1,100 ppm	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system; central nervous system; peripheral nervous system	Irritation of eyes, nose; lightheadedness; nausea
Lead (elemental)	0.050 mg/m^3	0.050 $mg/m^{3(}$	100 mg/m^3	Inhalation; ingestion, direct contact	Eyes; GI tract; central nervous system; kidneys; blood; gingival tissue	Weakness; lassitude; insomnia; facial pallor; pale eyes; anorexia; low weight; malnutrition; constipation; abdominal pain; colic; anemia; gingival lead line; tremor; paralysis of wrist, ankles; encephalopathy; kidney disease; irritated eyes; hypotension
Methylene Chloride	Lowest possible exposure	25 ppm (29 CFR 1910.1052)	2,300 ppm	Inhalation; ingestion; skin absorption, skin and/or eye contact	Eyes; skin; central nervous system; cardiovascular system	Irritation of eyes, skin; lightheadedness; somnolence
Methyl Ethyl Ketone Peroxide	0.2 ppm	---	Not determined	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system; liver; kidneys	Irritation of eyes, skin, nose, throat; cough; blisters; vomiting; blurred vision
Phosphoric Acid	1 mg/m^3	1 mg/m^3	1,000 mg/m^3	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system	Irritation of eyes, skin, upper respiratory system; eye and skin burns
Tetrachloroethene	Minimize expose concentrations	100 ppm	150 ppm	Inhalation; ingestion; absorption; skin/eye contact	Eyes, skin, respiratory system, liver, kidneys, central nervous system	Irritation of eyes, nose, throat, nausea, flush face and neck, vertigo, dizziness, incoordination, somnolence, skin erythema (redness), liver damage (carcinogen)
Toluene	100 ppm	200 ppm	500 ppm	Inhalation, absorption, ingestion, skin/eye contact	Central nervous system; liver; kidneys; skin	Fatigue; confusion, euphoria, dizziness, headache; dilated pupils; lacrimation; nervousness; insomnia; Paresthesia; dermatitis
Trichloroethene	25 ppm	100 ppm	1000 ppm	Inhalation; ingestion; absorption; skin/eye contact	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Irritation eyes, skin; headache, visual disturbance, lassitude, dizziness, tremor, drowsiness, nausea, vomiting; dermatitis, cardiac arrhythmias, paresthesia, liver injury
Vinyl Chloride	Lowest possible exposure	1.0 ppm (29 CFR 1910.1017)	Not determined	Inhalation; skin/eye contact	Liver, central nervous system, blood, respiratory system, lymphatic system	Lassitude; abdominal pain; GI bleeding; enlarged liver; pallor or cyanosis of extremities; liquid; frostbite
Xylene	100 ppm	100 ppm	900 ppm	Inhalation; ingestion; absorption; skin/eye contact	Central nervous system; GI tract; blood; liver; kidneys; skin	Dizziness, excitement, drowsiness, uncoordination, staggered gait; irritation of eyes, nose, throat; corneal vacuolization; anorexia; nausea; vomiting, abdominal pain; dermatitis

REL – Recommended Exposure Limit (NIOSH) Pocked Guide to Chemical Hazards, June 1997
PEL – Permissible Exposure Limit (OSHA) Table Z-1 in 29 CFR 1910.1000
IDLH – Immediately Dangerous to Life or Health

3.2 Fire and Explosion Hazards

It is highly unlikely that vapors from the contaminated soils will be present at levels sufficient to create an explosion and/or fire hazard. It should be noted, however, that the 1996 Emergency Response Guidebook, published by the United States Department of Transportation, identifies the following explosion and/or fire hazards associated with fuel vapors.

- Heat, sparks, or flames may ignite flammable/combustible material
- Vapors may travel to a source of ignition and flash back
- Containers may explode in heat or fire
- Vapor explosion hazards may exist indoors, outdoors or in sewers
- Run-off to sewers may cause a fire or explosion hazard

3.3 Physical Hazards

Following is a summary of a variety of physical hazards that may be encountered on the job-site. For convenience, these hazards have been categorized into several general groupings and suggested preventative measures are also included.

Category	Cause	Prevention
Head Hazards	Falling and/or sharp objects, bumping hazards.	Hard hats will be worn by all personnel at all times when overhead hazards are present.
Foot/Ankle Hazards	Sharp objects, dropped objects, uneven and/or slippery surfaces, chemical exposure	Chemical resistant, steel-toed boots must be worn at all times on-site.
Eye Hazards	Sharp objects, poor lighting, bright lights (welding equipment), exposure due to splashes	Safety glasses/face shields will be worn when appropriate. Shaded welding protection will be worn when appropriate.
Electrical Hazards	Underground utilities, overhead utilities	Locator service mark-outs, visual inspection of work area prior to starting work.
Mechanical Hazards	Heavy equipment such as drill rigs, service trucks, excavation equipment, saws, drills, etc.	Competent operators, backup alarms, regular maintenance, daily mechanical checks, proper guards.
Noise Hazards	Machinery creating >85 decibels TWA, >115 decibels continuous noise, or peak at >140 decibels	Wear earplugs or protective ear muffs when appropriate.
Fall Hazards	Elevated and/or slippery or uneven surfaces. Trips caused by poor "house keeping" practices	Care should be used to avoid such accidents and to maintain good "house keeping". Fall protection devices must be used when work proceeds on elevated surfaces.
Lifting Hazards	Injury due to improper lifting techniques, overreaching/overextending, heavy objects	Use proper lifting techniques, mechanical devices where appropriate.
Lighting Accidents	Improper illumination	Work will proceed during daylight hours only, or under sufficient artificial illumination.

4.0 AIR/SITE MONITORING

The following section describes monitoring techniques and equipment that are to be used during site work. The Site Health and Safety Officer, or a designated alternate, is responsible for performing all monitoring activities. Air and site monitoring will be used to determine the level of protection that is required for work to proceed safely.

4.1 Air Monitoring

Air monitoring will be performed to ensure that personnel are not exposed to harmful vapor concentrations in excess of PELs. This monitoring will also be used to identify any increases in airborne contaminant concentrations during work activities.

4.1.1 Air Monitoring Equipment

All monitoring equipment used during this project will be inspected and calibrated at least daily to ensure that it is in proper working condition. If any piece of required monitoring equipment does not work properly, work in the monitored area will stop and will not continue until the monitoring equipment is repaired.

PID: Because exposure to airborne contaminants is expected to be limited to volatile organic compounds (VOCs), air monitoring will be performed with a Photoionization Detector (PID). The range of contaminants expected to be present require that the PID be equipped with a 10.2 eV detector lamp. The most likely airborne constituents include TCE and vinyl chloride. Because the site action level for VOCs is set and 5 ppm and the PEL for vinyl chloride is 1.0 ppm it will be important to determine if the total VOCs detected in the air contain greater than 1.0 ppm vinyl chloride. This determination will be made using colorimetric tubes specifically designed to detect and quantify vinyl chloride concentrations in the air. If total VOC concentrations are greater than 1.0 ppm over background (sustained for >15 minutes) EPI or Golder field personnel will use colorimetric tubes to evaluate the vinyl chloride concentration. If vinyl chloride is detected at concentrations greater than 1.0 ppm in the breathing zone engineering controls will be implemented and the breathing zone will be re-tested. Work will not be resumed until vinyl chloride concentrations are below 1.0 ppm in the breathing zone.

The PID must be "zeroed" and calibrated according to manufacturer instructions at least daily. Initial monitoring will be performed every 5 minutes, unless odors, tastes, or a PID response indicate the presence of airborne contaminants above background levels. If airborne contaminants are detected, air monitoring will be performed continuously. If airborne contaminants are not detected in the first 30 minutes of monitoring then monitoring intervals can be increased to every 15 minutes.

4.1.2 Action Levels

Photoionization Detector (PID)

Response	Length of Time	Protective Measure
< 5 ppm	15 minute average	Level D PPE
>1 ppm over background	15 minute average	Evaluate vinyl chloride concentrations relative to total VOCs using colorimetric tubes
5-25 ppm	15 minute average	Allow work area to vent. If persistent: Level C
25-50 ppm	Sustained over 15 minutes	Level C PPE, High-efficiency organic vapor cartridges in respirator
> 50 ppm	One (1) minute average	Vacate work area, notify Site Health and Safety Officer or designated alternate immediately

It should be noted that these action levels are based on the presence of benzene and vinyl chloride which have the lowest PELs and STELs of the compounds listed in Table 1.

4.2 Site Monitoring

The Site Health and Safety Officer will visually inspect the work-site at least daily to identify whether any new potential hazards have arisen. If and whenever possible, immediate measures will be taken to eliminate, or reduce the risks associated with these hazards.

4.3 Personal Protective Equipment (PPE)

It is anticipated that all field tasks will be performed in Level D PPE unless additional PPE is required because of task or site-specific upgrades. Level D PPE includes the following items:

- Nitrile inner and outer gloves
- Steel toe, steel shank work boots. Neoprene steel-toe, steel shank boots for ground water sampling and for drilling below the water table
- Hearing protection during drilling activities
- Hard hat during drilling activities and excavation work
- Safety glasses
- Cotton or Tyvek coveralls required

Level C PPE includes all Level D items plus the following:

- Full-face respirator equipped with organic vapor/HEPA combination cartridges (full face respirator replaces safety glasses for eye protection),
- Tyvek or Saranex coveralls
- Neoprene steel-toe, steel shank boots

5.0 HAZARD ANALYSIS BY TASK

The following section identifies potential hazards associated with each task listed in Section 2.2 of this Health and Safety Plan. Unless otherwise noted, work will begin and proceed in Level D personal protective equipment. The level of protection will be upgraded accordingly by the Site Health and Safety Officer whenever warranted by conditions present in the work area.

Task 1 – Monitoring Well Installation and Development: Exposure to volatile organic compounds in soil, air and groundwater; head, foot/ankle, and eye hazards; electrical and mechanical hazards; noise, fall, lifting, and overhead hazards.

Task 2 – Direct-Push Probe Groundwater and Soil Sampling: Exposure to volatile organic compounds in soil, air and groundwater; head, foot/ankle, and eye hazards; electrical and mechanical hazards; noise, fall, lifting, and overhead hazards.

Task 3 – Groundwater Sampling: Exposure to volatile organic compounds; head, foot/ankle, and eye hazards; electrical and mechanical hazards; noise, fall, and lifting hazards.

Task 4 - Surveying Well and Probe Locations: Limited potential for exposure to volatile organic compounds in air, potential slip, trip, and fall hazards.

Task 5 – Construction or Demolition Oversight: Exposure to volatile organic compounds in soil, air and groundwater; head, foot/ankle, and eye hazards; electrical and mechanical hazards; heavy equipment traffic hazards; noise, fall, lifting, and overhead hazards.

Personnel: EPI – Greg McCormick, Doug Kunkel, Monica Mogg, Kristin Addis
Golder - Ted Norton, Mike Lumpkin

Contractor Names: Cascade Drilling or other drilling company for drilling and probing
Dwayne Hartman and Associates for surveying tasks
APS or other utility locating company for subsurface utility locating
Cascade Concrete Sawing or other company for concrete coring
Additional Contractors to be determined

6.0 SITE CONTROL

The following section identifies several activity zones located on the work-site. It should be noted that access to some of these activity zones (i.e. the exclusion zone) will be restricted to designated personnel.

The work site is secured. Pedestrians and other unauthorized personnel will not be allowed within the exclusion zone.

6.1 Contamination Reduction Zone

A specified area will be established for the decontamination of sampling equipment and personnel. Because the location of this zone will change during the course of the investigation the site safety office will discuss the contaminant reduction zone location during each daily safety briefing.

6.1.1 Decontamination Procedures - Equipment

Split-spoon samplers and other down-hole equipment will be decontaminated with a solution of Liquinox™ or equivalent soap and potable water and rinsed with distilled or deionized water prior to collecting soil samples for analysis. An alternative method of decontamination is to hot water pressure wash all down-hole sampling and drilling equipment. All decontamination wastes will be containerized, properly marked, and left in a designated on-site location for disposition by Boeing.

6.1.2 Decontamination Procedures - Personnel

All personal protective clothing (i.e. nitrile gloves) and other miscellaneous waste will be bagged in opaque garbage bags and will be discarded in the trash. All on-site personnel must, at a minimum, wash their face and hands before eating, before break periods, and prior to leaving the site.

7.0 EMERGENCY RESPONSE AND CONTINGENCY PLAN

The purpose of this section is to define procedures and specific responsibilities that are to be followed in the event that a chemical spill or release, a fire or explosion, or an accident involving injuries occurs. The Site Health and Safety Officer, or a designated alternate, will determine when emergency and/or regulatory agencies should be contacted and which agencies are appropriate to contact. It should be noted that if injuries have occurred, all site workers have the responsibility to secure medical help for the affected worker(s). Medical emergency help can be contacted at the appropriate phone numbers listed on the pink pages of this Plan. A route map to the nearest hospital (Harborview Medical Center) is included with the attached figures.

In all emergency situations, the rule is SAFETY FIRST! Do not, under any circumstances, endanger yourself or others to rescue a fallen co-worker. It is far better to rescue one person after proper safety measures for the rescue have been carefully considered, than to have to rescue additional people whose haste to help out got them in trouble.

In case of injury: call 206-655-2222 first, then 911 if necessary.

8.0 ADMINISTRATIVE

8.1 Medical Surveillance

Personnel involved with field activities must be covered under their employer's medical surveillance program that includes annual physical examinations and certification to wear respiratory protective equipment. These medical monitoring programs must be in compliance with all applicable worker health and safety regulations.

8.2 Record Keeping

The Site Health and Safety Officer, or a designated alternate, will be responsible for keeping daily logs of workers and visitors present at the work site, attendance lists of personnel present at site health and safety meetings, accident reports, air monitoring results, and signatures of all personnel who have read this Health and Safety Plan.

SIGNATURE PAGE

I have read this Health and Safety Plan and understand its contents. I agree to abide by its provisions and will immediately notify the Site Health and Safety Officer (Josh Bernthal, (425) 241-5400), or designated alternate if site conditions or hazards not specifically designated herein are encountered.

Name (Print)	Signature	Date	Company/Affiliation

Figures

KEY:

SOURCE: USGS 7.5 MINUTE QUANDRANGLE (TOPOGRAPHIC)

SEATTLE SOUTH
1983

SCALE = 1:25,000

ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 2-1

BOEING PLANT 2

PROJECT	BOEING PLANT 2
PREPARED FOR	THE BOEING COMPANY
LOCATION	BOEING PLANT 2 SEATTLE/TUKWILA, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	ARM	JLD	10/28/11

FLOYD | SNIDER
strategy • science • engineering

General Health and Safety Plan for Boeing Plant 2 Seattle/Tukwila, Washington

Figure 7–1
Route to Hospital Map

F:\projects\Boeing Plant 2 2011\GIS\MXD\Figure X (Route to Hospital Map).mxd
10/28/2011 10:10:22 AM

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: EPI / Boeing	Phone: (425) 395-0010	Date: 10/6/11	Ice Present? Y
Client Contact: Doug Kunkel		No. of Coolers: 1	Cooler Temps: 16.1
Client Project Name: Well Decommissioning Interim Measures			
Client Project #: 17513.1 Task 600.04	Samplers:		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	PCBs MTCA	VOCs	Total Metals	pH	Set Solids	NWTPH Dx			Notes/Comments
Well Decommissioning Drum #1	10/6/11	1635	W		X	X	X	X	X	X			

Analyses

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Greg McCormick	Printed Name: Taylor Steele	Printed Name:	Printed Name:
	Company: EPI	Company: ARI	Company:	Company:
	Date & Time: 10/6/11 1635	Date & Time: 10-6-11 1635	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

ENVIRONMENTAL PARTNERS INC 295 NE Gilman Boulevard, Suite 201 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

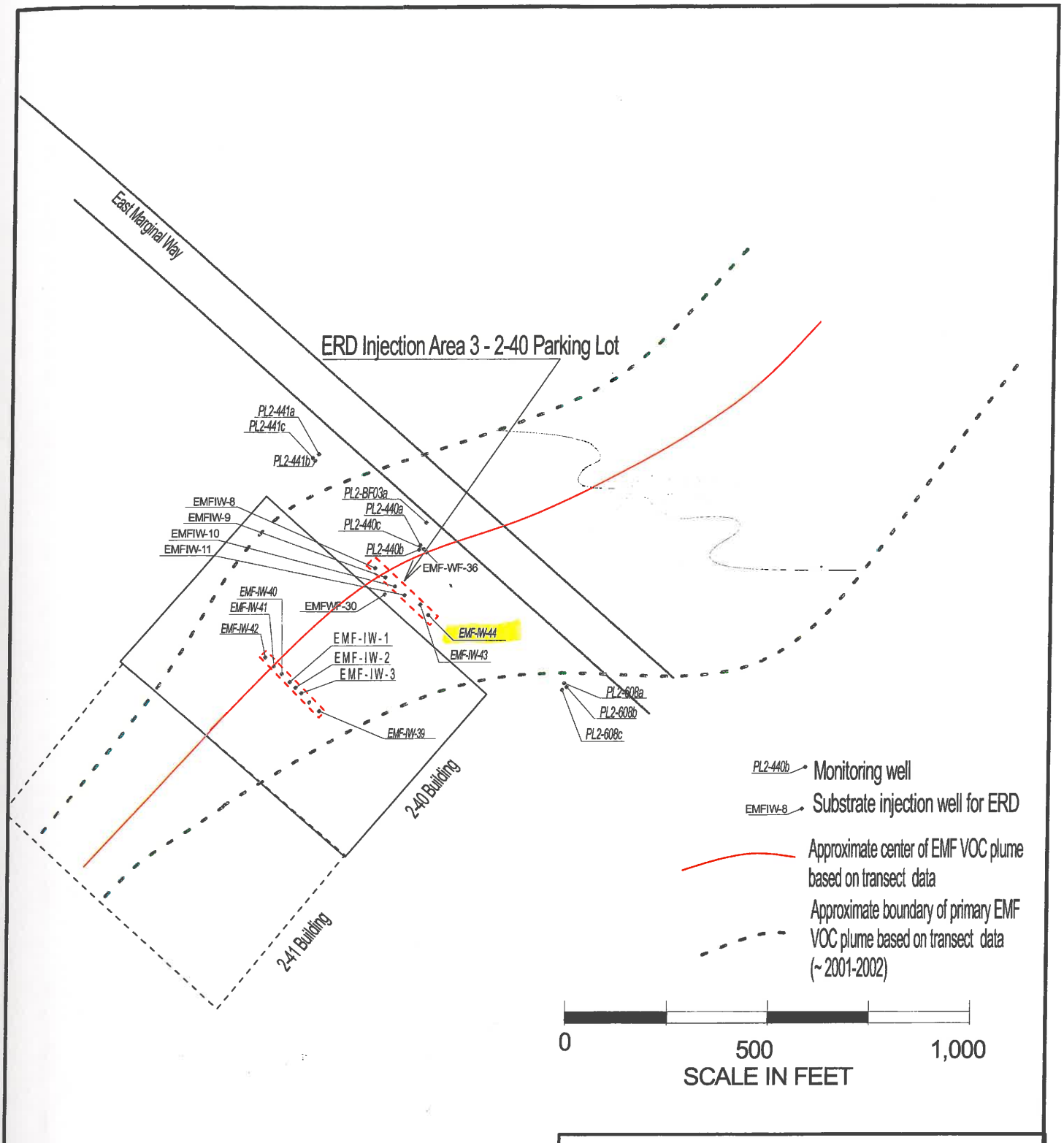
Well Decommissioning Interim Measure – May 2012 Book #8

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number 17513.2.Task 500.04

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, Washington 98027
(425) 395-0010

Wells to be Decommissioned - May 2012

Well	Northing	Easting	Diameter (inches)	Total Depth (ft. bgs)	Screened Interval (ft. bgs)	Area	Notes
PL2-014AR	195979.4	1275645.1	2	21	6-21	2-66	Decommissioned for sediment / habitat bank construction work in 2012.
PL2-014B	195976.5	1275649/1	2	45.5	40.5-45.5	2-66	
PL2-015AR	196022	1275589	2	19.5	9.4-19	2-66	
PL2-015BR	196028	1275591.2	2	45	40-45	2-66	
OA-12-03B	196408.500	1276141.700	4	45.5	35-45	2-60s	Damaged and not repairable
EMF-IW-44			4	50	40-50	2-40s	Needs to be decommissioned for stormwater system construction



BOEING®

CALIBRE Systems Inc.

N

FIGURE 5 EMF Plume Well Locations in the 2-40 Parking Lot

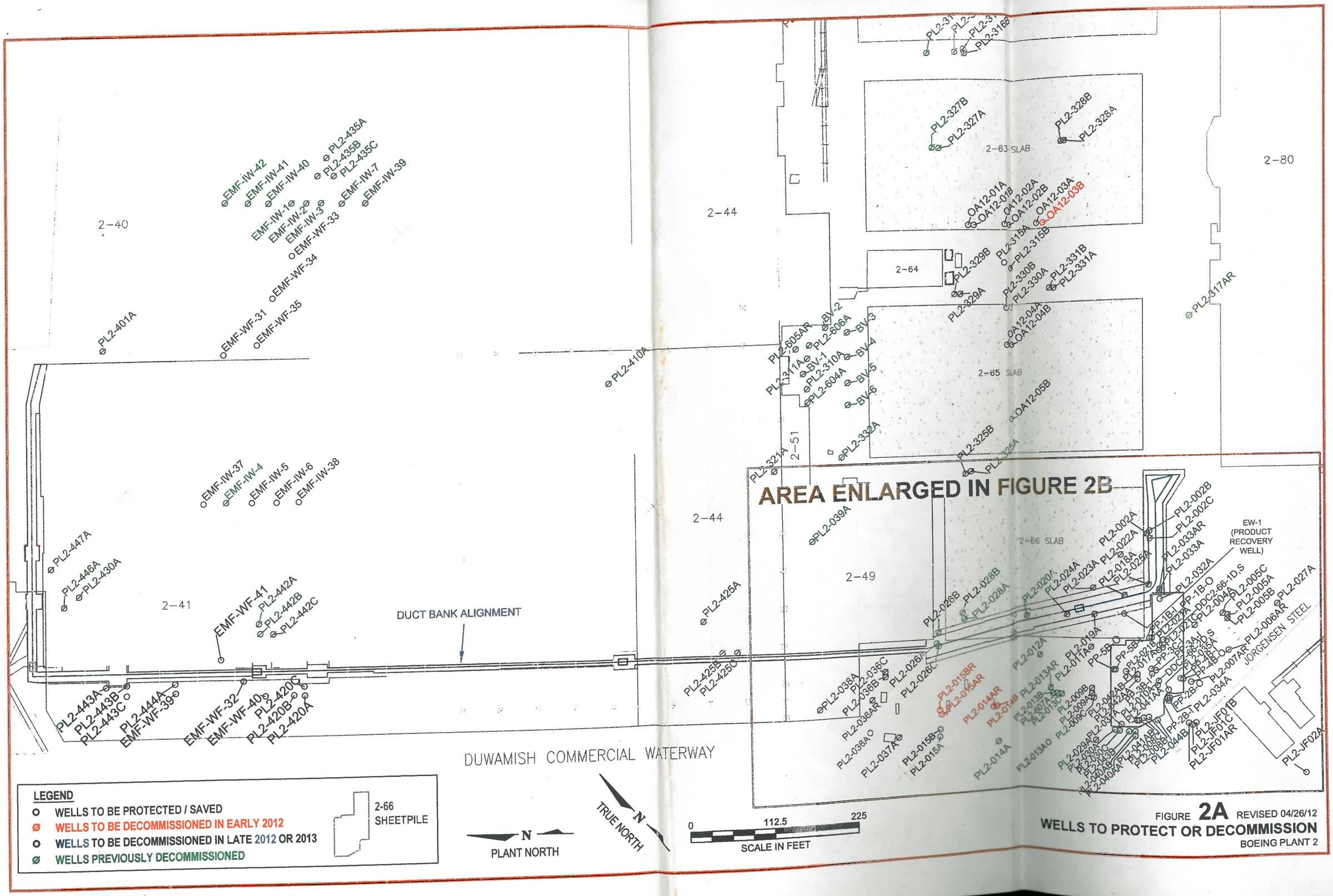


FIGURE **2A** REVISED 04/26/12

WELLS TO PROTECT OR DECOMMISSION

BOEING PLANT 2

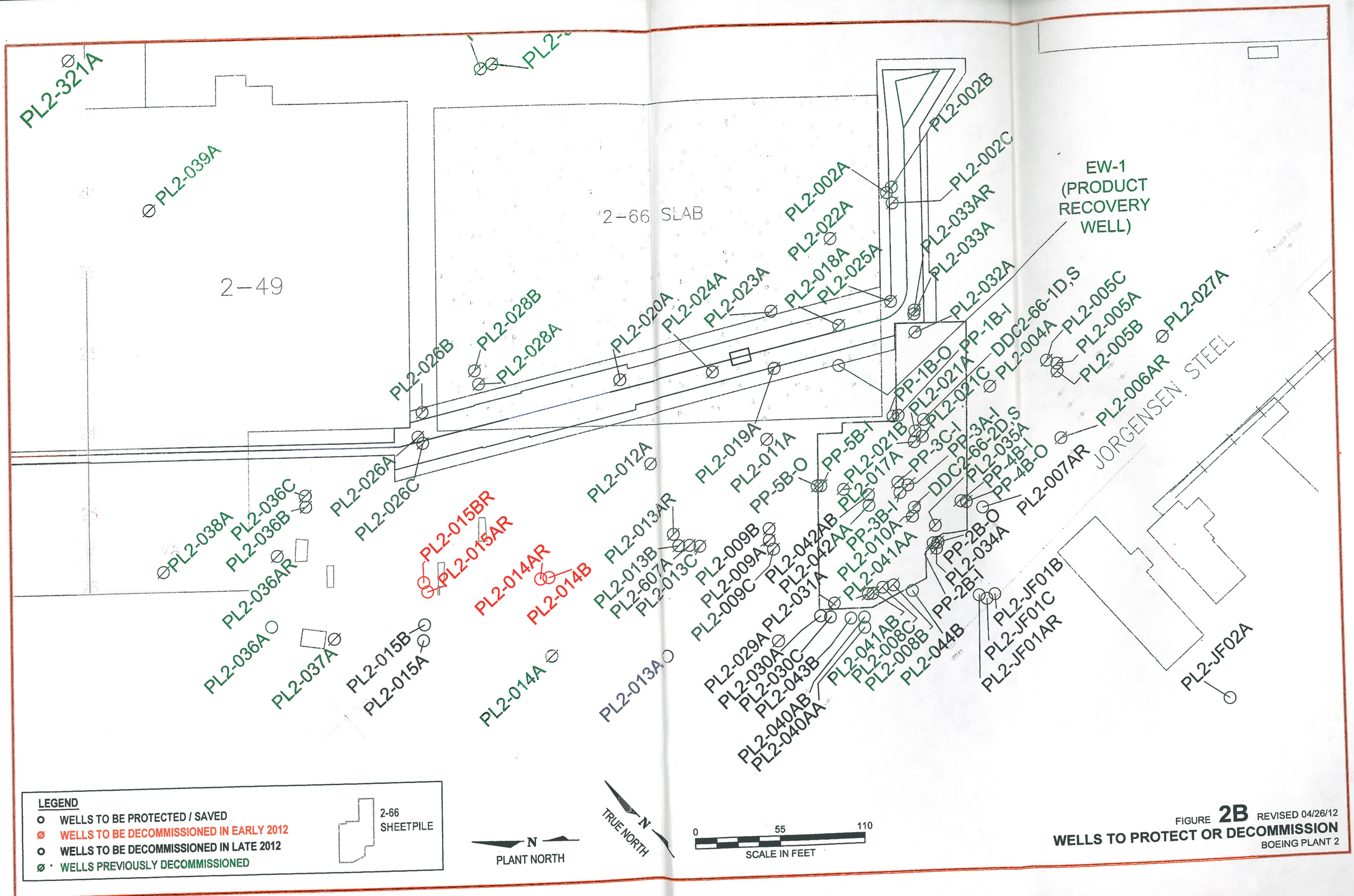


FIGURE **2B** REVISED 04/26/12

WELLS TO PROTECT OR DECOMMISSION

BOEING PLANT 2

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF-IW-44	
Well Location	Northing:	Easting: 240's Parking lot
Start (date and time)	5/10/12 0700	
End (date and time)	5/10/12	
Installation Method	Geoprobe	
Total Well Depth	50'	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40-50	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Cetco Hole Abandonment Grout	
Grout or Chip Volume	8.0	Gallons or Cubic Feet
Surface Completion		
Drilling Contractor	Cascade Drilling	
License Number	2501	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	Kris Addis	Kristin L. Addis

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-015AR	
Well Location	Northing:	Easting: 2-66 area
Start (date and time)	5/16/12 0752	
End (date and time)	5/16/12 0924	
Installation Method	HSA	
Total Well Depth	20	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	9-19	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Cetco Pureagold Medium chip	
Grout or Chip Volume	3.2	Gallons or Cubic Feet
Surface Completion	none - to be removed	
Drilling Contractor	Cascade Drilling Inc Curtis	
License Number	2867	
Signature (Driller)	C. Askew	
Signature (Engineer or Geologist)	Kristin L. Addis LG	

Additional Information:

Pump saved + stored in conex

Displaced water in WL ~0.5 gal

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-15BR	
Well Location 2-66	Northing	Easting
Start (date and time)	5/16/12 0752	
End (date and time)	5/16/12 0900	
Installation Method	HSA	
Total Well Depth	45	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40-45	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Halliburton Quikgrout	
Grout or Chip Volume	14.7	Gallons or Cubic Feet
Surface Completion	none - to be removed	
Drilling Contractor	Cascade Drilling Inc Curtis v	
License Number	2867	
Signature (Driller)	C. Askew	
Signature (Engineer or Geologist)	Kurt J. Addis L.G.	

Additional Information:

~10 gallons displaced in WI drum
0850 - Pump not working
0924 - Pump fixed.

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-014BR	
Well Location 12-line	Northing:	Easting: 2-66
Start (date and time)	5/16/12	
End (date and time)	5/16/12	
Installation Method	HSA	
Total Well Depth	45.5	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	~~PVC~~	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	40.5-45.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Halliburton Quikgrout	
Grout or Chip Volume	15	Gallons or Cubic Feet
Surface Completion	None - to be removed 5/17/12	
Drilling Contractor	Cascade Drilling Curtis	
License Number	2867	
Signature (Driller)	C Askew	
Signature (Engineer or Geologist)	Kristi L Addis	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number: PL2- 014AR

Well Location: 12-line | Northing: | Easting: | 2-66 area

Start (date and time):

End (date and time):

Installation Method:

Total Well Depth: 21 feet bgs

Well Diameter: 2 inches

Type of Casing (circle): ~~PVC~~ Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 6-21 feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: Cetco Pureguard Medium Chip

Grout or Chip Volume: 3.36 Gallons or Cubic Feet

Surface Completion: None - to be removed 5/17/12

Drilling Contractor: Cascade Drilling Inc Curtis T

License Number: 2867

Signature (Driller): C. Askew

Signature (Engineer or Geologist): Kristin L. Adelis

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	OA12-OSB	
Well Location OA12	Northing	Easting
Start (date and time)	5-16-12 1045	
End (date and time)		
Installation Method	HSA	
Total Well Depth	45.5	feet bgs
Well Diameter	4"	inches
Type of Casing (circle)	~~PVC~~	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	35-45	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Halliburton	
Grout or Chip Volume	14	Gallons or Cubic Feet
Surface Completion	Remove well monument	
Drilling Contractor	Cascade Drilling	
License Number	2867	
Signature (Driller)	C. Askew	
Signature (Engineer or Geologist)	Kristin L. Adelis	

Additional Information:

MONITORING WELL PL2-015AR

WESTON

PROJECT Boeing - Plant 2
DATE COMPLETED 29 March 2001
DRILLING METHOD 8" OD HSA - Cascade Drilling
SAMPLING METHOD 3" OD Split Spoon, 300lb Hammer
TOP OF CASING
GROUND SURFACE ELEV
LOGGED BY K. Broom - WESTON

Depth (ft)	PID Reading (ppm)	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0						8" Concrete
	0.0	HA			SP	SAND, (SP), brown, fine to medium grained, trace fine gravel, dry, metal banding, no odor or staining, (fill).
	0.0	HA				SAA, no gravel, no metal banding.
5	0.0	10	X			SAA, loose.
	0.0	13	X			SAA, medium dense, silty lense at 8.4 feet, approximately 1.5" thick.
10	0.0	11	X		SM	Silty SAND, (SM), greyish brown, fine to medium sand, wet, no odor or sheen, (alluvium).
	0.2	10	X			SAA.
15	0.0	12	X		ML	Slightly sandy SILT, (ML), grey, medium dense, wet, no odor or sheen, (alluvium).
	0.2	21	X		SM	Silty SAND, (SM), grey, fine sand, medium dense, wet, (alluvium).
					SW	SAND, (SW), black, fine to medium grained, medium dense, wet, (alluvium).
20	0.2	20	X			SAA.
25						BOH @ 21.5 feet bgs

Notes:
BOH = Bottom of hole
SAA = Same as above
HA = Hand grab sample
No soil samples were collected for laboratory analysis.

Well Construction

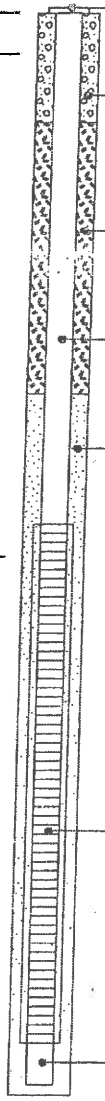


PLATE A-3

JOB NUMBER: 03709-034-600-0002-03 DATE: March 2001

RECORD OF BOREHOLE 2-66-PL2-015BR

PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 8/1/06
DATE COMPLETED: 8/1/06
WEATHER: Overcast, Breezy

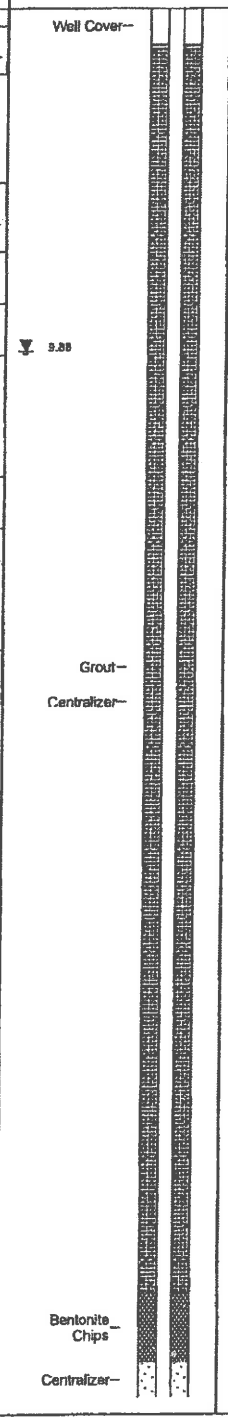
DATUM: NGVD 29
COORDS: N: 1,275,591.2 E: 196,028.0
GS ELEVATION: 12.1 ft
TOC ELEVATION: 11.8 ft
TEMPERATURE: 76 F

INCLINATION: 90
DEPTH W.L.: 9.9 ft
ELEVATION W.L.: 1.9 ft
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES PID (ppm)	NUMBER	TYPE	REC / ATT
0		0.0 - 0.5 Concrete slab			12.6 / 0.5	18.0	1	GRAB	0.5 / 0.5
		0.5 - 2.0 Brown fine SAND with fine to medium Gravel, Concrete and Brick fragments (FILL)			14.1 / 2.0				
	15	2.0 - 5.0 Brown fine SAND with fine to medium gravel (SP)	SP		17.1 / 5.0				
5		5.0 - 8.0 AUGER; Brown fine to medium SAND with fine to medium Gravel in cuttings			20.1 / 8.0	31.3	2	GRAB	0.5 / 2.0
	20	8.0 - 10.0 Brown fine to medium SAND, moist (SP)	SP		22.1 / 10.0	10.3	3	SS	1.5 / 1.5
10		10.0 - 13.0 AUGER; Brown fine to medium SAND in cuttings			25.1 / 13.0				
	25	13.0 - 14.0 Brown fine to medium SAND, saturated (SP)	SP		26.1 / 14.0				
		14.0 - 15.0 Gray-brown Silty CLAY and fine Sand, saturated (CL-ML)	CL-ML		27.1 / 15.0	0.0	4	SS	1.5 / 1.5
15		15.0 - 18.0 AUGER; Brown fine to medium SAND in cuttings			30.1 / 18.0				
	30	18.0 - 20.0 Brown fine to medium SAND, saturated (SP)	SP		32.1 / 20.0				
20		20.0 - 23.0 AUGER; Brown fine to medium SAND in cuttings			35.1 / 23.0				
	35	23.0 - 25.0 NO RECOVERY; Heave, presumed SAND			37.1 / 25.0				
25		25.0 - 45.0 AUGER; Brown fine SAND in cuttings				0.0	5	SS	1.5 / 20.0
	40								
	45								
35									
	50								
40									

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

2-66-PL2-015BR
Borehole Diameter: 6.0-in
WELL CASING
Interval: 0-40 ft
Material: PVC
Diameter: 2.0-in
Joint Type: Threaded
WELL SCREEN
Interval: 40-45 ft
Material: PVC
Diameter: 2.0-in
Slot Size: 0.010-in
End Cap:
FILTER PACK
Interval: 39-45 ft
Type: Silica Sand
Quantity: 6.0 ft
FILTER PACK SEAL
Interval: 37-39 ft
Type: Bentonite Chips
Quantity: 2.0 ft
ANNULUS SEAL
Interval: 0-37 ft
Type: Grout
Quantity: 37.0 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: F. Scott

GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

RECORD OF BOREHOLE 2-66-PL2-015BR

PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 8/1/06
DATE COMPLETED: 8/1/06
WEATHER: Overcast, Breezy

DATUM: NGVD 29
COORDS: N: 1,275,591.2 E: 196,028.0
GS ELEVATION: 12.1 ft
TOC ELEVATION: 11.8 ft
TEMPERATURE: 76 F

INCLINATION: 90
DEPTH W.L.: 9.9 ft
ELEVATION W.L.: 1.9 ft
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		25.0 - 45.0 AUGER; Brown fine SAND in cuttings*(Continued)*								2-66-PL2-015BR Silica Sand–10-slot/Screen Centralizer–	**2-66-PL2-015BR** Borehole Diameter: 6.0-in **WELL CASING** Interval: 0-40 ft Material: PVC Diameter: 2.0-in Joint Type: Threaded **WELL SCREEN** Interval: 40-45 ft Material: PVC Diameter: 2.0-in Slot Size: 0.010-in End Cap: **FILTER PACK** Interval: 39-45 ft Type: Silica Sand Quantity: 6.0 ft **FILTER PACK SEAL** Interval: 37-39 ft Type: Bentonite Chips Quantity: 2.0 ft **ANNULUS SEAL** Interval: 0-37 ft Type: Grout Quantity: 37.0 ft
45	55				57.1						
		Boring completed at 45.0 ft									
50	60										
55	65										
60	70										
65	75										
70	80										
75	85										
80	90										

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: F. Scott

GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

RECORD OF BOREHOLE 2-66-PL2-014AR

SHEET 1 of 1

PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 21.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 7/31/06
DATE COMPLETED: 7/31/06
WEATHER: Clear, Sunny

DATUM: NGVD 29
COORDS: N: 1,275,645.1 E: 195,979.4
GS ELEVATION: 13.0 ft
TOC ELEVATION: 12.3 ft
TEMPERATURE: 78 F

INCLINATION: 90
DEPTH W.L.: 11.4 ft
ELEVATION W.L.: 1.0 ft
DATE W.L.:
TIME W.L.:

SOIL PROFILE					SAMPLES						MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	PID (ppm)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	2-66-PL2-014AR
0		0.0 - 0.5 Concrete slab			13.5 / 0.5	0.0	1	GRAB	N/A			Well Cover; Grout; Bentonite Chips; Silica Sand-10-slot Screen; ▼ 11.36
	15	0.5 - 2.0 Brown fine SAND with fine to medium Gravel, Concrete, Brick, and Rock fragments (FILL)			15.0 / 2.0							**2-66-PL2-014AR** Borehole Diameter: 6.0-in **WELL CASING** Interval: 0-6 ft Material: PVC Diameter: 2.0-in Joint Type: Threaded **WELL SCREEN** Interval: 6-21 ft Material: PVC Diameter: 2.0-in Slot Size: 0.010-in End Cap: **FILTER PACK** Interval: 6-21 ft Type: Silica Sand Quantity: 15.0 ft **FILTER PACK SEAL** Interval: 3-5 ft Type: Bentonite Chips Quantity: 2.0 ft **ANNULUS SEAL** Interval: 0-3 ft Type: Grout Quantity: 3.0 ft
		2.0 - 5.0 Brown fine SAND with some fine Gravel, moist (SP)	SP		18.0	0.0	2	GRAB	N/A			
5		5.0 - 8.0 AUGER; Brown fine SAND in cuttings, moist			5.0 / 21.0							
	20	8.0 - 10.0 Brown Clayey SILT and fine Sand, saturated (ML)	ML		8.0 / 23.0	0.0	3	SS	2 -2 -3 -2		2.0 / 2.0	
10		10.0 - 13.0 Brown Sandy and Silty CLAY (CL)	CL		10.0 / 26.0							
	25	13.0 - 15.0 Brown fine SAND with little silt, saturated (SP)	SP		13.0 / 28.0	0.0	4	SS	1 -1 -2 -4		2.0 / 2.0	
15		15.0 - 21.0 Brown fine SAND (SP)	SP		15.0 / 34.0							
	30	Boring completed at 21.0 ft										
20												
	35											
25												
	40											
30												
	45											
35												
	50											
40												

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: F. Scott

GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

RECORD OF BOREHOLE 2-66-PL2-014B

PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 8/1/06
DATE COMPLETED: 8/1/06
WEATHER: Overcast, Breezy

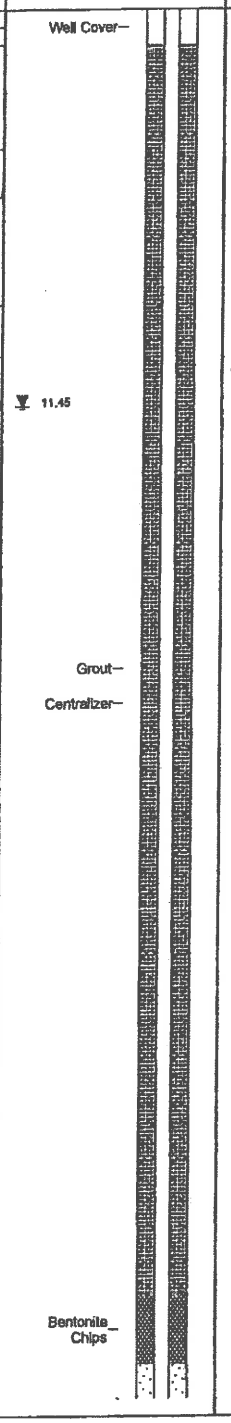
DATUM: NGVD 29
COORDS: N: 1,275,649.1 E: 195,976.5
GS ELEVATION: 13.0 ft
TOC ELEVATION: 12.2 ft
TEMPERATURE: 60 F

INCLINATION: 90
DEPTH W.L.: 11.5 ft
ELEVATION W.L.: 0.7 ft
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES PID (ppm)	NUMBER	TYPE	REC / ATT
0		0.0 - 0.5 Concrete slab			13.5 / 0.5	0.0	1	GRAB	
	15	0.5 - 3.0 Brown fine SAND, little Silt, with Concrete, Brick, and Rock fragments (FILL)			16.0				
		3.0 - 4.0 Concrete Boulder			3.0 / 17.0				
5		4.0 - 5.0 Brown fine SAND with fine to medium Gravel and large Concrete fragments (FILL)			4.0 / 18.0	0.0	2	SS	1.0 / 1.0
	20	5.0 - 8.5 AUGER; Brown fine to medium SAND with Gravel in cuttings			5.0 / 21.5				
10		8.5 - 10.0 Brown fine SAND with stratified gray-red Silty CLAY laminations, moist at 9.0 ft bgs (SP-SC)	SP-SC		8.5 / 23.0	0.2	3	SS	1.5 / 1.5
	25	10.0 - 13.5 AUGER; Brown fine SAND in cuttings			10.0 / 26.5				
15		13.5 - 15.0 Brown fine SAND with some stratified Silt, wet (SP-SM)	SP-SM		13.5 / 28.0	0.0	4	SS	1.5 / 1.5
	30	15.0 - 18.5 AUGER; Brown fine SAND in cuttings			15.0 / 31.5				
20		18.5 - 20.0 Brown fine SAND with little Silt, saturated (SP)	SP		18.5 / 33.0	36.4	5	SS	1.5 / 1.5
	35	20.0 - 23.5 AUGER; Brown fine SAND in cuttings			20.0 / 36.5				
25		23.5 - 25.0 Brown fine SAND, saturated (SP)	SP		23.5 / 38.0	7.6	6	SS	1.5 / 1.5
	40	25.0 - 28.5 AUGER; Brown fine SAND in cuttings			25.0 / 41.5				
30		28.5 - 30.0 Brown fine SAND, saturated (SP)	SP		28.5 / 43.0	7.0	7	SS	1.5 / 1.5
	45	30.0 - 33.5 AUGER; Brown fine SAND in cuttings			30.0 / 46.5				
35		33.5 - 35.0 Brown fine SAND, saturated (SP)	SP		33.5 / 48.0	0.0	8	SS	1.5 / 1.5
	50	35.0 - 45.0 Presumed Brown fine SAND (SP)	SP		35.0				
40									

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

2-66-PL2-014B
Borehole Diameter: 6.0-in
WELL CASING
Interval: 0-40 ft
Material: PVC
Diameter: 2.0-in
Joint Type: Threaded
WELL SCREEN
Interval: 40.5-45.5 ft
Material: PVC
Diameter: 2.0-in
Slot Size: 0.010-in
End Cap:
FILTER PACK
Interval: 39-45.5 ft
Type: Silica Sand
Quantity: 6.5 ft
FILTER PACK SEAL
Interval: 37-39 ft
Type: Bentonite Chips
Quantity: 2.0 ft
ANNULUS SEAL
Interval: 0-37 ft
Type: Grout
Quantity: 37.0 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: F. Scott

GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

AA BOREHOLE RECORD BOEING PL2 2-66.GPJ GOLDER NJ-PA 05-24-06.GDT 6/12/07

RECORD OF BOREHOLE 2-66-PL2-014B

PROJECT: Boeing Plant 2 2-66 Area
PROJECT NUMBER: 013-1646
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: 2-66 Area

DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 8/1/06
DATE COMPLETED: 8/1/06
WEATHER: Overcast, Breezy

DATUM: NGVD 29
COORDS: N: 1,275,649.1 E: 195,976.5
GS ELEVATION: 13.0 ft
TOC ELEVATION: 12.2 ft
TEMPERATURE: 60 F

INCLINATION: 90
DEPTH W.L.: 11.5 ft
ELEVATION W.L.: 0.7 ft
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		35.0 - 45.0 Presumed Brown fine SAND (SP)*(Continued)*	SP		58.0					Centralizer Silica Sand– 10-slot Screen Centralizer–	**2-66-PL2-014B** Borehole Diameter: 6.0-in **WELL CASING** Interval: 0-40 ft Material: PVC Diameter: 2.0-in Joint Type: Threaded **WELL SCREEN** Interval: 40.5-45.5 ft Material: PVC Diameter: 2.0-in Slot Size: 0.010-in End Cap: **FILTER PACK** Interval: 39-45.5 ft Type: Silica Sand Quantity: 6.5 ft **FILTER PACK SEAL** Interval: 37-39 ft Type: Bentonite Chips Quantity: 2.0 ft **ANNULUS SEAL** Interval: 0-37 ft Type: Grout Quantity: 37.0 ft
45		Boring completed at 45.0 ft									

Depth scale: 40, 45, 50, 55, 60, 65, 70, 75, 80
Elevation scale: 55, 60, 65, 70, 75, 80, 85, 90

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling, Inc
DRILLER: F. Scott

GA INSPECTOR: D.Gorman
CHECKED BY: T.Norton
DATE: 6/1/07

Golder Associates

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: OA12-03B

Client: Boeing
Logged By: T. Sparley
Date of Drilling: 05/21/08
Location: 7555 East Marginal Way, Seattle, WA
Drilling Contractor: Boart Longyear
Drill Rig: Foremost Mobile Model B-59
Method: Hollow Stem Auger (HSA)
Borehole: 10"

Site Representation:

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Blows per 6"	Sample	PID (ppm)	Well Data	Comments
25–30		SM	***Silty Sand*** Black; wet; fine-medium sand with silt			4-5-9		0.1		Hydrated Bentonite Chips
34–38		SM	***Silty Sand*** Black; wet; fine-medium sand with silt			5-8-11		0.0		Stainless Steel Centralizer; 4" PVC Screen 0.02" 35' - 45'
39–40		MH	***Silt with Sand*** Black; medium plasticity; saturated			4-5-9		0.0		10x12 CSSI Sand Filter Pack
41–43		CH	***Fat Clay with Sand*** Black; medium sand; saturated; high plasticity							
44–45		SM	Grades to **Silty Sand**; black; coarse sand; saturated			1-3-5		0.0		Stainless Steel Centralizer
46–49			End of Borehole							

Project No. 17510.2

ENVIRONMENTAL PARTNERS INC

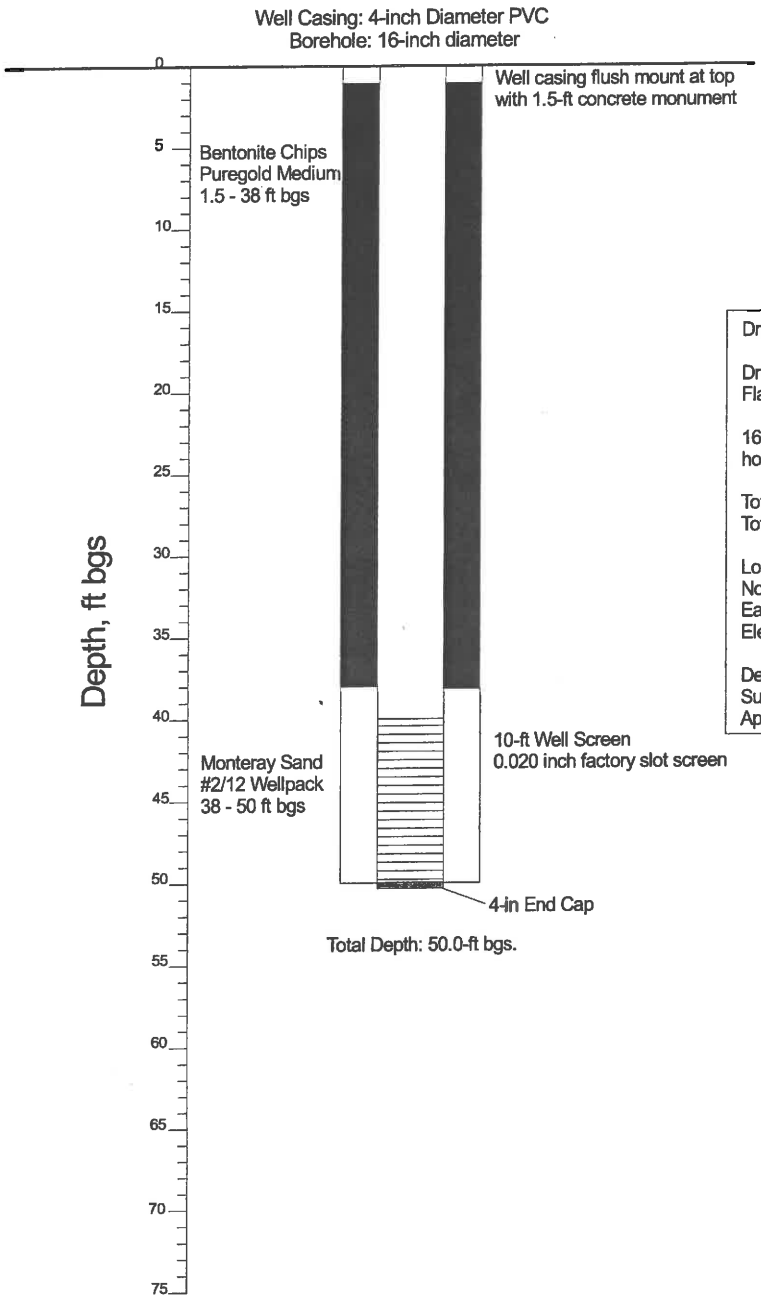
Boring/Well Designation: OA12-03B

Client: Boeing
Logged By: T. Sparley
Date of Drilling: 05/21/08
Location: 7555 East Marginal Way, Seattle, WA
Drilling Contractor: Boart Longyear
Drill Rig: Foremost Mobile Model B-59
Method: Hollow Stem Auger (HSA)
Borehole: 10"

Site Representation:

Depth	SUBSURFACE PROFILE: Log	USCS Code	Description	SAMPLE: Interval	Recovery	Blows per 6"	Sample	PID (ppm)	Well Data	Comments
			Ground Surface							Flush Mounted Vault Set In Concrete
0–7		SP - SM	***Poorly-Graded Sand with Silt*** Brown; moist; medium sand with silt							Hydrated Bentonite Chips
4						0-1-1		0.1		
7–9		CL	***Lean Clay*** Brown; moist; medium plasticity							Injection Well 4" PVC Casing
9						1-1-2		0.2		
10–12		SP	***Poorly-Graded Sand*** Brown; moist; medium sand							
13–14		SC	***Clayey Sand*** Wet; fine-medium sand; medium plasticity			0-0-1		0.1		
15–18		SM	***Silty Sand*** Dark brown to black; wet; fine-medium sand; silt							Stainless Steel Centralizer
19		SM	***Silty Sand*** Black; wet; fine sand; silt with sand			3-6-7		0.2		
20–23		SM	***Silty Sand*** Black; wet; fine-medium sand; silt; wood chips noted							
24						7-7-7		0.2		

Project No. 17510.2



Drilling Date: 1/16/09

Driller: Cascade Drilling - Andy Flagan

16 inch Borehole, 8-1/4-in ID hollow-stem augers

Total Well Depth 50 ft
Total Geoprobe Depth 41 ft

Location and Elevation:
Northing: 197,276.4
Easting: 1,275,773.7
Elevation: 13.45

Development: 1/20/09
Surge and pump,
Approx. 200 gallons removed

Reference Geoprobe Boring: EMF GP-70

BOEING CALIBRE	Injection Well Completion Boeing EMF Project Seattle, WA	**Injection Well: EMF-IW-44**

5/29/12

EMF-WF-33 Extra heavy monument

Top of casing to be raised coupler w/screws sealed in concrete

WSDOE 545

Finish 1046

Start EMF-WF-34 at 1050

Top of casing raised coupler w/screws

End 1310 - Call for forklift to move parking barrier

Start EMF-WF-31 at 1310

End 1505

Start EMF-WF-35 - 1505

Only had larger monument available

End 1619 Cleanup

Dump crushed rock in recycled area.

BOEING

CHAIN OF CUSTODY RECORD / LABORATORY ANALYSIS REQUEST (IDS)

ENVIRONMENTAL ANALYSIS LABORATORY
Integrated Defense Systems
Kent Space Center, Bldg. 18-61.2, Door 27R2
PO BOX 3707 MC 8Y-55
Seattle, WA 98124-2207 Phone: 253-773-8934

REPORT TO: maryjo.donnelly@boeing.com **CC:** kent.r.peterson@boeing.com

BEMSID	NAME		BEMSID	NAME	
	MaryJo Donnelly			Kent Peterson	
ORGN.	MC	PHONE 206 662-2534	ORGN.	MC	PHONE 206 854-4493
CHARGELINE			SAMPLERS EPI - K. Addis		

ANALYSIS REQUESTED (SEE FORM INSTRUCTIONS FOR DETAILS)

SAMPLE DESCRIPTION AND LOCATION (INCLUDE PLANT, BLDG, SITE, SAMPLE #, ETC.)	SAMPLE DATE	SAMPLE TIME	MATX	COLL. TYPE	NO. CONT	LAB ID (LAB USE ONLY)	METRO METALS (7) / METHOD 200.7	TOTAL METALS (14 / METHOD 200.7)	MTCA METALS (5) - TOTAL	PRI. POLL. METALS (13) - TOTAL	RCRA METALS (8) - TOTAL	TCLP-ICP METALS (5)	TCLP-GFAA / CVAA METALS (3)	SELECTED METALS	VOA / METHOD 8260 / 624	SEMI-VOA / METHOD 8270 / 625	NWTPH-Dx / WDOE METHOD	NWTPH-G / WDOE METHOD	PCB / METHOD 8082	TOTAL CYANIDE	AMENABLE CYANIDE	HEM (FOG), TOTAL	HEM (FOG), NON-POLAR	pH	TOTAL SUSPENDED SOLIDS	SETTLEABLE SOLIDS	OTHER		
P2CS-Redev-47-WDRM	5/23/12	1045	W	Drum				X							X				X			X		X	X	X		

NEED RESULTS BY: June 6, 2012

COMMENTS / SPECIAL INSTRUCTIONS
Excess groundwater from decommissioned wells EMF-1W-44, PL2-015BR + PL2-014BR (2-405 + 2-66 areas)
Waste characterization
Please email results to Redev list and dougk@epi-wa.com

RELINQUISHED BY SIGNATURE		RELINQUISHED BY SIGNATURE		RELINQUISHED BY SIGNATURE	
Kristin L. Addis					
PRINTED NAME Kristin L Addis		PRINTED NAME		PRINTED NAME	
COMPANY EPI		COMPANY		COMPANY	
DATE 5/23/12	TIME 1045	DATE	TIME	DATE	TIME
RECEIVED BY SIGNATURE		RECEIVED BY SIGNATURE		RECEIVED BY SIGNATURE	
PRINTED NAME		PRINTED NAME		PRINTED NAME	
COMPANY		COMPANY		COMPANY	
DATE	TIME	DATE	TIME	DATE	TIME

(LAB USE ONLY) JOB ID: _____ CUSTODY SEALS: ☐ PRESENT ☐ INTACT PAGE _____ OF _____

7775 REV (05 MAY 2008)

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BOEING

CHAIN OF CUSTODY RECORD / LABORATORY ANALYSIS REQUEST (IDS)

ENVIRONMENTAL ANALYSIS LABORATORY
Integrated Defense Systems
Kent Space Center, Bldg. 18-61.2, Door 27R2
PO BOX 3707 MC 8Y-55
Seattle, WA 98124-2207 Phone: 253-773-8934

REPORT TO: maryjo.donnelly@boeing.com

BEMSID	NAME	
	Mary Jo Donnelly	
ORGN.	MC	PHONE 206 662-2534
CHARGELINE		

CC: kent.r.peterson@boeing.com

BEMSID	NAME	
	Kent Peterson	
ORGN.	MC	PHONE 206 854-4993
SAMPLERS		
EPI - K. Addis		

ANALYSIS REQUESTED (SEE FORM INSTRUCTIONS FOR DETAILS)

SAMPLE DESCRIPTION AND LOCATION (INCLUDE PLANT, BLDG, SITE, SAMPLE #, ETC.)	SAMPLE DATE	SAMPLE TIME	MATX	COLL. TYPE	NO. CONT	LAB ID (LAB USE ONLY)	METRO METALS (7) / METHOD 200.7	TOTAL METALS (14 / METHOD 200.7)	MTCA METALS (5) - TOTAL	PRI. POLL. METALS (13) - TOTAL	RCRA METALS (8) - TOTAL	TCLP-ICP METALS (5)	TCLP-GFAA / CVAA METALS (3)	SELECTED METALS	VOA / METHOD 8260 / 624	SEMI-VOA / METHOD 8270 / 625	NWTPH-Dx / WDOE METHOD	NWTPH-G / WDOE METHOD	PCB / METHOD 8082	TOTAL CYANIDE	AMENABLE CYANIDE	HEM (FOG), TOTAL	HEM (FOG), NON-POLAR	pH	TOTAL SUSPENDED SOLIDS	SETTLEABLE SOLIDS	OTHER		
P2CS-Redev-46-WDRM	5/23/12	1030	W	Drum				X							X				X			X		X	X	X		

NEED RESULTS BY: June 6, 2012

COMMENTS / SPECIAL INSTRUCTIONS
Excess groundwater from decommissioned well OA-12-03B from the 2-63 slab area
Waste characterization
Please email results to Redev list and dougk@epi-wa.com

RELINQUISHED BY SIGNATURE	RELINQUISHED BY SIGNATURE	RELINQUISHED BY SIGNATURE
Kristin L. Addis		
PRINTED NAME: Kristin L Addis	PRINTED NAME	PRINTED NAME
COMPANY: EPI	COMPANY	COMPANY
DATE: 5/23/12 TIME: 1210	DATE / TIME	DATE / TIME
RECEIVED BY SIGNATURE	RECEIVED BY SIGNATURE	RECEIVED BY SIGNATURE
PRINTED NAME	PRINTED NAME	PRINTED NAME
COMPANY	COMPANY	COMPANY
DATE / TIME	DATE / TIME	DATE / TIME

(LAB USE ONLY) JOB ID: _____ CUSTODY SEALS: ☐ PRESENT ☐ INTACT PAGE _____ OF _____

X27775 REV (05 MAY 2008)

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CASCADE DRILLING, L.P.
LEADERS IN SAFETY

CASCADE DRILLING DAILY WORK REPORT

PO Box 1184 – Woodinville, WA 98072 – 425-485-8908 # CASCADL91508
13600 SE Ambler Road – Clackamas, OR 97015 – 503-775-4118 #CCB-187984
555 S. Harbor Blvd. – La Habra, CA 90631 – 562-929-8176 #C57-938110
3632 Omec Circle – Rancho Cordova, CA 95742 – 916-638-1169 #C57-938110

CLIENT	PROJECT NO	DATE	DAY
JOB LOCATION	DIG ALERT #	CD-LP#	

DESCRIPTION OF WORK

Well # Bore #	Depth Drilled	Please explain reasons for Down Time and Standby Time and Shop Time	HOURS Start	HOURS Stop	Total Hrs	Charge Hrs
		AM Shop Time				
		Travel to Site				
		Travel to Shop				
		PM Shop Time				
Total Ft.		TOTAL CHARGEABLE RIG HOURS				

RIG ENGINE HOURS: START _____ STOP _____ TOTAL _____

EQUIPMENT				CASING				MATERIALS ITEM	QTY	ITEM	QTY
DRILL RIG #		COMPRESSOR/JACKHAMMER		TYPE___SLOT___	2	4		SAND		WELL COVER 8"	
SUPPORT TRUCK #		SNOW FENCE RENTAL		20' SCREEN				READYMIX		WELL COVER 12"	
SUPPORT TRUCK #		CONTINUOUS SAMPLER		10' SCREEN				QUICKSET		MONUMENT CASING	
TRAILER #		CONTINUOUS SAMPLER FOOTAGE		5' SCREEN				PORTLAND		BOLLARDS	
BOBCAT		# OF CORE CUTS		20' BLANK				ASPHALT		SOIL DRUMS	
AUTO HAMMER		# OF BULLDOG CUTS		10' BLANK				BENTONITE GROUT		DEVELOPMENT DRUMS	
GROUT MIXER		# OF SERVICE RUNS		5' BLANK				BENTONITE CHIPS		DECON DRUMS	
GROUT PUMP		# OF SAW CUTS		5' PP SCREEN				BENTONITE POWDER		HOLE COVER PLATES	
PERISTALTIC PUMP		PORTABLE RESTROOM		10' PP SCREEN				BENTONITE PELLETS		PLASTIC SHEETING	
FORKLIFT/HOPPER				SLIP CAP				BENTONITE GRANULAR		TRAFFIC CONTROL	
				THREADED CAPS				SAMPLER TUBES		CORE BOXES	
				LOCKING CAPS				SHELBY TUBES		PLYWOOD	
				DRIVE SHOE				PROBE POINTS "		SOIL SAMPLES	
				CENTRALIZERS				GW PROBE POINTS		WATER SAMPLES	
				LOCKS				MACRO LINERS		HYDROPUNCH SAMPLES	
								SAMPLER SHOE		AUGER PLUGS	
				UTILITIES FOUND OR HIT						DRILL OUT BITS	

LABOR

CREW WITH PER DIEM		CHARGEABLE EXTRA LABOR HRS		
NAME	SIGNATURE	SHOP	DRILL	TOTAL HRS

REMARKS

Client Signature_____ Operator Signature_____

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

CASCADE DRILLING DAILY WORK REPORT

PO Box 1184 – Woodinville, WA 98072 – 425-485-8908 # CASCADL91508
13600 SE Ambler Road – Clackamas, OR 97015 – 503-775-4118 #CCB-187984
555 S. Harbor Blvd. – La Habra, CA 90631 – 562-929-8176 #C57-938110
3632 Omec Circle – Rancho Cordova, CA 95742 – 916-638-1169 #C57-938110

CLIENT	PROJECT NO	DATE 5-16-12	DAY WED
JOB LOCATION 7755 E. Marginal Way S	DIG ALERT #	CD-LP#	

DESCRIPTION OF WORK

Please explain reasons for Down Time and Standby Time and Shop Time

Well # Bore #	Depth Drilled			HOURS Start	HOURS Stop	Total Hrs	Charge Hrs
		AM Shop Time	Pre-trip	5:30	6:00	.5	
		Travel to Site		6:00	7:00	1	
			site walk, gas, access & HTS	7:00	8:00	1	
			set up, start drilling, install 4" PVC	8:00	10:30	2.5	
			3"x45' PLR-4SBR & 2"x45' PLR-4148	—	—		
			4" CIP 2"x20' PLR-4SA & 2"x21' PLR-4148	—	—		
			Clean & move to next area	10:30	11:00	.5	
			set up, install 4"x45' CAR-628	11:00	12:00	1	
			Lunch today	12:00	12:30		
		Travel to Shop					
		PM Shop Time					
Total Ft.		TOTAL CHARGEABLE RIG HOURS					

RIG ENGINE HOURS: START _____ STOP _____ TOTAL _____

EQUIPMENT

DRILL RIG #	LW37	COMPRESSOR/JACKHAMMER	
SUPPORT TRUCK #	LW511	SNOW FENCE RENTAL	
SUPPORT TRUCK #		CONTINUOUS SAMPLER	
TRAILER #		CONTINUOUS SAMPLER FOOTAGE	
BOBCAT		# OF CORE CUTS	
AUTO HAMMER		# OF BULLDOG CUTS	
GROUT MIXER	✓	# OF SERVICE RUNS	
GROUT PUMP	✓	# OF SAW CUTS	
PERISTALTIC PUMP		PORTABLE RESTROOM	
FORKLIFT/HOPPER			

LABOR

CREW WITH PER DIEM _____ CHARGEABLE EXTRA LABOR HRS _____

NAME	SIGNATURE	SHOP	DRILL	TOTAL HRS
Cole A				
Shane F				

CASING

TYPE___SLOT___	2	4	
20' SCREEN			
10' SCREEN			
5' SCREEN			
20' BLANK			
10' BLANK			
5' BLANK			
5' PP SCREEN			
10' PP SCREEN			
SLIP CAP			
THREADED CAPS			
LOCKING CAPS			
DRIVE SHOE			
CENTRALIZERS			
LOCKS			

UTILITIES FOUND OR HIT

MATERIALS

ITEM	QTY	ITEM	QTY
SAND		WELL COVER 8"	
READYMIX	3	WELL COVER 12"	
QUICKSET		MONUMENT CASING	
PORTLAND		BOLLARDS	
ASPHALT		SOIL DRUMS	
BENTONITE GROUT	2	DEVELOPMENT DRUMS	
BENTONITE CHIPS	2	DECON DRUMS	
BENTONITE POWDER		HOLE COVER PLATES	
BENTONITE PELLETS		PLASTIC SHEETING	
BENTONITE GRANULAR		TRAFFIC CONTROL	
SAMPLER TUBES		CORE BOXES	
SHELBY TUBES		PLYWOOD	
PROBE POINTS "		SOIL SAMPLES	
GW PROBE POINTS		WATER SAMPLES	
MACRO LINERS		HYDROPUNCH SAMPLES	
SAMPLER SHOE		AUGER PLUGS	
		DRILL OUT BITS	

REMARKS

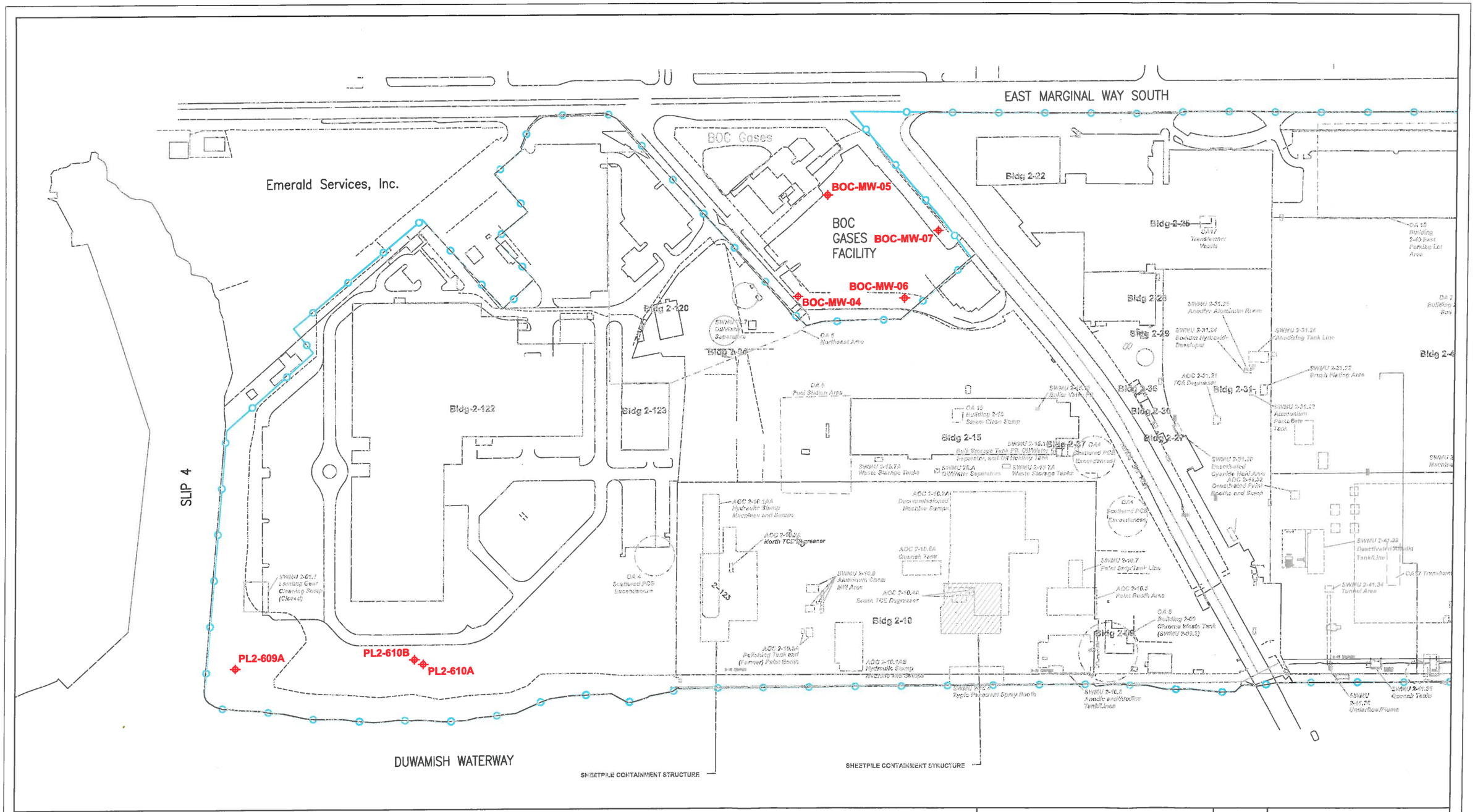
Client Signature _____ Operator Signature _____

ENVIRONMENTAL PARTNERS INC 295 NE Gilman Boulevard, Suite 201 Issaquah, Washington 98027 pb 425.395.0010 fax 425.395.0011

Well Decommissioning Interim Measure – August 2012 Book #9

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number 17513.2.Task 500.04

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, Washington 98027
(425) 395-0010



KEY:

WELLS PROPOSED FOR DECOMMISSIONING

0 50 100 200

SCALE: 1" = 200'

THIS FIGURE WAS ORIGINALLY PRODUCED IN COLOR. REPRODUCTION IN BLACK AND WHITE MAY RESULT IN LOSS OF INFORMATION.

BUILDINGS

BUILDING SLABS

SHEETPILE CONTAINMENT STRUCTURE

PROPERTY BOUNDARY

ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 1

APPROXIMATE LOCATIONS OF WELLS PROPOSED FOR DECOMMISSIONING

PROJECT	NORTH BOEING PLANT 2 CMS		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY ALW	REVIEWED BY DCK	DATE 08/06/12

Table 1: Boeing Plant 2 Wells to be Decommissioned				
Well ID	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Well Diameter and Material**	**Decommissioning Method**
PL2-609A	21.5	6 - 21	2-inch PVC	Chip
PL2-610A	21.5	6 - 21	2-inch PVC	Grout
PL2-610B	45.5	35 - 45	2-inch PVC	Chip
BOC-MW-04	19	9 - 19	2-inch PVC	Chip
BOC-MW-05	14	4 - 14	2-inch PVC	Chip
BOC-MW-06	14	4 - 14	2-inch PVC	Chip
BOC-MW-07	14	4 - 14	2-inch PVC	Chip

Well Decommissioning Log - Boeing Plant 2

Well Number	BOC-MW-06	
Well Location	Northing	Easting
Start (date and time)	8/29/12 0700	
End (date and time)	8/29/12 0730	
Installation Method	Hollow Stem Auger	
Total Well Depth	14.01	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	4-14	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Pureg old® Medium Chips	
Grout or Chip Volume	.3	Gallons or Cubic Feet
Surface Completion	~~CONCRETE~~ PB CEMENT	
Drilling Contractor	Cascade Drilling, INC	
License Number	CASCADI*151OK	
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	BOC-MW-07	
Well Location	Northing	Easting
Start (date and time)	8/29/12 0735	
End (date and time)	8/29/12 0755	
Installation Method	Hollow Stem Auger	
Total Well Depth	13.76	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	4-14	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Pureset® Medium Chips	
Grout or Chip Volume	.3	Gallons or Cubic Feet
Surface Completion	CEMENT	
Drilling Contractor	CASCADE	
License Number	CASCADE91508	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	BOC-MW-05	
Well Location	Northing	Easting
Start (date and time)	8/29/12 0800	
End (date and time)	8/29/12 0820	
Installation Method	Hollow Stem Auger	
Total Well Depth	13.76	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	4-14	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Puregold® Medium Chips	
Grout or Chip Volume	.3	Gallons or Cubic Feet
Surface Completion	CEMENT	
Drilling Contractor	CASCADE	
License Number	CASCADL91508	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	BOG-MW-04	
Well Location	Northing	Easting
Start (date and time)	8/29/12 0830	
End (date and time)	8/29/12 0850	
Installation Method	Hollow Stem Auger	
Total Well Depth	18.94	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	9-19	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Puregold® Medium Chips	
Grout or Chip Volume	.4	Gallons or Cubic Feet
Surface Completion	CEMENT	
Drilling Contractor	Cascade Drilling Inc.	
License Number	CASCADL91508	
Signature (Driller)	[signature]	
Signature (Engineer or Geologist)	[signature]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-610A	
	Northing	Easting
Well Location	198,145.9	1,273,308.7
Start (date and time)	8/29/12 0900	
End (date and time)	8/29/12 0920	
Installation Method	Hollow Stem Auger	
Total Well Depth	21.06	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	6-21	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Pureg old® Medium Chips	
Grout or Chip Volume	.45	Gallons or Cubic Feet
Surface Completion	CEMENT	
Drilling Contractor	CASCADE DRILLING INC	
License Number	CASCADL 91508	
Signature (Driller)		
Signature (Engineer or Geologist)		

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-610B	
	Northing	Easting
Well Location	198,152.3	1,273,311.2
Start (date and time)	8/29/12 0930	
End (date and time)	8/29/12 1010	
Installation Method	Hollow Stem Auger	
Total Well Depth	44.91	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	35-45	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quick Grout	
Grout or Chip Volume	12	Gallons or Cubic Feet
Surface Completion	CEMENT	
Drilling Contractor	CASCADE DRILLING, INC	
License Number	CASCADL91508	
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	PLZ-609A	
	Northing	Easting
Well Location	198,430.0	1,273,035.6
Start (date and time)	8/29/12 1030	
End (date and time)	8/29/12 1100	
Installation Method	Hollow Stem Auger	
Total Well Depth	20.87	feet bgs
Well Diameter	2"	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	6-21	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Puregold® Medium Chips	
Grout or Chip Volume	.45	Gallons or Cubic Feet
Surface Completion	CEMENT	
Drilling Contractor	CASCADE Drilling INC	
License Number	CASCAD91508	
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number

	Northing	Easting
Well Location		

Start (date and time)

End (date and time)

Installation Method

Total Well Depth feet bgs

Well Diameter inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips

Grout or Chip Volume Gallons or Cubic Feet

Surface Completion

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

_____

Well Decommissioning Log - Boeing Plant 2

Well Number

	Northing	Easting
Well Location		

Start (date and time)

End (date and time)

Installation Method

Total Well Depth _____ feet bgs

Well Diameter _____ inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) _____ feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips

Grout or Chip Volume _____ Gallons or Cubic Feet

Surface Completion

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

_____

Well Decommissioning Log - Boeing Plant 2

Well Number		
	Northing	Easting
Well Location		
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips		
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion		
Drilling Contractor		
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

RECORD OF BOREHOLE NA-PL2-610B

SHEET 1 of 2

PROJECT: Boeing Plant II North Area DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 46.5 ft
AZIMUTH: N/A
LOCATION: Along Duwamish Waterway

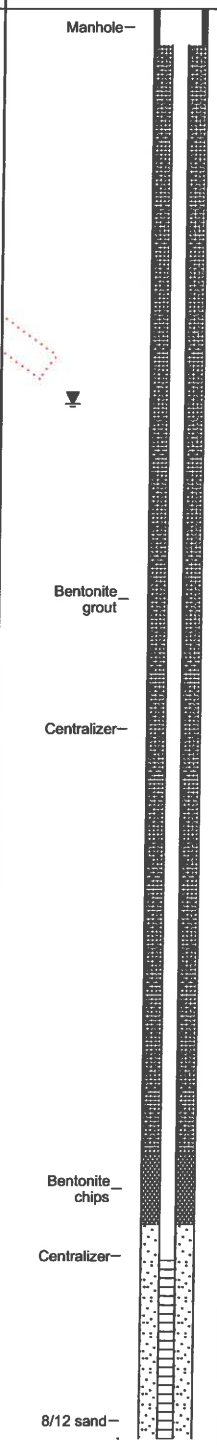
DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 9/16/08
DATE COMPLETED: 9/16/08
WEATHER: Clear

DATUM: Geodetic
COORDS: N: 198,152.3 E: 1,273,311.2
GS ELEVATION: 13.8 ft
TOC ELEVATION: 13.4 ft
TEMPERATURE: 56 F

INCLINATION: -90
DEPTH W.L.: 11.1 ft
ELEVATION W.L.: 2.3 ft
DATE W.L.: 10/22/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT
0		0.0 - 21.0 See Boring log for NA-PL2-610A									
		21.0 - 22.5 Medium dense, gray, interlayered, fine SAND and fine SANDY SILT, wet, no odor (ML)	SP-SM		-7.2 21.0 -8.7	0.0	1	SPT	9 -10 -10		1.5/1.5
		22.5 - 25.0 HSA			22.5 -11.2						
		25.0 - 26.5 Medium dense, gray, fine to medium SAND, wet, no odor (SP)	SP		25.0 -12.7	0.0	2	SPT	15 -15 -16		1.5/1.5
		26.5 - 30.0 HSA			26.5 -16.2						
		30.0 - 31.5 Medium dense, gray, fine to medium SAND, wet, no odor (SP)	SP		30.0 -17.7	0.0	3	SPT	17 -19 -20		1.5/1.5
		31.5 - 35.0 HSA			31.5 -21.2						
		35.0 - 36.5 Medium dense, gray, fine to medium SAND, wet, no odor (SP) (Likely HEAVE)	SP		35.0 -22.7	0.0	4	SPT	20 -22 -26		1.5/1.5
		36.5 - 40.0 HSA			36.5 -26.2						
40		Log continued on next page									

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-610B
Borehole Diameter: 6
WELL CASING
Interval: 0-35 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 35-45 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 34-45 ft
Type: 8/12 Sand
Quantity: 11 ft
FILTER PACK SEAL
Interval: 32-34 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 0-32 ft
Type: Bentonite grout
Quantity: 32 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: S. Choate

GA INSPECTOR: I. Young/D. Gorman
CHECKED BY: I. Young
DATE: 2/2/09

Golder Associates

AA BOREHOLE RECORD NORTH AREA DGI.GPJ GOLDER NJ-PA 05-24-06.GDT 2/16/09

RECORD OF BOREHOLE NA-PL2-610B

PROJECT: Boeing Plant II North Area DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 46.5 ft
AZIMUTH: N/A
LOCATION: Along Duwamish Waterway

DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 9/16/08
DATE COMPLETED: 9/16/08
WEATHER: Clear

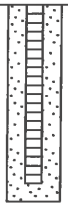
DATUM: Geodetic
COORDS: N: 198,152.3 E: 1,273,311.2
GS ELEVATION: 13.8 ft
TOC ELEVATION: 13.4 ft
TEMPERATURE: 56 F

INCLINATION: -90
DEPTH W.L.: 11.1 ft
ELEVATION W.L.: 2.3 ft
DATE W.L.: 10/22/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT
40		40.0 - 41.5 3.0-ft HEAVE, no blow counts; medium dense gray fine sand, saturated, no odor	SP		40.0 -27.7	0.0	5	SPT	N/A		1.5 / 1.5
		41.5 - 45.0 HSA			41.5 -31.2						
45		45.0 - 46.5 Medium dense gray fine SAND, saturated, no odor (SP) (Likely HEAVE)	SP		45.0 -32.7	0.0	6	SPT	50/3.0"		0.3 / 1.5
		Boring completed at 46.5 ft									

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

PL2-610B



WELL CONSTRUCTION DETAILS

PL2-610B
Borehole Diameter: 6
WELL CASING
Interval: 0-35 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 35-45 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 34-45 ft
Type: 8/12 Sand
Quantity: 11 ft
FILTER PACK SEAL
Interval: 32-34 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 0-32 ft
Type: Bentonite grout
Quantity: 32 ft

DRAFT

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: S. Choate

GA INSPECTOR: I. Young/D. Gorman
CHECKED BY: I. Young
DATE: 2/2/09

Golder Associates

RECORD OF BOREHOLE NA-PL2-610A

SHEET 1 of 1

PROJECT: Boeing Plant II North Area DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 21.5 ft
AZIMUTH: N/A
LOCATION: Along Duwamish Waterway

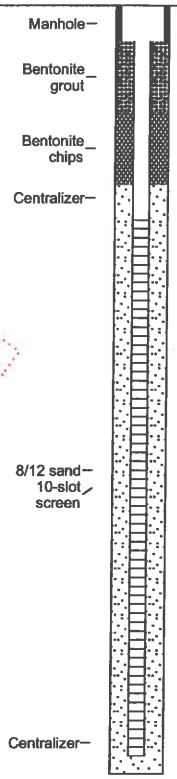
DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 9/15/08
DATE COMPLETED: 9/15/08
WEATHER: Clear

DATUM: Geodetic
COORDS: N: 198,145.9 E: 1,273,308.7
GS ELEVATION: 14.0 ft
TOC ELEVATION: 13.4 ft
TEMPERATURE: 56 F

INCLINATION: -90
DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	PID (ppm)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT
0		0.0 - 1.5 Medium dense, brown, fine SAND, with fine Gravel, dry, roots and organic material, no odor (SP)	SP		12.5	0.0	1	SPT	7 -8 -9		1.5/1.5
		1.5 - 1.8 Medium dense, gray and brown, fine to medium SAND, dry, no odor (SP)	SP / ML		1.8 / 11.0	0.0	2	SPT	10 -12 -14		1.5/1.5
	10	1.8 - 3.0 Medium dense, brown mottled gray, fine SANDY SILT, dry to damp, no odor (ML)	ML / ML		3.0 / 10.0 / 9.2	0.0	3	SPT	5 -7 -9		1.5/1.5
	5	3.0 - 4.0 Medium dense, gray to brown, fine SANDY SILT, damp, no odor (ML)	SM		4.8 / 8.0	0.0	4	SPT	7 -9 -11		1.5/1.5
		4.0 - 4.8 Medium dense, brown mottled gray, SILT, moist, no odor (ML)			6.0 / 6.0		5	SPT	50/1.0"		0.0/2.0
	5	4.8 - 6.0 Medium dense, brown, SILTY fine SAND, moist, no odor (SM)	SP / ML		8.0 / 4.7	0.0	6	SPT	4 -4 -5		1.5/1.5
10		6.0 - 8.0 NO RECOVERY	SP		9.5	0.0	7	SPT	9 -11 -11		1.5/1.5
		8.0 - 9.3 Medium dense, gray to brown, fine SAND, moist, no odor (SP)			1.5	0.0	8	SPT	10 -11 -13		1.5/1.5
	0	9.3 - 9.5 Medium dense, dark gray, interlayered, SILT and fine SAND, moist, no odor (ML)	SP / ML / CL-ML		12.8 / 0.2 / 14.0	0.0	9	SPT	11 -11 -11		1.5/1.5
15		9.5 - 12.5 Medium dense, gray, fine SAND, saturated, silt laminations at 10.5, 11.75, and 12.0 ft bgs, no odor (SP)			-1.5	0.0	10	SPT	12 -16 -22		0.8/1.5
		12.5 - 12.8 Medium dense, gray, fine SAND, saturated, no odor (SP)	CL-ML		15.5 / -3.5	0.0	11	SPT	14 -16 -17		1.5/1.5
	-5	12.8 - 13.8 Medium dense, gray, fine SANDY SILT, damp, wood debris at 13.5 ft bgs, no odor (ML)	SM / SM		17.5 / -4.5 / -5.0	0.0	12	SPT	15 -15 -17		1.5/1.5
20		13.8 - 14.0 Dense, gray, CLAYEY SILT, damp, no odor (CL-ML)	SP		19.0	0.0	13	SPT	12 -12 -14		1.5/1.5
		14.0 - 15.5 Poor recovery; wood debris in sampler			-7.5	0.0	14	SPT	12 -14 -18		1.5/1.5
		15.5 - 17.5 Dense, gray, CLAYEY SILT, damp to wet, no odor (CL-ML)									
	-10	17.5 - 18.5 Medium dense, gray, SILTY fine SAND, wet to saturated, thin silt lenses, no odor (SM)									
25		18.5 - 19.0 Medium dense, gray, SILTY fine SAND, wet to saturated, thin sand lenses, no odor (SM)									
		19.0 - 21.5 Medium dense, gray, fine to medium SAND, wet, no odor (SP)									
	-15	Boring completed at 21.5 ft									
30											
	-20										
35											
	-25										
40											

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-610A
Borehole Diameter: 6-inch
WELL CASING
Interval: 0-6 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 6-21 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 5-21 ft
Type: 8/12 Sand
Quantity: 16 ft
FILTER PACK SEAL
Interval: 3-5 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 0-3 ft
Type: Bentonite grout
Quantity: 3 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: S. Choate

GA INSPECTOR: I. Young
CHECKED BY: I. Young
DATE: 2/2/09

Golder Associates

RECORD OF BOREHOLE NA-PL2-609A

SHEET 1 of 1

PROJECT: Boeing Plant II North Area DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 21.5 ft
AZIMUTH: N/A
LOCATION: Slip 4 & Duwamish

DRILL METHOD: Hollow-stem auger
DRILL RIG: CME 75
DATE STARTED: 9/16/08
DATE COMPLETED: 9/16/08
WEATHER: Clear

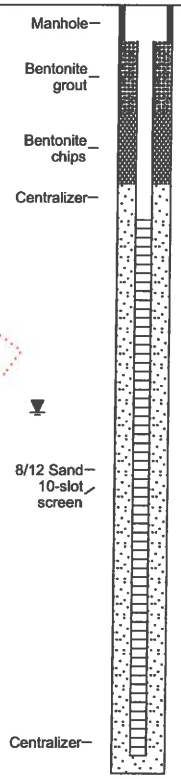
DATUM: Geodetic
COORDS: N: 198,430.0 E: 1,273,035.6
GS ELEVATION: 13.9 ft
TOC ELEVATION: 13.7 ft
TEMPERATURE: 56 F

INCLINATION: -90
DEPTH W.L.: 11.4 ft
ELEVATION W.L.: 2.3 ft
DATE W.L.: 10/24/08
TIME W.L.:

DESCRIPTION	USCS	ELEV. / DEPTH (ft)	PID (ppm)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT
0.0 - 2.0 Brown, medium dense, SAND and medium Gravel (GP)	GP	11.9						
2.0 - 3.5 Light brown, medium dense, fine SAND, with Gravel, dry, no odor (Topsoil and Sub-base)		2.0 / 10.4	0.0	1	SPT	40 -50/5"		1.0 / 1.5
3.5 - 5.0 Light brown, medium dense, fine SAND, some fine to medium Gravel, angular, dry, no odor (SP)	SP	3.5 / 8.9	0.0	2	SPT	12 -14 -17		1.5 / 1.5
5.0 - 6.5 Light brown, medium dense, fine SAND, some fine to medium Gravel, angular, dry, no odor (SP)	SP	5.0 / 7.4	0.0	3	SPT	14 -14 -17		1.5 / 1.5
	SP / SM / SP	7.2 / 5.9	0.0	4	SPT	9 -11 -18		1.5 / 1.5
6.5 - 6.8 Light brown, medium dense, fine SAND, some fine to medium Gravel, angular, dry, no odor (SP)	SP / SM / SP	5.4 / 4.9 / 4.4	0.0	5	SPT	8 -12 -7		1.5 / 1.5
6.8 - 7.2 Brown, medium dense, SILTY fine SAND, with black Clayey Silt lens at 7.1 ft bgs, damp, no odor (SM)	SP / ML / SP-SM	3.9 / 10.0 / 2.9 / 2.4	0.0	6	SPT	1 -2 -2		1.5 / 1.5
7.2 - 8.0 Medium dense, brown to gray, fine to medium SAND, damp to moist, no odor (SP)	ML	11.5 / 1.4	0.0	7	SPT	5 -6 -7		1.5 / 1.5
8.0 - 8.5 Medium dense, brown to gray, fine to medium SAND, damp to moist, no odor (SP)	ML	12.5 / -0.1	0.0	8	SPT	5 -5 -5		1.5 / 1.5
	ML	14.0 / -1.6	0.0	9	SPT	4 -6 -5		1.5 / 1.5
8.5 - 9.0 Medium dense, brown to gray, SILTY fine SAND, moist, no odor (SM)		15.5						
9.0 - 9.5 Medium dense, brown to gray, fine to medium SAND, moist, no odor (SP)		-4.6		10	SH	N/A		2.5 / 3.0
9.5 - 10.0 Loose, dark gray, fine SAND, moist, no odor (SP)	SP	18.5 / -5.8	0.0	11	SPT	7 -8 -6		1.5 / 1.5
10.0 - 11.0 Loose, gray and mottled black, SILT, little fine Sand, moist, no odor (ML)	SM / SP	20.0 / -7.6	0.0	12	SPT	7 -9 -11		1.5 / 1.5
11.0 - 11.5 Soft, dark gray, fine SAND and SILT, moist, no odor (SP-SM)								
11.5 - 12.5 Soft, gray to dark gray with interlayered red-brown, SILT, with root material, moist, no odor (ML)								
12.5 - 14.0 Soft, light gray, SILT, trace to little fine Sand in lenses, moist, root material, no odor (ML)								
14.0 - 15.5 Soft, light gray, SILT, moist, no odor (ML)								
15.5 - 18.5 Push Shelby Tube for AMEC/GEOMATRIX								
18.5 - 19.8 Medium dense, gray, well sorted, fine SAND, wet, no odor (SP)								
19.8 - 20.0 Loose, light gray, SILTY fine SAND, wet, no odor (SM)								
20.0 - 21.5 Medium dense, gray, fine SAND, saturated, no odor (SP)								

Boring completed at 21.5 ft

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-609A
Borehole Diameter: 6-inch
WELL CASING
Interval: 0-6 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 6-21 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 5-21 ft
Type: 8/12 Sand
Quantity: 16 ft
FILTER PACK SEAL
Interval: 3-5 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 0-3
Type: Bentonite grout
Quantity: 2 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: S. Choate

GA INSPECTOR: I. Young/D. Gorman
CHECKED BY: I. Young
DATE: 2/2/09

Golder Associates

RESOURCE PROTECTION WELL REPORT

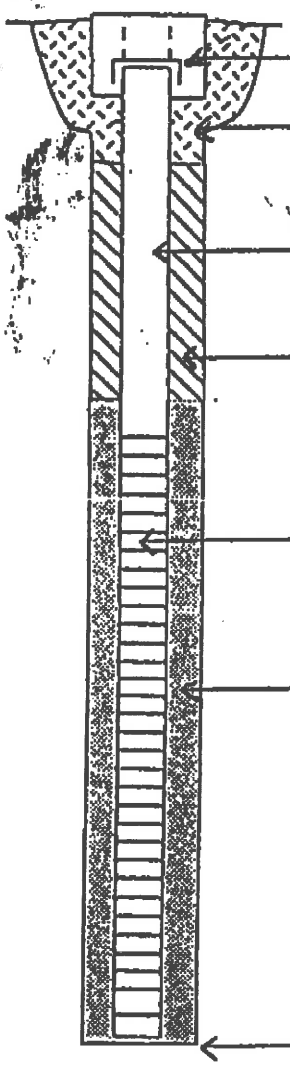
ENTERED

START CARD NO. R039526

PROJECT NAME: BOC GASSES
WELL IDENTIFICATION NO. AEE 586
DRILLING METHOD: HSA
DRILLER: Brian G. Gose
FIRM: Cascade Drilling, Inc.
SIGNATURE:
CONSULTING FIRM: DELTA ENV.
REPRESENTATIVE: James Peale

COUNTY: King
LOCATION: SE ¼ SE ¼ Sec 29 Twn 24N R 4E
STREET ADDRESS OF WELL: 7700 - 14th Ave South, Seattle
WATER LEVEL ELEVATION: 4'
GROUND SURFACE ELEVATION: N/A
INSTALLED: 5/30/98
DEVELOPED: YES

8245

AS-BUILT	WELL DATA	FORMATION DESCRIPTION
	WELL COVER CONCRETE SURFACE SEAL DEPTH = 1/ft PVC BLANK 2"x 4' BACKFILL 2 ft. TYPE: bent. Chips PVC SCREEN 2"x 10' SLOT SIZE: .010 GRAVEL PACK 11 ft. MATERIAL: 2/12 sand WELL DEPTH 14' "	0 - 5 ft. brown sand, gravel + debris (FILL) 5 - 14 ft. black sand - ft.

SCALE: 1" = _____ PAGE _____ OF _____

ECY 050-12 (Rev. 11/09)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

ENTERED

RESOURCE PROTECTION WELL REPORT

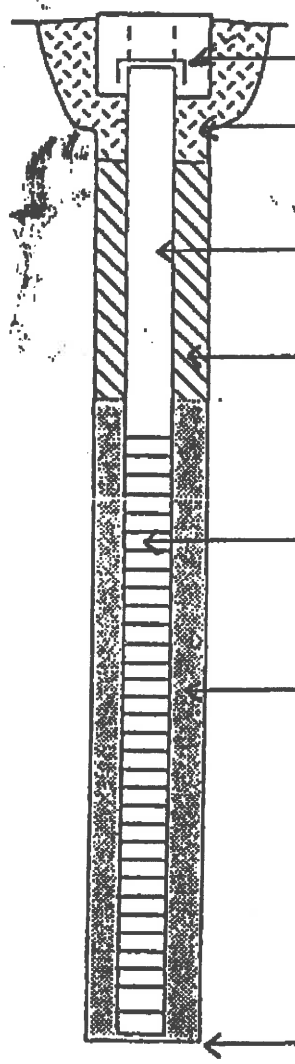
START CARD NO. R039526

PROJECT NAME: BOC GASSES
WELL IDENTIFICATION NO. AEE 585
DRILLING METHOD: HSA
DRILLER: Brian G. Gose
FIRM: Cascade Drilling, Inc.
SIGNATURE:
CONSULTING FIRM: DELTA ENV.
REPRESENTATIVE: James Peale

COUNTY: King
LOCATION: SE ¼ SE ¼ Sec 29 Twn 24N R 4E
STREET ADDRESS OF WELL: 7700-14th Ave South, Seattle
WATER LEVEL ELEVATION: 4'
GROUND SURFACE ELEVATION: N/A
INSTALLED: 5/30/98
DEVELOPED: YES

8245

AS-BUILT	WELL DATA	FORMATION DESCRIPTION



WELL COVER

CONCRETE SURFACE SEAL DEPTH = 1/ft

PVC BLANK 2" x 4'

BACKFILL 2 ft.
TYPE: bent. Chips

PVC SCREEN 2" x 10'
SLOT SIZE: .010

GRAVEL PACK 11 ft.
MATERIAL: 2/12 sand

WELL DEPTH 14' '' "

FORMATION DESCRIPTION:

0 - 5 ft.
brown sand, gravel + debris (FILL)

5 - 14 ft.
black sand

- ft.

SCALE: 1" = _____ PAGE _____ OF _____

ECY 050-12 (Rev. 11/09)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

RESOURCE PROTECTION WELL REPORT 24-4-29R

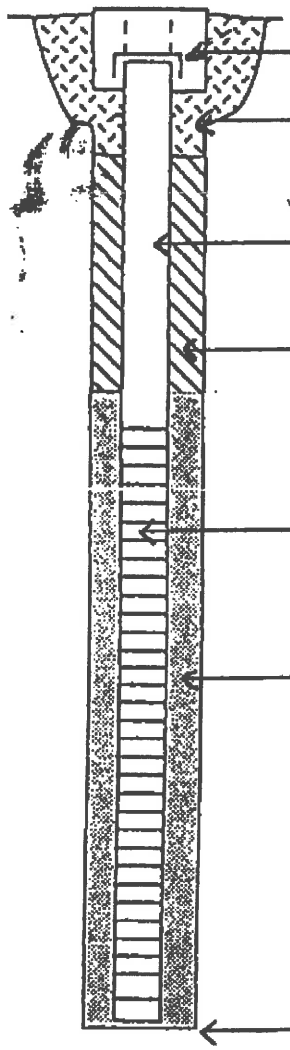
ENTERED

START CARD NO. R039526

PROJECT NAME: BOC GASSES
WELL IDENTIFICATION NO. AEE 584
DRILLING METHOD: HSA
DRILLER: Brian G. Gose
FIRM: Cascade Drilling, Inc.
SIGNATURE:
CONSULTING FIRM: DELTA ENV.
REPRESENTATIVE: James Peale

COUNTY: King
LOCATION: SE ¼ SE ¼ Sec 29 Twn 24N R 4E
STREET ADDRESS OF WELL: 7700-14th Ave South, Seattle
WATER LEVEL ELEVATION: 4'
GROUND SURFACE ELEVATION: N/A
INSTALLED: 5/30/98
DEVELOPED: YES

8245

AS-BUILT	WELL DATA	FORMATION DESCRIPTION
	WELL COVER CONCRETE SURFACE SEAL DEPTH = 1/ft PVC BLANK 2"x 4' BACKFILL 2 ft. TYPE: bent. Chips PVC SCREEN 2"x 10' SLOT SIZE: .010 GRAVEL PACK 11 ft. MATERIAL: 8/12 sand WELL DEPTH 14' "	0 - 5 ft. brown sand, gravel + debris (FILL) 5 - 14 ft. black sand - ft.

RECEIVED
JUL 14 1998
NWRO-WR
DEPT OF ECOLOGY

SCALE: 1" = _____ PAGE _____ OF _____

ECY 050-12 (Rev. 11/09)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Delta Environmental Consultants, Inc.

Site Id: MW-04	Drilling Method: HSA
Location: SW of Inactive Pond/Parking Lot	
Total Depth: 19.00'	Completed Depth: 18.50'
Elevation: 14.27'	Datum: Mean Sea Level
Logged By: DH	Date(s): 08/12/97 - 08/12/97
Contractor: Cascade Drilling	Consultant: Delta Environmental
Borehole Dia.: 6.25in	Measuring Point: 13.81'

Project Name: BOC Gases

Project Number: M097-750

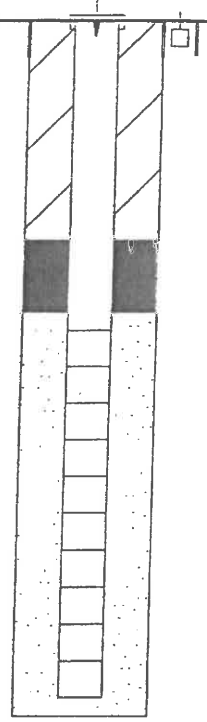
Remarks: Water at 12.5' bgs at time of drilling.

Blank Casing:
type: pvc dia: 2.00in fm: 0.0' to: 8.50'

Annular Fill:
type: Grout fm: 0.00' to: 6.00'
type: Bentonite fm: 6.00' to: 8.00'
type: Sand Filter fm: 8.00' to: 19.00'

Screens:
type: Slotted size: 0.010in dia: 2.00in fm: 8.50' to: 18.50'

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	Graphic Log	Material Description	Well Construction
10						(SP-SM) SAND, fine-medium, dark brown, moist	MP. EL. 13.81
0	10					(SP-SM) SAND, as above, wet	
-10	20						



WAC 173-160-420

What are the general construction requirements for resource protection wells?

(1) No resource protection well or soil boring excavation may be used to withdraw or inject water for domestic, industrial, municipal, commercial, or agricultural purposes.

(2) No resource protection well or soil boring excavation may interconnect aquifers.

(3) Nested resource protection wells are prohibited.

(4) Cuttings, development water, and other investigation derived waste from resource protection well construction or geotechnical soil borings shall be managed in a manner consistent with the intent and purposes of the Water Pollution Control Act, chapter 90.48 RCW, the Hazardous Waste Management Act, chapter 70.105 RCW, and implementing regulations.

(5) Well tagging:

(a) It shall be the driller's responsibility to place a well identification tag with a unique identification number on every resource protection well that they construct or alter within thirty days of completion of the well. Uncased geotechnical soil borings and environmental investigation wells are exempt from the tagging requirements of this chapter.

(i) The alpha-numeric number shall be recorded on the drilling report in the space provided.

(ii) The driller shall remove the well identification tag on all resource protection wells they decommission and shall attach the tag to the decommissioning well report.

(b) It shall be the well owner's responsibility to place a well identification tag with a unique identification number on every resource protection well they own and which was completed prior to the effective date of this regulation.

(i) Upon request, the department shall furnish the well owner with a well tag and tagging instructions.

(ii) The well owner shall tag their well(s) and submit a completed tagging report to the department.

(c) The well tag shall be permanently attached to:

(i) The well casing and be visible above land surface for all wells which have been completed above land surface.

(ii) The well casing or to any permanent and protected portion of the vault for wells completed below land surface.

(iii) A prominent system component visible above land surface for ground source heat pump borings.

(d) All well identification tags shall be supplied by the department.

(e) It is unlawful for a person to tamper with or remove a well identification tag except during well alteration.

(6) All resource protection wells will be sealed in accordance with WAC 173-160-450 regardless of the method of installation. Except, resource protection wells that are properly decommissioned prior to the removal of any drilling equipment from the well location are

exempted from the surface sealing requirements of this chapter. Provided the decommissioning process includes the removal of any conduit, tubing, probe, or other items inserted into the ground.

(7) All geotechnical soil borings shall be decommissioned under the terms of this chapter.

(8) Except as provided in RCW 18.104.180, all construction, alteration, reconstruction, and decommissioning of resource protection wells and geotechnical soil borings shall be done by an individual licensed under the provisions of chapter 173-162 WAC.

(9) A notice of intent to construct or decommission a resource protection well and a geotechnical soil boring shall be filed with the department a minimum of seventy-two hours prior to initiating construction or decommissioning of the well(s) or boring(s). A fee must accompany each notice of intent to construct or decommission a resource protection well.

(a) The fee for a resource protection well, except for an environmental investigation well, a ground source heat pump boring, or a grounding well, is forty dollars for each well.

(b) The fee for an environmental investigation well in which ground water is sampled or measured is forty dollars for the construction of up to four environmental investigation wells per project, and ten dollars for each additional environmental investigation well constructed on a project with more than four wells. There is no fee for soil or vapor sampling purposes.

(c) The fee for a ground source heat pump boring or a grounding well is forty dollars for construction of up to four ground source heat pump borings or grounding wells per project and ten dollars for each additional ground source heat pump boring or grounding well constructed on a project with more than four wells.

(d) The fee to decommission a resource protection well, except for an environmental investigation well, is twenty dollars per well. There is no fee to decommission an environmental investigation well or a geotechnical soil boring.

(e) The fee to decommission a ground source heat pump boring or a grounding well is twenty dollars per well.

(f) Under some circumstances, it may be necessary to construct more resource protection wells or geotechnical soil borings than originally anticipated. When additional resource protection wells are constructed on a site for which a notice of intent and fee were submitted, a second notice and fee shall be submitted within twenty-four hours after all wells have been completed or as soon as the final number of wells to be constructed is determined, whichever is sooner. When additional geotechnical soil borings are needed, the borings may be completed. A follow-up notice of intent shall be submitted to the department within twenty-four hours after all borings are constructed. Notification to construct multiple wells or geotechnical soil borings within the same quarter/quarter section, township, and range may be submitted on one notice form.

(10) Resource protection well reports.

(a) Anyone who constructs or decommissions a well is required to submit a complete well report on the construction or decommissioning of all resource protection wells and geotechnical soil borings. Reports must be submitted to the water resources program within thirty days after completion of construction or decommissioning. Submission of a well report to consulting firms does not meet the requirement of this section. The report must be an accurate summation of data collected in the field taken from field notes written as the well was constructed or decommissioned. Field notes must be available at all times during construction or decommissioning for review by state and local inspectors and kept until the well report is submitted.

(b) The resource protection well report must be made on a form provided by the department, or a reasonable facsimile of the form, as approved by the department.

(c) Where applicable the report shall include the following information:

(i) Owner's name; operator/trainee name; operator/trainee license number; contractor registration number, drilling company name;

(ii) Tax parcel number;

(iii) Well location address;

(iv) Location of the well to at least 1/4, 1/4 section or smallest legal subdivision;

(v) Unique well identification tag number;

(vi) Construction date;

(vii) Start notification number;

(viii) Intended use of well;

(ix) The well depth, diameter, and general specifications of each well;

(x) Total depth of casing;

(xi) Well head elevation;

(xii) Drilling method;

(xiii) Seal material, seal location and type of placement used;

(xiv) Filter pack location; filter pack material used;

(xv) The thickness and character of each bed, stratum or formation penetrated by each well including identification of each water bearing zone;

(xvi) Casing gauge, diameter, stickup, type of material, and length, also of each screened interval or perforated zone in the casing;

(xvii) The depth to the static water level, as measured below the land surface; and

(xviii) Such additional factual information as may be required by the department.

(d) The well report must include one of the following:

(i) The license number and signature of the person who constructed or decommissioned the well;

(ii) The license number and signature of the trainee and the licensed operator under chapter 18.104 RCW; or

(iii) The license number and signature of an exempted individual as defined under RCW 18.104.180(3).

(e) This rule shall allow an individual to submit electronic reports in accordance with department procedures. The use of a digital signature in the electronic reports will be authorized as a substitute for an original signature under (d) of this subsection.

What are the surface protection requirements?

(11) All resource protection wells shall be capped and protected using one of the following methods:

(a) If the well is cased with metal and completed above the ground surface, you must attach a watertight cap with a lock to the top of the casing.

(b) If the well is not cased with metal and completed above the land surface, you must install a protective metal casing over and around the well. The protective casing shall extend at least six inches above the top of the well casing and be cemented at least two feet into the ground. A cap with lock shall be attached to the top of the protective casing.

(12) You shall protect the well(s) completed above ground from damage by:

(a) Cementing three metal posts, at least three inches in diameter, in a triangular array around the casing and at least two feet from it. Each post shall extend at least three feet above and below the land surface.

(b) A reinforced concrete pad may be installed to protect against and prevent frost heave. If installed, the concrete pad shall extend to a depth equal to anticipated frost depth. When a concrete pad is used, the well seal may be part of the concrete pad.

(13) If the well is completed below land surface, a watertight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent the inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The cover must be designed to withstand the maximum expected loading.

(14) The protective measures may be waived or modified upon written approval from the department (a variance).

(15) If the well is damaged, the well protection measures and casing shall be repaired to meet the requirements of this chapter. If the well is damaged beyond repair, it shall be decommissioned in accordance with WAC 173-160-460.

WAC 173-160-460

What is the decommissioning process for resource protection wells?

(1) For resource protection wells and geotechnical soil borings that were not constructed in accordance with these regulations, or for which a drilling report required under this section is missing, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers, and decommission in one of the following ways:

(a) Perforate the casing from the bottom to land surface and pressure grout the casing.

(i) Perforations shall be at least four equidistant cuts per row, and one row per foot. Each cut shall be at least one and one-half inches long.

(ii) Apply enough pressure to force the sealing material through the perforations, filling any voids on the outside of the casing.

(iii) The remainder of the casing shall be filled with neat cement grout, neat cement, or bentonite slurry; or

(b) Withdraw the casing and fill the bore hole with neat cement grout, neat cement, bentonite or bentonite slurry as the casing is being withdrawn.

(2) For resource protection wells and geotechnical soil borings that were constructed in accordance with these regulations, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers and then decommission in one of the following ways:

(a) Wells with an inside casing diameter equal to or greater than one inch and constructed in accordance with these regulations as verified through a field examination and review of the drilling report shall be decommissioned by filling the casing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement.

(b) Wells with an inside casing diameter less than one inch shall be decommissioned by pressure grouting the entire casing length with bentonite slurry, neat cement grout, or neat cement.

(c) Vibrating wire piezometers installed to meet or exceed the sealing requirements of WAC 173-160-450, 173-160-457, and 173-160-458 are exempt from the decommissioning procedures and decommissioning reporting requirements provided here.

(d) Direct push wells shall be decommissioned in accordance with this section.

(e) Geotechnical soil borings, or boring, shall be decommissioned by sealing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement. Sealing material placed below the static water level shall be piped directly to the point of application or placed by means of a dump bailer or pumped through a tremie tube. If bentonite slurry, neat cement grout or neat cement is used to seal below the water level in the well, the material shall be placed from the bottom up by methods that avoid segregation or dilution of the material. When used to place bentonite slurry, neat cement or neat cement grout, the discharge end of the tremie tube shall be submerged in the bentonite slurry, neat cement or neat cement grout to avoid breaking the seal while filling the annular space. Provided the material does not dilute or segregate and the resulting seal is free of voids, sealing material may be hand poured above the static water level.

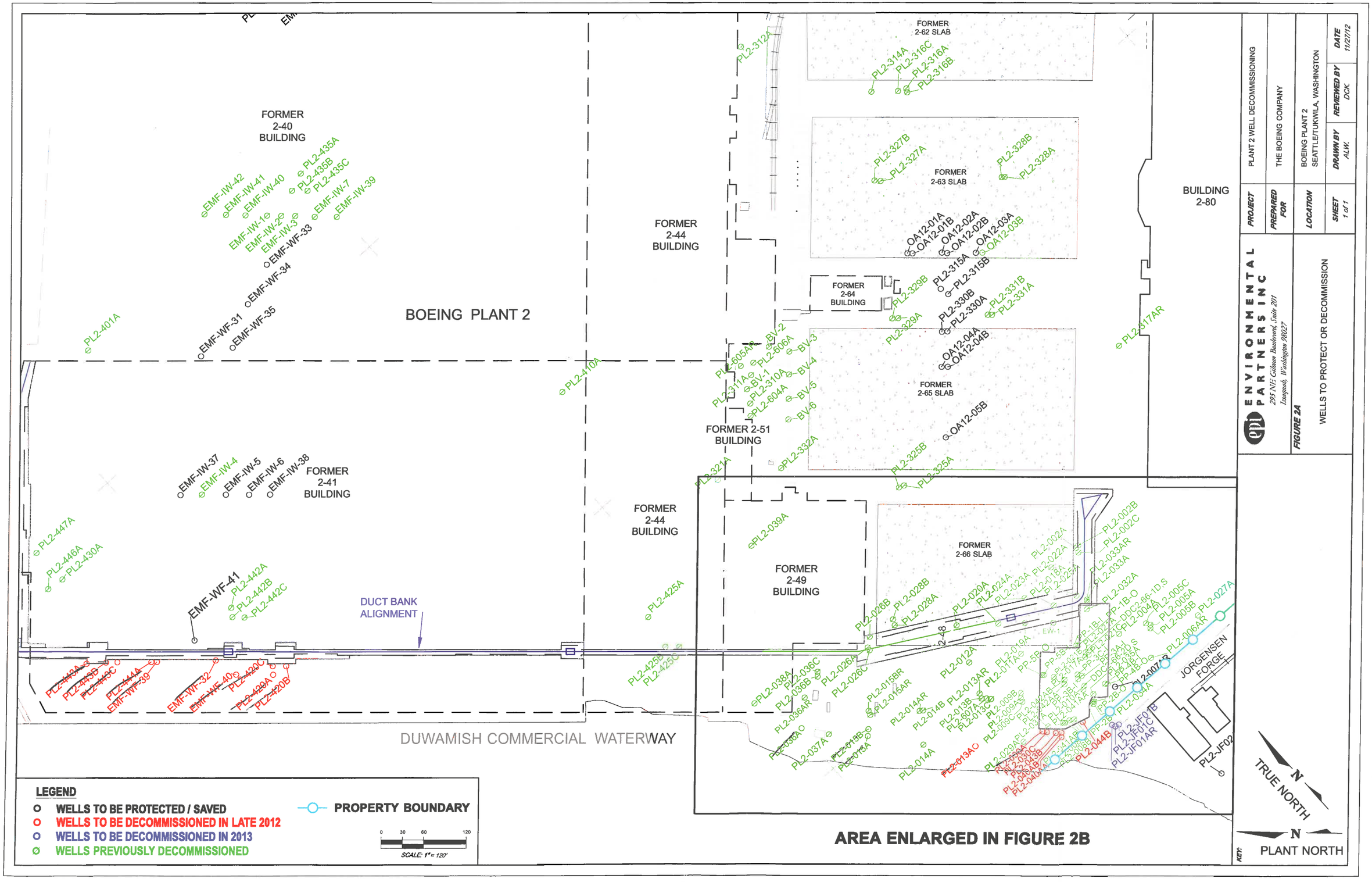
ENVIRONMENTAL PARTNERS INC 295 NE Gilman Boulevard, Suite 201 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

Well Decommissioning Interim Measure – December 2012 Book #10

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number 17513.2.Task 500.04

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, Washington 98027
(425) 395-0010

Table 1: Boeing Plant 2 Wells to be Decommissioned December 2012					
Well ID	**Total Depth (ft. bgs)**	**Screened Interval (ft. bgs)**	**Well Diameter and Material**	**Decom. Timeframe**	**Decommissioning Method**
PL2-040AA	18	15-18	2-inch steel	Dec. 2012	Over-drill then chip or grout
PL2-040AB	50	47-50	2-inch PVC	Dec. 2012	Over-drill then grout
PL2-043B	56	50.5-55.5	2-inch PVC	Dec. 2012	Grout
PL2-044B	57	51.7-56	2-inch PVC	Dec. 2012	Grout
PL2-030A	30	25-30	2-inch PVC	Dec. 2012	Chip
PL2-030C	81	75.5-80	2-inch PVC	Dec. 2012	Grout
PL2-013A	22	6-20	~~2~~ 4-inch PVC	Dec. 2012	Chip
PL2-015A	22	6-20.5	~~2~~ 4-inch PVC	Dec. 2012	Chip
PL2-015B	50	45-50	2-inch PVC	Dec. 2012	Grout
PL2-036A	20	8-18	2-inch PVC	Dec. 2012	Chip
EMF-WF-32	35	25-35	2-inch PVC	Dec. 2012	Grout
EMF-WF-39	45	35-45	2-inch PVC	Dec. 2012	Grout
EMF-WF-40	32	22-32	2-inch PVC	Dec. 2012	Grout
PL2-420A	29	14-29	2-inch PVC	Dec. 2012	Chip
PL2-420B	45.5	35-45	2-inch PVC	Dec. 2012	Grout
PL2-420C	80.5	75-80	2-inch PVC	Dec. 2012	Grout
PL2-443A	23	8-23	2-inch PVC	Dec. 2012	Chip
PL2-443B	45.5	35-45	2-inch PVC	Dec. 2012	Grout
PL2-443C	75.5	70-75	2-inch PVC	Dec. 2012	Grout
PL2-444A	26.5	10-25	2-inch PVC	Dec. 2012	Chip


FORMER 2-40 BUILDING
BOEING PLANT 2
FORMER 2-44 BUILDING
FORMER 2-62 SLAB
FORMER 2-63 SLAB
FORMER 2-64 BUILDING
FORMER 2-65 SLAB
FORMER 2-51 BUILDING
BUILDING 2-80
FORMER 2-41 BUILDING
FORMER 2-44 BUILDING
FORMER 2-49 BUILDING
FORMER 2-66 SLAB
DUCT BANK ALIGNMENT
DUWAMISH COMMERCIAL WATERWAY
JORGENSEN FORGE
EMF-IW-42
EMF-IW-41
EMF-IW-40
EMF-IW-1
EMF-IW-2
EMF-IW-3
EMF-IW-7
EMF-IW-39
EMF-WF-33
EMF-WF-34
EMF-WF-31
EMF-WF-35
EMF-IW-37
EMF-IW-4
EMF-IW-5
EMF-IW-6
EMF-IW-38
EMF-WF-41
PL2-401A
PL2-435A
PL2-435B
PL2-435C
PL2-447A
PL2-446A
PL2-430A
PL2-442A
PL2-442B
PL2-442C
PL2-410A
PL2-312A
PL2-314A
PL2-316C
PL2-316A
PL2-316B
PL2-327B
PL2-327A
PL2-328B
PL2-328A
OA12-01A
OA12-01B
OA12-02A
OA12-02B
OA12-03A
OA12-03B
PL2-315A
PL2-315B
PL2-329B
PL2-329A
PL2-330B
PL2-330A
PL2-331B
PL2-331A
OA12-04A
OA12-04B
OA12-05B
PL2-325B
PL2-325A
PL2-317AR
PL2-605AR
PL2-606A
BV-2
BV-3
BV-4
BV-5
BV-6
BV-1
PL2-311A
PL2-310A
PL2-604A
PL2-332A
PL2-321A
PL2-039A
PL2-425A
PL2-425B
PL2-425C
PL2-026B
PL2-028B
PL2-028A
PL2-020A
PL2-024A
PL2-023A
PL2-018A
PL2-025A
PL2-002A
PL2-022A
PL2-002B
PL2-002C
PL2-033AR
PL2-033A
PL2-032A
PL2-005C
PL2-005A
PL2-005B
PL2-027A
PL2-006AR
PL2-007AR
PL2-034A
PL2-JF01B
PL2-JF01C
PL2-JF01AR
PL2-JF02
PL2-044B
PL2-038A
PL2-036C
PL2-036B
PL2-036AR
PL2-036AO
PL2-026A
PL2-026C
PL2-015BR
PL2-015AR
PL2-014AR
PL2-014B
PL2-013B
PL2-013AR
PL2-013C
PL2-012A
PL2-037A
PL2-015B
PL2-015A
PL2-014A
PL2-013AO
PL2-009B
PL2-009C
PL2-009A
PL2-019A
PL2-017AR
PL2-017A
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PL2-1B-I
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PL2-004B
PL2-003A
PL2-003B
PL2-034B
PL2-041A
PL2-041B
PL2-040A
PL2-040B
PL2-043A
PL2-043B
PL2-030A
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PL2-031B
PL2-008A
PL2-008B
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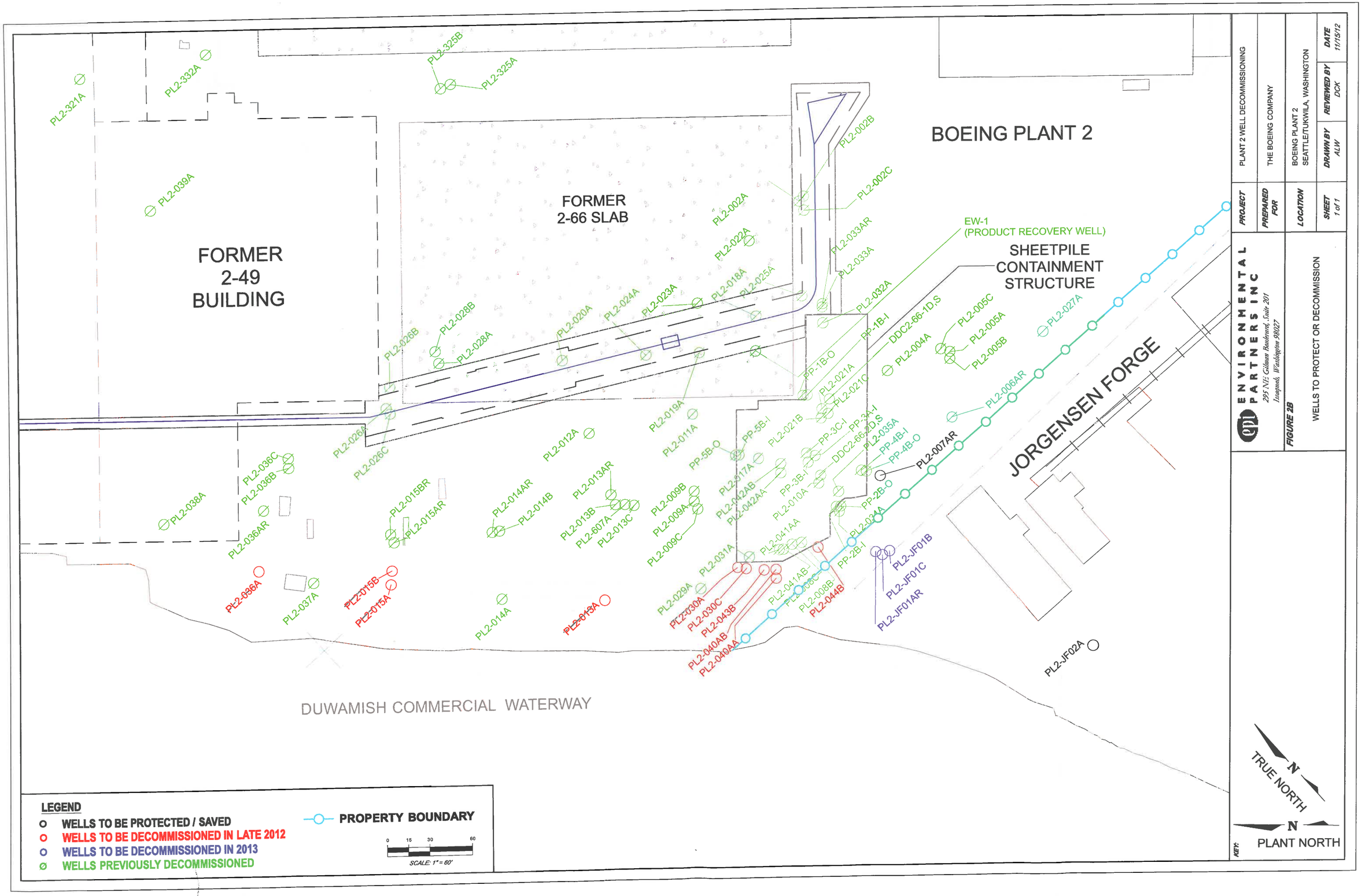
PL2-2B
PL2-2A
PP-1B
PP-5B
PP-5A
PP-4B
PP-4A
PP-3B
PP-3A
PP-2B
PP-2A
PP-1A
EW-1
DDC2-66-1D S
DDC-PP-2A
DDC-PP-2B
DDC-PP-3A
DDC-PP-3B
DDC-PP-4A
DDC-PP-4B
DDC-PP-5A
DDC-PP-5B
DDC-PP-1A
DDC-PP-1B
N
TRUE NORTH
N
PLANT NORTH
KEY:
LEGEND
WELLS TO BE PROTECTED / SAVED
WELLS TO BE DECOMMISSIONED IN LATE 2012
WELLS TO BE DECOMMISSIONED IN 2013
WELLS PREVIOUSLY DECOMMISSIONED
PROPERTY BOUNDARY
0 30 60 120
SCALE: 1" = 120'
AREA ENLARGED IN FIGURE 2B
PROJECT
PLANT 2 WELL DECOMMISSIONING
PREPARED FOR
THE BOEING COMPANY
LOCATION
BOEING PLANT 2
SEATTLE/TUKWILA, WASHINGTON
SHEET
1 of 1
DRAWN BY
ALW.
REVIEWED BY
DCK.
DATE
11/27/12
ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027
FIGURE 2A
WELLS TO PROTECT OR DECOMMISSION



PROJECT	PLANT 2 WELL DECOMMISSIONING
PREPARED FOR	THE BOEING COMPANY
LOCATION	BOEING PLANT 2 SEATTLE/TUKWILA, WASHINGTON
SHEET 1 of 1	DRAWN BY ALW / REVIEWED BY DCK / DATE 11/15/12

ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 2B

WELLS TO PROTECT OR DECOMMISSION

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-443A	
	Northing	Easting
Well Location	196826.6461	1274807.579
Start (date and time)	12/17/12 @ 10:40	
End (date and time)	12/17/12 @ 10:54	
Installation Method	HSA	
Total Well Depth	23 feet bgs	
Well Diameter	2 inches	
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8-23 feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Cetco Pure Gold Medium Chips	
Grout or Chip Volume	(1) 50-lb Bag ~~Gallons or Cubic Feet~~ Bags	
Surface Completion	Remove Steel lid & concrete the monument	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	DGK 12/17/12 ~~Douglas K~~ Jeff O. Gose	
Signature (Engineer or Geologist)	Douglas Kimball	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-443B	
	Northing	Easting
Well Location	196832.6	1274801
Start (date and time)	12/17/12 @ 10:38	
End (date and time)	12/17/12 @ 10:44	
Installation Method	HSA	
Total Well Depth	45.5	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	35-45	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quick-Grout	
Grout or Chip Volume	12	Gallons or Cubic Feet
Surface Completion	Remove steel lid, fill with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	Aly D. GOSE	
Signature (Engineer or Geologist)	Douglas Kimball	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-443C	
	Northing	Easting
Well Location	196836.8	1274797.4
Start (date and time)	12/17/12 @ 10:22	
End (date and time)	12/17/12 @ 10:36	
Installation Method	HSA	
Total Well Depth	75.5	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	70-75	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quick-Grout	
Grout or Chip Volume	Approx 15	Gallons or Cubic Feet
Surface Completion	Remove steel lid, fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	Aly D. Gose	
Signature (Engineer or Geologist)	Douglas Kunkel	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-444A	
	Northing	Easting
Well Location	196767	1274878
Start (date and time)	12/17/12 @ 11:15	
End (date and time)	12/17/12 @ 11:28	
Installation Method	HSA	
Total Well Depth	265	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	10-25	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Cetco Pure Gold medium chips	
Grout or Chip Volume	(1) 50-lb Bag	Bags ~~Gallons or Cubic Feet~~
Surface Completion	Remove steel cap lid, fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D. Gose	
Signature (Engineer or Geologist)	Douglas Kunkel	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF-WF-39	
	Northing	Easting
Well Location	196760.26	1274885.62
Start (date and time)	12/17/12 @ 11:10	
End (date and time)	12/17/12 @ 11:20	
Installation Method	HSA	
Total Well Depth	45	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	35-45	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quick-Grout	
Grout or Chip Volume	12	Gallons or Cubic Feet
Surface Completion	Remove steel lid + fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	Jeff D. Bose	
Signature (Engineer or Geologist)	Douglas Kimball	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	EmF-WF-32	
	Northing	Easting
Well Location	196707.4	1274946.9
Start (date and time)	12/17/12 @ 11:40	
End (date and time)	12/17/12 @ 11:46	
Installation Method	HSA	
Total Well Depth	35	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	25-35	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Barrod Quick-Grout	
Grout or Chip Volume	10	Gallons or Cubic Feet
Surface Completion	Remove steel lid, fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D. Gose	
Signature (Engineer or Geologist)	Douglas Kunkel	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number	EMF-WF-40	
Well Location	Northing: 196694.66	Easting: 1274956.29
Start (date and time)	12/17/12 @ 11:50	
End (date and time)	12/17/12 @ 12:05	
Installation Method	HSA	
Total Well Depth	32 feet bgs	
Well Diameter	2 inches	
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	22-32 feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quick-Grout	
Grout or Chip Volume	Gallons or Cubic Feet	
Surface Completion	Remove Steel lid fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	Myles D. Gose	
Signature (Engineer or Geologist)	Douglas Kimpel	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-420B	
	Northing	Easting
Well Location	196642.3	1275004.6
Start (date and time)	12/17/12 @ 1321	
End (date and time)	12/17/12 @ 1330	
Installation Method	HSA	
Total Well Depth	45.5	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	35-45	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quick-Grout	
Grout or Chip Volume	12	Gallons or Cubic Feet
Surface Completion	Remove steel lid, fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D. Gose	
Signature (Engineer or Geologist)	Douglas Kunkel	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-420c	
Well Location	Northing: 196645.4	Easting: 1275001.3
Start (date and time)	12/17/12 @ 1308	
End (date and time)	12/17/12 @ 1320	
Installation Method	HSA	
Total Well Depth	80.5	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	75-80	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quick-Grout	
Grout or Chip Volume	15	Gallons or Cubic Feet
Surface Completion	Remove Steel lid, fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D. Gose	
Signature (Engineer or Geologist)	Douglas Kunkel	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-420A	
	Northing	Easting
Well Location	196637.0977	1274993.97
Start (date and time)	12/17/12 @ 1306	
End (date and time)	12/17/12 @ 1307	
Installation Method	HSA	
Total Well Depth	29 feet bgs	
Well Diameter	2 inches	
Type of Casing (circle)	(PVC)	Stainless Steel Other_____
Type of Well Screen	(PVC)	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	14-29 feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or (chip in place)*	
Type of Grout or (Chips)	Cetco Pure Gold Medium chips	
Grout or (Chip) Volume	1.5 50lb Bags	Bags ~~Gallons or Cubic Feet~~
Surface Completion	Remove steel lid, fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	~~2789~~ 2744	
Signature (Driller)	D. GOSE	
Signature (Engineer or Geologist)	Douglas Kinkel	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-015B	
Well Location	Northing: 196068.4253	Easting: 1275573.96
Start (date and time)	12/17/12 @ 1400	
End (date and time)	12/17/12 @ 1415	
Installation Method	HSA	
Total Well Depth	50	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	45-50	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quick-Grout	
Grout or Chip Volume	13	Gallons or Cubic Feet
Surface Completion	Remove steel lid fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D. Gore	
Signature (Engineer or Geologist)	Douglas Kinkel	

Additional Information: Removed dedicated pump & Bagged For Decon. and Re-use

Well Decommissioning Log - Boeing Plant 2

Well Number	PLZ-015A	
	Northing	Easting
Well Location	196001.6284	1275566.77
Start (date and time)	12/17/12 @ 1420	
End (date and time)	12/17/12 @ 1427	
Installation Method	HSA	
Total Well Depth	22	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	6-20.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Cetco Solid Gold Medium Chips	
Grout or ~~Chip~~ Volume	(3) 50 lb.	Bags ~~Gallons or Cubic Feet~~
Surface Completion	Remove Steel lid, fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	Jeff D. Gose	
Signature (Engineer or Geologist)	Douglas Kunkel	
Additional Information:	Removed dedicated pump put in Trash Bag for decon	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-036A	
	Northing	Easting
Well Location	196072.6405	1275503.5
Start (date and time)	12/17/12 @ 1430	
End (date and time)	12/17/12 @ 1434	
Installation Method	HSA	
Total Well Depth	20	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	8-18	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	CETCO Pure Gold medium chips	
Grout or Chip Volume	(1) 50-lb.	bags ~~Gallons or Cubic Feet~~
Surface Completion	Above Ground, filled with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D. Gove	
Signature (Engineer or Geologist)	Douglas Kunkel	
Additional Information:	Removed Dedicated Pump & put into a new Trash bag for Decon	

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-013A	
	Northing	Easting
Well Location	195888.4881	1275670.6940
Start (date and time)	12/17/12 1420	
End (date and time)	12/17/12 @ 1450	
Installation Method	HSA	
Total Well Depth	22	feet bgs
Well Diameter	4	inches
Type of Casing (circle)	PVC	Stainless Steel Other_____
Type of Well Screen	PVC	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	6-20	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	CETCO Pure Gold Medium chips	
Grout or Chip Volume	(3) 50 lb	Bags ~~Gallons or Cubic~~ Feet
Surface Completion	Remove steel lid, fill monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	Jeff Dipose	
Signature (Engineer or Geologist)	Douglas Kunkel	

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-030A	
	Northing	Easting
Well Location	195840.127	1275756.42
Start (date and time)	12/17/12 @ 1500	
End (date and time)	12/17/12 @ 1530	
Installation Method	HSA	
Total Well Depth	30 feet bgs	
Well Diameter	4 inches	
Type of Casing (circle)	~~PVC~~ Stainless Steel Other_____	
Type of Well Screen	~~PVC~~ Stainless Steel Other_____	
Depth of Screened Interval (ft. bgs)	25-30 feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	CETCO Pure Gold medium chips	
Grout or Chip Volume	(1) 50-lb Bag ~~Gallons or Cubic~~ Bags Feet	
Surface Completion	Remove Steel Lid, fill Monument with concrete	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D. Bose	
Signature (Engineer or Geologist)	Douglas Kimbel	

Additional Information: Removed dedicated pump & put into new Trash Bag

Well Decommissioning Log - Boeing Plant 2

Well Number

	Northing	Easting
Well Location		

Start (date and time)

End (date and time)

Installation Method

Total Well Depth feet bgs

Well Diameter inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips

Grout or Chip Volume Gallons or Cubic Feet

Surface Completion

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

_____

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-040AB	
Well Location	Northing: Not Surveyed	Easting:
Start (date and time)	12/18/12 @ 0927	
End (date and time)	12/18/12 @ 1145	
Installation Method	HSA	
Total Well Depth	50	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	47-50	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quick-Grout	
Grout or Chip Volume	50	Gallons or Cubic Feet
Surface Completion	Removed monument, concrete to grade	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D Gose	
Signature (Engineer or Geologist)	Douglas Kunkel	

Additional Information:

Took sample PL2-040AB from 12-15 ft BGS at PL2-040AB Borehole. Sample time is 10:15. Sample for VOCs + TCLP metals

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-040AA	
	Northing	Easting
Well Location	Not Surveyed	
Start (date and time)	12/18/12 @ 12:34	
End (date and time)	12/18/12 [illegible]	
Installation Method	Driven	
Total Well Depth	18	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel / Other Steel
Type of Well Screen	PVC	Stainless Steel / Other Steel
Depth of Screened Interval (ft. bgs)	15-18	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then ~~grout~~ chip*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Cetco Pure Gold Medium chips	
Grout or Chip Volume	(6) 50-lb Bags	~~Gallons or Cubic~~ Feet
Surface Completion	Remove monument, concrete to Grade	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D Gose	
Signature (Engineer or Geologist)	Douglas Kinkel	

Additional Information: overdrilled + chipped Borehole Removed Steel piezometer took Sample PL2-040AA @ 1:10 for VOA + TCLP metals

Well Decommissioning Log - Boeing Plant 2

Well Number	PC2-080C	
	Northing	Easting
Well Location	195835.404	1245760.3
Start (date and time)	12/18/12 @ 1360	
End (date and time)	12/18/12 @ 1448	
Installation Method	HSA	
Total Well Depth	81	feet bgs
Well Diameter	2	inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs)	75.5-80	feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips	Baroid Quick-Grout	
Grout or Chip Volume	16	Gallons or Cubic Feet
Surface Completion		
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D GOSE	
Signature (Engineer or Geologist)	Douglas Kunkel	

Additional Information: Removed Dedicate pump and placed into New Trash Bag.

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-043B	
Well Location	Northing: 195825.948	Easting: 1275769.123
Start (date and time)	12/18/12 @ 1450	
End (date and time)	12/18/12 @ 1505	
Installation Method	HSA	
Total Well Depth	56	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	PVC	Stainless Steel / Other_____
Type of Well Screen	PVC	Stainless Steel / Other_____
Depth of Screened Interval (ft. bgs)	50-55.5	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Baroid Quick Grout	
Grout or Chip Volume	12	Gallons or Cubic Feet
Surface Completion	Remove steel lid, fill with concrete to grade	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D. Gose	
Signature (Engineer or Geologist)	Douglas Kunkel	

Additional Information: Removed dedicated pump and put into new trash bag

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-044B	
	Northing	Easting
Well Location	195811.313	1275808.371
Start (date and time)	12/18/12 @ 1510	
End (date and time)	12/18/12 @ 1540	
Installation Method	HSA	
Total Well Depth	57	feet bgs
Well Diameter	2	inches
Type of Casing (circle)	(PVC)	Stainless Steel Other_____
Type of Well Screen	(PVC)	Stainless Steel Other_____
Depth of Screened Interval (ft. bgs)	51.7-56	feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *(grout) or chip in place*	
Type of (Grout) or Chips	Baroid Quick Grout	
(Grout) or Chip Volume	14	(Gallons) or Cubic Feet
Surface Completion	Remove Steel lid, concrete to surface	
Drilling Contractor	Cascade Drilling	
License Number	2744	
Signature (Driller)	D. Gose	
Signature (Engineer or Geologist)	Douglas Kunkel	

Additional Information: Removed dedicated pump, placed into new Trash Bag

Well Decommissioning Log - Boeing Plant 2

Well Number

	Northing	Easting
Well Location		

Start (date and time)

End (date and time)

Installation Method

Total Well Depth feet bgs

Well Diameter inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips

Grout or Chip Volume Gallons or Cubic Feet

Surface Completion

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

_____

CASCADE DRILLING DAILY WORK REPORT

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

PO Box 1184 – Woodinville, WA 98072 – 425-485-8908 # CASCADL91508
13600 SE Ambler Road – Clackamas, OR 97015 – 503-775-4118 #CCB-187984
555 S. Harbor Blvd. – La Habra, CA 90631 – 562-929-8176 #C57-938110
3632 Omec Circle – Rancho Cordova, CA 95742 – 916-638-1169 #C57-938110

CLIENT GOLDER	PROJECT NO	DATE 12/17/12	DAY MONDAY
JOB LOCATION BOEING PLANT 2	DIG ALERT #		CD-LP# W2 772

DESCRIPTION OF WORK

Please explain reasons for Down Time and Standby Time and Shop Time

Well # Bore #	Depth Drilled	Description	Hours Start	Hours Stop	Total Hrs	Charge Hrs
		AM Shop Time	545	730	1.75	
		Travel to Site	730	930	1.0	
		HEALTH-SAFETY STAGE EQUIPMENT	930	900	.50	
		CHIP IN PLACE PLZ-030A 2"×30' PLZ-015A 4"×20', PLZ-015A 4"×30'	900			
		PLZ-036A 2"×13' PLZ-420A 2"×29', PLZ-443A 2"×23'				
		PLZ-444A 2"×26'6"				
		GROUT IN PLACE PLZ 015B 2"×50' EMF-WF-32 2"×25' EMF-WF-39 2"×45'				
		EMF-WF-40 2"×32' PLZ-420B 2"×45'6" PLZ-420C 2"×80'				
		PLZ-443B 2"×45'6" PLZ-443C 2"×75'6"		415		
		LUNCH	1200	1230	.50	
		Travel to Shop	415			
		PM Shop Time				
Total Ft.		**TOTAL CHARGEABLE RIG HOURS**				

RIG ENGINE HOURS: START _____ STOP _____ TOTAL _____

EQUIPMENT

DRILL RIG #	JDI	COMPRESSOR/JACKHAMMER	
SUPPORT TRUCK #	831	SNOW FENCE RENTAL	
SUPPORT TRUCK #		CONTINUOUS SAMPLER	
TRAILER #		CONTINUOUS SAMPLER FOOTAGE	
BOBCAT		# OF CORE CUTS	
AUTO HAMMER		# OF BULLDOG CUTS	
GROUT MIXER	✓	# OF SERVICE RUNS	
GROUT PUMP	✓	# OF SAW CUTS	
PERISTALTIC PUMP		PORTABLE RESTROOM	
FORKLIFT/HOPPER			

LABOR

CREW WITH PER DIEM		CHARGEABLE EXTRA LABOR HRS	

NAME	SIGNATURE	SHOP	DRILL	TOTAL HRS
David Gore				
Steve Smith				

CASING

TYPE___SLOT___	2	4	
20' SCREEN			
10' SCREEN			
5' SCREEN			
20' BLANK			
10' BLANK			
5' BLANK			
5' PP SCREEN			
10' PP SCREEN			
SLIP CAP			
THREADED CAPS			
LOCKING CAPS			
DRIVE SHOE			
CENTRALIZERS			
LOCKS			

UTILITIES FOUND OR HIT

MATERIALS

ITEM	QTY	ITEM	QTY
SAND		WELL COVER 8"	
READYMIX	8	WELL COVER 12"	
QUICKSET		MONUMENT CASING	
PORTLAND		BOLLARDS	
ASPHALT		SOIL DRUMS	
BENTONITE GROUT	3	DEVELOPMENT DRUMS	
BENTONITE CHIPS	3	DECON DRUMS	
BENTONITE POWDER		HOLE COVER PLATES	
BENTONITE PELLETS		PLASTIC SHEETING	
BENTONITE GRANULAR		TRAFFIC CONTROL	
SAMPLER TUBES		CORE BOXES	
SHELBY TUBES		PLYWOOD	
PROBE POINTS "		SOIL SAMPLES	
GW PROBE POINTS		WATER SAMPLES	
MACRO LINERS		HYDROPUNCH SAMPLES	
SAMPLER SHOE		AUGER PLUGS	
		DRILL OUT BITS	

REMARKS

Client Signature Douglas Kimbel Operator Signature

CASCADE DRILLING, L.P.
LEADERS IN SAFETY

CASCADE DRILLING DAILY WORK REPORT

PO Box 1184 – Woodinville, WA 98072 – 425-485-8908 # CASCADL91508
13600 SE Ambler Road – Clackamas, OR 97015 – 503-775-4118 #CCB-187984
555 S. Harbor Blvd. – La Habra, CA 90631 – 562-929-8176 #C57-938110
3632 Omec Circle – Rancho Cordova, CA 95742 – 916-638-1169 #C57-938110

CLIENT	PROJECT NO	DATE	DAY
JOB LOCATION	DIG ALERT #	CD-LP#	

DESCRIPTION OF WORK

Please explain reasons for Down Time and Standby Time and Shop Time

Well # Bore #	Depth Drilled			HOURS Start	HOURS Stop	Total Hrs	Charge Hrs
		AM Shop Time		545	630	.75	
		Travel to Site		630	800	1.50	
				800	900	1.0	
				100	915	.75	
		DRILL OUT PL2 040AB 0-50' DRILL OUT PL2 042AA 0-100'		915			
		GROUT IN PLACE CEMENT IN BOX PL2 043B 2"x 56'					
		PL2 044B 2"x 57'					
		PL2 0306 2"x81			400	6.75	
		CLEAN UP, LOAD EQUIPMENT		400	515	1.25	
		Travel to Shop		515			
		PM Shop Time					
Total Ft.		TOTAL CHARGEABLE RIG HOURS					

RIG ENGINE HOURS: START _____ STOP _____ TOTAL _____

EQUIPMENT

DRILL RIG #	101	COMPRESSOR/JACKHAMMER	
SUPPORT TRUCK #	553	SNOW FENCE RENTAL	
SUPPORT TRUCK #	835	CONTINUOUS SAMPLER	
TRAILER #	214	CONTINUOUS SAMPLER FOOTAGE	
BOBCAT		# OF CORE CUTS	
AUTO HAMMER		# OF BULLDOG CUTS	
GROUT MIXER	✓	# OF SERVICE RUNS	
GROUT PUMP	✓	# OF SAW CUTS	
PERISTALTIC PUMP		PORTABLE RESTROOM	
FORKLIFT/HOPPER			

LABOR

CREW WITH PER DIEM _____ CHARGEABLE EXTRA LABOR HRS _____

NAME	SIGNATURE	SHOP	DRILL	TOTAL HRS
David Cox				
Kerry Vandehaar				
Fred Smith				

CASING

TYPE___SLOT___	2	4	
20' SCREEN			
10' SCREEN			
5' SCREEN			
20' BLANK			
10' BLANK			
5' BLANK			
5' PP SCREEN			
10' PP SCREEN			
SLIP CAP			
THREADED CAPS			
LOCKING CAPS			
DRIVE SHOE			
CENTRALIZERS			
LOCKS			

UTILITIES FOUND OR HIT

MATERIALS

ITEM	QTY	ITEM	QTY
SAND		WELL COVER 8"	
READYMIX	11	WELL COVER 12"	
QUICKSET	1	MONUMENT CASING	
PORTLAND		BOLLARDS	
ASPHALT		SOIL DRUMS	
BENTONITE GROUT	4	DEVELOPMENT DRUMS	
BENTONITE CHIPS	6	DECON DRUMS	
BENTONITE POWDER		HOLE COVER PLATES	
BENTONITE PELLETS		PLASTIC SHEETING	
BENTONITE GRANULAR		TRAFFIC CONTROL	
SAMPLER TUBES		CORE BOXES	
SHELBY TUBES		PLYWOOD	
PROBE POINTS "		SOIL SAMPLES	
GW PROBE POINTS		WATER SAMPLES	
MACRO LINERS		HYDROPUNCH SAMPLES	
SAMPLER SHOE		AUGER PLUGS	
		DRILL OUT BITS	

REMARKS

USED CUTTINGS DRUMS

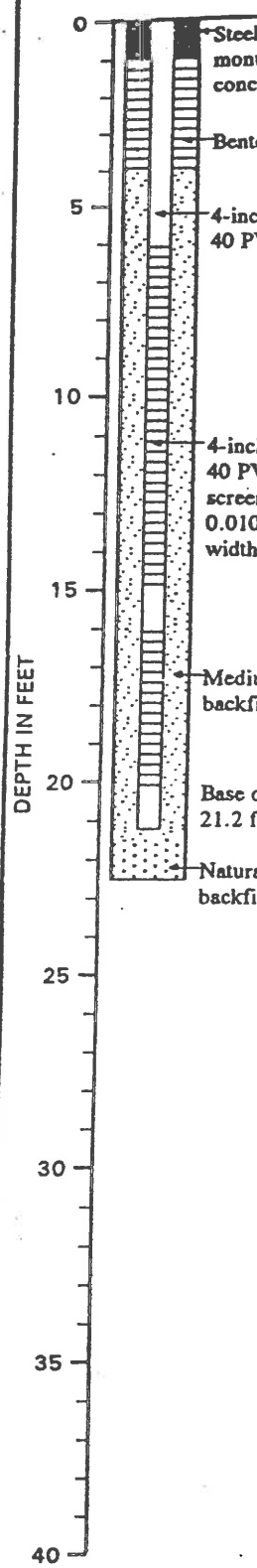
Client Signature Douglas Kunkel Operator Signature

MONITORING WELL PL2SW-MW13

PL2-013A

WELL SCHEMATIC

Casing Elevation (ft.): 11.04
Casing Stickup (ft.): -0.29



Vapor Conc. (ppm) OVA / PID	Blow Count	Samples	Group Symbol	DESCRIPTION (Surface Elevation (ft.): 11.33)
				6 inches concrete
			SP–SM	Brown fine to medium sand with silt and occasional brick fragments, gravel, cobbles and blue crystalline material (moist) (fill)
0.4 / 0.0	7	CA	SP–SM	Brown fine to medium sand with silt, metal pieces and yellow and blue crystalline material (very loose, moist) (fill)
0.0 / 0.0	15			▽ Water level ranged between 5.3 and 14.3 feet during the 2-week tidal study (12/20/91 through 01/02/92)
0.0 / 0.0	14	CA		Grades to loose
0.3 / 0.0	14			Grades to wet Increased silt content
62 / 67	17	CA	SP–SM	Black stained fine to medium sand with silt (loose, wet)
32 / 19	7		SP	Brown fine to medium sand with a trace of silt and occasional gravel (very loose, wet)
40 / 34	25			▽ Grades to loose
85 / 14	47		SP	Black-stained fine to medium sand with a trace of silt and occasional gravel (medium dense, wet) Grades to with silt and occasional organic material
12 / 5.7	5		SP	Blackish brown fine to medium sand with a trace of silt (loose, wet)
13 / 11.5	4	CA		

Boring completed at 22.5 feet on 10/09/91
Petroleum-like odor and staining noted between 10.5 feet and base of boring
Soil samples not field screened for VC or TCE

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

MK 7/19/94

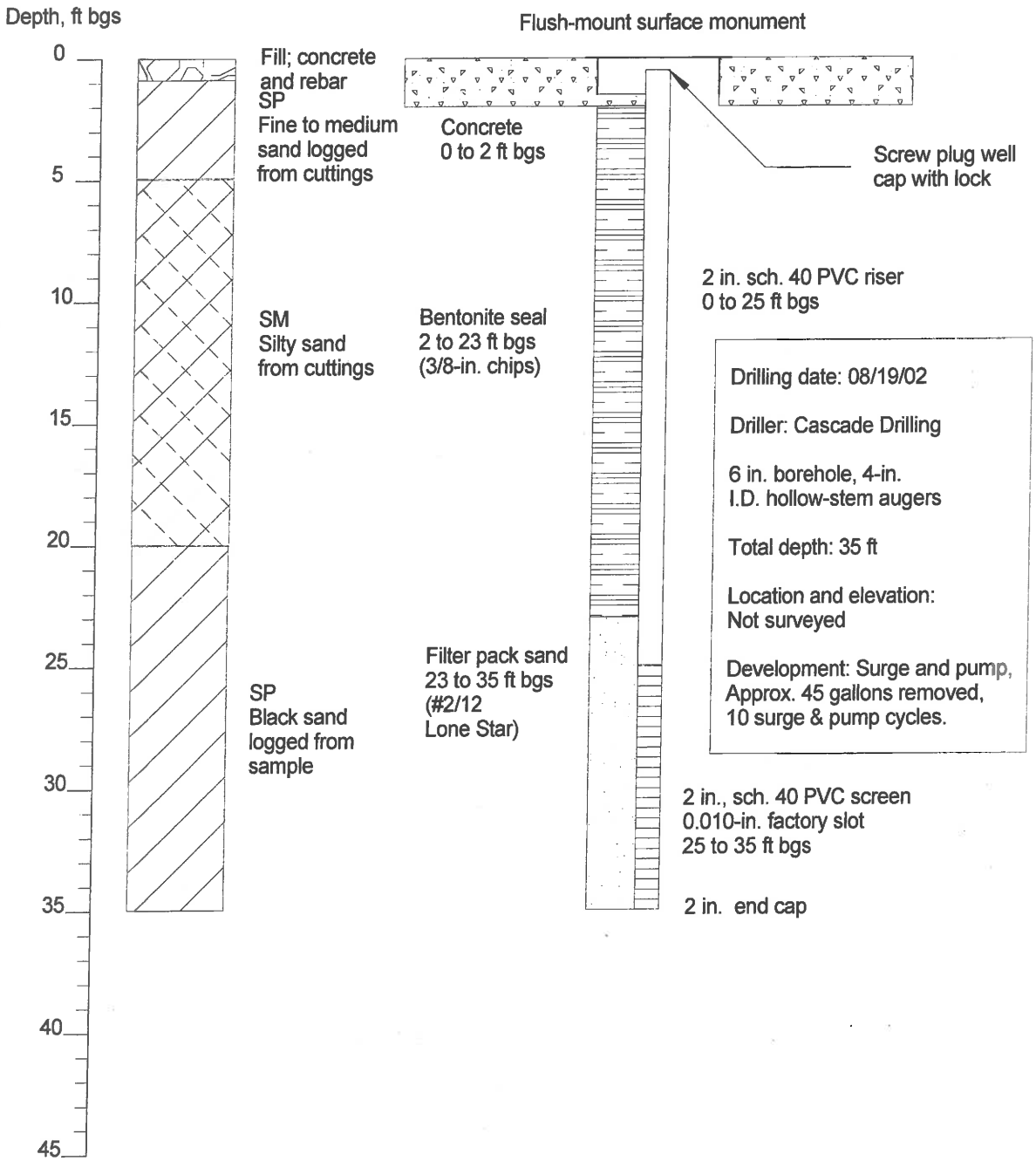
Geo Engineers

LOG OF MONITORING WELL

FIGURE A-17

:CRW:RNM:PGW:CMS 10/16/92

0120-149-R14



Drilling date: 08/19/02

Driller: Cascade Drilling

6 in. borehole, 4-in. I.D. hollow-stem augers

Total depth: 35 ft

Location and elevation: Not surveyed

Development: Surge and pump, Approx. 45 gallons removed, 10 surge & pump cycles.

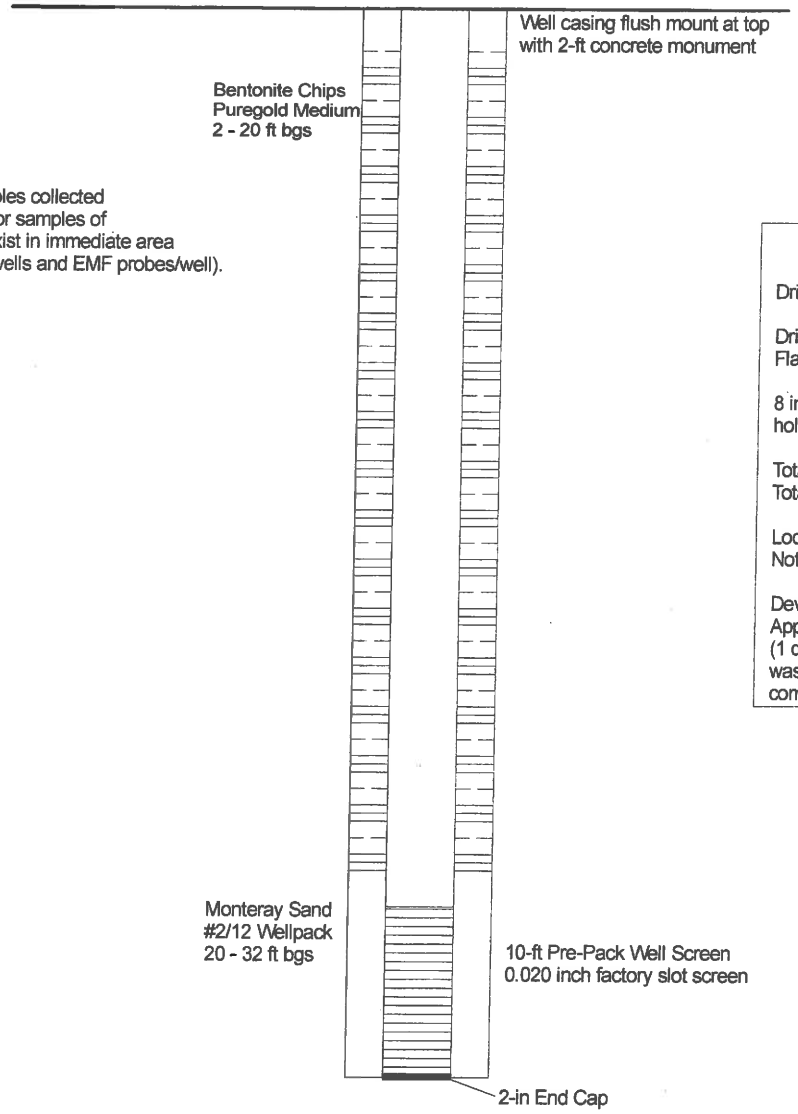
Project Performance Corporation
16935 SE 39th St.
Bellevue, WA 98008
(425) 643-4634 fax (425) 649-0643

REVISION NO.:	DATE:	ACAD FILE:
0	10/04/02	32.SKF

Monitoring Well EMF WF 32

DRAWN:	CLIENT:	PROJECT NO.:
JJD	Boeing	1214-203
CHECKED: TJM	LOCATION: EMF Plume in Plant II Area	FIGURE: -

Well Casing: 2-inch Diameter PVC
Borehole: 8-inch diameter



Total Depth: 32.0-ft bgs.

No geologic samples collected during drilling, prior samples of geologic profile exist in immediate area (from P2 probes/wells and EMF probes/well).

Drilling Date: 11/17/10

Driller: Cascade Drilling - Andy Flagan

8 inch Borehole, 6-1/4-in ID hollow-stem augers

Total Well Depth 32 ft
Total Borehole Depth 32 ft

Location and Elevation:
Not yet surveyed

Development: Surge and pump, Approx. 50 gallons removed (1 drum); repeated until water was substantially clear; completed 11/18/10

CALIBRE *Our Success Follows Yours*	**Well Completion** **Boeing EMF Site** **Seattle, WA**	**Well: EMF-WF-40**

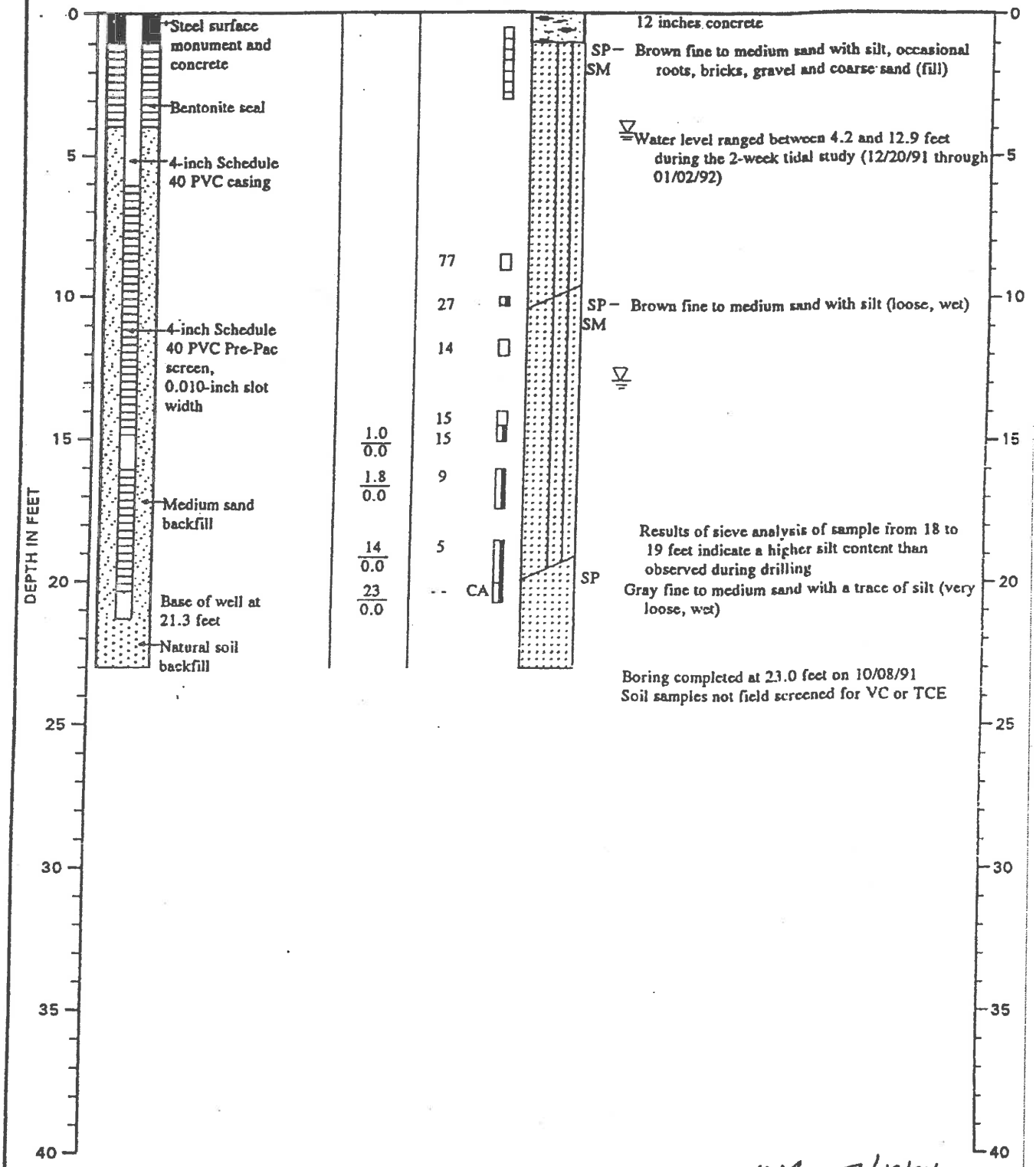
MONITORING WELL PL2SW-MW15

PL2-015A

WELL SCHEMATIC

Casing Elevation (ft.): 11.44
Casing Stickup (ft.): -0.36

Surface Elevation (ft.): 11.80



DESCRIPTION

Note: See Figure A-2 for explanation of symbols
See Figure A-34 for explanation of typical shallow 4-inch diameter monitoring well construction

MR 7/19/94

Geo Engineers

LOG OF MONITORING WELL

FIGURE A-19

:CRW:RNM:PGW:CMS 10/20/92

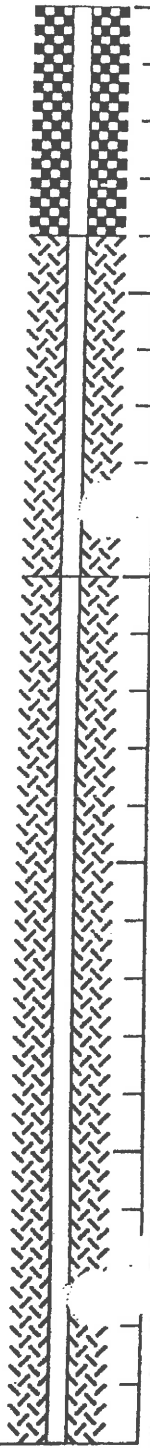
120-149-R14

Sheet 1 of 3

Boring PL2-015B

Project	Boeing RFI	Start Date 02/22/95	Finish Date 02/22/95
Location	Plant 2 Seattle, WA	Driller	Drilling Co. PTL
Project No.		Drilling Method 4in ID HSA	
Contractor	Weston	Sampling Method split spoon	
Logged by	Stoopes	Top of Casing (ft) 11.58	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 11.82	Total Depth (ft) 51.50

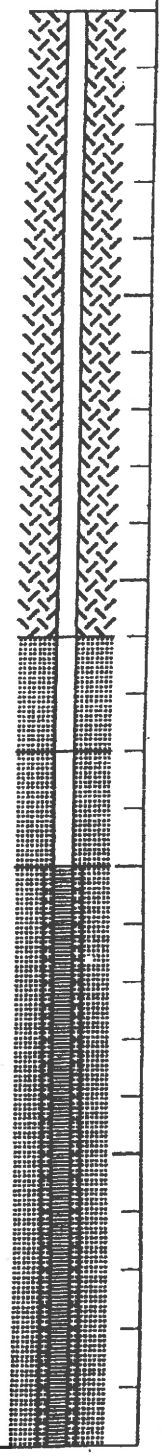
Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete.
							GP	Gravel with sand (GP), brown (10YR5/3), 85% angular gravel, 15% medium sand, dense, dry (Fill).
5				24			SM	Silty sand (SM), brown (10YR5/3), 80% sand, 15% silt, 5% rounded pea gravel, medium dense, damp to moist.
10				1			SP	Sand (SP), brownish gray (10YR5/2), 90% sand, 10% silt, loose, wet. Wood fragments @ 20 feet. Grades to 95% medium sand, 5% silt @ 40 feet.
15				1				
20				11				



Boring PL2-015B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No.
Contractor Weston
Logged by Stoopes

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					13			
30					13			
35					23			
40					22			
45					48			



Boring PL2-015B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No.
Contractor Weston
Logged by Stoopes

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					31			
55								
60								
65								
70								

Sheet 1 of 2

Boring PL2-030A

Project	Boeing Plant 2 ICM	Start Date 09/15/94	Finish Date 09/15/94
Location	Plant 2 Seattle, W	Driller	Drilling Co. Cascade Drilling
Project No.	03709-034-401	Drilling Method 4 in ID HSA	
Contractor	Weston	Sampling Method 2 in SS, 140 lb hmr.	
Logged by	Erik Lottsfeldt	Top of Casing (ft) 0.00	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 11.15	Total Depth (ft) 31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
							GP	Asphalt Gravelly fill.
							SP	Sand with gravel (SP), light grayish brown, 85% medium sand, 15% angular gravel, medium dense, dry. (fill)
5	BG				17			
10	BG	VOC	SB-06644-0100		41		SP	Sand (SP), v. dk. brn. (10YR2/2), 100% med. sand, dense, moist, wet in shoe @ 15ft wet, 21ft yell.brn.(10YR5/4), 25ft v.dk.grey
15	BG	VOC	SB-06644-0150		15			
20	BG	VOC	SB-06644-0200		0			

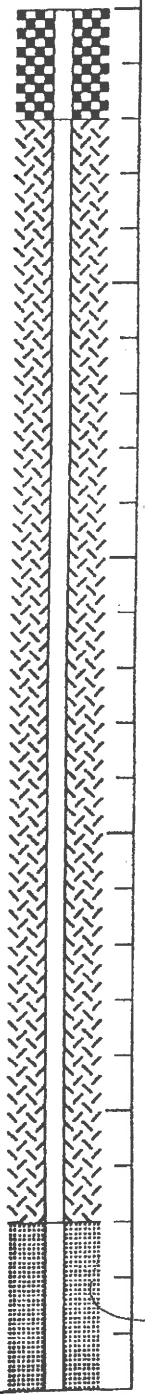


FIGURE A-2
1 of 2

Boring PL2-030A

Project	Boeing Plant 2 ICM	Start Date	09/15/94	Finish Date	09/15/94
Location	Plant 2 Seattle, W	Driller		Drilling Co.	Cascade Drilling
Project No.	03709-034-401	Drilling Method	4 in ID HSA		
Contractor	Weston	Sampling Method	2 in SS, 140 lb hmr.		
Logged by	Erik Lottsfeldt	Top of Casing (ft)	0.00	Boring Diam. (in)	10
		Ground Surf. Elev. (ft)	11.15	Total Depth (ft)	31.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
	BG				34			
30	BG	VOC	PL2-030A-0300		27			
35								
40								
45								

FIGURE A-2

MONITORING WELL PL2-030C

WESTON — MANAGERS DESIGNERS/CONSULTANTS

PROJECT: Boeing - Plant 2
DATE COMPLETED: 28 March 2001
DRILLING METHOD: 8" OD HSA - Cascade Drilling
SAMPLING METHOD: 3" OD Split Spoon, 300lb Hammer
TOP OF CASING:
GROUND SURFACE ELEV:
LOGGED BY: K. Broom - WESTON

Depth (ft)	PID Reading (ppm)	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0						4" Asphalt
					GW	Gravelly fill
					SW	Gravelly SAND, (SW), light greyish brown, 85% medium sand, 15% angular gravel, medium dense, dry, (fill).
10					SP	SAND, (SP), brown, 100% medium sand, moist to wet.
35	2.2	42	☒		SW	SAND, (SW), black, fine to medium grained, wet, no odor or sheen, (alluvium).
40	5.4	29	☒			SAA, scattered roots.
45			◫			No recovery.
50	3.7	37	☒			SAA, no roots.
55			◫			No recovery.
60			◫			No recovery.
65	4.6	31	☒			SAA.
70	3.3	49	☒			SAA.
75	2.4	15	☒			SAA.
					SM	Silty SAND, (SM), black, wet, medium dense no odor or sheen, (alluvium).
80	1.3	12	☒			SAA. Silty fine SAND, scattered sea shells.
						BOH = 81.5 feet
85						

Well Construction

- Flush mounted steel well monument and locking cap
- Concrete surface seal
- Bentonite grout well seal
- 2" well casing schedule 40 PVC
- Filter pack #10/20 RMC sand
- 3.5" PVC 0.01" slotted prepack well screen
- 2" threaded endcap

4/23/01

Notes:
BOH = Bottom of hole.
SAA = Same as above
No soil samples were collected for laboratory analysis.
Lithology for 0 to 30 feet taken from PL2-030A log.

PLATE A-4

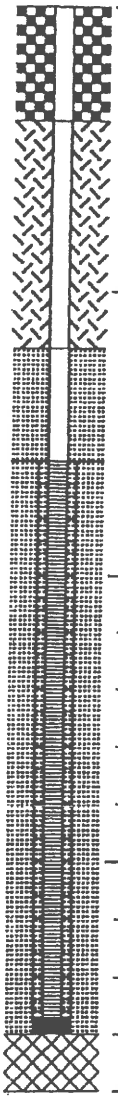
JOB NUMBER: 03709-034-600-0602-03 DATE: March 2001

Sheet 1 of 1

Boring PL2-036A

Project	Boeing Plant 2 RFI 1B	Start Date 10/26/94	Finish Date 10/26/94
Location	Plant 2 Seattle, WA	Driller	Drilling Co. Cascade Drilling
Project No.	03709-034-300	Drilling Method 4 in ID HSA	
Contractor	Weston	Sampling Method 2 in SS, 140 lb hmr.	
Logged by	Tim Fitzgerald	Top of Casing (ft) 0.00	Boring Diam. (in) 10
		Ground Surf. Elev. (ft)	Total Depth (ft) 19.00

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
	BG						CR	Concrete
	BG	VOC-PCB	SB-06628-0020		18		SP	Gravelly sand (SP), brown (10YR5/3), 60% sand, 40% gravel (top 1.5 in.), dense, moist, brick fragments.
							CR	Concrete rip rap.
5	BG				8		SP	Sand with gravel (SP), brown (10YR5/3), 80% coarse-med. sand, 20% ang. gravel, moist. @10ft concrete fragments (FILL).
	BG	VOC-PCB	SB-06628-0075		12			
10	BG				8			
	BG	VOC-PCB	SB-06628-0125		18		SP	Sand (SP), gray, brown (10YR5/2), 90% med-coarse sand, 10% pea gravel, med. dense, moist-wet. @15.5ft 4in sand lens, gray, 100% med. s
15	BG				26			
	BG				49			
20								



Boring_id 10019

RECORD OF BOREHOLE PL2-420B

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41, along bulkhead

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/10/08
DATE COMPLETED: 7/10/08
WEATHER: Inside Bldg

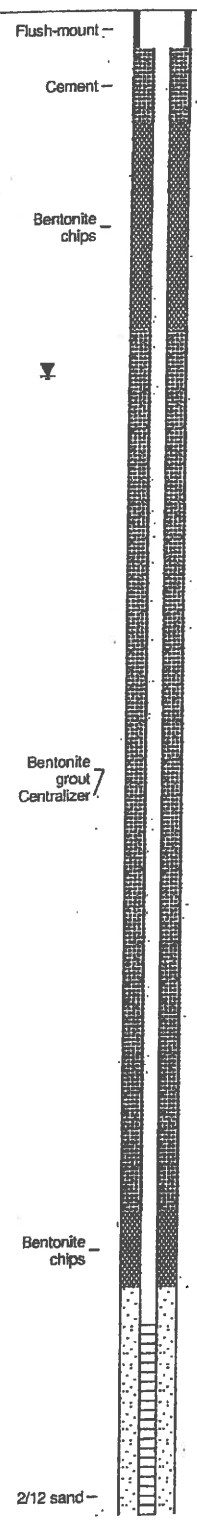
DATUM: Geodetic
COORDS: N: 196,642.3 E: 1,275,004.6
GS ELEVATION: 13.4 ft
TOC ELEVATION: 13.0 ft
TEMPERATURE: 74 F

INCLINATION: -90
DEPTH W.L.: 9.7 ft
ELEVATION W.L.: 3.3 ft
DATE W.L.: 10/23/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES PID (ppm)	NUMBER	TYPE	REC / ATT
0		0.0 - 0.5 CONCRETE			12.9 / 0.5				
		0.5 - 1.5 Light brown, fine SAND, little to some fine Gravel, dry, no odor (SP)	SP		11.9 / 1.5	0.0	1	GRAB	5.0 / 5.0
	10	1.5 - 5.0 Light brown, poorly graded, fine SAND, dry, no odor (SP)	SP		8.4 / 5.0				
5		5.0 - 8.0 Light brown, poorly graded, fine SAND, dry, no odor (SP)	SP		5.4 / 8.0	0.0	2	GRAB	5.0 / 5.0
	5	8.0 - 9.0 Red-brown, fine SANDY SILT, moist, no odor (ML)	ML		4.4 / 9.0				
		9.0 - 10.0 Dark brown, fine to medium SAND, moist, no odor (SP)	SP		3.4 / 10.0				
10		10.0 - 45.0 Soil logging stopped at 10.0 ft bgs in this borehole. SEE PL2-420C BOREHOLE LOG FOR SOIL LITHOLOGY DESCRIPTION.							

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-420B
Borehole Diameter: 8-inch
WELL CASING
Interval: 0 -35 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 35-45 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 34-45 ft
Type: 2/12 sand
Quantity: 11 ft
FILTER PACK SEAL
Interval: 32-34 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 3-32 ft
Type: Bentonite grout
Quantity: 29 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

RECORD OF BOREHOLE PL2-420B

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41, along bulkhead

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/10/08
DATE COMPLETED: 7/10/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,642.3 E: 1,275,004.6
GS ELEVATION: 13.4 ft
TOC ELEVATION: 13.0 ft
TEMPERATURE: 74 F

INCLINATION: -90
DEPTH W.L.: 9.7 ft
ELEVATION W.L.: 3.3 ft
DATE W.L.: 10/23/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		10.0 - 45.0 Soil logging stopped at 10.0 ft bgs in this borehole. SEE PL2-420C BOREHOLE LOG FOR SOIL LITHOLOGY DESCRIPTION. *(Continued)*								PL2-420B 10-slot screen Centralizer	**PL2-420B** Borehole Diameter: 8-inch **WELL CASING** Interval: 0 -35 ft Material: PVC Diameter: 2-inch Joint Type: Threaded **WELL SCREEN** Interval: 35-45 ft Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: Flush **FILTER PACK** Interval: 34-45 ft Type: 2/12 sand Quantity: 11 ft **FILTER PACK SEAL** Interval: 32-34 ft Type: Bentonite chips Quantity: 2 ft **ANNULUS SEAL** Interval: 3-32 ft Type: Bentonite grout Quantity: 29 ft
	-30										
45		Boring completed at 45.0 ft			-31.6						
	-35										
50											
	-40										
55											
	-45										
60											
	-50										
65											
	-55										
70											
	-60										
75											
	-65										
80											

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

RECORD OF BOREHOLE PL2-420C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41, along bulkhead

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/9/08
DATE COMPLETED: 7/10/08
WEATHER: Inside Bldg.

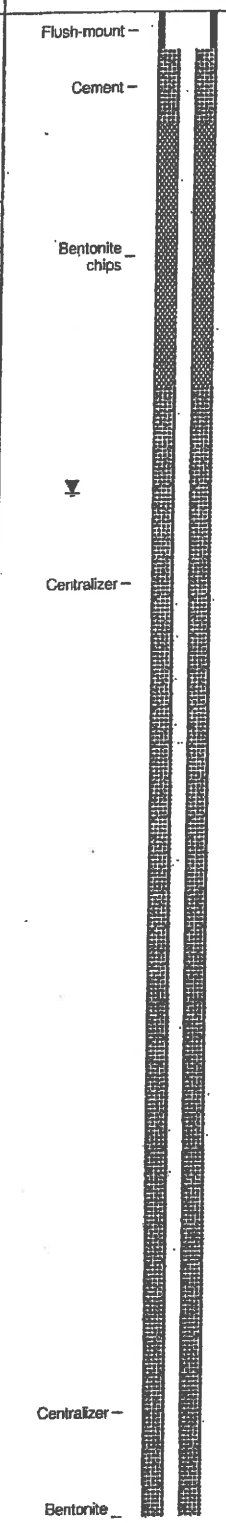
DATUM: Geodetic
COORDS: N: 196,645.4 E: 1,275,001.3
GS ELEVATION: 13.4 ft
TOC ELEVATION: 13.0 ft
TEMPERATURE: 74 F

INCLINATION: -90
DEPTH W.L.: 12.8 ft
ELEVATION W.L.: 0.2 ft
DATE W.L.: 8/7/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	ELEV. / DEPTH (ft)	SAMPLES PID (ppm)	NUMBER	TYPE	REC / ATT
0		0.0 - 0.5 CONCRETE	SP	12.9 / 0.5				
		0.5 - 1.5 Light brown, fine SAND, some fine Gravel, dry, no odor (SP)		11.9 / 1.5				
	10	1.5 - 5.0 Light brown, poorly graded, fine SAND, dry, no odor (SP)	SP	8.4	0.0	1	GRAB	4.5 / 5.0
5		5.0 - 8.8 Light brown, poorly graded, fine SAND, dry, no odor (SP)	SP	5.0 / 4.7	0.0	2	GRAB	5.0 / 5.0
	5	8.8 - 9.0 Brown, fine SANDY SILT, dry, no odor (ML)	ML	9.0				
10		9.0 - 10.0 Dark brown, fine to medium SAND, dry, no odor (SP)	SP	10.0 / 3.4				
		10.0 - 11.0 Dark brown, fine to medium SAND, dry, no odor (SP)	ML	2.4				
		11.0 - 11.3 Dark brown, SILT, some fine Sand and trace fine Gravel, moist, no odor (ML)	SM	11.3 / 1.2				
	0	11.3 - 12.3 Gray-brown, SILTY fine SAND, wet at 12.0 ft bgs, no odor (SM)	CL	12.3 / -0.1	0.0	3	GRAB	5.0 / 5.0
		12.3 - 13.5 Gray CLAY, wet, low plasticity, no odor (CL)	OL	-0.6				
15		13.5 - 14.0 Black, organic SILT, some Clay and fine SAND, wet, some root/tree fragments, no odor (OL)	SP	14.0 / -2.6				
		14.0 - 16.0 Gray, poorly graded, fine Sand, wet, no odor (SP)	ML	16.0 / -3.9				
	-5	16.0 - 17.3 Gray, fine SANDY SILT, wet, some organic matter, no odor (ML)	SP	17.3 / -6.6	0.0	4	GRAB	5.0 / 5.0
20		17.3 - 20.0 Dark gray to black, fine to medium SAND, wet, no odor (SP)						
		20.0 - 25.0 Dark gray to black, fine to medium SAND, wet, no odor (SP)	SP	20.0 / -11.6	0.0	5	GRAB	5.0 / 5.0
	-10							
25		25.0 - 30.0 Dark gray to black, medium to coarse SAND, wet, no odor (SP)	SP	25.0 / -16.6	0.0	6	GRAB	5.0 / 5.0
	-15							
30		30.0 - 42.5 Dark gray to black, poorly graded, medium SAND, wet, no odor (SP)	SP	30.0	0.0	7	GRAB	5.0 / 5.0
	-20							
35					0.0	8	GRAB	5.0 / 5.0
	-25							
40								

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS.

PL2-420C
Borehole Diameter: 8-Inch
WELL CASING
Interval: 0-75 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 75-80 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 73-80
Type: 2/12 Sand
Quantity: 7 ft
FILTER PACK SEAL
Interval: 70-73
Type: Bentonite chips
Quantity: 3 ft
ANNULUS SEAL
Interval: 0-70 ft
Type: Bentonite grout
Quantity: 70 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

RECORD OF BOREHOLE PL2-420C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41, along bulkhead

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/9/08
DATE COMPLETED: 7/10/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,645.4 E: 1,275,001.3
GS ELEVATION: 13.4 ft
TOC ELEVATION: 13.0 ft
TEMPERATURE: 74 F

INCLINATION: -90
DEPTH W.L.: 12.8 ft
ELEVATION W.L.: 0.2 ft
DATE W.L.: 8/7/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT
40		30.0 - 42.5 Dark gray to black, poorly graded, medium SAND, wet, no odor (SP) *(Continued)*	SP		-29.1	0.0	9	GRAB	5.0/5.0
	-30	42.5 - 44.5 Gray, fine SANDY SILT, wet, no odor (ML)	ML		42.5 -31.1				
45		44.5 - 45.0 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		-31.6				
		45.0 - 47.8 Dark gray to black, poorly graded, medium SAND, wet, no odor (SP)	SP		45.0 -34.4	0.0	10	GRAB	5.0/5.0
	-35	47.8 - 48.0 Gray, SILT, wet, no odor (ML)	ML		48.0				
50		48.0 - 50.0 Dark gray to black, poorly graded, medium SAND, wet, no odor (SP)	SP		-36.6				
		50.0 - 58.5 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		50.0	0.0	11	GRAB	5.0/5.0
55	-40					0.0	12	GRAB	5.0/5.0
	-45				-45.1				
60		58.5 - 59.5 Dark gray to black, fine SANDY CLAY, wet, low plasticity, no odor (CL)	CL		58.5 -46.1				
		59.5 - 65.0 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		59.5	0.0	13	GRAB	5.0/5.0
65	-50				-51.6				
		65.0 - 70.0 Dark gray to black, fine to medium SAND, wet, no odor (SP)	SP		65.0	0.0	14	GRAB	5.0/5.0
70	-55				-56.6				
		70.0 - 79.8 Dark gray to black, fine SAND, wet, 1-inch wood fragment at 74 ft bgs, no odor (SP)	SP		70.0	0.0	15	GRAB	5.0/5.0
75	-60					0.0	16	GRAB	5.0/5.0
	-65								
80					-66.4				

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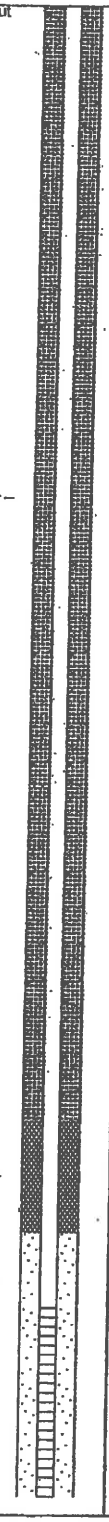
MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-420C
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-75 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 75-80 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 73-80
Type: 2/12 Sand
Quantity: 7 ft
FILTER PACK SEAL
Interval: 70-73
Type: Bentonite chips
Quantity: 3 ft
ANNULUS SEAL
Interval: 0-70 ft
Type: Bentonite grout
Quantity: 70 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

RECORD OF BOREHOLE PL2-420C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41, along bulkhead

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/9/08
DATE COMPLETED: 7/10/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,645.4 E: 1,275,001.3
GS ELEVATION: 13.4 ft
TOC ELEVATION: 13.0 ft
TEMPERATURE: 74 F

INCLINATION: -90
DEPTH W.L.: 12.8 ft
ELEVATION W.L.: 0.2 ft
DATE W.L.: 8/7/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES (PL2-420C)	WELL CONSTRUCTION DETAILS
80		79.8 - 80.0 Dark gray, SILT, wet, little fine shell fragments, no odor (ML)	ML		80.0						**PL2-420C** Borehole Diameter: 8-inch **WELL CASING** Interval: 0-75 ft Material: PVC Diameter: 2-inch Joint Type: Threaded **WELL SCREEN** Interval: 75-80 ft Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: Flush **FILTER PACK** Interval: 73-80 Type: 2/12 Sand Quantity: 7 ft **FILTER PACK SEAL** Interval: 70-73 Type: Bentonite chips Quantity: 3 ft **ANNULUS SEAL** Interval: 0-70 ft Type: Bentonite grout Quantity: 70 ft
	-70	80.0 - 85.0 Dark gray to black, fine SAND, wet, no odor (SP)	SP		-71.6	0.0	17	GRAB	5.0/5.0	Heave	
85		Boring completed at 85.0 ft									
	-75										
90											
	-80										
95											
	-85										
100											
	-90										
105											
	-95										
110											
	-100										
115											
	-105										
120											

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-08.GDT 3/25/09

RECORD OF BOREHOLE PL2-443B

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41, along bulkhead

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/9/08
DATE COMPLETED: 7/9/08
WEATHER: Inside Bldg

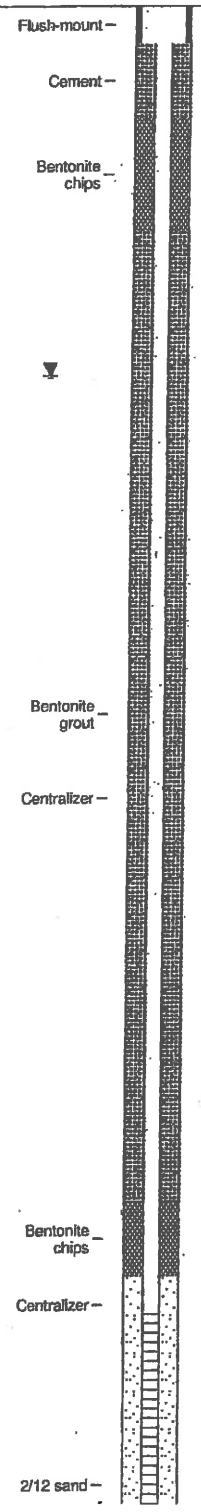
DATUM: Geodetic
COORDS: N: 196,832.6 E: 1,274,801.0
GS ELEVATION: 13.4 ft
TOC ELEVATION: 13.0 ft
TEMPERATURE: 72 F

INCLINATION: -90
DEPTH W.L.: 9.9 ft
ELEVATION W.L.: 3.1 ft
DATE W.L.: 10/27/08
TIME W.L.:

DESCRIPTION	USCS	ELEV. / DEPTH (ft)	PID (ppm)	NUMBER	TYPE	REC / ATT
0.0 - 0.5 CONCRETE		12.9 / 0.5				
0.5 - 5.0 Orange-brown, fine SAND, little to some Silt, dry, no odor (SM)	SM	8.4	0.0	1	GRAB	4.5 / 5.0
5.0 - 6.0 Orange-brown, fine SAND, little to some Silt, dry, no odor (SM)	SM	5.0 / 7.4				
6.0 - 9.5 Dark brown, poorly graded, medium SAND, dry, no odor (SP)	SP	6.0 / 3.9	0.0	2	GRAB	5.0 / 5.0
9.5 - 10.0 Brown and gray, CLAY, some fine Sand, dry, low plasticity, no odor (CL)	CL	3.4 / 10.0				
10.0 - 45.0 Soil logging stopped at 10.0 ft bgs in this borehole. SEE PL2-443C BOREHOLE LOG FOR SOIL LITHOLOGY DESCRIPTION.						

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-443B
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-35 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 35-45 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 34-45 ft
Type: 2/12 sand
Quantity: 11 ft
FILTER PACK SEAL
Interval: 32-34 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 3-32 ft
Type: Bentonite grout
Quantity: 28 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

RECORD OF BOREHOLE PL2-443B

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 45.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41, along bulkhead.

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/9/08
DATE COMPLETED: 7/9/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,832.6 E: 1,274,801.0
GS ELEVATION: 13.4 ft
TOC ELEVATION: 13.0 ft
TEMPERATURE: 72 F

INCLINATION: -90
DEPTH W.L.: 9.9 ft
ELEVATION W.L.: 3.1 ft
DATE W.L.: 10/27/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES (PL2-443B)	WELL CONSTRUCTION DETAILS
40		10.0 - 45.0 Soil logging stopped at 10.0 ft bgs in this borehole. SEE PL2-443C BOREHOLE LOG FOR SOIL LITHOLOGY DESCRIPTION. *(Continued)*								10-slot screen	**PL2-443B** Borehole Diameter: 8-inch **WELL CASING** Interval: 0-35 ft Material: PVC Diameter: 2-inch Joint Type: Threaded **WELL SCREEN** Interval: 35-45 ft Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: Flush **FILTER PACK** Interval: 34-45 ft Type: 2/12 sand Quantity: 11 ft **FILTER PACK SEAL** Interval: 32-34 ft Type: Bentonite chips Quantity: 2 ft **ANNULUS SEAL** Interval: 3-32 ft Type: Bentonite grout Quantity: 28 ft
	-30										
45		Boring completed at 45.0 ft			-31.6						
	-35										
50											
	-40										
55											
	-45										
60											
	-50										
65											
	-55										
70											
	-60										
75											
	-65										
80											

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

RECORD OF BOREHOLE PL2-443C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41, along bulkhead

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/9/08
DATE COMPLETED: 7/9/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,836.8 E: 1,274,797.4
GS ELEVATION: 13.4 ft
TOC ELEVATION: 13.0 ft
TEMPERATURE: 72 F

INCLINATION: -90
DEPTH W.L.: 12.4 ft
ELEVATION W.L.: 0.6 ft
DATE W.L.: 8/7/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT
0		0.0 - 0.5 CONCRETE			12.9 / 0.5				
		0.5 - 3.8 Orange-brown, fine SAND, little to some Silt, dry, no odor (SM)	SM		9.7	0.0	1	GRAB	4.5 / 5.0
	10	3.8 - 3.9 Orange-brown, SILT, dry, no odor (ML)	ML		3.9				
		3.9 - 5.0 Orange-brown, fine SAND, little to some Silt, dry, no odor (SM)	SM		8.4 / 5.0				
5		5.0 - 6.0 Orange-brown, fine SAND, little to some Silt, dry, no odor (SM)	SM		7.4 / 6.0				
		6.0 - 9.5 Dark brown, poorly graded, medium SAND, dry, no odor (SP)	SP		3.9	0.0	2	GRAB	5.0 / 5.0
	5	9.5 - 10.0 Brown and light gray, CLAY, some fine Sand, dry, low plasticity, no odor (CL)	CL		3.4				
10		10.0 - 12.0 Light brown, fine to medium SAND, some fine Gravel, moist at 12 ft bgs, no odor (SP)	SP		10.0 / 1.4				
	0	12.0 - 15.0 Gray-brown, fine SAND, little Silt, wet, no odor (SP-SM)	SP-SM		12.0 / -1.6	0.0	3	GRAB	5.0 / 5.0
15		15.0 - 15.5 Orange-brown, poorly graded, fine SAND, wet, no odor (SP)	SP		-2.1				
		15.5 - 15.8 Light brown, CLAY, wet, low plasticity, no odor (CL)	CL		15.8				
		15.8 - 18.0 Orange-brown, poorly graded, fine SAND, wet, no odor (SP)	SP		-4.6	0.0	4	GRAB	5.0 / 5.0
	-5	18.0 - 20.0 Dark gray to black, fine to medium SAND, wet, no odor (SP)	SP		18.0 / -6.6				
20		20.0 - 25.0 Dark gray to black, poorly graded, medium SAND, wet, no odor (SP)	SP		20.0 / -11.6	0.0	5	GRAB	5.0 / 5.0
	-10	25.0 - 30.0 Dark gray to black, poorly graded, medium SAND, wet, no odor (SP)	SP		25.0 / -16.6	0.0	6	GRAB	5.0 / 5.0
25	-15	30.0 - 33.0 Dark gray to black, poorly graded, medium SAND, wet, no odor (SP)	SP		30.0 / -19.6	0.0	7	GRAB	5.0 / 5.0
30	-20	33.0 - 35.0 Dark gray to black, coarse SAND, trace fine Gravel, wet, no odor (SP)	SP		33.0 / -21.6				
		35.0 - 37.0 Dark gray to black, coarse SAND, trace fine Gravel, wet, no odor (SP)	SP		35.0 / -23.6				
35	-25	37.0 - 40.0 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		37.0 / -26.6	0.0	8	GRAB	5.0 / 5.0
40									

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES — PL2-443C

WELL CONSTRUCTION DETAILS

PL2-443C
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-70 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 70-75 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 67-75 ft
Type: 2/12 sand
Quantity: 8 ft
FILTER PACK SEAL
Interval: 65-67 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 3-65 ft
Type: Bentonite grout
Quantity: 62 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

AA BOREHOLE RECORD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

RECORD OF BOREHOLE PL2-443C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41, along bulkhead

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/9/08
DATE COMPLETED: 7/9/08
WEATHER: Inside Bldg

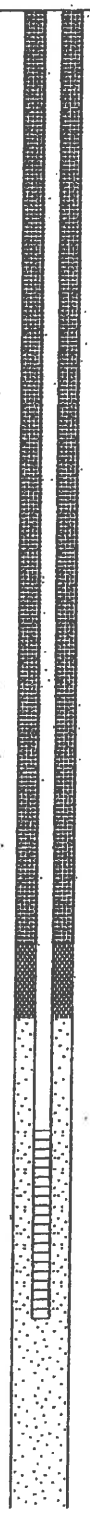
DATUM: Geodetic
COORDS: N: 196,836.8 E: 1,274,797.4
GS ELEVATION: 13.4 ft
TOC ELEVATION: 13.0 ft
TEMPERATURE: 72 F

INCLINATION: -90
DEPTH W.L.: 12.4 ft
ELEVATION W.L.: 0.6 ft
DATE W.L.: 8/7/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT
40		40.0 - 45.0 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		40.0 / -31.6	0.0	9	GRAB	5.0/5.0
45	-30	45.0 - 50.0 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		45.0 / -36.6	0.0	10	GRAB	5.0/5.0
50	-35	50.0 - 53.5 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		50.0 / -40.1	0.0	11	GRAB	5.0/5.0
	-40	53.5 - 53.8 Gray, SILT, some fine Sand, wet, no odor (ML)	ML		53.8				
55		53.8 - 55.0 Dark gray to black, poorly graded, fine SAND, wet, no odor (SP)	SP		-41.6				
		55.0 - 59.5 Dark gray to black, fine to medium SAND, trace organic matter, wet, no odor (SP)	SP		55.0 / -46.1	0.0	12	GRAB	5.0/5.0
	-45	59.5 - 60.0 Light gray, fine SAND, trace Silt, wet, no odor (SP)	SP		-46.6				
60		60.0 - 65.0 Dark gray , poorly graded, fine SAND, wet, no odor (SP)	SP		60.0 / -51.6	0.0	13	GRAB	5.0/5.0
65	-50	65.0 - 69.0 Dark gray, fine SAND, little to some Silt, wet, no odor (SM)	SM		65.0 / -55.6	0.0	14	GRAB	5.0/5.0
	-55	69.0 - 70.0 Dark gray to black, poorly graded, medium SAND, wet, no odor (SP)	SP		69.0 / -56.6				
70		70.0 - 71.0 Dark gray, fine SAND, some Silt, wet, no odor (SM)	SM		70.0 / -57.6				
		71.0 - 72.5 Gray, CLAY, wet, low plasticity, no odor (CL)	CL		71.0 / -59.1	0.0	15	GRAB	5.0/5.0
	-60	72.5 - 74.5 Dark gray, SILTY fine SAND, wet, no odor (SM)	SM		72.5 / -61.1				
75		74.5 - 75.0 Light gray, SILTY fine SAND, wet, no odor (SM)	SM		-61.6				
		75.0 - 78.0 Gray, fine SANDY CLAY, wet, shell fragments at 78 ft bgs, low plasticity, no odor (CL)	CL		75.0 / -64.6	0.0	16	GRAB	5.0/5.0
	-65	78.0 - 80.0 Dark gray, poorly graded, fine SAND, wet, no odor (SP)	SP		78.0 / -66.6				
80									

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

PL2-443C
Borehole Diameter: 8-inch
WELL CASING
Interval: 0-70 ft
Material: PVC
Diameter: 2-inch
Joint Type: Threaded
WELL SCREEN
Interval: 70-75 ft
Material: PVC
Diameter: 2-inch
Slot Size: 0.010-inch
End Cap: Flush
FILTER PACK
Interval: 67-75 ft
Type: 2/12 sand
Quantity: 8 ft
FILTER PACK SEAL
Interval: 65-67 ft
Type: Bentonite chips
Quantity: 2 ft
ANNULUS SEAL
Interval: 3-65 ft
Type: Bentonite grout
Quantity: 62 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

Golder Associates

RECORD OF BOREHOLE PL2-443C

PROJECT: Boeing Plant II 2-40s DGI
PROJECT NUMBER: 013-1646-008-200
DRILLED DEPTH: 85.0 ft
AZIMUTH: N/A
LOCATION: Bldg 2-41, along bulkhead

DRILL METHOD: Geoprobe
DRILL RIG: 6600
DATE STARTED: 7/9/08
DATE COMPLETED: 7/9/08
WEATHER: Inside Bldg

DATUM: Geodetic
COORDS: N: 196,836.8 E: 1,274,797.4
GS ELEVATION: 13.4 ft
TOC ELEVATION: 13.0 ft
TEMPERATURE: 72 F

INCLINATION: -90
DEPTH W.L.: 12.4 ft
ELEVATION W.L.: 0.6 ft
DATE W.L.: 8/7/08
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: PID (ppm)	NUMBER	TYPE	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES (PL2-443C)	WELL CONSTRUCTION DETAILS
80		80.0 - 85.0 Dark gray, poorly graded, fine SAND, wet, no odor (SP)	SP		80.0	0.0	17.	GRAB	5.0/5.0	Heave	**PL2-443C** Borehole Diameter: 8-inch **WELL CASING** Interval: 0-70 ft Material: PVC Diameter: 2-inch Joint Type: Threaded **WELL SCREEN** Interval: 70-75 ft Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: Flush **FILTER PACK** Interval: 67-75 ft Type: 2/12 sand Quantity: 8 ft **FILTER PACK SEAL** Interval: 65-67 ft Type: Bentonite chips Quantity: 2 ft **ANNULUS SEAL** Interval: 3-65 ft Type: Bentonite grout Quantity: 62 ft
	-70				-71.6						
85		Boring completed at 85.0 ft									
	-75										
90											
	-80										
95											
	-85										
100											
	-90										
105											
	-95										
110											
	-100										
115											
	-105										
120											

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling Inc
DRILLER: K. Goble

GA INSPECTOR: D.Gorman
CHECKED BY: M. Lumpkin
DATE: 3/4/09

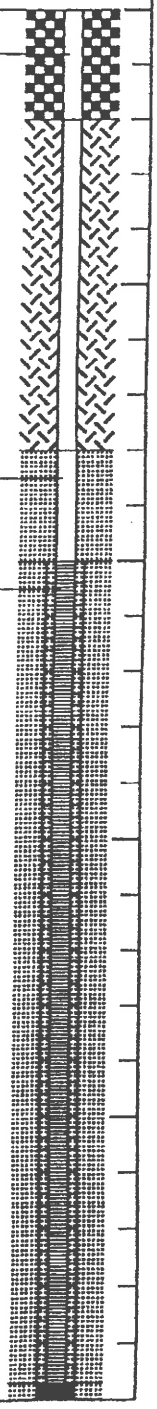
Golder Associates

AA BOREHOLE REL...rD BOEING 2_40S.GPJ GOLDER NJ-PA 05-24-06.GDT 3/25/09

Boring PL2-444A

Project	Boeing RFI 1C	Start Date 07/20/95	Finish Date 07/20/05
Location	Plant 2 Seattle, WA	Driller	Drilling Co. PTL
Project No.	03709-034-300-3430-	Drilling Method 4 in. ID HSA	
Contractor	Weston	Sampling Method split spoon	
Logged by	Robbins		Boring Diam. (in) 10
			Total Depth (ft) 26.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
								Concrete
							SP	Sand (SP), very dk gray (10YR3/1), 100% med sand, loose, moist
5					4			
							ML	Silt (ML), brn (10YR5/3), 95% silt, 5% fine sand, loose, moist
10					16		SP	Sand (SP), very dk gray (10YR3/1), 95% fine sand, 5% silt, loose, wet
15					9			
20					24			



Boring_id 20129

Boring PL2-444A

Project Boeing RFI 1C
Location Plant 2 Seattle, WA
Project No. 03709-034-300-3430-
Contractor Weston
Logged by Robbins

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					19			
30								
35								
40								
45								

Boring_id 20129

WAC 173-160-420

What are the general construction requirements for resource protection wells?

(1) No resource protection well or soil boring excavation may be used to withdraw or inject water for domestic, industrial, municipal, commercial, or agricultural purposes.

(2) No resource protection well or soil boring excavation may interconnect aquifers.

(3) Nested resource protection wells are prohibited.

(4) Cuttings, development water, and other investigation derived waste from resource protection well construction or geotechnical soil borings shall be managed in a manner consistent with the intent and purposes of the Water Pollution Control Act, chapter 90.48 RCW, the Hazardous Waste Management Act, chapter 70.105 RCW, and implementing regulations.

(5) Well tagging:

(a) It shall be the driller's responsibility to place a well identification tag with a unique identification number on every resource protection well that they construct or alter within thirty days of completion of the well. Uncased geotechnical soil borings and environmental investigation wells are exempt from the tagging requirements of this chapter.

(i) The alpha-numeric number shall be recorded on the drilling report in the space provided.

(ii) The driller shall remove the well identification tag on all resource protection wells they decommission and shall attach the tag to the decommissioning well report.

(b) It shall be the well owner's responsibility to place a well identification tag with a unique identification number on every resource protection well they own and which was completed prior to the effective date of this regulation.

(i) Upon request, the department shall furnish the well owner with a well tag and tagging instructions.

(ii) The well owner shall tag their well(s) and submit a completed tagging report to the department.

(c) The well tag shall be permanently attached to:

(i) The well casing and be visible above land surface for all wells which have been completed above land surface.

(ii) The well casing or to any permanent and protected portion of the vault for wells completed below land surface.

(iii) A prominent system component visible above land surface for ground source heat pump borings.

(d) All well identification tags shall be supplied by the department.

(e) It is unlawful for a person to tamper with or remove a well identification tag except during well alteration.

(6) All resource protection wells will be sealed in accordance with WAC 173-160-450 regardless of the method of installation. Except, resource protection wells that are properly decommissioned prior to the removal of any drilling equipment from the well location are

exempted from the surface sealing requirements of this chapter. Provided the decommissioning process includes the removal of any conduit, tubing, probe, or other items inserted into the ground.

(7) All geotechnical soil borings shall be decommissioned under the terms of this chapter.

(8) Except as provided in RCW 18.104.180, all construction, alteration, reconstruction, and decommissioning of resource protection wells and geotechnical soil borings shall be done by an individual licensed under the provisions of chapter 173-162 WAC.

(9) A notice of intent to construct or decommission a resource protection well and a geotechnical soil boring shall be filed with the department a minimum of seventy-two hours prior to initiating construction or decommissioning of the well(s) or boring(s). A fee must accompany each notice of intent to construct or decommission a resource protection well.

(a) The fee for a resource protection well, except for an environmental investigation well, a ground source heat pump boring, or a grounding well, is forty dollars for each well.

(b) The fee for an environmental investigation well in which ground water is sampled or measured is forty dollars for the construction of up to four environmental investigation wells per project, and ten dollars for each additional environmental investigation well constructed on a project with more than four wells. There is no fee for soil or vapor sampling purposes.

(c) The fee for a ground source heat pump boring or a grounding well is forty dollars for construction of up to four ground source heat pump borings or grounding wells per project and ten dollars for each additional ground source heat pump boring or grounding well constructed on a project with more than four wells.

(d) The fee to decommission a resource protection well, except for an environmental investigation well, is twenty dollars per well. There is no fee to decommission an environmental investigation well or a geotechnical soil boring.

(e) The fee to decommission a ground source heat pump boring or a grounding well is twenty dollars per well.

(f) Under some circumstances, it may be necessary to construct more resource protection wells or geotechnical soil borings than originally anticipated. When additional resource protection wells are constructed on a site for which a notice of intent and fee were submitted, a second notice and fee shall be submitted within twenty-four hours after all wells have been completed or as soon as the final number of wells to be constructed is determined, whichever is sooner. When additional geotechnical soil borings are needed, the borings may be completed. A follow-up notice of intent shall be submitted to the department within twenty-four hours after all borings are constructed. Notification to construct multiple wells or geotechnical soil borings within the same quarter/quarter section, township, and range may be submitted on one notice form.

(10) Resource protection well reports.

(a) Anyone who constructs or decommissions a well is required to submit a complete well report on the construction or decommissioning of all resource protection wells and geotechnical soil borings. Reports must be submitted to the water resources program within thirty days after completion of construction or decommissioning. Submission of a well report to consulting firms does not meet the requirement of this section. The report must be an accurate summation of data collected in the field taken from field notes written as the well was constructed or decommissioned. Field notes must be available at all times during construction or decommissioning for review by state and local inspectors and kept until the well report is submitted.

(b) The resource protection well report must be made on a form provided by the department, or a reasonable facsimile of the form, as approved by the department.

(c) Where applicable the report shall include the following information:

(i) Owner's name; operator/trainee name; operator/trainee license number; contractor registration number, drilling company name;

(ii) Tax parcel number;

(iii) Well location address;

(iv) Location of the well to at least 1/4, 1/4 section or smallest legal subdivision;

(v) Unique well identification tag number;

(vi) Construction date;

(vii) Start notification number;

(viii) Intended use of well;

(ix) The well depth, diameter, and general specifications of each well;

(x) Total depth of casing;

(xi) Well head elevation;

(xii) Drilling method;

(xiii) Seal material, seal location and type of placement used;

(xiv) Filter pack location; filter pack material used;

(xv) The thickness and character of each bed, stratum or formation penetrated by each well including identification of each water bearing zone;

(xvi) Casing gauge, diameter, stickup, type of material, and length, also of each screened interval or perforated zone in the casing;

(xvii) The depth to the static water level, as measured below the land surface; and

(xviii) Such additional factual information as may be required by the department.

(d) The well report must include one of the following:

(i) The license number and signature of the person who constructed or decommissioned the well;

(ii) The license number and signature of the trainee and the licensed operator under chapter 18.104 RCW; or

(iii) The license number and signature of an exempted individual as defined under RCW 18.104.180(3).

(e) This rule shall allow an individual to submit electronic reports in accordance with department procedures. The use of a digital signature in the electronic reports will be authorized as a substitute for an original signature under (d) of this subsection.

What are the surface protection requirements?

(11) All resource protection wells shall be capped and protected using one of the following methods:

(a) If the well is cased with metal and completed above the ground surface, you must attach a watertight cap with a lock to the top of the casing.

(b) If the well is not cased with metal and completed above the land surface, you must install a protective metal casing over and around the well. The protective casing shall extend at least six inches above the top of the well casing and be cemented at least two feet into the ground. A cap with lock shall be attached to the top of the protective casing.

(12) You shall protect the well(s) completed above ground from damage by:

(a) Cementing three metal posts, at least three inches in diameter, in a triangular array around the casing and at least two feet from it. Each post shall extend at least three feet above and below the land surface.

(b) A reinforced concrete pad may be installed to protect against and prevent frost heave. If installed, the concrete pad shall extend to a depth equal to anticipated frost depth. When a concrete pad is used, the well seal may be part of the concrete pad.

(13) If the well is completed below land surface, a watertight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent the inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The cover must be designed to withstand the maximum expected loading.

(14) The protective measures may be waived or modified upon written approval from the department (a variance).

(15) If the well is damaged, the well protection measures and casing shall be repaired to meet the requirements of this chapter. If the well is damaged beyond repair, it shall be decommissioned in accordance with WAC 173-160-460.

WAC 173-160-460

What is the decommissioning process for resource protection wells?

(1) For resource protection wells and geotechnical soil borings that were not constructed in accordance with these regulations, or for which a drilling report required under this section is missing, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers, and decommission in one of the following ways:

(a) Perforate the casing from the bottom to land surface and pressure grout the casing.

(i) Perforations shall be at least four equidistant cuts per row, and one row per foot. Each cut shall be at least one and one-half inches long.

(ii) Apply enough pressure to force the sealing material through the perforations, filling any voids on the outside of the casing.

(iii) The remainder of the casing shall be filled with neat cement grout, neat cement, or bentonite slurry; or

(b) Withdraw the casing and fill the bore hole with neat cement grout, neat cement, bentonite or bentonite slurry as the casing is being withdrawn.

(2) For resource protection wells and geotechnical soil borings that were constructed in accordance with these regulations, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers and then decommission in one of the following ways:

(a) Wells with an inside casing diameter equal to or greater than one inch and constructed in accordance with these regulations as verified through a field examination and review of the drilling report shall be decommissioned by filling the casing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement.

(b) Wells with an inside casing diameter less than one inch shall be decommissioned by pressure grouting the entire casing length with bentonite slurry, neat cement grout, or neat cement.

(c) Vibrating wire piezometers installed to meet or exceed the sealing requirements of WAC 173-160-450, 173-160-457, and 173-160-458 are exempt from the decommissioning procedures and decommissioning reporting requirements provided here.

(d) Direct push wells shall be decommissioned in accordance with this section.

(e) Geotechnical soil borings, or boring, shall be decommissioned by sealing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement. Sealing material placed below the static water level shall be piped directly to the point of application or placed by means of a dump bailer or pumped through a tremie tube. If bentonite slurry, neat cement grout or neat cement is used to seal below the water level in the well, the material shall be placed from the bottom up by methods that avoid segregation or dilution of the material. When used to place bentonite slurry, neat cement or neat cement grout, the discharge end of the tremie tube shall be submerged in the bentonite slurry, neat cement or neat cement grout to avoid breaking the seal while filling the annular space. Provided the material does not dilute or segregate and the resulting seal is free of voids, sealing material may be hand poured above the static water level.

ENVIRONMENTAL PARTNERS INC 295 NE Gilman Boulevard, Suite 201 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

Well Decommissioning Interim Measure – August 2013 Book #11

Boeing Plant 2
Seattle/Tukwila, Washington
Project Number 17513.3.Task 300.02

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, Washington 98027
(425) 395-0010

Table 1: Wells to be Decommissioned August 2013					
Well ID	Well Owner	Total Depth (ft. bgs)	Screened Interval (ft. bgs)	Well Diameter and Material	Decommissioning Method
PL2-JF01AR	Boeing	27.5	23-27	2-inch PVC	chip
PL2-JF01B	Boeing	50	40-50	2-inch PVC	grout
PL2-JF01C	Boeing	79	74-79	2-inch PVC	grout
PL2-JF02A	Boeing	23	5.5-23	2-inch PVC	chip
MW-5	Jorgensen Forge	17	7-17	2-inch PVC	chip

0707 On site M. Holder (EPI) DON Harnden (ESN) and Richard Bates (ESN)
Holder contacted Sheri Bozic (JFC) & Jennifer Parsons (Boeing)
Harnden & Bates attended Jorgensen Forge safety Training.
Holder located wells & removed pumps

Harnden & Bates decommissioned wells
Holder searched for JF02B/03A

1000 Sheri Bozic, David Mendel (SES) & Kemp Garcia (Bravo) met in area
and attempted to locate well w/ metal detector

1030 Called Doug Kunkel. He will locate decommissioning paperwork for
PL2-JF03A to send to Sheri.

1040 Called Jennifer to open gate.
Boeing security & Sheri Bozic opened gate
Transfered ground water to one drum & extra grout to another drum
label: Hold for Characterization label: non haz waste
Double locked gate. Cleaned up site.

~ 11:30 M Holder left Jorgensen Forge & went to Boeing.
Collected waste characterization sample from groundwater
Placed pumps in EPI/Golder Conex

1215 Relinquished waste samples to Jennifer Parsons (Boeing)

~ 1245 Left Boeing M. Holder (McElheron)

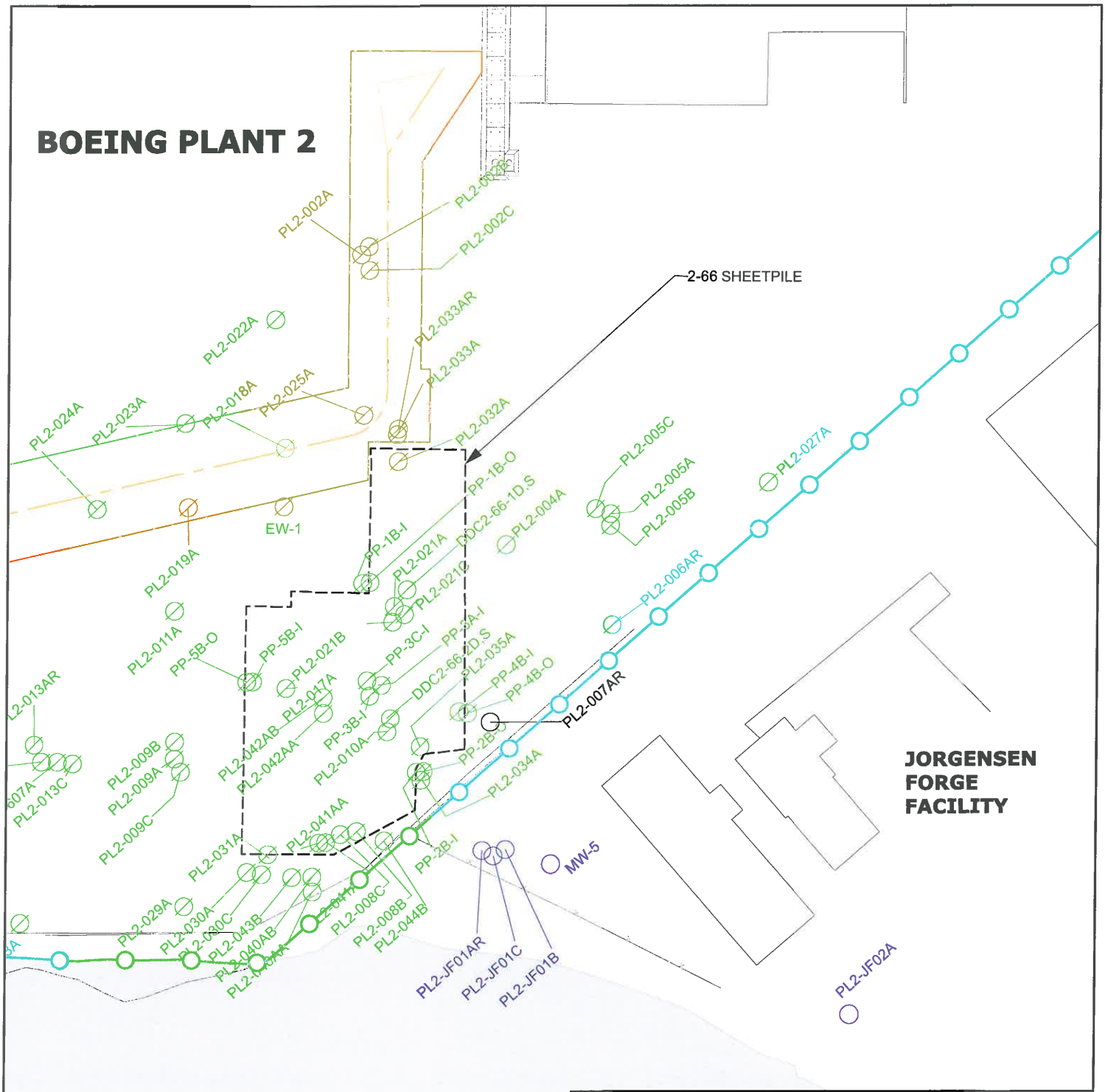


FIGURE 2B
WELL DECOMMISSIONING STATUS AS OF AUGUST 2013, SOUTH PLANT 2 ENLARGEMENT

LEGEND

- WELLS THAT REMAIN
- WELLS TO BE DECOMMISSIONED IN 2013
- WELLS PREVIOUSLY DECOMMISSIONED
- PROPERTY BOUNDARY

TRUE NORTH N

PLANT NORTH N

0 30 60 120

SCALE: 1" = 120'

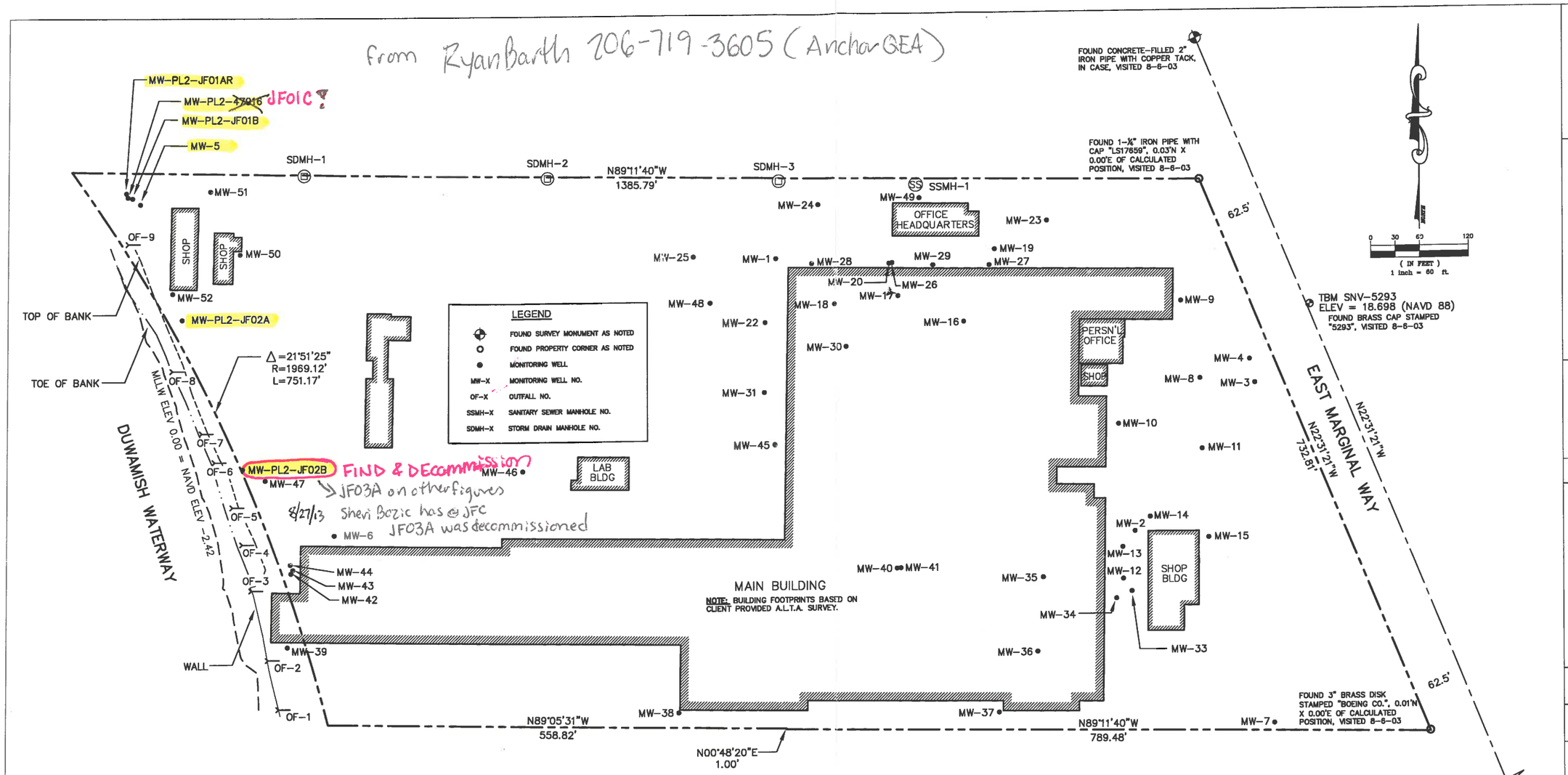
PREPARED BY	epi ENVIRONMENTAL PARTNERS INC		
REPORT	THE BOEING COMPANY		
LOCATION	BOEING PLANT 2 SEATTLE/TUKWILA, WASHINGTON		
PREPARED FOR	THE BOEING COMPANY		
DATE 8/15/13	DRAWN BY ALW	REVIEWED BY DCK	PROJECT NUMBER 17513.3.300.02

Waste characterization sample collected

JF Decom - 08272013 8/27/13 @ 1145

Signed over to Jennifer Parsons @ 12:15

from Ryan Barth 206-719-3605 (Anchor QEA)



MONITORING WELLS

NOMENCLATURE-DESCRIPTION	NAD 83 (91) NORTHING	NAD 83 (91) EASTING	NAVD 88 TOM ELEV	NAVD 88 TOC ELEV
MW-1	195697.43	1276634.67	18.17	17.83
MW-2	195360.45	1277075.11	17.81	17.60
MW-3	195540.15	1277222.54	N.M.	N.M.
MW-4	195568.96	1277216.06	17.81	17.48
MW-5	195768.60	1275853.22	17.55	17.03
MW-6	195363.83	1276094.80	21.04	20.61
MW-7	195123.89	1277244.64	21.40	20.84
MW-8	195546.17	1277155.31	17.98	17.70
MW-9	195640.93	1277132.06	17.98	17.79
MW-10	195491.39	1277055.28	17.71	17.57
MW-11	195480.25	1277157.74	17.92	17.70
MW-12	195301.81	1277060.57	17.60	17.19
MW-13	195341.01	1277059.93	17.80	17.44
MW-14	195377.64	1277093.70	17.88	17.64
MW-15	195351.83	1277165.19	17.97	17.65
MW-16	195618.50	1276865.30	18.09	17.72
MW-17	195650.58	1276785.50	17.89	17.61
MW-18	195641.34	1276706.80	17.89	17.51
MW-19	195706.57	1276903.46	18.18	17.47
MW-20	195690.54	1276774.29	18.96	18.22
MW-21	NOT LOCATED AT THIS TIME			
MW-22	195691.91	1276620.90	17.91	16.98
MW-23	195740.61	1276967.50	18.38	17.84

NOMENCLATURE-DESCRIPTION	NAD 83 (91) NORTHING	NAD 83 (91) EASTING	NAVD 88 TOM ELEV	NAVD 88 TOC ELEV
MW-24	195763.13	1276686.38	18.21	17.88
MW-25	195700.83	1276534.05	18.10	17.64
MW-26	195691.17	1276777.96	18.86	18.36
MW-27	195687.39	1276896.91	18.74	18.15
MW-28	195691.14	1276678.49	18.81	18.35
MW-29	195688.11	1276828.56	18.69	18.24
MW-30	195589.35	1276721.45	18.04	17.48
MW-31	195534.39	1276620.06	18.07	17.50
MW-32	NOT LOCATED AT THIS TIME			
MW-33	195286.51	1277070.95	17.63	17.23
MW-34	195277.95	1277051.98	17.57	17.13
MW-35	195304.84	1276962.31	17.97	N.M.
MW-36	195214.19	1276955.42	17.71	17.41
• MW-37	195140.68	1276907.71	18.14	17.55
• MW-38	195144.27	1276515.50	17.90	17.45
• MW-39	195227.47	1276037.75	21.07	20.83
• MW-40	195317.74	1276783.81	17.64	17.19
• MW-41	195318.13	1276788.81	17.75	17.37
• MW-42	195317.30	1276041.81	18.01	17.54
• MW-43	195321.73	1276044.17	17.95	17.49
• MW-44	195328.21	1276041.04	17.78	17.14
• MW-45	195470.37	1276633.58	17.95	17.16
• MW-46	195440.77	1276324.49	18.10	17.74
• MW-47	195431.07	1276009.50	21.32	20.80

NOMENCLATURE-DESCRIPTION	NAD 83 (91) NORTHING	NAD 83 (91) EASTING	NAVD 88 TOM ELEV	NAVD 88 TOC ELEV
• MW-48	195644.01	1276554.39	17.81	17.33
• MW-49	195769.80	1276811.92	17.81	17.33
• MW-50	195707.20	1275976.38	18.10	17.69
• MW-51	195784.19	1275939.17	17.94	17.46
• MW-52	195659.56	1275893.45	18.29	17.67
MW-PL2-JF01AR	195782.18	1275836.02	17.40	16.88
MW-PL2-JF01B	195775.96	1275843.51	17.53	16.97
MW-PL2-JF01C	195777.24	1275837.92	17.52	17.08
MW-PL2-JF02A	195627.60	1275905.40	18.26	17.81
MW-PL2-JF03A	195445.02	1275981.38	18.36	17.95

OUTFALLS

NOMENCLATURE-DESCRIPTION	NAD 83 (91) NORTHING	NAD 83 (91) EASTING	NAVD 88 INVERT ELEV	PIPE SIZE	PIPE TYPE
OUTFALL-1	195151.90	1276027.03	10.00	18"	DI
OUTFALL-2	195211.78	1276013.69	6.62	12"	CMP
OUTFALL-3	195296.65	1275992.91	6.49	18"	RCP
OUTFALL-4	195352.99	1275981.45	4.57	12"	DI
OUTFALL-5	195398.32	1275969.11	6.46	12"	RCP
OUTFALL-6	195453.54	1275946.70	15.13	5"	DI
OUTFALL-7	195488.82	1275930.63	15.27	5"	DI
OUTFALL-8	195565.11	1275893.99	8.18	12"	DI
OUTFALL-9	195719.99	1275839.05	15.70	2.5"	DI

STORM & SANITARY SEWER MANHOLES

NOMENCLATURE-DESCRIPTION	NAD 83 (91) NORTHING	NAD 83 (91) EASTING	NAVD 88 RIM ELEV
SSMH-1	195786.16	1276807.68	17.65
SDMH-1	195802.99	1276055.26	17.10
SDMH-2	195798.21	1276354.29	17.09
SDMH-3	195792.30	1276638.25	17.28

NOMENCLATURE-DESCRIPTION	INVERT ELEV	DIRECTION	PIPE SIZE	COMMENT
SSMH-1	7.15	EAST	24"	
"	7.10	WEST	24"	
SDMH-1	8.7	EAST	18"?	DEBRIS
"	8.6	WEST	18"?	DEBRIS
SDMH-2	9.8	NORTHEAST	12"?	DEBRIS
"	9.8	WEST	18"?	DEBRIS
SDMH-3	7.48	NORTHEAST	12"	
"	6.98	SOUTH	18"	

DEBRIS– PIPES FULL OF DEBRIS, INVERT ELEV TO TOP OF DEBRIS
? – PIPE SIZE UNCERTAIN DUE TO EXTENT OF DEBRIS

DI – DUCTILE IRON PIPE
CMP – CORRUGATED METAL PIPE
RCP – REINFORCED CONCRETE PIPE

• – MONITOR WELLS ADDED MARCH 2009
N.M. – NOT MEASURED
TOC – TOP OF CASING
TOM – TOP OF (WELL) MONUMENT

SURVEYOR'S NOTES AND COMMENTS:

1. BASIS OF BEARINGS: WASHINGTON COORDINATE SYSTEM, NORTH ZONE NAD 83(91), PER RECORD OF SURVEY RECORDING NUMBER 9601039012.

2. VERTICAL DATUM: NAVD 88 PER CITY OF SEATTLE BENCHMARK NO. SNV-5293. ELEVATION = 18.698. MEAN LOWER LOW WATER ELEVATION (MLLW) DERIVED USING CONVERSION FACTOR OF -2.42 FROM NAVD 88.

3. BOUNDARY: THE BOUNDARY SHOWN HEREON IS BASED UPON RECORD OF SURVEY RECORDING NUMBER 9004309031. A LIMITED FIELD SURVEY WAS PERFORMED TO VERIFY THE EASTERLY LINE OF SAID SURVEY. DISCREPANCIES HAVE BEEN NOTED HEREON.

4. FIELD SURVEY METHODOLOGY: FIELD MEASUREMENTS FOR THIS SURVEY WERE PERFORMED USING A NIKON DTM-530, 3-SECOND ELECTRONIC TOTAL STATION IN CONFORMANCE WITH ACCEPTED SURVEY PROCEDURES WHICH MEET OR EXCEED STATE STANDARDS AS SPECIFIED BY WAC – 332-130 WITH REGARD TO LINEAR AND ANGULAR CLOSURES.

5. INSTRUMENT CALIBRATION: ALL MEASURING INSTRUMENTS EMPLOYED IN THIS SURVEY HAVE BEEN MAINTAINED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND HAVE BEEN COMPARED WITH AND ADJUSTED TO A NATIONAL GEODETIC SURVEY CALIBRATED BASELINE WITHIN THE PRECEDING 12 MONTHS.

6. PURPOSE OF SURVEY: THE PURPOSE OF THIS SURVEY IS TO PROVIDE AN EXHIBIT MAP AND TABLE OF MONITORING WELL, OUTFALL PIPE AND OTHER FEATURE LOCATIONS AS REQUESTED BY THE CLIENT. NO TITLE REPORT, LEGAL DESCRIPTION OR OTHER BOUNDARY DOCUMENTATION HAS BEEN PROVIDED NOR EXAMINED FOR THIS SURVEY. THIS SURVEY IS NOT INTENDED IN ANY WAY TO DEPICT BOUNDARY ISSUES OF ANY TYPE. BUILDING LOCATIONS HAVE BEEN SCALED FROM A.L.T.A. SURVEY SHEETS 1 & 2 BY DUFFY, LAWVER & KUMPF, INC. DATED JUNE 5, 1992.

7. EXCLUSIVITY: THIS SURVEY WAS PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT NAMED HEREON. ITS' USE DOES NOT EXTEND TO ANY UNANAMED PERSON OR PERSONS WITHOUT THE EXPRESS RECERTIFICATION BY THIS SURVEYOR NAMING SUCH PARTY.

PLS, Inc. Professional Land Surveyors
1045 - 12th Ave. N.W., Suite F-6
Issaquah, Washington 98027
(425) 313-9378 (fax) 313-9379

JORGENSEN FORGE FACILITY
8531 EAST MARGINAL WAY
SEATTLE, WA

REVISIONS

NO.	DATE	DESCRIPTION	BY
1	3/10/09	NEW MONITOR WELLS 37-52 INCLUDED	MJH

SHEET TITLE: JORGENSEN FORGE FACILITY MONITORING WELL EXHIBIT MAP

CLIENT: FARALLON CONSULTING, LLC
320 3RD AVE NE – STE 200
ISSAQUAH, WA 98027

DRAWN BY: JB
CHECKED BY: BVP
SCALE: 1" = 60'
DATE: 22-AUG-2003
JOB NO: 3048 – 9007
DRAWING NAME: 9007 Mon Wells

SHEET 1 OF 1

Well Decommissioning Log - Boeing Plant 2

Ecology tag # AFT951

Well Number (monument stamped →) PL2-JF01AR

	Northing	Easting
Well Location	195782.18	1275836.02

Start (date and time): 8/27/2013 ~0800

End (date and time): 8/27/2013 ~0815

Installation Method: HSA

Total Well Depth: 27.3' feet bgs 12.52 DTW

Well Diameter: 2" inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 23-27' feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: Cetco PureGold Medium Chips

Grout or Chip Volume: ~40lbs <1 cuft (4.4) Gallons or Cubic Feet

Surface Completion: Concrete

Drilling Contractor: ESN Northwest

License Number: 2914

Signature (Driller): [signature]

Signature (~~Engineer or Geologist~~ Env. Scientist): [signature]

Additional Information:

Well Decommissioning Log - Boeing Plant 2

Well Number (monument stamped →) PL2-JF01B Ecology tag # None

	Northing	Easting	
Well Location	195775.96	1275843.51	JF map

Start (date and time): 8/27/2013 0913

End (date and time): 8/27/2013

Installation Method: HSA

Total Well Depth: 49.15 feet bgs 12.49 DTW

Well Diameter: 2" inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 40-50? feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: Hydro Wyoming Bentonite (HydroGrout 20)

Grout or Chip Volume: ~12 gallons Gallons or Cubic Feet

Surface Completion: Concrete

Drilling Contractor: ESN Northwest

License Number: 2914

Signature (Driller): [signature]

Signature (~~Engineer or Geologist~~ Env. Scientist): [signature]

Additional Information:

~5 gallons wastewater came up

Well Decommissioning Log - Boeing Plant 2

Well Number (monument stamped JF01C): PL2-JF01C AFT952

	Northing	Easting
Well Location	195777.24	1275837.92

JF Map

Start (date and time): 8/27/13 ~0845

End (date and time): 8/27/13 ~0900

Installation Method: HSA

Total Well Depth: 79.4 feet bgs 13.55 DTW

Well Diameter: 2" inches

Type of Casing (circle): PVC Stainless Steel Other_____

Type of Well Screen: PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs): 74-79' feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips: mmt 8/27 ~~Cetco PureGold Medium Chips~~ Hydro Wyoming Bentonite Hydro Grout 20

Grout or Chip Volume: ~17 gallons Gallons or Cubic Feet

Surface Completion: Concrete

Drilling Contractor: ESN Northwest

License Number: 2914

Signature (Driller): [signature]

Signature (~~Engineer~~ Env. Scientist or Geologist): [signature]

Additional Information:

<10 gallons waste water came up

Well Decommissioning Log - Boeing Plant 2

Well Number	PL2-JF02A	no Ecology tag
Well Location	Northing: 195627.60 / Easting: 1275905.40	JF map
Start (date and time)	8/27/2013 ~0930	
End (date and time)	8/27/2013 ~0935	
Installation Method	HSA	
Total Well Depth	22.9' feet bgs	DTW 12.04'
Well Diameter	2" inches	
Type of Casing (circle)	PVC Stainless Steel Other_____	
Type of Well Screen	PVC Stainless Steel Other_____	
Depth of Screened Interval (ft. bgs)	5.5-23 feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout* WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips	Cetco Pure Gold Medium Chips	
Grout or Chip Volume	most of a bag <1 cuft Gallons or Cubic Feet	
Surface Completion	Concrete	
Drilling Contractor	ESN Northwest	
License Number	2914	
Signature (Driller)		
Signature (~~Engineer or Geologist~~ Env. Scientist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number (monument not stamped but marked "decom")	MW-5	No Ecology tag
Well Location	Northing: 195768.60 / Easting: 1275853.22	JF map
Start (date and time)	8/27/13 ~ 0930	
End (date and time)	8/27/13 ~ 0935	
Installation Method	—	
Total Well Depth	18.8 feet bgs	12.3 DTW
Well Diameter	2" inches	
Type of Casing (circle)	(PVC) Stainless Steel Other_____	
Type of Well Screen	PVC Stainless Steel Other_____	
Depth of Screened Interval (ft. bgs)	7-17 feet bgs	
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	(WAC 173-160-460(2) *grout or chip in place*)	
Type of Grout or Chips	Cetco PureGold Medium Chips	
Grout or Chip Volume	~~5/16th of a bag ~40lbs~~ Gallons or Cubic Feet	<1 (partial bag) mmH 8/27
Surface Completion	Concrete	
Drilling Contractor	ESN Northwest	
License Number	29.11	
Signature (Driller)	[signature]	
Signature (~~Engineer or Geologist~~ Env. Scientist)	[signature]	
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number		
	Northing	Easting
Well Location		
Start (date and time)		
End (date and time)		
Installation Method		
Total Well Depth		feet bgs
Well Diameter		inches

Type of Casing (circle)	PVC	Stainless Steel	Other_____
Type of Well Screen	PVC	Stainless Steel	Other_____

Depth of Screened Interval (ft. bgs)		feet bgs
Decommissioning Procedure (circle)	WAC 173-160-460(1) *perforate or overdrill then grout*	
	WAC 173-160-460(2) *grout or chip in place*	
Type of Grout or Chips		
Grout or Chip Volume		Gallons or Cubic Feet
Surface Completion		
Drilling Contractor		
License Number		
Signature (Driller)		
Signature (Engineer or Geologist)		
Additional Information:		

Well Decommissioning Log - Boeing Plant 2

Well Number

	Northing	Easting
Well Location		

Start (date and time)

End (date and time)

Installation Method

Total Well Depth feet bgs

Well Diameter inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips

Grout or Chip Volume Gallons or Cubic Feet

Surface Completion

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

_____

Well Decommissioning Log - Boeing Plant 2

Well Number

	Northing	Easting
Well Location		

Start (date and time)

End (date and time)

Installation Method

Total Well Depth feet bgs

Well Diameter inches

Type of Casing (circle) PVC Stainless Steel Other_____

Type of Well Screen PVC Stainless Steel Other_____

Depth of Screened Interval (ft. bgs) feet bgs

Decommissioning Procedure (circle)

WAC 173-160-460(1) *perforate or overdrill then grout*

WAC 173-160-460(2) *grout or chip in place*

Type of Grout or Chips

Grout or Chip Volume Gallons or Cubic Feet

Surface Completion

Drilling Contractor _____

License Number _____

Signature (Driller) _____

Signature (Engineer or Geologist) _____

Additional Information: _____

_____

_____

_____

MONITORING WELL PL2-JF01AR

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT Boeing - Plant 2
DATE COMPLETED 09 May 2001
DRILLING METHOD 8" OD HSA - GeoTech Explorations
SAMPLING METHOD 2" OD Split Spoon, 140lb Hammer
TOP OF CASING
GROUND SURFACE ELEV
LOGGED BY D. Dinkuhn - WESTON

Depth (ft)	PID Reading (ppm)	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0	1.5	HA			SW	Silty gravelly SAND, (SW), grey, damp, no odor or staining, (fill).
5	0.0	2			SM	Silty fine SAND, (SM), grey, damp, some gravel, very loose, damp, no odor or staining, (fill).
10	1.0	2				Silty fine to medium SAND, (SM), grey, very loose, wet at 11', no odor or sheen, (alluvium).
15	0.0	1				SAA.
20	34.0	15			SW	SAND, (SW), grey, fine to medium grained, wet, no odor or sheen, (alluvium).
25	10.0	12				SAA.
30						

BOH @ 28 feet bgs

Notes:
BOH = Bottom of hole
SAA = Same as above
HA = Hand grab sample
No soil samples were collected for laboratory analysis

Well Construction

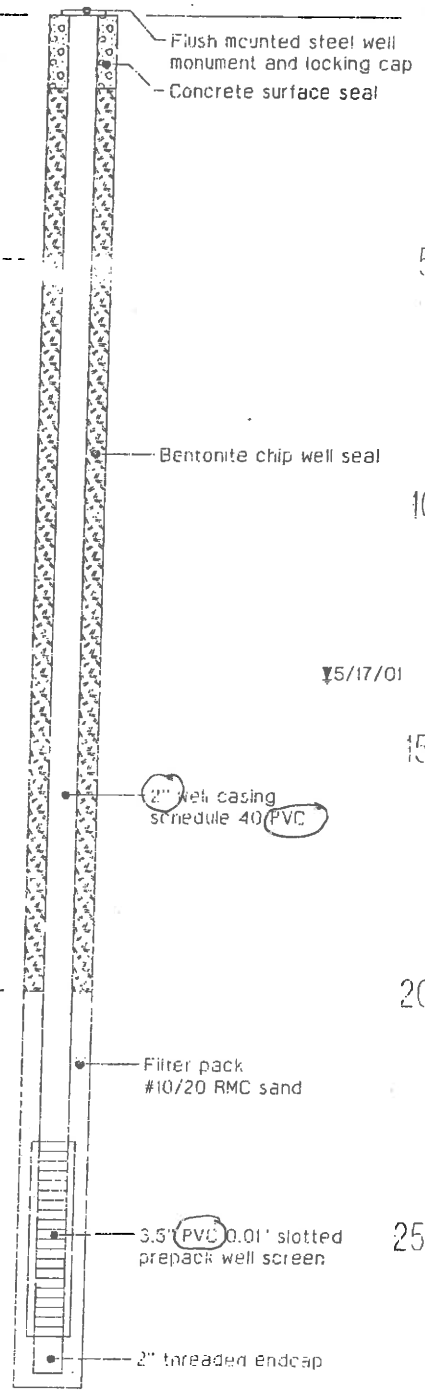


PLATE A-17

JOB NUMBER: 04709-034-600-0002-03
DATE: May 2001

Boring PL2-JF01B

Project	Boeing RFI	Start Date 03/10/95	Finish Date 03/21/95
Location	Plant 2 Seattle, WA	Driller	Drilling Co. PTL
Project No.	03709-034-300	Drilling Method HSA	
Contractor	Weston	Sampling Method 2 in. Split Spoon	
Logged by	Stoopes	Top of Casing (ft) 13.51	Boring Diam. (in) 10
		Ground Surf. Elev. (ft) 13.85	Total Depth (ft) 51.50

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
							GP	Gravel with sand (GP), brown (10YR5/3), 60% angular gravel/slag to 3 in., 40% medium sand, dense, moist.
							SP	Sand (SP), grayish brown (10YR5/2), 100% fine to medium sand, trace pebbles, loose, moist. Silt interbeds with iron oxide staining @ 16 ft.
5					10			
10					4			
15					10			
20					35			

Boring PL2-JF01B

Project Boeing RFI
Location Plant 2 Seattle, WA
Project No. 03709-034-300
Contractor Weston
Logged by Stoopes

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
					32			
					32		ML	Silt with sand (ML), brown (10YR5/3), 80% silt, 20% fine sand, soft, wet.
55								
60								
65								
70								

MONITORING WELL PL2-JF01C

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT Boeing - Plant 2
DATE COMPLETED 9 May 2001
DRILLING METHOD 8" OD HSA - GeoTech Explorations
SAMPLING METHOD 2" OD Split Spoon, 140lb Hammer
TOP OF CASING
GROUND SURFACE ELEV
LOGGED BY D. Dinkuhn - WESTON

Depth (ft)	PID Reading (ppm)	Blows Per Foot	Sample Recovery	Graphic Log	USC Classification	Lithological Description
0					GW	Sandy GRAVEL, (GW), brown, moist, (fill).
5					SP	SAND, (SP), greyish brown, fine to medium grained, trace pebbles, loose to medium dense, damp to wet, silt interbeds, (alluvium).
10						
15						
20						
25						
30						
35						
40						
45						
50					ML	Sandy SILT, (ML), brown, 80% silt, 20% fine sand, wet, (alluvium).
55						
60	0.0	72	X		SW	SAND, (SW), grey, fine to medium grained, wet, no odor or sheen, (alluvium)
65	0.0	64	X			SAA.
70	0.0	51	X			SAA.
75	0.0	33	X		SM	Silty SAND, (SM), grey, fine sand, wet, no odor or sheen, (alluvium).
80	0.0	13	X		ML	Sandy SILT, (ML), grey, fine sand, wet, no odor or sheen, (alluvium).
85						BOH @ 81.5 feet bgs
90						

Notes:
BOH = Bottom of hole
SAA = Same as above.
No soil samples were collected for laboratory analysis.
Lithology for 0 to 60 feet taken from PL2-JF01B log.

Well Construction

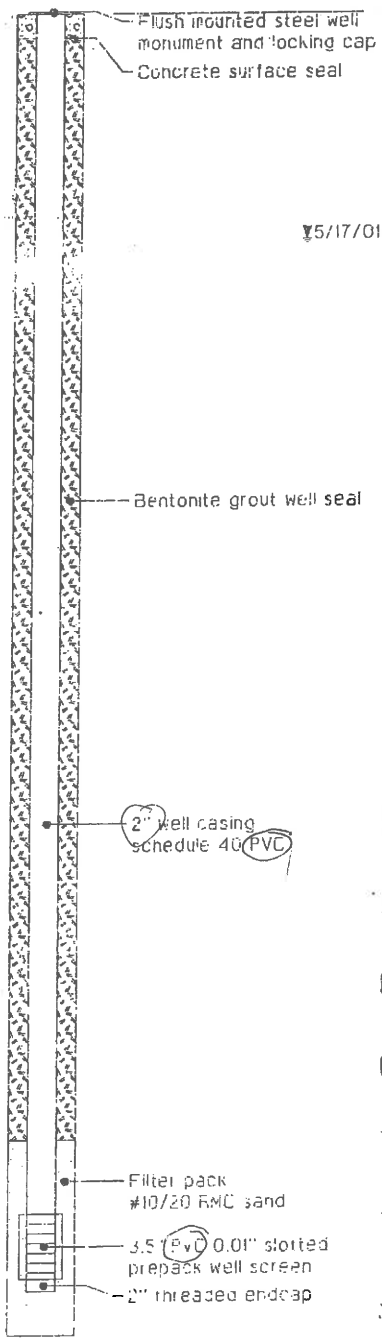


PLATE A-15

JOB NUMBER: 03709-034-000-0002-00
DATE: May 2001

Sheet 1 of 1

Boring PL2-JF02A

Project	Boeing RFI 1C	Start Date 09/21/95	Finish Date 09/21/95
Location	Plant 2 Seattle, WA	Driller	Drilling Co. PTL
Project No.	03709-034-300-3300-	Drilling Method 4 in. ID HSA	
Contractor	Weston	Sampling Method 2" SPT	
Logged by	Lottsfeldt		Boring Diam. (in) 10
			Total Depth (ft) 23.00

Depth (ft)	PID	Lab Analysis	Sample Number	Sample Recovery	Blows/ft	Graphic Log	USCS Code	Lithological Description
							GP	Gravel (GP), very dk gray (10YR3/1), 90% furnace "slag" gravel, 10% sand, damp
							SP	Sand (SP), very dk gray brn (10YR3/2), 100% med sand, loose, dry
5								
10	BKG							
	BKG				50			
							ML	Silt w/sand (ML), very dk gray (10YR3/2), 75% silt, 25% fine sand, soft, wet, blk mottling, trace organics
15								
	BKG				4			
							SP	Sand (SP), very dk gray (10YR3/1), 100% fine to med sand, med dense, wet
20								
	BKG				28			

Boring_id 20136

WAC 173-160-460

What is the decommissioning process for resource protection wells?

(1) For resource protection wells and geotechnical soil borings that were not constructed in accordance with these regulations, or for which a drilling report required under this section is missing, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers, and decommission in one of the following ways:

(a) Perforate the casing from the bottom to land surface and pressure grout the casing.

(i) Perforations shall be at least four equidistant cuts per row, and one row per foot. Each cut shall be at least one and one-half inches long.

(ii) Apply enough pressure to force the sealing material through the perforations, filling any voids on the outside of the casing.

(iii) The remainder of the casing shall be filled with neat cement grout, neat cement, or bentonite slurry; or

(b) Withdraw the casing and fill the bore hole with neat cement grout, neat cement, bentonite or bentonite slurry as the casing is being withdrawn.

(2) For resource protection wells and geotechnical soil borings that were constructed in accordance with these regulations, remove all debris, accumulated sediment, equipment and obstructions from the well casing, except well screens and packers and then decommission in one of the following ways:

(a) Wells with an inside casing diameter equal to or greater than one inch and constructed in accordance with these regulations as verified through a field examination and review of the drilling report shall be decommissioned by filling the casing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement.

(b) Wells with an inside casing diameter less than one inch shall be decommissioned by pressure grouting the entire casing length with bentonite slurry, neat cement grout, or neat cement.

(c) Vibrating wire piezometers installed to meet or exceed the sealing requirements of WAC 173-160-450, 173-160-457, and 173-160-458 are exempt from the decommissioning procedures and decommissioning reporting requirements provided here.

(d) Direct push wells shall be decommissioned in accordance with this section.

(e) Geotechnical soil borings, or boring, shall be decommissioned by sealing from bottom to land surface with bentonite, bentonite slurry, neat cement grout, or neat cement. Sealing material placed below the static water level shall be piped directly to the point of application or placed by means of a dump bailer or pumped through a tremie tube. If bentonite slurry, neat cement grout or neat cement is used to seal below the water level in the well, the material shall be placed from the bottom up by methods that avoid segregation or dilution of the material. When used to place bentonite slurry, neat cement or neat cement grout, the discharge end of the tremie tube shall be submerged in the bentonite slurry, neat cement or neat cement grout to avoid breaking the seal while filling the annular space. Provided the material does not dilute or segregate and the resulting seal is free of voids, sealing material may be hand poured above the static water level.

WAC 173-160-420

What are the general construction requirements for resource protection wells?

(1) No resource protection well or soil boring excavation may be used to withdraw or inject water for domestic, industrial, municipal, commercial, or agricultural purposes.

(2) No resource protection well or soil boring excavation may interconnect aquifers.

(3) Nested resource protection wells are prohibited.

(4) Cuttings, development water, and other investigation derived waste from resource protection well construction or geotechnical soil borings shall be managed in a manner consistent with the intent and purposes of the Water Pollution Control Act, chapter 90.48 RCW, the Hazardous Waste Management Act, chapter 70.105 RCW, and implementing regulations.

(5) Well tagging:

(a) It shall be the driller's responsibility to place a well identification tag with a unique identification number on every resource protection well that they construct or alter within thirty days of completion of the well. Uncased geotechnical soil borings and environmental investigation wells are exempt from the tagging requirements of this chapter.

(i) The alpha-numeric number shall be recorded on the drilling report in the space provided.

(ii) The driller shall remove the well identification tag on all resource protection wells they decommission and shall attach the tag to the decommissioning well report.

(b) It shall be the well owner's responsibility to place a well identification tag with a unique identification number on every resource protection well they own and which was completed prior to the effective date of this regulation.

(i) Upon request, the department shall furnish the well owner with a well tag and tagging instructions.

(ii) The well owner shall tag their well(s) and submit a completed tagging report to the department.

(c) The well tag shall be permanently attached to:

(i) The well casing and be visible above land surface for all wells which have been completed above land surface.

(ii) The well casing or to any permanent and protected portion of the vault for wells completed below land surface.

(iii) A prominent system component visible above land surface for ground source heat pump borings.

(d) All well identification tags shall be supplied by the department.

(e) It is unlawful for a person to tamper with or remove a well identification tag except during well alteration.

(6) All resource protection wells will be sealed in accordance with WAC 173-160-450 regardless of the method of installation. Except, resource protection wells that are properly decommissioned prior to the removal of any drilling equipment from the well location are

exempted from the surface sealing requirements of this chapter. Provided the decommissioning process includes the removal of any conduit, tubing, probe, or other items inserted into the ground.

(7) All geotechnical soil borings shall be decommissioned under the terms of this chapter.

(8) Except as provided in RCW 18.104.180, all construction, alteration, reconstruction, and decommissioning of resource protection wells and geotechnical soil borings shall be done by an individual licensed under the provisions of chapter 173-162 WAC.

(9) A notice of intent to construct or decommission a resource protection well and a geotechnical soil boring shall be filed with the department a minimum of seventy-two hours prior to initiating construction or decommissioning of the well(s) or boring(s). A fee must accompany each notice of intent to construct or decommission a resource protection well.

(a) The fee for a resource protection well, except for an environmental investigation well, a ground source heat pump boring, or a grounding well, is forty dollars for each well.

(b) The fee for an environmental investigation well in which ground water is sampled or measured is forty dollars for the construction of up to four environmental investigation wells per project, and ten dollars for each additional environmental investigation well constructed on a project with more than four wells. There is no fee for soil or vapor sampling purposes.

(c) The fee for a ground source heat pump boring or a grounding well is forty dollars for construction of up to four ground source heat pump borings or grounding wells per project and ten dollars for each additional ground source heat pump boring or grounding well constructed on a project with more than four wells.

(d) The fee to decommission a resource protection well, except for an environmental investigation well, is twenty dollars per well. There is no fee to decommission an environmental investigation well or a geotechnical soil boring.

(e) The fee to decommission a ground source heat pump boring or a grounding well is twenty dollars per well.

(f) Under some circumstances, it may be necessary to construct more resource protection wells or geotechnical soil borings than originally anticipated. When additional resource protection wells are constructed on a site for which a notice of intent and fee were submitted, a second notice and fee shall be submitted within twenty-four hours after all wells have been completed or as soon as the final number of wells to be constructed is determined, whichever is sooner. When additional geotechnical soil borings are needed, the borings may be completed. A follow-up notice of intent shall be submitted to the department within twenty-four hours after all borings are constructed. Notification to construct multiple wells or geotechnical soil borings within the same quarter/quarter section, township, and range may be submitted on one notice form.

(10) Resource protection well reports.

(a) Anyone who constructs or decommissions a well is required to submit a complete well report on the construction or decommissioning of all resource protection wells and geotechnical soil borings. Reports must be submitted to the water resources program within thirty days after completion of construction or decommissioning. Submission of a well report to consulting firms does not meet the requirement of this section. The report must be an accurate summation of data collected in the field taken from field notes written as the well was constructed or decommissioned. Field notes must be available at all times during construction or decommissioning for review by state and local inspectors and kept until the well report is submitted.

(b) The resource protection well report must be made on a form provided by the department, or a reasonable facsimile of the form, as approved by the department.

(c) Where applicable the report shall include the following information:

(i) Owner's name; operator/trainee name; operator/trainee license number; contractor registration number, drilling company name;

(ii) Tax parcel number;

(iii) Well location address;

(iv) Location of the well to at least 1/4, 1/4 section or smallest legal subdivision;

(v) Unique well identification tag number;

(vi) Construction date;

(vii) Start notification number;

(viii) Intended use of well;

(ix) The well depth, diameter, and general specifications of each well;

(x) Total depth of casing;

(xi) Well head elevation;

(xii) Drilling method;

(xiii) Seal material, seal location and type of placement used;

(xiv) Filter pack location; filter pack material used;

(xv) The thickness and character of each bed, stratum or formation penetrated by each well including identification of each water bearing zone;

(xvi) Casing gauge, diameter, stickup, type of material, and length, also of each screened interval or perforated zone in the casing;

(xvii) The depth to the static water level, as measured below the land surface; and

(xviii) Such additional factual information as may be required by the department.

(d) The well report must include one of the following:

(i) The license number and signature of the person who constructed or decommissioned the well;

(ii) The license number and signature of the trainee and the licensed operator under chapter 18.104 RCW; or

(iii) The license number and signature of an exempted individual as defined under RCW 18.104.180(3).

(e) This rule shall allow an individual to submit electronic reports in accordance with department procedures. The use of a digital signature in the electronic reports will be authorized as a substitute for an original signature under (d) of this subsection.

What are the surface protection requirements?

(11) All resource protection wells shall be capped and protected using one of the following methods:

(a) If the well is cased with metal and completed above the ground surface, you must attach a watertight cap with a lock to the top of the casing.

(b) If the well is not cased with metal and completed above the land surface, you must install a protective metal casing over and around the well. The protective casing shall extend at least six inches above the top of the well casing and be cemented at least two feet into the ground. A cap with lock shall be attached to the top of the protective casing.

(12) You shall protect the well(s) completed above ground from damage by:

(a) Cementing three metal posts, at least three inches in diameter, in a triangular array around the casing and at least two feet from it. Each post shall extend at least three feet above and below the land surface.

(b) A reinforced concrete pad may be installed to protect against and prevent frost heave. If installed, the concrete pad shall extend to a depth equal to anticipated frost depth. When a concrete pad is used, the well seal may be part of the concrete pad.

(13) If the well is completed below land surface, a watertight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent the inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The cover must be designed to withstand the maximum expected loading.

(14) The protective measures may be waived or modified upon written approval from the department (a variance).

(15) If the well is damaged, the well protection measures and casing shall be repaired to meet the requirements of this chapter. If the well is damaged beyond repair, it shall be decommissioned in accordance with WAC 173-160-460.