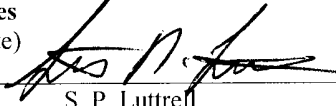
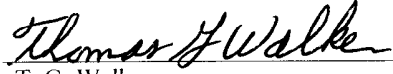
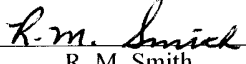



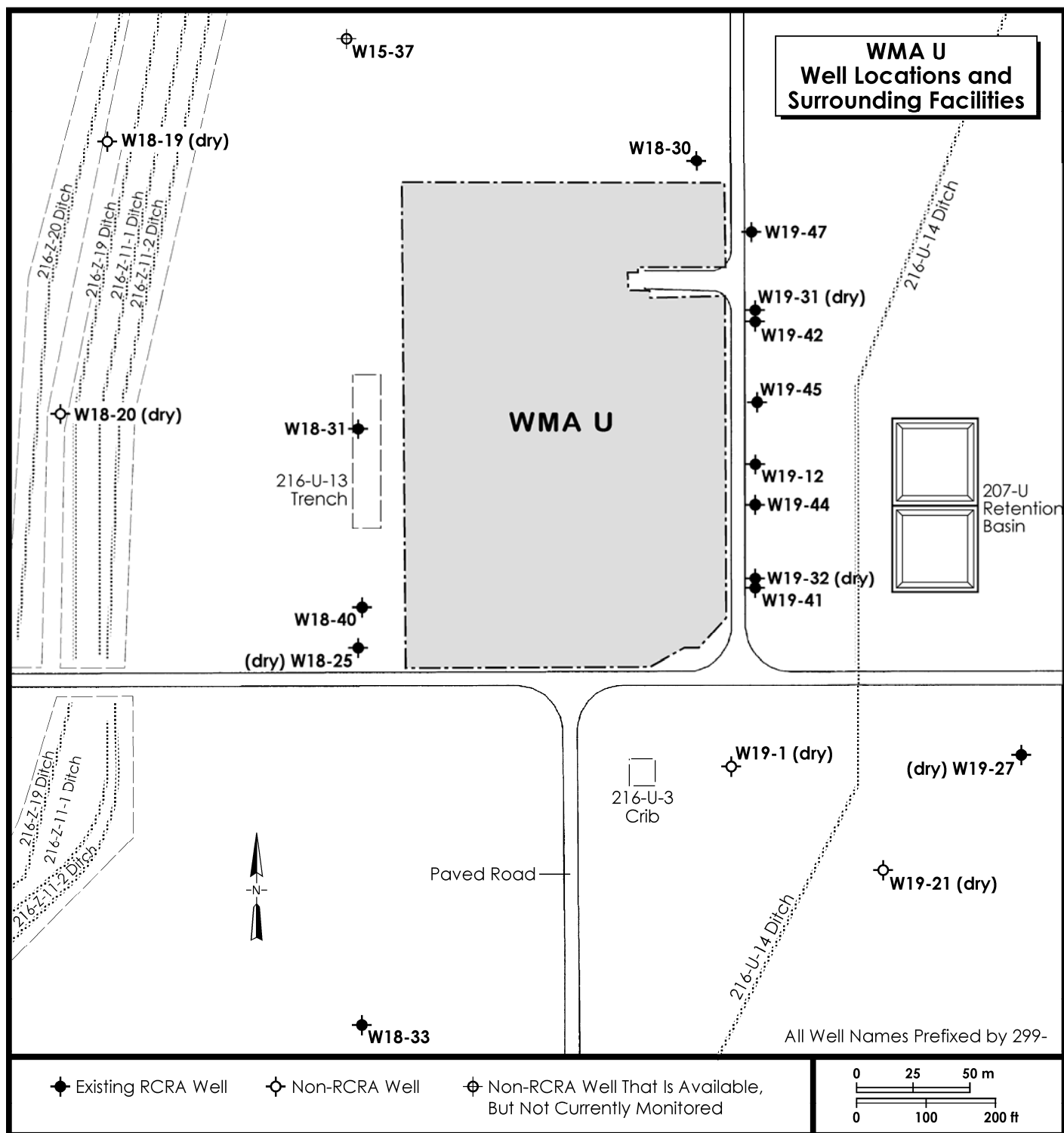
INTERIM CHANGE NOTICE
(ICN)

A. Document No.: PNNL-13612 Revision No.: August 2001		Effective Date of ICN: 1/6/06
Document Title: Groundwater Quality Assessment Plan for Single-Shell Tank Waste Management Area U		
Document's Original Author: R. M. Smith, F. N. Hodges, B. A. Williams		Change Requested By: Ronald M. Smith
B. Action: Make changes in the WMA U 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 WMA U monitoring system and to revise the analyte list.		
D. Reason for Change/Description of Change: Reason for Change: One new well, 299-W19-47, has been constructed at WMA U and incorporated into the monitoring network. The analyte list has been modified to account for removing aluminum from the Method 6010 analyte list. Aluminum is not a constituent of concern and the aluminum method detection limit for the ICP method does not consistently yield quantifiable results below the drinking water standard. In addition, radioactive constituents, not regulated under RCRA regulations, were removed from Table 5.2 at the direction of DOE. Description of Change: Replace Figure 2.1, page 5 with the attached revised figure. Replace Table 5.2, page 31 with the attached revised table. 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 : <u></u> <u>1-06-06</u> S. P. Luttrell		Type of Change: (Check one): <input type="checkbox"/> Minor <input checked="" type="checkbox"/> Major

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

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

 Date: 6 Jan 05
M. J. Hartman



2005/DCL/U/005 (11/07)

Figure 2.1. Waste Management Area U.

Table 5.2. Sampling Frequency and Constituent List for WMA U.

Well ID	Well Name	Purpose	WAC Compliant	Constituents of Interest			Supporting Constituents								
				Specific Conductance (a)	Chromium (total, filtered)	Nitrate	Temperature (a)	pH (a)	Turbidity (a)	Water Level (a)	Alkalinity	Anions (b)	Metals (filtered) (c)	Gross Alpha/Beta	
A4942	299-W18-30	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A	A
A4943	299-W18-31	Upgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A
C3395	299-W18-40	Upgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A
A4945	299-W19-12	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A
B8551	299-W19-41	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A
B8553	299-W19-42	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A
C3393	299-W19-44	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A
C3394	299-W19-45	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A
C4258	299-W19-47	Downgradient	C	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A

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

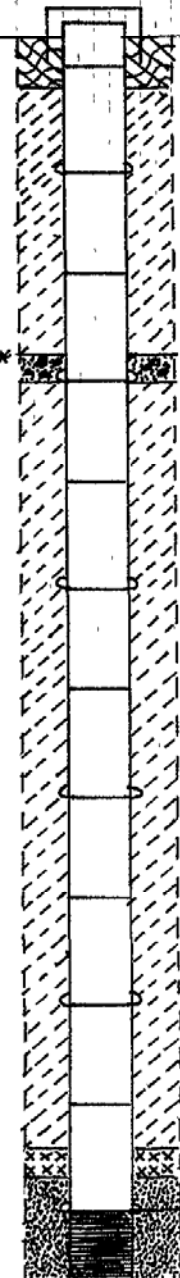

N = Well construction is not compliant with WAC 173-160 resource protection requirements

C = Well is constructed as a WAC 173-160 resource protection well

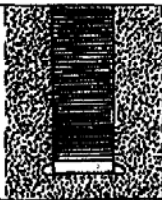

A = To be sampled annually

Q = To be sampled quarterly

WELL CONSTRUCTION SUMMARY REPORT						Start Date <u>04/23/04</u>	
						Finish Date <u>08/25/04</u>	
						Page <u>1</u> of <u>1</u>	
Well ID <u>C4268</u>		Well Name <u>299-W19-47</u>		Approximate Location <u>East Side of WMA-U/200 West</u>			
Project <u>ECRA/CERCLA Drilling, FY 2004</u>				Other Companies <u>FA, CHG</u>			
Drilling Company <u>Blue Star Enterprises</u>				Geologist(s) <u>C. Martinez, J. Whalen, D. Weekes</u>			
Driller <u>David Curry</u>		License # <u>2617</u>					
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 _____			
<u>1 1/2" / 10 3/4" CS, P.D.</u>	<u>0' - 268'</u>	<u>120" / 10 3/8"</u>	Cable Tool (drive barrel)	Diameter <u>8 5/8"</u> From <u>0'</u> to <u>95'</u>			
			Air Rotary	Diameter _____ From _____ to _____			
			A R w/Sonic	Diameter _____ From _____ to _____			
			Cable tool (hard tool)	Diameter <u>10"</u> From <u>95'</u> to <u>140'</u>			
			Cable tool (drive barrel)	Diameter <u>8 5/8"</u> From <u>140'</u> to <u>241'</u>			
*Indicate Welded (W) - Flush Joint (FJ) Coupled (C) & Thread Design			Cable tool (DB)	Diameter <u>9 1/2"</u> From <u>241'</u> to <u>265'</u>			
			Cable tool (DB)	Diameter <u>8 5/8"</u> From <u>265'</u> to <u>269'</u>			
			Drilling Fluid <u>N/A</u>				
Total Drilled Depth <u>269'</u>		Hole Dia @ TD <u>8 5/8"</u>		Total Amt. Of Water Added During Drilling			
Well Straightness Test Results <u>Passed on 04/08/04 using</u>			Static Water Level <u>226.84'</u>		Date <u>08/09/04</u>		
<u>20' long CS, 9 3/8" OD Tool,</u>			GEOPHYSICAL LOGGING				
Sondes (type)	Interval	Date	Sondes (type)	Interval	Date		
<u>Spectral Gamma</u>	<u>0' - 268'</u>	<u>06/02, 06/03 4 06/07/04</u>					
COMPLETED WELL							
Size/Wt /Material	Depth	Thread	Slot Size	Type	Interval Annular Seal/Filter Pack	Volume	Mesh Size
<u>4" ID SS 304 sch 5 riser</u>	<u>0' - 227.05'</u>	<u>F480</u>	<u>N/A</u>	<u>Portland Cement (94")</u>	<u>0' - 10.7'</u>	<u>7</u>	<u>N/A</u>
<u>4" ID SS 304 sch 5 well screen</u>	<u>227.05' - 262.04'</u>	<u>F480</u>	<u>0.020"</u>	<u>Granular bentonite (50")</u>	<u>10.7' - 215.8'</u>	<u>196</u>	<u>N/A</u>
<u>4" ID SS 304 sch 5 sump</u>	<u>262.04' - 265.02'</u>	<u>F480</u>	<u>N/A</u>	<u>Bentonite Pellets (50")</u>	<u>215.8' - 220.7'</u>	<u>7</u>	<u>38"</u>
				<u>Colorado Silica Sand (50")</u>	<u>220.7' - 269'</u>	<u>62</u>	<u>10-20</u>
OTHER ACTIVITIES							
Aquifer Test <u>well development</u>		Date <u>08/23/04</u>		Well Decommission		Yes	No
Description <u>24.46 / 25.16 / 240.1 / 4.58 (3) / 3.34 (m)</u>		Final Turbidity		Description			
<u>1.54 NTU. Gpm: 24, 22, 31.10 / 31, 20 / 10</u>							
WELL SURVEY DATA (if applicable)							
				Protective Casing Elevation			
Washington State Plane Coordinates				Brass Survey Marker Elevation			
COMMENTS / REMARKS							
<u>Vol. calcs: P.C. => 7 bags * 1.285 ft³/bag = 9.00 ft³. Granules => 196 bags * 0.71 ft³/bag = 139.16 ft³.</u> <u>Pellets => 7 buckets * 0.62 ft³/bucket = 4.34 ft³. 10-20 Sand => 62 bags * 0.535 ft³/bag = 33.17 ft³.</u>							
Reported By <u>Charlene Martinez</u>		Title <u>Geologist</u>		Signature <u>Charlene Martinez</u>		Date <u>09/14/04</u>	

WELL SUMMARY SHEET		Start Date <u>04/23/04</u>		Page <u>1</u> of <u>2</u>
		Finish Date <u>08/05/04</u>		
Well ID: <u>C4258</u>		Well Name <u>299-W19-47</u>		
Location <u>East side of WMA-4/200 West</u>		Project <u>RCRA/CERCLA drilling FY 2004</u>		
Prepared By <u>Charlene Martinez</u>	Date <u>08/11/04</u>	Reviewed By <u>L.D. Walker</u>	Date <u>8-24-04</u>	
Signature <u>Charlene Martinez</u>		Signature <u>L.D. Walker</u>		
CONSTRUCTION DATA		GEOLOGIC/HYDROLOGIC DATA		
Description	Diagram	Depth in Feet	Graphic Log	Lithologic Description
<u>1 7/8" / 10 7/8" temporary casing used.</u>		0		<u>0'-1' Backfill material</u>
				<u>1'-8' SAND(S) Hardpan Fmtn</u>
				<u>8'-15' sandy GRAVEL(SG)</u>
<u>6" ID 55304 protective casing set + 1.0' above permanent</u>				<u>15'-16.5' SAND(S)</u>
				<u>16.5'-17.5' sandy GRAVEL(SG)</u>
<u>4" ID 55304, sch. 5 riser:</u>				<u>17.5'-23' SAND(S)</u>
<u>+ 2.0' → 227.05'</u>				<u>23'-27' sandy GRAVEL(SG)</u>
				<u>27'-36' silty sandy GRAVEL(mSG)</u>
<u>Portland Cement:</u>				<u>36'-47' sandy GRAVEL(SG)</u>
<u>0' → 10.7'</u>				<u>47'-53' gravelly SAND (GS)</u>
				<u>53'-90' SAND(S)</u>
<u>Granular Bentonite:</u>				<u>90'-124' silty SAND (MS)</u>
<u>10.7' → 215.8'</u>				
<u>* Formation Slough 62.3' → 66.3'</u>				
<u>3/8" Bentonite Pellets:</u>				<u>124'-138' SILT(m) (Cold Creek unit)</u>
<u>215.8' → 220.7'</u>		<u>138'-145' CALICHE, silty sandy Gravel (mSG)</u>		
<u>10-20 mesh Colorado Silica Sand:</u>		<u>145'-162' silty sandy GRAVEL (mSG)</u>		
<u>220.7' → 227.05'</u>		<u>162'-165' sandy GRAVEL(SG)</u>		
<u>4" ID 55304, sch. 5, 0.020-inch cont. wire-wrap wellscreen:</u>		<u>165'-185.5' silty sandy GRAVEL (mSG)</u>		
<u>227.05' → 227.04'</u>		<u>185.5'-192' sand (S)</u>		
<u>All depths in feet below ground surface</u>		<u>192'-198.5' silty sandy gravel (mSG)</u>		
		<u>198.5'-201' sand (S)</u>		
<u>All temporary casing removed from ground.</u>		<u>201'-204' sandy gravel (SG)</u>		
		<u>204'-227' silty sandy gravel (mSG)</u>		
		<u>227'-229' sandy GRAVEL(SG)</u>		

A-6003-643 (03/03)

WELL SUMMARY SHEET		Start Date 04/23/04		Page 2 of 2	
		Finish Date 08/09/04			
Well ID: C4258		Well Name 299-W19-47			
Location East side of WMA-U/200 West		Project RCRA/CERCLA drilling FY 2004			
Prepared By: Charlene Martinez		Date 08/16/04		Reviewed By: L.D. Walker	
Signature: Charlene Martinez		Date 8-24-04		Signature: L.D. Walker	
CONSTRUCTION DATA		GEOLOGIC/HYDROLOGIC DATA			
Description	Diagram	Depth in Feet	Graphic Log	Lithologic Description	
4" ID 55304 sch. 5 Sump: 262.04' → 265.02'		240		229' - 238' silty sandy GRAVEL (ms)	
				238' - 244' sandy GRAVEL (SG)	
				244' - 260' silty sandy GRAVEL (ms)	
				260' - 266' sandy GRAVEL (SG)	
				266' - 269' silty sandy GRAVEL (ms)	
		280		TD @ 269' bgs	
				Static water @ 226.84' bgs	
				(08/09/04)	
NCR-04-GRP-015					
issued on the					
formation slough condition					
at 62.3' → 66.3'					
All depths in feet below					
ground surface:					
All temporary casing					
removed from ground.					

BOREHOLE LOG						Page 1 of 7
Well ID: C4253		Well Name: 299-W19-47		Location: East side of WMA-4/200 West		
Project: RCRA CERCLA drilling / FY 2004				Reference Measuring Point: Ground Surface		
Depth (Ft.)	Sample Type No.	Blows Recovery	Graphic Log	Sample Description	Comments	
				Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level	
0	DS 5'	11A		0-1' Bk. fill material. silty sandy gravel	Cable tool drilling using 1 1/2" OD CS temp. casing. Drive barrel @ 5.5' OD	
5	DS 5'			1-4' Sand(s) 100% vfn-fn grained, well sorted, SR-R, non-basaltic. 2.5Y4/3 olive brown (moist). Weak to no rxn HCl.	collect 5' archive.	
10	DS 5'			4-15' sandy GRAVEL (SG) 35% gravel, 45% sand. Gravel poorly sorted, SR-SA, small pebbles-sm cobbles. mps ~ 3". CaCO ₃ coating w/ strong rxn HCl. 55% basalt, 45% quartz. Sand, SR-R, well sorted vfn-fn, non-basaltic. 2.5Y4/3 olive brown, moist. Strong rxn HCl.	collect 10' archive	
15	DS 5'			@ 4' bgs gravel increasing to 35% sand 45% gravel 45% basalt, 55% quartz. Sand graded to poorly sorted SR-SA, vfn-fn grained. 35% basalt, 70% quartz. 2.5Y4/3 olive brown, moist. mod. rxn HCl.	@ 14.5' bgs, v compact sand lens, vfn-fn grain non-basaltic ~ 0.5' thick 2.5Y5/3 light olive brown (moist) weak to no rxn HCl collect 15' archive	
20	DS 5'			15-16.5' SAND(S) 97% sand, 3% silt. Sand, SR-R, vfn-fn, mod sorted 15% basalt, 45% quartz. 2.5Y5/3 12 olive brown. no rxn HCl.	lg. quartzite fragment ~ 9" (17 bgs) collect 20' archive 17.5' sporadic silt lenses ~ 0.1' thick	
25	DS 5'			16.5-17.5' Sandy GRAVEL (SG) 45% gravel 30% sand, 5% silt. Gravel, v. poorly sorted, sm pebbles to cobbles, mps ~ 9" 55% basalt, 45% quartz, R-A.	collect 25' archive sporadic vfn grained sand lens @ 25' bgs.	
30	DS 5'			Sand, SR-SA, vfn-fn, poorly sorted, 80% basalt, 20% quartz (moist).	Trace caliche @ 27' bgs. Strong rxn HCl. collect 30' archive	
35	DS 5'			17.5-20' Sand (S) similar to above	Trace caliche @ 30' bgs. Increased moisture @ 30' bgs. gravel sm pebbles-lg pebbles @ 21' mod. sorted	
				20-21' Sandy GRAVEL (SG) 45% gravel 55% sand, 5% silt. Gravel, v. poorly sorted, 50% basalt, 20% quartz, SR-SA mps ~ 5". Sand, mod sorted, SR-SA, vfn-fn.	collect 35' archive. E.O.S. @ 35' bgs (04/23/04) Start (04/24/04)	

Reported By: Charlene Martinez	Reviewed By: L.D. Walker
Title: Geologist	Title: Geologist
Signature: Charlene Martinez	Signature: L.D. Walker
Date: 04/23/04	Date: 6/10/04

A-6003-642 (03/03)

BOREHOLE LOG						Page 2 of 7	
Well ID: C-4253		Well Name: 299-4019-47		Location: East side of WMA-4			
Project: RCRA CERCLA drilling FY2004				Reference Measuring Point: Ground surface			
Depth (Ft.)	Sample		Graphic Log	Sample Description	Comments		
	Type No.	Blows Recovery			Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level		
40	DB 8 3/8"	N/A		23' sand graded to poorly sorted, vfn- vase. Sporadic vfn grained sand stringers (non-basaltic)	Cable tool using 8 3/8" DB. Collect 40' archive. @ 43' sand graded to poorly sorted, vfn-vase grained.		
45	DB 8 3/8"			27'-36' Silty Sandy GRAVEL (msG) 60% gravel, 30% sand, 10% silt. Gravel SE-A, v. poorly sorted, 3m pebbles-1g. cobbles. 55% basalt, 45% qtz/other, sand, SE-SA, mod. sorted, 20% basalt, 80% qtz/other. Trace mica. 2.5Y 5/3 brownish gray (dry). Strong rxn HCl.	Collect 45' archive. A.M. RCTCK, organics & dateable.		
50	DB 8 3/8"			36'-47' Sandy GRAVEL (sG) 90% gravel, 55% sand, 5% silt. Gravel, 55% basalt, 45% qtz/other, SA-R, mod. sorted sm-1g pebbles. Sand, SE-SA, mod sorted, vfn-cse grained, 15% basalt, 85% qtz/other 10YR 4/3, very dark grayish brown (moist) weak to no rxn HCl.	Collect 50' archive Trace caliche @ 53' bgs. strong rxn HCl.		
55	DB 8 3/8"			47'-53' gravelly SAND (sS) 15% gravel, 90% sand, 5% silt. Gravel, poorly sorted, sm. pebbles-3m. cobbles, 60% basalt, 40% qtz/other. Sand, poorly sorted, SE-SA, vfn-vase, 20% basalt, 80% qtz/other. 2.5Y 4/3 light olive brown (moist) weak to no rxn HCl. @ 52' bgs, gravel decreasing to 6104	Collect 55' archive A.M. RCTCK 5.8, 8.0 background		
60	DB 8 3/8"			53'-60' SAND (s) 5% gravel, 90% sand, 5% silt. Gravel, well sorted, R basaltic, Sand, SE-SA, poorly sorted, vfn-vase, 20% basalt, 80% qtz/other. 2.5Y 4/3 light olive brown (moist) No rxn HCl.	Collect 60' archive @ 60' v. compact sand lens. Non-basaltic, micaceous, R, vfn-mo. grained, well-sorted. 2.5Y 4/4, olive brown (moist) Fe oxide staining No rxn HCl.		
65	DB 8 3/8"			60'-69' SAND (s) 5% gravel, 90% sand, 5% silt. Gravel, well sorted, R basaltic, Sand, SE-SA, poorly sorted, vfn-vase, 20% basalt, 80% qtz/other. 2.5Y 4/3 light olive brown (moist) No rxn HCl.	Collect 65' archive		
70	DB 8 3/8"			@ 62' sand graded to mod. sorted, non- basaltic, vfn-cse grained.	P.M. RCTCK @ 6.8, 8.0 @ background.		
75	DB 8 3/8"			@ 72' sand graded to poorly sorted, vfn-vase grains. 15% basalt, 85% qtz/other sporadic fn-vfn grained sand nodules between 60-79' bgs.	75' archive not collected @ 74' vfn-fn grained sand nodules.		

Reported By: Charlene Martinez		Reviewed By: L.D. Walker	
Title: Geologist		Title: Geologist	
Signature: Charlene Martinez	Date: 04/23/04	Signature: L.D. Walker	Date: 6/10/04

A-6003-642 (03/03)

BOREHOLE LOG				Page <u>3</u> of <u>7</u>	
Well ID: <u>C4258</u>		Well Name: <u>299-W19-47</u>	Location: <u>East side of WMA-41 200 West</u>		
Project: <u>RCEA/CERCLA Drilling, F42004</u>			Reference Measuring Point: <u>Ground Surface</u>		
Depth (ft.)	Sample		Graphic Log	Sample Description	Comments
	Type No.	Blows Recovery		Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Depth of Casing, Drilling Method Method of Driving Sampling Tool Sampler Size, Water Level
80	DB 8 1/2"	N/A	↓	@ 76' sand graded to med sorted vfn-fn grained, SE-R, non-basaltic	cable tool using 8 1/2" DB Collect 80' archive.
85	DB 8 3/8"		↓	@ 79.5' sand graded to well-sorted vfn-fn grained, R, non-basaltic	P.M. Thick organics <detected>
90	DB 8 7/8"		↓	@ 82.5' bgs sand graded to med.-sorted fn-cse, SE-SN, 20% n basalt, 80% qtz/other	collect 85' archive E.O.S. @ 85' bgs (04/26/04)
95	HT 10"		↓	@ 89' sand graded to well sorted, SE-R vfn-fn grained	start 04/27/04 cold creek unit @ 89' bgs
100	HT 10"		↓	90"-124' silty SAND (MS) 75% n sand, 25% silt. Sand, SE-R, vfn-fn, well sorted, 20% n basalt, 80% qtz/other	@ 89' compact silt lens. laminar bedding, med. ran
105	HT 10"		↓	trace mica. Compact silt nodules, non-plastic, 2.54 g/13.17, olive brown (moist) weak rxn HCl (silt). Sand on rock	HCl. Non-plastic. 2.54 g/13.17 15. yellowish brown (moist)
110	HT 10"		↓	@ 92' silt nodules increasing in thickness (~0.2' thick), med rxn HCl.	collect 90' archive A.M. BCT ch. 4 (background)
115	HT 10"		↓	@ 100' slurry dried out, sample is still silty sand as above.	@ 300 cpm. Spills @ 500 ppm no or detected.
* Note: ~ 285 gallons of water were added to the bore hole during the hard tool drilling					collect 95' archive changed over to Hard tool bit, 10" wide.
120	HT 10"		↓		collect 100' archive (slurry)
125	HT 10"		↓		collect 105' archive (slurry)
130	HT 10"		↓		E.O.S. @ 108' bgs (04/27/04) start 04/28/04
135	HT 10"		↓		(slurry) collect 110' archive
140	HT 10"		↓		A.M. BCT ch. 4, 88' & background
145	HT 10"		↓		collect 115' archive (slurry)

BOREHOLE LOG						Page 4 of 7
						Date: 04/28/04
Well ID: CH258		Well Name: 299-019-47		Location: East side of WMAU / 200 West Area		
Project: RCRA/CERCLA drilling FY 2004				Reference Measuring Point: Ground surface		
Depth (ft.)	Sample Type No.	Blows Recovery	Graphic Log	Sample Description	Comments	
120	HT 10"	71A		124'-138' SILT (m) 100% compact, non-plastic. 2.5Y5/3 it olive brown, moist. Strong rxn HCl. Sample was in slurry form & allowed to dry till moist.	Cable tool using hard tool bit. 10" wide collected 120' archive (slurry) COLD CREEK UNIT @ 124' collected 125' archive (slurry)	
125	Grab HT 10"					
130	Grab HT 10"				Collect 130' archive (slurry) P.M. RCT ck. d. 33" @ background. P.M. Ith ck. organics < detectable Collect 135' archive.	
135	Grab HT 10"					
140	Grab DB 8"			138'-145' Caliche. Silty Sandy GRAVEL (msG) 40% gravel, 25% silt, 15% sand. Gravel poorly sorted, R.A. fragmented, im pebbles - cobbles, mp 5-5". Sand 5-5". mid-sorted, vfn-cse grained. 20% basalt. 90% qtz/other. Fragmented caliche. med-cementation, Fe oxide staining micaceous. 2.5Y4/3 olive brown (moist). Strong rxn HCl.	Collect 140' archive E.O.S. @ 140' bgs (04/29/04) Start 04/29/04 A.M. Ith ck. organics < detectable using 8" DB (140' bgs) Collect 145' archive	
145	Grab DB 8"				145'-148' Silty Sandy GRAVEL (msG) 45% gravel, 22% sand, 13% silt. Gravel poorly sorted SA-R, im pebbles - cobbles, mp 5-5". 90% basalt. 60% qtz/other. Sand, 5-5". poorly sorted, 12% basalt, 90% qtz/other. vfn-cse grained 2.5Y5/3 it olive brown (moist). No rxn HCl. micaceous.	Ringold "unit E" @ 145' bgs E.O.S. @ 148' bgs (04/29/04) Start @ 148' bgs (04/30/04) Collect 150' archive
150	Grab DB 8"					
155	Grab DB 8"				@ 147' bgs. silt increasing to 20%, sand decreasing to 20%, gravel decreasing to 60%. @ 155' silt decreasing to 15%	Collect 155' archive P.M. RCT ck. Radon detected on gloves. 33" < background. P.M. Ith ck. organics < detectable
Reported By: Charlene Martinez				Reviewed By: L.D. Walker		
Title: Geologist				Title: Geologist		
Signature: Charlene Martinez		Date: 04/28/04		Signature: L.D. Walker		
				Date: 6/10/04		

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BOREHOLE LOG					Page 5 of 2
					Date: 04/30/04
Well ID: C4258		Well Name: 299-W19-47		Location: East side of WMA-11/200 WEA	
Project: RCRA CERCLA Drilling, FY 2004				Reference Measuring Point: Ground Surface	
Depth (Ft.)	Sample Type No.	Blows Recovery	Graphic Log	Sample Description	Comments
				Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
160	DB 898	N/A		1160' silt decreasing to ~10% sand increasing to 30%.	Cable tool drilling using 8 5/8" OD drive barrel. Collect 160' archive
162	Grab DB 898			162'-165' sandy GRAVEL (SG) 60% gravel, 23% sand, 7% silt, Gravel, SR-A, v. poorly sorted, fragmented, sm pebbles	E.O.S @ 162' bgs (04/30/04) Start 05/03/04
165	Grab DB 898			- cobbles up to ~4", 40% basalt, 60% quartzite, sand, SR-SA, mod. sorted, vfn-cse, 10% basalt, 90% quartzite	Collect 165' archive
170	Grab DB 898			Fe oxide staining, slight cementation (Fe oxide + silica) 2.57 g/l olive brown (moist)	Am. I.M. RCT OK. detect background. collect 170' archive
175	Grab DB 898			no rxn HCl.	Added ~4 gals H ₂ O @ 173' bgs. 1g basalt boulder (~11"). increase in clay w/ mod. plasticity. @ 174' more clay, increased cementation, Fe oxide staining
180	Grab DB 898			2.57 g/l gray (dry), no rxn HCl	E.O.S @ 174' (05/03/04) start 05/04/04
185	Grab DB 898			between 170'-180' mod cementation observed (silica & Fe oxide)	Am. I.M. RCT OK. 9.3.8 @ background
190	Grab DB 898			cementation continues. Gravel 5' above 185' gravel decreased to 55% sand, increased to 35% silt, 10% gravel.	Collect 175' archive. Am. I.M. RCT OK. organic C detect
195	Grab DB 898			poorly sorted R-A. Fragmented, sand, non-basaltic, mod. sorted, vfn-cse. Cementation slight to moderate	Collect 180' archive. Am. I.M. RCT OK. 4.38 @ background
198	Grab DB 898			195'-198' SAND (S) 90% sand, 10% silt, sand, SR-SA, mod. sorted, non-basaltic micaceous, vfn-cse, grainy	E.O.S @ 184' bgs (05/04/04) start 05/05/04
199	Grab DB 898			192'-198' silty sandy gravel (MSG), moist 70% gravel 15% sand 15% silt, 2.57 g/l	Collect 185' archive.
200	Grab DB 898			Gravel: 10% basalt, 90% others. R-A poorly sorted; sm pebbles -> cobbles	Am. I.M. RCT OK. organic C detect
205	Grab DB 898			mod ~5" sand, SR-SA, mod sorted	E.O.S @ 194' (5/5/04) start 5/6/04
210	Grab DB 898			vfn-cse, 75% basalt, 73% others, norm HCl	collect 195' archive
Reported By: Charlotte Martinez				Reviewed By: L.D. Walker	
Title: Geologist				Title: Geologist	
Signature: Charlotte Martinez		Date: 04/30/04		Signature: L.D. Walker	

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BOREHOLE LOG					Page 7 of 7
					Date: 5/24/04
Well ID: C4258		Well Name: 299-2A-47		Location: East side of WMA-41 200 West	
Project: RCRA CERCLA Drilling			Reference Measuring Point: Ground Surface		
Depth (Ft.)	Sample		Graphic Log	Sample Description	Comments
	Type No.	Blows Recovery			
240	Grab DB 9 1/2"	N/A		238'-244' Sandy GRAVEL (SG): 60-70% Gravel, 20-30% sand, 10% silt, 2.5Y 7/2 light gray (dry), wet, v poorly sorted; gravel is SR-WR, 20% bas, 80% other; sand is f-c, SA-R, 20% bas; MPS ~ 4"; no to slight rxn to HCl, mica common	AM RCT backgrnd. @ 241' switched to 8 1/2" x 9 1/2" OD drive barrel
245	Grab DB 9 1/2"			244'-260' Silty Sandy GRAVEL (msG): 60-70% Gravel, 10-20% sand, 10-30% silt, 2.5Y 7/2 light gray (dry), wet, v poorly sorted; gravel is SR-WR, 20% bas; sand is f-c, SA-R, 20% bas; MPS ~ 4"; no to slight rxn to HCl, very little mica	Collect 245' archive. AM RCT backgrnd.
250	Grab DB 9 1/2"			260'-266' Sandy GRAVEL (SG) 70% gravel, 25% sand, 5% silt. Gravel, v poorly sorted, SA-R, 10% basalt, 90% qtz, other, MPS ~ 4". Sand, SA-R, v fine med grained, med sorted, 5-10% basalt, trace mica. Moderate Fe oxide + siliceous cementation. 2.5Y 5/3 light olive brown (moist). No rxn HCl.	Collect 255' archive. Start shift ~ 257' hrs (05/28/04) End @ 260' (05/28/04) Start unloaded
255	Grab DB 9 1/2"			@ 265' gravel decreasing to 60% poorly sorted, 20% basalt, 80% qtz other SA-R. Sand increasing to 20%, v poorly sorted, v fine v coarse grains, SA-R silt increasing to 10%.	Collect 260' archive. ss interval ~ 260'-262.5' Am. IHC. 3-5 ppm organics (spoils drum)
260	Grab DB 9 1/2"	spills spoon 100% rec		@ 265K increasing Fe oxide staining + cementation.	Collect 265' archive. Sand ~ heaving??
265	Grab DB 3 1/2"	N/A			Beginning @ 266.5' hrs sporadic sand lenses SA-R, well sorted, fine med grained, non-basaltic.
270	TD @ 269' hrs			266'-278' silty, sandy GRAVEL (msG) 55% gravel, 25% sand, 20% silt - Gravel, SR-R, poorly sorted, 20% basalt, 80% qtz, other; Sand, SR-SA poorly sorted, 35% basalt, 75% qtz, other. Extensive Fe oxide cementation. Manganese rich. Some Saco visible. 2.5YR 2.5/1 reddish black (moist). No rxn HCl.	Collect 265' archive. Sand ~ heaving??
275					Basalt fragment @ 269' hrs ~ 7.5" long.

Reported By: DC Weeks / S. Martinez	Reviewed By: L.D. Walker
Title: Geologist	Title: Geologist
Signature: [Signature]	Signature: [Signature]
Date: 5/24/04	Date: 6/10/04

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