Interim Change Notice
(ICN)

A. Document No.: PNNL-12114 **Revision No.:** September 1999

Document Title: RCRA Assessment Plan for Single-Shell Tank Waste Management Area S-SX at the Hanford Site, September 1999

Document's Original Author: V. G. Johnson and C. J. Chou

Effective Date of ICN: 1/6/06

Change Requested By: Ronald M. Smith

B. Action: Make changes in the WMA S-SX groundwater quality assessment plan as described in Section D below. Attach this ICN to the front of the document

C. Effect of Change: This ICN updates the assessment plan to reflect the current wells in the monitoring system and the current constituent list for WMA S-SX in compliance with RCRA assessment monitoring. This ICN supplements all previous ICNs (PNNL-12114-September 1999.1 and PNNL-12114-September 1999.2).

D. Reason for Change/Description of Change:

Reason for Change: One new well, 299-W22-47, was constructed at WMA S-SX and incorporated into the monitoring network. One old well, 299-W22-46, has gone dry due to the falling water table and has been replaced with existing well 299-W22-50. The monitoring well list has been modified accordingly to accommodate these changes. The analyte list has been modified to account for removing aluminum from the Method 6010 analyte list and removal of bromide from the anion list. Aluminum is not a constituent of concern (refer to the Field Investigation Report for Waste Management Area S-SX, RPP-7884, January 31, 2002, Section E.3.2.1) and the aluminum method detection limit for the ICP method does not consistently yield quantifiable results below the drinking water standard. Bromide was removed from the analyte list for the small group of wells that were monitored as part of a tracer study that has been completed. In addition, radioactive constituents, not regulated under RCRA regulations, were removed from Table R3.1 at the direction of DOE.

Description of Change: Replace Figure R2.A.2 (page 3) in ICN PNNL-12114-September 1999.2 with.Figure R3.A.2 attached. Replace Table R2.1 with the attached revised Table R3.1. Add well construction summary report, well summary sheet, and borehole log for new well 299-W19-47 to Appendix B.

E. Document Management Decisions: None.

F. Approval Signatures
(Please Sign and Date)

Task Manager: S. P. Luttrell 1-6-06

Type of Change: (Check one):
___ Minor _√_ Major

Project Quality Engineer: T. G. Walker Date: 1-5-06

Other Approvals: R. M. Smith Date: 1/5/06

M. J. Hartman Date: 5Jan06

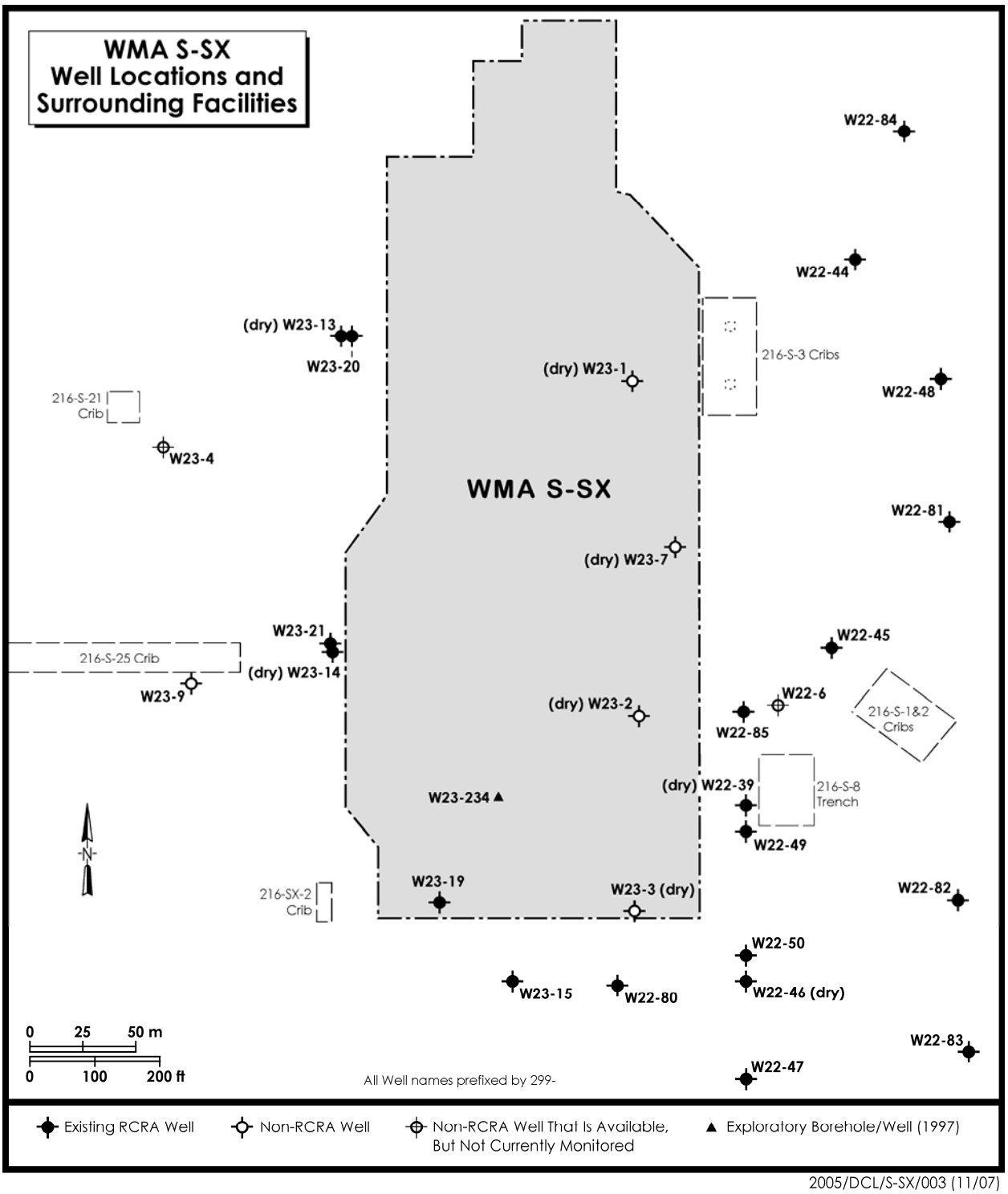

Figure R3.A.2. Waste Management Area S-SX.

Table R3.1. Assessment Monitoring Network, Constituent List, and Sampling Frequency for WMA S-SX.

				Constituents of Interest			Supporting Constituents						
Well ID	Well Name	Purpose	WAC Compliant	Specific Conductance (a)	Chromium (total, filtered)	Nitrate	Temperature (a)	pH (a)	Turbidity (a)	Water Level (a)	Alkalinity	Anions (b)	Metals (filtered) (c)
A4975	299-W22-44	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
A4976	299-W22-45	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
C4667	299-W22-47	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
B8812	299-W22-48	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
B8813	299-W22-49	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
B8814	299-W22-50	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
C3115	299-W22-80	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
C3123	299-W22-81	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
C3124	299-W22-82	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
C3126	299-W22-83	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
C3398	299-W22-84	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
C3399	299-W22-85	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
A4984	299-W23-15	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
B8809	299-W23-19	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
C3112	299-W23-20	Upgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
C3113	299-W23-21	Upgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q

Footnotes

(a)	Field measurement.
(b)	Anions - Analytes include but not limited to chloride, nitrate, sulfate, and fluoride.
(c)	Metals - Analytes include but not limited to calcium, potassium, magnesium, and sodium.

Codes

N = Well construction is not compliant with WAC 173-160 resource protection requirements
C = Well is constructed as a WAC 173-160 resource protection well
A = To be sampled annually
Q = To be sampled quarterly

WELL CONSTRUCTION SUMMARY REPORT

Start Date: 12-21-04
Finish Date: 03-10-05
Page 1 of 1

Well ID: C4667 | Well Name: 299-W22-47 | Approximate Location: WMA S-SX
Project: FY05 RCRA MONITORING WELL | Other Companies: FREESTONE, CHG, NORTHWIND
Drilling Company: LAYNE CHRISTENSEN | Geologist(s): MICHAEL CARON, BJORN HELGESON, JEFF WEISS, JASON CAPRON, LES WALKER
Driller: License #:

TEMPORARY CASING AND DRILL DEPTH			DRILLING METHOD	HOLE DIAMETER (in.) / INTERVAL (ft)
*Size/Grade/Lbs. Per Ft.	Interval	Shoe O.D./I.D.	Auger:	Diameter ____ From ____ to ____
9" x 6" DUAL WALL CASING	0' - 348.6'	10" / 6 1/2"	Cable Tool:	Diameter ____ From ____ to ____
	____ - ____		Air Rotary:	Diameter ____ From ____ to ____
	____ - ____		A.R. w/Sonic:	Diameter ____ From ____ to ____
	____ - ____		DIESEL HAMMER	Diameter 10" From 0' to 348.6'
	____ - ____			Diameter ____ From ____ to ____
*Indicate Welded (W) - Flush Joint (FJ) Coupled (C) & Thread Design				Diameter ____ From ____ to ____

Drilling Fluid: N/A
Total Drilled Depth: 348.6' | Hole Dia @ TD: 10" | Total Amt. Of Water Added During Drilling: N/A
Well Straightness Test Results: PASSED | Static Water Level: 229.43' bgs | Date: 03-10-05

GEOPHYSICAL LOGGING

Sondes (type)	Interval	Date	Sondes (type)	Interval	Date
	____ - ____			____ - ____	
	____ - ____			____ - ____	
	____ - ____			____ - ____	

COMPLETED WELL

Size/Wt./Material	Depth	Thread	Slot Size	Type	Interval Annular Seal/Filter Pack	Volume	Mesh Size
4" ID SS304, SCH 5 RISER	+1.47' - 228.67	F480	N/A	PORTLAND CEMENT	0' - 10.0'		
4" ID SS304, SCH 5 SCREEN	228.67 - 263.68	"	0.020"	GRANULAR BENTONITE	10.0' - 212.8'	92 bags	n/a
4" ID SS304, SCH 5 SUMP	263.68 - 265.68	"	N/A	BENTONITE PELLETS	212.8' - 218.1'	2 buckets	1/2"
	____ - ____			COLORADO SILICA SAND	218.1' - 269.9'	80 bags	10-20
	____ - ____			BENTONITE PELLETS	269.9' - 274.9'	3 buckets	1/2"
				OTHER ACTIVITIES CO SILICA SAND	274.91' - 348.8'	104 bags	10-20

Aquifer Test: WELL DEVELOPMENT | Date: 03-09-05 | Well Decommission: | Yes: | No: | Date:
Description: 5 HP FRANKLIN SUB. PUMP; INTAKE @ 260'(TOC) 21 gpm. END TURB (2.02 NTU). INTAKE RAISED TO 249'(TOC) 21 gpm. END TURB 1.07 NTU. INTAKE RAISED TO 239'(TOC) 23 gpm. END TURB 1.67 NTU | Description:

WELL SURVEY DATA (if applicable)

Washington State Plane Coordinates: | Protective Casing Elevation: | Brass Survey Marker Elevation:

COMMENTS / REMARKS

VOL. CALS: P.C. => bags * 1.285 ft³/bag = ft³ : GRANULES => 92 bags * 0.71 ft³/bag = 65.32 ft³ : PELLETS => 2 buckets * 0.62 ft³/bucket = 1.24 ft³ : 10-20 MESH SILICA SAND => 80 bags * 0.535 = 42.8 ft³ : PELLETS => 3 buckets * 0.62 ft³/bucket = 1.86 ft³

Reported By: BJORN HELGESON | Title: GEOLOGIST | Signature: [signature] | Date: 3/11/05

A-6003-658 (04/03)

WELL SUMMARY SHEET

Start Date: 1-3-05
Finish Date: 3-10-06
Page 1 of 3

Well ID:	C4667	Well Name:	299-W22-47
Location:	WMA S-SX	Project:	FY05 RCRA Monitoring Well
Prepared By:	Michael E. Caron / Brad Helton	Date: 3-14-05	
Reviewed By:	L.D. Walker	Date: 3/16/05	
Signature:	MEC / BJH	Signature:	LDW

CONSTRUCTION DATA

Description	Diagram
4" TP-304/304L SchOS Riser +1.47' → 228.67'	
4" TP-304/304L SchOS 0.020" CONT. WIRE WRAP SCREEN 228.67' → 263.68' (20-slot)	
4" TP-304/304L SchOS Sump 263.68' → 265.68'	
TYPE I, II, IV PORTLAND CEMENT 0 → 10.0'	
GRANULAR BENTONITE 10.0' → 212.8'	
BENTONITE PELLETS 212.8' → 218.1'	
COLORADO 10-20 HIGH SILICA SAND 218.1' → 269.9'	
TEMPORARY CASING, 9"x6" DUAL-WALL 0' → 348.6'	
NOTE: ALL TEMPORARY CASING HAS BEEN REMOVED FROM THE GROUND. ALL DEPTHS REPORTED IN FT. BELOW GROUND SURFACE.	

GEOLOGIC/HYDROLOGIC DATA

Depth in Feet	Graphic Log	Lithologic Description
0		0-5': no recovery
20		5-76': medium to coarse sand, Hanford fm.
40		
60		
80		76-77': sandy gravel, Hanford fm. 77-81': gravelly sand, Hanford fm.
100		81-137': fine to medium sand, Hanford fm.

A-6003-643 (03/03)

WELL SUMMARY SHEET

Start Date: 1-3-05
Finish Date: 3-10-05
Page 2 of 3

Well ID: C4667
Well Name: 299-W22-47
Location: WMA S-SX
Project: FY05 RCRA Monitoring Well
Prepared By: Michael E. Caron/Brad Hedges Date: 3-14-05
Reviewed By: L.D. Walker Date: 3/16/05
Signature: ME Caron / Brad Hedges
Signature: L.D. Walker

CONSTRUCTION DATA

Description	Diagram
6" SS protective casing set 1.0' above the well casing	
water table = 228.3' bgs	

GEOLOGIC/HYDROLOGIC DATA

Depth in Feet	Graphic Log	Lithologic Description
120		81-137': fine to medium sand, Hanford fm.
140		137-139': fine to medium sand with minor caliche - Cold Creek Unit?
		139-147': gravelly sand, Hanford fm
		147-158': sandy gravel, Hanford fm.
160		158-182': coarse sand, Hanford fm.
180		182-207': sandy gravel, Ringold 'E'
200		207-210': medium sand, Ringold 'E'
		210-348.6': sandy gravel, Ringold 'E'
220		

A-6003-643 (03/03)

WELL SUMMARY SHEET

Start Date: 1-3-05
Finish Date: 3-10-05
Page 3 of 3

Well ID: C4667
Well Name: 299-W22-47
Location: WMA S-SX
Project: FY05 RCRA Monitoring Well
Prepared By: Michael E. Caron / Brian Henderson
Date: 3-14-05
Reviewed By: L.D. Walker
Date: 3/16/05
Signature: MEC / BH
Signature: LD Walker

CONSTRUCTION DATA

Description	Diagram
Bentonite Pellets, 1/2" 269.9' → 274.9'	
Colorado Silica Sand 10-20 mesh 274.9' → 348.6'	
TD = 348.6' bgs	

GEOLOGIC/HYDROLOGIC DATA

Depth in Feet	Graphic Log	Lithologic Description
240		
260		
280		
300		210 - 348.6': sandy gravel, Ringold 'E'
320		
340		

A-6003-643 (03/03)

BOREHOLE LOG

Page 1 of 5
Date: 1-4-05

Well ID: C4667 | Well Name: 299-W22-47 | Location: WMA S-SX

Project: RCRA Monitoring Well | Reference Measuring Point: ground surface

Depth (Ft.)	Sample Type No.	Sample Blows Recovery	Graphic Log	Sample Description: Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Comments: Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
0			no recovery		Becker Hamer (diesel hammer) using 9" x 6" dual wall drill casing
				0-5': no recovery	
				5-76: fine quartzose sand, sparse oxide clasts	
				[12'] ~ 25% mafic clasts	
10				- sparse mafic pebbles to 0.5cm	1-pint archive samples collected at 5-Ft intervals through entire borehole
				[25'] v. fine sand, quartz dominates, v. well-sorted	
20					
				[35'] less well-sorted, generally fine to v. fine-grained, <10% angular lavan glass? chips	
30				[45'] medium sand, granitoid, well-sorted, angular → sub-angular clasts	
40					
				[55'] medium sand, granitoid, well-sorted, ~5% mafic clasts, 1-2% oxide clasts, v. sparse well-rounded coarse → v. coarse clasts	
50					
60				[65'] medium sand, moderately well-sorted	
				[67'] coarse sand, ~25% mafic clasts, sparse well-rounded pebbles to 1.5 cm, moderately well-sorted, sub-angular to sub-rounded clasts	
70					
				76-77': sandy gravel, basalt cobbles to 3"	

Reported By: Michael E. Caron | Title: Senior Geologist | Signature: MEC | Date: 1-5-05

Reviewed By: L.D. Walker | Title: Geologist | Signature: LD Walker | Date: 3-1-05

A-6003-642 (03/03)

BOREHOLE LOG

Page 2 of 5
Date: 1-5-05

Well ID: C4667 | Well Name: 299-W22-47 | Location: WMA S-SX
Project: RCRA Monitoring Well | Reference Measuring Point: ground surface

Depth (Ft.)	Sample Type No.	Sample Blows Recovery	Graphic Log	Sample Description: Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Comments: Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
80				77-81': gravelly sand (gS), medium to coarse sand, 10-20% pebbles to 2cm, mostly mafic (basalt)	Becker Hammer with 9" x 6" dual wall casing
				81-87': well-sorted medium sand (S), sparse angular → subangular clasts to 1.2 mm	
90					
100					
110				[115'] fine → medium sand, well-sorted, sparse, subangular clasts	
				[120'] fine sand, ~5% mafic clasts	
120					
130				127-139: fine → med sand (S) with minor calcareous silty layers and sparse angular basalt cobbles to 4"	
140				139-147: gravelly sand (sG), coarse mafic sand, 15-20% mafic pebbles to 2 cm - sub-rounded to subangular	
150				147-158: sandy gravel (sG) 30-40% coarse sand, remainder = heterolithic cobbles to 4 → 5", well-rounded, basalt, intermediate volcanics, lesser granitics	

Reported By: Michael E. Carm | Reviewed By: L.D. Walker
Title: Senior Geologist | Title: Geologist
Signature: [signature] Date: 1-5-05 | Signature: [signature] Date: 3/1/05

A-6003-642 (03/03)

BOREHOLE LOG

Page 3 of 5
Date: 1-5-05

Well ID: C4667 | Well Name: 299-W22-47 | Location: WMA S-SX

Project: RCRA Monitoring Well | Reference Measuring Point: ground surface

Depth (Ft.)	Sample Type No.	Sample Blows Recovery	Graphic Log	Sample Description: Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Comments: Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
160				158 – 182′: coarse sand, well-sorted, 10-15% mafic clasts, qtz dominated, subrounded to well-rounded clasts	
				· few thin cobbly layers with basalt cobbles to 2-3", well-rounded	Becker Hammer dual wall casing 9" x 6"
170		Cut after HP		[177′] medium sand, gravel dominated, >10% mafic clasts	
180				182 – 207: sandy gravel, 20 → 30% coarse sand, heterolithic cobbles to 8" in diameter, abundant intermediate volcanics (Cascade provenance?), lesser basalt, metamorphics (mostly qtzite), intrusives - probably Ringold 'E' gravels, unit SG	
190		Ringold Fm. to		[195′] clean felsic med → coarse sand matrix, qtz dominated, pebbles avg. 1.5 → 2 cm in dia., well-rounded, heterolithic as above (~ 50% intermediate volcanics)	
200				[205′] medium → coarse sand matrix, >10% mafic, cobbles > 2 cm avg.	
210				207 – 210: medium sand, generally felsic (quartzose), sparse heterolithic cobbles to 2" (well-rounded)	
				210 – 238′: gravel [GG], well-rounded, heterolithic, v. little sand, volcanics + metamorphics + basalt + intrusive cobbles – avg = 1.5"	"
220				[217′] 10 → 15% medium to coarse sand	228.2′ bgs = water table on 1-6-05.
		▽		[220′] abundant pink quartzite pebbles to 1.5"	230′ - damp sediments, probably near water table
230		water B103264		· unit generally passes downward into sandy gravel (SG)	231′ - borehole starts making water,
		B103265			235′: water slurry sample (PNNL)
					235′: water slurry sample (PNNL)

Reported By: Michael E. Caron | Reviewed By: L.D. Walker

Title: Senior Geologist | Title: Geologist

Signature: MEC | Date: 1-5-05 | Signature: LD Walker | Date: 3/1/05

A-6003-642 (03/03)

BOREHOLE LOG

Page 4 of 5
Date: 1-5-05

Well ID: C4467 | Well Name: 299-W22-47 | Location: WMA S-SX

Project: RCRA monitoring well | Reference Measuring Point: ground surface

Depth (Ft.)	Sample Type No.	Sample Blows Recovery	Graphic Log	Sample Description: Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Comments: Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
240		water B1BW65		238-318 : sandy gravel (SG), Ringgold 'E', heterolithic cobbles (volcanics, basalt, metamorphics, granitics) - medium to coarse sand, subrounded clasts - cobbles avg 1.5 ± 2" diameter, maximum = 5 → 6"	diesel hammer 9"x6" dual wall
		B1BW66			248': water slurry sample (PNNL)
		slug tests			243': water slurry sample (PNNL)
					244.5': PNNL slug tests
		water B1BW86 B1C343,344, 345			247.6': Fluor, PNNL pumped water samples
250		B1BW67			253': water slurry sample (PNNL)
					258': water slurry sample (PNNL)
					259': PNNL slug tests
		B1BW68		[268'] - gravel with <10% sand, heterolithic, subrounded to well - rounded pebbles, avg. size ± 0.75 inch - sparse large basalt and granitic boulders > 6" in diameter.	
260		slug tests			
		water B1BW69			263': water slurry sample (PNNL)
					269': Fluor, PNNL pumped water samples
		B1BW98 B1C346,347, 348		[273'] - moderately cemented sandy gravel, heterolithic, well-rounded cobbles to 3" (avg ± 1.5" diameter), sandy cement	
270		B1BW70			273': water slurry sample (PNNL)
					278': water slurry sample (PNNL)
		B1BW71			283': water slurry sample (PNNL)
280					
		B1BW72		[292'] - moderately to strongly cemented sandy gravel - occasional quartzite cobble to > 6" diameter	288: Fluor, PNNL pumped water samples
		B1BW90 B1C349, 350, 351			293': water slurry sample
290				[302'] - strongly cemented heterolithic sandy gravel - cobble avg size ± 1.5", max 2-3", medium sand in matrix	293': PNNL slug tests
		B1BW73 slug tests			298': water slurry sample (PNNL)
					303': water slurry sample (PNNL)
		B1BW74			
300				[307'] - more abundant sand,	308': Fluor, PNNL pumped water samples
		B1BW77			
					313': water slurry sample (PNNL)
		B1BW92			
310				[313] - strongly cemented cobbles, well-rounded	318': water slurry sample (PNNL)
		B1BW80			
		B1BW81			

Reported By: Michael E. Caron | Reviewed By: L.D. Walker

Title: Senior Geologist | Title: Geologist

Signature: [signature] Date: 4-19-05 | Signature: [signature] Date: 3/1/05

A-6003-642 (03/03)

BOREHOLE LOG

Page 5 of 5
Date: 1-19-05

Well ID: C4667 | Well Name: 299-W22-47 | Location: WMA S-SX

Project: RCRA Monitoring Well | Reference Measuring Point: ground surface

Depth (Ft.)	Sample Type No.	Sample Blows Recovery	Graphic Log	Sample Description: Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Comments: Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
320				318-348.6: sandy gravel (Ringold 'E'), well-sorted medium sand matrix, well-rounded hekolithic	diesel hammer, 9"x6" dual wall
		B1BW82		cobbles to 4" diameter, avg. dia. = 1.5",	323': water slurry sample (PNNL)
		B1BW74, B1C355, 356, 357		cobble lithology = metamorphics, intermediate volcanics, granitics, lesser basalt, locally moderately to well-cemented	water level = 328' (1-20-05)
330					328': pumped water sample (Fluor + PNNL)
		B1BW83		[335'] strongly cemented gravels (s G), avg.	333': water slurry sample (PNNL)
		B1BW84		cobble diameter ≈ 2", max = 4",	336': water slurry sample (PNNL)
				sub-rounded to well-rounded	335': hole making abundant water
340					
		B1BW85			343': water slurry sample (PNNL)
					348.6': pumped water sample (Fluor + PNNL)
		B1BW76, B1C358, 359, 360, 361		TD = 348.6 ft. bgs	
350					

Reported By: Michael E. Caron | Title: Senior Geologist | Signature: [signature] | Date: 1-21-05

Reviewed By: L.D. Walker | Title: Geologist | Signature: LD Walker | Date: 3/1/05

A-6003-642 (03/03)