MEMORANDUM

To: Dr. Charles Andrews
S. S. Papadopulos & Associates, Inc.
7944 Wisconsin Avenue
Bethesda, MD 20814

Sarah Prowell, R.G.
Prowell Environmental, Inc.
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Date: July 26, 2012

RE: BOP-43(ds,dg) and BOP-68(usg) Well Decommissioning Work Plan
TSA Remedy, East Multnomah County, Oregon

Introduction

This work plan summarizes plans to decommission groundwater monitoring wells BOP-43(ds,dg) and BOP-68(usg), as part of the Troutdale Sandstone Aquifer (TSA) remedy being implemented under the Department of Environmental Quality's (DEQ's) *Consent Order No. No. WMCSR-NWR-96-08* (DEQ, 1997). The wells are located north of Sandy Boulevard, as shown in Figure 1. The well site is 19000 block NE Sandy Boulevard, Gresham, (Tax Lot No. 1) and is owned by Weston Investment Co., LLC, (Portland Maps, 2012).

BOP-43(ds,dg) were installed in 1992 and are screened in the Upper and Lower TSA subunits. BOP-68(usg) was installed in 1995 and is screened in the upper part of the Sand and Gravel Aquifer (SGA). (See Attachment A for well records.) The wells were proposed for either decommissioning or well head modification on June 13, 2012 (Prowell, 2012) in response to the property owner's plans to grade and develop the site. In its July 11, 2012 email, DEQ indicated its preparedness to approve the decommissionings, pending update of the *2009 TSA Monitoring and Contingency Plan for PWB Pumping Events* (Prowell Environmental and Landau Associates, 2009) to include well BOP-21(ds) as a replacement well for BOP-43(ds)'s previous status as water quality threshold monitoring well. The requested plan update is anticipated to be submitted to DEQ by S. S. Papadopulos & Associates concurrent with this work plan.

As shown in Table 1, volatile organic compounds (VOCs) have remained at consistently compliant levels in each of the BOP-43(ds,dg) and BOP-68(usg) wells for the last five or more years. Trichloroethene (TCE) in Upper TSA well BOP-43(ds) has ranged between non-detectable and 1.4 micrograms per liter (μg/L) during the last five years, compared with the remedy cleanup level of 5 (μg/L). TCE in Lower TSA well BOP-43(dg) and SGA well BOP-68(usg) has remained consistently below method detection limits during this period, as have other VOC constituents of concern for each of the three wells.

Methods

The wells will be decommissioned in accordance with applicable Oregon Administrative Rules (OARs) as outlined in Chapter 690, Division 240 (OAR 690-240), following receipt of property owner approval to proceed.

The following tasks will be completed before work begins:

- Perform below-grade utility survey in the well vicinity to confirm clearance before drilling
- Obtain an OWRD start card for well decommissioning, per OAR-690-240-0385
- Measure the well for total depth and depth to groundwater.

The wells will be decommissioned using either overdrill or in situ methods, pending review and method approval by the Oregon Water Resource Department. All work will be performed by an Oregon-licensed drilling contractor under the oversight of Prowell Environmental. DEQ will be notified of the final selected contractor and approved method(s) before work begins.

Overdrill Decommissioning. It is anticipated that Upper TSA well BOP-43(ds) will be decommissioned using overdrill methods, per OAR-690-240-0510(1), based on the presence of compliant but detectable levels of TCE in groundwater samples collected from this well. As shown in the well log (Attachment A), the borehole intercepts the TGA, CU1, and TSA sandstone and the well was constructed as follows:

- 8-inch diameter borehole from ground surface to 90 feet (ft)
- 6-inch step-down borehole diameter from 90 to 155.6 ft
- 2-inch PVC screen from 136 to 155.6 feet
- Sand filter pack from approximately 133 to 155.6 ft
- Bentonite chip seal from approximately 130 to 133 ft; bentonite grout seal from approximately 35 to 130 ft; bentonite chip seal from approximately 130 to 2 ft.
- Above-grade surface completion.

. Decommissioning methods are anticipated to include:

- Removing the above-grade well-head casing, stanchions, and concrete pad
- Overdrilling the wellbore using a minimum 8-inch diameter borehole from ground surface to 90 ft; and drilling a minimum 6-inch diameter borehole from 90 ft to total well depth (155.6 ft), removing original well construction materials from the hole.
- Bailing and cleaning out the borehole to remove residual debris
- Measuring the borehole depth and estimating the downhole seal volume
- Injecting a high solids bentonite grout slurry (per OAR-690-240-0475) through a tremie pipe, filling the borehole from the bottom upward to within approximately 1 foot of ground surface
- Containing all well construction debris in labeled, sealed, DOT-approved 55-gallon drums

In situ Decommissioning. Based on the absence of detectable VOCs in BOP-43(dg) and BOP-68(usg), inquiries will be made with OWRD with regards to possible in situ decommissioning. If approved by OWRD, the wells will be decommissioned by injecting a high solids bentonite grout (per OWR-690-240-0475) through a tremie pipe lowered inside the well casing to the bottom of the well, as described above. If overdrill decommissioning is required for these wells, the overdrill methods above will be used, as applicable to the specific borehole depths and diameters for each well.

Site Cleanup and Waste Management. Upon completion, the drill site will be cleared and restored to pre-decommissioning condition. All drummed waste cuttings and deconstruction debris will be transported to Cascade's remediation yard for interim staging, waste characterization, permitting, and transport to an appropriately licensed disposal facility. Above-grade well completion debris will be managed as construction debris and will be transported from the site for appropriate disposal.

Well Decommission Reporting. Upon completion of the well decommissioning, the drilling contractor will prepare and submit an abandonment report to the OWRD, per OAR-690-240-0510(6). A memorandum of well decommissioning completion will also be submitted to the DEQ and Weston Investment Co., LLC, as owner, documenting the work performed.

Schedule

Pending receipt of DEQ's approval to proceed and driller availability, the above described decommissionings are anticipated to occur in August or September. Completion reporting is anticipated to be submitted to DEQ within approximately 1 month of work completion.

References

Department of Environmental Quality, 2012. Email to S. Prowell, Prowell Environmental *Re: TSA Remedy: BOP-43(ds,dg) and BOP-68(usg) property owner's requests*. July 11.

Department of Environmental Quality, 1997. *Order on Consent to The Boeing Company and Cascade Corporation, Troutdale Sandstone Aquifer*. Oregon Department of Environmental Quality No. WMCSR-NWR-96-08, with amendments. February 5.

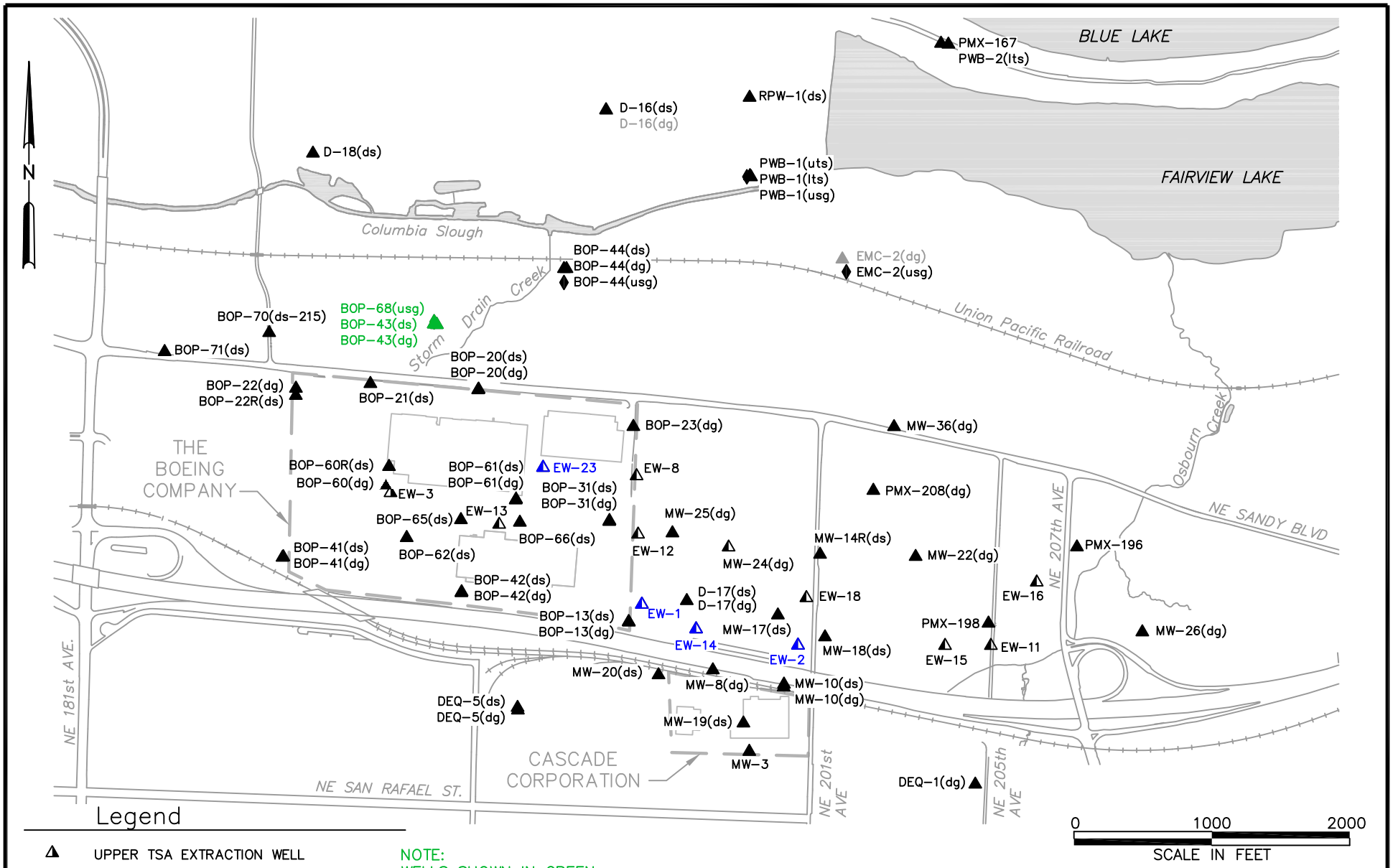
Portland Maps, 2012. www.portlandmaps.com.

Prowell Environmental, 2012. Email to R. Williams, DEQ, *Re: TSA Remedy: BOP-43(ds,dg) and BOP-68(usg) property owner's request.* June 13.

Memorandum enclosures:

Figure 1. BOP-43(ds,dg) & BOP-68(usg) Well Locations
Attachment A. Well Logs

cc: John Cushing, Cascade Corporation
Ken Chaput, The Boeing Company
Chris Kimmel, Landau Associates



Legend

- UPPER TSA EXTRACTION WELL
- LOWER TSA EXTRACTION WELL
- TSA MONITORING WELL
- SGA MONITORING WELL
- CU2 MONITORING WELL

NOTE:
WELLS SHOWN IN GREEN
PROPOSED FOR DECOMMISSIONING

NOTES:
WELLS SHOWN IN GRAY MONITORED ONLY DURING PWB PUMPING EVENTS LASTING >30 DAYS.

OPERATING EXTRACTION WELLS SHOWN IN BLUE.

Figure 1
BOP-43(ds,dg) & BOP-68(usg) Well Locations
TSA Remedy – East Multnomah County

Y:\Prowell Environmental\Cascade\TSA Decommissionings\2012\Figure1.dwg 7/26/12

Table 1
BOP-43(ds,dg) and BOP-68(usg) VOC Concentrations
TSA Remedy - East Multnomah County

Well Name	Sample Date	PCE		TCE		cDCE		VC	
		(µg/L)	L	(µg/L)	L	(µg/L)	L	(µg/L)	L
TSA Remedy Cleanup Level and EPA Drinking Water MCL[a]		**5**		**5**		**70**		**2**	
BOP-43(ds)	2/9/2006	0.5	U	0.65		0.5	U	0.5	U
BOP-43(ds)	8/16/2006	0.5	U	1.4		0.5	U	0.5	U
BOP-43(ds)	11/6/2006	0.5	U	0.90		0.5	U	0.5	U
BOP-43(ds)	2/13/2007	0.5	U	0.89		0.5	U	0.5	U
BOP-43(ds)	8/6/2007	0.5	U	1.2		0.5	U	0.5	U
BOP-43(ds)	2/7/2008	0.5	U	0.93		0.5	U	0.5	U
BOP-43(ds)	8/11/2008	0.5	U	1.2		0.5	U	0.5	U
BOP-43(ds) Dup	8/11/2008	0.5	U	1.2		0.5	U	0.5	U
BOP-43(ds)	8/13/2009	0.5	U	0.87		0.5	U	0.5	U
BOP-43(ds) Dup	8/13/2009	0.5	U	0.87		0.5	U	0.5	U
BOP-43(ds)	8/10/2010	0.5	U	0.67		0.5	U	0.5	U
BOP-43(ds) Dup	8/10/2010	0.5	U	0.64		0.5	U	0.5	U
BOP-43(ds)	8/8/2011	0.5	U	0.72		0.5	U	0.5	U
BOP-43(ds) Dup	8/8/2011	0.5	U	0.74		0.5	U	0.5	U
BOP-43(dg)	8/16/2006	0.5	U	0.5	U	0.5	U	0.5	U
BOP-43(dg)	8/16/2007	0.5	U	0.5	U	0.5	U	0.5	U
BOP-43(dg)	8/11/2008	0.5	U	0.5	U	0.5	U	0.5	U
BOP-43(dg)	8/13/2009	0.5	U	0.5	U	0.5	U	0.5	U
BOP-43(dg)	8/8/2011	0.5	U	0.5	U	0.5	U	0.5	U
BOP-68(usg)	8/16/2006	0.5	U	0.5	U	0.5	U	0.5	U
BOP-68(usg)	8/16/2007	0.5	U	0.5	U	0.5	U	0.5	U
BOP-68(usg)	8/11/2008	0.5	U	0.5	U	0.5	U	0.5	U
BOP-68(usg)	8/13/2009	0.5	U	0.5	U	0.5	U	0.5	U
BOP-68(usg)	8/8/2011	0.5	U	0.5	U	0.5	U	0.5	U
Total Wells: 3									

NOTES:

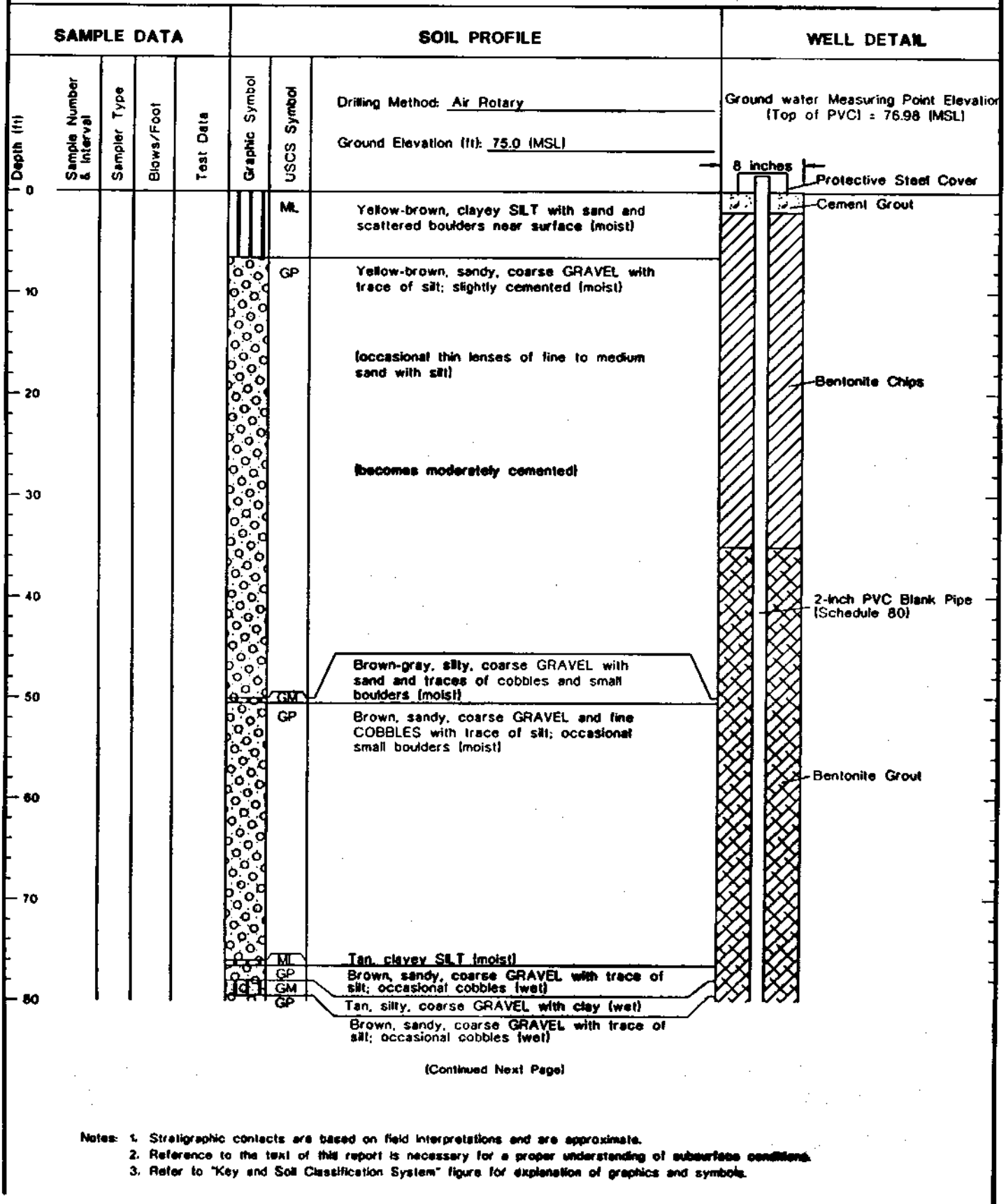
[a] TSA Remedy cleanup levels are EPA drinking water Maximum Contaminant Levels, as identified in TSA Record of Decision (DEQ, 1996).

PCE = tetrachloroethene; TCE = trichloroethene; cDCE = cis-1,2-dichloroethene; VC = vinyl chloride.

µg/L = micrograms per liter; L = laboratory qualifier; U = compound was analyzed, but not detected at posted detection limit.

ATTACHMENT A. Well Logs

BOP-43(ds)



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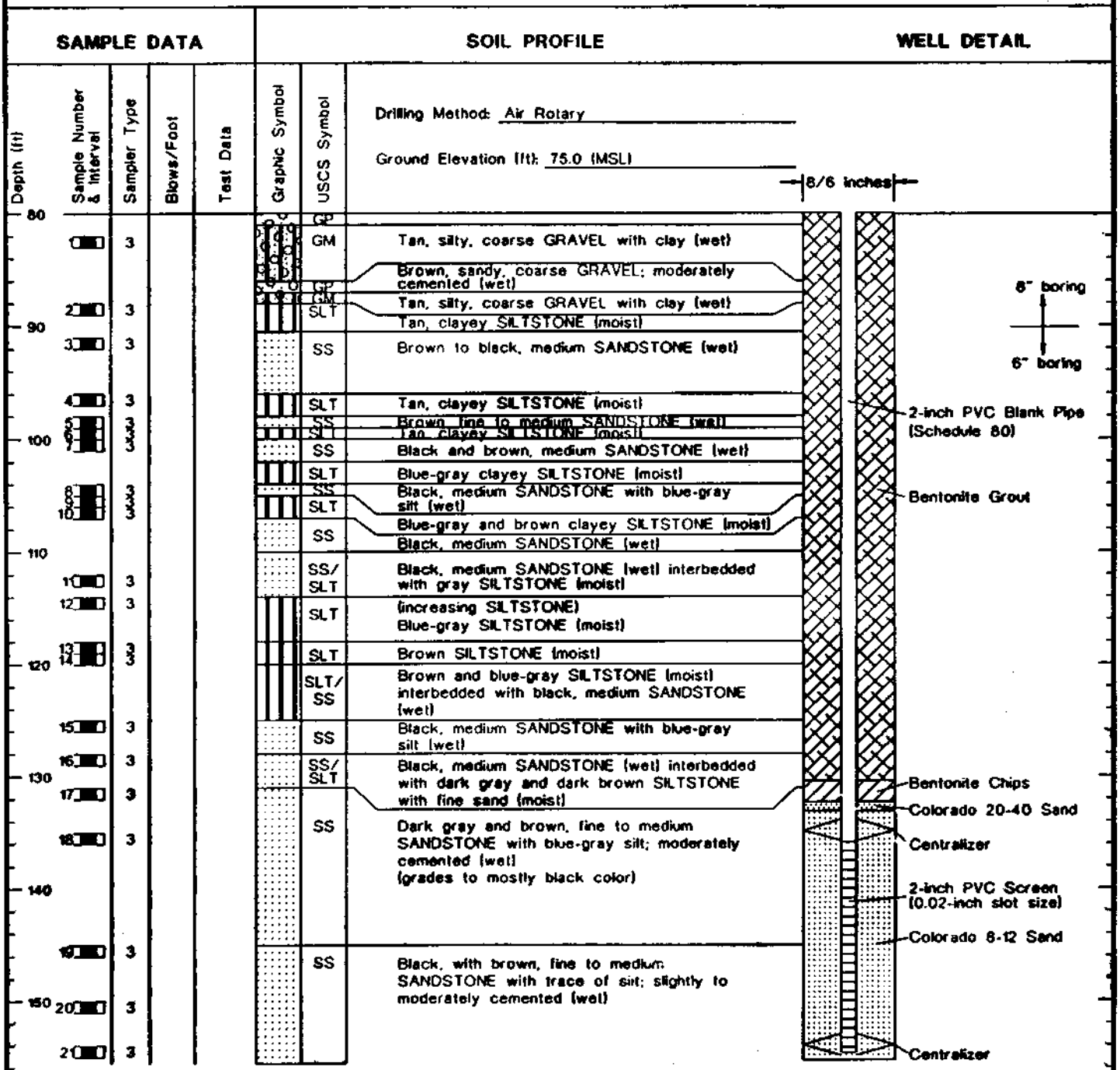
Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Key and Soil Classification System" figure for explanation of graphics and symbols.

Log of Boring and Monitoring Well BOP-43(ds) | Figure C-3

BOP-43(ds) (Continued)



Boring Completed = 4/20/92
Total Depth = 155.6 ft

Well Completed = 4/22/92

Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate.
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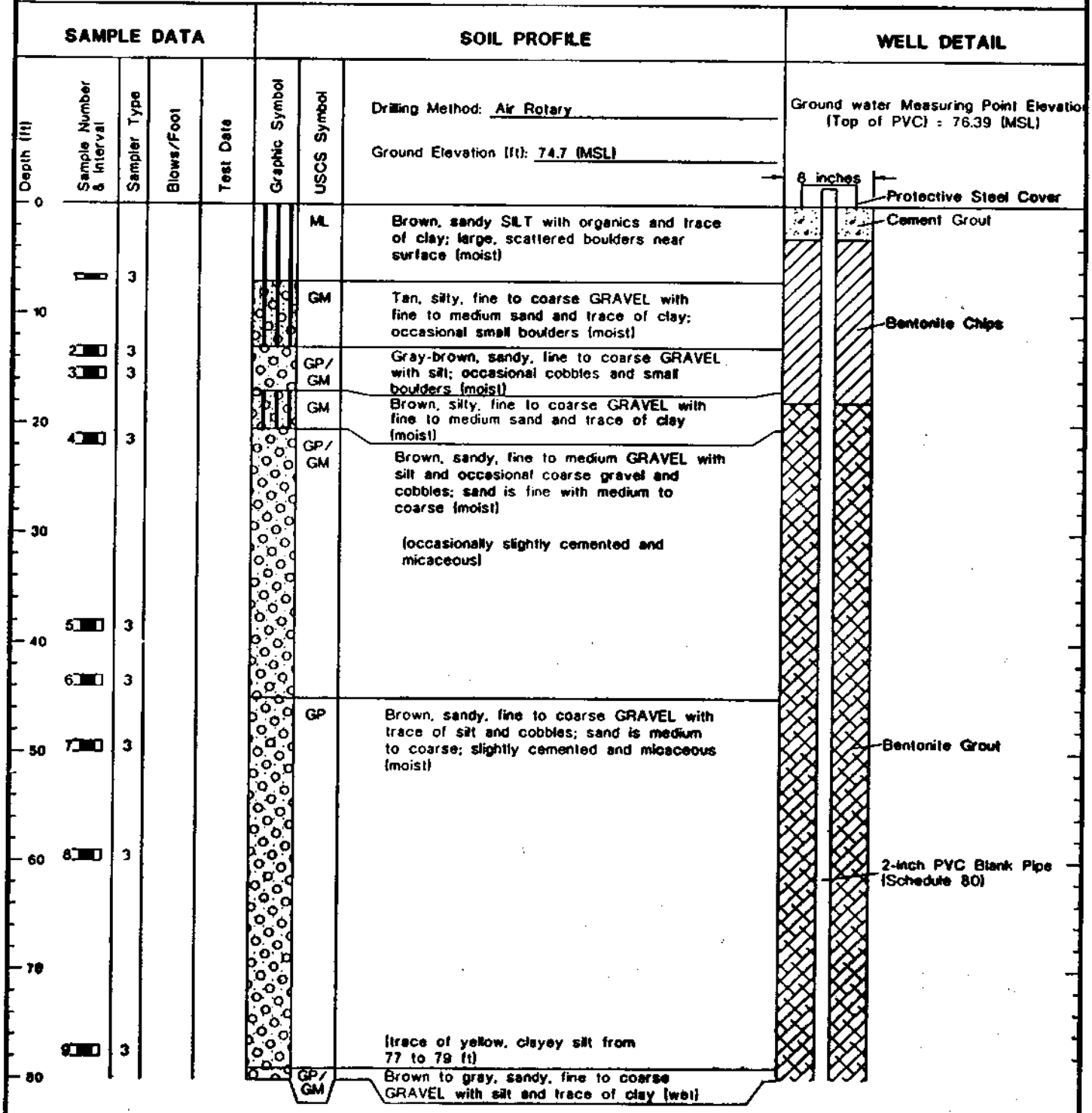
250110.11 Boeing Portland/Phase II Investigation/C292 Status Report 1992

Log of Boring and Monitoring Well BOP-43(ds) | Figure C-3

BOP-43(dg)



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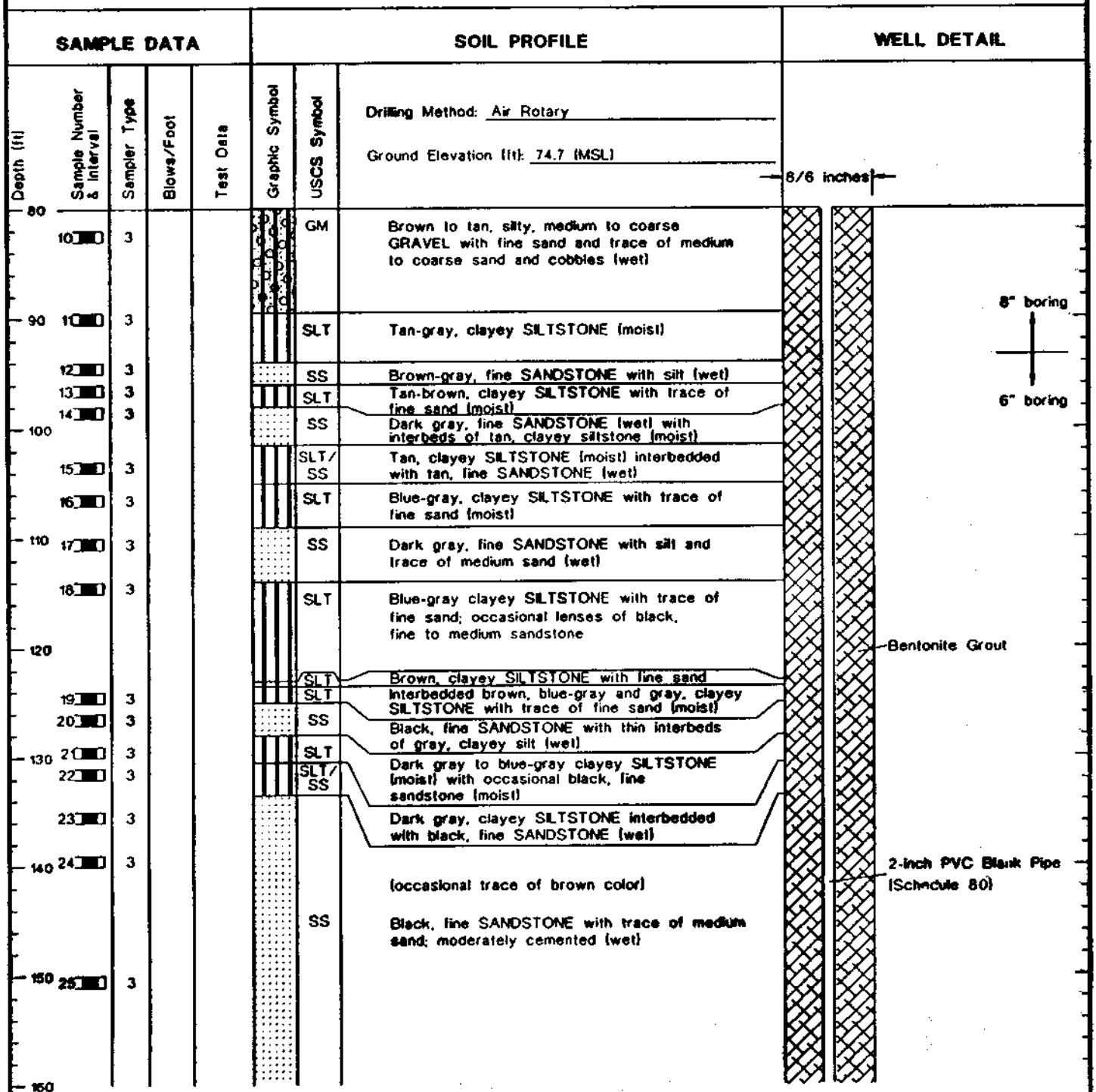
Log of Boring and Monitoring Well BOP-43(dg) | Figure C-2

BOP-43(dg) (Continued)



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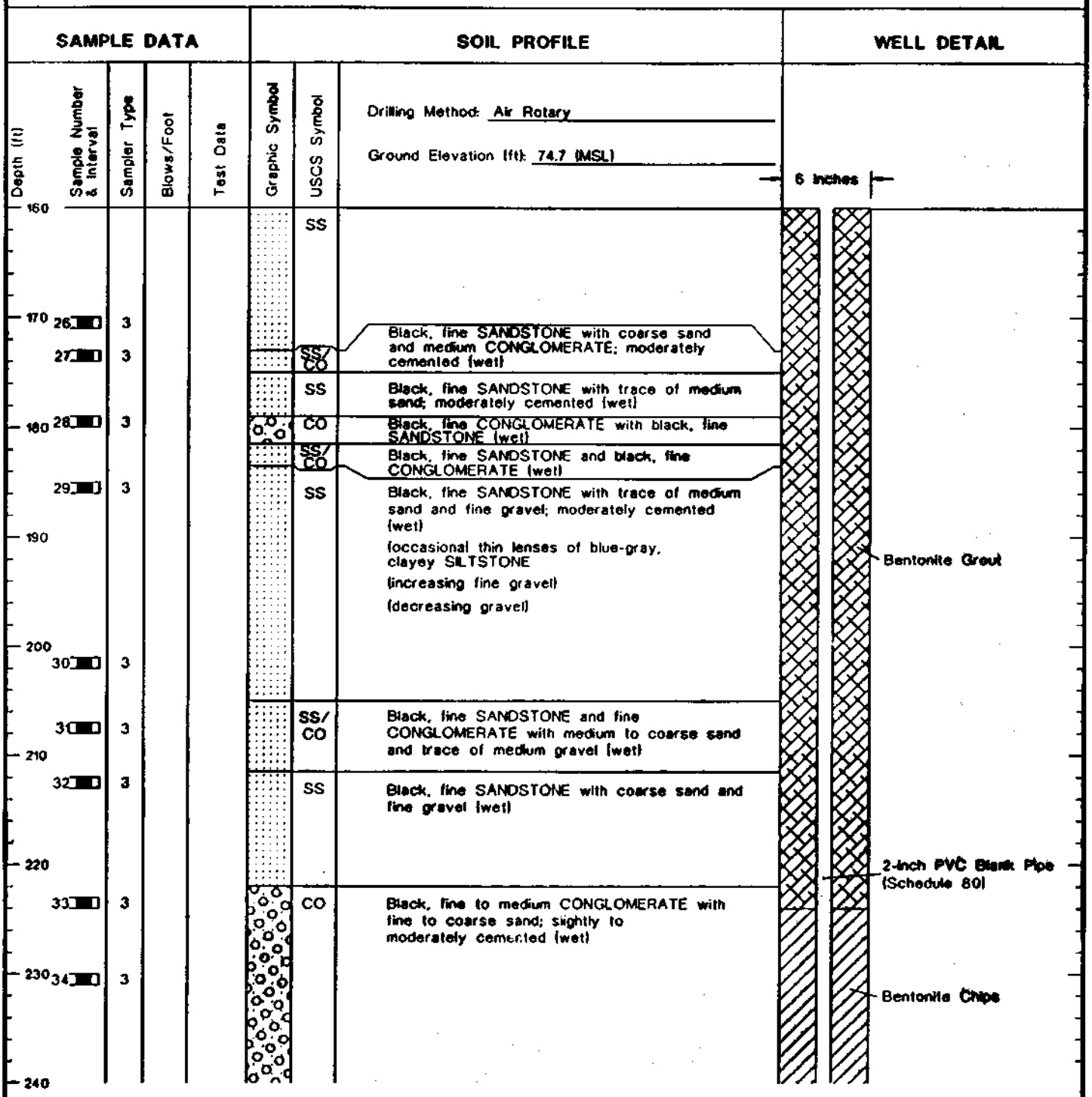
Log of Boring and Monitoring Well BOP-43(dg) | Figure C-2

BOP-43(dg) (Continued)



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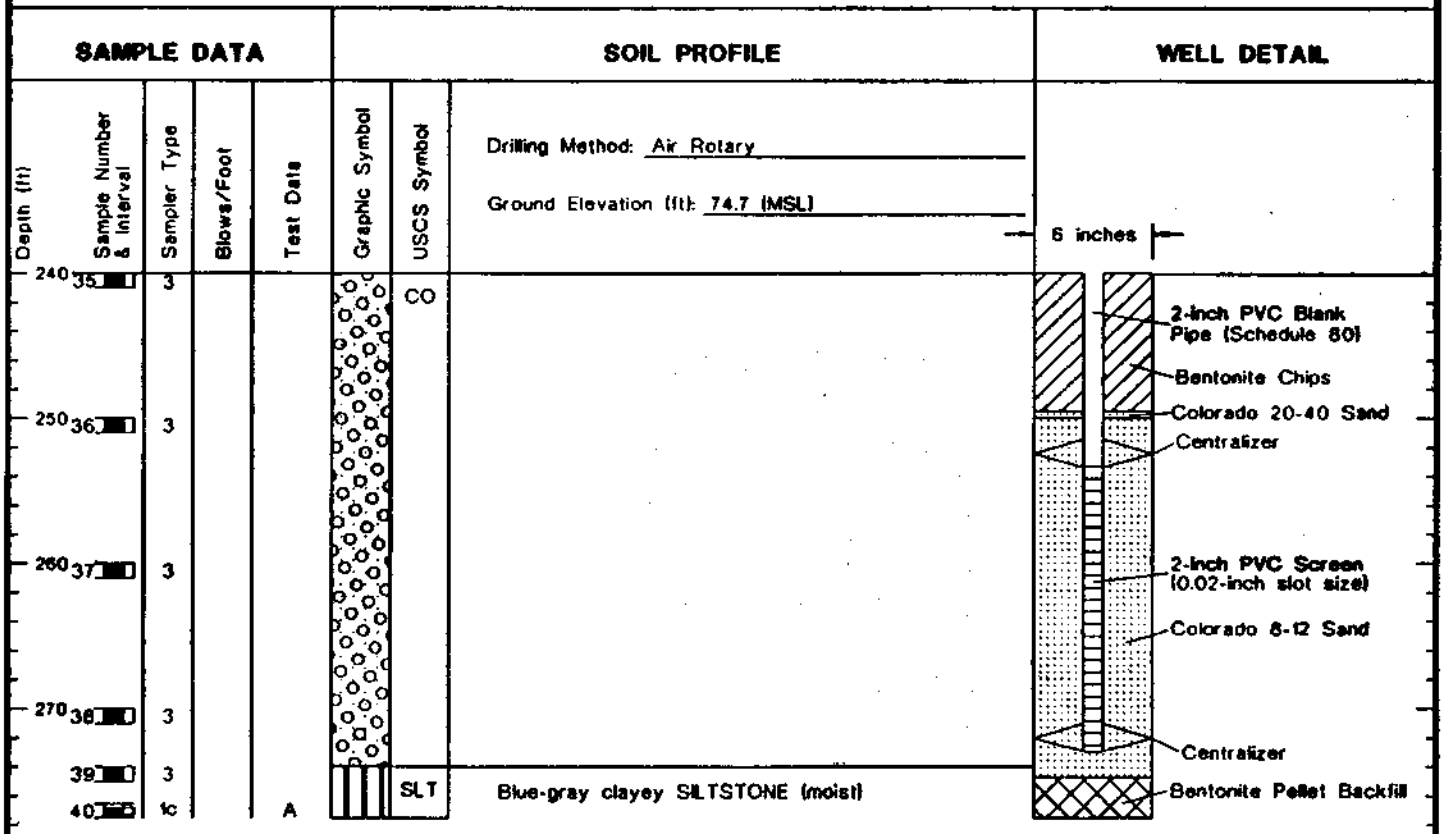
Log of Boring and Monitoring Well BOP-43(dg) | Figure C-2

BOP-43(dg) (Continued)



Boring Completed = 4/10/92
Total Depth = 277.5 ft

Well Completed = 4/17/92

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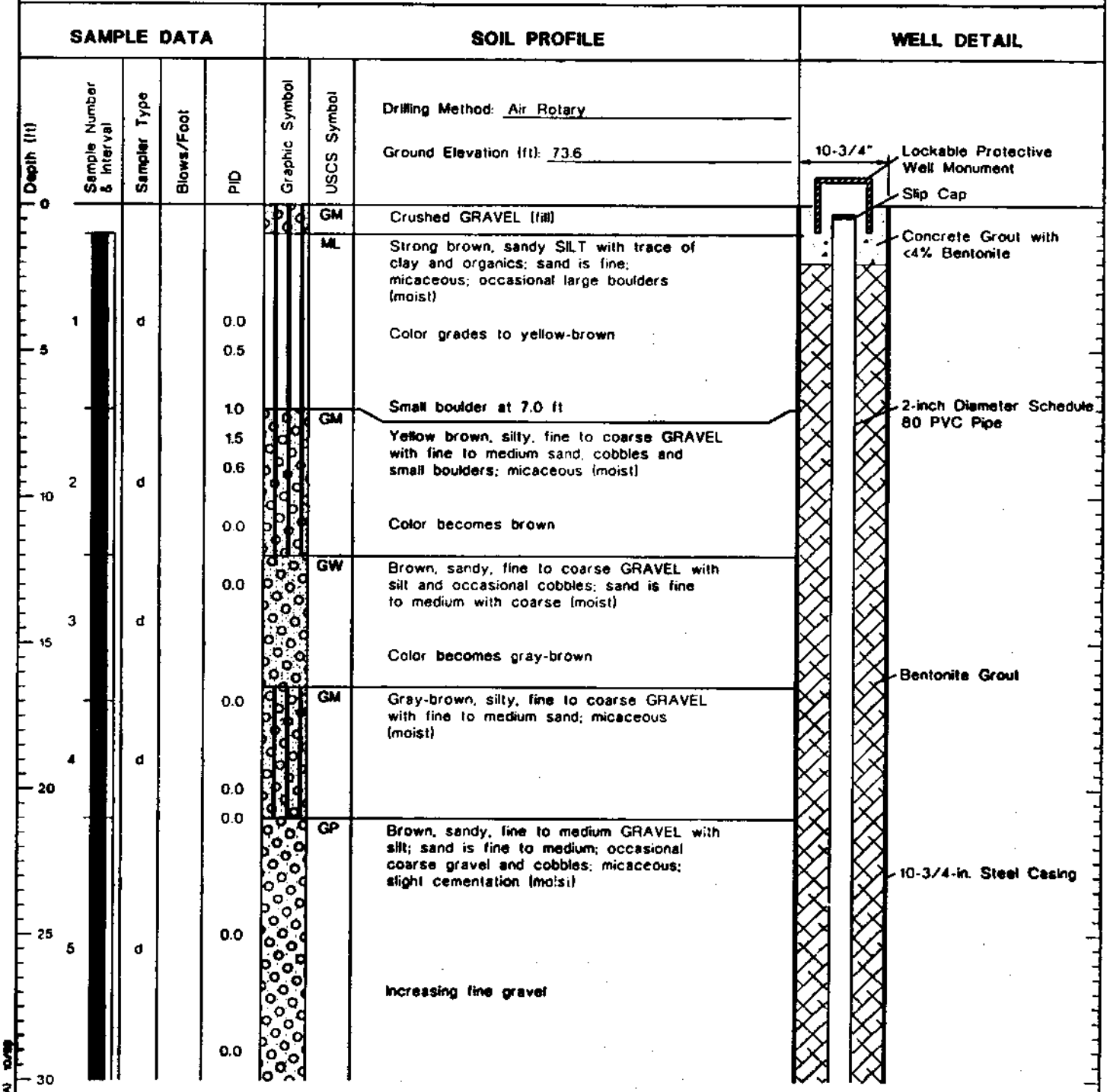
3. Refer to "Key and Soil Classification System" figure for explanation of graphics and symbols.

250110.11 Boring Portland/Phase II Investigation/0292 Status Report 9/92

Log of Boring and Monitoring Well BOP-43(dg) | Figure C-2

BOP-68(usg) Preliminary



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Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate. Refer to the text for an explanation of subsurface conditions.
2. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

Boring and Monitoring Well BOP-68(usg)

Figure A-1 (1 of 12)

BOP-68(usg) Preliminary

SAMPLE DATA				SOIL PROFILE			WELL DETAIL
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID	Graphic Symbol	USCS Symbol	
30				0.0		GP	Drilling Method: Air Rotary Ground Elevation (ft): 73.6 10-3/4"
35	5	d		0.0			Color grades to gray-brown with decreasing sand and silt 2-inch Diameter Schedule 80 PVC Pipe
40				0.0		GW	Brown-gray, sandy, fine to coarse GRAVEL with silt; sand is fine to medium; micaceous; strong cementation (moist)
45				0.0		GW	Yellow-brown, sandy, fine to coarse GRAVEL with trace of silt; sand is fine with trace of medium to coarse; slightly micaceous; occasional cobbles and small boulders; slight to moderate cementation (moist) Bentonite Grout
50	6	d		0.0			Increasing silt
55				0.0			10-3/4-in. Steel Casing
60	7	d		0.0			Color becomes gray-brown

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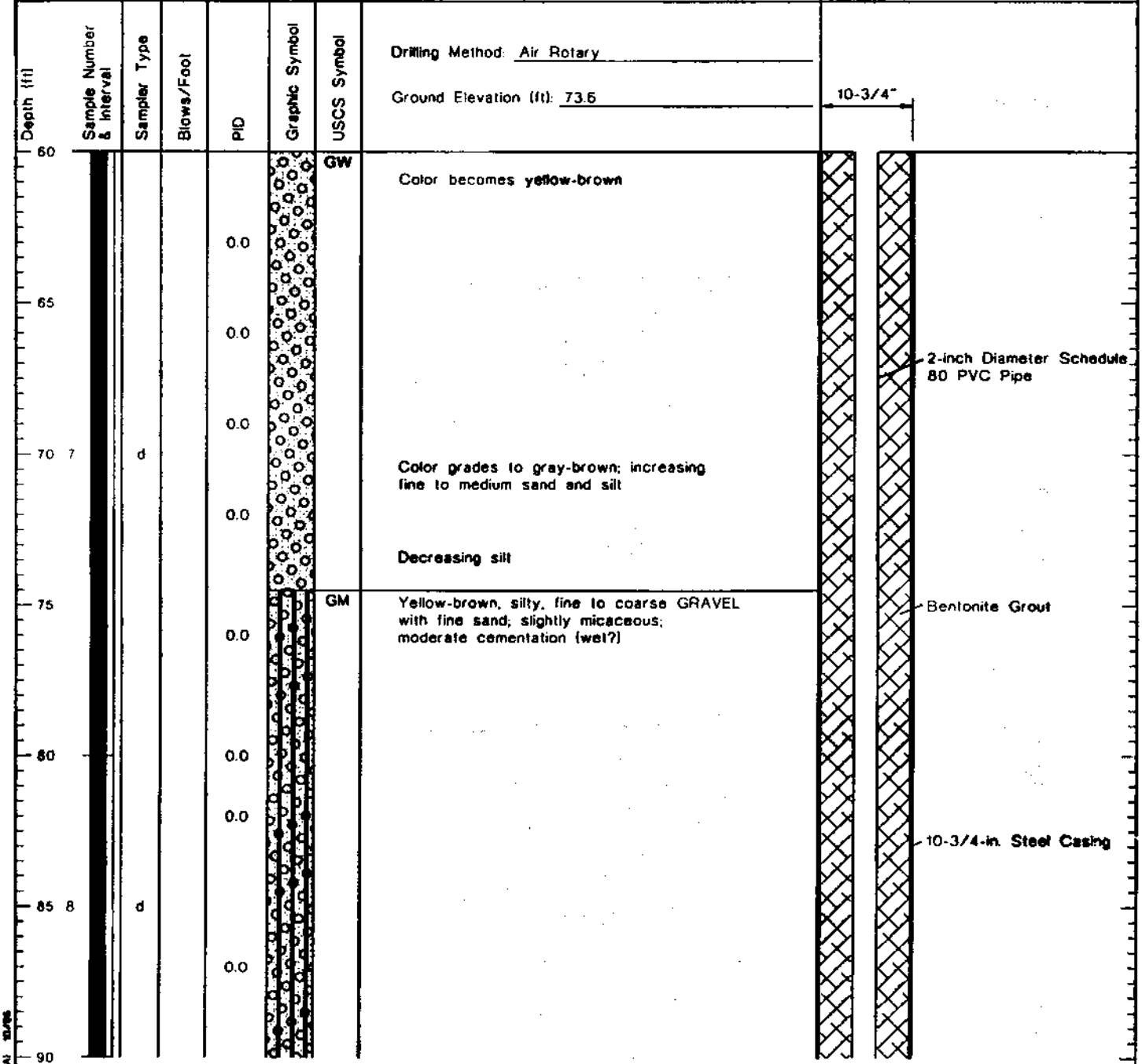
BOP-68(usg) Preliminary



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Boring and Monitoring Well BOP-68(usg)

Figure A-
(3 of 12)

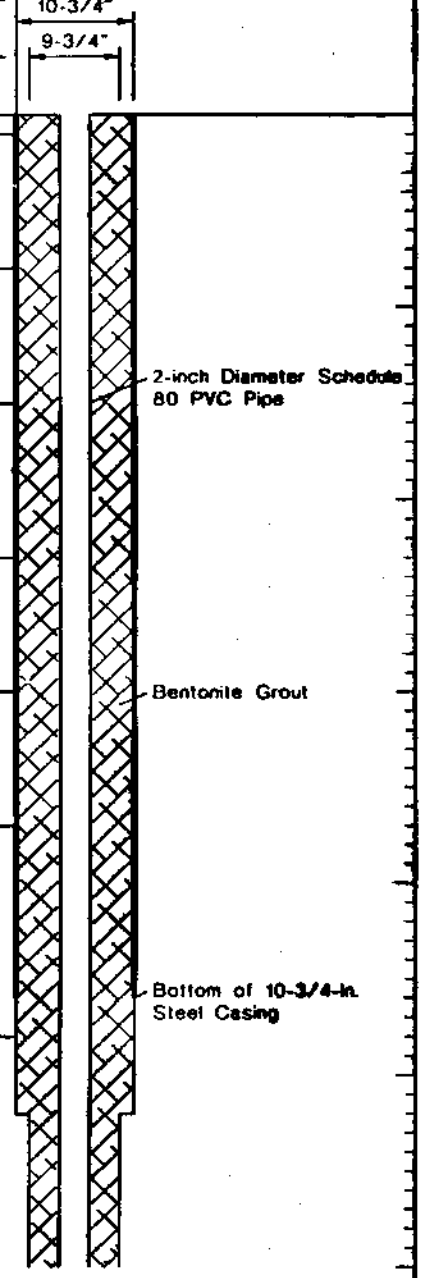
BOP-68(usg) Preliminary

Drilling Method: Air Rotary

Ground Elevation (ft): 73.6

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID	Graphic Symbol	USCS Symbol	SOIL PROFILE
90						GM	
						SLT	Red-brown to yellow-brown, clayey SILTSTONE with trace of fine sand (moist)
	9	d		0.0			
95						SS	Yellow-brown, fine to medium SANDSTONE with silt; moderate cementation (wet)
	10	d		0.0			
						SLT	Dark yellow-brown, clayey SILTSTONE with trace of fine sand; slightly micaceous (moist)
100	11	d		0.0			Thin (<1 ft.), dark gray SANDSTONE bed at 100 ft.
				0.0			
						SLT	Light olive-brown, clayey SILTSTONE with very thin interbeds (<1/4-in) of fine sand; slightly micaceous (moist)
	12	d					
105				0.0		SLT	Dark green-gray, clayey SILTSTONE with trace of fine sand; micaceous (moist)
	13	d		0.0			
						SS	Dark gray-brown, silty, fine SANDSTONE with trace of medium sand; strong cementation (wet?)
110							
	14	d					
	15	a2	150 / 3"	0.0		SLT	Green-gray, clayey SILTSTONE with trace of fine sand; slightly micaceous (moist)
115				0.0			
	16	d					
120							

WELL DETAIL



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Notes:
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2. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

Boring and Monitoring Well BOP-68(usg)

Figure A-(4 of 12)

BOP-68(usg) Preliminary

SAMPLE DATA | **SOIL PROFILE** | **WELL DETAIL**

Drilling Method: Air Rotary

Ground Elevation (ft): 73.6

Well borehole diameter: 9-3/4"

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID	USCS Symbol	Description
120	16	d			SLT	Occasional very thin interbeds (<2-in) of dark gray, fine to medium sandstone
				0.0	SLT	Dark brown, clayey SILTSTONE interbedded with dark gray-brown, clayey SILTSTONE with trace of fine sand; micaceous; occasional very thin interbeds (<2-in) of dark gray, fine sandstone (moist)
125	17	d				
				0.0	SLT SS	Very dark gray and dark blue-gray, clayey SILTSTONE interbedded with black, fine SANDSTONE (moist)
130	18	d				Decreasing siltstone interbeds
				0.0	SS	Black, fine SANDSTONE with trace of medium sand; non micaceous; strong cementation (wet)
135						
140					SS	Black and very dark brown, fine SANDSTONE with trace of silt and medium sand; moderate to strong cementation (wet)
	19	d		0.0		
				0.0		Becomes slightly cemented
145						Becomes more black in color
				0.0		
150						

Well detail: 2-inch Diameter Schedule 80 PVC Pipe; Bentonite Grout

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Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate. Refer to the text for an explanation of subsurface conditions.
2. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

Boring and Monitoring Well BOP-68(usg)

BOP-68(usg) Preliminary

SAMPLE DATA				SOIL PROFILE			WELL DETAIL
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID	Graphic Symbol	USCS Symbol	
150				0.0		SS	Drilling Method: Air Rotary Ground Elevation (ft): 73.6
	19	d					9-3/4"
				0.0			Becomes moderately cemented
155							Occasional brown color
160						SS	Black and dark brown, fine to medium SANDSTONE with trace of silt and coarse sand; moderate to strong cementation (wet)
				0.0			
	20	d					
165				0.0			
170							
				0.0			Sand becomes fine with trace of medium sand
						SS	Black, fine SANDSTONE with fine gravel and trace of silt and medium sand; moderate cementation (wet)
175						SS	Black, fine SANDSTONE with trace of silt, medium sand and fine gravel; moderate cementation (wet)
	21	d		0.0			
						CO	Black, fine CONGLOMERATE with fine to medium sand and trace of silt; moderate cementation (wet)
180							

2-inch Diameter Schedule 80 PVC Pipe

Bentonite Grout

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2. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

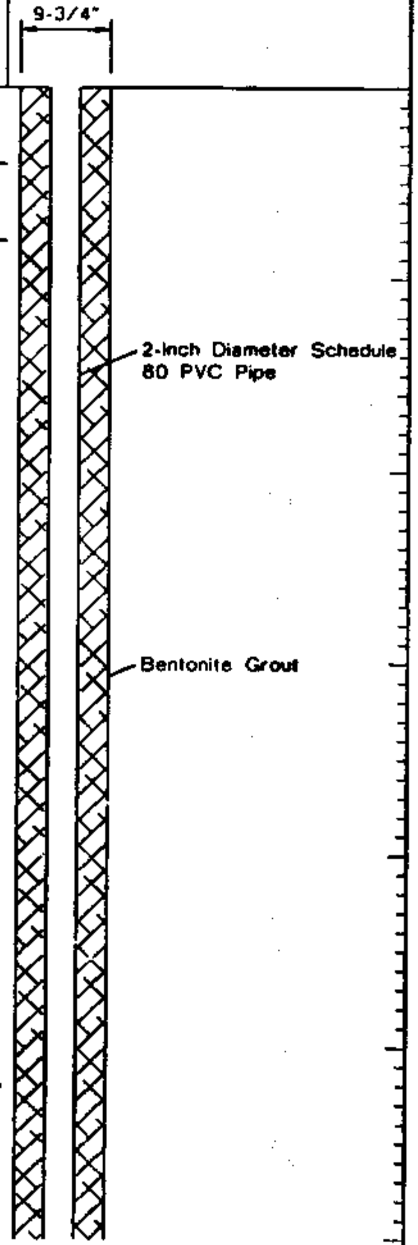
BOP-68(usg) Preliminary

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Profile
180						CO	
	21	d					
				0.0		SS	Black, fine to medium SANDSTONE with fine gravel and trace of silt; moderate cementation (wet)
185						SS	Black, fine SANDSTONE with trace of silt, medium sand and fine gravel; moderate cementation (wet)
				0.0			
				0.0			
190				0.0			
				0.0			
195	22	d					
				0.0			Sand becomes very dark-brown color
							Increasing silt
200				0.0			Becomes strongly cemented
				0.0			Occasional very thin interbeds (<2-in) of blue-gray and yellow-brown silt
205							Increasing pale-olive silt
						SS	Black, fine to medium SANDSTONE with fine gravel and trace of silt and coarse sand; moderate cementation (wet)
	23	d					
				0.0			
210							

Drilling Method: Air Rotary

Ground Elevation (ft): 73.6

WELL DETAIL



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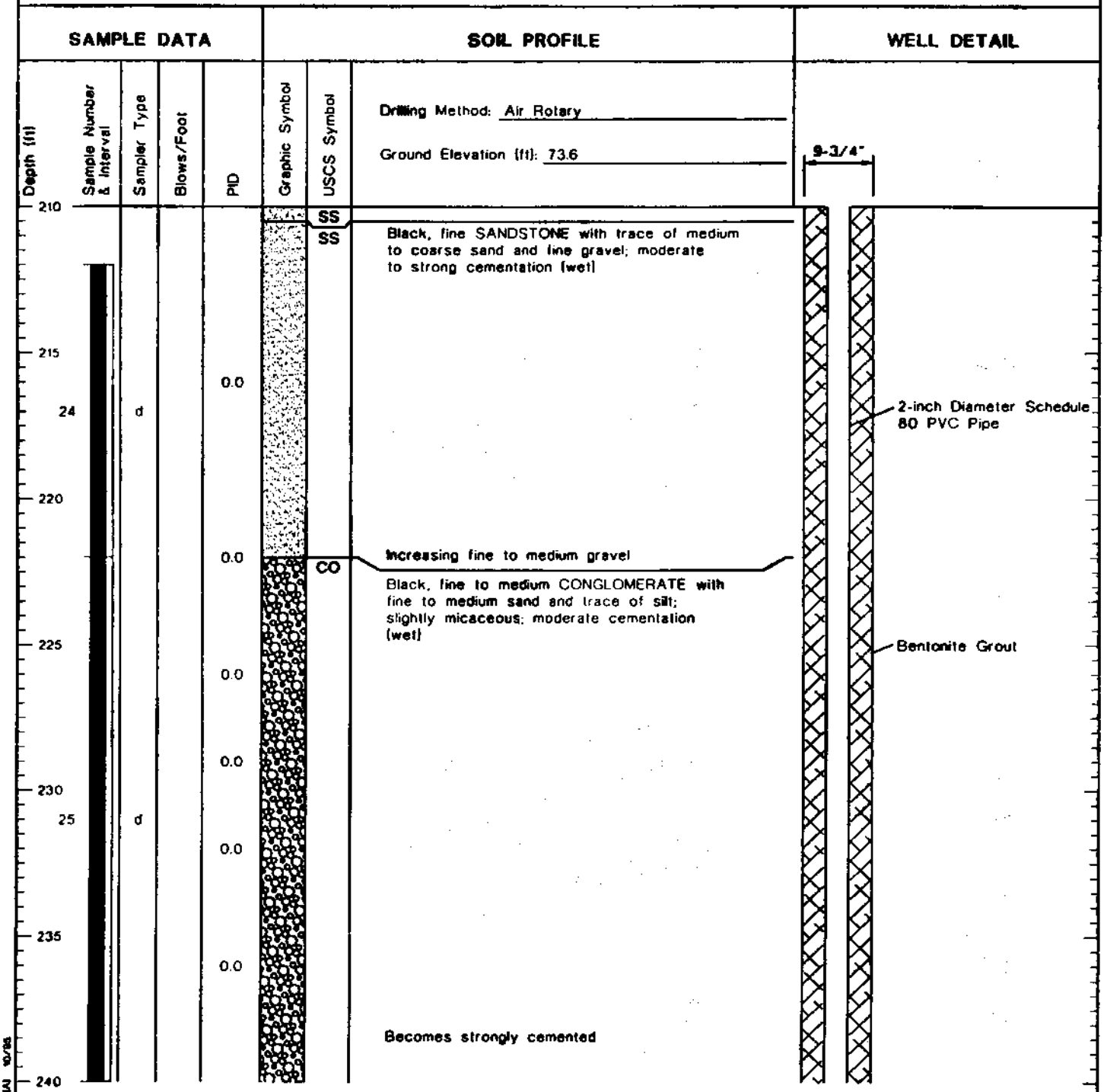
BOP-68(usg) Preliminary



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Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate. Refer to the text for an explanation of subsurface conditions.
2. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

BOP-68(usg) Preliminary

SAMPLE DATA				SOIL PROFILE			WELL DETAIL
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID	Graphic Symbol	USCS Symbol	
240				0.0		CO	Black, fine to medium CONGLOMERATE with fine to medium sand and trace of silt; slightly micaceous; moderate cementation (wet)
245				0.0			
	26	d		0.0			
250				0.0			
255				0.0			
260				0.0			
	27	d		0.0			
265				0.0			
270							

Drilling Method: Air Rotary

Ground Elevation (ft): 73.6

9-3/4"

2-inch Diameter Schedule 80 PVC Pipe

Bentonite Grout

(Continued Next Page)

Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate. Refer to the text for an explanation of subsurface conditions.
2. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

BOP-68(usg) Preliminary

SAMPLE DATA

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID
270				
				0.0
	27	d		
				0.0
275				
	28	a2	189	0.0
	29	f		
				0.0
280				
	30	f		
				0.0
	31	f		
285				0.0
	32	f		
				0.0
290				
	33	f		
				0.0
	34	f		
295				
	35	f		
				0.0
	36	f		0.0
300				

SOIL PROFILE

Drilling Method: Air Rotary

Ground Elevation (ft): 73.6

USCS Symbol	Description
CO	Black, fine to medium CONGLOMERATE with fine sand and trace of silt and medium sand, slightly micaceous; moderate cementation (wet)
SLT	Dark blue-gray, clayey SILTSTONE with trace of fine sand; micaceous; occasional very thin interbeds (<1/2-in) of fine, sandy, clayey silt (moist)
SLT	Dark green-gray, clayey SILTSTONE with fine sand; micaceous (moist)
SLT	Green-gray, sandy SILTSTONE with clay; sand is fine; very micaceous (moist)
SLT	Green-gray SILTSTONE with clay and fine sand; very micaceous (moist)
SS	Olive-gray silty fine SANDSTONE with trace of clay mottled with green-gray SILTSTONE; very micaceous; occasional organic material (?) (moist)
SLT	Green-gray mottled with blue-gray, fine, sandy SILTSTONE with trace of clay, micaceous (moist)
SLT	Green-gray, sandy SILTSTONE with trace of clay; sand is fine; very micaceous (moist) Decreasing fine sand Occasional organic materials (?)
SLT	Green-gray, mottled with very dark gray, clayey SILTSTONE with fine sand; micaceous; occasional very thin (<1/8") irregular shaped laminations (moist)
SLT	Brown-gray, clayey SILTSTONE; micaceous occasional organic material (?)(moist)
SLT	Dark blue-gray, mottled with dark green-gray, clayey SILTSTONE; slightly micaceous; occasional organic material (?) (moist) slickenside features at 297.2, 299.3, and 299.7 ft.

(Continued Next Page)

WELL DETAIL

9-3/4"

7"

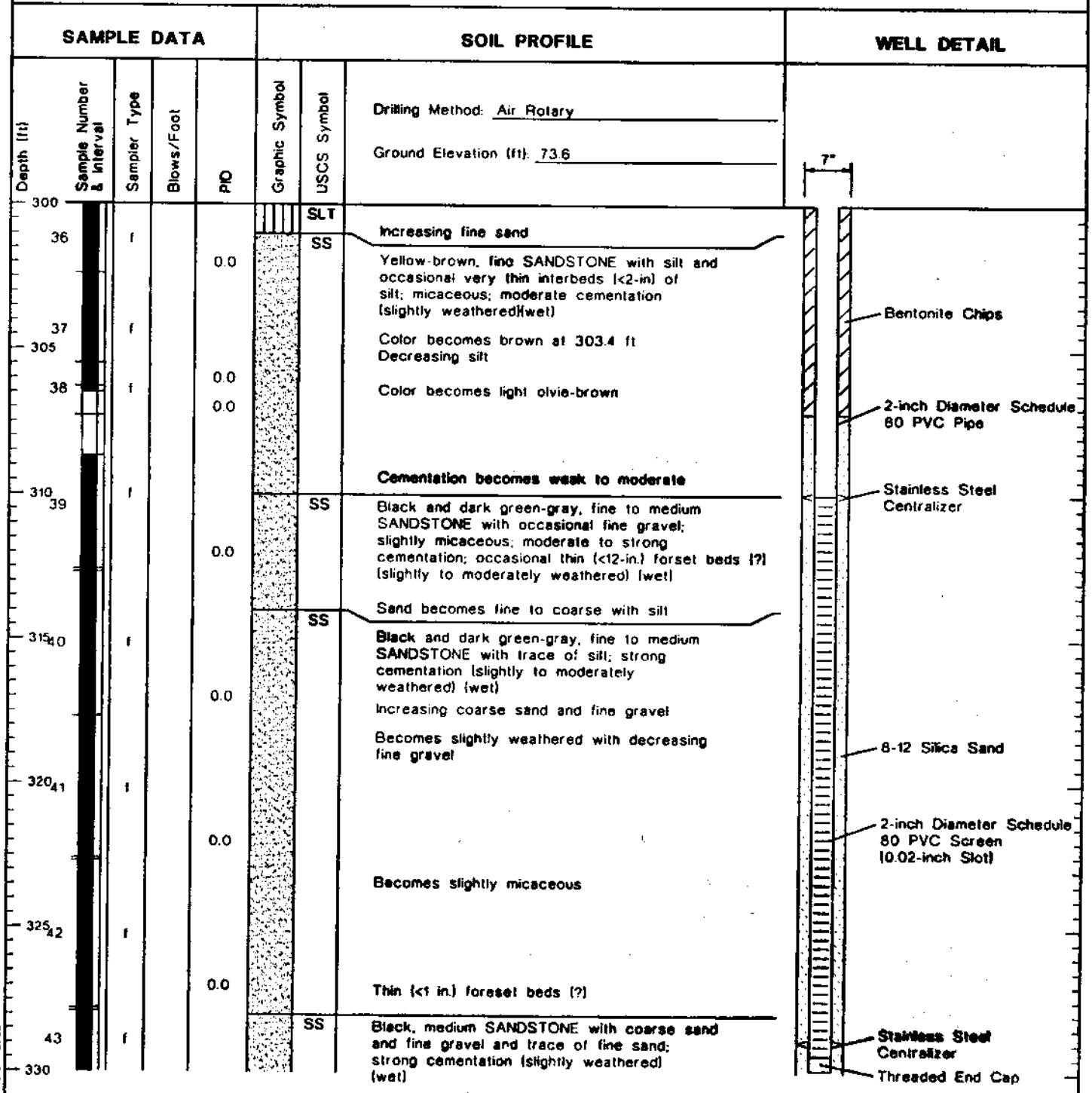
2-inch Diameter Schedule 80 PVC Pipe

Bentonite Grout

Bentonite Chips

Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate. Refer to the text for an explanation of subsurface conditions.
2. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

BOP-68(usg) Preliminary



(Continued Next Page)

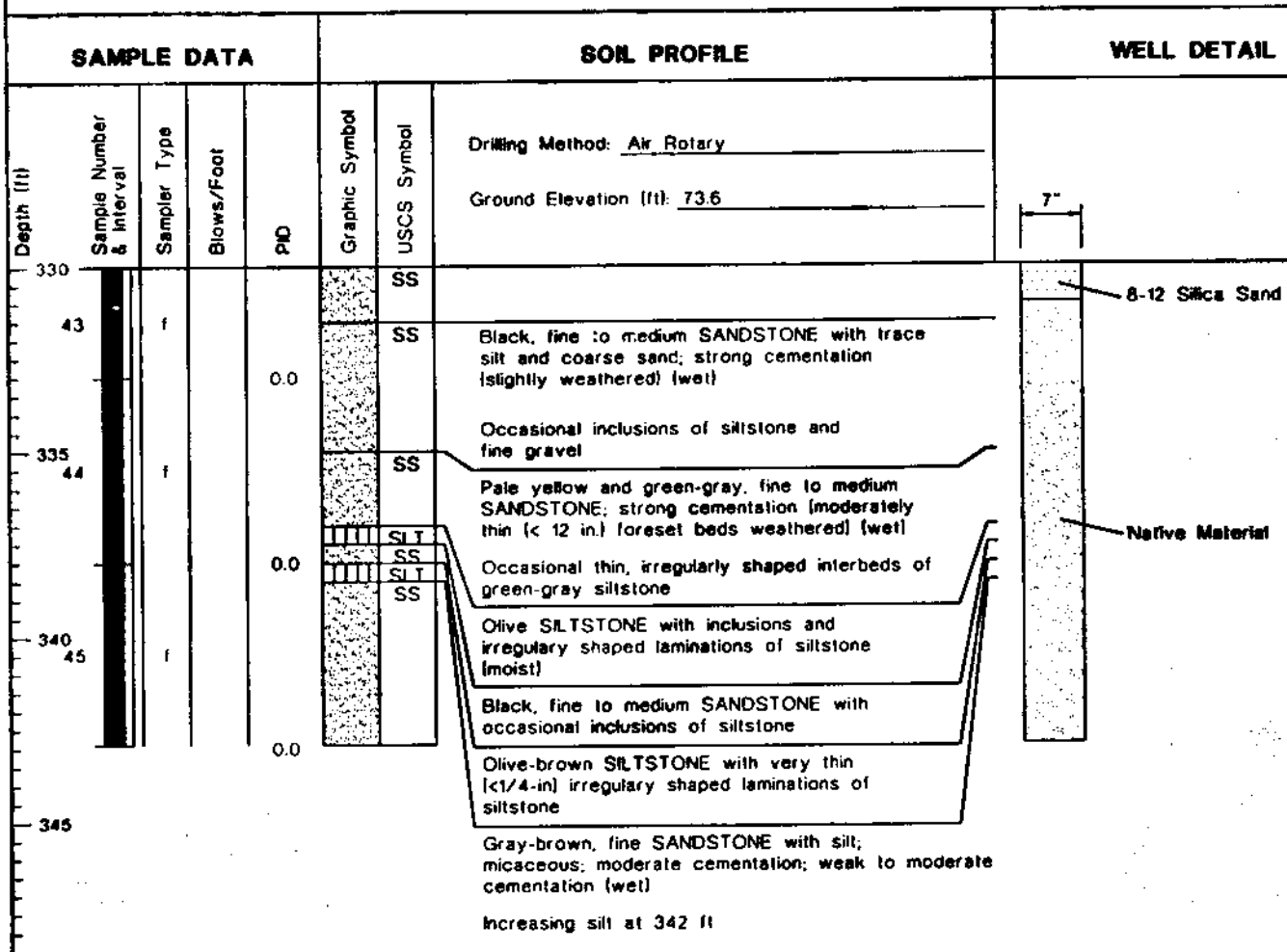
Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate. Refer to the text for an explanation of subsurface conditions.
2. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

2610.01 Boeing Portland/RI Report (A) 10/95

Boring and Monitoring Well BOP-68(usg)

Figure A-(11 of 12)

BOP-68(usg) Preliminary



Boring Completed 05/08/95
Total Depth = 342.9 ft.

Well Completed 05/08/95
Elevation at Top of PVC Casing = 76.18

Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate. Refer to the text for an explanation of subsurface conditions.
2. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

Boring and Monitoring Well BOP-68(usg)

Figure A-(12 of 12)

STATE OF OREGON

MONITORING WELL REPORT

(as required by ORS 537.765 & OAR 690-240-095)

MULT 4978

1N/03E/29 BA

Start Card # 75425

Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT:

WELL NO. 75425 BOP-68(usg)

Name Boeing Co.

Address PO Box 3707

City Seattle State WA Zip 98124-2207

(2) TYPE OF WORK:

☒ New construction ☐ Alteration (Repair/Recondition)

☐ Conversion ☐ Deepening ☐ Abandonment

(3) DRILLING METHOD

☒ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Hollow Stem Auger ☐ Other

(4) BORE HOLE CONSTRUCTION

Special Standards Yes ☒ No ☐ Depth of completed well 331 ft.

Land surface

Vault 0 ft. TO 4 ft.

Seal 4 ft. TO 298 ft.

Filter pack 308 ft. TO 331 ft.

Water-tight cover

Surface flush vault

Locking cap

Casing diameter 2 in.

material PVC

Welded ☐ Threaded ☒ Glued ☐

Liner 1' AGS to 113 BGS

diameter 10 in.

material STEEL

Welded ☒ Threaded ☐ Glued ☐

Well seal:

Material BENTONITE GROUT

Amount 1400 GAL.

Grout weight 10.1

Borehole diameter 10 in.

Bentonite plug at least 3 ft. thick

Screen

material PVC

interval(s):

From 311 To 331

From ____ To ____

Slot size .020 in.

Filter pack:

Material SAND

Size 8-12 in.

(5) WELL TEST:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Permeability ____ Yield ____ GPM

Conductivity ____ PH ____

Temperature of water 57 °F/C Depth artesian flow found ____ ft.

Was water analysis done? ☐ Yes ☒ No

By whom? ____

Depth of strata to be analyzed. From ____ ft. to ____ ft.

Remarks: ____

Name of supervising Geologist/Engineer Landau

(6) LOCATION OF WELL By legal description

Well Location: County Multnomah

Township 1 (N or S) Range 3 (E or W) Section 29

1. NE 1/4 of NW 1/4 of above section.

2. **Either** Street address of well location NE Sandy Blvd. Hwy 84 Portland, OR

or Tax lot number of well location 1a

3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:

62 Ft. below land surface. Date 5-8-95

Artesian Pressure ____ lb/sq. in. Date ____

(8) WATER BEARING ZONES:

Depth at which water was first found 62'

From	To	Est. Flow Rate	SWL
81	91		
128	276		
309	331		

(9) WELL LOG:

Ground elevation ____

Material	From	To	SWL
SILT	0	7	
SILTY GRAVEL	7	91	
SILTSTONE	91	114	
CLAYEY SILTSTONE	114	128	
SANDSTONE	128	222	
CONGLOMERATE	222	276	
SILTSTONE	276	309	
SANDSTONE	309	331	

RECEIVED SEP 15 1995 WATER RESOURCES DEPT. SALEM, OREGON

RECEIVED JAN 2 1996 WATER RESOURCES DEPT SALEM, OREGON

Date started 4-19-95 Completed 5-8-95

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

Signed [signature] MWC Number 10071

Date 5-8-95

(bonded) Monitor Well Constructor Certification:

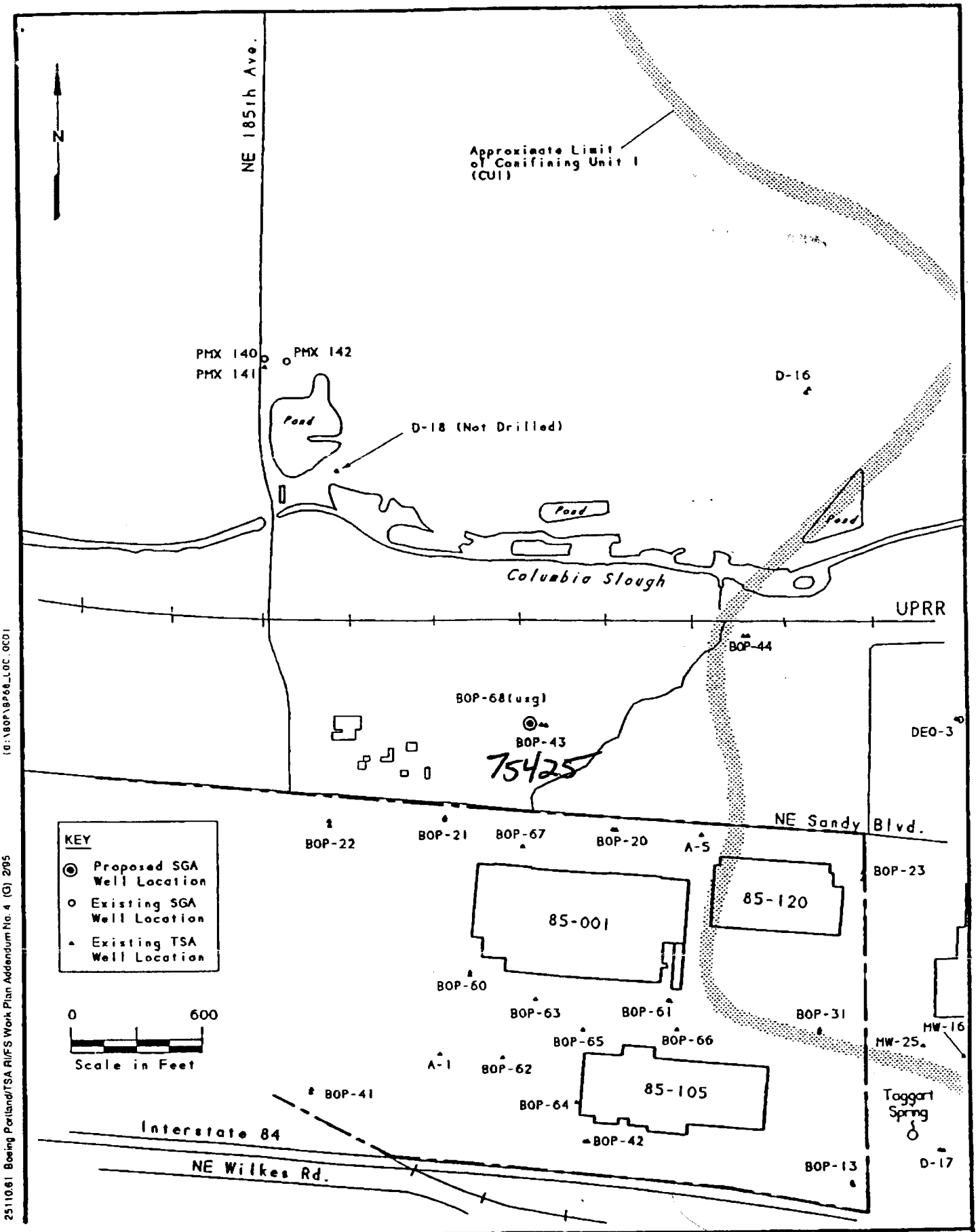
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

Signed [signature] MWC Number 10024

Date 5/8/95

OR 5031
OR 5027

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER



Proposed Location for BOP-68(usg)

Figure 1

LANDAU ASSOCIATES, INC.

25110.81 Boeing Portland/TSA RI/FS Work Plan Addendum No. 4 (G) 2/95

G:\BOP\BP68_LOC.GCDI