

APPENDIX D

REMEDIAL INVESTIGATION FIELD LOGS AND SAMPLING DETAILS

Appendix D has been subdivided as follows:

- D-1: Field Logs
- D-2: Slug Test Analysis
- D-3: Aerial Photographs
- D-4: Summary Tables
- D-5: Lysimeter and Geochemical Sampling Details
- D-6: Determination of Fill Deposits in Contact with Groundwater

APPENDIX D-1

FIELD LOGS

MONITORING WELLS

Physical Description of Soil Key



Visual Soil Descriptions consist of the following:

Depth (recovered), USC symbol, moisture content, density/consistency (estimated based on visual observation), color, MAJOR CONSTITUENT/GROUP NAME with minor constituents. Amount and shape of minor constituents (e.g., wood, shells) followed by major constituent structure. Sheen and odor.

Recovered and In-situ depths

Recovered = measured in the lab, actual sediment depth from core tube
In situ = compaction-corrected, applied to samples only

Soil Description Terminology:

Moisture and Density:

Moisture Content	
Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content, no visible water
Wet	Visible free water, probably above optimum

Density		
SAND or GRAVEL		SILT or CLAY
Density	Visual	Consistency
Very loose	freefall	Very soft
Loose	easy penetration	Soft
Medium dense	moderate penetration	Medium stiff
Dense	hard penetration	Stiff
Very dense	refusal	Very Stiff/Hard

Density/Consistency
Soil density and consistency are estimated based on visual observations

Major and Minor Constituents by Volume:

Soil	Percent
Trace (clay, silt, etc.)	0-5
Slightly (clayey, silty, etc.)	5-15
Clayey, silty, sandy, gravelly	15-30
Very (clayey, silty, etc.)	30-50
GROUP NAME	> 50

Other Minor Constituents: % vol. (anthropogenics, etc.)	
Trace	0-5
Occasional	5-10
Moderate	10-30
Substantial	30-50

Sheen - Visual Description	
rainbow	multicolored
metallic	metallic gray-colored
florlets	semi-circular and
blebs	semi-circular and
streaks	long and flowing shape

Odor Descriptions	
	trace
	slight
	moderate
	strong
	HC = Hydrocarbon-like
	H2S = Hydrogen sulfide

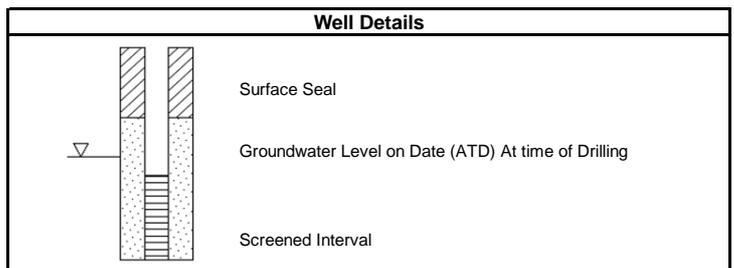
*No odor or sheen observed unless noted

Sheen - % coverage	
None, trace	<2
Slight Sheen	2-15
Moderate Sheen	15-40
Moderate to Heavy	40-70
Heavy	>70

Structure and Other Sediment Descriptions	
Blocky	Cohesive soil that can be broken down into smaller lumps
Fibrous	Stringy or rope like structure
Seam	1/16 to 1/2" thick
Layer	Greater than 1/2" thick
Interbedded	Multiple layers within a unit (>1/2" thick)
Anthropogenic	Debris, include description in parenthesis
Decomposed	Visible sign of decomposition or discoloration
Fresh	No visible sign of decomposition or discoloration
Winnowed	Loss of fines
Slumped	Settled but intact
Pockets	Semicircular to circular inclusion/deposit

Contacts:	
@	Compositional change or presence of anthropogenic material
-----	Major unit change/non-discrete, gradual contact
_____	Major unit change/visually discrete, abrupt contact

Core Acceptance Guidelines
1. Desired drive depth is reached or refusal.
2. Core recovery is greater than 75%.
3. Core tube appears intact (no signs of blocking, bending).
4. Minimal sediment loss out the top or bottom (minimal)



NOTES:

*Classification of soil in core logs is based on visual field and laboratory observations which include density/consistency, grain size, and plasticity plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification method ASTM D-2488 for the description and identification of soils was used as an identification guide.



PROJECT REYNOLDS SOLID WASTE PILE INVESTIGATION

Page 1 of 1

Location N.E. of landfill

Boring No. RLSW-1

Surface Elevation Top PVC 13.29 ft.

Drilling Method Hollow Stem Auger

Total Depth 20 feet

Drilled By Sweet, Edwards and Assoc., Inc.

Date Completed 5/6/85

Logged By J. Maul

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
		0						
		5	1	SS			3.5-5.5' <u>SILT</u> , gray to tan, mottled, organic. ML	
		10	2	SS			8.5-10.0' <u>SANDY SILT</u> , gray to tan, very fine sand. Sharp contact in bottom 0.25' of spoon with gray fine sand, clean, saturated ML/SP	
		15	3	SS			13.5-15.0' <u>SILTY SAND</u> , gray, fine to very fine sand, trace of silt, saturated. SM	
		20	4	SS			18.5-20.0' <u>SAND</u> , same as above, except slightly coarser and cleaner. SP	
		25						



PROJECT REYNOLDS SOLID WASTE PILE INVESTIGATION

Page 1 of 1

Location North of landfill

Boring No. RLSW-2

Surface Elevation Top PVC 14.95 ft.

Drilling Method Hollow Stem Auger

Total Depth 18.5 feet

Drilled By Sweet, Edwards and Assoc., Inc.

Date Completed 5/7/85

Logged By J. Maul

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
		0						
		5	1	SS			3.5-5.0' <u>SILTY SAND/SILT</u> , brown to black, appears to be road fill containing some black mud.	
		10	2	SS			8.5-10.0' <u>SILT</u> , grayish green, some orange streaks, core is layered with black carbon laminae with some organics. Sharp contact in lower 0.25' of spoon with clean gray fine to very fine sand, saturated. ML/SP	
		15	3	SS			13.5-15.0' <u>SAND</u> , gray, fine to very fine in bottom of spoon grading upward to medium to fine sand, minor amts of wood fragments, clean, saturated. SP	
		20						



PROJECT REYNOLDS SOLID WASTE PILE INVESTIGATION Page 1 of 1

Location N.W. of landfill

Boring No. RLSW-3

Surface Elevation Top PVC 12.5 ft.

Drilling Method Hollow Stem Auger

Total Depth 20 feet

Drilled By Sweet, Edwards and Assoc., Inc.

Date Completed 5/8/85

Logged By J. Maul

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
<p>1.5" Sch. 80 PVC Bentonite Powder Number 8 Monterey Sand 0.010" Slot Screen</p>		0						
		3.5-5.0'	1	SS			3.5-5.0' <u>SANDY SILT</u> , brown, medium to fine sand, some organics. ML	
		8.5-10.0'	2	SS			8.5-10.0' <u>SILTY CLAY</u> , CLAYEY SILT, gray, inter-layered with abundant organics, saturated. ML/CL	
		13.5-15.0'	3	SS			13.5-15.0' <u>SILTY SAND</u> , green, fine to medium sand, some organics, saturated. SM	
		18.5-20.0'	4	SS			18.5-20.0' <u>SILT</u> , green, cohesive, some organics, saturated. ML	



PROJECT REYNOLDS SOLID WASTE PILE INVESTIGATION

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Location South of landfill

Boring No. RLSW-4

Surface Elevation Top PVC 26.87 ft.

Drilling Method Hollow Stem Auger

Total Depth 28.5 feet

Drilled By Sweet, Edwards and Assoc., Inc.

Date Completed 5/20/85

Logged By J. Maul

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
1.5" Sch. 80 PVC Bentonite Powder Bentonite Pellets Number 8 Monterey Sand 0.010" Slot Screen		0						
		3.5-5.0'	1	SS			3.5-5.0' <u>SANDY SILT</u> , gray some white fibrous material, slight odor, some perched water. ML	
		8.5-10.0'	2	SS			8.5-10.0' <u>SILTY CLAY</u> , gray, some medium fine sand and pea gravel, lenses moist to saturated Unsaturated medium to fine brown sand in tip of spoon. ML/CL	
		13.5-15.0'	3	SS			13.5-15.0' <u>SAND</u> , gray to light brown, some layers of coarse sand, moist. SP	
		18.5-20.0'	4	SS			18.5-20.0' <u>SAND</u> , gray, medium to fine grained, saturated. SP	
		23.5-25.0'	5	SS			23.5-25.0' <u>SAND, SILT, SILTY SAND</u> , gray, some wood fragments. SP/ML 24.0-25.0' <u>CLAYEY SILT, SILTY CLAY</u> , gray, cohesive some wood fragments at contact with above, saturated. ML/CL	
		30						



A TETRA TECH COMPANY

19203 36th Ave. W., Suite 101
Lynnwood, WA 98036-5707
(425) 921-4000
(425) 921-4040

LOG OF BORING PZ-6

(Page 1 of 1)

Alcoa Longview Site
Former Reynolds Metals Facility
Longview, Washington

MFG Project# 059741

Drilling Agency : Cascade Drilling, Inc. Date Completed : 11/26/02
Drill Rig : CME 85 Track Rig Logged By : N. Morrow
Drilling Method : Hollow Stem Auger/9" O.D. Top of Casing Elev. : 7.01 ft NAVD88
Sample Method : 1.5"x1.5' Split Spoon Northing Coordinate : 306391.57
Sample Type : 2.5 foot interval Easting Coordinate : 1002978.72

Depth ft bgs	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	REMARKS
0	SILTY SAND to SANDY SILT, brown to yellowish orange, few to some clay, moist.						Well casing measured from top of casing to top of concrete. Located in north plant area north of BMP; between BMP main access road and CDID ditch. Well: PZ-6 Elev.: 7.01 ft NAVD88 Cover 2.1 ft (2.6 ft steel) Surface Casing Cement 2 ft bgs 2" SCH 40 PVC Casing 3/8" Bentonite Chips 4.9 ft bgs 5.38 ft bgs 11/27/02 7.5 ft bgs 10x20 Silica Sand 2" SCH 40 0.010 Slot PVC Screen 11.9 ft bgs Sump 12.6 ft bgs Slough 16.5 ft bgs
1							
2							
3	-yellowish orange to pale brown, very fine to fine sand, some iron oxide mottling, grades to yellowish orange to gray with minor iron oxide mottling, moist.			1	6	80	
4					4		
5	SILTY SAND, medium gray, very fine to fine sand, grain size gradually decreases, minor wood pieces, sulfidic odor, very moist to wet.			2	2	90	
6					2		
7					2		
8	-very fine to fine sand, slight decrease in sulfidic odor, wet	SM-ML		3	3	90	
9	-increase in fine sand content, wet			6	6		
10				19	19		
11	-several layers with higher fine sand content, wet			4	4	90	
12				7	7		
13				5	5		
14	SILTY SAND TO SANDY SILT, brown, very fine to fine sand, very moist.			5	2	100	
15				4	4		
16	SILT, greenish gray to gray, some to few very fine sand, very moist grades to moist to very moist.	ML		6	1	100	
17					3		
					5		
Total depth of borehole = 16.5 feet bgs							

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LOG OF BORING PZ-7

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Alcoa Longview Site
 Former Reynolds Metals Facility
 Longview, Washington

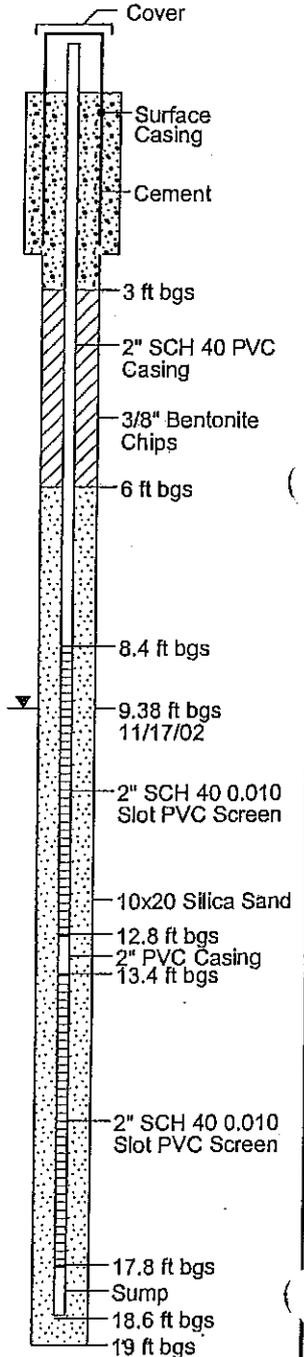
MFG Project# 059741

Drilling Agency : Cascade Drilling, Inc.
 Drill Rig : CME 85 Track Rig
 Drilling Method : Hollow Stem Auger/9" O.D.
 Sample Method : 1.5"x1.5' Split Spoon
 Sample Type : 2.5 foot interval

Date Completed : 11/26/02
 Logged By : N. Morrow
 Surface Elevation : 10.36 ft NAVD88
 Northing Coordinate : 305858.71
 Easting Coordinate : 1002976.47

Depth ft bgs	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	REMARKS
0	SILTY SAND, brown, fine to medium sand, few to some angular to subangular gravel up to 1/2-inch size, moist. Fill.	AR					Located in north plant area north of BMP; between BMP main access road and CDID ditch.
1	SAND, yellowish orange, iron oxide mottling, very fine to fine sand, few to some silt, moist.						
2				1	4	10	
3					15		
4					13		
5	-light brown to light olive gray, slight increase in grain size to fine sand, few to minor medium sand, increase in iron oxide mottling, slightly moist to moist.			2	4	80	
6					3		
7					3		
8	-grades from very moist to wet to wet to saturated			3	4	90	
9					4		
10					4		
11	-wet to saturated	SP		4	16	60	
12					13		
13					7		
14	-fine sand, few medium sand, sulfidic odor, wet to saturated			5	14	75	
15					15		
16	-as above			6	2	75	
17					3		
18					4		
19	-decrease in moisture content very moist to wet			7	2	100	
20	SILTY SAND to SANDY SILT, very fine sand, few fine sand, dense, moist to very moist.	SP-ML			6		
21					10		
22	Total depth of borehole = 19 feet bgs						

Well: PZ-7
 Elev.: 10.36 ft NAVD88



02-17-2003 wa:059741 LongviewLongview DPT and PZ Logs 2002/PZ-7.BOR



PROJECT Reynolds

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Location Southwest of Black Mud Lagoon

Boring No. RL-1 (shallow)

Surface Elevation _____

Drilling Method Auger

Total Depth 18 ft.

Drilled By Sweet, Edwards & Assoc.

Date Completed 6/28/63

Logged By J.E. Edwards

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
Bentonite Seal 2" Sch. 80 PVC Casing Coarse Silica Sand 0.010" slotted PVC screen		5 10 15 20 25 30 35					See Boring Log for RL-1 (deep).	350µs/cm DTW=11.8' 6/28,1200 1050µs/cm DTW=10/7' 6/29,0900
					 11.8' First Water			



PROJECT Reynolds

Page 1 of 2

Location S.W. black mud lagoon

Boring No. RL-1 (deep)

Surface Elevation

Drilling Method Auger

Total Depth 39.5

Drilled By Sweet, Edwards & Assoc.

Date Completed 6/29/83

Logged By J.E. Edwards

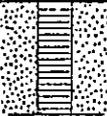
WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
		5	1	Split Spoon		CL/ML	3'-4.5' <u>Silty Clay, Clayey Silt</u> - Grey, mottled red and brown, roots and organics, dry.	Cond. = 459µs/cm @23'
		10	2	Split Spoon		SP/SM	7' Drop in drill resistance. 8'-9.5' <u>Sand</u> - Grey, very fine, with trace silt, soft, semi-saturated, massive, some roots.	Cond. = 1350µs/cm 6/25/83 Time = 09:00am
		15	3	Split Spoon		SP/SM	13'-14.5' Same as above, no roots.	
		20	4	Split Spoon		SP	18'-19.5' <u>Sand</u> - Grey, fine grained, trace silt, saturated, massive.	
		25	5	Split Spoon		ML/CL	23'-24.5' <u>Silt</u> - Grey, trace to some sand, some clay, massive, slightly saturated.	
		30	6	Split Spoon		CL	28'-29.5' <u>Clay</u> - Grey, some wood fibers, firm, semi-saturated.	
		35	7	Split Spoon		SP	33'-34.5' <u>Sand</u> - Grey, fine to medium grained, clean, saturated.	



PROJECT REYNOLDS

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Boring No. RL-1 (deep)

WELL DETAILS	PENE-TRATION TIME / RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
		40	8	Split Spoon		CL	38'-39.5' Clay- Grey, organics, semi-saturated.	
		45						
		50						
		55						
		60						
		65						
		70						



PROJECT Reynolds

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Location Northwest of Black Mud Lagoon

Boring No. RL-2 (shallow)

Surface Elevation _____

Drilling Method Auger

Total Depth 17.5 ft.

Drilled By Sweet, Edwards & Assoc.

Date Completed 6/29/83

Logged By J.E. Edwards

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
Bentonite Seal 2" Sch. 80 PVC Coarse Silica Sand Natural Heave 0.010" Slotted PVC Screen		5					See Boring Log for RL-2 (deep).	Cond. = 450 μ s/cm 6/29/83 Time-1200 ----- Cond. = 1,300 μ s/cm 6/29/83
		10						
		15						
		20						
		25						
		30						
		35						



PROJECT Reynolds

Page 1 of 1

Location Northwest of Black Mud Lagoon

Boring No. RL-2 (deep)

Surface Elevation _____

Drilling Method Auger

Total Depth 34.5 ft.

Drilled By Sweet, Edwards & Assoc.

Date Completed 6/30/83

Logged By J.E. Edwards

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
<p>Bentonite Seal 2" Sch. 80 PVC Casing Natural Heave 0.010" Slotted PVC Screen</p>		5	1	Split Spoon		SP	3'-4.5' <u>Sand</u> - Grey to rust, fine to medium grained, clean, dry, roots.	Cond. = 5600µs/cm 6/29/84 Time-1700
		10	2	Split Spoon		SP	8'-9.5' <u>Sand</u> - Grey, medium grained, clean, saturated.	
		15	3	Split Spoon		ML/SM	13'-14.5' <u>Sandy Silt, Silty Sand</u> - Grey, sand-very fine grained, soft, semi-saturated.	
		20	4	Split Spoon		SM/SC	18'-19.5' <u>Sand</u> - Grey, fine grained with some silt and clay, soft, semi-saturated.	
		25	5	Split Spoon		SP and SM/ML	23'-24.5' <u>Sand and Silt</u> - Interbedded, clean, medium grained sand or silty sand, saturated, chemical odor.	
		30	6	Split Spoon		SP	28'-29.5' <u>Sand</u> - Medium grained, clean, loose, saturated.	
		35	7	Split Spoon		SP/ML	33'-34.5' <u>Sand and Silt</u> - Grey, interbedded, medium grained, clean sand.	



PROJECT REYNOLDS

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Location _____

Boring No. RL-3 (shallow)

Surface Elevation _____

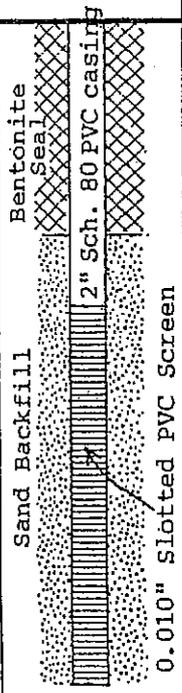
Drilling Method Auger

Total Depth 17.5 ft.

Drilled By Sweet, Edwards & Ass.,

Date Completed 6/30/83

Logged By J.J.Maul

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
 <p>Bentonite Seal 2" Sch. 80 PVC casing Sand Backfill 0.010" Slotted PVC Screen</p>							See Boring Log for RL3 (deep).	



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Location _____

Boring No. RL-3 (deep)

Surface Elevation _____

Drilling Method _____

Total Depth 39 ft.

Drilled By Sweet, Edwards & Assoc.

Date Completed 6/30/83

Logged By J.J.Maul

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
Bentonite Seal 2" Sch. 80 PVC Casing Natural Heave 0.010" Slotted PVC Screen		5						Cond.= 680 s/cm 6/30/83 Time- 1937
		10	1	Split Spoon		SM	7.5'-9' <u>Silty Sand</u> - Tan to grey, medium to fine grained, saturated, hard push.	
		15	2	Split Spoon		SP	13.5'-14' <u>Sand</u> - Grey, medium to fine grained, clean saturated.	
		20	3	Split Spoon		ML	17.5'-19' <u>Clayey Silt</u> - Grey, medium plasticity, soft, trace sand organic.	
		25	4	Split Spoon		ML	23.5'-24' <u>Clayey Silt</u> - As above, stiff, non-plastic, 10 ft. heave.	
		30	5	Split Spoon		SP	27.5'-29' <u>Sand</u> - Grey, medium to fine grained, clean.	
		35	6	Split Spoon				



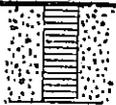
Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT Reynolds

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Boring No. RL-3 (deep)

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
		40	7	Split Spoon			37.5'-39' <u>Clayey Silt-Grey</u> , plastic, highly organic.	
		45						
		50						
		55						
		60						
		65						
		70						



PROJECT Reynolds

Page 1 of 1

Location _____

Boring No. RL-4 (shallow)

Surface Elevation _____

Drilling Method Auger

Total Depth 13.5 ft.

Drilled By Sweet, Edwards & Assoc.

Date Completed 9/30/83

Logged By J.J.Maul

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
<p>Bentonite Seal</p> <p>Gravel Pack</p> <p>2" Sch. 80 PVC Casing</p> <p>0.010" Slotted PVC Screen</p>							See Boring Log for RL-4 (deep).	



PROJECT Reynolds

Page 1 of 1

Location _____

Boring No. RL-4 (deep)

Surface Elevation _____

Drilling Method Auger

Total Depth 35 ft.

Drilled By Sweet, Edwards & Assoc.

Date Completed 9/30/83

Logged By J.J. Maul

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
Bentonite Seal 2" Sch. 80 PVC Casing Cravel Pack 0.010" slotted PVC screen		5	1	SS		ML	3.5'-5' <u>Clayey Silt-</u> Grey, soft, roots, slightly plastic.	
		10	2	SS		ML	8.5'-10' <u>Silty Clay-</u> Grey-blue, soft.	
		15	3	SS		ML	13.5'-15' <u>Silty Clay-</u> Grey some silty sand at end of spoon.	
		20	4	SS		ML	18.5'-20' <u>Silt-</u> Grey, organics (roots, wood), trace very fine sand, some sandy lenses.	
		25	5	SS		ML	23.5'-25' <u>Clayey Silt-</u> Greyish green, organics, trace sands at end of spoon.	
		30	6	SS		ML	28.5'-30' <u>Sandy Silt-</u> Grey some very fine mica sand, massive.	
		35	7	SS		ML	33.0'-35' <u>Sandy Silt-</u> Same as above.	



PROJECT REYNOLDS BLACK MUD LAGOON

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Location NE corner of lagoon

Boring No. RL-5

Surface Elevation Top of PVC = 13.65 ft.

Drilling Method Hollow Stem Auger

Total Depth 40 ft.

Drilled By Sweet, Edwards & Assoc.

Date Completed 7/20/84

Logged By D. Dykes/J. Maul

WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
							0'-5' Fill	
		5					8'-9.5' <u>Silt</u> - Grey to tan mottling with some red staining, some clay and very fine sand, roots, cohesive, unsaturated. (ML)	
		10					10.5'-12' <u>Silt</u> - Tan to grey, mottled, some organics stained red; Grey, fine to very fine sand in tip of spoon (saturated). (ML)	
		15					13.5'-15' <u>Silty Sand</u> - Grey fine to very fine sand, saturated. (SM)	EC = 450 micro-mhos/cm
		20					15.5'-17' <u>Sand</u> - Grey, massive, fine to very fine sand, trace silt, saturated. (SM)	
		25					18.5'-20' <u>Silty Sand</u> - Grey fine to very fine sand, saturated. (SM)	
		30					20.5'-22' <u>Sand</u> - Grey, massive, some buried organics, very fine to fine sand, saturated. (SM)	
		35					28.5'-30' <u>Silty Clay</u> - Grey, organics. (CL)	
							33.5'-35' <u>Silty Clay</u> - Same as above. (CL)	



WELL DETAILS	PENE-TRATION TIME/RATE	DEPTH (FEET)	SAMPLE		PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			NO.	TYPE				
		40					38.5'-40' Silty Clay- Same as above. (CL)	
		45					7/19/84 First borehole to 40' abandoned with bentonite slurry tremied from bottom of hole to surface.	
		50					7/20/84 Topped off with bentonite powder 12 to 0 feet. Moved over 5 ft. and installed RL-5. Drilled to 22 ft.	
		55					7/19/84 Depth to water - 11.5 ft., with hole to 40 ft.	
		60						
		65						
		70						



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LOG OF BORING PZ-1

(Page 1 of 1)

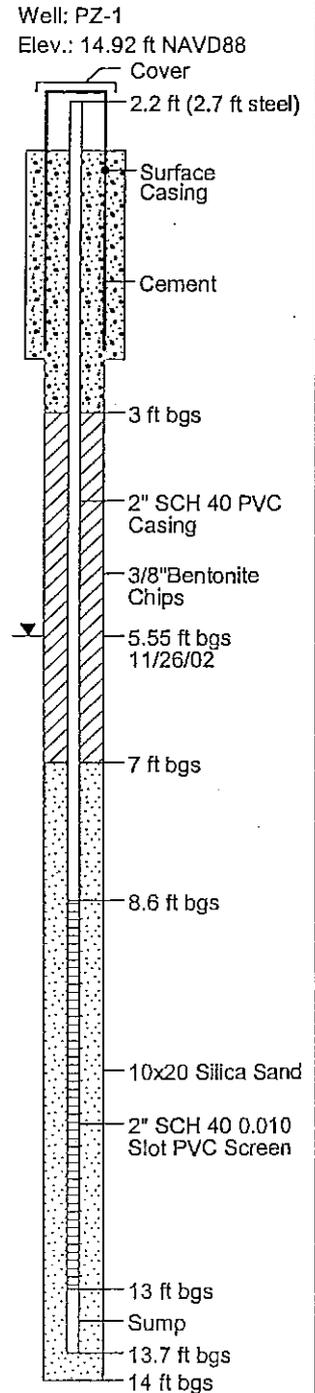
Alcoa Longview Site
Former Reynolds Metals Facility
Longview, Washington

MFG Project# 059741

Drilling Agency : Cascade Drilling, Inc.
Drill Rig : CME 85 Track Rig
Drilling Method : Hollow Stem Auger/9" O.D.
Sample Method : 1.5"x1.5" Split Spoon
Sample Type : 2.5 foot Interval

Date Completed : 11/25/02
Logged By : N. Morrow
Top of Casing Elev. : 14.92 ft NAVD88
Northing Coordinate : 302744.72
Easting Coordinate : 1008299.05

Depth ft bgs	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	REMARKS
0	SILTY SAND, dark brown, moist. Fill.	AR	[Cross-hatched pattern]				Well slickups were measured from top of casing to top of concrete.
1	SAND, black, fine sand size material, very moist to wet. Waste.	AR	[Cross-hatched pattern]				
2	-yellowish orange with iron oxide mottling, few to minor gravel up to 1/8-inch size, slightly moist to moist.	AR	[Cross-hatched pattern]		10		Located in south plant area adjacent to DP-12, PZ-2, and surface water ditch.
3	-silt size waste			1	5	50	
4	SANDY SILT, light brown to light gray, few to minor iron oxide mottling, very fine to fine sand, moist. Native.	ML	[Diagonal lines]		5		
5	CLAYEY SILT to SILTY CLAY, gray to greenish gray, minor sand, sulfidic odor, moist to very moist.				2		
6				2	2	100	
7	SANDY SILT to SANDY CLAY, olive gray, wet. CLAYEY SILT to SILTY CLAYEY, olive gray, iron oxide mottling, few to minor fine to coarse sand, minor rootlets, slightly moist to moist.	ML-CL	[Diagonal lines]		1		
8				4	4		
9				3	3	100	
10	SILT, greenish gray to gray, iron oxide mottling, few clay, moist, minor saturated intervals with fine to very coarse sand up to 0.25 and 0.5 feet thick.				4		
11				4	8	100	
12		ML	[Diagonal lines]		8		
13	-greenish gray, iron oxide mottling -SANDY SILT, saturated, fine sand, few medium to very coarse sand, few to minor clay				4		
14	SANDY CLAY to CLAYEY SAND, wet to saturated.	CL	[Diagonal lines]		7	100	
14	SILT, greenish gray, iron oxide mottling, moist.	ML	[Diagonal lines]		9		
15	Total depth of borehole = 14 feet bgs.						



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LOG OF BORING PZ-2

(Page 1 of 1)

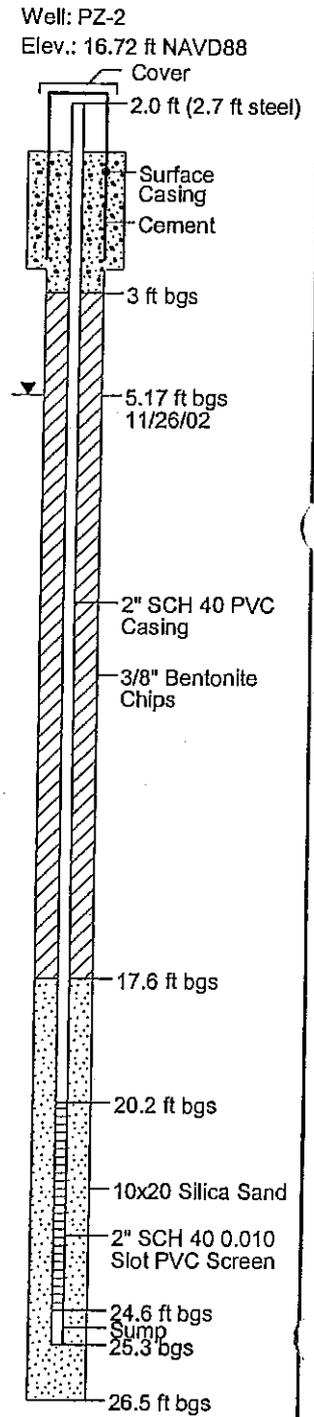
Alcoa Longview Site
Former Reynolds Metals Facility
Longview, Washington

MFG Project# 059741

Drilling Agency : Cascade Drilling, Inc.
Drill Rig : CME 85 Track Rig
Drilling Method : Hollow Stem Auger/9" O.D.
Sample Method. : 1.5"x1.5' Split Spoon
Sample Type : 2.5 foot Interval

Date Completed : 11/25/02
Logged By : N. Morrow
Top of Casing Elev. : 16.72 ft NAVD88
Northing Coordinate : 302751.01
Easting Coordinate : 1008300.80

Depth ft bgs	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	REMARKS
0	SAND, dark brown, medium grained, minor gravel up to 3-inch size, moist.	AR	[Cross-hatched pattern]				Well stickups were measured from top of casing to top of concrete.
1	SILT grades to SILTY SAND, black, very fine to fine sand size material, very moist to wet grades to moist to very moist. Waste.	AR	[Cross-hatched pattern]	1	4	100	
2					5		Located in south plant area adjacent to DP-12 and PZ-1.
3	CLAYEY SILT to SILTY CLAY, gray, few to some iron oxide mottling, very moist to wet. Native.	ML	[Vertical lines pattern]	2	1	100	
4					1		
5					1		
6	SILTY SAND to CLAYEY SAND, dark gray, fine to very coarse sand, saturated.	SM	[Dotted pattern]	3	5	15	
7					4		
8	CLAYEY SILT to SILTY CLAY, gray, iron oxide mottling, very moist to wet grades to moist to very moist with no iron oxide mottling.	ML-CL	[Vertical lines pattern]	4	2	100	
9					5		
10					4		
11	SAND, gray to greenish gray, wet to saturated.	SP	[Dotted pattern]	5	5	100	
12					10		
13	SILT to SANDY SILT, light brownish gray, few to no iron oxide mottling, minor very fine to fine sand, very moist.	ML	[Vertical lines pattern]	6	5	5	
14	-light brownish gray, wet to saturated				10		
15					17		
16							
17	SAND, gray, very fine to fine grained, moderately dense, wet to saturated.		[Dotted pattern]	7	27	30	
18					50/		
19					5.5"		
20	-fine to medium sand						
21					11	20	
22					28		
23	-as above				32		
24							
25	-very fine to fine sand, gradual increase to SILTY SAND.			9	7	10	
26					15		
27					9		
28							
	Total depth of borehole = 26.5 feet bgs			10	4	20	
					4		
					2		



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LOG OF BORING PZ-3

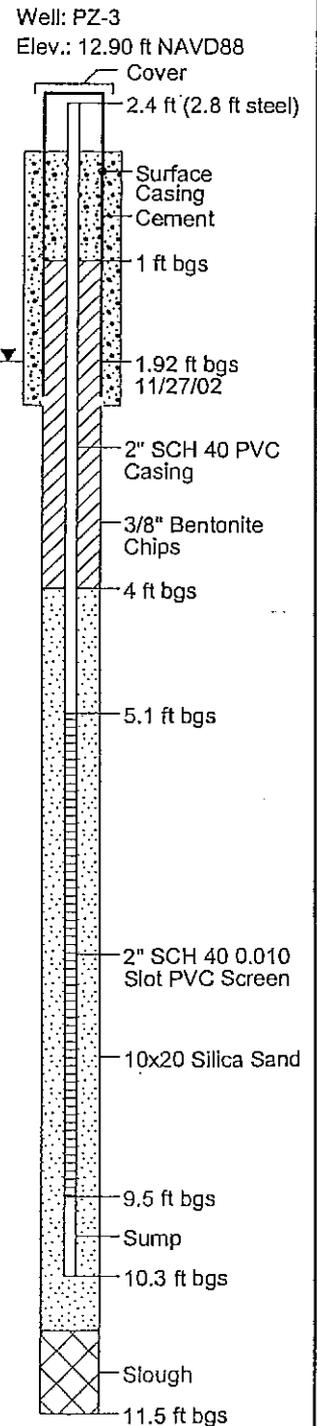
(Page 1 of 1)

Alcoa Longview Site
 Former Reynolds Metals Facility
 Longview, Washington
 MFG Project# 059741

Drilling Agency : Cascade Drilling, Inc.
 Drill Rig : CME 85 Track Rig
 Drilling Method : Hollow Stem Auger/9" O.D.
 Sample Method : 1.5"x1.5' Split Spoon
 Sample Type : 2.5 foot Interval

Date Completed : 11/26/02
 Logged By : N. Morrow
 Top of Casing Elev. : 12.90 ft NAVD88
 Northing Coordinate : 302972.98
 Easting Coordinate : 1008251.97

Depth ft bgs	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	REMARKS
0	SAND, brown, few gravel 3/4-inch size, fine to medium grained, some to few silt, wet. Fill.				20		Well stickups were measured from top of casing to top of concrete.
1	SAND, brown, fine to medium grained, minor silt. Fill.	AR		1	14	40	
2	SILT to SANDY SILT, black, dry to slightly moist. Waste.	AR			14		Located in south plant area on south side of cryolite storage building, adjacent to road.
3	SAND, gray, medium grained, some to few fine to coarse sand, wet. Native.			2	10		
4					9	50	Soil Sample: PZ-3(2.5'-4")
5	-saturated			3	7		
6		SP			4		
7					5	75	
8	-slight increase in coarseness, sulfidic odor, 0.25-foot silt layer at approximately 8 feet bgs.				6		
9					2		
10					3	100	
11	SILT to CLAYEY SILT, olive gray, minor very fine to fine sand, very moist to wet, grades to wet.	ML			3		
12				5	1	75	
					2		



Total depth of borehole = 11.5 feet bgs

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LOG OF BORING PZ-4

(Page 1 of 1)

Alcoa Longview Site
Former Reynolds Metals Facility
Longview, Washington

MFG Project# 059741

Drilling Agency : Cascade Drilling, Inc.
Drill Rig : CME 85 Track Rig
Drilling Method : Hollow Stem Auger/9" O.D.
Sample Method : 1.5"x1.5' Split Spoon
Sample Type : Continuous

Date Completed : 11/25/02
Logged By : N. Morrow
Top of Casing Elev. : 11.27 ft NAVD88
Northing Coordinate : 303050.14
Easting Coordinate : 1008584.21

Depth ft bgs	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	REMARKS
0	SAND, brown, fine to coarse grained, roots, very moist to wet. Cap material.	AR	[Cross-hatched pattern]	1	2		Well casings measured from top of casing to top of concrete.
1	SAND to SILTY SAND, black, fine sand and silt size material; few to some rootlets, very moist. Waste.	AR	[Cross-hatched pattern]	2	4	50	
2	-gray, fine to very coarse sand and silt size waste, very moist to wet			6	6		
3	-as above			8			
4	-wet			10	50	Located in south plant area on south side of cryolite storage building, adjacent to road.	
5		1					
6		2	80				
7		3					
8		4		1	75	Soil Sample: PZ-4(3'-6')	
9		5		1/12"			
10	SILT, light brown, iron oxide mottling, moist.	ML	[Vertical lines pattern]	6	6	100	Soil Sample: PZ-4(12'-13.5')
11	-greenish gray, iron oxide mottling, slightly moist to moist			7	5	100	
12	-wet			8	2	100	
13	-slightly moist			9	7	100	
14		10	10	100			
15		11	10	100			
16		12	8	100			
17		13	4	100			
18		14	4	100			
19		15	4	100			
20		16	11	100			
21		17	9	10			
22		18	6				
23		19	9				
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LOG OF BORING PZ-5

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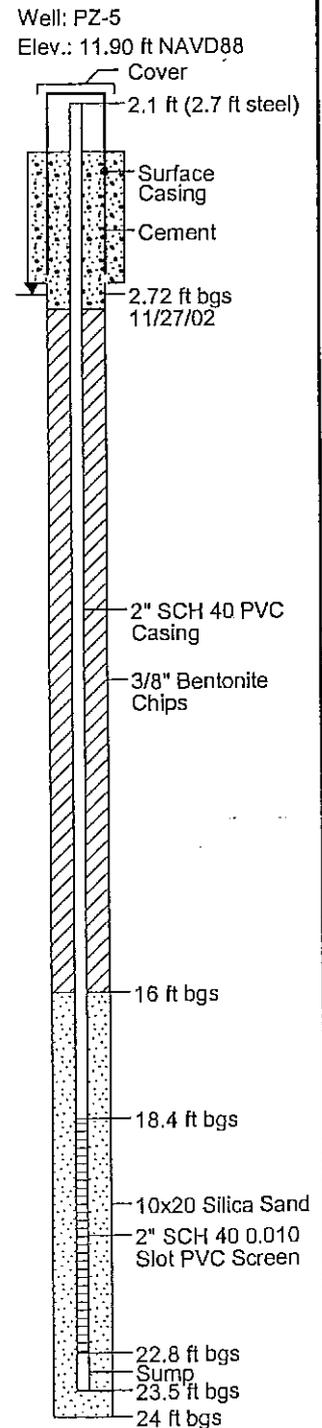
Alcoa Longview Site
 Former Reynolds Metals Facility
 Longview, Washington

MFG Project# 059741

Drilling Agency : Cascade Drilling, Inc.
 Drill Rig : CME 85 Track Rig
 Drilling Method : Hollow Stem Auger/9" O.D.
 Sample Method : 1.5"x1.5' Split Spoon
 Sample Type : 2.5 foot interval

Date Completed : 11/26/02
 Logged By : N. Morrow
 Top of Casing Elev. : 11.90 ft NAVD88
 Northing Coordinate : 302595.68
 Easting Coordinate : 1007993.58

Depth ft bgs	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	REMARKS
0	SAND, brown, medium grained, wet. Cap material.	AR					Well casings measured from top of casing to top of concrete.
1	SILTY SAND, gray-brown, very fine to medium sand, few coarse sand, few gravel up to 3/4-inch size, minor rootlets, wet. Fill.	AR					Located in south plant area near surface water gaging station G1; south side of ditch/pond.
2	SILTY SAND to SANDY SILT, yellowish brown, slightly moist to moist. Fill.	AR		1	3	60	
3	SILTY SAND to SANDY SILT, gray, very fine to fine sand, minor rootlets, crumbly, ammonia-like odor, moist.	AR		2	14		
4	-few small fractures with brown silt, ammonia-like odor	AR		3	6		
5	-gray to olive gray, ammonia-like odor	AR		4	6	100	
6	SAND, gray to olive gray, sulfidic to ammonia-like odor, saturated.	SP-SM		5	7		
7	SAND, light gray to black, very fine to fine sand, few medium sand, wet to saturated.	SP-SM		6	13	100	
8	SILT, sulfidic to ammonia-like odor, moist to very moist.	SM-ML		7	5		
9	SAND, dark gray with black laminations, wet to saturated.	SM-ML		8	7	80	
10	-gray, very fine to fine grained, saturated.	SM-ML		9	3		
11	-fine to medium grained, few to minor silt	SM-ML		10	5	80	
12	-as above, ammonia-like odor	SM-ML		11	8		
13		SM-ML		12	8	80	
14		SM-ML		13	9		
15		SM-ML		14	11	75	
16		SM-ML		15	15		
17		SM-ML		16	14		
18		SM-ML		17	5	10	
19		SM-ML		18	11		
20		SM-ML		19	4	10	
21		SM-ML		20	18		
22		SM-ML		21	4		
23		SM-ML		22	5	10	
24		SM-ML		23	16		
25	Total depth of borehole = 24 feet bgs						



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Sweet, Edwards & Associates, Inc.

BORING LOG R-1S

Project REYNOLDS LONGVIEW Sheet 2 of 2
 Client REYNOLDS Drilled By CEW
 Feature POTLINER STORAGE PILE Logged By JEE
 Location WEST OF POTLINER PILE; TOE OF DIKE see map Date Logged 10/4/82
 Depth to Water see log., well R-1D Surf Elev. _____
 Date October 4, 1982 Total Depth 12 feet

WELL DETAIL	UNIFIED CLASS	DEPTH (ft)	ELEVATION (ft)	SAMPLE RECORD			DESCRIPTION
				Sample No	Blows per 6 inches	Recovery w/n 0.1 ft		Sample Type
<p>Security Casing</p> <p>granular material</p> <p>heavy soil</p> <p>2" PVC</p> <p>2" screen .010 slots</p>		5				<p>Elevation Top PVC = 14.87 feet</p> <p>SEE LOG, WELL R-1D</p>	
		10					
		15					
		20					
		25					
		30					
		35					
		40					
		45					
		50					
		55					
		60					

REMARKS:



Project REYNOLDS LONGVIEW Sheet 1 of 2
 Client Reynolds Drilled By CEW
 Feature POTLINER STORAGE PILE Logged By JEE
 Location WEST OF POTLINER PILE: Toe of Dike, see map Date Logged 10/4/82
 Depth to Water 5.5 feet Surf Elev. _____
 Date October 4, 1982 Total Depth 26 feet

WELL DETAIL	UNIFIED CLASS	DEPTH (ft)	ELEVATION (ft)	SAMPLE RECORD				DESCRIPTION
				Sample No	Blows per 6 inches	Recovery w/n 0.1 ft	Sample Type	
		5						Elevation Top PVC = 15.38 feet.
		4.5'-6.0'				SS	4.5'-6.0' Spoils, sand, medium to coarse grained, clean, scattered fine gravel (SP) dry.	
		1		100	Push			
		9.5'-11-0'				SS	9.5'-11-0' Silty, v. fine sand to fine sandy-silt (SM-ML), dark gray, saturated, roots & organics, rotten smell, water sample #1 (D-T-W. 5.4 pumped 2 gallons prior to taking sample).	
		2		100	Push			
		10						
		14.5'-16'			SS	14.5'-16' Same as above w/less sand (ML) saturated, roots, rotten odor, water sample #2 (D-T-W. 10.0', pumped 2 gal prior to laking sample)		
		3		100	Push			
		15						
		19.5'-21.0'			SS	19.5'-21.0' Same as above with clay, organics and wood fragments (ML-CL)		
		4		100	Push			
		20						
		24.5'-26.0'			SS	24.5'-26.0' Silt, gray, w/4" peat layer moist, not saturated (ML) water sample #3 (D-T-W. 17', pumped 7 gallons prior to taking sample).		
		5		100	Push			
		25						
		30						

REMARKS: Analysis of ground water samples taken during drilling by Reynolds, Longview. Redrilled twice due to heaving of upper sand.



Project REYNOLDS LONGVIEW Sheet 1 of 1
 Client REYNOLDS Drilled By CEW
 Feature POTLINER STORAGE PILE - BACKGROUND WELL Logged By JEE
 Location WEST OF INDUSTRIAL WAY; SOUTH OF IP SWITCHYARD Date Logged 10/5/82
 Depth to Water 2.4 feet Surf Elev. _____
 Date October 5, 1982 Total Depth 15 feet

UNIFIED CLASS	DEPTH (ft)	ELEVATION (ft)	SAMPLE RECORD			DESCRIPTION
			Sample No	Blows per 6 inches	Recovery w/n 0.1 ft Sample Type	
<p>Security casing WELL DETAIL 2" riser 2" screen 1010 slots Spoil sand at backfill Bentonite granular at riser</p>						Elevation Top PVC = 6.53 feet
		0-2'				Thick mat of marsh grass and peat.
		3.5'-5.0'				Spoon blocked
		5				SS
		6.0'-7.5'	1	100	Push	Interbedded silt, clay and fine sand, w/iron staining, roots and other organics, partially saturated; water sample #1 (D-T-W. 2.4', pumped 4 gal. prior to taking sample).
		8.5'-10.0'	2	100	Push	Silt, gray, soft, partially saturated (ML), fine sand lense from 8.5'-8.7'.
		10				S1
		13.5'-15.0'	3	100	Push	Very fine sand, gray, saturated soft, with interbedded silt (SM-ML), water sample #2 (D-T-W. 7.0', pumped 5 gal. prior to taking sample)
		15				

REMARKS: Analysis of ground water samples taking during drilling by Reynolds, Longview.



Project REYNOLDS LONGVIEW Sheet 1 of 1
 Client REYNOLDS Drilled By CEW
 Feature POTLINER STORAGE PILE Logged By JEE
 Location EAST OF PILE, WEST EDGE OF DITCH, ADJACENT TO Date Logged 10/5/82
 Depth to Water _____ (RR TRACKS) Surf Elev. _____
 Date _____ Total Depth 25 feet

WELL DETAIL	UNIFIED CLASS	DEPTH (ft)	ELEVATION (ft)	SAMPLE RECORD				Elevation Top PVC = 11.15 feet	DESCRIPTION
				Sample No	Blows per 6 inches	Recovery w/n 0.1 ft	Sample Type		
<p>security casing 2" riser 2" screen 0.10" slots spoil sand backfill heave soil green bentonite 2" riser</p>		0' - 2'						Railroad ballast	
		3.5' - 5.0'					SS	Clayey-silt to silty-clay (ML-CL), brown w/iron staining & wood fragments, moist soft.	
	1			100	Push				
		8.5' - 10.0'					SS	Clay, Brown and gray (CL) some silt and very fine sand, soft, partially saturated.	
	2			100	Push				
	13.5' - 15.0'					SS	Fine sandy-silt (ML) w/clay, cohesive, v. soft, partially saturated, water sample #1 (D-T-W. 9.5' bailed sample)		
3			100	Push					
	18.5' - 20.0'					SS	Very fine sand, heaved into the auger, chemical odor.		
4			100	Push					
	22' - 25'							Clay, light green, moderately stiff (CL), auger bit sample.	
5									

REMARKS: Analysis of ground water samples taken during drilling by Reynolds, Longview



Project REYNOLDS LONGVIEW Sheet 1 of 2
 Client REYNOLDS Drilled By JJM
 Feature POTLINER STORAGE PILE Logged By JEE
 Location WEST OF POTLINER PILE: TOE OF DIKE, SEE MAP Date Logged 10/6/82
 Depth to Water 11.5 Surf Elev. _____
 Date 10/6/82 Total Depth _____

WELL DETAIL	UNIFIED CLASS	DEPTH (ft)	ELEVATION (ft)	SAMPLE RECORD			Elevation Top PVC = 16.71 feet	DESCRIPTION
				Sample No	Blows per 6 inches	Recovery w/n 0.1 ft			Sample Type
<p>Security casing 1" riser pellet and sand mix bentonite pellets 2" screen SP 0.10" slots</p>		5		1		100	SS	3.5'-5.0' Spoils, sand, clean, loose (SP)
		10		2		100	SS	8.5'-10.0' Sand, dark gray, v. fine gravel, some silt, saturated v. soft (SM-SP), water sample #1 (D-T-W. 11.5' pumped 4 gallons prior to taking sample).
		15						Severe Sand Heave at 13.5 prevented sampling
		20		4				16' - 18' Silty-clay, gray, v. soft (CL-ML), auger bit sample
		25						27.5' Clay, auger bit sample
		30						

REMARKS: Drilled with wooden plug in hollow stem to prevent sand heave at depth.

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:

Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 - 4	Very soft	0 - 2	<0.125
Loose	4 - 10	Soft	2 - 4	0.125 - 0.25
Medium dense	10 - 30	Medium stiff	4 - 8	0.25 - 0.5
Dense	30 - 50	Stiff	8 - 15	0.5 - 1.0
Very dense	>50	Very stiff	15 - 30	1.0 - 2.0
		Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content
Wet	Much perceptible moisture, probably above optimum

Minor Constituents

Estimated Percentage

Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Legends

Sampling Test Symbols

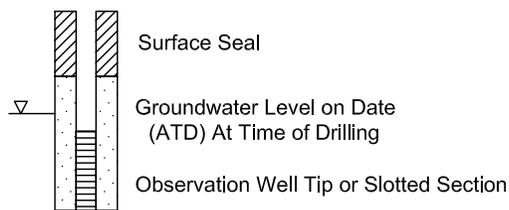
BORING SAMPLES

	Split Spoon
	Shelby Tube
	Cuttings
	Core Run
*	No Sample Recovery
P	Tube Pushed, Not Driven

TEST PIT SAMPLES

	Grab (Jar)
	Bag
	Shelby Tube

Groundwater Observations



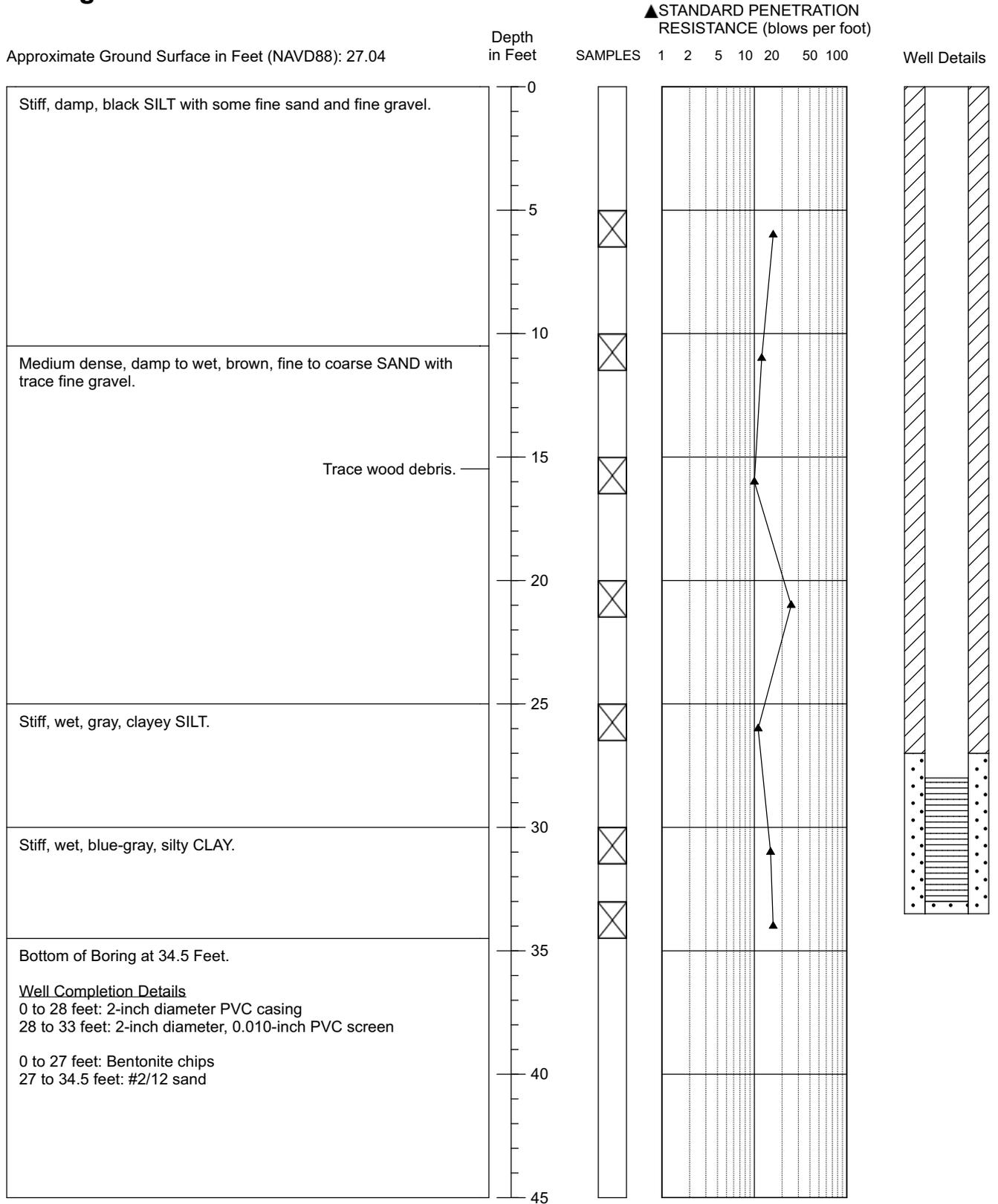
Test Symbols

NS	No Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
TCD	Triaxial Consolidated Drained
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer
TV	Torvane
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits
	Water Content in Percent
	Liquid Limit
	Natural
	Plastic Limit
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	In Situ Density Test

Jun 12, 2007 10:45am cdavidson K:\Jobs\060354-CHINOOK\06035401\06035401-017.dwg FIG A-1

Boring: G-1D

Approximate Ground Surface in Feet (NAVD88): 27.04



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

● WATER CONTENT (percent)



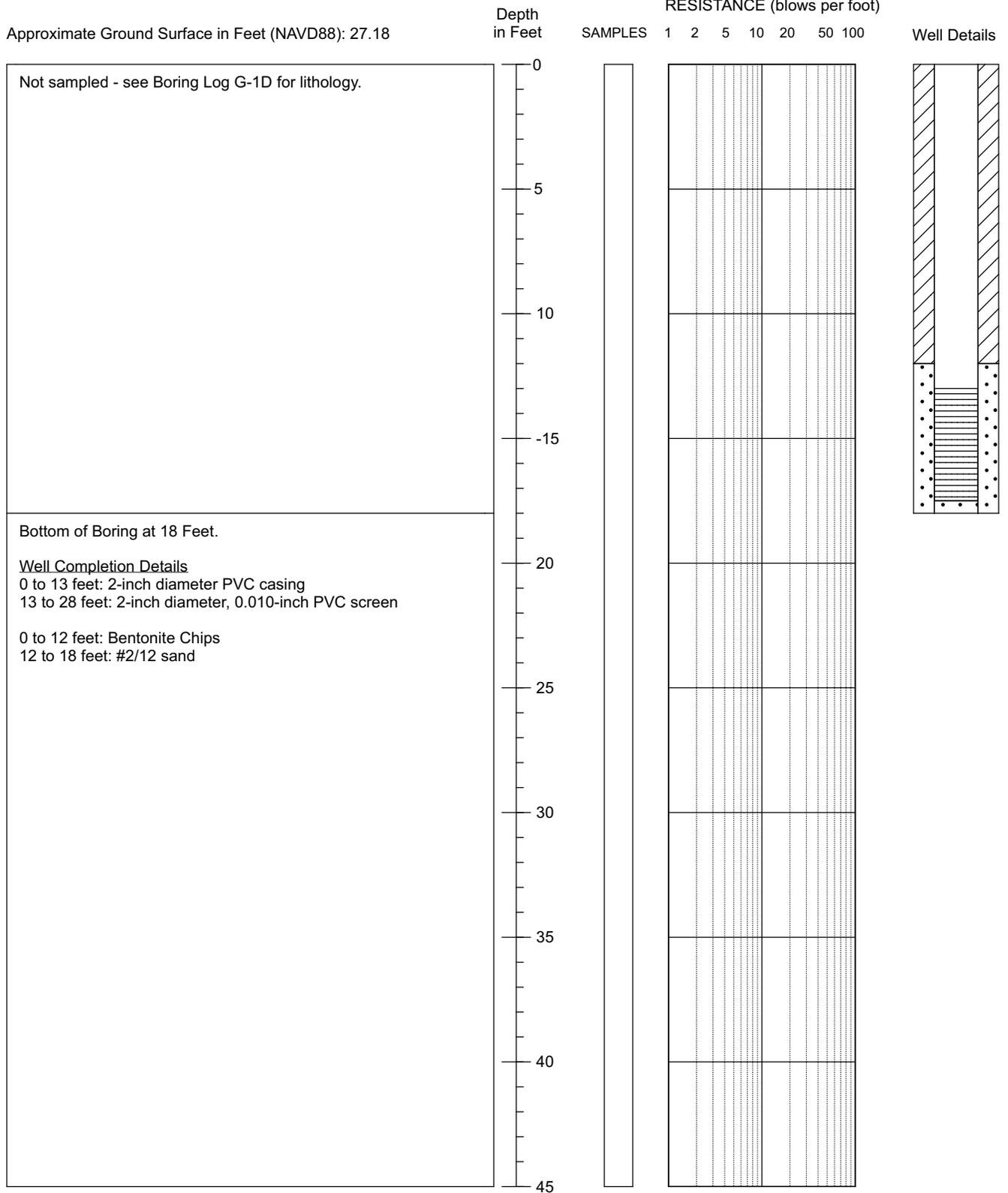
060354-CHINOOKLOGS

Figure A-2
Boring G-1D
Chinook Ventures
Longview Site

Boring: G-1S

Approximate Ground Surface in Feet (NAVD88): 27.18

▲ STANDARD PENETRATION RESISTANCE (blows per foot)



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

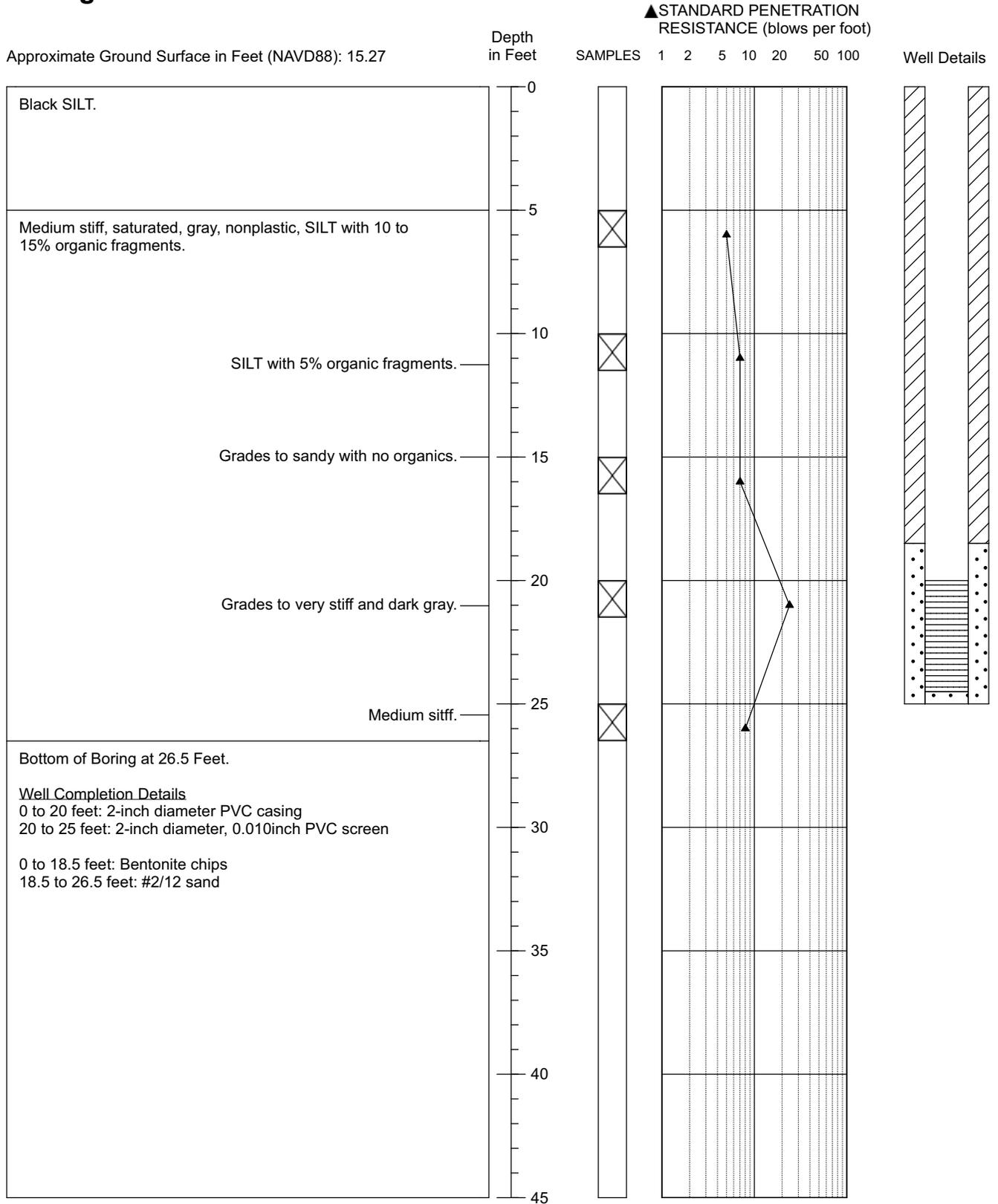


060354-CHINOOKLOGS

Figure A-3
 Boring G-1S
 Chinook Ventures
 Longview Site

Boring: G2-D

Approximate Ground Surface in Feet (NAVD88): 15.27



1. Refer to Figure A1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.



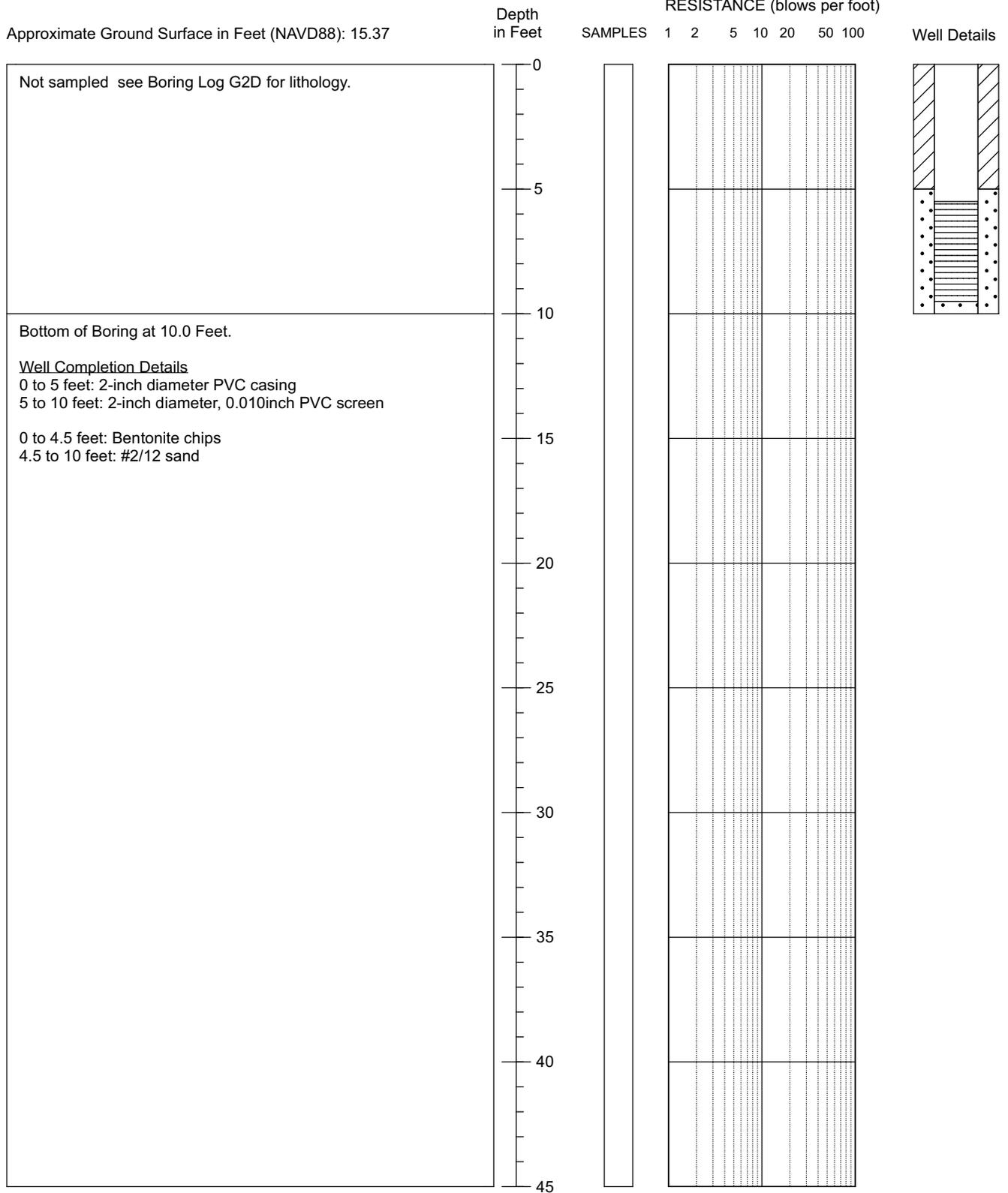
060354CHINOOKLOGS

Figure A-4
 Boring G2-D
 Chinook Ventures
 Longview Site

Boring: G2-S

Approximate Ground Surface in Feet (NAVD88): 15.37

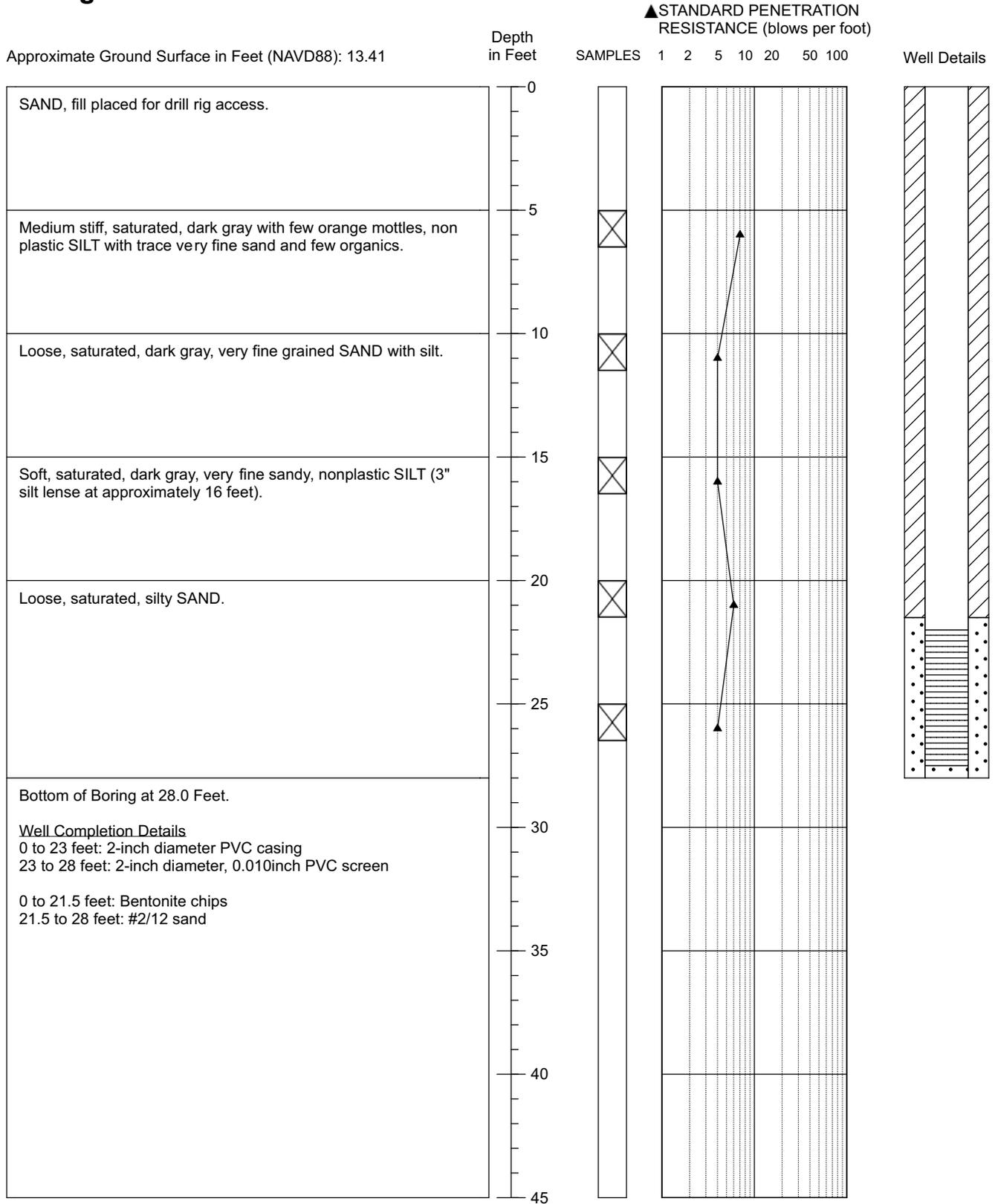
▲ STANDARD PENETRATION RESISTANCE (blows per foot)



1. Refer to Figure A1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

Boring: G3-D

Approximate Ground Surface in Feet (NAVD88): 13.41



1. Refer to Figure A1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

● WATER CONTENT (percent)



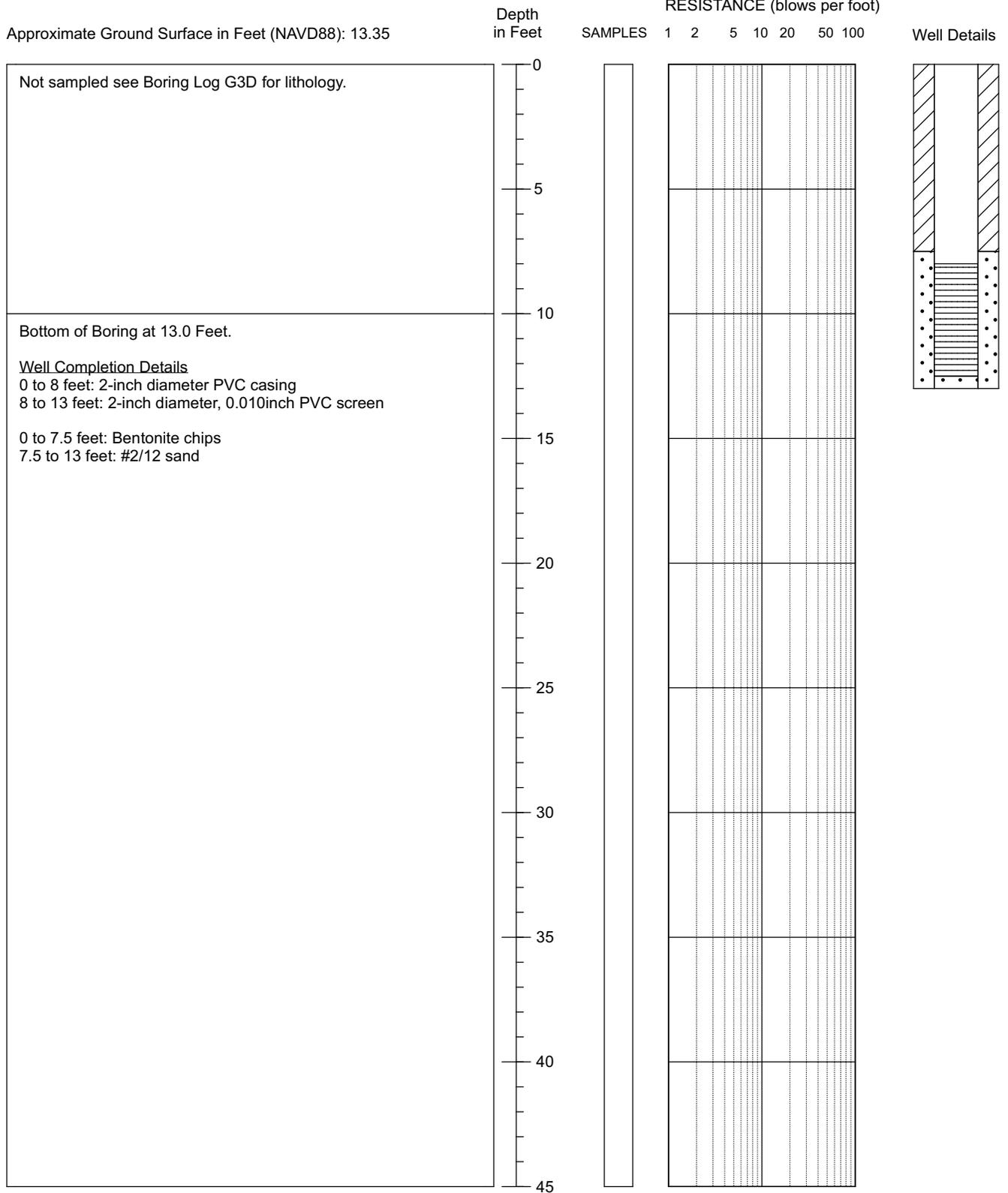
060354CHINOOKLOGS

Figure A-6
Boring G3-D
Chinook Ventures
Longview Site

Boring: G3-S

Approximate Ground Surface in Feet (NAVD88): 13.35

▲ STANDARD PENETRATION RESISTANCE (blows per foot)



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

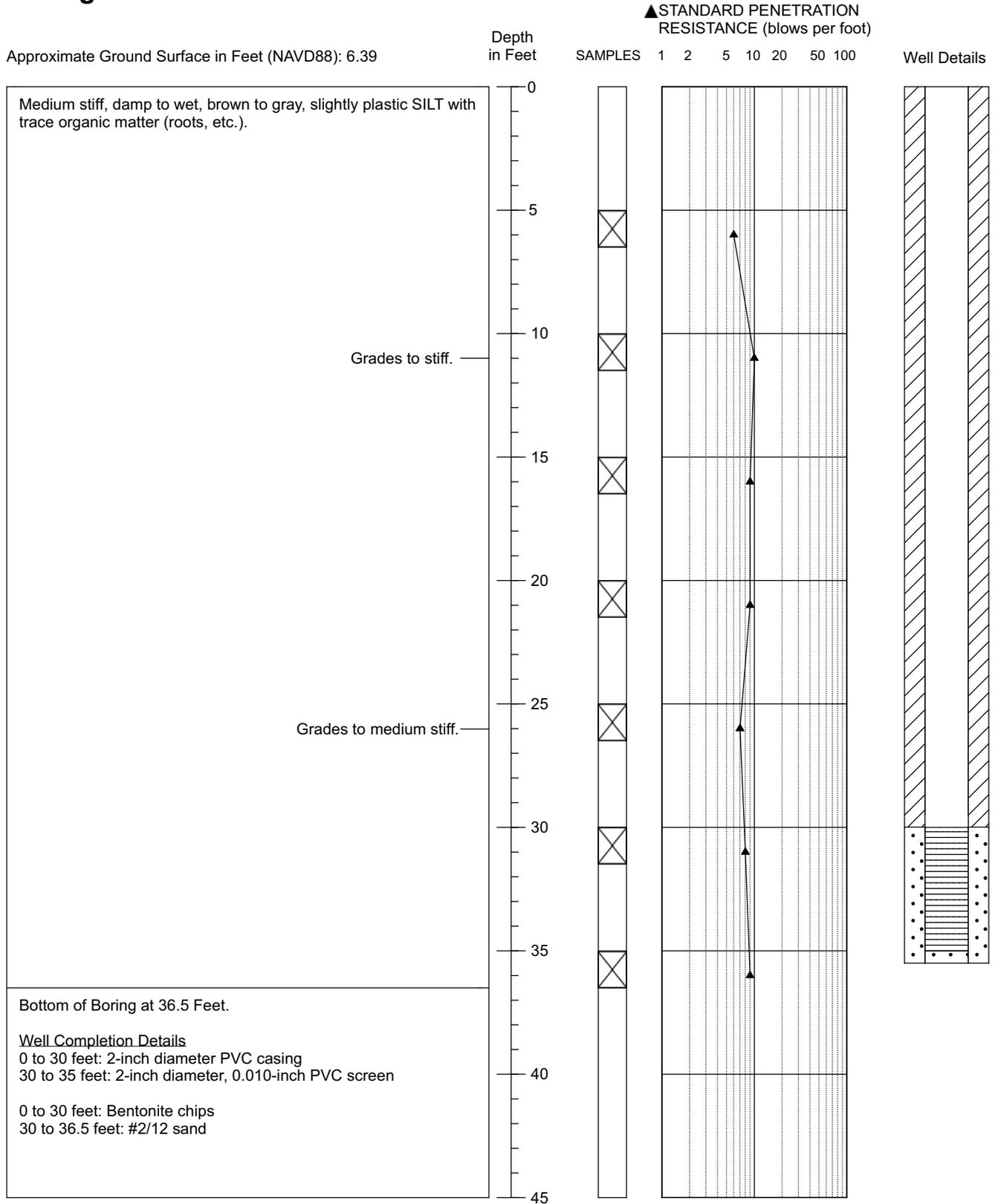


060354CHINOOKLOGS

Figure A-7
 Boring G3-S
 Chinook Ventures
 Longview Site

Boring: G-4D

Approximate Ground Surface in Feet (NAVD88): 6.39



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.



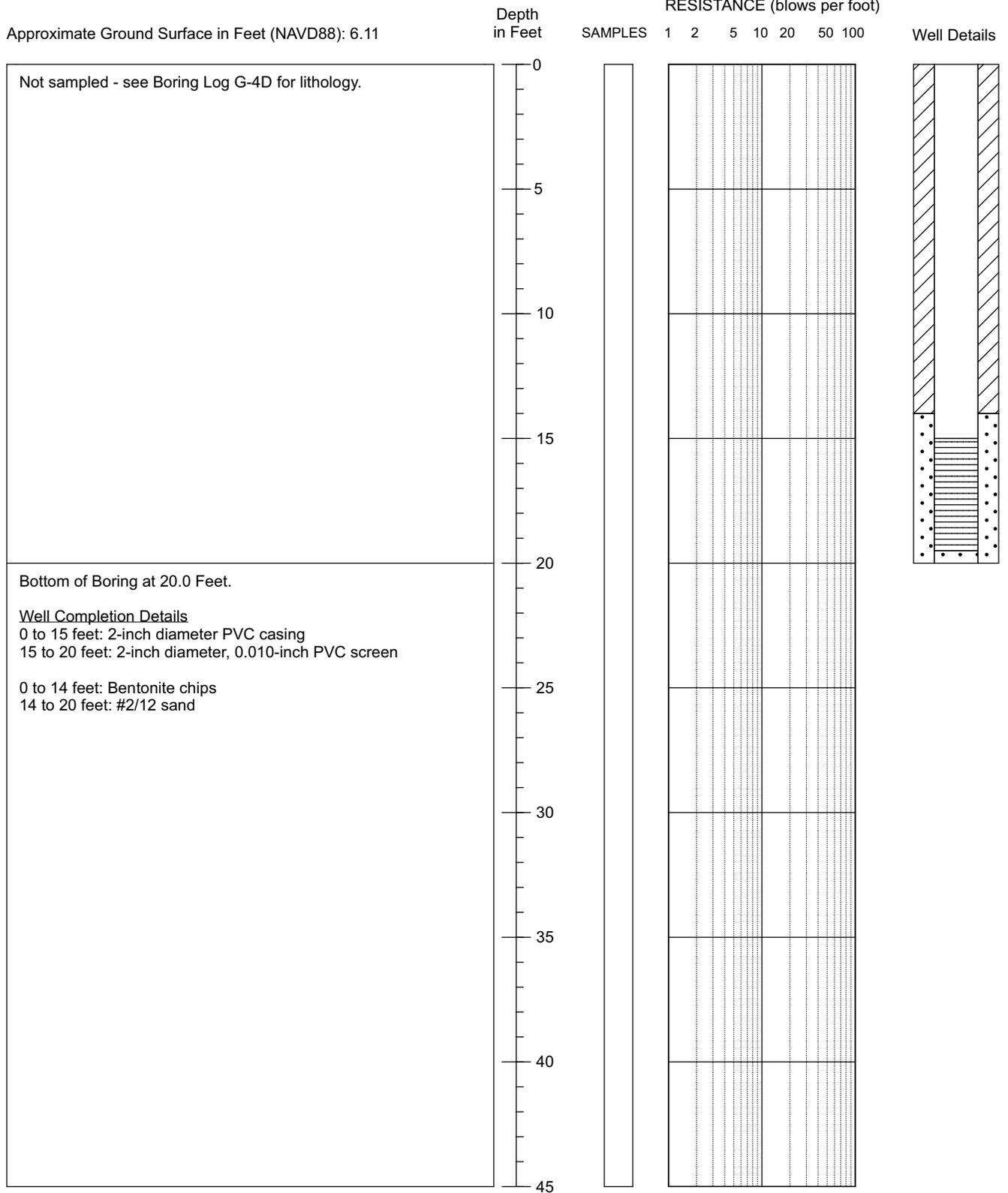
060354-CHINOOKLOGS

Figure A-8
 Boring G-4D
 Chinook Ventures
 Longview Site

Boring: G-4S

Approximate Ground Surface in Feet (NAVD88): 6.11

▲ STANDARD PENETRATION RESISTANCE (blows per foot)



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

● WATER CONTENT (percent)

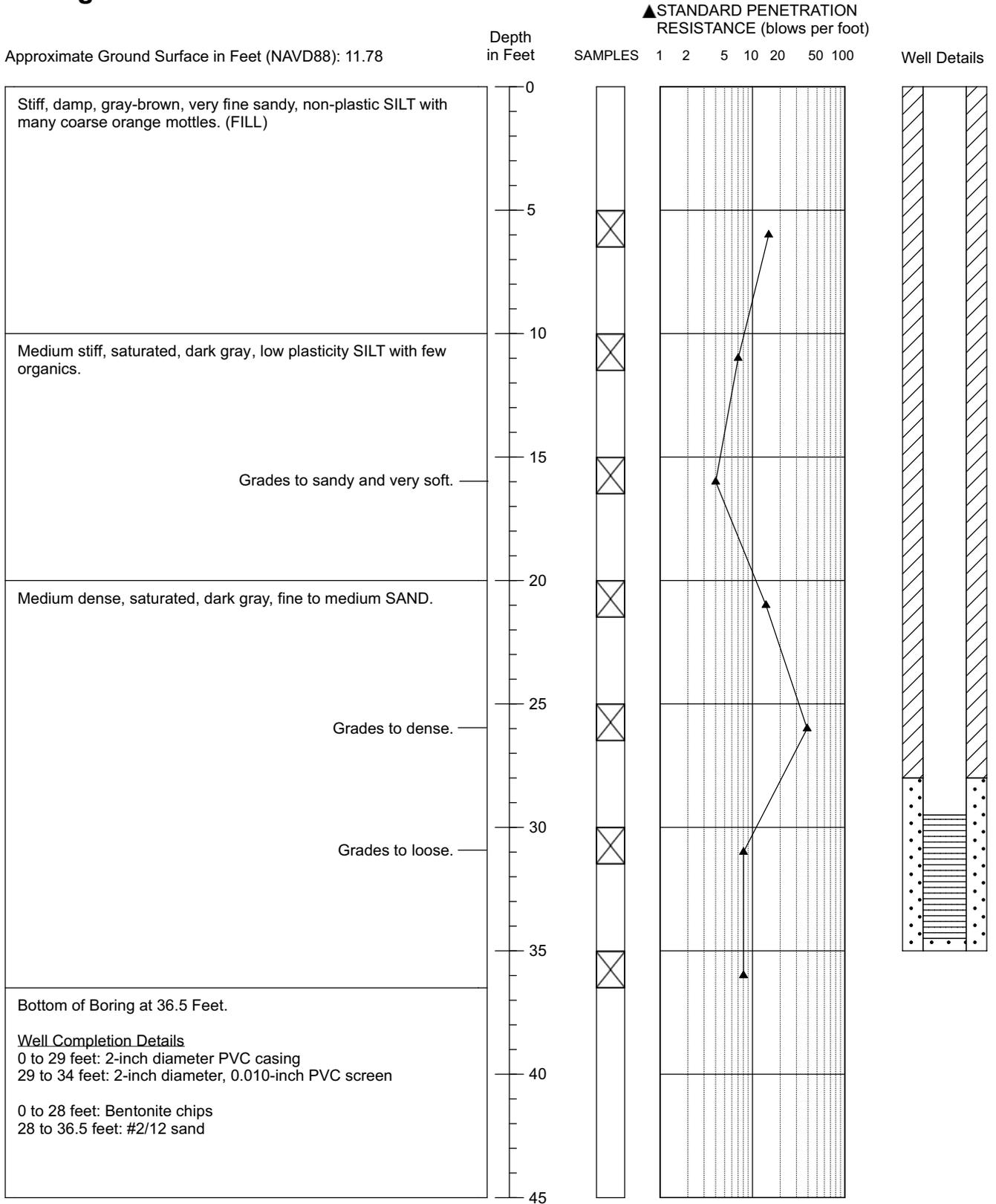


060354-CHINOOKLOGS

Figure A-9
Boring G-4S
Chinook Ventures
Longview Site

Boring: G-5D

Approximate Ground Surface in Feet (NAVD88): 11.78



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

● WATER CONTENT (percent)



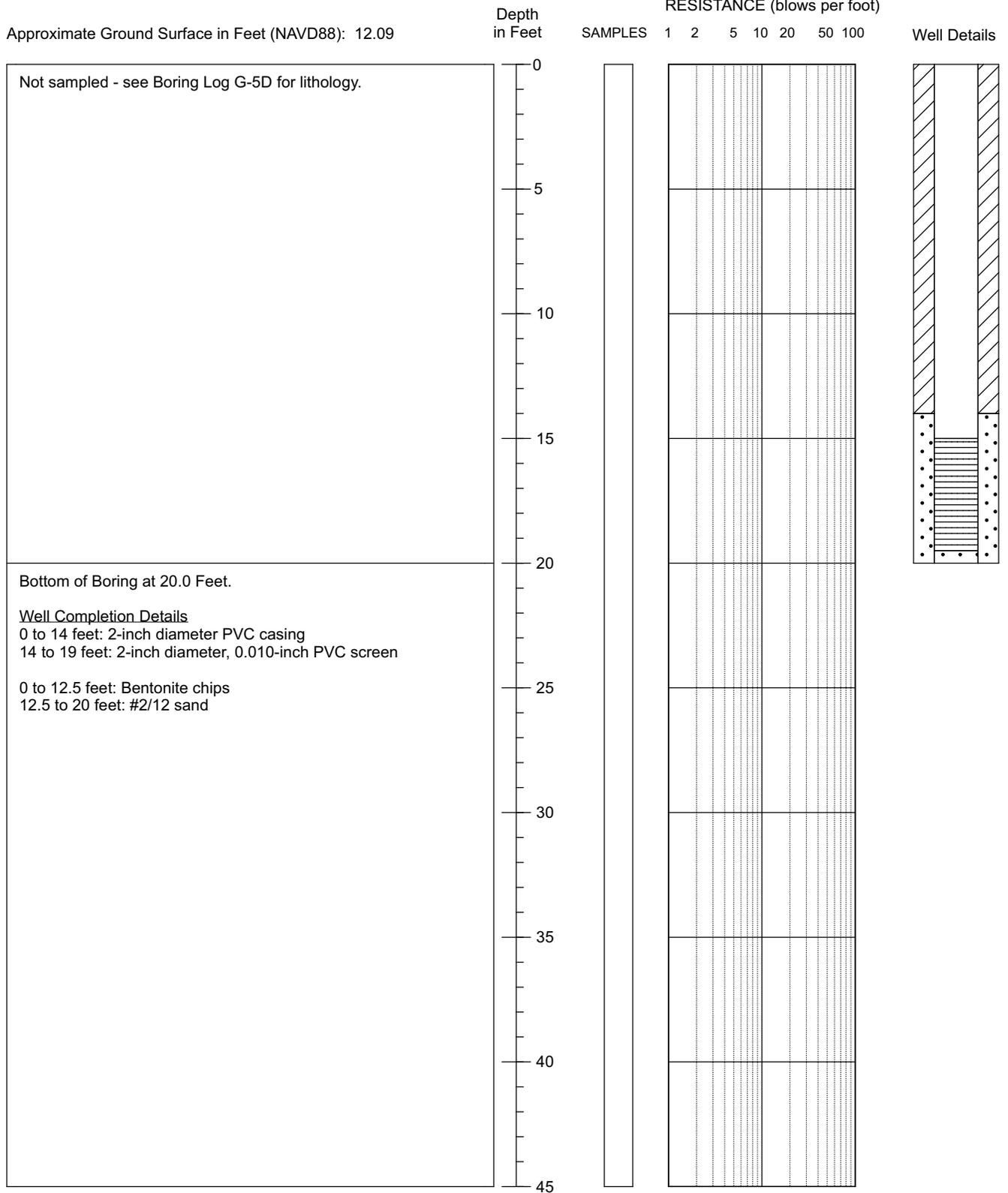
060354-CHINOOKLOGS

Figure A-10
 Boring G-5D
 Chinook Ventures
 Longview Site

Boring: G-5S

Approximate Ground Surface in Feet (NAVD88): 12.09

▲ STANDARD PENETRATION RESISTANCE (blows per foot)

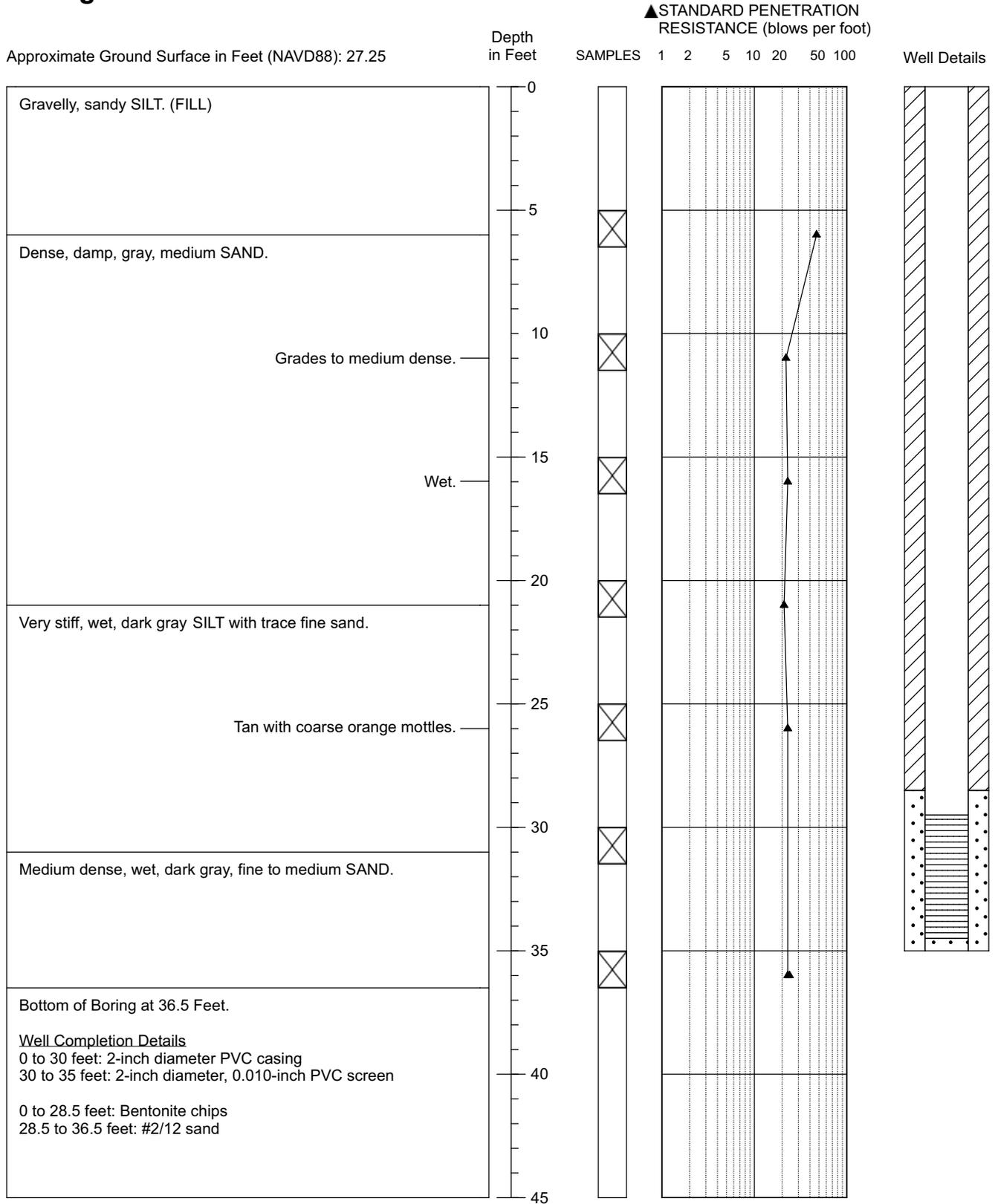


1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

Figure A-11
 Boring G-5S
 Chinook Ventures
 Longview Site

Boring: G-6D

Approximate Ground Surface in Feet (NAVD88): 27.25



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.



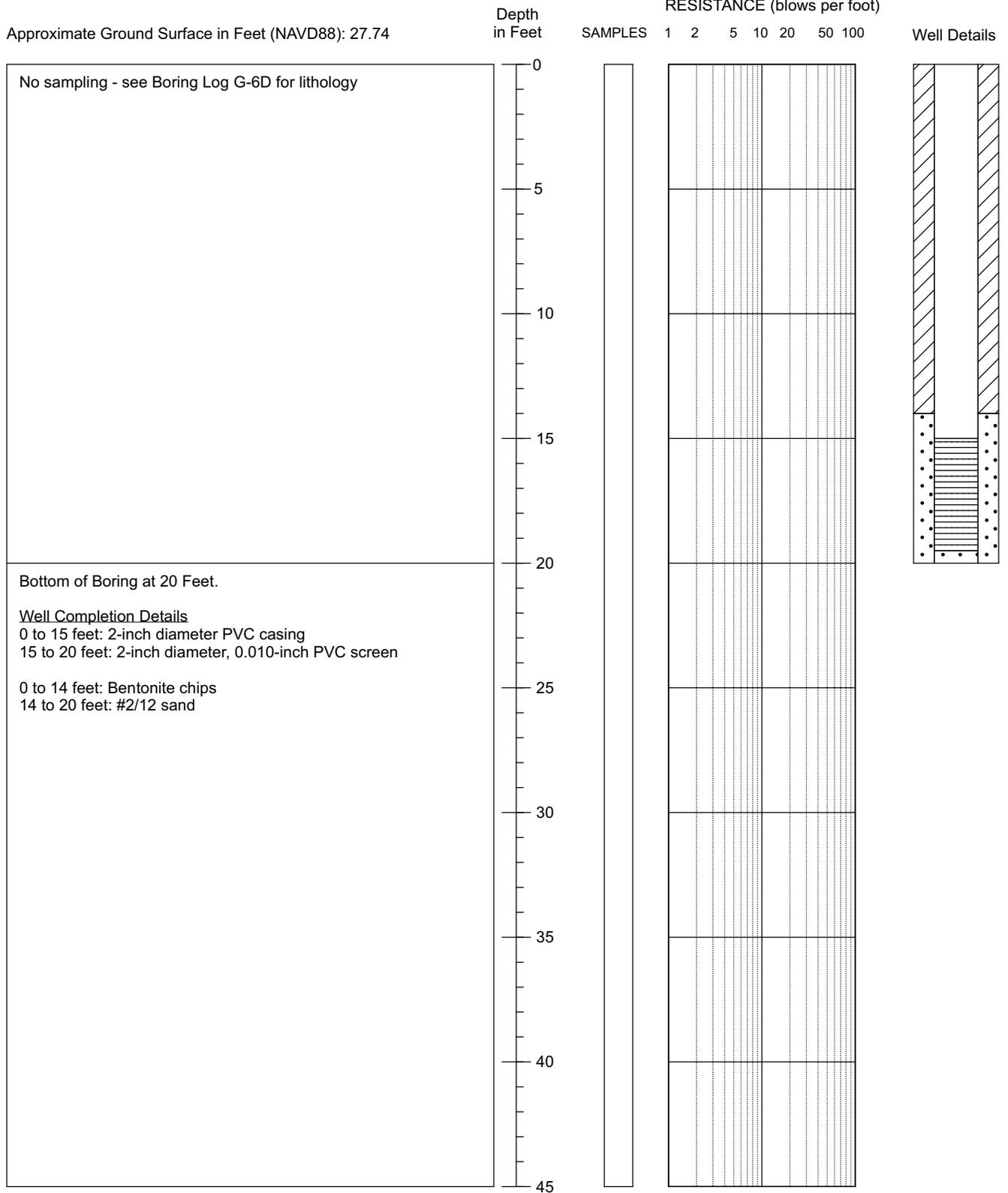
060354-CHINOOKLOGS

Figure A-12
 Boring G-6D
 Chinook Ventures
 Longview Site

Boring: G-6S

Approximate Ground Surface in Feet (NAVD88): 27.74

▲ STANDARD PENETRATION RESISTANCE (blows per foot)



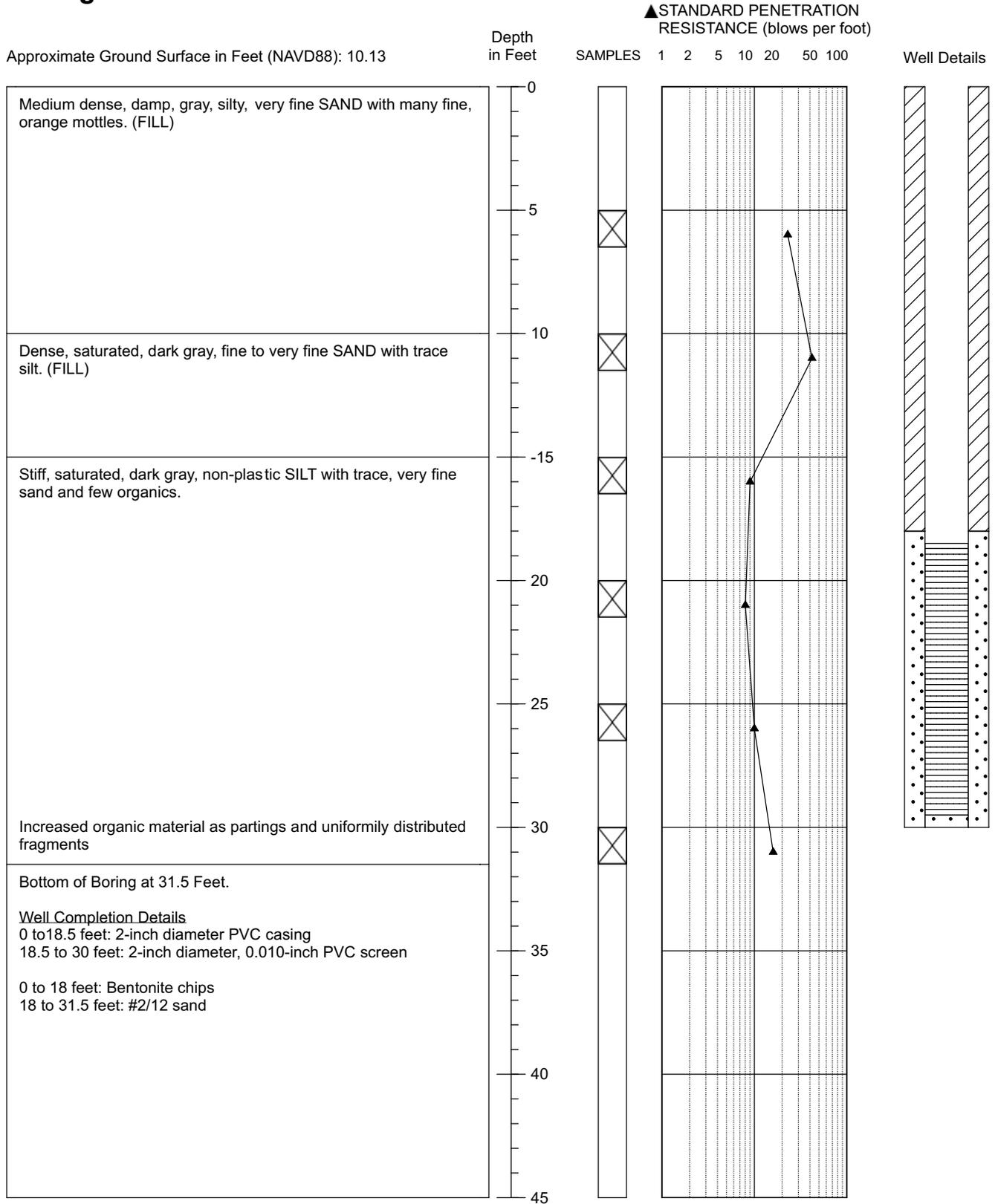
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

● WATER CONTENT (percent)

Figure A-13
Boring G-6S
Chinook Ventures
Longview Site

Boring: G-7D

Approximate Ground Surface in Feet (NAVD88): 10.13



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling or at the time and date specified. Ground water level may vary with time.

● WATER CONTENT (percent)



060354-CHINOOKLOGS

Figure A-14
 Boring G-7D
 Chinook Ventures
 Longview Site

Well Installation Log

SSA4-MW-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct push & Hollow-Stem Auger
Project #: 130720-02.01	Northing: 305483.94 Easting: 1006430.83	Total Depth (ft): 15
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: MW
Collection Date: 1/15/2012		
Contractor: Cascade Drilling		

Depth (ft)	Sample Recovery (%)	Groundwater	GRAVEL (%)	SAND %	SILT %	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme: USCS</small>	Well Details	Graphic Log	Depth (ft)
0			0	100	0	POORLY GRADED SAND (SP): Dry, loose, brown, fine sand. No odor.			0
1		K	80	0	20	SILTY GRAVEL (GM): Wet, slightly cohesive, dark gray. Gravels are angular. No odor.			1
2	70		0	10	90	SILT (ML): Damp, stiff, low plasticity, dark gray, 10% fine sand. No odor.			2
3			0	70	30	SILTY SAND (SM): Wet, loose, gray with light brown mottling, fine to medium sand. No odor.			3
4			0	10	90	@5.0-6.8': Increasing silt content. @5.8-6.0': Fine gravel layer.			4
5			0	10	90	SILT (ML): Damp, stiff, non-plastic, gray with light brown mottling, 10% sand. Occasional thin layers of sand (SP).			5
6	100		0	100	0	POORLY GRADED SAND (SP): Wet, loose, brown.			6
7			0	100	0	@12.6': Grades to medium dense, gray, fine sand.			7
8			0	100	0	SILT (ML): Soft, non-plastic, gray. Occasional wood pieces.			8
9			0	100	0	POORLY GRADED SAND (SP): Moist, medium dense, gray, fine sand. Trace organic debris.			9
10						End of boring @ 15'.			10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20

Well Installation Log

SSA6-MW-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct push & Hollow-Stem Auger
Project #: 130720-02.01	Northing: 303588.88 Easting: 1006762.77	Total Depth (ft): 15
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: MW
Collection Date: 1/5/2012		
Contractor: Cascade Drilling		

Depth (ft)	Sample Recovery (%)	Groundwater	GRAVEL (%)	SAND %	SILT %	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme: USCS</small>	Well Details	Graphic Log	Depth (ft)
0			15	0	85	GRAVELLY SILT (ML): Damp, soft, crumbly, low plasticity, dark gray. No odor. Occasional black, coal-like granules.			0
1			0	0	100				1
2						ELASTIC SILT (MH): Moist, soft, high plasticity, dark gray. No sheen, no odor.			2
3	40					@ 1.9': Rust red mottling.			3
4						@ 2.0'-5.0': No recovery.			4
5						@ 6.4': Grades to firm. Trace sweet, petroleum-like odor.			5
6		N							6
7						@ 7.3': Grades to stiff.			7
8	80					@ 8.0': Grades to sandy.			8
9			0	90	10	POORLY GRADED SAND (SP): Wet, medium dense, gray, fine to medium sand. Moderate sweet, petroleum-like odor, no sheen. Occasional silt layers (ML).			9
10						@ 10.8'-10.9': Silt layer (ML).			10
11						@ 11.0'-11.2': Silt layer (ML).			11
12						@ 11.4'-11.7': Silt layer (ML).	12		
13	100						13		
14			0	0	100	SILT (ML): Moist, stiff, low to medium plasticity, gray. No sheen. Trace wood pieces.	14		
15						End of boring @ 15'.	15		
16							16		
17							17		
18							18		
19							19		
20							20		

Well Installation Log

SSA7-MW-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct push & Hollow-Stem Auger
Project #: 130720-02.01	Northing: 302694.57 Easting: 1006957.55	Total Depth (ft): 16.5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: MW
Collection Date: 2/21/2012		
Contractor: Cascade Drilling		

Depth (ft)	Sample Recovery (%)	Groundwater	GRAVEL (%)	SAND %	SILT %	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Well Details	Graphic Log	Depth (ft)
0			0	30	70	SANDY SILT (ML): Moist, soft, non-plastic, dark brown. No odor, no sheen. Occasional layers of gray, fine sand (SP). @ 0.0'-0.2': Abundant wood debris.			0
1	65					@ 2.5'-2.6': Wood debris.			1
2						@ 4.0': Dark gray and rust red thin laminations, 1 to 5 mm thick.			2
3	80					@ 5.1'-5.2': Decayed wood debris.			3
4						SILT (ML): Moist, soft, non-plastic, dark gray. Occasional dark red laminations.			4
5	80		0	0	100	POORLY GRADED SAND (SP): Wet, loose, dark gray, medium sand. No odor, no sheen.			5
6			0	100	0	@ 6.5'-7.0': Layer of highly plastic, dark gray, SILT (MH).			6
7	80					@ 11.4'-11.8': Layer of moist, soft, highly plastic, dark gray, SILT (MH).			7
8	87					@ 12.0'-13.5': Occasional silt blebs.			8
9									9
10	100								10
11	100								11
12						ELASTIC SILT (MH): Moist, moderate plasticity, dark gray. No odor, no sheen.			12
13	100								13
14	100								14
15	100		0	0	100				15
16						End of boring @ 16.5'.			16
17									17
18									18
19									19
20									20

SOIL BORING AND TEST PIT LOGS

Physical Description of Soil Key



Visual Soil Descriptions consist of the following:

Depth (recovered), USC symbol, moisture content, density/consistency (estimated based on visual observation), color, MAJOR CONSTITUENT/GROUP NAME with minor constituents. Amount and shape of minor constituents (e.g., wood, shells) followed by major constituent structure. Sheen and odor.

Recovered and In-situ depths

Recovered = measured in the lab, actual sediment depth from core tube
In situ = compaction-corrected, applied to samples only

Soil Description Terminology:

Moisture and Density:

Moisture Content	
Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content, no visible water
Wet	Visible free water, probably above optimum

Density		
SAND or GRAVEL		SILT or CLAY
Density	Visual	Consistency
Very loose	freefall	Very soft
Loose	easy penetration	Soft
Medium dense	moderate penetration	Medium stiff
Dense	hard penetration	Stiff
Very dense	refusal	Very Stiff/Hard

Density/Consistency
Soil density and consistency are estimated based on visual observations

Major and Minor Constituents by Volume:

Soil	Percent
Trace (clay, silt, etc.)	0-5
Slightly (clayey, silty, etc.)	5-15
Clayey, silty, sandy, gravelly	15-30
Very (clayey, silty, etc.)	30-50
GROUP NAME	> 50

Other Minor Constituents: % vol. (anthropogenics, etc.)	
Trace	0-5
Occasional	5-10
Moderate	10-30
Substantial	30-50

Sheen - Visual Description	
rainbow	multicolored
metallic	metallic gray-colored
florlets	semi-circular and
blebs	semi-circular and
streaks	long and flowing shape

Odor Descriptions	
	trace
	slight
	moderate
	strong
	HC = Hydrocarbon-like
	H2S = Hydrogen sulfide

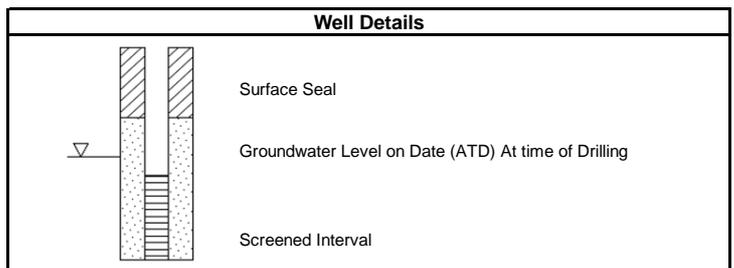
Sheen - % coverage	
None, trace	<2
Slight Sheen	2-15
Moderate Sheen	15-40
Moderate to Heavy	40-70
Heavy	>70

*No odor or sheen observed unless noted

Structure and Other Sediment Descriptions	
Blocky	Cohesive soil that can be broken down into smaller lumps
Fibrous	Stringy or rope like structure
Seam	1/16 to 1/2" thick
Layer	Greater than 1/2" thick
Interbedded	Multiple layers within a unit (>1/2" thick)
Anthropogenic	Debris, include description in parenthesis
Decomposed	Visible sign of decomposition or discoloration
Fresh	No visible sign of decomposition or discoloration
Winnowed	Loss of fines
Slumped	Settled but intact
Pockets	Semicircular to circular inclusion/deposit

Contacts:	
@	Compositional change or presence of anthropogenic material
-----	Major unit change/non-discrete, gradual contact
_____	Major unit change/visually discrete, abrupt contact

Core Acceptance Guidelines
1. Desired drive depth is reached or refusal.
2. Core recovery is greater than 75%.
3. Core tube appears intact (no signs of blocking, bending).
4. Minimal sediment loss out the top or bottom (minimal)



NOTES:

*Classification of soil in core logs is based on visual field and laboratory observations which include density/consistency, grain size, and plasticity plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification method ASTM D-2488 for the description and identification of soils was used as an identification guide.

GeoProbe Log

AQ-SSA1-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 305509.49 Easting: 1004613.29	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15			N/A	N/A	N	<p>SILT WITH GRAVEL (ML): Moist, medium stiff, brown, slightly clayey. Moderate rootlets, biota (worms) and woody debris. No odor.</p> <hr/> <p>POORLY GRADED SAND (SP): Moist to wet, loose, brown-gray. Trace fine gravel (pumice). Moderate rootlets and larger woody debris. No odor.</p> <p>End of test pit @ 4'</p>		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Notes:

GeoProbe Log

AQ-SSA1-02

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 305494.98 Easting: 1004742.65	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15			N/A	N/A	N	<p>LEAN CLAY (CL): Moist, stiff, silty. Lenses of gray, POORLY GRADED medium SAND (SP). Occasional large woody decomposing debris.</p> <p>@ 2': Grades to LEAN CLAY WITH GRAVEL (CL).</p> <p>POORLY GRADED SAND (SP): Wet. Loose, brown-gray, medium to coarse sand. Occasional rootlets. No odor.</p> <p>End of test pit @ 4'</p>		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Notes:

GeoProbe Log

AQ-SSA1-03

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 305392.61 Easting: 1004559.07	Total Depth (ft): 5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			<p>SANDY SILT (ML): Moist, stiff, brown, slightly clayey. Moderate rootlets and woody debris. No odor.</p> <p>@ 2.0': Large log piece.</p>	0	0
-1							-1	-1
-2							-2	-2
-3							-3	-3
-4	AQ-SSA1-03-3-4	Fl, CN, PAHs, TPH		NS		<p>POORLY GRADED SAND WITH GRAVEL (SP): Moist, medium dense, gray-brown. Moderate to abundant rootlets and decaying wood fragments. No odor.</p> <p>@ 3.0'-4.0': Lenses of dark gray, organic matter. No odor.</p> <p>End of test pit @ 5'</p>	-4	-4
-5				NS	K		-5	-5
-6							-6	-6
-7							-7	-7
-8							-8	-8
-9							-9	-9
-10							-10	-10
-11							-11	-11
-12							-12	-12
-13							-13	-13
-14							-14	-14
-15							-15	-15

GeoProbe Log

AQ-SSA1-04

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 305322.69 Easting: 1004698.06	Total Depth (ft): 4.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15			N/A	N/A		<p>SANDY SILT (ML): Moist, stiff, brown, slightly clayey. Moderate rootlets and woody debris. No odor.</p> <hr/> <p>POORLY GRADED SAND (SP): Moist, loose, dark gray-brown. Moderate rootlets and pockets of woody debris. No odor.</p> <p style="text-align: center;">N</p> <p>End of test pit @ 4.5'</p>		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Notes:

GeoProbe Log

AQ-SSA1-05

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 305357.47 Easting: 1004850.54	Total Depth (ft): 4.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15			N/A	N/A		<p>POORLY GRADED SAND (SP): Moist, loose, brown. No odor.</p> <p>@ 3.0': Trace woody debris.</p> <hr/> <p>LEAN CLAY (CL): Damp, stiff, gray-blue. Moderate rootlets. Slight H₂S-like odor.</p> <p>End of test pit @ 4.5'</p>		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

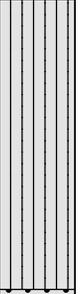
Notes: 1. No groundwater encountered.

GeoProbe Log

AQ-SSA1-06

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 305518.65 Easting: 1004381.33	Total Depth (ft): 5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A	N/A		<p>SANDY SILT (ML): Moist, medium stiff, brown, slightly clayey. Moderate rootlets and woody debris. Decomposing sticks and fragments. No odor.</p>		0
-1								-1
-2							-2	-2
-3	AQ-SSA1-06-3-3.5	F, CN, PAHs, TPH				<p>@ 3.0'-3.5': Organic-rich lens with abundant roots and woody debris. Dark gray to black. No odor.</p>	-3	-3
-4						<p>POORLY GRADED SAND WITH GRAVEL (SP): Moist to wet, loose, brown-gray. Moderate rootlets and woody debris. No odor.</p>	-4	-4
-5					N	<p>End of test pit @ 5'</p>	-5	-5
-6							-6	-6
-7							-7	-7
-8							-8	-8
-9							-9	-9
-10							-10	-10
-11							-11	-11
-12							-12	-12
-13							-13	-13
-14							-14	-14
-15							-15	-15

GeoProbe Log

AQ-SSA1-07

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 305616.61 Easting: 1004742.3	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A	N/A		<p>SANDY SILT (ML): Moist, stiff, brown, coarse sandy, slightly clayey. Moderate roots. No odor.</p>	0	
-1						<p>POORLY GRADED SAND WITH GRAVEL (SP): Moist to wet, medium dense, gray. Occasional rootlets. No odor.</p>	-1	
-2							-2	
-3							-3	
-4					N	<p>End of test pit @ 4'</p>	-4	
-5							-5	
-6							-6	
-7							-7	
-8							-8	
-9							-9	
-10							-10	
-11							-11	
-12							-12	
-13							-13	
-14							-14	
-15							-15	

Notes:

GeoProbe Log

AQ-SSA1-08

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 305381.19 Easting: 1004991.13	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A	N/A		<p>SILT (ML): Moist, medium stiff, brown, clayey. Trace gravels, moderate rootlets. No odor.</p>	0	0
1							1	1
2							2	2
3						<p>POORLY GRADED SAND WITH GRAVEL (SP): Moist to wet, loose, medium dense, gray. Occasional large woody debris (decomposing). No odor.</p>	3	3
4					N	<p>End of test pit @ 4'</p>	4	4
5							5	5
6							6	6
7							7	7
8							8	8
9							9	9
10							10	10
11							11	11
12							12	12
13							13	13
14							14	14
15							15	15

Notes:

Test Plot Log

AQ-SSA2-03

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Hand Shovel
Project #: 130720-02.01	Northing: 305860.71 Easting: 1004006.24	Total Depth (ft): 0.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: N/A		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0	AQ-SSA2-03-0-0.5	TOC, TKN, Nitrate/Nitrite, Ammonia, Total Phosphorous, Orthophosphate, Potassium, Archive		<p>SILT WITH GRAVEL (ML): Moist, medium dense, dark brown. Trace clay, moderate rootlets. Gravels are up to 1" diameter and angular. No odor.</p> <p>End of test plot @ 0.5'</p>		0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

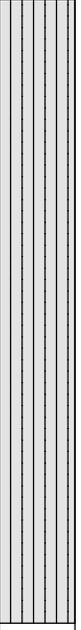
Notes: No groundwater encountered.

Test Plot Log

AQ-SSA2-04

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Hand Shovel
Project #: 130720-02.01	Northing: 305801.55 Easting: 1004053.23	Total Depth (ft): 0.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/16/2012		
Contractor: N/A		

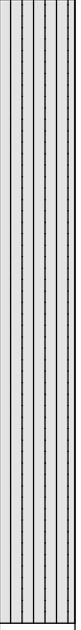
Recovered Depth (ft)	Sample Interval	Chemical Analysis	Groundwater	Soil Description	Graphic Log	Recovered Depth (ft)
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0	AQ-SSA2-04-0-0.5	TOC, TKN, Nitrate/Nitrite, Ammonia, Total Phosphorous, Orthophosphate, Potassium, Archive	K	<p style="text-align: center;">Soil Description</p> <p style="text-align: center;">Samples and descriptions are in recovered depths. Classification scheme based on USCS</p> <p>SILT (ML): Wet, medium dense, brown. Trace clay, moderate rootlets, trace biota (worms). No odor.</p> <p>End of test plot @ 0.5'</p>		0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Test Plot Log

AQ-SSA2-05

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Hand Shovel
Project #: 130720-02.01	Northing: 305680.43 Easting: 1004011.45	Total Depth (ft): 0.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: N/A		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0	AQ-SSA2-05-0-0.5	TOC, TKN, Nitrate/Nitrite, Ammonia, Total Phosphorous, Orthophosphate, Potassium, Archive		<p>SILT WITH GRAVEL (ML): Moist, medium stiff, dark brown. Moderate rootlets, gravels are up to 1" in diameter and are subangular. No odor.</p> <p>End of test plot @ 0.5'</p>		0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Notes: No groundwater encountered.

Test Plot Log

AQ-SSA2-06

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Hand Shovel
Project #: 130720-02.01	Northing: 305612.88 Easting: 1004053.89	Total Depth (ft): 0.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/16/2012		
Contractor: N/A		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Groundwater	Soil Description	Graphic Log	Recovered Depth (ft)
0.0			k	SILT (ML): Wet, medium stiff, brown. Trace clay, moderate rootlets. No odor.		0.0
0.1						0.1
0.2		TOC, TKN, Nitrate/Nitrite, Ammonia, Total Phosphorous, Orthophosphate, Potassium, Archive				0.2
0.3	AQ-SSA2-06-0-0.5					0.3
0.4						0.4
0.5				End of test plot @ 0.5'		0.5
0.6						0.6
0.7						0.7
0.8						0.8
0.9						0.9
1.0						1.0

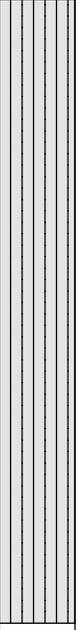
Notes: Station under standing water.

Test Plot Log

AQ-SSA2-07

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Hand Shovel
Project #: 130720-02.01	Northing: 305498.28 Easting: 1004016.86	Total Depth (ft): 0.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/15/2012		
Contractor: N/A		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0	AQ-SSA2-07-0-0.5	TOC, TKN, Nitrate/Nitrite, Ammonia, Total Phosphorous, Orthophosphate, Potassium, Archive		<p>SILT WITH GRAVEL (ML): Moist, medium dense, brown, slightly coarse sandy. Moderate rootlets. No odor.</p> <p>@ 0.5': Grades to very wet, end of test plot.</p>		0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

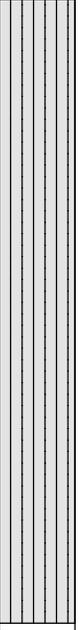
Notes: No groundwater encountered.

Test Plot Log

AQ-SSA2-REF-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Hand Shovel
Project #: 130720-02.01	Northing: 304509.4 Easting: 1003549.73	Total Depth (ft): 0.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/16/2012		
Contractor: N/A		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0	AQ-SSA2-REF-01-0-0.5	TOC, TKN, Nitrate/Nitrite, Ammonia, Total Phosphorous, Orthophosphate, Potassium, Archive	N	<p>SILT (ML): Wet, soft to medium stiff, brown. Trace clay and angular gravels, moderate rootlets. No odor.</p> <p>End of test plot @ 0.5'</p>		0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

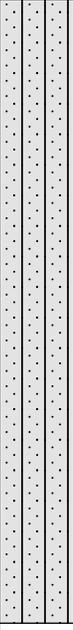
Notes:

Test Plot Log

AQ-SSA2-REF-02

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Hand Shovel
Project #: 130720-02.01	Northing: 304597.02 Easting: 1003338.47	Total Depth (ft): 0.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, DL
Collection Date: 03/16/2012		
Contractor: N/A		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0	AQ-SSA2-REF-02-0-0.5	TOC, TKN, Nitrate/Nitrite, Ammonia, Total Phosphorous, Orthophosphate, Potassium, Archive		<p>SILTY SAND (SM): Damp, loose, medium to coarse sand, trace fine gravel, moderate rootlets. No odor.</p> <p>End of test plot @ 0.5'</p>		0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Notes: No groundwater encountered.

Test Pit Log

AQ-SSA3-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 305613.91 Easting: 1002954.54	Total Depth (ft): 7
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/13/2011		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			<p>SILT (ML): Dry, soft, dark brown, slightly fine to medium sandy. No odor. Moderate biota (roots).</p> <p>@ 1': Grades to dark orange - brown. Occasional roots.</p>	0	0
-1				NS			-1	-1
-2				NS			-2	-2
-3	AQ-SSA3-01-2-3	Fluoride, Cyanide (WAD & Total)		NS			-3	-3
-4				NS		<p>LEAN CLAY (CL): Damp, stiff, dark gray with dark orange and brown mottling, slightly silty, trace fine to medium sand. Occasional rootlets. No odor.</p>	-4	-4
-5							-5	-5
-6							-6	-6
-7							-7	-7
-8						End of test pit @ 7'	-8	-8
-9							-9	-9
-10							-10	-10
-11							-11	-11
-12							-12	-12
-13							-13	-13
-14							-14	-14
-15							-15	-15

Test Pit Log

AQ-SSA3-02

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 306149.12 Easting: 1002953.16	Total Depth (ft): 7
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/13/2011		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			<p>SILTY SAND (SM): Dry, loose, light gray with brown mottling. Moderate rootlets in top 6". Trace biota (worms). No odor.</p> <hr style="border-top: 1px dashed black;"/> <p>SANDY SILT (ML): Damp, medium stiff, light gray with orange-brown mottling, trace clay. Trace rootlets. No odor.</p> <hr style="border-top: 1px dashed black;"/> <p>SILTY SAND (SM): Damp, medium dense, gray, trace clay.</p> <p>@ 5': Grades to moist.</p> <p>@ 7': Grades to dark gray, slightly clayey.</p> <p>End of test pit @ 7'</p>	0	
-1				NS			-1	
-2				NS			-2	
-3	AQ-SSA3-02-2-3	Fluoride, Cyanide (WAD & Total)		NS			-3	
-4				NS		-4		
-5						-5		
-6						-6		
-7						-7		
-8						-8		
-9						-9		
-10						-10		
-11						-11		
-12						-12		
-13						-13		
-14						-14		
-15						-15		

Test Pit Log

AQ-SSA3-03

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 306164.82 Easting: 1003008.18	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/13/2011		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			<p>POORLY GRADED SAND (SP): Dry, loose, dark brown, trace gravel (up to 1.5"-diameter). Moderate rootlets and biota (worms) in top 8". No odor.</p> <hr style="border-top: 1px dashed black;"/> <p>SANDY SILT (ML): Damp, medium stiff, dark gray with occasional brown mottling, trace gravel (up to 1"-diameter). Occasional rootlets.</p> <hr style="border-top: 1px dashed black;"/> <p>LEAN CLAY (CL): Moist, stiff, dark gray, slightly fine sandy, slightly silty.</p> <p>End of test pit @ 4'</p>	0	
1				NS			1	
2				NS			2	
3	AQ-SSA3-03-2-3	Fluoride, Cyanide (WAD & Total)		NS			3	
4				NS		4		
5							5	
6							6	
7							7	
8							8	
9							9	
10							10	
11							11	
12							12	
13							13	
14							14	
15							15	

Test Pit Log

AQ-SSA3-04

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 306498.66 Easting: 1002957.94	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/13/2011		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			<p>SILT (ML): Damp, medium stiff, dark brown, slightly very fine sandy. Moderate rootlets (up to 8"). No odor.</p> <p>@ 2': Grades to brown with orange mottling, trace clay. Trace rootlets.</p> <p>@ 3': Grades to moist, stiff, dark gray, slightly clayey. Occasional decomposed sticks. Slight H₂S-like odor.</p> <p>End of test pit @ 4'</p>		0
-1				NS				-1
-2				NS				-2
-3	AQ-SSA3-04-2-3	Fluoride, Cyanide (WAD & Total)		NS				-3
-4				NS			-4	
-5							-5	
-6							-6	
-7							-7	
-8							-8	
-9							-9	
-10							-10	
-11							-11	
-12							-12	
-13							-13	
-14							-14	
-15							-15	

Test Pit Log

AQ-SSA3-05

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 306504.50 Easting: 1003028.45	Total Depth (ft): 5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/13/2011		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			<p>SILTY SAND (SM): Damp, medium dense, dark brown. Occasional gravels up to 1"-diameter. Moderate rootlets. No odor.</p> <hr style="border-top: 1px dashed black;"/> <p>SILT (ML): Damp, stiff, brown with orange mottling, trace fine sand and clay.</p> <p>@ 3': Layer of black mottling. Grades to light brown with orange mottling. Occasional decomposed sticks.</p> <p>End of test pit @ 5'</p>	0	0
-1				NS			-1	-1
-2				NS			-2	-2
-3	AQ-SSA3-05-2-3	Fluoride, Cyanide (WAD & Total)		NS			-3	-3
-4				NS		-4	-4	
-5						-5	-5	
-6						-6	-6	
-7						-7	-7	
-8						-8	-8	
-9						-9	-9	
-10						-10	-10	
-11						-11	-11	
-12						-12	-12	
-13						-13	-13	
-14						-14	-14	
-15						-15	-15	

Test Pit Log

AQ-SSA3-06

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 306841.00 Easting: 1002961.63	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/13/2011		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			<p>SILT (ML): Damp, medium stiff, dark brown with orange mottling, slightly sandy. Moderate rootlets in top 1'. No odor.</p> <hr style="border-top: 1px dashed black;"/> <p>SILTY SAND (SM): Damp, medium dense, dark brown. Occasional rootlets. No odor.</p> <hr style="border-top: 1px dashed black;"/> <p>SANDY SILT (ML): Moist, medium stiff, dark gray, trace clay. No odor.</p> <p>End of test pit @ 4'. Slight ponding of groundwater at base of test pit.</p>	0	0
1				NS			1	1
2	AQ-SSA3-06-2-3	Fluoride, Cyanide (WAD & Total)		NS			2	2
3				NS			3	3
4				NS	N	4	4	4
5								5
6								6
7								7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

Test Pit Log

AQ-SSA3-07

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 306833.50 Easting: 1003053.24	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/13/2011		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			<p>SILT (ML): Dry, soft, dark brown, slightly sandy. Moderate coarse gravel (angular, volcanic) in top 2.5'. Moderate rootlets and biota (worms). No odor.</p> <p>@ 2': Grades to damp, medium stiff, slightly clayey.</p> <p>SILTY SAND (SM): Damp, medium dense, light brown. No odor.</p> <p>End of test pit @ 4'</p>	0	0
-1				NS			-1	-1
-2				NS			-2	-2
-3	AQ-SSA3-07-2-3	Fluoride, Cyanide (WAD & Total)		NS			-3	-3
-4				NS		-4	-4	
-5							-5	-5
-6							-6	-6
-7							-7	-7
-8							-8	-8
-9							-9	-9
-10							-10	-10
-11							-11	-11
-12							-12	-12
-13							-13	-13
-14							-14	-14
-15							-15	-15

Test Pit Log

AQ-SSA3-08

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 306832.84 Easting: 1003124.14	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/13/2011		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			<p>WELL GRADED SAND WITH GRAVEL (SW): Damp, loose, dark brown, fine to medium sand and gravel. Gravels are subangular. Occasional biota (worms). No odor.</p>	0	0
-1				NS			-1	-1
-2				NS		<p>SANDY SILT (ML): Damp, medium stiff, dark brownish gray with orange mottling, trace clay. Occasional rootlets. No odor.</p>	-2	-2
-3	AQ-SSA3-08-2-3	Fluoride, Cyanide (WAD & Total)		NS		<p>@ 3': Grades to stiff, dark gray, slightly clayey.</p>	-3	-3
-4				NS		<p>End of test pit @ 4'</p>	-4	-4
-5							-5	-5
-6							-6	-6
-7							-7	-7
-8							-8	-8
-9							-9	-9
-10							-10	-10
-11							-11	-11
-12							-12	-12
-13							-13	-13
-14							-14	-14
-15							-15	-15

Test Pit Log

AQ-SSA4-12A

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305558.76 Easting: 1006068.99	Total Depth (ft): 2
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/08/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-12A-0-1	PAHs	NS	N	<p>POORLY GRADED SAND (SP): Wet, loose, brown, medium sand. No odor. Groundwater pooling @ base of pit (brown, slightly foamy, no sheen). Occasional coarse gravel and wood fragments.</p> <p>SILTY SAND (SM): Wet, medium dense, dark gray. Occasional gravels. Trace rootlets (plant fibers).</p> <p>@1.5': 2" layer of orange-brown (oxidized?) color.</p> <p>End of test pit @ 2' due to caving.</p>		0
1	AQ-SSA4-12A-1-2	PAHs	NS			2	
2							2
3							3
4							4
5							5
6							6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15

Test Pit Log

AQ-SSA4-12B

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305605.72 Easting: 1006208.42	Total Depth (ft): 3
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/8/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-12B-0-1	PAHs	NS	N	POORLY GRADED SAND (SP): Wet, loose, brown, medium sand. Occasional gravels. Trace sticks. No odor (fill). Groundwater pooling in base of pit is brown, slightly foamy, no sheen. @1': Trace pockets of brown, medium stiff SILT (ML). End of test pit @ 3' due to extensive caving.		0
1	AQ-SSA4-12B-1-2	PAHs	NS				1
2			NS				2
3						3	3
4						4	4
5						5	5
6						6	6
7						7	7
8						8	8
9						9	9
10						10	10
11						11	11
12						12	12
13						13	13
14						14	14
15						15	15

Test Pit Log

AQ-SSA4-13

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305442.06 Easting: 1006258.38	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/8/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-13-0-1	PAHs	NS		<p>POORLY GRADED SAND (SP): Damp, loose, brown, medium sand. Occasional pockets of stiff, gray-brown SILT (ML). Trace sticks. No odor.</p> <p>@1': Grades to medium dense.</p> <p>@2': Grades to wet, trace pockets SILT (ML).</p>		0
1	AQ-SSA4-13-1-2	PAHs	NS				1
2			NS				2
3			NS				3
4			NS		4		
5					End of test pit @ 4' due to extensive caving.		5
6							6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15

Test Pit Log

AQ-SSA4-14

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305292.57 Easting: 1006264.79	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/8/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-14-0-1	PAHs	NS	N	<p>POORLY GRADED SAND (SP): Wet, loose, brown, medium sand. Occasional pockets of brown SILT (ML). Trace gravel and wood fragments (sticks).</p> <p>@1': Grades to medium dense.</p> <p>@2.5': Grades to POORLY GRADED SAND WITH GRAVEL (SP) (1-2" diameter, angular, gray). No odor.</p> <p>WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM): Damp, dense, dark gray, slightly sandy, slightly silty, fine to coarse gravel (angular). Gravels up to 6" diameter.</p> <p>End of test pit @ 4'.</p>	0	0
1	AQ-SSA4-14-1-2	PAHs	NS			1	1
2			NS			2	2
3			NS			3	3
4			NS		4	4	4
5					5	5	5
6					6	6	6
7					7	7	7
8					8	8	8
9					9	9	9
10					10	10	10
11					11	11	11
12					12	12	12
13					13	13	13
14					14	14	14
15					15	15	15

Test Pit Log

AQ-SSA4-15

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305345.60 Easting: 1005908.97	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/8/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-15-0-1	PAHs	NS	N	<p>POORLY GRADED SAND (SP): Wet, loose, brown, medium sand. Occasional gravel (rounded). No odor. Trace wood fragments.</p> <p>@2': Grades to medium dense, trace sulfur-like odor.</p> <p>@3': Grades to POORLY GRADED SAND WITH GRAVEL (SP). Gravels are gray, angular.</p> <p>End of test pit @ 4'.</p>	0	0
1	AQ-SSA4-15-1-2	PAHs	NS	N		1	
2			NS			2	
3			NS			3	
4			NS			4	
5						5	5
6						6	6
7						7	7
8						8	8
9						9	9
10						10	10
11						11	11
12						12	12
13						13	13
14						14	14
15						15	15

Test Pit Log

AQ-SSA4-16

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305263.56 Easting: 1006097.06	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/8/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-16-0-1	PAHs	NS		<p>POORLY GRADED SAND (SP): Damp, medium dense, brown, medium sand, trace gravel. Trace pockets of brown and gray SILT (ML). No odor. Occasional wood fragments (sticks).</p> <p>@1': Charred wood piece, grades to moist.</p> <p>@2.5': Grades to wet.</p> <p>@3.5': Grades to gray. Piece of blue plastic.</p> <p>@4': Thin layer of black organic-rich material (wood fragments, roots) approximately 1-2" thick (part of sample).</p> <p>End of test pit @ 4'.</p>	0	0
-1	AQ-SSA4-16-1-2	PAHs	NS			-1	-1
-2			NS	N		-2	-2
-3			NS			-3	-3
-4			NS		-4	-4	
-5					-5	-5	
-6					-6	-6	
-7					-7	-7	
-8					-8	-8	
-9					-9	-9	
-10					-10	-10	
-11					-11	-11	
-12					-12	-12	
-13					-13	-13	
-14					-14	-14	
-15					-15	-15	

Test Pit Log

AQ-SSA4-17

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305067.29 Easting: 1006062.46	Total Depth (ft): 3
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/8/2012		
Contractor: Terra Hydr		

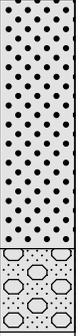
Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-17-0-1	PAHs	NS	N	<p>POORLY GRADED SAND (SP): Wet, loose, brown, medium sand. Occasional gravels and wood fragments (sticks). Trace pockets of gray SILT (ML).</p> <p>@1.5': Grades to gray.</p> <p>@2': Hit small groundwater spring.</p> <p>WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM): Wet, dense, dark gray, slightly sandy, slightly silty, fine to medium gravel (angular). No odor. Trace rainbow sheen.</p> <p>End of test pit @ 3' due to caving.</p>	0	0
1	AQ-SSA4-17-1-2	PAHs	NS			1	1
2			NS			2	2
3					3	3	3
4					4	4	4
5					5	5	5
6					6	6	6
7					7	7	7
8					8	8	8
9					9	9	9
10					10	10	10
11					11	11	11
12					12	12	12
13					13	13	13
14					14	14	14
15					15	15	15

Test Pit Log

AQ-SSA4-18

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305127.77 Easting: 1005835.16	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/8/2012		
Contractor: Terra Hydr		

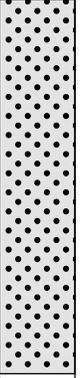
Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-18-0-1	PAHs	NS		POORLY GRADED SAND (SP): Wet, loose, brown, medium sand. Moderate wood fragments in top 1'. Occasional gravels (pumice). @1.5': 8" long piece of wood (decaying). Trace pockets fine sand.		0
1	AQ-SSA4-18-1-2	PAHs	NS				-1
2			NS	K			2
3			NS				3
4			NS		WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM): Moist, stiff, dark gray, slightly silty, slightly sandy, fine to medium gravel. No odor. Gravels are angular, gray. Occasional rootlets.		4
5					End of test pit @ 4' due to pit caving.		5
6							6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15

Test Pit Log

AQ-SSA4-19

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305008.09 Easting: 1005860.24	Total Depth (ft): 4.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/9/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-19-0-1/ AQ-SSA4-69-0-1	PAHs	NS	N	<p>POORLY GRADED SAND (SP): Damp, loose, brown, medium sand. Trace gravel and pockets of SILT (ML). Occasional wood fragments. No odor.</p> <p>@2': Grades to wet, medium dense.</p> <p>@3': Grades to trace sulfur-like odor. Groundwater infiltrating at base of pit.</p> <p>@4': Grades to gray, 6" layer of angular fine to medium gravel (gray) with sand below.</p> <p>End of test pit @ 4.5'.</p>		0
1	AQ-SSA4-19-1-2/ AQ-SSA4-69-1-2	PAHs	NS				1
2			NS				2
3			NS				3
4			NS	4			
5				5			
6				6			
7				7			
8				8			
9				9			
10				10			
11				11			
12				12			
13				13			
14				14			
15				15			

Test Pit Log

AQ-SSA4-20

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 304937.74 Easting: 1005951.97	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/8/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-20-0-1	PAHs	NS	N	<p>POORLY GRADED SAND (SP): Wet, loose, brown, medium sand, occasional gravel (pumice) and wood fragments (sticks). Trace pockets of gray SILT (ML). No odor.</p> <p>@2': Grades to gray, trace sulfur-like odor.</p> <p>WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM): Wet, dense, gray, slightly silty, slightly sandy, fine to medium gravel. No odor. Gravels are angular.</p> <p>POORLY GRADED SAND (SP): Wet, medium dense, gray, medium to coarse sand. No odor.</p> <p>End of test pit @ 4' due to pit caving.</p>	0	0
1	AQ-SSA4-20-1-2	PAHs	NS			1	1
2			NS			2	2
3			NS			3	3
4			NS		4	4	4
5					5	5	5
6					6	6	6
7					7	7	7
8					8	8	8
9					9	9	9
10					10	10	10
11					11	11	11
12					12	12	12
13					13	13	13
14					14	14	14
15					15	15	15

Test Pit Log

AQ-SSA4-21

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305399.09 Easting: 1006369.35	Total Depth (ft): 4.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/9/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			NS		<p>POORLY GRADED SAND (SP): Damp, loose, brown, medium sand, trace fine to medium gravel and pockets of brown-gray SILT (ML). No odor. Occasional wood fragments (sticks).</p> <p>@1': Grades to medium dense.</p>		0
1			NS				1
2			NS		<p>WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM): Damp, dense, dark gray to black with rusty orange mottling, slightly sandy, slightly silty, fine to medium gravel. Gravels are gray, angular, 1-2" diameter.</p> <p>@2.5': 1" thick layer of hard, brick-colored gravel with silt matrix. Thin, 6" long piece of metal at top of layer.</p>		2
3			NS				3
4			NS		<p>LEAN CLAY (CL): Damp, medium stiff, gray, slightly silty. Moderate organic material (roots, leaves). No odor.</p>		4
5					<p>End of test pit @ 4.5'.</p>		5
6							6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15

Test Pit Log

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Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305348.48 Easting: 1006351.56	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/9/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			NS		<p>POORLY GRADED SAND (SP): Damp, loose to medium dense, brown, medium sand. Trace fine to medium gravel (rounded). Occasional wood fragments (sticks). No odor. Trace pockets brown-gray SILT (ML) (1"-diameter).</p> <p>@2': Grades to wet, trace sulfur-like odor.</p> <p>WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM): Moist, wet, dense, brown slightly sandy, slightly silty, fine to medium gravel. Gravels are angular.</p> <p>LEAN CLAY (CL): Damp, medium stiff, gray, silty. Bluish-gray mottling on some areas. Trace gravel. Occasional-moderate (20%) organic material (rootlets, decomposing twigs).</p> <p>End of test pit @ 4'.</p>	0	0
1			NS			1	1
2			NS	N		2	2
3			NS			3	3
4			NS		4	4	4
5						5	5
6						6	6
7						7	7
8						8	8
9						9	9
10						10	10
11						11	11
12						12	12
13						13	13
14						14	14
15						15	15

Test Pit Log

AQ-SSA4-23

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305310.86 Easting: 1006372.50	Total Depth (ft): 3
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 11/9/2012		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			NS	N	POORLY GRADED SAND (SP): Moist to wet, loose, gray-brown medium sand, trace gravel. No odor. Occasional rootlets.		0
1			NS		WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM): Moist, medium dense, gray with brown mottling, slightly silty, slightly sandy, gravel. No odor. Gravels are angular. Occasional metal pieces, including 1" long scrap metal pieces and 2" long, 3" diameter steel "pins" (anodes).		1
2			NS		LEAN CLAY (CL): Damp, stiff, bluish-gray with rust-colored mottling, slightly silty. Moderate organic material (rootlets, twigs). No odor.		2
3					End of test pit @ 3'. Pit edges above 1.5' caving in.		3
4							4
5							5
6							6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15

Test Pit Log

AQ-SSA4-24

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305379.00 Easting: 1006452.53	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 1/11/2013		
Contractor: Terra Hydr		

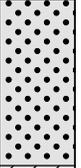
Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-24-0-1	PAHs	NS		POORLY GRADED SAND (SP): Moist to wet, medium dense, brown, slightly gravelly, medium sand. Gravels are subangular. No odor. @1': Grades to trace gravel.		0
1	AQ-SSA4-24-1-2	PAHs	NS				2
2			NS	N	LEAN CLAY (CL): Moist, stiff, gray, slightly silty. No odor. Trace rootlets.		2
3			NS				3
4			NS		End of test pit @ 4'.		4
5							5
6							6
7							7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15

Test Pit Log

AQ-SSA4-25

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305352.91 Easting: 1006430.96	Total Depth (ft): 3
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 1/11/2013		
Contractor: Terra Hydr		

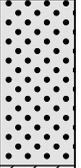
Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-25-0-1	PAHs	NS		POORLY GRADED SAND (SP): Moist, loose to medium dense, gravelly, brown to dark gray, medium sand. Gravels are sub-angular. No odor. @1': Grades to brown.		0
-1	AQ-SSA4-25-1-2	PAHs	NS				-1
-2			NS	N	LEAN CLAY (CL): Damp, stiff, gray, slightly silty. Trace rootlets. No odor.		-2
-3			NS		End of test pit @ 3'.		-3
-4							-4
-5							-5
-6							-6
-7							-7
-8							-8
-9							-9
-10							-10
-11							-11
-12							-12
-13							-13
-14							-14
-15							-15

Test Pit Log

AQ-SSA4-26

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305392.49 Easting: 1006429.68	Total Depth (ft): 3
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 1/11/2013		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-26-0-1/ AQ-SSA4-76-0-1	PAHs	NS		POORLY GRADED SAND WITH GRAVEL (SP): Moist, loose to medium dense, dark gray to dark brown, medium sand. Gravels are subangular. No odor. @1': Grades to no gravels, brown. 1" thick orange rusty-colored horizon.		0
-1	AQ-SSA4-26-1-2/ AQ-SSA4-76-1-2	PAHs	NS				-1
-2			NS	K	LEAN CLAY (CL): Damp, stiff, gray, slightly silty. Trace rootlets. No odor.		-2
-3			NS		End of test pit @ 3'.		-3
-4							-4
-5							-5
-6							-6
-7							-7
-8							-8
-9							-9
-10							-10
-11							-11
-12							-12
-13							-13
-14							-14
-15							-15

Test Pit Log

AQ-SSA4-27

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 305367.08 Easting: 1006413.31	Total Depth (ft): 4
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 1/11/2013		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-27-0-1	PAHs	NS		POORLY GRADED SAND (SP): Damp, loose, brown, medium sand, trace gravel. No odor.		0
-1					@1': Grades to POORLY GRADED SAND WITH GRAVEL (SP), gray, medium dense.		-1
-2	AQ-SSA4-27-1-2	PAHs	NS	K	@1.5": 6" thick piece of concrete in southeast corner of pit.		-2
-3			NS		SANDY SILT (ML): Moist, medium dense, brown with gray mottling, medium sandy. Trace clay pockets. Trace rootlets.		-3
-4			NS		LEAN CLAY (CL): Damp, stiff, gray. Trace rootlets. No odor.		-4
-5					End of test pit @ 4'.		-5
-6							-6
-7							-7
-8							-8
-9							-9
-10							-10
-11							-11
-12							-12
-13							-13
-14							-14
-15							-15

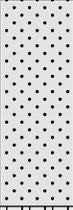
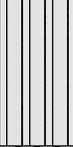
Notes: 1. NS = No sheen, SS = Slight sheen, MS = Moderate sheen, HS = Heavy sheen

Direct-Push Soil Boring Log

AQ-SSA4-01

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 305677.85 Easting: 1005934.68	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-01-0-1	PAHs	█		N/A	WELL GRADED SAND (SW): Very dry, very loose, light gray, fine to coarse sand. Trace HC-like odor. @ 0.6': Grades to moist, loose.		0
1	AQ-SSA4-01-1-2	PAHs	█			ELASTIC SILT (MH): Moist, soft, dark gray. Occasional rootlets. @ 3.5': Grades to light gray with dark red mottling, firm.		1
2			█			POORLY GRADED SAND (SP): Wet, medium-dense, gray with abundant dark red mottling, fine sand. No odor, no staining. End of boring @ 5'.		2
3			█					3
4			█					4
5			█					5
6			█					6
7			█					7
8			█					8
9			█					9
10			█					10
11			█					11
12			█					12
13			█					13
14			█					14
15			█					15

Notes: 1. Soil boring only. No well installed. Boring abandoned with bentonite upon reaching total depth.

Direct-Push Soil Boring Log

AQ-SSA4-02

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 305612.66 Easting: 1006010.12	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-02-0-1	PAHs	█	N/A		SILTY SAND (SM): Very dry, very loose, light brown. No odor, no staining.	█	0
1			█				█	1
2	AQ-SSA4-02-1-2	PAHs	█			WELL GRADED SAND (SW): Moist, loose, dark gray, fine to coarse sand.	█	2
3			█				█	3
4			█		N	@ 3.3': Grades to wet.	█	4
5			█			ELASTIC SILT (MH): Firm, light gray with dark red mottling. Occasional rootlets, no odor, no staining.	█	5
6			█			End of boring @ 5'.	█	6
7			█				█	7
8			█				█	8
9			█				█	9
10			█				█	10
11			█				█	11
12			█				█	12
13			█				█	13
14			█				█	14
15			█				█	15

Notes: 1. Soil boring only. No well installed. Boring abandoned with bentonite upon reaching total depth.

Direct-Push Soil Boring Log

AQ-SSA4-03

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 305629.55 Easting: 1006183.98	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-03-0-1	PAHs	N/A			WELL GRADED SAND (SW): Moist to wet, loose, dark gray, fine to coarse sand, trace gravel. Trace HC-like odor, no staining.	0	0
1	AQ-SSA4-03-1-2	PAHs					1	1
2							2	2
3					N		3	3
4						@ 3.3': Grades to wet.	4	4
5						End of boring @ 5'.	5	5
6							6	6
7							7	7
8							8	8
9							9	9
10							10	10
11							11	11
12							12	12
13							13	13
14							14	14
15							15	15

Direct-Push Soil Boring Log

AQ-SSA4-04

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 305382.05 Easting: 1006224.28	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-04-0-1	PAHs	██████████	N/A		WELL GRADED SAND (SW): Moist, loose, well graded, dark brown, fine to coarse sand. Trace fine gravel, occasional wood pieces from 0-1'. No odor, no sheen.	●●●●●●	0
1	AQ-SSA4-04-1-2	PAHs	██████████				●●●●●●	1
2			██████████				●●●●●●	2
3			██████████				●●●●●●	3
4			██████████				●●●●●●	4
5			██████████			SILTY GRAVEL (GM): Dry, dense, dark gray, silty (non-plastic), fine to coarse gravel. Gravel is angular with abundant red (possibly brick) pieces. No odor, no staining.	○●○●○●	5
6			██████████			End of boring @ 5'.	○●○●○●	6
7			██████████				○●○●○●	7
8			██████████				○●○●○●	8
9			██████████				○●○●○●	9
10			██████████				○●○●○●	10
11			██████████				○●○●○●	11
12			██████████				○●○●○●	12
13			██████████				○●○●○●	13
14			██████████				○●○●○●	14
15			██████████				○●○●○●	15

Direct-Push Soil Boring Log

AQ-SSA4-05

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 305379.51 Easting: 1006437.10	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-05-0-1	PAHs	██████████	N/A		POORLY GRADED SAND (SP): Damp, loose, dark gray, fine sand. No odor.	●●●●●●	0
1			██████████			SILTY GRAVEL (GM): Moist, loose, dark gray. Gravel is angular, no odor.	○ ○	1
2	AQ-SSA4-05-1-2	PAHs	██████████			POORLY GRADED SAND (SP): Damp, medium dense, dark brown, fine to medium sand. No odor or staining.	●●●●●●	2
3	AQ-SSA4-05-2-3	PAHs	██████████			@ 2.2': Grades to gray.	●●●●●●	3
4	AQ-SSA4-05-3-4	PAHs	██████████			SILT (ML): Moist, stiff, low plasticity, gray. No odor or staining.	|||||	4
5			██████████			@ 4.5': Grades to SANDY SILT (ML). @ 4.9': Grades to fine sand.	|||||	5
6			██████████			End of boring @ 5'.	|||||	6
7			██████████				|||||	7
8			██████████				|||||	8
9			██████████				|||||	9
10			██████████				|||||	10
11			██████████				|||||	11
12			██████████				|||||	12
13			██████████				|||||	13
14			██████████				|||||	14
15			██████████				|||||	15

Notes: 1. Soil boring only. No well installed. Boring abandoned with bentonite upon reaching total depth.

Direct-Push Soil Boring Log

AQ-SSA4-06

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 305281.99 Easting: 1005833.69	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-06-0-1	PAHs	N/A			WELL GRADED SAND (SW): Moist, loose, dark brown, fine to coarse sand. No odor, no staining.	0	0
1					N	SILTY GRAVEL (GM): Wet, loose, dark gray, silty, fine to coarse gravel. Gravel is angular and looks crushed and broken. Dark gray silt slurry covers gravel, no odor.	1	1
2	AQ-SSA4-06-1-2	PAHs				POORLY GRADED SAND (SP): Wet, loose, dark gray, fine sand. No odor, no staining.	2	2
3						ELASTIC SILT WITH SAND (MH): Moist, highly plastic, soft, dark gray. Occasional black banding, no odor.	3	3
4							4	4
5						End of boring @ 5'.	5	5
6							6	6
7							7	7
8							8	8
9							9	9
10							10	10
11							11	11
12							12	12
13							13	13
14							14	14
15							15	15

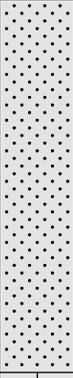
Notes: 1. Soil boring only. No well installed. Boring abandoned with bentonite upon reaching total depth.

Direct-Push Soil Boring Log

AQ-SSA4-07

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 305124.01 Easting: 1005959.35	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-07-0-1	PAHs	N/A	N/A	N/A	<p>WELL GRADED SAND (SW): Wet, loose, dark gray grading to dark brown, fine to coarse sand, trace gravel. Abundant white pumice sand grains, trace wood pieces, no odor, no staining.</p> <p>@ 1.1': Grades to moist.</p>		0
1	AQ-SSA4-07-1-2	PAHs						1
2						<p>SILTY GRAVEL (GM): Wet, loose, dark gray. Gravel is angular.</p> <p>End of boring @ 5'.</p>		2
3								3
4								4
5								5
6								6
7								7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

Direct-Push Soil Boring Log

AQ-SSA4-08

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 305092.91 Easting: 1006105.31	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-08-0-1	PAHs	████████	N/A		WELL GRADED SAND (SW): Moist, loose, dark gray, fine to coarse sand. No odor, no staining.	[Pattern: Dotted]	0
1	AQ-SSA4-08-1-2	PAHs	████████				[Pattern: Dotted]	1
2			████████				[Pattern: Dotted]	2
3			████████				[Pattern: Dotted]	3
4			████████			SILTY GRAVEL (GM): Moist, medium-dense, dark gray. Silt is non-plastic, gravels are angular.	[Pattern: Gravel]	4
5			████████			POORLY GRADED SAND (SP): Moist, loose, dark brown, fine sand. Slight HC-like odor.	[Pattern: Sand]	5
6			████████			SILT (ML): Dry, stiff, low plasticity, dark gray. Slight HC-like odor.	[Pattern: Sand]	6
7			████████			End of boring @ 5'.	[Pattern: Sand]	7
8			████████				[Pattern: Sand]	8
9			████████				[Pattern: Sand]	9
10			████████				[Pattern: Sand]	10
11			████████				[Pattern: Sand]	11
12			████████				[Pattern: Sand]	12
13			████████				[Pattern: Sand]	13
14			████████				[Pattern: Sand]	14
15			████████				[Pattern: Sand]	15

Notes: 1. Soil boring only. No well installed. Boring abandoned with bentonite upon reaching total depth.

Direct-Push Soil Boring Log

AQ-SSA4-09

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 305067.36 Easting: 1005681.01	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-09-0-1	PAHs	N/A		N	WELL GRADED SAND (SW): Moist, loose, fine to coarse sand. No odor, no staining.		0
1	AQ-SSA4-09-1-2	PAHs	N/A			SILTY GRAVEL (GM): Wet, loose, dark gray, fine to coarse gravel. Silt is non-plastic, no odor, no staining.		1
2						@ 1.4': Core blockage, no recovery 1.4-5'. Driller indicated lots of gravel below 1.4'.		2
3						End of boring @ 5'.		3
4								4
5								5
6								6
7								7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

Direct-Push Soil Boring Log

AQ-SSA4-10

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 304905.63 Easting: 1005741.20	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-10-0-1	PAHs	██████████	N/A		WELL GRADED SAND (SW): Moist, loose, dark brown, fine to coarse sand. No odor, no staining.	[Pattern: Dotted]	0
1	AQ-SSA4-10-1-2	PAHs	██████████				[Pattern: Dotted]	1
2			██████████				[Pattern: Dotted]	2
3			██████████				[Pattern: Dotted]	3
4			██████████				[Pattern: Dotted]	4
5			██████████			<p>SILTY GRAVEL (GM): Wet, medium dense, dark gray. Silt is non-plastic, no odor, no staining.</p> <p>@ 4.2': Grades to dry.</p> <p>POORLY GRADED SAND (SP): Moist, loose, dark brown, fine sand. No odor, no staining.</p> <p>End of boring @ 5'.</p>	[Pattern: Dotted]	5
6			██████████				[Pattern: Dotted]	6
7			██████████				[Pattern: Dotted]	7
8			██████████				[Pattern: Dotted]	8
9			██████████				[Pattern: Dotted]	9
10			██████████				[Pattern: Dotted]	10
11			██████████				[Pattern: Dotted]	11
12			██████████				[Pattern: Dotted]	12
13			██████████				[Pattern: Dotted]	13
14			██████████				[Pattern: Dotted]	14
15			██████████				[Pattern: Dotted]	15

Notes: 1. Soil boring only. No well installed. Boring abandoned with bentonite upon reaching total depth.

Direct-Push Soil Boring Log

AQ-SSA4-11

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 304788.01 Easting: 1005855.06	Total Depth (ft): 5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/01/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA4-11-0-1	PAHs	██████████	N/A	K	WELL GRADED SAND (SW): Moist to wet, loose, dark brown, fine to coarse sand. No odor, no staining.	██████████	0
-1	AQ-SSA4-11-1-2	PAHs	██████████				@ 2.4-2.6': Dark gray angular gravel.	██████████	-1
-2			██████████				██████████	-2
-3			██████████				██████████	-3
-4			██████████			SILT (ML): Moist, firm, low plasticity, dark grayish-brown with dark red mottling. No odor, no staining.	██████████	-4
-5			██████████			End of boring @ 5'.	██████████	-5
-6			██████████				██████████	-6
-7			██████████				██████████	-7
-8			██████████				██████████	-8
-9			██████████				██████████	-9
-10			██████████				██████████	-10
-11			██████████				██████████	-11
-12			██████████				██████████	-12
-13			██████████				██████████	-13
-14			██████████				██████████	-14
-15			██████████				██████████	-15

Direct-Push Soil Boring Log

AQ-SSA5-01

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303707.38 Easting: 1007428.93	Total Depth (ft): 36.5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/31/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			Concrete		0
1			N/A					1
2			N/A			POORLY GRADED SAND (SP): Dry, loose, dark brown, fine sand.		2
3			N/A					3
4			N/A					4
5			N/A					5
6			N/A					6
7			N/A					7
8			N/A					8
9	AQ-SSA5-01-8-10	PAHs, Fluoride	N/A					9
10			N/A					10
11			N/A					11
12			N/A					12
13			N/A					13
14			N/A					14
15	AQ-SSA5-01-14-16	PAHs, Fluoride	N/A					15
16			N/A					16
17			N/A					17
18			N/A					18
19			N/A					19
20			N/A			@ 19.7': 0.2' SILT layer.		20
21			N/A					21
22			N/A					22
23			N/A					23
24			N/A			@ 23.8': Grades to wet.		24
25			N/A					25
26			N/A					26
27			N/A					27
28			N/A					28
29			N/A					29
30			N/A					30
31			N/A					31
32			N/A					32
33			N/A					33
34			N/A					34
35			N/A					35
36			N/A			End of boring @ 36.5' due to refusal.		36
37			N/A					37
38			N/A					38
39			N/A					39
40			N/A					40

Direct-Push Soil Boring Log

AQ-SSA5-02

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303692.81 Easting: 1007432.10	Total Depth (ft): 38.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/31/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						Concrete		0
1								1
2						POORLY GRADED SAND (SP): Dry, loose, dark brown, fine sand.		2
3								3
4								4
5								5
6								6
7								7
8								8
9	AQ-SSA5-02-8-10	PAHs, Fluoride						9
10								10
11								11
12								12
13								13
14								14
15	AQ-SSA5-02-14-16	PAHs, Fluoride						15
16								16
17								17
18								18
19								19
20								20
21								21
22								22
23								23
24						@ 23.0': Grades to wet.		24
25								25
26								26
27								27
28								28
29								29
30								30
31								31
32								32
33								33
34								34
35								35
36								36
37						End of boring @ 38.0' due to refusal.		37
38								38
39								39
40								40

Direct-Push Soil Boring Log

AQ-SSA5-03

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303699.65 Easting: 1007421.98	Total Depth (ft): 36.5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/31/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						Concrete		0
1								1
2						POORLY GRADED SAND (SP): Dry, loose, dark brown, fine sand. No odor, no staining.		2
3								3
4								4
5								5
6								6
7								7
8								8
9	AQ-SSA5-03-8-10	PAHs, Fluoride						9
10								10
11								11
12								12
13								13
14								14
15	AQ-SSA5-03-14-16	PAHs, Fluoride						15
16								16
17								17
18								18
19								19
20						@ 20.0': Trace coarse sand-sized white pumice grains for 0.5'.		20
21								21
22								22
23								23
24						@23.8': Grades to wet.		24
25								25
26								26
27								27
28						SILT (ML): Low plasticity, firm, dark brown.		28
29								29
30						POORLY GRADED SAND (SP): Dry, loose, dark brown, fine sand. No odor, no staining.		30
31								31
32						@ 32.4': Grades to very wet, very loose, soupy for 0.5'.		32
33								33
34								34
35								35
36						End of boring @ 36.5' due to refusal.		36
37								37
38								38
39								39
40								40

Direct-Push Soil Boring Log

AQ-SSA5-04

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303592.21 Easting: 1007319.48	Total Depth (ft): 36.5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/31/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						Concrete		0
1			|||||			POORLY GRADED SAND (SP): Dry, loose, dark brown, fine sand. Minor fraction of silt occurs in interspersed thin layers, no odor, no staining. Trace white pumice is fine to coarse gravel-sized.		1
2			|||||				2	
3			|||||					3
4			|||||					4
5			|||||					5
6			|||||					6
7			|||||					7
8			|||||					8
9	AQ-SSA5-04-8-10	PAHs, Fluoride	|||||					9
10			|||||					10
11			|||||					11
12			|||||			SILT (ML)		12
13			|||||					13
14			|||||					14
15	AQ-SSA5-04-14-16	PAHs, Fluoride	|||||			POORLY GRADED SAND (SP): Dry, loose, dark brown, fine to medium sand. Minor fraction of silt occurs in interspersed thin layers, no odor, no staining. Trace white pumice is fine to coarse gravel-sized.		15
16			|||||					16
17			|||||					17
18			|||||					18
19			|||||					19
20			|||||					20
21			|||||					21
22			|||||					22
23			|||||					23
24			|||||					24
25			|||||					25
26			|||||					26
27			|||||			@25.9': Grades to wet.		27
28			|||||					28
29			|||||					29
30			|||||					30
31			|||||					31
32			|||||					32
33			|||||					33
34			|||||					34
35			|||||					35
36			|||||			End of boring @ 36.5' due to refusal.		36
37			|||||					37
38			|||||					38
39			|||||					39
40			|||||					40

Direct-Push Soil Boring Log

AQ-SSA5-05

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303577.82 Easting: 1007323.35	Total Depth (ft): 38.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/31/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						Concrete		0
1								1
2						POORLY GRADED SAND (SP): Dry, loose, dark brown, fine to medium sand. No odor, no staining.		2
3								3
4								4
5								5
6	AQ-SSA5-05-5-7	PAHs, Fluoride						6
7								7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15	AQ-SSA5-05-14-16	PAHs, Fluoride						15
16								16
17								17
18								18
19								19
20						@ 21.5': Wood pieces.		20
21								21
22						@ 22.4': Wood pieces.		22
23								23
24						SILT (ML)		24
25						POORLY GRADED SAND (SP): Dry, loose, dark brown, fine to medium sand. No odor, no staining.		25
26						@ 25': Wood pieces.		26
27								27
28								28
29								29
30						@ 26': Grades to wet.		30
31								31
32								32
33								33
34								34
35								35
36								36
37						End of boring @ 38.0' due to refusal.		37
38								38
39								39
40								40

Direct-Push Soil Boring Log

AQ-SSA5-06

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303584.78 Easting: 1007312.79	Total Depth (ft): 36.5
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/31/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						Concrete		0
1								1
2								2
3			||||					3
4								4
5								5
6								6
7			||||					7
8								8
9	AQ-SSA5-06-8-10	PAHs, Fluoride	||||					9
10								10
11								11
12			||||					12
13								13
14								14
15	AQ-SSA5-06-14-16	PAHs, Fluoride	||||					15
16								16
17			||||					17
18								18
19								19
20			||||					20
21								21
22								22
23			||||					23
24								24
25								25
26								26
27					N			27
28						@ 27.1': Grades to wet.		28
29								29
30								30
31								31
32			||||					32
33								33
34								34
35						@ 34.8': Piece of coarse gravel (rounded).		35
36			||||					36
37						End of boring @ 36.5' due to refusal.		37
38								38
39								39
40								40

Direct-Push Soil Boring Log

AQ-SSA6-01

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303570.22 Easting: 1006749.20	Total Depth (ft): 9.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/30/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			|			POORLY GRADED SAND (SP): Very dry, very loose, brown, fine sand. No odor, no staining.	●●●●	0
1			|		SS		●●●●	1
2			|			SILT (ML): Moist, soft, low plasticity, dark gray, trace fine sand. Moderate, sweet, plastic-like odor, trace plant debris, firms with depth. Moderate sheen (blocky/platy).	|	2
3			|		MS		|	3
4	AQ-SSA6-01-3-4	NWTPH-DX, EPH	|				|	4
5			|				|	5
6			|			POORLY GRADED SAND (SP): Dry, very loose, brown, fine sand. Oil-like odor. Slight sheen (platy, blocky).	●●●●	6
7			|		SS		●●●●	7
8	AQ-SSA6-01-7-8	NWTPH-DX, EPH	|			ELASTIC SILT (MH): Stiff, greenish-gray with dark red mottling, trace fine sand. Trace oil-like odor. Core had shiny greenish residue. Trace sheen (blocky). @ 8': Grades to moderate sheen (blocky).	|	8
9			|		SS		|	9
10			|			End of boring @ 9'.	|	10
11			|		MS		|	11
12			|				|	12
13			|				|	13
14			|				|	14
15			|			|	15	

Direct-Push Soil Boring Log

AQ-SSA6-02

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303573.20 Easting: 1006710.32	Total Depth (ft): 10.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/30/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0			N/A			SILTY GRAVEL (GM): Dry, gray, loose. Gravels are angular.		0
1								1
2						POORLY GRADED SAND (SP): Dry, loose, poorly graded, brown, fine sand, occasional bands of differing tones of brown. No odor, no staining.		2
3								3
4	AQ-SSA6-02-3-4	NWTPH-DX				ELASTIC SILT (MH): Moist, firm, dark gray. Slight HC-like odor. @ 3.4': 0.2'-thick SAND (SP) layer		4
5	AQ-SSA6-02-4-5	NWTPH-DX						5
6	AQ-SSA6-02-5-6	NWTPH-DX				SANDY SILT (ML): Moist, low plasticity, light gray with dark red mottling, fine sandy. Trace HC-like odor, no staining.		6
7						SILTY SAND (SM): Wet, loose, poorly graded, light gray with dark red mottling. No odor, no staining.		7
8						No recovery		8
9								9
10						End of boring @ 10'.		10
11								11
12								12
13								13
14								14
15								15

Direct-Push Soil Boring Log

AQ-SSA6-03

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303537.47 Easting: 1006751.49	Total Depth (ft): 10.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/30/2011		
Contractor: Cascade Drilling		

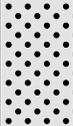
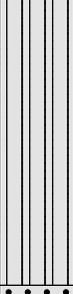
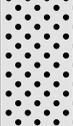
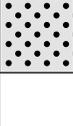
Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			█			<p>ELASTIC SILT (MH): Moist, soft, light gray with dark red mottling, very rubbery texture. No odor, no staining.</p> <p>@ 2.7': Grades to dark gray, moderate sweet plastic-like odor. Rubbery texture to 6.0'.</p> <p>@ 3': Grades to very dark gray. Occasional thin seams of sand.</p> <p>@ 5': Light sheen on core in spots, outside of core was soupy and wet.</p> <p>End of boring @ 10'.</p>	█	0
1			█				█	1
2			█				█	2
3			█				█	3
4	AQ-SSA6-03-3-4	NWTPH-DX, EPH	█				█	4
5			█				█	5
6			█				█	6
7	AQ-SSA6-03-6-7	NWTPH-DX	█				█	7
8			█				█	8
9			█				█	9
10			█			█	10	
11			█			█	11	
12			█			█	12	
13			█			█	13	
14			█			█	14	
15			█			█	15	

Direct-Push Soil Boring Log

AQ-SSA6-04

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303524.57 Easting: 1006706.17	Total Depth (ft): 10.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/30/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			SILTY GRAVEL (GM): Dry, loose, light gray, fine to coarse gravel. Gravels are angular.		0
1	AQ-SSA6-04-1-2	NWTPH-DX	N/A			POORLY GRADED SAND (SP): Dry, loose, poorly graded, light brown, fine sand. No odor, no staining.		1
2			N/A					2
3	AQ-SSA6-04-3-4	NWTPH-DX	N/A			SILT (MH): Moist, soft, moderate plasticity, dark brown with dark red mottling, trace fine sand, firms with depth. No odor, no staining.		3
4			N/A					4
5			N/A					5
6			N/A					6
7			N/A					7
8			N/A			POORLY GRADED SAND: Wet, medium dense, light gray with dark red mottling, silty, fine sand. No odor, no staining.		8
9			N/A					9
10			N/A			End of boring @ 10'.		10
11			N/A					11
12			N/A					12
13			N/A					13
14			N/A					14
15			N/A					15

Direct-Push Soil Boring Log

AQ-SSA6-05

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303534.01 Easting: 1006692.31	Total Depth (ft): 10.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/30/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Dry, very loose, light brownish-gray, fine to medium sand. No odor, no staining.		0
1	AQ-SSA6-05-1-2	NWTPH-DX	████████					1
2			████████					2
3	AQ-SSA6-05-3-4	NWTPH-DX	████████			WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): Moist, medium dense, brown, fine to coarse gravelly, fine to medium sand. No odor, no staining.		3
4			████████					4
5			████████			SANDY SILT (ML): Moist, firm, low plasticity, dark gray with dark red mottling, fine sandy. No odor, no staining.		5
6			████████					6
7			████████			@ 7.0': Grades to dark gray.		7
8	AQ-SSA6-05-7-8	NWTPH-DX	████████			SILTY SAND (SM): Moist, medium dense, poorly graded, light gray with dark red mottling, fine sand. No odor, no staining.		8
9			████████			@ 8.7': Grades to wet		9
10			████████			End of boring @ 10'.		10
11			████████					11
12			████████					12
13			████████					13
14			████████					14
15			████████					15

Direct-Push Soil Boring Log

AQ-SSA6-06

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303494.88 Easting: 1006730.56	Total Depth (ft): 10.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/30/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			SILTY GRAVEL (GM): Dry, loose, light gray, fine to coarse gravel. Gravels are angular, no odor, no staining.	0	0
1	AQ-SSA6-06-1-2	NWTPH-DX	100%			POORLY GRADED SAND (SP): Dry, loose, brown, fine sand. No odor, no staining.	1	1
2			100%				2	2
3	AQ-SSA6-06-3-4	NWTPH-DX	100%			ELASTIC SILT WITH SAND (MH): Moist, firm, moderate plasticity, brown with dark red mottling, sandy. No odor, no staining.	3	3
4			100%				4	4
5			100%				5	5
6			100%				6	6
7			100%			@6.9': Grades to dark gray.	7	7
8			100%				8	8
9			100%			SANDY SILT (SM): Moist, firm, slight plasticity, light gray with dark red mottling, fine sandy. No odor, no staining.	9	9
10			100%			End of boring @ 10'.	10	10
11			100%				11	11
12			100%				12	12
13			100%				13	13
14			100%				14	14
15			100%				15	15

Direct-Push Soil Boring Log

AQ-SSA6-07

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303519.07 Easting: 1006759.41	Total Depth (ft): 9.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/30/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			WELL GRADED GRAVEL (GW): Dry, loose. Gravels are angular.		0
1	AQ-SSA6-07-1-2	NWTPH-DX	[Symbol]			POORLY GRADED SAND WITH SILT AND GRAVEL (SW): Moist, loose, poorly graded, dark brown, fine sand. Trace soft, fibrous material.		1
2			[Symbol]					2
3			[Symbol]					3
4			[Symbol]			ELASTIC SILT (MH): Moist, firm, dark gray with dark red mottling. Trace plant debris.		4
5	AQ-SSA6-07-5-6	NWTPH-DX	[Symbol]					5
6			[Symbol]			@6.0': Grades to very dark gray.		6
7			[Symbol]			@6.9': Grades to gray with dark red mottling.		7
8			[Symbol]					8
9			[Symbol]			End of boring @ 9'.		9
10								10
11								11
12								12
13								13
14								14
15								15

Direct-Push Soil Boring Log

AQ-SSA6-08

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303583.89 Easting: 1006696.08	Total Depth (ft): 10.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 08/30/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			<p>WELL GRADED GRAVEL (GW): Gray, loose. Gravels are angular.</p> <p>POORLY GRADED SAND (SP): Dry, loose, brown, fine sand. No odor.</p>	0	0
-1							-1	-1
-2							-2	-2
-3						@ 2.8': Black, carbon-like smear, no sheen, no odor.	-3	-3
-4						ELASTIC SILT (MH): Moist, soft, dark gray with dark red mottling. Trace HC-like odor, no staining.	-4	-4
-5	AQ-SSA6-08-4-5	NWTPH-DX					-5	-5
-6							-6	-6
-7						@ 6.8': Grades to dark gray.	-7	-7
-8	AQ-SSA6-08-7-8	NWTPH-DX				@ 7.7': Grades to light gray.	-8	-8
-9							-9	-9
-10						End of boring @ 10'.	-10	-10
-11							-11	-11
-12							-12	-12
-13							-13	-13
-14							-14	-14
-15							-15	-15

Direct-Push Soil Boring Log

AQ-SSA6-09

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303586.13 Easting: 1006766.27	Total Depth (ft): 15.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/02/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			SILTY GRAVEL (GM): Dry, loose, dark brown, fine to coarse gravel. Non-plastic silt, gravels are angular, trace pieces of black, coal-like material, trace pitch-like odor.	0	0
1							1	1
2	AQ-SSA6-09-2-3	NWTPH-DX	█			POORLY GRADED SAND (SP): Dry, loose, dark brown, fine sand. No odor, no staining.	2	2
3							3	3
4	AQ-SSA6-09-4-5	NWTPH-DX	█			SILTY GRAVEL (GM): Dry, loose, dark brownish-gray, fine to coarse gravel. Non-plastic silt, gravels are angular. @ 4.2': Grades to very dark grayish-brown, traces of small, black, moist pieces of carbon-like material, trace oil pitch-like odor.	4	4
5							5	5
6						POORLY GRADED SAND (SP): Dry, loose, dark brown, fine sand. No odor, no staining.	6	6
7						@ 6.9': Grades to damp, dark gray.	7	7
8					N	@ 8': Grades to wet.	8	8
9							9	9
10							10	10
11	AQ-SSA6-09-11-12	NWTPH-DX	█			@ 10.5': Piece of aluminum, sweet, plastic-like odor to 12'. High plasticity silt layers to 12.7'.	11	11
12						@ 12': Grades to no odor.	12	12
13	AQ-SSA6-09-13-14	NWTPH-DX	█			@ 13.3': Grades to fine sand.	13	13
14							14	14
15						ELASTIC SILT (MH): Wet, soft, dark brown. No odor, no staining. End of boring @ 15'.	15	15

Direct-Push Soil Boring Log

AQ-SSA6-10

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303557.61 Easting: 1006790.74	Total Depth (ft): 3.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/02/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA6-10-0-1	NWTPH-DX	|			SILTY GRAVEL (GM)	○ ○	0
1	AQ-SSA6-10-1-2	NWTPH-DX	|			POORLY GRADED SAND (SP): Dry, dark brown, loose, fine sand. No odor, no staining.	● ● ● ●	1
2	AQ-SSA6-10-2-3	NWTPH-DX	|		SS	SILTY GRAVEL (GM): Dry, dense, gray to brown to black. Silt is non-plastic. Substantial block pieces and chips of hardened pitch, slight pitch-like odor.	○ ○	2
3						End of boring @ 3' due to refusal.	○ ○	3
4								4
5								5
6								6
7								7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

Direct-Push Soil Boring Log

AQ-SSA6-11

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Method: Direct Push
Project #: 130720-02.01	Northing: 303614.70 Easting: 1006733.38	Total Depth (ft): 15.0
Client: Millennium Bulk Terminals-Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Matt Wilson
Collection Date: 09/02/2011		
Contractor: Cascade Drilling		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sample Recovery	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			WELL GRADED GRAVEL WITH SAND (GW): Dry, loose, dark brown, fine sandy, fine to coarse gravel. Gravels are angular, no odor, no staining.	0	0
1								1
2	AQ-SSA6-11-2-3	NWTPH-DX				WELL GRADED GRAVEL WITH SILT AND SAND (GW=GM): Moist, medium dense, dark brown and black. Occasional pieces of hardened pitch, trace pitch-like odor.		2
3								3
4								4
5								5
6	AQ-SSA6-11-5-6	NWTPH-DX				@ 6.0': Trace HC-like odor.		6
7					N			7
8						POORLY GRADED SAND (SP): Moist to wet, loose, dark brown, fine sand. No odor, no staining.		8
9								9
10								10
11						@ 10.9': 0.1' layer of angular coarse gravel.		11
12								12
13								13
14						SILT (ML): Wet, firm, grayish brown. Trace plant debris, no odor or staining. End of boring @ 15'.		14
15								15

Notes: 1. Soil boring only. No well installed. Boring abandoned with bentonite upon reaching total depth.

Test Pit Log

AQ-SSA7-01

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 303148.57 Easting: 1006651.03	Total Depth (ft): 13.8
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/27/2011		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0					<p>WELL GRADED SAND WITH GRAVEL (SW): Damp, loose, dark brown, fine to coarse gravel, medium to coarse sand. Gravels are angular to rounded, up to 2"-diameter. Occasional brick fragments and organic material (roots). No odor.</p> <p>@ 1.5': Grades to medium stiff, light orange brown and gray mottling, slightly gravelly. Trace silt. Trace rootlets.</p> <p>@ 3': Grades to moist, stiff.</p>	0	
-1						-1	
-2						-2	
-3						-3	
-4	AQ-SSA7-01-3-4	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs			<p>SILTY SAND (SM): Grades to dark gray, fine to coarse sand. Trace angular gravels. Trace wood fragments.</p> <p>@ 5': Grades to slightly clayey. Clay is blue-green to gray and has slight H2S-like odor. Occasional gravels (angular rip rap, up to 4"-diameter).</p> <p>@ 7': Grades to moist. Occasional rock (1'-diameter with very fine-grained dark gray to black matrix that appears crystalline, no odor, breaks easily). Occasional decomposing wood fragments (up to 6" long).</p> <p>@ 9': Grades to CLAYEY SAND (SC). Moderate decomposing wood fragments (up to 1' long, 2"-diameter).</p>	-4	
-5						-5	
-6						-6	
-7						-7	
-8						-8	
-9						-9	
-10						-10	
-11						-11	
-12						-12	
-13						-13	
-14						-14	
-15					End of test pit @ 13.8'	-15	

Notes:

Test Pit Log

AQ-SSA7-02

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 303053.39 Easting: 1006766.89	Total Depth (ft): 10.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/27/2011		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15					<p>WELL GRADED SAND WITH GRAVEL (SW): Damp, loose, dark brown, fine to coarse gravel, medium to coarse sand. Gravels are subangular, up to 3"-diameter. Moderate organic material (roots). Trace biota (worms). No odor.</p> <p>-----</p> <p>SILTY SAND (SM): Damp, medium stiff, dark brown with gray mottling, fine sand. Occasional rootlets.</p> <p>@ 3': Moderate 4"-diameter pockets of light gray to tan with orange mottling, SILT (ML). Trace gravels (angular, up to 2"-diameter).</p> <p>@ 5': Grades to occasional (~10%) coarse gravel (angular, black, up to 6"-diameter).</p> <p>@ 6': Trace boulders (subangular, black, up to 1'-diameter). Trace decomposing sticks.</p> <p>SILT WITH GRAVEL (ML): Moist, medium stiff, dark gray fine to medium gravel, fine to medium sand, trace clay. Gravels are subangular, up to 2"-diameter. Occasional wood fragments (decomposing sticks and roots). Slight H2S-like odor.</p> <p>@ 10': Grades to moist, slightly clayey, with occasional (~10%) coarse gravel (subangular, up to 6"-diameter).</p> <p>End of test pit @ 10.5' due to refusal by large log.</p>	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
	AQ-SSA7-02-3-4	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs		NS			

Notes:

Test Pit Log

AQ-SSA7-03

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 302965.33 Easting: 1006888.12	Total Depth (ft): 12
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/27/2011		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0					<p>WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): Damp, loose, dark brown, fine to medium gravel, fine to medium sand. Moderate rootlets. No odor.</p> <p>@ 1': Grades to medium dense, gray-brown. Gravels are rounded to subrounded, up to 2"-diameter. Moderate lenses and pockets of light gray with orange mottling, SILT (ML).</p> <p>@ 4': Moderate chunks of concrete. No odor.</p> <p>@ 5': Red brick fragments (up to 3").</p> <p>@ 6': Grades to loose, orange-brown. Gravels are subrounded to angular. Moderate lenses and pockets of tan, clayey, SILT (ML).</p> <p>-----</p> <p>SILT WITH GRAVEL (ML): Damp, medium stiff, dark gray, fine to coarse gravel, fine to medium sand, trace clay. No odor.</p> <p>@ 7.5': Block of concrete (10" x 5").</p> <p>@ 9': Grades to occasional pockets of clay (CL). Trace fine gravel. Occasional rootlets and decomposing sticks.</p> <p>@ 10': Grades to SANDY SILT WITH GRAVEL (ML), fine to medium sand, fine to coarse gravel. Gravels are angular, black, up to 5"-diameter. No odor.</p> <p>@ 11': Grades to moist.</p> <p>End of test pit @ 12'</p>	NS	0
1						1	
2						2	
3						3	
4						4	
5	AQ-SSA7-03-4-5	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs				5	
6						6	
7						7	
8						8	
9						9	
10						10	
11	AQ-SSA7-03-11-12	PAHs, Fluoride, Total Cyanide, PCBs				11	
12					12		
13					13		
14					14		
15					15		

Notes:

Test Pit Log

AQ-SSA7-04

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 302876.33 Easting: 1007029.95	Total Depth (ft): 13
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/27/2011		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0					<p>WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): Damp, loose, dark brown with black mottling, fine to medium gravel, medium to coarse sand. Substantial rootlets. No odor.</p>	0	0
1						1	1
2	AQ-SSA7-04-1.5-2	PAHs,Fl, CN Sulfate,PCBs			<p>POORLY GRADED SAND (SP): Damp, loose, tan brown, fine to medium sand, trace gravel (rounded white pumice).</p>	2	2
3						3	3
4						4	4
5						5	5
6						6	6
7					<p>SANDY SILT (ML): Moist, medium stiff, dark gray, fine to medium sand. Moderate wood fragments (decomposed sticks up to 4" long). Slight H2S-like odor.</p>	7	7
8					<p>@ 7': Grades to moderate interbeds of fine to medium POORLY GRADED SAND (SP). Substantial wood fragments (decomposing sticks).</p>	8	8
9	AQ-SSA7-04-8-9	PAHs,Fluoride, Total Cyanide, Sulfate,PCBs				9	9
10						10	10
11						11	11
12						12	12
13					<p>POORLY GRADED SAND (SP): Moist, loose, orange-brown, medium to coarse sand. No odor.</p>	13	13
14					<p>End of test pit @ 13'</p>	14	14
15						15	15

Notes:

Test Pit Log

AQ-SSA7-05

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 302795.21 Easting: 1007117.84	Total Depth (ft): 13
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/27/2011		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA7-05-0-1	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs			FILL: Concrete slab (6"-thick) with metal cables and wires present on surface.	0	0
1					WELL GRADED SAND (SW): Damp, loose, dark brown, fine to medium gravel, fine to coarse sand. Moderate rootlets. No odor.	1	1
2	AQ-SSA7-05-2-3	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs, HClD, TPH			FILL: Stiff, dark gray with light gray to black mottling, well-cemented, industrial waste materials (Alcoa rep describes as possible cryolite, fluoride, soda ash - see photos; generally described as "process waste"). Moderate chemical odor. Heterogeneous pockets contain soft, white, fine grained material with moderate paint-thinner-like odor. Metal, plastic, and brick fragments vary in size.	2	2
3						3	3
4						4	4
5					SILTY SAND (SM): Wet, loose, dark gray with light gray mottling. Moderate HC-like odor.	5	5
6	AQ-SSA7-05-6-7	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs, HClD, TPH	SS		@ 6': Grades to medium-dense, dark gray, slightly silty, fine to coarse gravelly. Gravels are rounded to angular, up to 4"-diameter. Slight metallic gray sheen. Moderate HC-like odor.	6	6
7					@ 7': Grades to moist. Occasional pockets of blue-green to gray, silty, CLAY (CL). Occasional large wood pieces (up to 2' long).	7	7
8					SILT WITH GRAVEL (ML): Moist, medium stiff, gray, fine to medium gravel, fine to coarse sand. Slight HC-like odor.	8	8
9					@ 8': 3 pieces of rebar, piece of plywood (3' x 3').	9	9
10					@ 9': Grades to slightly clayey with fine to medium sand pockets. No odor in silt, slight HC-like odor in sand pockets.	10	10
11					@ 10': Grades to moderate wood fragments. No odor.	11	11
12	AQ-SSA7-05-12-13	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs, HClD			POORLY GRADED SAND (SP): Damp, loose, dark gray, medium sand, trace fine gravel. Gravel is subrounded to rounded. No odor.	12	12
13					End of test pit @ 13'	13	13
14						14	14
15						15	15

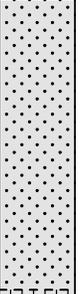
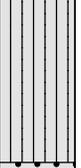
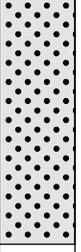
Notes:

Test Pit Log

AQ-SSA7-06

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 302788.90 Easting: 1007233.68	Total Depth (ft): 9
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/27/2011		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0	AQ-SSA7-06-0-1	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs	NS		Concrete slab (6"-thick) present on surface.		0
1					WELL GRADED SAND WITH GRAVEL (SW): Damp, loose, dark brown, fine to medium sand, fine to medium gravel, slightly silty. Moderate rootlets. No odor. @ 1': Grades to medium stiff, dark gray-brown. Moderate pockets and lenses of tan SILT (ML). @ 1.5': 10"-long corrugated hose.		1
2					@ 2.5': Red brick fragment.		2
3					@ 4' - 5.5': Visible in pit wall: black and white mottled layer with distorted white and gray strata		3
4	AQ-SSA7-06-4-5	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs			SILT (ML): Damp, medium stiff, fine gravel, fine sand. Gravels are subrounded. Occasional 1" to 3"-diameter pockets and stratified lenses of wet, alternating white and light gray, silty material (Alcoa rep suggests possibly CaCO3, or white spent lime). No odor.		4
5							5
6					POORLY GRADED SAND (SP): Damp, loose, gray, medium sand, trace fine gravel. Moderate woody debris. No odor.		6
7							7
8	AQ-SSA7-06-8-9	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs			@ 9': Grades to brownish gray.		8
9					End of test pit @ 9'		9
10							10
11							11
12							12
13							13
14							14
15							15

Notes:

Test Pit Log

AQ-SSA7-07

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 302896.70 Easting: 1007127.37	Total Depth (ft): 7
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/28/2011		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0	AQ-SSA7-07-0-1	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs	NS		<p>WELL GRADED SAND WITH GRAVEL (SW): Dry, loose, dark brown with black mottling, fine to coarse gravel, fine to coarse sand. Gravels are subrounded to angular. Trace angular brick fragments. Several small blocks of gray concrete present on surface. Occasional charcoal-like black material in top 8". Substantial roots. No odor.</p> <p>SANDY SILT (ML): Damp, medium stiff, brown with white, gray and tan mottling, slightly gravelly, fine to medium sand. White and gray silt is powdery and has no odor.</p> <p>@ 3': Trace f-gravel-sized, blocky chunks of black material (resembling charcoal) with slight chemical odor. Occasional concrete chunks up to 1' x 6" x 3".</p> <p>SILTY SAND (SM): Damp, medium dense, dark brown, slightly silty, slightly fine to medium gravel, medium to coarse sand, trace clay. Gravels are subrounded. Occasional wood fragments. No odor.</p> <p>LEAN CLAY (CL): Moist, medium stiff, dark gray with light brown and bluish-tan mottling, silty. Trace HC-like odor.</p> <p>POORLY GRADED SAND (SP): Damp, medium dense, dark grayish-brown, medium to coarse sand. No odor.</p> <p>End of test pit @ 7'</p>	0	0
1						1	1
2						2	2
3	AQ-SSA7-07-3-4	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs				3	3
4						4	4
5						5	5
6						6	6
7	AQ-SSA7-07-6-7	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs				7	7
8						8	8
9						9	9
10						10	10
11						11	11
12						12	12
13						13	13
14						14	14
15						15	15

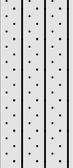
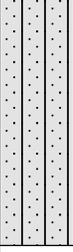
Notes:

Test Pit Log

AQ-SSA7-08

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 302960.13 Easting: 1007007.23	Total Depth (ft): 7
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/28/2011		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0					WELL GRADED SAND WITH GRAVEL (SW): Damp, loose, fine to coarse gravel, silt, fine to coarse sand. Gravels are subrounded to angular. Substantial rootlets. No odor.		0
1					SILTY SAND (SM): Damp, medium stiff, light brown, slightly silty, fine to medium sand. Occasional pockets of tan SILT (ML).		1
2							2
3							3
4	AQ-SSA7-08-3-4	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs			@ 4': Grades to slightly fine to medium gravelly (pumice).		4
5					@ 6': Grades to gray-brown.		5
6							6
7					End of test pit @ 7'		7
8							8
9							9
10							10
11							11
12							12
13							13
14							14
15							15

Notes:

Test Pit Log

AQ-SSA7-09

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 302713.59 Easting: 1006965.54	Total Depth (ft): 8
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/28/2011		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0			NS		SANDY SILT (ML): Dry, soft, dark brown, fine to coarse sand. Substantial roots and woody debris up to 3'-long and 3"-diameter (tree roots).		0
1							1
2					SILTY SAND (SM): Dry, medium dense, tan-brown with minor orange-brown mottling, slightly silty, fine to coarse sand. Moderate laminated beds of SILT (ML). Moderate rootlets. No odor.		2
3							3
4	AQ-SSA7-09-3-4	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs			SANDY SILT (ML): Damp, stiff, dark gray, fine sand, trace clay. Moderate wood fragments (decaying sticks) up to 3"-long.		4
5							5
6					LEAN CLAY (CL): Moist, stiff, gray.		6
7					SILT (ML): Moist, stiff, gray, slightly sandy, clayey. Moderate wood fragments (decaying).		7
8					End of test pit @ 8'		8
9							9
10							10
11							11
12							12
13							13
14							14
15							15

Notes:

Test Pit Log

AQ-SSA7-10

Sheet 1 of 1

Project: Millennium Bulk Terminals RI/FS	Location: Longview, WA	Excavation Method: Backhoe
Project #: 130720-02.01	Northing: 302671.76 Easting: 1007069.24	Total Depth (ft): 8
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: JL, BH
Collection Date: 10/28/2011		
Contractor: Terra Hydr		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	Sheen Test	Groundwater	Soil Description <small>Samples and descriptions are in recovered depths. Classification scheme based on USCS</small>	Graphic Log	Recovered Depth (ft)
0					<p>SILTY SAND (SM): Dry, loose, light brown, slightly silty, fine to medium sand. Moderate roots and organic matter (leaves). No odor.</p> <p>@ 1': Grades to damp, medium dense, stratified beds. Occasional rootlets.</p>		0
1				NS			1
2						2	2
3						3	3
4	AQ-SSA7-10-3-4	PAHs, Fluoride, Total Cyanide, Sulfate, PCBs				4	4
5					<p>@ 4': Grades to trace fine gravel (pumice).</p> <p>@ 5': Grades to moderate, thin laminated beds of light brown to tan, fine sandy, SILT (ML). Moderate wood fragments (roots and sticks up to 4"-long, parallel to bedding).</p>	5	5
6					<p>@ 6': Grades to damp, gray, slightly clayey.</p>	6	6
7						7	7
8						8	8
9					End of test pit @ 8'	9	9
10						10	10
11						11	11
12						12	12
13						13	13
14						14	14
15						15	15

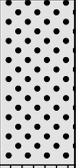
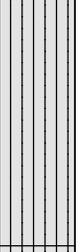
Notes:

GeoProbe Log

AQ-BMD-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 304853.73 Easting: 1003256.83	Total Depth (ft): 7
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie, Amy Thatcher
Collection Date: 10/22/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Dry, loose, brown, medium to coarse sand, trace gravel. Moderate roots in top 6". No odor.		0
1								1
2				NS		SILT (ML): Moist, medium stiff, black, slightly sandy, occasional fist-sized chunks of pitch. Slight chemical odor.		2
3	AQ-BMD-01-2-5	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs, VOCs				@3': Trace moist, soft, white mottling		3
4				NS		@4': 3' piece of rebar.		4
5				SS	N	SILT WITH GRAVEL (ML): Moist, medium stiff, brown, slightly sandy, trace clay. No odor.		5
6								6
7						End of test pit @ 7'.		7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

GeoProbe Log

AQ-BMD-02

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 304753.40 Easting: 1003520.49	Total Depth (ft): 7
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie, Amy Thatcher
Collection Date: 10/22/2012		
Contractor: Terra Hydr, Inc.		

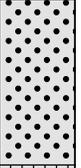
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Dry, loose, brown, medium to coarse sand, trace gravel. Moderate roots in top 6". No odor.		0
1								1
2					SS	SILT (ML): Damp, medium stiff, black, slightly sandy. Trace gravel and wood fibers. No odor.		2
3		Fluoride, Cyanide (WAD and Total), Total Metals, PAHs, VOCs			SS	@3.9': Trace white mottling, wood pieces. Trace boulders (1'-diameter), concrete, rebar.		3
4	AQ-BMD-02-1.5-5.5							4
5					SS			5
6						SILT WITH GRAVEL (ML): Moist, medium stiff, brown, slightly sandy, trace clay. No odor.		6
7						End of test pit @ 7'.		7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

GeoProbe Log

AQ-BMD-03

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 304928.45 Easting: 1003748.81	Total Depth (ft): 9.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie, Amy Thatcher
Collection Date: 10/22/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Dry, loose, brown, medium to coarse sand, trace gravel. Moderate roots in top 6". No odor.		0
1								1
2								2
3					SS	SILT (ML): Moist, medium stiff, black, slightly sandy. No odor. Slight metallic sheen. @3': Brick fragments and trace white mottling.		3
4								4
5	AQ-BMD-03-2-8	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs, SVOCs, PCB Aroclors, VOCs			SS			5
6								6
7					SS	@7': Transition to stiff.		7
8								8
9						SILT WITH GRAVEL (ML): Moist, medium stiff, brown, slightly sandy, trace clay. No odor.		9
10						End of test pit @ 9.5'.		10
11								11
12								12
13								13
14								14
15								15

GeoProbe Log

AQ-BMD-04

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 304511.10 Easting: 1004510.45	Total Depth (ft): 9
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie, Amy Thatcher
Collection Date: 10/22/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Dry, loose, brown, medium to coarse sand. Moderate roots in top 6". No odor.		0
1						SILT (ML): Moist, medium stiff, black, slightly fine sandy, trace gravel. No odor.		1
2					SS			2
3								3
4	AQ-BMD-04-1-7	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs, VOCs				@4': 3" wood fragment with trace rainbow sheen. Slight chemical-like odor.		4
5						@5': Grades to stiff.		5
6					SS			6
7								7
8					SS	SANDY SILT (ML): Damp, medium stiff, olive brown, slightly fine to medium gravelly. Gravels are subrounded. Occasional debris (nails, scrap metal pipe, concrete). No odor.		8
9						End of test pit @ 9'.		9
10								10
11								11
12								12
13								13
14								14
15								15

GeoProbe Log

AQ-BMD-05

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 304789.27 Easting: 1004543.39	Total Depth (ft): 7
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie, Amy Thatcher
Collection Date: 10/22/2012		
Contractor: Terra Hydr, Inc.		

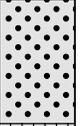
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Dry, loose, brown, slightly gravelly. No odor. Substantial rootlets.		0
1						SILT (ML): Damp to moist, medium stiff, black, slightly fine sandy. No odor. Trace white mottling and rootlets.		1
2					SS			2
3		Fluoride, Cyanide (WAD and Total), Total Metals, PAHs, VOCs				@3': Grades to sandy SILT (ML), fine sand.		3
4	AQ-BMD-05-1-6				SS			4
5								5
6					SS/MS			6
7						SANDY SILT (ML): Moist, medium stiff, olive brown, fine sand. No odor. Moderate organics (grass and decomposing wood material). Slight H2S-like odor.		7
8						End of test pit @ 7'.		8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

GeoProbe Log

AQ-BMD-06

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 304634.30 Easting: 1004770.29	Total Depth (ft): 6
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie, Amy Thatcher
Collection Date: 10/22/2012		
Contractor: Terra Hydr, Inc.		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Damp, loose, brown, slightly gravelly, fine to medium sand. No odor.		0
1								1
2					SS	SANDY SILT (ML): Damp to moist, medium stiff, black with occasional white mottling (in pockets), fine sand. No odor. Trace woody debris.		2
3		Fluoride, Cyanide (WAD and Total), Total Metals, PAHs, VOCs						3
4	AQ-BMD-06-1.5-5.5				SS			4
5					NS			5
6						SILT (ML): Moist, medium stiff, olive brown, slightly fine sand, trace clay. Slight H2S-like odor. Occasional organic material (twigs, decomposing grass).		6
7						End of test pit @ 6'.		7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

GeoProbe Log

AQ-BMD-07

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 304923.41 Easting: 1004744.74	Total Depth (ft): 5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie, Amy Thatcher
Collection Date: 10/22/2012		
Contractor: Terra Hydr, Inc.		

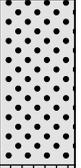
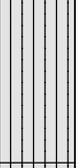
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Damp, loose, brown, slightly gravelly, fine to medium sand. Substantial rootlets in top 6".		0
1						SANDY SILT (ML): Moist, medium stiff, black with occasional white mottling. No odor.		1
2	AQ-BMD-07-1-3	Fluoride, Cyanide (WAD and Total), Total and TCLP Metals, PAHs, VOCs			SS	SILT (ML): Moist, stiff, olive brown, slightly fine sandy, trace clay. Occasional organics (twigs, grass). Slight H2S-like odor.		2
3								3
4								4
5						End of test pit @ 5'.		5
6								6
7								7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

GeoProbe Log

AQ-BMD-08

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Direct Push Drilling Rig
Project #: 130720-02.01	Northing: 304930.10 Easting: 1005013.02	Total Depth (ft): 5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie, Amy Thatcher
Collection Date: 10/23/2012		
Contractor: Terra Hydr, Inc.		

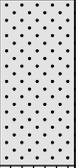
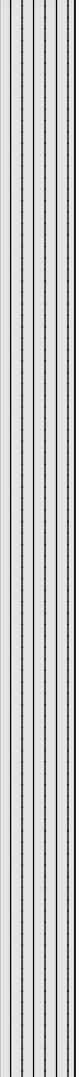
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Dry, loose, brown, medium to coarse sand. Moderate roots in top 6". No odor.		0
-1								-1
-2								-2
-3	AQ-BMD-08-2-4	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs				SILT (ML): Moist, medium stiff, black with occasional white mottling, slightly fine sand. No odor.		-3
-4								-4
-5						SANDY SILT (ML): Moist, stiff, olive brown, fine sand. Trace rootlets with slight H2S-like odor.		-5
-6						End of test pit @ 5'.		-6
-7								-7
-8								-8
-9								-9
-10								-10
-11								-11
-12								-12
-13								-13
-14								-14
-15								-15

Test Pit Log

AQ-BMP-01

Sheet 1 of 2

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302840.44 Easting: 1008854.81	Total Depth (ft): 16
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/24/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						POORLY GRADED SAND (SP): Dry, loose, brown, medium sand. Substantial roots, grass in top 1.5'. No odor (fill).		0
1								1
2				NS		SANDY SILT (ML): Damp, medium stiff, fine sand. Dark gray with occasional light gray and white layers (1-2 cm thick). No odor.		2
3			0.3					3
4				NS		@4': Grades to moist, trace clay. Trace white layers.		4
5			0.3					5
6				MS		@6': Grades to wet, soft, trace sand, slight chemical-like odor. Grades to 25-35% white SILT (ML).		6
7			0.3					7
8				MS		@8': Grades to moderate chemical-like odor.		8
9	AQ-BMP-01-2-16	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs	0.3					9
10				MS		@10': Grades to ELASTIC SILT (MH), white and dark gray.		10
11			0.3					11
12				SS		@12': Grades to medium stiff, black with trace white, slightly fine sandy. Slight odor.		12
13			0.6					13
14				SS				14
15			0.5					15

Test Pit Log

AQ-BMP-01

Sheet 2 of 2

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302840.44 Easting: 1008854.81	Total Depth (ft): 16
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/24/2012		
Contractor: Terra Hydr, Inc		

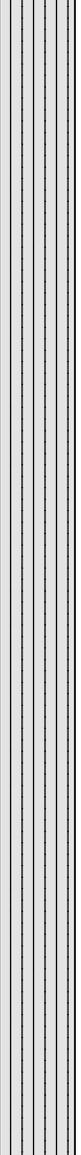
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
15						@ 15': Grades to occasional pockets of olive-brown LEAN CLAY (CL). Trace odor.		15
16						End of test pit @ 16'.		16
17								17
18								18
19								19
20								20
21								21
22								22
23								23
24								24
25								25
26								26
27								27
28								28
29								29
30								30

Test Pit Log

AQ-BMP-02

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302569.98 Easting: 1008920.94	Total Depth (ft): 15
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/24/2012		
Contractor: Terra Hydr, Inc		

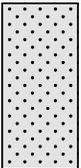
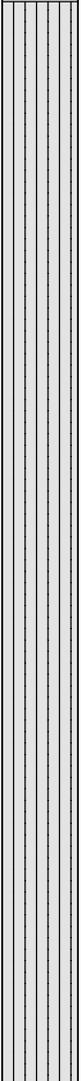
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						POORLY GRADED SAND (SP): Dry, loose, brown, medium sand, substantial roots.		0
1				NS		SILT (ML): Damp, medium stiff, black with occasional gray and white layers (up to 4cm thick). No odor.		1
2			0.3					2
3				SS		@3': Grades to SANDY SILT (ML), trace white layers, fine sand.		3
4			0.3					4
5				SS		@5': Trace odor present.		5
6			0.2					6
7				MS		@7': Grades to slight chemical-like odor.		7
8	AQ-BMP-02-1-15	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs, VOCs	0.8					8
9				MS				9
10			1.0					10
11				MS		@11': Grades to moist		11
12			1.7					12
13				MS		@13': Grades to occasional pockets of light gray, moist, slightly clayey SILT (ML). No odor.		13
14			1.3					14
15						End of test pit @ 15' due to caving.		15

Test Pit Log

AQ-BMP-03

Sheet 1 of 2

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302545.39 Easting: 1008774.70	Total Depth (ft): 16
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/23/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						POORLY GRADED SAND (SP): Dry, loose, brown, medium to coarse sand. Moderate roots in top 1'. No odor.		0
1								1
2						SILT (ML): Moist, medium stiff, black with occasional gray and white bands, fine sand. No odor.		2
3			0.3					3
4						@4': Grades to substantial layers of moist to wet, white, SILT (ML). Slight chemical-like odor.		4
5			0.2					5
6						@6': Grades to trace layers of white silt, occasional gray layers (<1cm thick). Slight chemical-like odor.		6
7			0.3					7
8						@8': Grades to wet.		8
9	AQ-BMP-03-2-16	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs	0.3					9
10						@10': Grades to SANDY SILT (ML).		10
11			0.4					11
12						@12': Grades to moist, slight chemical-like odor.		12
13			0.9					13
14					N	@14': Grades to wet, slightly clayey, trace chemical-like odor.		14
15			0.5					15

Test Pit Log

AQ-BMP-03

Sheet 2 of 2

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302545.39 Easting: 1008774.70	Total Depth (ft): 16
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/23/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
15								15
16						End of test pit @ 16' due to pit walls caving.		16
17								17
18								18
19								19
20								20
21								21
22								22
23								23
24								24
25								25
26								26
27								27
28								28
29								29
30								30

Test Pit Log

AQ-BMP-04

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302535.65 Easting: 1008546.90	Total Depth (ft): 13.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/23/2012		
Contractor: Terra Hydr, Inc		

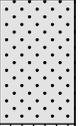
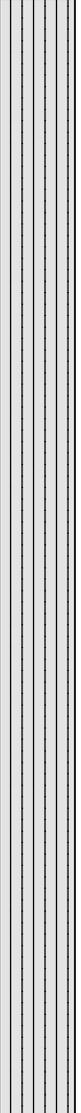
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						POORLY GRADED SAND (SP): Dry, loose, brown, medium to coarse sand. Moderate to substantial roots in top 1'. No odor.	0	0
1							1	1
2			0.0	NS		SILT (ML): Moist, medium stiff, black with occasional white mottling, slightly fine sandy, trace clay silt.	2	2
3			0.0	NS		@2.5': 2" layer of white SILT (ML). Occasional 1-2 cm bands of gray, fine SANDY SILT (ML). @3': 2" layer of white SILT (ML).	3	3
4			0.0			@3.5': 4" layer of white SILT (ML), slight chemical-like odor.	4	4
5							5	5
6			0.0	SS		@5.5': Grades to slight chemical-like odor. Grades to trace pockets of white SILT (ML).	6	6
7		Fluoride, Cyanide (WAD and Total), Total and TCLP Metals, PAHs, SVOCs, PCB Aroclors					7	7
8	AQ-BMP-04-1.5-13.5		0.0	MS		SILTY SAND (SM): Wet, medium dense, dark gray, fine sand. Slight chemical-like odor.	8	8
9				MS			9	9
10			0.1				10	10
11			0.1	SS		SILT (ML): Wet, soft, dark gray to black, slightly fine sandy. Moderate chemical-like odor. Moderate (30%) 1/4-1/2" layers of light gray SILT (ML).	11	11
12			0.1			@12': Grades to f-sandy, moderate chemical-like odor.	12	12
13				SS			13	13
14						End of test pit @ 13.5'.	14	14
15							15	15

Test Pit Log

AQ-BMP-05

Sheet 1 of 2

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302387.40 Easting: 1008757.91	Total Depth (ft): 17
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/23/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						POORLY GRADED SAND (SP): Dry, loose, brown medium to coarse sand. Moderate roots in top 1'. No odor.		0
1								1
2			0.2			SILT (ML): Damp, medium stiff, black, slightly fine sandy. Occasional 1cm - thick layers of gray and rust colored fine-sand. No odor.		2
3				SS				3
4			0.1			@3.5': Grades to SANDY SILT (ML).		4
5				MS				5
6			0.9			@5.5': Grades to slight chemical-like odor.		6
7								7
8			1.4					8
9	AQ-BMP-05-1.5-15.5	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs		MS				9
10			1.0			@10': Grades to moist.		10
11				SS				11
12			0.5					12
13								13
14			0.3			@13.5': Grades to slight H2S-like odor, wet.		14
15				SS				15

Test Pit Log

AQ-BMP-05

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302387.40 Easting: 1008757.91	Total Depth (ft): 17
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/23/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
15					N		15	15
16				SS		POORLY GRADED SAND (SP): Wet, medium dense, dark gray, slightly silty fine to medium sand. Slight H2S-like odor. Pooling groundwater has moderate gray metallic sheen.	16	16
17						End of test pit @ 17' due to caving.	17	17
18							18	18
19							19	19
20							20	20
21							21	21
22							22	22
23							23	23
24							24	24
25							25	25
26							26	26
27							27	27
28							28	28
29							29	29
30							30	30

Test Pit Log

AQ-ECA-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 303134.33 Easting: 1008536.14	Total Depth (ft): 6.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/19/2012		
Contractor: Terra Hydr, Inc		

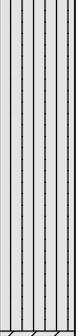
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						POORLY GRADED SAND (SP): Dry, loose, brown, slightly silty. Moderate roots in top 6".	0	0
1							1	1
2							2	2
3	AQ-ECA-01-2-5	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs	0.1	SS	N	SILT (ML): Moist, medium stiff, black, trace clay. Slight odor. Groundwater has slight metallic sheen.	3	3
4						@4': Grades to trace odor.	4	4
5			0.1	NS			5	5
6						POORLY GRADED SAND (SP): Moist to wet, medium dense, gray, slightly silty, fine to medium sand.	6	6
7						LEAN CLAY (CL): Moist, medium stiff, olive gray. Moderate organic debris (wood fibers). Slight H2S-like odor.	7	7
8						End of test pit @ 6.5'.	8	8
9							9	9
10							10	10
11							11	11
12							12	12
13							13	13
14							14	14
15							15	15

Test Pit Log

AQ-ECA-02

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302911.78 Easting: 1008524.69	Total Depth (ft): 6
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/19/2012		
Contractor: Terra Hydr, Inc		

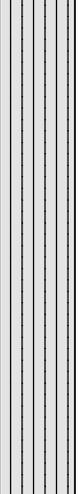
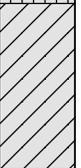
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						POORLY GRADED SAND (SP): Moist, loose, brown, with moderate roots in top 6".		0
1						SILT (ML): Moist, medium stiff, black. No odor.		1
2			0.0	SS		@2': Slight brown mottling, occasional coarse gravel (6"-1' diameter).		2
3	AQ-ECA-02-1-5	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs				@3': Grades to moist, slight sweet odor.		3
4			0.0	SS	N	@4': Groundwater has moderate metallic sheen. Grades to SILT WITH SAND (ML), wet.		4
5						SILTY LEAN CLAY (CL): Moist, medium stiff to stiff, olive gray. Slight H2S-like odor with trace organic debris.		5
6						End of test pit @ 6'.		6
7								7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

Test Pit Log

AQ-ECA-03

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302901.57 Easting: 1008285.58	Total Depth (ft): 9
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/19/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						POORLY GRADED SAND (SP): Damp, loose, brown, medium sand. Moderate roots. No odor.		0
1						SILT (ML): Damp, medium stiff, black with gray mottling. Slight sweet odor.		1
2			0.1	NS				2
3		Fluoride, Cyanide (WAD and Total), Total Metals, PAHs, SVOCs, PCB Aroclors, VOCs						3
4	AQ-ECA-03-1-7		0.2	SS				4
5								5
6			0.3	SS		@6': Grades to moist, trace odor.		6
7						SILTY LEAN CLAY (CL): Damp, stiff, olive gray. Slight H2S-like odor.		7
8			0.2					8
9						End of test pit @ 9'.		9
10								10
11								11
12								12
13								13
14								14
15								15

Test Pit Log

AQ-ECA-04

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302650.04 Easting: 1008356.66	Total Depth (ft): 9
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/19/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						POORLY GRADED SAND (SP): Dry, loose, brown, slightly silty. Moderate roots in top 1-1.5'.		0
1				NS				1
2								2
3			0.1	NS		SILT (ML): Damp to moist, medium stiff, black and white, trace clay. No odor.		3
4						@4': Grades to black. Trace odor. Trace metal debris.		4
5	AQ-ECA-04-2-8	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs	0.1	NS		@6': Grades to wet.		5
6								6
7			0.1	NS				7
8					N	SILTY SAND (SM): Moist, medium dense, gray.		8
9						End of test pit @ 9'.		9
10								10
11								11
12								12
13								13
14								14
15								15

Test Pit Log

AQ-FSL-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302008.55 Easting: 1008621.64	Total Depth (ft): 12
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/18/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)	
0						POORLY GRADED SAND (SP): Loose, dry, brown, medium sand.		0	
1			2.4	NS		SANDY SILT (ML): Medium stiff, dry, dark gray to black, slightly gravelly. Substantial debris. No odor.		1	
2						@2': 6"-thick rust-colored layer.		2	
3			0.8	NS		ELASTIC SILT (MH): Moist, stiff, gray with light gray mottling. Occasional rust-colored 6" diameter fragments and bricks. Substantial debris, including metal scraps, plastic bags, wood pieces, wire cables, possibly slag or pitch (up to 4'x4' chunks), aluminum (white with blue mottling, hard).		3	
4						@4': Grades to black, moderate to strong solvent-like odor.		4	
5		Fluoride, Cyanide (WAD and Total), Total and TCLP Metals, SVOCs, PCB Aroclors, VOCs	26.6	NS		@6': Grades to ELASTIC SILT WITH GRAVEL (MH), wet.		5	
6	AQ-FSL-01-0-12							6	
7			1.2	SS				7	
8					N		@8': Moderate silver metallic sheen.		8
9			1.2	MS			@10': Slight to moderate rainbow florets.		9
10								10	
11			1.2	SS		@12': Grades to slight metallic sheen, trace rainbow florets.		11	
12						End of test pit @ 12' due to caving.		12	
13								13	
14								14	
15								15	

Test Pit Log

AQ-FSL-02

Sheet 1 of 2

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 301886.20 Easting: 1008499.40	Total Depth (ft): 16
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/18/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						SILT WITH GRAVEL (ML): Dry, soft, gray with white mottling. Trace sand. No odor.		0
1			3.0	NS				1
2						@2': Grades to medium stiff.		2
3			4.7	NS				3
4								4
5			20.6	NS		SANDY SILT (ML): Damp, stiff, black. Occasional wood fragments and pieces of rebar. Moderate white mottling. Occasional black shiny pitch. Trace brick fragments. Slight HC-like odor (black silt has odor, gray/white does not have odor).		5
6						@6': Grades to moderate wood fragments and pieces of metal banding.		6
7			7.5	NS		@7.5': Large chunks of concrete (1'x3') with rebar netting and aluminum scrap.		7
8	AQ-FSL-02-0-16	Fluoride, Cyanide (WAD and Total), Total and TCLP Metals, SVOCs, PCB Aroclors, VOCs						8
9			8.5	NS		@9': Large (4' long) metal roller chain. Occasional pieces of gray/black pitch (1'-diameter).		9
10								10
11			5.6	NS		@12': Grades to moist, SILT WITH GRAVEL (ML).		11
12								12
13			15.2	SS		@14': Grades to wet, moderate HC-like odor. Substantial debris (wood fragments, metal pins and rebar, brick fragments, plastic pieces, flux tubes, nails, and steel banding).		13
14					N			14
15			31.6					15

Test Pit Log

AQ-FSL-02

Sheet 2 of 2

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 301886.20 Easting: 1008499.40	Total Depth (ft): 16
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/18/2012		
Contractor: Terra Hydr, Inc		

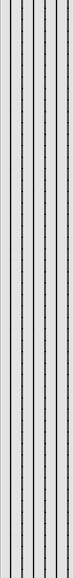
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
15						<p>SS</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> SILT (ML): Wet, stiff, dark brown SILT, trace clay. Moderate HC-like odor. Pooling water has slight silver metallic sheen. </div> <p>End of test pit @ 16'.</p>	15	15
16					16		16	
17							17	17
18							18	18
19							19	19
20							20	20
21							21	21
22							22	22
23							23	23
24							24	24
25							25	25
26							26	26
27							27	27
28							28	28
29							29	29
30							30	30

Test Pit Log

AQ-FSL-03

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 302026.68 Easting: 1008399.07	Total Depth (ft): 8.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/18/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						POORLY GRADED SAND (SP): Dry, loose, brown, medium sand.		0
1						<p>SILT WITH SAND (ML): Dry to damp, stiff, gray with white and black mottling, fine sand. Trace shiny, black, angular gravel-sized pieces of pitch/anode material. No odor. Occasional pockets of white material (crumbly and blocky).</p> <p>@4': Grades to moist.</p> <p>@5': Grades to wet, dark gray. Trace sweet odor. Groundwater has a moderate gray metallic sheen.</p> <p>@6': Grades to GRAVELLY SILT (ML), black, moderate to strong HC-like odor. Moderate debris, including brick fragments, wood, pitch, metal wires, and concrete. Moderate sheen (rainbow florets and metallic gray).</p>		1
2			0.6	NS			2	
3							3	
4			1.7	NS			4	
5	AQ-FSL-03-1-8.5	Fluoride, Cyanide (WAD and Total), Total and TCLP Metals, SVOCs, PCB Aroclors, VOCs			N		5	
6			2.2	MS			6	
7							7	
8			0.5	SS		POORLY GRADED SAND (SP): Wet, loose, brown medium sand. Slight HC-like odor and trace sheen (rainbow florets).		8
9						End of test pit @ 8.5'.		9
10							10	
11							11	
12							12	
13							13	
14							14	
15							15	

Test Pit Log

AQ-ILF-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 304884.35 Easting: 1003995.82	Total Depth (ft): 11
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/17/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0								0
1			0.0	NS		<p>SILT WITH SAND (ML): Dry to damp, medium stiff, gray to black, slightly gravelly, fine to medium sand. No odor. Brick fragments, concrete, rebar, wood pieces, scrap metal, and cathode (black, carbonaceous) material in test pit.</p> <p>@2': Large pocket of damp, medium-sand-sized, peach to light blue material (possible refractory material from the furnace). No odor. Moderate landfill debris (rebar, concrete, brick).</p> <p>@4.5': Long metal piece, 10-12 bricks, void space on west side of pit, black plastic bag. Grades to slightly gravelly, sandy. Pocket of possible furnace refractory material extends to 6'bgs. Occasional bricks and peach and blue-colored debris on north side of pit.</p> <p>@10': Occasional 2'-long concrete pieces. Digging below 10.5' difficult, pit collapsing. Groundwater pooling in pit @ 11' does not have sheen.</p>		1
2			0.0	NS			2	
3			0.0	NS			3	
4			0.0	NS			4	
5			0.0	NS			5	
6	AQ-ILF-01-0-11	Fluoride, Cyanide (WAD and Total), Total and TCLP Metals, SVOCs, PCB Aroclors						6
7			0.0	NS				7
8			0.0	NS				8
9			0.0	NS				9
10			0.0	NS				10
11			0.0	NS	N	<p>WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): Moist to wet, medium dense, black, slightly silty, gravelly, medium to coarse sand. No odor. 1-2' long pieces of concrete, metal, rebar, bricks (debris). Pit caving rapidly impedes progress.</p> <p>End of test pit @ 11' due to caving/refusal.</p>		11
12								12
13								13
14								14
15								15

Test Pit Log

AQ-ILF-02

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 304863.63 Easting: 1004128.74	Total Depth (ft): 12
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/17/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0								0
1			0.0	NS		SILT (ML): Dry, soft, dark brown, slightly gravelly, slightly fine sandy. No odor. Trace 1-2" diameter pieces of shiny black pitch material and white crumbling material. Occasional rootlets and small woody debris in top 1'.		1
2								2
3			0.0	NS		@3': Grades to gray, medium stiff. Moderate blocky pieces of white and shiny black material. Trace debris (tubing, plastic, metal fragments, wire).		3
4						@4': Grades to damp, trace gravel, 2.5' diameter pocket of gray powdery material. Slight to moderate HC-like odor present in silty black and gray/white mottled layer.		4
5		Fluoride, Cyanide (WAD and Total), Total and TCLP Metals, SVOCs, PCB Aroclors, VOCs	0.0	NS				5
6	AQ-ILF-02-0-12					@6': Grades to moderate debris (4' long concrete, spools of steel banding, large bricks, white possible refractory furnace debris, and hard, shiny, black 1/2" diameter balls). Slight HC-like odor.		6
7			0.6	NS				7
8								8
9			0.2	NS				9
10						@10': Grades to moist, dark gray to black, trace rock fragments.		10
11			0.1	NS	K	@11': Grades to wet.		11
12						@12': Large concrete slabs, moderate steel banding and plastic.		12
13						End of test pit @ 12'		13
14								14
15								15

Test Pit Log

AQ-ILF-03

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 304709.28 Easting: 1004248.56	Total Depth (ft): 12
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/17/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0						<p>SILT (ML): Dry, loose, gray slightly fine to coarse sandy. Trace gravel. Moderate rootlets in top 6". Some white mottling in upper 1.5'. No odor.</p> <p>@2': Occasional pockets of fine gravel (subrounded). Occasional debris including rubber, plastic, wood fragments, and other debris (possible pitch and refractory).</p> <p>@1-5': Occasional dry, blocky, silty, white material. No odor.</p>	0	
1			0.2	NS	1			
2			0.2	NS	2			
3			0.2	NS	3			
4			0.2	NS	4			
5		Fluoride, Cyanide and (WAD and Total), Total and TCLP Metals, SVOCs, PCB Aroclors, VOCs	0.2	NS	5			
6	AQ-ILF-03-0-12		0.2	NS	6			
7			0.2	NS	7			
8			0.2	NS	8			
9			1.5	NS	9			
10			0.4	NS	10			
11					11			
12					12			
13					13			
14					14			
15					15			

Test Pit Log

AQ-ILF-04

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 304765.75 Easting: 1004058.45	Total Depth (ft): 14
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/17/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0							0	0
1			0.2	NS		<p>SILT (ML): Dry, loose, gray to rust-brown with white mottling, slightly sandy, slightly gravelly. Moderate rootlets in top 8". Occasional white blocky material.</p> <p>@1': 1' diameter pocket of rust colored gravels. Occasional landfill debris (metal, rubber, plastic pipe, concrete).</p> <p>@2': 3' long piece of concrete, 1-3' long pieces of wood, 6" long "flux tube" (material rich in carbon/graphite).</p> <p>@4': Occasional pockets of dark gray SILT (ML). Grades to SANDY SILT (ML), medium stiff.</p> <p>@7': Grades to dry, medium stiff, dark gray SILT (ML). Trace debris (plastic).</p>	1	1
2							2	2
3			0.2	NS			3	3
4							4	4
5			0.3	NS			5	5
6		Fluoride, Cyanide (WAD and Total), Total and TCLP Metals, SVOCs, PCB Aroclors, VOCs	0.2	NS			6	6
7	AQ-ILF-04-0-14						7	7
8			0.2	NS			8	8
9			0.2	NS			9	9
10						<p>POORLY GRADED SAND (SP): Damp, loose, beige, medium sand. No odor.</p>	10	10
11				NS			11	11
12							12	12
13			0.5	NS		<p>@13': Grades to wet, dark brown, slightly silty, trace gravel. Slight HC-like odor.</p>	13	13
14				NS		<p>End of test pit @ 14'</p>	14	14
15							15	15

Test Pit Log

AQ-ILF-05

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 304742.31 Easting: 1003942.50	Total Depth (ft): 14
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/18/2012		
Contractor: Terra Hydr, Inc		

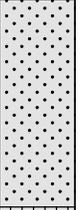
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0								0
1			0.0	NS		SANDY SILT (ML): Dry to damp, soft, dark gray. Moderate chunks of white blocky silt (possible alumina) and shiny, hard, black material (possible pitch). Occasional wood pieces and trace metal scraps. No odor.		1
2						@2': Moderate bricks. Grades to no white material.		2
3			0.2	NS		@3': 6' long metal pipe		3
4						@3.5': Grades to medium stiff, dark gray. Occasional wires, cables, and plastic pieces.		4
5			0.0	NS		@5': Metal rebar throughout pit. Hard digging, had to step back 6' to avoid large slab of concrete.		5
6								6
7	AQ-ILF-05-0-14	Fluoride, Cyanide (WAD and Total), Total and TCLP Metals, SVOCs, PCB Aroclors, VOCs	1.7	NS		@7': Grades to brown. Moderate 2" pieces of concrete. No odor.		7
8								8
9			0.5	NS				9
10								10
11			2.9	NS				11
12						@12': Grades to moist, black, SILT (ML). Slight chemical-like odor. Occasional 6' long metal cables and plastic.		12
13			0.4	NS		@13': Grades to SILT WITH GRAVEL (ML). No odor. Trace metal rods and plastic.		13
14					N	POORLY GRADED SAND (SP): Brown, loose, medium sand. No odor. End of test pit @ 14'.		14
15								15

Test Pit Log

AQ-WMP-01

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 303308.07 Easting: 1009175.49	Total Depth (ft): 8
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/24/2012		
Contractor: Terra Hydr, Inc		

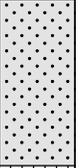
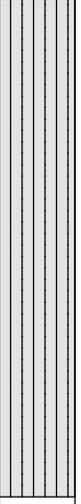
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Dry, loose, brown, medium to coarse sand, substantial roots in top 1'. No odor.		0
1								1
2								2
3					N	SILT (ML): Moist to wet, medium stiff, white (eggshell) with occasional yellow (rusty) marbling. Slight sweet odor.		3
4					NS	@3': Grades to wet, trace yellow layers.		4
5	AQ-WMP-01-2.5-7.5	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs				@4.5': Grades to trace odor. Trace black (<1") layers.		5
6					NS			6
7						@6.5': Grades to white. Extensive caving below 6.5'.		7
8						POORLY GRADED SAND WITH GRAVEL (SP): Wet, loose to medium dense, dark gray. No odor. Moderate roots (decomposing) and pockets of gray clay.		8
9						End of test pit @ 8' due to caving.		9
10								10
11								11
12								12
13								13
14								14
15								15

Test Pit Log

AQ-WMP-02

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 303214.40 Easting: 1009400.04	Total Depth (ft): 8
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/24/2012		
Contractor: Terra Hydr, Inc		

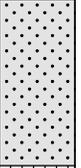
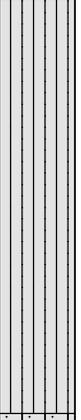
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			WELL GRADED SAND (SW): Dry, loose, brown, fine to coarse sand. Moderate roots in top 1.5'. No odor.		0
1								1
2								2
3				NS	N	SILT (ML): Moist, medium stiff, white with yellow (rusty) marbling. Trace sweet odor.		3
4						@4': Grades to occasional eggshell-colored layers. Moderate sweet odor.		4
5	AQ-WMP-02-2-8	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs		NS				5
6								6
7				NS				7
8						End of test pit @ 8'.		8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

Test Pit Log

AQ-WMP-03

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 303103.49 Easting: 1009055.99	Total Depth (ft): 7.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/24/2012		
Contractor: Terra Hydr, Inc		

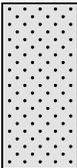
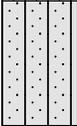
Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			WELL GRADED SAND (SP): Dry, loose, brown, medium sand. Substantial roots and grass in top 1.5'. No odor.		0
1								1
2								2
3				NS	N	SILT (ML): Wet, light gray, slightly clayey, occasional black layers (1-2cm thick). No odor.		3
4	AQ-WMP-03-2-6	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs						4
5				NS				5
6								6
7						SILTY SAND (SM): Wet, dark gray. No odor.		7
8						End of test pit @ 7.5'.		8
9								9
10								10
11								11
12								12
13								13
14								14
15								15

Test Pit Log

AQ-WMP-04

Sheet 1 of 1

Location: Longview, WA	Project: Former Reynolds Metals Reduction Plant RI/FS	Method: Backhoe
Project #: 130720-02.01	Northing: 303024.99 Easting: 1009359.77	Total Depth (ft): 9.5
Client: Millennium Bulk Terminals - Longview, LLC	Horizontal Datum: NAD83 WA State Plane South Feet	Logged By: Julia Labadie
Collection Date: 10/24/2012		
Contractor: Terra Hydr, Inc		

Recovered Depth (ft)	Sample Interval	Chemical Analysis	PID (ppm)	Sheen Test	Groundwater	Soil Description Samples and descriptions are in recovered depths. Classification scheme based on USCS	Graphic Log	Recovered Depth (ft)
0			N/A			POORLY GRADED SAND (SP): Dry, loose, brown, medium to coarse sand. Moderate roots in top 1.5'. No odor.		0
1								1
2								2
3				NS	N	SILT (ML): Wet, medium stiff, white with occasional yellow mottling, slightly clayey. Moderate sweet odor.		3
4								4
5	AQ-WMP-04-2-8	Fluoride, Cyanide (WAD and Total), Total Metals, PAHs, SVOCs, PCB Aroclors		NS		@5': Grades to SILT WITH SAND (ML), moderate yellow (rusty) colored layers.		5
6								6
7				NS				7
8								8
9						SILTY SAND (SM): Wet, medium dense, dark gray, fine to medium sand with substantial organic materials. Occasional gray layers 1" thick (silt and clay).		9
10						End of test pit @ 9.5' due to caving.		10
11								11
12								12
13								13
14								14
15								15

TRANSDUCER INSTALLATION LOGS

Stilling Well
Transducer Installation Log

Well ID: Stillwell-01 Date: 09/24/2012 Time: 1343

Project Name: Former Reynolds Metals Reduction Plant RI/FS Project Number: 110730-02.01

Coordinates (Datum: WA SP North, NAD 83) Transducer Model: In-Situ Mini Troll 500 (non-vented)

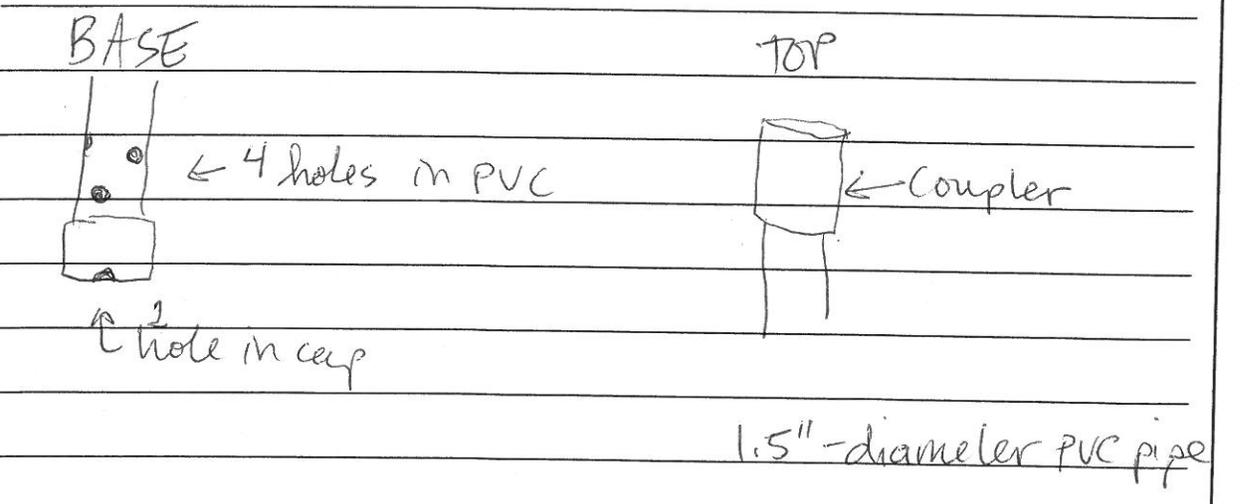
Easting: 1002903.39 Northing: 305195.63

Depth to Water (below top of casing): 3.9 feet

Total Depth (btoc): 4.85 feet

~~Transducer Depth (btoc):~~

Comments:
 Installed on steel post on bridge (by CIDID down)
 water depth (lead line) = 4.8 feet (from ^{taken} bridge platform).



total length of stilling well: 7.15 ft.

attached using weatherstrips and zip ties

Field Personnel: NB/BK/JL

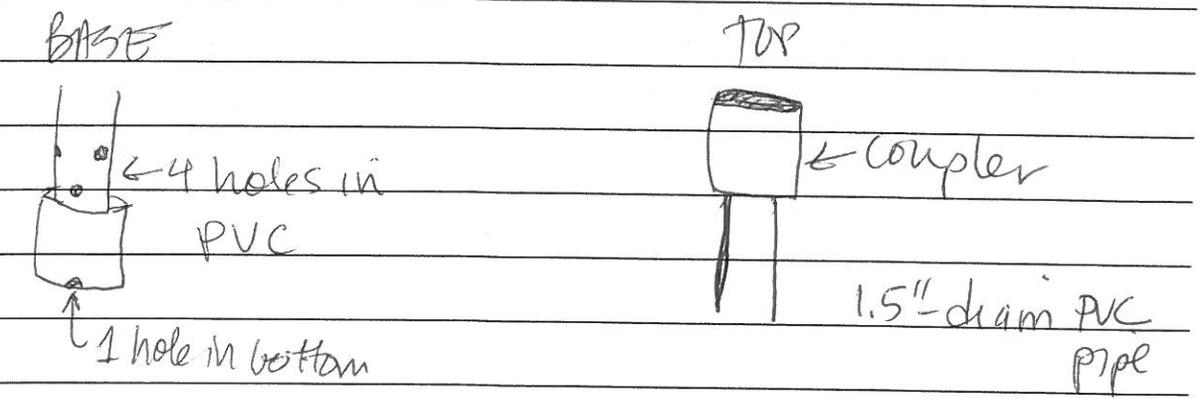
Stilling Well
 Transducer Installation Log

Well ID: Stillwell-02	Date: 09/24/2012	Time: 1413
Project Name: Former Reynolds Metals Reduction Plant RI/FS	Project Number: 110730-02.01	
Coordinates (Datum: WA SP North, NAD 83)	Transducer Model: In-Situ Mini Troll 500 (non-vented)	
Easting: 1007298.53	Northing: 302392.02	

Depth to Water (below top of casing): 5.4'
 Total Depth (btoc): 7'

~~Transducer Depth (btoc):~~ Total length of stilling well = 7.15' (w/cap)

Comments:
 Installed on metal post (2' offshore) in SW DMSA pond.
 water depth (lead line) = 1.9 feet (at metal post)



attached to metal post w/ weatherstrips + zip ties

Field Personnel: NB, BH, JL



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Stilling Well
Transducer Installation Log

Well ID: Stillwell-03 Date: 09/24/2012 Time: 1543

Project Name: Former Reynolds Metals Reduction Plant RI/FS Project Number: 110730-02.01

Coordinates (Datum: WA SP North, NAD 83) Transducer Model: In-Situ Mini Troll 500 (non-vented)

Easting: Northing:

Depth to Water (below top of casing): 4.4' @ 1531

Total Depth (btoc): 7.15' → @ 1531

Transducer Depth (btoc): water depth (lead line) = 2.9' @ outfall

Comments: by Reynolds Pump Station - in Columbia River.

Stilling well attached to I-Beam adjacent to Reynolds outfall pipe in SW corner of site.

Field Personnel: NB, BH, JL



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Transducer Installation Log

Well ID: RL-1D Date: 9/25/12 Time: 1029

Project Name: Former Reynolds Metals Reduction Plant RI/FS Project Number: 110730-02.01

Coordinates (Datum: WA SP North, NAD 83) Transducer Model: In-Situ Mini Troll 500 (non-vented)

Easting: Northing:

Depth to Water (below top of casing): ~~9.50~~ ^{mst} 9.48' @ 1029 hrs

Total Depth (btoc): ~~37.46~~ ^{mst} 37.71'

Transducer Depth (btoc): 36.90'

Comments: S/N 171794

Transducer installed @ 1045 hrs

Field Personnel: JL, BH, MST



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Transducer Installation Log

Well ID: Stillwell-01-t Date: 9/25/12 Time: 1050

Project Name: Former Reynolds Metals Reduction Plant RI/FS Project Number: 110730-02.01

Coordinates (Datum: WA SP North, NAD 83) Transducer Model: In-Situ Mini Troll 500 (non-vented)

Easting: Northing:

Depth to Water (below top of casing): 3.97' @ 1051 hrs

Total Depth (btoc): 7.15'

Transducer Depth (btoc): 7.11'

Comments: S/N 137547
transducer installed @ 1052 hrs

Field Personnel: MST, BH, NB, JL



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Transducer Installation Log

Well ID: Stillwell-02-t	Date: 9/25/12	Time: 1231
-------------------------	---------------	------------

Project Name: Former Reynolds Metals Reduction Plant RI/FS	Project Number: 110730-02.01
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Coordinates (Datum: WA SP North, NAD 83)	Transducer Model: In-Situ Mini Troll 500 (non-vented)
--	---

Easting:	Northing:
----------	-----------

Depth to Water (below top of casing): 5.74' @ 1233

Total Depth (btoc): ~~6.87~~^{mst} 7.12'

Transducer Depth (btoc): ~~7.15~~^{mst} 6.52'

Comments: S/N 134865
transducer installed @ 1239 hrs

Field Personnel: BH, NB, MST



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Transducer Installation Log		
Well ID: RI-D	Date: 09/25/2012	Time: 1320
Project Name: Former Reynolds Metals Reduction Plant RI/FS	Project Number: 110730-02.01	
Coordinates (Datum: WA SP North, NAD 83)	Transducer Model: In-Situ Mini Troll 500 (non-vented)	
Easting:	Northing:	
Depth to Water (below top of casing):	8.73' @ 1328	7.21' @ 1600
Total Depth (btoc):	24.68' hard bottom	2943 ± 25' off
Transducer Depth (btoc):	21.09'	
Comments:	S/N: 167310 transducer installed @ 1333 * tubing had to be removed to fit transducer - stored temporarily in bag. - returned to check water level @ 1600 hrs.	
Field Personnel:	NB, BH, JL	



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Transducer Installation Log

Well ID: G5-D Date: 09/25/2012 Time: 1450

Project Name: Former Reynolds Metals Reduction Plant RI/FS Project Number: 110730-02.01

Coordinates (Datum: WA SP ^{South}North, NAD 83) Transducer Model: In-Situ Mini Troll 500 (non-vented)

Easting: Northing:

Depth to Water (below top of casing): 11.88' @ 1451

Total Depth (btoc): 36.95'

Transducer Depth (btoc): 35.80'

Comments: s/n:
transducer installed @ 1457

Field Personnel: NB, BH, JL



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Transducer Installation Log		
Well ID: G7-D	Date: 9/25/12	Time: 1515
Project Name: Former Reynolds Metals Reduction Plant RI/FS		Project Number: 110730-02.01
Coordinates (Datum: WA SP North, NAD 83)		Transducer Model: In-Situ Mini Troll 500 (non-vented)
Easting:		Northing:
Depth to Water (below top of casing): 10.91' @ 1515 hrs		
Total Depth (btoc): 32.94'		
Transducer Depth (btoc): 31.38'		
Comments: S/N 167313 transducer installed @ 1520 hrs Hard bottom		
Field Personnel: BH, NB, JL, MST		

~~32.69~~ MST



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Transducer Installation Log

Well ID: PZ-7	Date: 9/25/12	Time: 1521
Project Name: Former Reynolds Metals Reduction Plant RI/FS	Project Number: 110730-02.01	
Coordinates (Datum: WA SP North, NAD 83)	Transducer Model: In-Situ Mini Troll 500 (non-vented)	
Easting:	Northing:	

Depth to Water (below top of casing): 11.19' @ 1525 hrs

Total Depth (btoc): 19.05'

Transducer Depth (btoc): 17.86'

Comments: S/N 134850

Transducer installed @ 1528

moderately soft bottom

Field Personnel: NB, BH, JL

~~18.9~~ #mst



720 Olive Way, Suite 1900
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

Transducer Installation Log

Well ID: RL-2D	Date: 9/25/12	Time: 1535
Project Name: Former Reynolds Metals Reduction Plant RI/FS	Project Number: 110730-02.01	
Coordinates (Datum: WA SP North, NAD 83)	Transducer Model: In-Situ Mini Troll 500 (non-vented)	
Easting:	Northing:	

Depth to Water (below top of casing): 9.21' @ 1536

Total Depth (btoc): 33.08' hard bottom

Transducer Depth (btoc): 31.74'

Comments: S/N 137523
transducer installed @ 1541

Field Personnel: NB, BH, MST

32.83 MST



720 Olive Way, Suite 1900
 Seattle, Washington 98101
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Transducer Installation Log		
Well ID: Stillwell-03-t	Date: 09/25/2012	Time: 908
Project Name: Former Reynolds Metals Reduction Plant RI/FS	Project Number: 110730-02.01	
Coordinates (Datum: WA SP North, NAD 83)	Transducer Model: In-Situ Mini Troll 500 (non-vented)	
Easting: 1002871.22	Northing: 304585.55	
Depth to Water (below top of casing): @919 : 5.26'		
Total Depth (btoc): (of stillingwell) = 7.15'		
Transducer Depth (btoc): 7.05'		
Comments: @908 Water depth adjacent to stillingwell: 1.7' (lead line) Location: Adjacent to Reynolds outfall pipe in Columbia River (by pump station).		
Field Personnel: JL, BH, NB, MST		

WELL DEVELOPMENT LOGS AND FSDS

Project No. 060354-01

Date: 7-12-06 Well: G3-35

Site Location: Chinook Ventures/Former Alcoa
Longview Facility

Name: SHARON

Initial DTB: 14.77

Final DTB: 15.44

Development Method: Suck Block/Bailer/A-pump

Initial DTW: 6.38

Final DTW: 6.81

Total Water Removed: 80

Pore Volume: 1.36

Water Contained? Yes

Casing Diameter: 2"

Estimate of specific capacity or recharge to well:

Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp.	EC	pH	DTW (TOC)	Appearance/Comments
1210							Start surging w Block/Bailer
1240							Start bailing w bailer
1245	2.0	250/1000	13.7	1130	7.49		clouds, Dk grey, silty
1250	4.0	300/1000	13.7	1122	7.02		
1255	6.0	100/1000	13.7	1126	6.95		clouds, grey
1300	8.0			1125	6.98		
1306	10.0	80/1000	13.8	1129	6.96		clouds, grey
1325							Start pumping w P-pump
1329	12.0	50/1000	14.5	1155	6.91		clouds, grey
1332	14.0	0/1000	14.5	1149	6.87		slt cloudy, LT Tan
1338	16.0	0/1000	14.5	1157	6.83		slt cloudy, LT LT tan
1337							Dry @ 16 gallons
1433						12.23	
1436						6.50	
1442	20.0	0/1000	14.5	1150	6.85		Start P-pumping - P-pump Clear, colorless



Project No. 060354-01

Date: 9-12-06 Well: G3D

Site Location: Chinook Ventures/Former Alcoa
Longview Facility

Name: S Harquart

Initial DTB: 29.81

Final DTB: 29.85

Development Method: 3 Blk/Bailer / Squirt Pump

Initial DTW: 7.09

Final DTW: 7.04

Total Water Removed: 32.0

Pore Volume: 3.71

Water Contained? Yes

Casing Diameter: 2"

Estimate of specific capacity or recharge to well:

Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp	EC	pH	DTW (TOC)	Appearance/Comments
1340							
1400							start Seising - Sugar block
1405	4.0	400/1000	14.0	688	6.82		start bailing - bairar
1408	6.0	250/1000	13.9	677	6.74		cloudy, Brown, silty
1410	8.0	125/1000	13.9	679	6.76		cloudy, Brown (DK)
1420							Cloudy Brown (DK)
1424	12.0	30/1000	14.0	715	6.60		Start pumping with squirt pump
1429	16.0	0/1000	13.9	712	6.58		cloudy Brown
1434	20.0	0/1000	13.9	718	6.60		slt cloudy, Lt grey Brown
1439	24.0	0/1000	13.8	719	6.57		slt cloudy, Lt Lt tan
1444	28.0	0/1000	13.8	717	6.54		slt cloudy Lt Lt tan
1449	32.0	0/1000	13.8	719	6.53		slightly cloudy Lt tan
							clear, colorless

Project No. 060354-01 Date: 9-2-06 Well: 663

Site Location: Chinook Ventures/Former Alcoa Longview Facility

Name: S Harvoni Initial DTB: 36.30 Final DTB: 36.45

Development Method: S BIK/Baird / squirt pump Initial DTW: 22.68 Final DTW: 27.23

Total Water Removed: 27.0 Pore Volume: 2.25

Water Contained? Yes Casing Diameter: 2"

Estimate of specific capacity or recharge to well: Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp	EC	pH	DTW (TOC)	Appearance/Comments
1000							
1035							start surging / BIK / Baird
1041	4.0	300/1000	12.8	1209	6.65		Start bailina w Darter
1048	6.0	30/1000	12.5	1290	6.34		Cloudy Dr. Brown, silty Cloudy Brown, some silt
1102							
							start pumping w squirt pump (Silt)
1104	8.5	0/1000	12.7	1384	6.26		Cloudy tan
1106	10.0	0/1000	12.8	1391	6.27		Slt clear Lt tan
1108	12.0	0/1000	12.7	1398	6.25	26.56	Slt cloudy Lt Lt tan
1111	15.00	0/1000	12.7	1412	6.26		Clear colorless
1115	18.00	0/1000	12.6	1415	6.22		Clear colorless
1118	21.0	0/1000	12.6	1416	6.24		Clear colorless
1125	27.0	0/1000	12.6	1415	6.22	27.10	Clear colorless

Project No. 060354-01 Date: 9-11-06 Well: G5-S

Site Location: Chinook Ventures/Former Alcoa Longview Facility

Name: *Sharvait* Initial DTB: *21.97* Final DTB: *22.07*

Development Method: *Bailer/Sing block* Initial DTW: *13.46* Final DTW: *18.36*

Total Water Removed: *10.5* Pore Volume: *138*

Water Contained? *Yes* Casing Diameter: *2"*

Estimate of specific capacity or recharge to well: Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp.	EC	pH	DTW (TOC)	Appearance/Comments
<i>1511</i>							
<i>1510</i>							<i>Start surging w bailer/Sing Block</i>
							<i>Start Bailing</i>
<i>1512</i>	<i>1.5</i>	<i>170/1000</i>	<i>12.1</i>	<i>1210</i>	<i>6.24</i>		<i>Cloudy, tan</i>
	<i>3.0</i>	<i>40/1000</i>	<i>12.2</i>	<i>1145</i>	<i>6.34</i>		<i>Cloudy, tan</i>
	<i>4.5</i>	<i>20/1000</i>	<i>12.2</i>	<i>1051</i>	<i>6.36</i>		<i>Cloudy, tan</i>
	<i>6.0</i>	<i>0/1000</i>	<i>12.1</i>	<i>1045</i>	<i>6.34</i>		<i>Cloudy, lt tan</i>
<i>1530</i>							
<i>1536</i>							<i>Surge with Bailer</i>
<i>1540</i>	<i>7.5</i>	<i>50/1000</i>	<i>12.2</i>	<i>846</i>	<i>6.33</i>		<i>Start Bailing</i>
	<i>9.0</i>	<i>10/1000</i>	<i>12.2</i>	<i>769</i>	<i>6.28</i>		<i>Cloudy, tan</i>
<i>1550</i>	<i>10.5</i>	<i>0/1000</i>	<i>12.2</i>	<i>786</i>	<i>6.25</i>		<i>Set Cloudy, lt tan</i>
<i>1600</i>							<i>Bailer Dry at 10.5 g</i>



Project No. 060354-01

Date: 9/11/06 Well: G-7

Site Location: Chinook Ventures/Former Alcoa
Longview Facility

Name: S. Hamrail

Initial DTB: 32.88

Final DTB: 32.96

Development Method: SBK/Bailer/Squirt Pump

Initial DTW: 12.42

Final DTW: 29.63

Total Water Removed: 14.0

Pore Volume: 3.33

Water Contained? Yes

Casing Diameter: 2"

Estimate of specific capacity or recharge to well:

Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp	EC	pH	DTW (TOC)	Appearance/Comments
1130	0						
1145							Start Surging with Super block
1158	1.0	125/1000	13.2	1558	8.01		Start bawling with bailer/surging
1209	3.5	25/1000	13.2	1542	7.08		Cloudy, Brown, silt
1210	4.5	10/1000	13.3	1505	6.88	24.47	Cloudy, Tan
1215	5.5	3/1000	13.2	1502	6.74		Set Cloudy, LT Tan
1230							Slightly Cloudy LT Tan
1233	9.0	20/1000	13.2	1533	6.51		Start Squirt pumping
1237	12.5	0/1000	13.3	1615	6.49		Cloudy, Tan
	14.0	0/1000	13.2	1501	6.47		Set Cloudy LT Tan
1239						30.45	
1244						29.96	Dry
1248						29.75	
1253						29.63	Pulled Pump

Project No. 060354-01 Date: 9-11-06 Well: G5-D

Site Location: Chinook Ventures/Former Alcoa
Longview Facility

Name: S Harward Initial DTB: 36.91 Final DTB: 37.00
 Development Method: Surge Rik/Bailer/Squirt Pump Initial DTW: 12.88 Final DTW: 12.79
 Total Water Removed: 38.0 Pore Volume: 3.96
 Water Contained? Yes Casing Diameter: 2"
 Estimate of specific capacity or recharge to well: Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp.	EC	pH	DTW (TOC)	Appearance/Comments
1300							
1305							Start surging w Bailer/Bailer
1335	4.0	250/1000	12.7	512	7.78	18.14	Start on line
1339	6.0	80/1000	12.2	467	6.60		Cloudy, Grey DK
1346							
1350	10.0	40/1000	12.2	473	6.42		Start Squirt Pumping
							Cloudy Tan (cleaning)
1352	12.0	0/1000	12.2	472	6.47		Clear, colorless (KLTan)
1354	14.0	0/1000	12.2	405	6.40		Slt cloudy colorless
1357	16.0	0/1000	12.3	395	6.39		" "
1402	20.0	0/1000	12.2	353	6.85		Clear, colorless
1406	24.0	0/1000	12.2	374	6.87		Clear, colorless
1410	28.0	0/100	12.2	380	6.39		
1414							Removed pump
1408	30.0	80/1000	12.3	391	6.44	13.1	Surge with Bailer
							Cloudy, Tan
1420	32.0	30/1000	12.2	386	6.41		Start pumping with squirt pump
							Slt cloudy, Lt Tan
1435	36.0	0/1000	12.2	370	6.39		Slt cloudy, colorless
1438	38.0	0/1000	12.2	366	6.37		Clear, colorless

Project No. 060354-01

Date: 9-12-06 Well: G6-S

Site Location: Chinook Ventures/Former Alcoa Longview Facility

Name: S. Marquart

Initial DTB: 22.80

Final DTB: 22.83

Development Method: Blank/Bailer/Pump

Initial DTW: 18.76

Final DTW: 18.79

Total Water Removed: 14.5

Pore Volume: 0.66

Water Contained? Yes

Casing Diameter: 2"

Estimate of specific capacity or recharge to well:

Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp	EC	pH	DTW (TOC)	Appearance/Comments
8:20							
8:50							Start Surging
8:50	0.5	400/1000	13.2	1930	7.08		Start Bailing
	1.0		12.9	1568	7.15		Clouds, DK grey, silty
9:05	1.5	250/1000	13.0	1601	7.23		Clouds, DK grey
	2.0		12.9	1537	7.32		Clouds, Lt grey
	2.5		12.6	1614	7.31		Clouds, Lt grey
9:15	3.0	40/1000	12.5	1597	7.35		"
	3.5	30/1000	12.6	1602	7.33		Clouds, grey
	4.0		12.5	1599	7.35		Clouds, grey
	4.5		12.5	1607	7.34		
9:25	5.0	20/1000	12.6	1595	7.31		
9:32	5.5						
9:35	6.0	10/1000	12.6	1630	7.42		Start P-Dumping 3/8
9:41	6.5	0/1000	12.6	1634	7.37		Clouds tan
9:45	7.0	0/1000	12.5	1622	7.39	18.77	Slt clouds Lt tan
9:50	7.5	0/1000	12.5	1635	7.44		Slt cloud, Lt Lt tan
9:55	8.0	0/1000	12.6	1634	7.47		Slt cloud, Lt Lt tan (Slight color)
							Cloudy colorless

Project No. 060354-01 Date: 9-12-06 Well: G2-5

Site Location: Chinook Ventures/Former Alcoa Longview Facility

Name: S Hargrave Initial DTB: 13.40 Final DTB: 13.43

Development Method: Bawlor Initial DTW: 8.62 Final DTW: 11.88

Total Water Removed: 6.5 Pore Volume: 0.78

Water Contained? Yes Casing Diameter: 2"

Estimate of specific capacity or recharge to well: Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp.	EC	pH	DTW (TOC)	Appearance/Comments
1515							Start Pumping w black Start w Bawlor Start bawling cloudy, tan
1545							
1550							
1555	1.0	15/1000	15.3	1803	7.44		
1600	2.0	30/1000	15.4	1771	7.14		
1605	3.0	0/1000		1764	7.04		cloudy, Lt tan
							Dry at 3.0 gallons
829						8.65	9-13-06
935	4.0	10/1000	14.9	1579	7.81		cloudy, tan
	5.0	0/1000	14.8		7.31		Cloudy, Lt tan
940	6.5	0/1000	14.7	7.29	11.88		Dry

Project No. 060354-01 Date: 9-13-06 Well: RL-30
 Site Location: Chinook Ventures/Former Alcoa Longview Facility
 Name: S Harzait Initial DTB: 39.10 Final DTB: 39.33
 Development Method: Bailor/Squad pump Initial DTW: 8.35 Final DTW: 38.13
 Total Water Removed: Pore Volume: 501
 Water Contained? Casing Diameter: 2"
 Estimate of specific capacity or recharge to well: Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp.	EC	pH	DTW (TOC)	Appearance/Comments
1525							Start surging
1545							Start Bailing / Surging
1605	4.0	380/1000	12.6	673	6.46		Cloudy, Brown
1615	6.0	190/1000	12.5	667	6.44		
	7.0	80/1000	12.4	663	6.46		
1625						38.38	Dry
1640						37.35	recharge duration
							9/14/06
0835	9.0	100/1000	12.5	653	6.33	17.83	Start surging w bailor cloudy, tan
	11.00	00/1000	12.3	647	6.31		cloudy, tan Dry after 3 gallons

Project No. 060354-01 Date: 9-17-06 Well: RL-4D

Site Location: Chinook Ventures/Former Alcoa Longview Facility

Name: J. Kavanagh Initial DTB: 39.04 Final DTB: 39.23

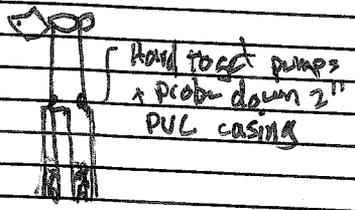
Development Method: Barler/Sprint pump Initial DTW: 8.50 Final DTW: 16.47

Total Water Removed: 22 gallons Pore Volume: 4.97

Water Contained? Yes Casing Diameter: 2"

Estimate of specific capacity or recharge to well: Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp.	EC	pH	DTW (TOC)	Appearance/Comments
915							Start surging w barler
945							Start barling
955	1.0	300/1000	13.4	356	6.53		cloudy, OK Brown, silty
1005	2.0	150/1000	13.4	354	6.50		cloudy Brown
							Start Sprint Pumping
1015	6.0	85/1000	13.6	352	6.33		cloudy Tan
1020	10.0	10/1000	13.7	354	6.31		set cloudy LT tan
1028	12.0	0/1000	13.5	353	6.28		clear, colorless
1037	18.0	0/1000	13.4	353	6.30		clear, colorless
	22.0	0/1000	13.4	356	6.27		clear, colorless



* couldn't get since down hole during pumping

* had to push with a long rod to get barler and pump past

Project No. 060354-01

Site Location: Chinook Ventures/Former Alcoa
Longview Facility



Date: 9-19-06 Well: R-1D

Name: Stephen Hargrave
Development Method: P-Pump

Initial DTB: 24.75
Initial DTW: 7.01
Pore Volume:
Casing Diameter: 1"
Meter #:

Final DTB:
Final DTW:

Total Water Removed:
Water Contained? (Yes)
Estimate of specific capacity or recharge to well:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp	EC	pH	DTW (TOC)	Appearance/Comments
1715	1.0	10/1000	13.7	753	6.13		
	1.5	0/1000	13.7	746	6.10		
1736	2.0	0/1000	13.7	748	6.18		SEC cloudy, LF, 1 cm clear, color is clear color Dry at 2.0 g
1758	2.5	0/1000	13.8	704	6.32	22.7.0	

Project No. 060354-01

Date: 9-14-06 Well: G4-D

Site Location: Chinook Ventures/Former Alcoa Longview Facility

Name: Sparrow

Initial DTB: 37.30

Final DTB: 37.53

Development Method: 5 Block/Barka/Squirt Pump

Initial DTW: 15.11

Final DTW: 35.38

Total Water Removed: 10.0

Pore Volume:

3.6

Water Contained? Yes

Casing Diameter: 2" 3.6

Estimate of specific capacity or recharge to well:

Meter #:

Time	Cum Vol Removed	Sand/Silt (ml/1000ml)	Temp	EC	pH	DTW (TOC)	Appearance/Comments
1530							Start Surging
1600	2.0	450/1000	13.2	748	6.36		Start Bailing Cloudy Silty, DK Brown
1610	4.0	200/1000	13.0	742	6.35		Cloudy Brown (DK)
1615	6.0		13.1	742	6.36		Cloudy Brown
1620	8.0	200/1000	13.0	740	6.416		cloudy, Brown
1625	10.0	200/1000	13.0	736	6.412		cloudy, Brown
1630						34.11	53
1635						35.38	

Project No. 060354-01 Date: 9-14-06 Well: G4-5

Site Location: Chinook Ventures/Former Alcoa Longview Facility

Name: S. Harkun Initial DTB: 22.50 Final DTB: 22.63

Development Method: Bailin / sm / BML Initial DTW: 5.70 Final DTW: 17.82

Total Water Removed: Pore Volume: 2.73

Water Contained? Yes Casing Diameter: 2" "

Estimate of specific capacity or recharge to well: Meter #:

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp	EC	pH	DTW (TOC)	Appearance/Comments
1400							Start Surging
1430							Start Bailing
1445	2.0	300/1000	13.6	808	6.54		Cloudy Brown, silty
1455	4.0	225/1000	13.5	800	6.52		Cloudy Brown
1505	6.0	140/1000	13.3	784	6.40		Cloudy Tan
1510	8.0	80/1000	13.2	742	6.41		Cloudy Tan
1520	10.0	60/1000	13.2	740	6.38		Dry @ 10.0
1530						21.31	
1750						17.66	

Project No.	110730-02.01 T:01-C-01	Date:	2/22/12	Well:	SSA7-MW-01
Site Location:	Longview, WA	Initial DTB:	17.18	Final DTB:	17.59 ^{xx}
Name:	Millennium Bulk Terminals RI/FS	Initial DTW:	9.74	Final DTW:	9.98 ^{xx}
Development Method:	Manual surge / waterera	Casing Volume:	1.21 gal		
Total Water Removed:	42 gallons	Casing Diameter:	2"=0.163 gal/ft		
Water Contained?	yes	Meter #:	26118		
Estimate of specific capacity or recharge to well:		x 0.5 gpm		OWRD#:	WDE # BCN 138
Gal/ft = (dia./2) ² x 0.163					
1"=0.041	2"=0.163	3"=0.367	4"=0.653	6"=1.469	8"=2.608
				10"=4.080	12"=5.875

x-Q 1235

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp.	EC	pH	DTW (TOC)	Appearance/Comments
0850	0	-	-	-	-	-	start manual surge
0905	0	-	-	-	-	-	stop manual surge / set up waterera
0920	0	-	-	-	-	9.90	start waterera w/ surge block @ 4' ABW - slow
0930	0	-	-	-	-	9.96	move inlet to 7' ABW - increase speed
0940	1 g	-	9.71	433	5.86	10.10	milky/cloudy, dark grey, move to -5' ABW
0945	3 g	20/500 ^A	10.28	534	6.22	10.21	milky/cloudy grey
0955	5 g	-	10.26	518	6.27	10.18	milky dark grey, move inlet to -5' ABW
1005	7 g	6/200 ^B	10.40	482	6.25	10.11	milky dark grey, move inlet to -4' ABW
1015	8.5 g	-	10.64	506	6.32	10.11	milky dark grey, move inlet to -3' ABW
1022	10 g	14/700 ^C	10.89	570	6.46	10.12	milky dark grey, move inlet to -2' ABW
1028	12.5 g	-	10.99	589	6.50	10.09	milky dark grey, move inlet to -1' ABW
1035	15 g	30/800 ^A	11.09	677	6.61	10.04	milky dark grey, move to 0.3' ABW, & after more
1043	18 g	-	11.01	576	6.51	10.16	milky dark grey, remove surge block @ 7' ABW
1058	21 g	1/1 ^B	10.31	488	6.34	10.02	very light brn/gry cloudy, move to 6' ABW
1110	23 g	-	10.55	544	6.41	9.98	light brn/gry cloudy, move to 5' ABW
1120	25 g	1/1 ^C	10.37	589	6.46	10.15	light brn/gry cloudy, move to 4' ABW
1130	27 g	-	10.51	570	6.48	10.16	very light brn/gry cloudy, move to 3' ABW
1140	30 g	-	10.69	580	6.48	10.16	" " " " move to 2' ABW
1146	32 g	<1 ^A	10.82	609	6.55	10.21	" " " " move to 1' ABW
1152	34 g	-	10.57	606	6.53	10.24	" " " " clear out bottom of well
1202	37 g	<1 ^B	10.85	600	6.54	10.29	dark gry to very light brn/gry cloudy, to 4' ABW
1210	39 g	-	10.63	576	6.51	10.28	almost clear, very slight brn cloudy
1215	40.5 g	-	10.81	578	6.51	10.30	clear w/ slight tint
1226	42 g	<1 ^C	10.79	578	6.51	10.30	" " " " - stop development complete

ABW = above bottom of well

WELL DEVELOPMENT FORM



Project Number: 110730-02.01 T:01-C-01 Date: 1/9/12 Well: SSA6-MW-61
 Site Location: MBT RI/FS Initial DTB: 13.87 Final DTB: 13.97
 Name: Doug Laffoon Initial DTW: 5.49 Final DTW: 3.52
 Development Method: manual surge/water w/ P-pump Casing Volume: 1.37 gal
 Total Water Removed: 44 gal Casing Diameter: 2"
 Water Contained? YES Meter #: 26118
 Estimate of specific capacity or recharge to well: > 1 gpm

Time	Cum. Vol. Removed	Sand/Silt (ml/1000ml)	Temp	EC	pH	DTW (TOC)	Turb (NTU)	Appearance/Comments
1300	0	—	—	—	—	—	—	manual surge
1330	0	—	—	—	—	—	—	started water w/ surge to block @ 2' TB, initial muddy grey
1345	3	—	—	—	—	5.88	—	more surge + inlet to 7' TB more
1350	4	—	—	—	—	5.82	—	grey dark milky spots of sheer
1353	5	—	—	—	—	—	—	more to 6 ft TB, dark grey m.
1400	7	—	—	—	—	5.88	—	more to 5 ft TB, dark grey milky
1405	9	—	—	—	—	6.07	—	more to 4 ft TB, dark grey milky
1409	11	—	—	—	—	6.04	—	more to 3 ft TB
1413	13	—	—	—	—	6.08	—	more to 2 ft TB
1417	15	A 16	—	—	—	6.07	—	more to 1 ft TB
1424	20	B 28	11.31	468	7.05	—	>1000	remove surge block, inlet @ 7' TB
1443	22	C 12	10.42	423	7.19	5.87	1000	inlet @ 6' TB, cloudy grey
1455	25	A 21	10.76	429	7.12	5.72	555	inlet @ 5' TB, lighter cloudy grey
1505	28	B 21	10.86	431	7.08	5.73	221	inlet @ 4' TB, light cloudy grey
1515	30	—	10.99	427	7.01	—	209	inlet @ 3' TB, very light cloudy
1521	32	C 21	11.52	422	6.99	5.87	241	inlet @ 2' TB
1530	34	A 21	11.10	420	6.99	5.72	134	inlet @ 1' TB
1536	36	B 21	11.17	419	6.77	5.93	226	inlet @ 1 ft bottom
1548	38	—	11.22	416	6.53	5.89	313	inlet cloudy to cream
1547	40	C 21	11.25	416	6.75	6.01	183	inlet almost clear
1555	42	—	—	—	—	—	—	stop water w/ surge, install P-pump
1600	43	—	10.88	398	7.09	5.62	86	clear
1612	44	—	10.89	421	7.06	5.61	86	clear - surge - sampled

WELL DEVELOPMENT FORM



Project Number: 110730-02.01 T:01-C-01 Date: 1/9/12 Well: SSA4-MW-01
 Site Location: MBT RI/FS Initial DTB: 14.56 Final DTB: 15.58
 Name: Doug Laffoon Initial DTW: 5.00 Final DTW: 5.26
 Development Method: Manual surge block / P-pump Casing Volume: 1.56 gal @ 12.50
 Total Water Removed: 36 gal Casing Diameter: 2"
 Water Contained? YES Meter #: 26118
 Estimate of specific capacity or recharge to well: > 1 gpm

Time	Gum Vol. Removed	Sand/Silt (ml/1000ml)	Temp	EC	pH	DTW (TOC)	Turb (NTU)	Appearance/Comments
0825	0	-	-	-	-	5.00	-	manual surge
0850	0	-	-	-	-	-	-	start P-pump
0857	1.5	A 36/420	-	-	-	6.21	-	muddy brown
0904	3.0	B 40/110	-	-	-	6.60	-	dark milky cloudy
0909	4.5	C 18/4	-	-	-	6.60	-	milky, cloudy brown / DTB - 15.58
0910	-	-	-	-	-	-	-	manual surge
0918	4.5	-	-	-	-	5.61	-	start P-pump / DTB - 15.54
0940	6.0	A 0/340	11.75	961	7.11	5.93	-	brown milky cloudy
0958	7.5	B 0/120	12.07	829	6.67	6.52	-	
1006	9.0	-	11.67	880	6.67	7.85	-	
1010	10.5	-	-	-	-	-	-	
1014	12.0	C 0/120	12.17	597	6.52	7.78	-	brown/grey milky / start water run
1018	13.0	-	-	-	-	-	-	
1022	17.5	-	-	-	-	-	-	
1027	20.0	A 0/44	12.40	543	6.47	7.74	-	stopped to empty buckets
1050	22.0	-	-	-	-	-	-	restart with water @ 1' TB
1110	22.5	B 9	11.04	476	6.79	5.80	2100	move to 2' TB - cloudy brown
1125	26.0	-	10.27	543	6.45	5.78	-	move to 6' TB - n n
1140	27.5	C 8	11.43	468	6.39	5.97	1000	move to 4' TB - light cloudy brn
1155	30.0	B <1	11.82	492	6.41	7.08	1000	move to 2' TB - light cloudy brn
1210	32.5	C <1	11.84	492	6.42	7.11	1000	stop water run / P-pump @ 5' TB, 1.6m
1215	33.0	-	12.47	428	6.12	6.03	394	very light cloudy / turn
1225	34.0	A <1	12.35	436	6.35	5.98	159	very light cloudy - almost clear
1240	36.0	B <1	12.49	438	6.36	5.97	91.2	clear - stop - complete

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

R1/FS SSA4/6

Office: (503) 670-1108

Fax:

(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals-Longview (SPL) ^{on} WELL ID: SSA4-MW-01

SITE ADDRESS: 4029 Industrial way, Longview, WA

BLIND ID: MBT- SSA4-MW-01-011212

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PARTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F 40's °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

[Product Thickness] [Water Column]

(Circle appropriate units) [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
1/12/12	13:43	15.58	---	5.14	---	10.14	X1 1.70
/ /	:	---	---	.	---	.	X3 5.10

Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
--	------------	------------	------------	------------	------------	-------------	-------------

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample)

Sample Depth: 13'

(N if used)

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	
White-Poly	1/12/12	14:15	B	2, 250, 500, 1L	None	YES	NO	NA	amber glass ✓
Green Poly	/ /	:		125, 500, 1L	NaOH	YES	NO		
Red Total Poly	/ /	:		250, 500, 1L	HNO ₃	YES	NO		
Red Diss. Poly	/ /	:		250, 500, 1L	HNO ₃	YES	YES		

Total Bottles (include duplicate count): 2

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO ₄) (F)
	YELLOW - Poly	(COD) (TOC) (Total PO ₄) (Total Kjeldahl Nitrogen) (NH ₃) (NO ₃ /NO ₂)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

amber glass CL PATHS 8270-51M

WATER QUALITY DATA

Purge Start Time: 13:45

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	13:48	0.7L	5.39	8.71	702	10.88	3.29	-14.7	almost clear
2	13:51	1.4L	5.41	8.37	706	11.36	2.02	-25.7	↓
3	13:54	2.0L	5.44	8.10	691	11.48	1.48	-31.7	clear, colorless
4	13:57	2.5L	5.43	7.95	665	11.56	1.14	-34.7	
5	14:00	3.0L	5.43	7.81	634	11.61	0.94	-37.1	
6	14:03	3.5L	5.44	7.70	608	11.69	0.85	-37.9	
7	14:06	4.0L	5.44	7.54	582	11.65	0.76	-38.6	
8	14:09	4.5L	5.44	7.46	566	11.57	0.72	-38.0	
9	14:12	5.0L	5.44	7.40	558	11.53	0.69	-37.4	↓
10	:								
11	:								
12	:								

[gallons or liters]

sample by Low Flow

[Clarity, Color]

Turbidity before sample collection (NTU) 15=0

Turbidity after sample collection (NTU) 7.71

SAMPLER: Doug Laffoon
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals-Longview (SPL) ²⁰⁰² WELL ID: SSA6-MW-01

SITE ADDRESS: 4029 Industrial way, Longview, WA BLIND ID: MBT-SSA6-MW-01-011212

DUP ID: _____

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: F 4.03 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

[Product Thickness] [Water Column]

(Circle appropriate unit) [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)	
1/12/12	14:38	13.97	---	5.73	---	8.24	X 1 1.34	
1/1	:	.	---	.	---	.	X 3 4.02	
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	<input checked="" type="radio"/> 2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875

§ METHODS: (A) Water Pit (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample)

Sample Depth: 12'

[if used]

Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	
White-Poly	1/1	:		250, 500, 1L	None	YES	NO	NA	✓
Green-Poly	1/12/12	15:05	B 4	125, 500, 1L	NaOH-HCl	<input checked="" type="radio"/> YES	<input checked="" type="radio"/> NO		amber glass ✓
Red Total Poly	1/1	:		250, 500, 1L	HNO ₃	YES	NO		
Red Diss. Poly	1/1	:		250, 500, 1L	HNO ₃	YES	YES		

Total Bottles (include duplicate count): 4

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO ₄) (F)
	YELLOW - Poly	(COD) (TOC) (Total PO ₄) (Total Keldahl Nitrogen) (NH ₃) (NO ₂ /NO ₃)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	
	<input checked="" type="checkbox"/> Amber glass	NWTPH-DX w/ silica gel cleanup / EPA

WATER QUALITY DATA

Purge Start Time: 14:40

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	14:43	0.7 L	5.78	9.30	371	10.47	3.21	-69.3	clear, colorless ↓ V
2	14:46	1.5 L	5.78	9.50	372	10.67	1.02	-98.7	
3	14:49	3.0 L	5.79	9.03	371	10.83	0.79	-102	
4	14:52	4.0 L	5.78	8.93	373	10.92	0.71	-104	
5	14:55	5.0 L	5.79	8.81	372	10.92	0.72	-120	
6	14:58	6.0 L	5.79	8.67	370	10.92	0.86	-127	
7	15:01	7.0 L	5.79	8.52	369	10.94	0.94	-132	
8	15:04	8.0 L	5.79	8.46	369	10.95	0.86	-134	
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

sampled by Low Flow

[Clarity, Color]

Turbidity before sample collection (NTU) 7.59

Turbidity after sample collection (NTU) 4.94

SAMPLER: Davey Laffoon
(PRINTED NAME)

[Signature]
(SIGNATURE)



WATER LEVEL SURVEY

Black Mud Pond

Anchor QEA L.L.C. Site: Millennium Bulk Terminals - Longview, WA Date: 10/4/11

Personnel: D. Laffoon Project No.: 110730-01.04 T-01-A-14

Weather: overcast/Cloudy, 50-60°F, wind light E Water Level Meter # 16903

Well	Time (2400)	DTW (feet)	Comments
Black Mud Pond Wells			
RL-1S	1114	10.04	
R-1D	1117	9.04	
RL-2S	1210	9.37	with new fence, may cause access problem
RL-2D	1207	8.84	" " " " " "
RL-3S	1141	7.50	
RL-3D	1144	7.29	
RL-4S	1432	+2.31m 7.29	
RL-4D	1436	8.96	need 2" cap (slip)
RL-5	1225	15.90	

Surface Water			
Cable Plant Ditch	1231	8.72	at platform across from RL-5; orange mark by valve handle
Recirculation Ditch	1148	2.12	orange mark on concrete pump pad near RL-3
Reynolds Storm Water Ditch	1146	5.93	top of steel pipe south of berm near RL-3
CDID - upstream	1217	2.94	top of steel pipe south of road along CDID
CDID downstream - staff gauge	1123	6.4	top of staff gauge - now corrected
CDID downstream - boom	1121	7.11	top of first piling on floating dock
Columbia River Staff Gauge	0851	7.0	south end of plant near Weyerhaeuser property line *
			* - not corrected, approx. gauge broken

RLSW wells			
RLSW-1	0958	9.39	
-2	1448	11.02	need to clear block berms - completed afternoon
-3	0817	8.56	" " " - measured 10/5/11
-4	1024	17.93	

Notes: Chayl - Duke - meet at gravel shack
503-502-8925



WATER LEVEL SURVEY

RI / FS

Anchor QEA L.L.C. Site: Millennium Bulk Terminals - Longview, WA Date: 10/4/11

Personnel: D. Laffoon Project No.: 110730-01.04 T=01-A-14 01-C-01

Weather: Overcast/Cloudy, 50-60°F, wind light \Rightarrow Water Level Meter # 16903

Well	Time (2400)	DTW (feet)	Comments
Piezometers			
PZ-1S	0816	8.23	
PZ-2D	0809	7.78	
PZ-3	0827	5.71	
PZ-4	0821	5.42	
PZ-5	0759	4.63	
PZ-6	1202	7.41	
PZ-7	1153	11.03	need 2" slip plug
"G" Wells			
G-1S	0847	16.29	
G-1D	0843	19.02	
G-2S	0859	7.55	
G-2D	0702	7.45	
G-3S	1354	6.13	
G-3D	1358	6.71	
G-4S	1348	6.03	
G-4D	1345	4.82	
G-5S	1416	12.31	
G-5D	1419	11.48	
G-6S	0948	18.47	
G-6D	0951	21.78	
G-7S	—	—	
G-7D	1157	10.78	fence may cause access problem
Pier @ stairs	0936	13.79	
Pier @ SW dolphin	0938	13.75	NW corner by oil spill box

Notes:



Location ID	Total Depth (ft below TOC)	Date	Sample ID	Sample Time	Well Integrity
Black Mud Pond Wells					
RL-1S	19.06	10/06/11	RL-1S-100611	08:50	Good 2 only
RL-1D	39.40	10/06/11	RL-1D-100611	09:10	ok 1 lock
RL-2S	19.78	10/06/11	RL-2S-100611	11:00	ok
RL-2D	33.00	10/06/11	RL-2D-100611	12:00	ok
RL-3S	19.81	10/06/11	RL-3S-100611	15:10	ok
RL-3D	39.23	10/06/11	RL-3D-100611	12:40	ok
RL-4S	18.35	10/06/11	RL-4S-100611	13:10	ok
RL-4D	39.00	10/06/11	RL-4D-100611	14:10	ok
RL-5	23.30	10/07/11	RL-5-100711	08:40	ok
RLSW-1	19.91 18:00	10/10/11	RLSW-1-101011	11:30	ok
RLSW-2	19.87 18:00	10/11/11	RLSW-2-101111	09:10	Cannot lock well casing sticks up about
RLSW-3	19.97 48:00	10/10/11	RLSW-3-101111	08:30	ok
RLSW-4	31.42 28.50	10/10/11	RLSW-4-101011	09:30	ok
Surface Water					
W1	---	10/12/11	W1-101211	15:10	Near pump station or industrial
W2	---	10/12/11	W2-101211	11:10	near G5 wells
W3	---	10/12/11	W3-101211	10:20	near CDID UP
W4-A	---	10/12/11	W4-101211	08:50	Near pump house near CDID Down
W4-B	---	---	---	---	NO sample collected Pump not running
W5	---	10/12/11	W5-101211	16:30	on Dock
W6	---	10/12/11	W6-101211	13:00	Main Pump house at CDID headworks
W7	---	10/12/11	W7-101211	14:10	Across from telephone
CDID Up	---	10/06/11	MBT-100611-02	10:20	---
CDID Down	---	10/06/11	MBT-100611-01	09:50	---
QA/QC					
R-3	---	10/05/11	R-53-100511	13:25	ok
G-15	---	10/11/11	G-51-S-101111	13:20	ok

Notes: 1 foot 36 Pharmed
 15 Pharmed 1
 25 ft - 1/4" Poly

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

Fax:

(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: PZ-1

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: PZ-1-100711

DUP ID: _____

WIND FROM:	N	NE	<u>E</u>	SE	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY	
WEATHER:	SUNNY			PRTLY CLOUDY		CLOUDY		<u>RAIN</u>		TEMPERATURE:	<u>50.5</u>	°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
<u>10/7/11</u>	<u>13:30</u>	<u>16.28</u>	---	<u>8.51</u>	---	<u>7.77</u>		X 1	<u>1.27</u>
/ /	:	.	---	.	---	.		X 3	<u>3.81</u>
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.633	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: <u>15'</u>	[√ if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL		Preservative [circle]	Ice	Filter	pH		
White Poly	<u>10/7/11</u>	<u>14:20</u>	<u>B</u>	<u>3</u>	<u>250, 500, 1L</u>	None	YES	NO	NA	✓	
Yellow Poly	<u>10/7/11</u>	<u>14:20</u>	<u>B</u>	<u>1</u>	<u>250, 500, 1L</u>	H2SO4	YES	NO		✓	
Green Poly	<u>10/7/11</u>	<u>14:20</u>	<u>B</u>	<u>2</u>	<u>125, 500, 1L</u>	NaOH	YES	NO		✓	
Red Diss. Poly	<u>10/7/11</u>	<u>14:20</u>	<u>B</u>	<u>1</u>	<u>250, 500, 1L</u>	HNO ₃	YES	YES		✓	
Amber Glass	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>2</u>	<u>250, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>		✓	
Total Bottles (include duplicate count):				<u>7(9)</u>							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorus)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (As) (Ca) (Cd) (Co) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA										Purge Start Time: <u>13:39</u>	Fe++: <u>0.2</u> mg/l	Sulfide: <u>0.4</u> mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality			
1	<u>13:42</u>	<u>0.45 L</u>	<u>8.92</u>	<u>9.36</u>	<u>3018</u>	<u>15.54</u>	<u>1.81</u>	<u>-53</u>	black opaque ↓			
2	<u>13:45</u>	<u>0.95 L</u>	<u>9.05</u>	<u>9.41</u>	<u>3103</u>	<u>15.21</u>	<u>0.67</u>	<u>-78</u>				
3	<u>13:48</u>	<u>1.4 L</u>	<u>9.08</u>	<u>9.45</u>	<u>3263</u>	<u>15.07</u>	<u>0.11</u>	<u>-102</u>				
4	<u>13:51</u>	<u>1.7 L</u>	<u>9.08</u>	<u>9.51</u>	<u>3347</u>	<u>15.02</u>	<u>0.07</u>	<u>-145</u>				
5	<u>13:54</u>	<u>2.0 L</u>	<u>9.08</u>	<u>9.51</u>	<u>3364</u>	<u>15.01</u>	<u>0.06</u>	<u>-169</u>				
6	<u>13:58</u>	<u>2.4 L</u>	<u>9.09</u>	<u>9.52</u>	<u>3375</u>	<u>14.98</u>	<u>0.05</u>	<u>-191</u>				
7	<u>14:02</u>	<u>2.8 L</u>	<u>9.09</u>	<u>9.52</u>	<u>3374</u>	<u>14.95</u>	<u>0.05</u>	<u>-206</u>				
8	:		.	.								
9	:		.	.								
10	:		.	.								
11	:		.	.								
12	:		.	.								

[gallons or liters] Turbidity before sample collection (NTU): 3.53 Turbidity after sample collection (NTU): 4.04 [Clarity, Color]

Comments: ~~As, Cr, Cu, Ni, Na~~ analyzed for Quarterly Groundwater Monitoring.
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: PZ-2

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: PZ-2-100711

DUP ID: NO 1st ind

WIND FROM:	N	NE	E	<u>SE</u>	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>CLOUDY</u>		RAIN		TEMPERATURE: °F <u>60</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/07/11	13:29	27.78	---	7.89	---	19.89			X 1
/ /	:	.	---	.	---	.			X 3
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (B) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	[√ if used]
White Poly	10/07/11	14:10	B	<u>(3)</u> 125, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>X</u>
Yellow Poly	/ /	:	↓	<u>(1)</u> 250, 500, 1L	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	---	<u>X</u>
Green Poly	/ /	:	↓	<u>(2)</u> 125, 500, 1L	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	---	<u>X</u>
Red Diss. Poly	/ /	:	↓	<u>(1)</u> 250, 500, 1L	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	---	<u>X</u>
Amber Glass	/ /	:	↓	<u>(2)</u> 250, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	---	<u>X</u>

Total Bottles (include duplicate count): 7 9

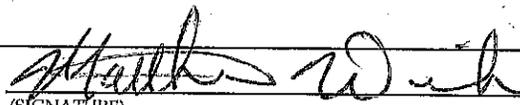
Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl)</u> (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	<u>(Total Phosphorous)</u>	
GREEN - Poly	<u>(Total Cyanide)</u> (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	<u>All</u> (Al) (Ca) (Cl) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)	
Amber Glass	<u>PAHS by 8270C SIM</u>	

WATER QUALITY DATA Purge Start Time: 13:36 Fe++: 1.0 mg/l Sulfide: 3.50 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.4L	8.07	9.48	7605	14.67	---	-102.4	Black, opaque
2	0:06	0.6L	8.07	9.57	8161	14.53	0.88	-132.7	↓ ↓
3	0:09	1.1L	8.11	9.58	8099	14.43	0.54	-152.1	↓ ↓
4	0:12	1.5L	8.16	9.57	8013	14.23	0.45	-146.6	↓ ↓
5	0:15	1.95L	8.20	9.56	7907	14.14	0.39	-162.0	↓ ↓
6	0:18	2.4L	8.17	9.55	7889	14.10	0.36	-171.8	↓ ↓
7	0:21	2.75L	8.11	9.55	7886	14.10	0.35	-188.2	↓ ↓
8	0:24	3.1L	8.10	9.55	7874	14.11	0.35	-166.0	↓ ↓
9	0:27	3.45L	8.09	9.55	7863	14.08	0.33	-160.8	↓ ↓
10	:		.	.					
11	:		.	.					
12	:		.	.					

[gallons or liters] Turbidity before sample collection (NTU): 1.67 Turbidity after sample collection (NTU): 1.92

Comments: ~~As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring~~
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME) 
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: PZ-3

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: PZ-3-100711

DUP ID:

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY	PRTLY CLOUDY	CLOUDY	<u>RAIN</u>	TEMPERATURE: °F <u>60.</u>		°C				

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	(Circle appropriate units)	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]	
									Volume (gal)	
10/07/11	15:07	13.03	---	5.71	---	7.32			X 1	1.19
/ /	:	.	---	.	---	.			X 3	3.57
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√		
White Poly	10/07/11	15:45	B	(3) (25, 500, 1L)	None	YES	NO	NA		X	
Yellow Poly	//	:		(1) (250, 500, 1L)	H2SO4	YES	NO	---		X	
Green Poly	//	:		(2) (125, 500, 1L)	NaOH	YES	NO	---		X	
Red Diss. Poly	//	:		(1) (250, 500, 1L)	HNO3	YES	YES	---		X	
Amber Glass	//	:		(2) (250, 500, 1L)	None	YES	NO	---		X	
Total Bottles (include duplicate count):				9							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (Mn) (Ca) (Co) (Fe) (Mg) (Mn) (K) (Na) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHs by 8270C SIM	

WATER QUALITY DATA							Purge Start Time: 15:12	Hach / YSI	Hach YSI	times dilution
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	Fe++:	mg/l	Sulfide:	mg/l
										Water Quality
1	0:03	0.25L	5.71	8.82	3376	16.02	0.8	38.2	0.20	bluish, opaque
2	0:06	0.6 L	5.76	8.62	7710	15.93	0.86	137.1	0.20	clear, dark amber
3	0:09	0.95 L	5.75	8.64	6921	15.96	0.55	165.6	0.20	↓ ↓
4	0:12	1.4 L	5.77	8.65	6294	16.03	0.51	170.1	0.20	↓ ↓
5	0:15	1.85 L	5.76	8.65	5878	16.10	0.45	173.4	0.20	↓ ↓
6	0:18	2.3 L	5.79	8.65	5634	16.16	0.42	168.8	0.20	↓ ↓
7	0:21	2.75 L	5.81	8.65	5442	16.23	0.39	155.5	0.20	↓ ↓
8	0:24	3.20 L	5.80	8.65	5299	16.30	0.37	168.2	0.20	↓ ↓
9	0:27	3.65 L	5.79	8.64	5197	16.36	0.34	171.7	0.20	↓ ↓
10	0:30	4.1 L	5.80	8.64	5125	16.37	0.32	158.0	0.20	↓ ↓
11	:									
12	:									

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 6.06

Turbidity after sample collection (NTU): 6.89

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: PZ-4

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: PZ-4-101011

DUP ID:

WIND FROM:	N	NE	E	<u>SE</u>	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>CLOUDY</u>		RAIN		TEMPERATURE: °F <u>55</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/10/11	15:59	20.94	---	5.14	---	15.80			X 1 2.58
/ /	:	---	---	.	---	.			X 3 7.74
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth:	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
White Poly	10/10/11	16:40	B	(3) 125,500, 1L	None	YES	NO	NA	X
Yellow Poly	/ /	:		(1) 250,800, 1L	H2SO4	YES	NO	---	X
Green Poly	/ /	:		(2) 125,500, 1L	NaOH	YES	NO	---	X
Red Diss. Poly	/ /	:		(1) 250,500, 1L	HNO3	YES	YES	---	X
Amber Glass	/ /	:		(2) 250,500, 1L	None	YES	NO	---	X
Total Bottles (include duplicate count):				(9)					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (Si) (Ca) (Cr) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA			Purge Start Time: 16:01	Fe++: 0.4 mg/l	Sulfide: 2.70 mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.4L	5.49	9.57	9462	15.08	---	48.7	black, opaque
2	0:06	0.6L	5.55	9.56	10250	14.81	1.05	35.1	↓ ↓
3	0:09	0.95L	5.58	9.71	12470	14.69	0.69	19.0	↓ ↓
4	0:12	1.35L	5.64	9.75	13570	14.55	0.50	15.1	↓ ↓
5	0:15	1.75L	5.65	9.77	13920	14.48	0.41	13.9	↓ ↓
6	0:18	2.10L	---	9.78	14190	14.43	0.26	14.5	↓ ↓
7	0:21	2.55L	5.57	9.73	12840	14.49	---	17.8	↓ ↓
8	0:24	2.7L	5.66	9.73	14170	14.31	0.08	-226.6	↓ ↓
9	0:27	2.9L	5.61	9.72	14190	14.30	0.05	-244.3	↓ ↓
10	0:30	3.3	5.65	9.69	14200	14.31	0.05	-256.7	↓ ↓
11	0:33	3.6	5.62	9.71	14220	14.33	0.03	-265.0	↓ ↓
12	0:36	3.9	5.60	9.70	14230	14.37	0.02	-273.8	↓ ↓

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 2.49

Turbidity after sample collection (NTU): 1.58

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring (1) Switched V&I meters.
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: PZ-5

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: PZ-5-101011-

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTL Y CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>60</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate units) [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/10/11	14:15	25.49	--	4.41	--	21.08		X 1	3.44
/ /	:	.	--	.	--	.		X 3	10.32
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth:	[if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
White Poly	10/10/11	15:00	B (3)	125, 500, 1L	None	YES	NO	NA	X
Yellow Poly	/ /	:	/	250, 500, 1L	H2SO4	YES	NO	--	X
Green Poly	/ /	:	/	125, 500, 1L	NaOH	YES	NO	--	X
Red Diss. Poly	/ /	:	/	250, 500, 1L	HNO3	YES	YES	--	X
Amber Glass	/ /	:	/	250, 500, 1L	None	YES	NO	--	X
Total Bottles (include duplicate count):				9					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO4) (E, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorus)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (M) (Ca) (Cl) (F) (Fe) (Mg) (Mn) (K) (Na) (Si) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 14:26 Fe++: 0.4 mg/l Sulfide: 5.00 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.3L	4.52	10.50	21190	14.58	--	59.2	Black, opaque
2	0:06	0.7L	4.58	10.50	21250	14.49	1.06	27.4	↓ ↓
3	0:09	1.1L	4.60	10.48	21250	14.51	0.73	26.3	↓ ↓
4	0:12	1.5L	4.63	10.47	21220	14.63	0.64	47.6	↓ ↓
5	0:15	1.95L	4.67	10.48	21270	14.52	0.52	0.15	↓ ↓
6	0:18	2.45L	4.66	10.48	21260	14.37	0.46	-4.0	↓ ↓
7	0:21	2.95L	4.66	10.48	21230	14.38	0.41	-4.7	↓ ↓
8	0:03	0.3L	4.68	10.35	21470	14.10	0.35	-22.7	black opaque
9	0:06	0.6L	4.67	10.35	21480	14.06	0.14	-24.3	
10	0:12	1.2L	4.73	10.35	21430	13.91	0.06	-26.1	
11	0:13	2.0L	4.71	10.35	21470	13.71	0.04	-29.5	
12	0:21	2.4L	4.72	10.35	21470	13.90	0.04	-30.8	

0:24 [gallons or liters] 4.72 10.35 21480 13.89 0.03 -31.4 [Clarity, Color]
 Turbidity before sample collection (NTU): 0.96 Turbidity after sample collection (NTU): 0.99

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
 Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
 (PRINTED NAME) (SIGNATURE)

* - rest but purge @ 1651 to get ORP reading from 2nd YSI

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: *P2-5 cont.*

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID:

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRITLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F		°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)	
/ /	:	.	---	.	---	.			X 1	.
/ /	:	.	---	.	---	.			X 3	.
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth:

[√ if used]

Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	/ /	:		125, 500, 1L	None	YES	NO	NA	
Yellow Poly	/ /	:	1	250, 500, 1L	H2SO4	YES	NO		
Green Poly	/ /	:		125, 500, 1L	NaOH	YES	NO		
Red Diss. Poly	/ /	:	1	250, 500, 1L	HNO ₃	YES	YES		
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		

Total Bottles (include duplicate count):

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA			Purge Start Time:			Hach / YSI	Hach / YSI _____ times dilution		
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<i>0:30</i>	<i>3.7L</i>	<i>4.73</i>	<i>10.35</i>	<i>21490</i>	<i>13.91</i>	<i>03</i>	<i>-338</i>	<i>black opaque</i> ↓
2	<i>0:33</i>	<i>4.2L</i>	<i>4.75</i>	<i>10.35</i>	<i>21510</i>	<i>13.92</i>	<i>03</i>	<i>-346</i>	
3	<i>0:36</i>	<i>4.3L</i>	<i>4.76</i>	<i>10.35</i>	<i>21510</i>	<i>13.95</i>	<i>02</i>	<i>-349</i>	
4	<i>0:39</i>	<i>4.6L</i>	<i>4.75</i>	<i>10.35</i>	<i>21520</i>	<i>13.93</i>	<i>02</i>	<i>-349</i>	
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU):

Turbidity after sample collection (NTU):

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon

(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: PZ-6

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: PZ-6-10074

DUP ID: _____

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY	PRTLY CLOUDY	<u>no wind</u> CLOUDY			RAIN	TEMPERATURE: °F <u>60.</u>		°C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)	
10/07/11	09:32	15.12	--	7.31	--	7.81			X 1	1.27
/ /	:	.	--	.	--	.			X 3	3.81
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (B) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method [§]	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	10/07/11	10:30	B	3 (125, 500, 1L)	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	1 (250, 500, 1L)	H2SO4	YES	NO	--	X
Green Poly	/ /	:	↓	2 (125, 500, 1L)	NaOH	YES	NO	--	X
Red Diss. Poly	✓ / /	✓ :	✓ ↓	1 (250, 500, 1L)	HNO3	YES	YES	--	X
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorus)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(AD) (As) (Ca) (Sb) (Cd) (Fe) (Mg) (Mn) (K) (Na) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 09:42 Fe⁺⁺: 1.6 mg/l Sulfide: 2.20 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.4 L	7.68	8.79	4050	13.93	--	-70.3	Black, opaque
2	0:06	0.6 L	7.93	9.45	4102	13.87	1.42	-67.1	↓ ↓
3	0:09	0.85 L	8.20	9.16	4070	13.93	0.83	-70.6	↓ ↓
4	:	could not low-flow	- purging 3 casing volumes						
5	—	1.36	10.31	9.52	3751	14.59	0.49	-62.5	Black, opaque
6	0:24	2.6	11.18	9.84	3338	14.66	0.43	-65.4	↓ ↓
7	0:30	3.9	12.81	9.69	3470	14.15	0.41	-75.2	↓ ↓
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 98.5 Turbidity after sample collection (NTU): 354

Comments: ~~As, Cr, Cu, Ni, Na~~ analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME) Matthew Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: P2-7

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: P2-7-100711

DUP ID: ---

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRITLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>56-60</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit(s)]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/7/11	09:28	19.13	---	11.04	---	8.09		X 1	Volume (gal) <u>1.32</u>
/ /	:	.	---	.	---	.		X 3	<u>3.96</u>
Gal/ft = (dia./2) ² × 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[if used]
Bottle Type	Date	Time	Method ^s	Amount & Volume mL		Preservative [circle]	Ice	Filter	pH		
White Poly	10/7/11	10:10	B	3	150, 500, 1L	None	YES	NO	NA	✓	
Yellow Poly	10/7/11	10:10	B	1	250, 500, 1L	H2SO4	YES	NO	---	✓	
Green Poly	10/7/11	10:10	B	2	125, 500, 1L	NaOH	YES	NO	---	✓	
Red Diss. Poly	10/7/11	10:10	B	1	250, 500, 1L	HNO ₃	YES	YES	---	✓	
Amber Glass	/ /	:			250, 500, 1L	None	YES	NO			
Total Bottles (include duplicate count):				7							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly		(Total Cl) (SO_{4}) (E, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly		(Total Phosphorus)
GREEN - Poly		(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
RED TOTAL - Poly		(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly		(Al) (M) (Ca) (K) (Mg) (Mn) (K) (Na) (Si) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass		PAHS by 8270C SIM

WATER QUALITY DATA										Purge Start Time: <u>09:32</u>	Fe++: <u>3.0</u> mg/l	Sulfide: <u>0.05</u> mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality			
1	09:35	0.3 L	11.26	7.07	2784	13.42	-135	2.61	black opaque			
2	09:39	0.7 L	11.41	7.03	2786	13.46	-130	2.13				
3	09:43	1.1 L	11.39	7.03	2781	13.54	-129	1.51				
4	09:47	1.5 L	11.56	7.09	2702	13.59	-136	0.98				
5	09:51	1.9 L	11.69	7.13	2619	13.69	-137	0.69				
6	09:55	2.3 L	11.67	7.15	2568	13.76	-138	0.57				
7	09:59	2.7 L	11.68	7.14	2533	13.81	-138	0.59				
8	:											
9	:											
10	:											
11	:											
12	:											

[gallons or liters] 6.38 [Clarity, Color] 14.6

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
 (PRINTED NAME) Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: G-5

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-5-10111

DUP ID: G51-5-10111 (1320)

WIND FROM:	N	NE	E	SE	<u>(S)</u>	SW	W	NW	<u>(LIGHT)</u>	MEDIUM	HEAVY
WEATHER:	SUNNY			PRTLY CLOUDY		CLOUDY		<u>(RAIN)</u>		TEMPERATURE: <u>(6F)</u> <u>50</u> °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DIB-DTW	Volume (gal)
10/11/11	12:54	19.67	--	16.34	--	3.34	X1 0.54
/ /	:	.	--	.	--	.	X3 1.63

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH
White Poly	10/11/11	13:35	B	3 125, 500, 1L	None	<u>(YES)</u>	<u>(NO)</u>	NA
Yellow Poly	10/11/11	13:15	B	1 250, 500, 1L	H2SO4	<u>(YES)</u>	<u>(NO)</u>	✓
Green Poly	10/11/11	13:15	B	2 125, 500, 1L	NaOH	<u>(YES)</u>	<u>(NO)</u>	✓
Red Diss. Poly	10/11/11	13:15	B	1 250, 500, 1L	HNO ₃	<u>(YES)</u>	<u>(YES)</u>	✓
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO	✓

Total Bottles (include duplicate count): 7 14 including duplicate

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl)</u> (SO ₄) (E, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	<u>(Total Phosphorous)</u>	
GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved</u>	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	<u>(Al) (Cl) (Ca) (Mn) (Fe) (Mg) (Mn) (K) (Na) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)</u>	
Amber Glass	PAHS by 8270C.SIM	

WATER QUALITY DATA Purge Start Time: 12:55 Fe++: 2.2 mg/l Sulfide: 0.10 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	12:58	0.8L	16.33	7.07	970	13.53	1.47	-48	clear, colorless
2	13:01	1.7L	16.34	7.10	958	13.59	0.53	-43	
3	13:04	2.5L	16.35	7.03	926	13.53	0.42	-51	
4	13:07	3.3L	16.34	7.00	893	13.53	0.34	-43	
5	13:10	4.3L	16.32	6.96	878	13.57	0.25	-39	
6	13:13	5.3L	16.32	6.94	859	13.64	0.25	-32	
7	13:16	6.3L	16.33	6.90	853	13.68	0.24	-30	↓
8	:		.	.	.	.	.	.
9	:		.	.	.	.	.	.
10	:		.	.	.	.	.	.
11	:		.	.	.	.	.	.
12	:		.	.	.	.	.	.

[gallons or liters] Turbidity before sample collection (NTU): 3.77 Turbidity after sample collection (NTU): 2.40 [Clarity, Color]

Comments: ~~As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring~~
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: G-1-D

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: G-1-D-101111

DUP ID: _____

WIND FROM:	N	NE	E	SE	<u>S</u>	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY		<u>RAIN</u>		TEMPERATURE: °F <u>50.</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
<u>10/11/11</u>	<u>13:20</u>	<u>37.07</u>	<u>--</u>	<u>16.34</u>	<u>--</u>	<u>15.57</u>			X 1
<u>/ /</u>	<u>:</u>	<u>34.95</u>	<u>--</u>	<u>19.38</u>	<u>--</u>	<u>.</u>			X 3
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller Sampled via (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[V if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH			
White Poly	<u>10/11/11</u>	<u>13:50</u>	<u>B</u>	<u>3</u>	<u>(25) 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>X</u>	
Yellow Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u>	<u>250, 500, 1L</u>	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	<u>--</u>	<u>X</u>	
Green Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>2</u>	<u>125, 500, 1L</u>	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	<u>--</u>	<u>X</u>	
Red Diss. Poly	<u>N</u>	<u>:</u>	<u>↓</u>	<u>1</u>	<u>250, 500, 1L</u>	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	<u>--</u>	<u>X</u>	
Amber Glass	<u>/ /</u>	<u>:</u>			<u>250, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>			
Total Bottles (include duplicate count):				<u>7</u>							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (TSS)</u>
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>
	RED DISSOLVED - Poly	<u>(Al) (As) (Ca) (Cd) (Co) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)</u>
Amber Glass	<u>PAHS by 8270C SIM</u>	

WATER QUALITY DATA Purge Start Time: 13:20 Fe++: 7.2 mg/l Sulfide: ND mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>0:03</u>	<u>0.25L</u>	<u>19.55</u>	<u>6.39</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>clear, colorless</u>
2	<u>0:06</u>	<u>0.4L</u>	<u>19.58</u>	<u>6.44</u>	<u>3688</u>	<u>15.51</u>	<u>8.23</u>	<u>-86.0</u>	<u>sl. cloudy, light amber</u>
3	<u>0:09</u>	<u>0.7L</u>	<u>19.63</u>	<u>6.45</u>	<u>3883</u>	<u>15.67</u>	<u>0.39</u>	<u>-87.0</u>	<u>↓ ↓</u>
4	<u>0:12</u>	<u>0.95L</u>	<u>19.66</u>	<u>6.45</u>	<u>3930</u>	<u>15.80</u>	<u>0.53</u>	<u>-90.3</u>	<u>↓ ↓</u>
5	<u>0:15</u>	<u>1.25L</u>	<u>19.72</u>	<u>6.45</u>	<u>3969</u>	<u>15.76</u>	<u>0.39</u>	<u>-91.0</u>	<u>↓ ↓</u>
6	<u>0:18</u>	<u>1.55L</u>	<u>19.73</u>	<u>6.43</u>	<u>3982</u>	<u>15.62</u>	<u>0.36</u>	<u>-89.9</u>	<u>↓ ↓</u>
7	<u>0:21</u>	<u>1.90</u>	<u>19.77</u>	<u>6.43</u>	<u>3971</u>	<u>15.62</u>	<u>0.35</u>	<u>-87.5</u>	<u>clear, light amber</u>
8	<u>0:24</u>	<u>2.25</u>	<u>19.78</u>	<u>6.42</u>	<u>3952</u>	<u>15.54</u>	<u>0.34</u>	<u>-81.7</u>	<u>↓ ↓</u>
9	<u>:</u>								
10	<u>:</u>								
11	<u>:</u>								
12	<u>:</u>								

[gallons or liters] Turbidity before sample collection (NTU): 23.2 Turbidity after sample collection (NTU): 15.0

Comments: As, Cr, Cu, Ni, Na... analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
 (PRINTED NAME) [Signature]
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: 62-S

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: 62-S-10111

DUP ID:

WIND FROM:	N	NE	E	<u>SE</u>	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY		<u>RAIN</u>		TEMPERATURE: °F <u>55</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate units] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
<u>10/11/11</u>	<u>14:42</u>	<u>13.49</u>	---	<u>7.18</u>	---	<u>6.31</u>	X 1 X 3 <u>3.09</u>
1/1	:	.	---	.	---	.	

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH		√	
White Poly	<u>10/11/11</u>	<u>16:00</u>	<u>B</u>	<u>3</u> <u>125, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>		<u>X</u>	
Yellow Poly	<u>/ /</u>	<u>:</u>	<u>B</u>	<u>1</u> <u>250, 500, 1L</u>	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	<u>-</u>		<u>X</u>	
Green Poly	<u>/ /</u>	<u>:</u>	<u>B</u>	<u>2</u> <u>125, 500, 1L</u>	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	<u>-</u>		<u>X</u>	
Red Diss. Poly	<u>/ /</u>	<u>:</u>	<u>B</u>	<u>1</u> <u>250, 500, 1L</u>	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	<u>-</u>		<u>X</u>	
Amber Glass	<u>/ /</u>	<u>:</u>		<u>250, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>				

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO4) (E, total and dissolved) (alkalinity) (TDS) (TSS)</u>
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)</u>
	RED DISSOLVED - Poly	<u>(Al) (As) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Mg) (Mn) (Ni) (Na) (Pb) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)</u>
Amber Glass	<u>PAHS by 8270C SIM</u>	

WATER QUALITY DATA Purge Start Time: 15:32 Fe++: 2.0 mg/l Sulfide: 0.04 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (uS)	Temp °C	DO	ORP	Water Quality
1	<u>15:32</u>	<u>1.16</u>	<u>9.35</u>	<u>7.17</u>	<u>3502</u>	<u>15.45</u>	<u>136.2</u>	<u>136.2</u>	<u>clear, light amber</u>
2	<u>15:33</u>	<u>2.26</u>	<u>10.55</u>	<u>7.14</u>	<u>3578</u>	<u>15.19</u>	<u>2.0</u>	<u>-138.4</u>	<u>↓ pale amber</u>
3	<u>15:34</u>	<u>3.26</u>	<u>11.40</u>	<u>7.14</u>	<u>3499</u>	<u>14.77</u>	<u>2.0</u>	<u>-134.8</u>	<u>↓ ↓</u>
4	:								
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 5.91 Turbidity after sample collection (NTU): 3.4
 Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring 0.136 GPM 0.94 LPM 540 ml/min
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon [Signature]
 (PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: G-2el

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: G-2el-10111

DUP ID:

WIND FROM:	N	NE	E	SE	<u>S</u>	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>CLOUDY</u>		<u>RAIN</u>		TEMPERATURE: <u>50-60</u> °F °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/11/11	14:25	27.82	---	7.08	---	20.74			X1 3.38 3.49
/ /	:	28.50	---	.	---	21.42			X3 10.14 10.17

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 20 [v if used]

Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	10/11/11	15:30	A	3 (25, 500, 1L)	None	<u>YES</u>	<u>NO</u>	NA	✓
Yellow Poly	10/11/11	15:30	A	1 (25, 500, 1L)	H2SO4	<u>YES</u>	<u>NO</u>		✓
Green Poly	10/11/11	15:30	A	2 (25, 500, 1L)	NaOH	<u>YES</u>	<u>NO</u>		✓
Red Diss. Poly	10/11/11	15:30	A	1 (25, 500, 1L)	HNO3	<u>YES</u>	<u>YES</u>		✓
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (TSS)</u>
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved</u>
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	<u>(Al) (As) (Ca) (Cl) (Cr) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)</u>

Amber Glass PAHS by 8270C SIM Hach YSI / YSI Hach YSI 1 times dilution

WATER QUALITY DATA Purge Start Time: 14:35 Fe++: 2.6 mg/l Sulfide: 0.08 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	14:38	1g	12.42	6.93	3548	13.69	1.46	-47	slight amber tint
2	14:48	3.5g	17.16	6.86	3539	13.02	0.51	-45	dark amber tint
3	14:56	5g	17.40	6.81	3528	12.97	3.86	-42	slight amber tint
4	15:08	7g	17.16	6.79	3527	12.85	1.74	-39	↓
5	15:22	10.5g	23.25	6.80	3496	12.54	0.16	-51	cloudy grey
6	:		.	.	.	.	.	.
7	:		.	.	.	.	.	.
8	:		.	.	.	.	.	.
9	:		.	.	.	.	.	.
10	:		.	.	.	.	.	.
11	:		.	.	.	.	.	.
12	:		.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 1870 Turbidity after sample collection (NTU): 518

Comments: ~~As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring~~
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME) [Signature] (SIGNATURE)

FIELD SAMPLING DATA SHEET



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Portland, OR 97224

Office: (503) 670-1108

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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: G-3-S

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-3-S-101111-

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY	
WEATHER:	SUNNY			PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>65</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate units)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/11/11	10:46	15.35	--	6.03	--	9.32			X 1
/ /	:								X 3
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller Sampled (a) (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH			
White Poly	10/11/11	11:20	B	(3) (125, 500, 1L)	None	YES	NO	NA		✓	
Yellow Poly	/ /	:	↓	(1) (250, 500, 1L)	H2SO4	YES	NO	-		✓	
Green Poly	/ /	:	↓	(2) (125, 500, 1L)	NaOH	YES	NO	-		✓	
Red Diss. Poly	/ /	:	↓	(1) (250, 500, 1L)	HNO3	YES	YES	-		✓	
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO				
Total Bottles (include duplicate count):										(7)	

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GRBBN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (As) (Ca) (Cd) (Co) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 10:48 Fe++: 5.10 mg/l Sulfide: 0.01 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.4L	6.46	6.76	2171	14.15	1.75	-141.7	clear, colorless
2	0:06	0.7L	6.58	6.90	2172	13.97	0.47	-144.3	clear pale pink
3	0:09	0.95L	6.59	6.99	2169	13.88	0.42	-142.1	↓ ↓
4	0:12	1.2L	6.59	7.02	2168	13.82	0.29	-139.4	↓ ↓
5	0:15	1.45L	6.60	7.03	2167	13.82	0.25	-138.8	↓ ↓
6	0:18	1.75L	6.63	7.06	2164	13.81	0.26	-135.3	↓ ↓
7	0:21	2.0L	6.64	7.08	2172	13.80	0.28	-133.8	↓ ↓
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 7.06

Turbidity after sample collection (NTU): 6.37

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
 (PRINTED NAME)

Matt Wilson
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: G-3-D

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-3d-10111

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY			RAIN		TEMPERATURE: 80-60 °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
10/11/11	11:09	39.23	---	6.64	---	32.89	X1 5.31
/ /	:	.	---	.	---	.	X3 15.93

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH
White Poly	10/11/11	11:40	B	3 250 500, 1L	None	YES	NO	NA
Yellow Poly	10/11/11	11:40	B	1 250 500, 1L	H2SO4	YES	NO	✓
Green Poly	10/11/11	11:40	B	2 250 500, 1L	NaOH	YES	NO	✓
Red Diss. Poly	10/11/11	11:40	B	1 250 500, 1L	HNO ₃	YES	YES	✓
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO	

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorus)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(All) (As) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Pb) (Se) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA		Purge Start Time: <u>11:11</u>	Fe++: <u>5.6</u> mg/l	Sulfide: <u>ND</u> mg/l					
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	11:14	0.4L	6.87	6.72	1172	13.90	2.41	-42	slight amber cloudy
2	11:17	0.75L	6.85	6.65	1164	13.90	0.73	-41	amber cloudy
3	11:20	1.2L	6.85	6.64	1148	13.98	0.56	-41	
4	11:23	1.6L	6.87	6.64	1133	14.13	0.37	-42	
5	11:26	2.0L	6.86	6.64	1131	14.18	0.29	-42	✓
6	11:29	2.4L	6.84	6.65	1132	14.25	0.22	-43	↓
7	11:32	2.8L	6.86	6.65	1133	14.43	0.21	-44	↓
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

Turbidity before sample collection (NTU): 74.4 Turbidity after sample collection (NTU): 27.3

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
 (PRINTED NAME)

[Signature]
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

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Office: (503) 670-1108

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(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: G-45

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-45-10101

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY	
WEATHER:	SUNNY			PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE:	50-60	°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/10/11	14:10	22.58	--	5.79	--	16.79		X 1	2.74
/ /	:	.	--	.	--	.		X 3	8.21
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: 22'	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH			
White Poly	10/10/11	15:40	B	3	125, 500, 1L	None	YES	NO	NA	✓	
Yellow Poly	10/10/11	15:40	B	1	250, 500, 1L	H2SO4	YES	NO		✓	
Green Poly	10/10/11	15:40	B	2	125, 500, 1L	NaOH	YES	NO		✓	
Red Diss. Poly	10/10/11	15:40	B	1	250, 500, 1L	HNO ₃	YES	YES		✓	
Amber Glass	/ /	:			250, 500, 1L	None	YES	NO			
Total Bottles (include duplicate count):				7							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Ca) (Cl) (Fe) (Mg) (Mn) (K) (Na) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA								Purge Start Time: 14:16	Hach / YSI	Hach / YSI	times dilution
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Fe++:	Sulfide:	Water Quality
1	14:21	1 gal	7.34	6.38	1101	13.08	0.78	-79	4.8 mg/l	ND mg/l	slight amber tint
2	14:26	3 gal	9.38	6.37	1075	12.55	0.74	-83			
3	14:37	2 gal	14.52	6.39	1062	12.92	0.64	-87			
4	14:45	3 gal	17.73	6.40	1056	12.61	0.65	-85			
5	14:50	4 gal	18.75	6.40	1064	12.51	0.66	-85			
6	14:57	4.5 gal	19.45	6.39	1067	12.58	0.67	-87			
7	15:05	6 gal	20.62	6.34	1062	12.25	0.92	-81			
8	15:13	7 gal	21.35	6.35	1056	12.24	0.90	-80			
9	15:23	8 gal	21.72	6.37	1044	12.46	0.83	-80			
10	15:28	8.5 gal	21.68	6.37	1040	12.54	0.81	-79			
11	:	:	:	:	:	:	:	:			✓
12	:	:	:	:	:	:	:	:			

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 325

Turbidity after sample collection (NTU): 167

Comments: ~~As, Cr, Cu, Ni, Na~~ analyzed for Quarterly Groundwater Monitoring.
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333
Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: G-4d

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: G4-D-101111-

DUP ID:

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 60 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/10/11	:	37.57	--	4.97	--	32.60		X 1	5.31
10/11/11	:	37.57	--	15.83	--	21.75		X 3	15.93

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth:	[if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	10/11/11	10:20	A	(3) 125,500, 1L	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	(1) 250,500, 1L	H2SO4	YES	NO	--	X
Green Poly	/ /	:	↓	(2) 125,500, 1L	NaOH	YES	NO	--	X
Red Diss. Poly	/ /	↓:	↓	(1) 250,500, 1L	HNO3	YES	YES	--	X
Amber Glass	/ /	:		250,500, 1L	None	YES	NO		

Total Bottles (include duplicate count): (7)

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cd) (SO ₄) (E, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ca) (Cd) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 13:55 Fe⁺⁺: 4.5 mg/l Sulfide: 0.01 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	13:59	2.0 g	19.72	6.38	1372	12.32	1.64	-74	brown/grey cloudy
2	14:03	4.0 g	26.95	6.31	1372	12.40	1.23	-69	
3	14:07	5.0 g	31.45	6.39	1370	12.81	1.14	-74	
4	14:10	6.0 g	36.54	6.46	1363	12.65	1.00	-78	
5	: well dry - allow to recharge								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 34.3 Turbidity after sample collection (NTU): 43.2

Comments: ~~As, Cr, Cu, Ni, Na~~ - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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Office: (503) 670-1108

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(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: G5-S

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G5-S-100711

DUP ID:

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTY CLOUDY		CLOUDY		<u>RAIN</u>		TEMPERATURE: °F <u>60</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate units)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/07/11	11:21	21.65	---	12.33	---	9.32		X 1	1.52
/ /	:	.	---	12.50	---	.		X 3	4.56
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	<u>2" = 0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	(if used)
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓		
White Poly	10/07/11	12:50	B	<u>(3)</u> 125, 500, 1L	None	YES	NO	NA		X	
Yellow Poly	/ /	:	↓	<u>(1)</u> 250, 500, 1L	H2SO4	YES	NO	---		X	
Green Poly	/ /	:	↓	<u>(2)</u> 125, 500, 1L	NaOH	YES	NO	---		X	
Red Diss. Poly	/ /	:	↓	<u>(1)</u> 250, 500, 1L	HNO3	YES	YES	---		X	
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO				
Total Bottles (include duplicate count): <u>(7)</u>											

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl)</u> (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	<u>(Total Phosphorus)</u>
	GREEN - Poly	<u>(Total Cyanide)</u> (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	<u>(Al) (Ar) (Ca) (Cl) (Co) (Fe) (Mg) (Mn) (K) (Na) (Si) (Silica)</u> (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA							Purge Start Time: <u>11:26</u> 1131	Fe++: <u>2.16</u> mg/l	Sulfide: _____ mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.45L	12.79	7.70	813	12.39	---	-95.3	clearly, light brown tint
2	0:06	0.7L	12.98	---	---	---	---	---	↓
3	0:09	0.95L	13.11	6.75	761	12.46	1.25	-85.2	↓
4	0:12	1.25L	13.25	6.74	734	12.13	1.07	-74.1	sl. cloudy, light brown tint
5	0:15	1.5L	13.4	6.7	700	11.8	1.00	-68.4	↓
6	0:22	1.65L	17.60	6.55	609	11.31	1.00	-68.4	↓
7	0:44	2.10L	18.80	6.75	639	11.68	1.02	-72.0	clear, colorless
8	1:02	4.65L	18.97	6.76	626	11.68	1.13	-67.5	↓
9	:								
10	:								
11	:								
12	:								

[gallons or liters] Turbidity before sample collection (NTU): 2.72 [Clarity, Color] Turbidity after sample collection (NTU): 1.84

Comments: ~~As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring~~ Pumping rate = 200ml/min = 0.2L/min = 0.0528 GPM
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: G-5D

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-5d-100711

DUP ID: _____

WIND FROM:	N	NE	E	SE	<u>S</u>	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRILY CLOUDY		CLOUDY		RAIN		TEMPERATURE: <u>50-60</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
<u>10/7/11</u>	<u>11:15</u>	<u>37.35</u>	---	<u>11.65</u>	---	<u>25.70</u>		X 1	<u>4.19</u>
/ /	:	.	---	.	---	.		X 3	<u>12.57</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterm (B) Peristaltic Pump (C) Disposable Bailer Sampled via (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: <u>35</u>	[V if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH			
White Poly	<u>10/7/11</u>	<u>11:50</u>	<u>B</u>	<u>3</u> <u>250, 500, 1L</u>	None	YES	NO	NA		✓	
Yellow Poly	<u>10/7/11</u>	<u>11:50</u>	<u>B</u>	<u>1</u> <u>250, 500, 1L</u>	H2SO4	YES	NO			✓	
Green Poly	<u>10/7/11</u>	<u>11:50</u>	<u>B</u>	<u>2</u> <u>125, 500, 1L</u>	NaOH	YES	NO			✓	
Red Diss. Poly	<u>10/7/11</u>	<u>11:50</u>	<u>B</u>	<u>1</u> <u>250, 500, 1L</u>	HNO3	YES	YES			✓	
Amber Glass	/ /	:		<u>250, 500, 1L</u>	None	YES	NO				

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO4) (R, total and dissolved) (alkalinity) (TDS) (TSS)</u>
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>
RED DISSOLVED - Poly	<u>(Al) (As) (Ca) (Cd) (Co) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Ce) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)</u>	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA										Purge Start Time: <u>11:23</u>	Fe++: <u>5.2</u> mg/l	Sulfide: <u>0.03</u> mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality	Hach / YSI	Hach / YSI	times dilution
1	<u>11:27</u>	<u>0.4L</u>	<u>11.7L</u>	<u>7.24</u>	<u>407</u>	<u>11.97</u>	<u>2.57</u>	<u>5.5</u>	<u>clear w/SP</u>			
2	<u>11:31</u>	<u>1.6L</u>	<u>11.73</u>	<u>6.92</u>	<u>416</u>	<u>11.89</u>	<u>1.55</u>	<u>-23</u>	↓			
3	<u>11:35</u>	<u>3.2L</u>	<u>11.73</u>	<u>6.43</u>	<u>456</u>	<u>11.82</u>	<u>0.65</u>	<u>-50</u>	↓			
4	<u>11:39</u>	<u>6.4L</u>	<u>11.74</u>	<u>6.41</u>	<u>467</u>	<u>11.77</u>	<u>0.36</u>	<u>-61</u>	<u>clear, colorless</u>			
5	<u>11:43</u>	<u>9.6L</u>	<u>11.74</u>	<u>6.37</u>	<u>466</u>	<u>11.75</u>	<u>0.47</u>	<u>-64</u>	↓			
6	<u>11:47</u>	<u>12.8L</u>	<u>11.74</u>	<u>6.37</u>	<u>464</u>	<u>11.77</u>	<u>0.47</u>	<u>-67</u>	↓			
7	:											
8	:											
9	:											
10	:											
11	:											
12	:											

[gallons or liters] Turbidity before sample collection (NTU): 4.35 [Clarity, Color] Turbidity after sample collection (NTU): 2.63

Comments: As, Cr, Cu, Ni, Pb analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum
SP = suspended particles

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME)
 _____ (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: 66-5

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: 66-5-101011

DUP ID:

WIND FROM:	N	NE	E	<u>SE</u>	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY			PRTLY CLOUDY		CLOUDY		<u>RAIN</u>		TEMPERATURE: °F	<u>55</u> °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit] [Water Column x Gal/ft]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)	
10/10/11	12:20	22.65	---	18.37	---	4.29			X 1	0.70
/ /	:	.	---	.	---	.			X 3	2.10
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[If used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓		
White Poly	10/10/11	12:50	B	(3) 125, 500, 1L	None	YES	NO	NA		X	
Yellow Poly	/ /	:	↓	(1) 250, 500, 1L	H2SO4	YES	NO	---		X	
Green Poly	/ /	:	↓	(2) 125, 500, 1L	NaOH	YES	NO	---		X	
Red Diss. Poly	/ /	:	↓	(1) 250, 500, 1L	HNO3	YES	YES	---		X	
Amber Glass	/ /	:	↓	(2) 250, 500, 1L	None	YES	NO	---		X	
Total Bottles (include duplicate count):				9							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (Ca) (Cd) (Fe) (Mg) (Mn) (K) (Na) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 12:24 Fe++: 0.8 mg/l Sulfide: 0.05 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:07	0.3L	18.38	7.00	1743	13.57	---	-239	clear, light amber tint
2	0:06	0.6L	18.38	7.49	3113	13.00	2.05	-45.7	↓ ↓
3	0:09	0.9L	18.39	7.57	3116	12.93	1.32	-25.0	↓ ↓
4	0:12	1.35L	18.39	7.60	3110	12.86	1.13	-13.2	↓ ↓
5	0:15	1.75L	18.39	7.65	3051	12.94	0.96	-0.7	↓ ↓
6	0:18	2.15L	18.39	7.71	2996	12.97	0.87	34.6	↓ ↓
7	0:21	2.60L	18.39	7.73	2946	12.91	0.81	37.1	↓ ↓
8	0:24	3.0L	18.39	7.75	2917	12.88	0.79	48.3	↓ ↓
9	0:27	3.45L	18.40	7.75	2892	12.79	0.80	58.7	↓ ↓
10	0:30	3.85L	18.40	7.75	2863	12.77	0.84	72.9	↓ ↓
11	0:33	4.4L	18.40	7.75	2843	12.79	0.85	80.9	↓ ↓
12	:	:	:	:	:	:	:	:	↓ ↓

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 4.07

Turbidity after sample collection (NTU): 3.33

Comments: ~~As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring~~
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon

(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: ~~66-66~~ ~~66-66~~ 66-D

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: ~~66-66~~ 101011

DUP ID:

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	LIGHT	<u>MEDIUM</u>	HEAVY
WEATHER:	SUNNY		PRTY CLOUDY		CLOUDY		<u>RAIN</u>		TEMPERATURE: <u>50</u> °F <u>50</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate units)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/10/11	12:20	37.65	--	21.68	--	15.37		X 1	2.51
/ /	:	.	--	.	--	.		X 3	7.53
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth:		(√ if used)
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH		√
White Poly	10/10/11	13:00	B	3' (125) 500, 1L	None	YES	<u>NO</u>	NA		✓
Yellow Poly	10/10/11	13:00	↓	1 (250) 500, 1L	H2SO4	YES	NO			✓
Green Poly	10/10/11	13:00	↓	2 (125) 500, 1L	NaOH	YES	<u>NO</u>			✓
Red Diss. Poly	10/10/11	13:00	✓	1 (250) 500, 1L	HNO ₃	YES	<u>YES</u>			✓
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO			
Total Bottles (include duplicate count):				7						

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cd) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Ca) (Fe) (Mn) (K) (Na) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 12:24 Fe++: 4.0 mg/l Sulfide: 0.02 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	12:27	0.5L	21.82	6.63	2853	13.17	1.84	-68	clear, colorless ↓
2	12:30	1.0L	21.84	6.57	2917	12.84	1.13	-68	
3	12:33	1.7L	21.83	6.54	2943	12.87	1.36	-67	
4	12:36	2.3L	21.83	6.52	2991	12.75	1.34	-67	
5	12:39	2.9L	21.83	6.52	2996	12.80	1.32	-66	
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 1.54

Turbidity after sample collection (NTU): 1.64

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: ~~6-7-D~~ **67-D**

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: ~~67-D-1007-11~~ **67-D-1007-11**

DUP ID:

WIND FROM:	N	NE	E	SE	no wind	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRITLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F 55 °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/06/11	16:33	32.81	--	11.05	--	21.76		X 1	3.55
10/17/11	09:02	32.81	--	15.16	--	17.65		X 3	10.65
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled (4) **Purge** (if used)

GROUNDWATER SAMPLING DATA										Sample Depth:
Bottle Type	Date	Time	Method §	Amount & Volume mL		Preservative [circle]	Ice	Filter	pH	✓
White Poly	10/07/11	09:10	A	3	125, 500, 1L	None	YES	NO	NA	X
Yellow Poly	//	:	↓	1	250, 500, 1L	H2SO4	YES	NO	--	X
Green Poly	//	:	↓	2	125, 500, 1L	NaOH	YES	NO	--	X
Red Diss. Poly	//	:	↓	1	250, 500, 1L	HNO3	YES	YES	--	X
Amber Glass	//	:			250, 500, 1L	None	YES	NO		
Total Bottles (include duplicate count):				7						

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (E, total and dissolved) (alkalinity) (TDS) (TS9)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (As) (Ca) (Cd) (Co) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA			Purge Start Time: 16:39	Fe++: 6.2 mg/l	Sulfide: 0.02 mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.3L	11.91	6.72	723	13.35	--	-716	clear, colorless
2	0:06	0.5L	12.09	6.70	1440	13.34	3.63	-527	sl. cloudy, yellow tint
3	0:09	0.65L	12.30	6.68	1508	13.33	2.14	-787	↓ ↓
4	0:12	Could not low-flow-purging				3 casing volumes			
5	→	3.66	28.54	6.73	1396	12.79	0.40	-527	clear, colorless
6	→	7.24	28.37	6.73	1467	12.66	0.61	-108	slight grey tint
7	:	well dry - allow to recharge							
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): **140** Turbidity after sample collection (NTU): **21.9**

Comments: ~~As, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring~~ **Purge slower - want to go dry and can purge 3x casing volume.**

Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matthew Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: R-15-R-15

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: R-15-100511

DUP ID:

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 60 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]		[Water Column]		[Circle appropriate units] [Water Column x Gal/ft]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW					Volume (gal)	
10/5/11	08:48	12.55	--	5.44	--	7.11				X 1	1.16	
/ /	:	.	--	.	--	.				X 3	3.48	

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:		(√ if used)
Bottle Type	Date	Time	Method §	Amount & Volume mL		Preservative [circle]	Ice	Filter	pH	√		
White Poly	10/5/11	09:35	B	3	125, 500, 1L	None	YES	NO	(NA)	X		
Yellow Poly	/ /	:	B	1	250, 500, 1L	H2SO4	YES	NO	--	X		
Green Poly	/ /	:	B	2	125, 500, 1L	NaOH	YES	NO	--	X		
Red Diss. Poly	/ /	↓	B	1	250, 300, 1L	HNO3	YES	YES	--	X		
Amber Glass	√ /	√ :	B	2	250, 500, 1L	None	YES	NO	--	X		

Total Bottles (include duplicate count): 9

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (E, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Mg) (Mn) (Ni) (Pb) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (As) (Ca) (Cd) (Co) (Fe) (Mg) (Mn) (Ni) (Pb) (Se) (Tl) (V) (Zn) (Hg) (Hardness)

Amber Glass RAHS by 8270C SIM Hach / YSI Hach (YSI) 1 times dilution

WATER QUALITY DATA										Purge Start Time: <u>09:56</u>	Fe++: <u>3.4</u> mg/l	Sulfide: <u>0.17</u> mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality			
1	0:03	0.3	5.54	8.04	1162	13.60	--	-156.0	clear, colorless			
2	0:06	0.6	5.55	7.83	1208	13.62	1.44	-166.5	↓ ↓			
3	0:09	0.9	5.56	7.75	1190	13.62	0.45	-166.7	↓ ↓			
4	0:12	1.2	5.57	7.72	1105	13.67	0.37	-160.9	↓ ↓			
5	0:15	1.5	5.57	7.72	1019	13.73	0.37	-155.7	↓ ↓			
6	0:18	1.9	5.57	7.71	908	13.79	0.39	-154.0	↓ ↓			
7	0:21	2.3	5.58	7.66	805	13.84	0.38	-151.9	↓ ↓			
8	0:24	2.7	5.58	7.60	722	13.88	0.39	-149.2	↓ ↓			
9	0:27	3.1	5.57	7.53	665	13.93	0.37	-157.3	↓ ↓			
10	0:30	3.5	5.57	7.49	623	13.96	0.36	-149.8	↓ ↓			
11	0:33	3.9	5.57	7.43	591	14.01	0.35	-147.9	↓ ↓			
12	0:36	4.3	5.57	7.40	574	13.94	0.39	-144.8	↓ ↓			

13 0:39 4.3 gallons of liters 5.57 7.37 555 14.05 0.35 -146.3 ↓ Clarity, Color
Turbidity before sample collection (NTU): 2.01 Turbidity after sample collection (NTU): 1.92

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: R-1D

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: A-11-100511

DUP ID:

WIND FROM:	N	NE	<u>E</u>	SE	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTY CLOUDY		<u>CLOUDY</u>			RAIN		TEMPERATURE (°F)	<u>50.5</u> °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/5/11	08:47	24.82	--	6.70	--	18.12		X 1	0.74
10/5/11	15:58	24.82	--	8.06	--	16.76		X 3	2.23
Gal/ft = (dia./2) ² x 0.163		1" = <u>0.041</u>	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	[√ if used]
White Poly	10/5/11	16:10	A	32 (15) 500, 1L	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	1 250, 500, 1L	H2SO4	YES	NO	--	X
Green Poly	/ /	:	↓	2 125, 500, 1L	NaOH	YES	NO	--	X
Red Diss. Poly	/ /	:	↓	1 250, 500, 1L	HNO3	YES	YES	--	X
Amber Glass	/ /	:	↓	2 250, 500, 1L	None	YES	NO	--	X

Total Bottles (include duplicate count):

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (As) (Ca) (Cd) (Co) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 09:10 Fe++: 5.0 mg/l Sulphide: ND mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality	
1	09:12	2.42L	13.64	6.67	2074	12.67	2.20	-127	slight yellow tint ↓ light yellow cloudy	
2	09:15	4.72L	18.57	6.58	2056	12.58	0.96	-127		
3	09:18	5.52L	21.05	6.57	2037	12.52	0.79	-126		
4	09:20	6.52L	22.47	6.57	2030	12.54	0.67	-123		
5	09:23	8.02L	23.69	6.57	2012	12.55	0.61	-118		
6	09:24	Well dry - allow to recharge								
7	:									
8	:									
9	:									
10	:									
11	:									
12	:									

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 83.9 Turbidity after sample collection (NTU): 72.0

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME) Matt Wilson (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: R-2

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: R-2-1005-11

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>60</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							Product Thickness	Water Column	[Circle appropriate units] [Water Column x Gal/ft]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)	
10/05/11	14:43	14.86	--	6.80	--	8.06			X 1	1.31
/ /	:	:	--	--	--	--			X 3	3.93
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: [V if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
White Poly	10/05/11	15:15	B	3 (125) 500, 1L	None	YES	NO	NA	✓
Yellow Poly	/ /	:	↓	1 (250) 500, 1L	H2SO4	YES	NO	---	X
Green Poly	/ /	:	↓	2 (125) 500, 1L	NaOH	YES	NO	---	X
Red Diss. Poly	/ /	:	↓	1 (250) 500, 1L	HNO3	YES	YES	---	X
Amber Glass	/ /	:	↓	2 250, 500 (1L)	None	YES	NO	---	X

Total Bottles (include duplicate count): 9

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorous)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (As) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Mg) (Mn) (Ni) (Na) (Pb) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 14:45 Fe++: 4.0 mg/l Sulfide: NI mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.7	7.04	8.18	778	11.44	0.86	-128.5	clear, colorless
2	0:06	1.3	3.94	7.30	648	11.48	0.86	-100.4	↓ ↓
3	0:09	1.6	6.99	6.96	629	11.50	0.57	-98.4	↓ ↓
4	0:12	2.05	7.05	6.80	583	11.49	0.43	-86.9	↓ ↓
5	0:15	2.5	7.05	6.76	559	11.56	0.41	-88.3	↓ ↓
6	0:18	2.95	7.05	6.71	537	11.63	0.35	-100.4	↓ ↓
7	0:21	3.4	7.05	6.70	523	11.67	0.33	-106.6	↓ ↓
8	0:24	3.8	7.07	6.69	510	11.71	0.31	-106.1	↓ ↓
9	:								
10	:								
11	:								
12	:								

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 23.1 Turbidity after sample collection (NTU): 19.9

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
 (PRINTED NAME)

Matt Wilson
 (SIGNATURE)

FIELD SAMPLING DATA SHEET

** * **



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: R-3

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: R-3-100511

DUP ID: R-53-100511 (1325)

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 60 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate units] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
10/05/11	12:05	24.65	---	3.48	---	21.17	X 1 3.45
/ /	:	---	---	---	---	---	X 3 10.35

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: [] [If used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
White Poly	10/05/11	12:40	B	3 (125, 500, 1L)	None	YES	NO	NA	X
Yellow Poly	/ /	13:20		1 (250, 500, 1L)	H2SO4	YES	NO	---	X
Green Poly	/ /	↓		2 (125, 500, 1L)	NaOH	YES	NO	---	X
Red Diss. Poly	/ /	↓		1 (250, 500, 1L)	HNO3	YES	YES	---	X
Amber Glass	N /	↓		2 (250, 500, 1L)	None	YES	NO	---	X

Total Bottles (include duplicate count): 9 (18)

Analysis Allowed per Bottle Type	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
WHITE - Poly	(Total CD) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorous)
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (As) (Ca) (Cd) (Co) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	EAHS by 8270C SIM Hach / YSI Hach YSI 10 times dilution

WATER QUALITY DATA Purge Start Time: 12:08 Fe++: 0.4 mg/l Sulfide: 3.20 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.5	4.05	10.28	22830	14.63	---	-347.8	cloudy opaque
2	0:06	0.8	4.09	10.15	22940	14.80	0.32	-387.8	↓ ↓
3	0:09	1.1	4.10	10.15	23050	14.92	0.17	-420.8	↓ ↓
4	0:12	1.4	4.09	10.16	23030	14.95	0.13	-432.6	↓ ↓
5	0:15	1.8	4.15	10.15	23010	14.90	0.10	-449.5	↓ ↓
6	0:18	2.2	4.19	10.14	22970	14.82	0.09	-458.5	↓ ↓
7	0:21	2.6	4.21	10.14	22830	14.87	0.07	-466.1	↓ ↓
8	0:24	3.1	4.15	10.14	22770	14.83	0.09	-475.9	↓ ↓
9	0:27	3.4	4.19	10.15	22710	14.57	0.07	-482.6	↓ ↓
10	0:30	3.7	4.23	10.15	22680	14.14	0.11	-488.7	↓ ↓
11	0:45	3.5	10.09	10.08	22230	13.26	0.07	-508.6	↓ ↓
12	---	7.0	10.10	10.11	22180	13.08	0.07	-517.5	↓ ↓

could not low-flow

Turbidity before sample collection (NTU): 1.69 Turbidity after sample collection (NTU): 1.52

Comments: As, Cl, Cu, Ni, Pb - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum
Could not low-flow sample, purged 3 casing volumes.

SAMPLER: Matt Wilson/Doug Laffoon
 (PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: R-45

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: R-45-100511

DUP ID:

WIND FROM:	N	NE	<u>(E)</u>	SE	S	SW	W	NW	<u>(LIGHT)</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>(CLOUDY)</u>		RAIN		TEMPERATURE (°F)	<u>50.5</u> °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]	
									Volume (gal)	
10/5/11	09:40	19.56	--	08.88	--	11.28			X 1	1.84
10/05/11	16:40	19.56	--	13.11	--	6.45			X 3	5.52
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>(0.163)</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Watterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL		Preservative [circle]	Ice	Filter	pH		
White Poly	10/05/11	16:40	B	3	<u>(125)</u> 500, <u>(1)</u>	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>	<u>(NA)</u>	<u>(X)</u>	
Yellow Poly	1/1	:	1	1	<u>(250)</u> 500, 1L	<u>(H2SO4)</u>	<u>(YES)</u>	<u>(NO)</u>	--	<u>(X)</u>	
Green Poly	1/1	:	2	2	<u>(125)</u> 500, 1L	<u>(NaOH)</u>	<u>(YES)</u>	<u>(NO)</u>	--	<u>(X)</u>	
Red Diss. Poly	1/1	:	1	1	<u>(250)</u> 500, 1L	<u>(HNO3)</u>	<u>(YES)</u>	<u>(YES)</u>	--	<u>(X)</u>	
Amber Glass	1/1	↓:	↓	2	250, 500, 1L	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>	--	<u>(X)</u>	
Total Bottles (include duplicate count):				9							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cd)</u> (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide)</u> (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	<u>(Al)</u> (As) (Ca) (Fe) (Pb) (Mg) (Mn) (K) (Na) (Ni) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 09:48 Fe++: 2.0 mg/l Sulfide: ND mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality	
1	09:51	2.25L	11.84	6.98	1980	12.99	1.23	-148	light orange opaque	
2	09:54	4.52	14.83	6.90	1847	13.23	0.72	-147	↓	
3	09:57	6.75L	17.33	6.88	1767	13.53	0.53	-140	very light orange opaque	
4	09:59	8.25L	19.25	6.88	1735	13.56	0.49	-135	↓	
5	10:00	well dry - allow to recharge								
6	:									
7	:									
8	:									
9	:									
10	:									
11	:									
12	:									

Turbidity before sample collection (NTU): 37.8 Turbidity after sample collection (NTU): 28.1

Comments: ~~As, Cr, Cu, Ni, Pb analyzed for Quarterly Groundwater Monitoring~~
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME) Matt Wilson (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: R-4D

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: R-4D-100511

DUP ID:

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 60 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/05/11	10:37	29.05	---	9.01	---	20.04		X 1	0.82
/ /	:	---	---	---	---	---		X 3	2.46
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method ^s	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	[√ if used]	
White Poly	10/05/11	11:10	B	3 (125, 500, 1L)	None	YES	NO	NA	X	
Yellow Poly	/ /	:	↓	1 (250, 500, 1L)	H2SO4	YES	NO	---	X	
Green Poly	/ /	:	↓	2 (125, 500, 1L)	NaOH	YES	NO	---	X	
Red Diss. Poly	/ /	:	↓	1 (250, 500, 1L)	HNO3	YES	YES	---	X	
Amber Glass	N/A	↓:	↓	2 (250, 500, 1L)	None	YES	NO	---	X	
Total Bottles (include duplicate count):				9						

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorous)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (As) (Ca) (Cd) (Co) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 10:42 Fe++: 4.5 mg/l Sulfide: N/D mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	→	0.9	18.04	6.58	1218	12.96	1.68	-88.9	sl cloudy, h yellow tint
2	→	1.8	17.91	6.71	1199	12.81	1.26	-96.8	↓ ↓
3	→	2.7	17.86	6.69	1159	12.80	1.03	-100.4	↓ ↓
4	:	
5	:	
6	:	
7	:	
8	:	
9	:	
10	:	
11	:	
12	:	

[gallons or liters] 41.3 [Clarity, Color] 5.25

Turbidity before sample collection (NTU): 41.3 Turbidity after sample collection (NTU): 5.25

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
 Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME) Matt Wilson (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: RL-15

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: RL-15-1006H

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY			PRTLY CLOUDY		CLOUDY			RAIN		TEMPERATURE: °F

high 50s° °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/5/11	10:56	19.06	--	10.03	--	9.03		X 1	1.47
10/06/11	08:40	19.06	--	9.90	--	9.16		X 3	4.41

Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
--	------------	------------	------------	------------	------------	-------------	-------------

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 18' [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	10/06/11	08:50	B	3 (125, 500, 1L)	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	1 (250, 500, 1L)	H2SO4	YES	NO	--	X
Green Poly	/ /	:	↓	2 (125, 500, 1L)	NaOH	YES	NO	--	X
Red Diss. Poly	↓	↓	↓	1 (250, 500, 1L)	HNO3	YES	YES	--	X
Amber Glass	↓	↓	↓	250, 500, 1L	None	YES	NO		

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total C) (SO ₄) (E, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorus)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)

PAHS by 8270C SIM Hach YSI Sulfide: 0.02 mg/l

WATER QUALITY DATA			Purge Start Time: 10:58	Fe++: 4.3 mg/l	Sulfide: 0.02 mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	11:02	2 L	14.84	6.51	383	12.09	0.33	38	cloudy orange
2	11:06	4 L	18.50	6.34	410	12.13	0.48	39	light cloudy orange
3	11:07	well dry - allow to recharge							
4	:								
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 6.89 Turbidity after sample collection (NTU): 17.3

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: RL-1d

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: RL-1D-100611

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: <u>F 50.5</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/5/11	10:19	8.87	---	39.40	---	30.53			X 1
10/06/11	09:03	39.40	---	16.46	---	22.94			X 3
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS (A) Water (B) Peristaltic Pump (C) Disposable Boiler Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: [] [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	
White Poly	10/06/11	09:10	BA	3 (125, 500, 1L)	None	YES	NO	NA	√
Yellow Poly	/ /	:	↓	(1) (250, 500, 1L)	H2SO4	YES	NO	-	X
Green Poly	/ /	:	↓	(2) (125, 500, 1L)	NaOH	YES	NO	-	X
Red Diss. Poly	/ /	:	↓	(1) (250, 500, 1L)	HNO3	YES	YES	-	X
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)

WATER QUALITY DATA Purge Start Time: 10:21 Fe++: 4.4 mg/l Sulfide: ND mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality	
1	10:25	1 gal	17.23	6.54	1329	11.81	5.01	-89	very cloudy grey	
2	10:29	2 gal	20.05	6.58	1316	11.82	5.45	-88	↓	
3	10:34	3.25 gal	26.42	6.60	1300	11.89	5.03	-82	dark cloudy grey	
4	10:39	4.0 gal	29.44	6.61	1290	11.94	4.42	-77	↓	
5	10:44	4.75 gal	32.30	6.60	1283	12.40	5.83	-69	↓	
6	10:46	well dry allow to recharge RL								
7	10:49	5.5 gal	36.72	6.65	1268	12.40	6.60	-62	very dark cloudy	
8	10:52	well dry allow to recharge								
9	:									
10	:									
11	:									
12	:									

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 354

Turbidity after sample collection (NTU): 61.9

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: RL-25

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: RL-25-1006-11

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRITLY CLOUDY		CLOUDY			RAIN		TEMPERATURE: 60	60.5 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
									Volume (gal)
10/5/14	11:37	19.78	---	9.37	---	10.41		X 1	1.7
10/06/11	10:35	19.78	---	9.25	---	10.53		X 3	5.09
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	10/06/11	11:00	B	3 (25, 500, 1L)	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	(1) 250, 500, 1L	H2SO4	YES	NO	---	X
Green Poly	/ /	:	↓	(2) 125, 500, 1L	NaOH	YES	NO	---	X
Red Diss. Poly	/ /	↓	↓	(1) 250, 500, 1L	HNO3	YES	YES	---	X
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		
Total Bottles (include duplicate count):				7					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (E, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (As) (Ca) (Cd) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA			Purge Start Time: 11:47	Fe++: 0.2 mg/l	Sulfide: 2.70 mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	11:51	3 L	13.40	9.49	5150	12.65	0.25	-147	black opaque
2	11:54	5.5 L	15.48	9.52	5194	12.96	0.16	-177	↓
3	11:57	7 L	17.72	9.65	5386	13.02	0.18	-179	↓
4	11:59	8.5 L	19.06	9.68	547	13.03	0.6	-179	↓
5	12:00	well dry - allow to recharge							
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

Turbidity before sample collection (NTU): 5.54 Turbidity after sample collection (NTU): 6.75

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME) Matt Wilson (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: RL-2D

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: RL-2D-100611-

WIND FROM: N NE E SE NO WIND SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 60 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/06/11	10:37	33.00	---	8.89	---	24.11		X 1	3.93
/ /	:	.	---	.	---	.		X 3	11.79
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterfall (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth:	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	10/06/11	12:00	A	(3) 125, 500, 1L	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	(1) 250, 300, 1L	H2SO4	YES	NO	-	X
Green Poly	/ /	:	↓	(2) 125, 500, 1L	NaOH	YES	NO	-	X
Red Diss. Poly	/ /	:	↓	(1) 250, 300, 1L	HNO3	YES	YES	-	X
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorous)	
GREEN - Poly	(Total Cyanide) (free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 10:55 Fe++: 4.3 mg/l Sulfide: 0.07 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	✓	4.06	18.12	7.04	3068	12.03	1.46	-108.4	clear, dark amber color
2	✓	8.06	---	6.87	2631	11.55	0.30	-137.0	↓ amber color
3	✓	12.06	18.23	6.85	2596	11.72	0.24	-146.5	↓ ↓
4	:								
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 5.15

Turbidity after sample collection (NTU): 5.65

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
 Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
 (PRINTED NAME)

[Signature]
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: RL-35

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: RL-35-100611-

DUP ID:

WIND FROM:	N	NE	E	SE	<u>NO wind</u>	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>CLOUDY</u>		RAIN		TEMPERATURE: °F <u>60</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
									Volume (gal)
10/06/11	14:38	19.81	---	7.85	---	11.96			X 1
/ /	:	.	---	.	---	.			X 3
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterfall (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: [] [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
White Poly	10/06/11	15:10	<u>B</u>	<u>(3)</u> (125,500, 1L)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	X
Yellow Poly	/ /	:	<u>B</u>	<u>(1)</u> (250,500, 1L)	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	---	X
Green Poly	/ /	:	<u>B</u>	<u>(2)</u> (125,500, 1L)	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	---	X
Red Diss. Poly	<u>✓</u>	:	<u>✓</u>	<u>(1)</u> (250,500, 1L)	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	---	X
Amber Glass	/ /	:		250,500, 1L	None	YES	NO		

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorous)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 14:44 Fe⁺⁺: 5.0 mg/l Sulfide: NA mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.5L	8.35	6.90	1630	13.57	4.03	-120.1	sl cloudy, no color
2	0:06	0.85L	8.42	6.83	1650	13.56	1.00	-120.2	clear, no color
3	0:09	1.25L	8.44	6.80	1664	13.46	0.78	-119.5	↓ ↓
4	0:12	1.55L	8.33	6.83	1664	13.49	0.60	-121.1	↓ ↓
5	0:15	1.9L	8.38	6.86	1664	13.54	0.49	-116.3	↓ ↓
6	0:18	2.4L	8.39	6.89	1666	13.53	0.42	-105.5	↓ ↓
7	0:21	2.75L	8.39	6.91	1661	13.54	0.41	-98.7	↓ ↓
8	0:		.	.		.			
9	:		.	.		.			
10	:		.	.		.			
11	:		.	.		.			
12	:		.	.		.			

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 5.43

Turbidity after sample collection (NTU): 4.74

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: RL-3d

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: RL-3D-100611

DUP ID:

WIND FROM:	N	NE	<u>E</u>	<u>SE</u>	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>CLOUDY</u>		<u>RAIN</u>		TEMPERATURE: <u>50-60</u> °F °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/A]
<u>10/5/11</u>	<u>12:13</u>	<u>39.23</u>	---	<u>7.38</u>	---	<u>31.85</u>			X 1
/ /	:	.	---		---				X 3
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	<u>2" = 0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	Volume (gal)
									<u>5.19</u>
									<u>15.57</u>

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH			
White Poly	<u>10/05/11</u>	<u>12:40</u>	<u>A</u>	<u>(3)</u> <u>(125, 500, 1L)</u>	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>		<u>X</u>	
Yellow Poly	/ /	:	↓	<u>(1)</u> <u>(250, 500, 1L)</u>	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	---		<u>X</u>	
Green Poly	/ /	:	↓	<u>(2)</u> <u>(125, 500, 1L)</u>	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	---		<u>X</u>	
Red Diss. Poly	/ /	:	↓	<u>(1)</u> <u>(250, 500, 1L)</u>	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	---		<u>X</u>	
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO				
Total Bottles (include duplicate count):				<u>7</u>							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl)</u> (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide)</u> (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RBD TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RBD DISSOLVED - Poly	<u>(Al)</u> (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Sulfate) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA										Purge Start Time: <u>12:19</u>	Fe++: <u>6.2</u> mg/l	Sulfide: <u>ND</u> mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality			
1	<u>12:24</u>	<u>1 g</u>	<u>14.98</u>	<u>6.56</u>	<u>1323</u>	<u>12.49</u>	<u>0.55</u>	<u>-87</u>	<u>tan cloudy</u>			
2	<u>12:27</u>	<u>2 g</u>	<u>20.42</u>	<u>6.55</u>	<u>1265</u>	<u>12.43</u>	<u>0.35</u>	<u>-82</u>	<u>dark tan grey cloudy</u>			
3	<u>12:34</u>	<u>2.7 g</u>	<u>25.74</u>	<u>6.57</u>	<u>1287</u>	<u>12.37</u>	<u>0.30</u>	<u>-80</u>	<u>dark tan/grey cloudy</u>			
4	<u>12:39</u>	<u>3.5 g</u>	<u>30.19</u>	<u>6.60</u>	<u>1213</u>	<u>12.39</u>	<u>0.28</u>	<u>-79</u>				
5	<u>12:34</u>	<u>4.2 g</u>	<u>34.25</u>	<u>6.63</u>	<u>1186</u>	<u>12.44</u>	<u>0.25</u>	<u>-70</u>				
6	<u>12:37</u>	<u>4.8 g</u>	<u>37.90</u>	<u>6.65</u>	<u>1165</u>	<u>12.51</u>		<u>-62</u>				
7	<u>12:51</u>	<u>well dry - allow to recharge</u>										
8	:											
9	:											
10	:											
11	:											
12	:											

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 303

Turbidity after sample collection (NTU): 64.5

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: RL-4D

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: RL-4D-10

DUP ID:

WIND FROM:	N	NE	E	SE	<u>NO wind</u>	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PARTLY CLOUDY		<u>CLOUDY</u>		RAIN		TEMPERATURE: °F <u>60</u> °C			

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DIB-DTW			Volume (gal)
10/06/11	13:21	39.60	---	9.05	---	30.55		X 1	4.98
10/06/11	14:29	42.42	---	---	---	---		X 3	14.94
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL		Preservative (circle)	Ice	Filter	pH	√	
White Poly	10/06/11	14:10	A	3	<u>125, 500, 1L</u>	None	YES	NO	NA	X	
Yellow Poly	/ /	:	↓	1	250, 500, 1L	H2SO4	YES	NO	---	X	
Green Poly	/ /	:	↓	2	125, 500, 1L	NaOH	YES	NO	---	X	
Red Diss. Poly	/ /	:	↓	1	250, 500, 1L	HNO3	YES	YES	---	X	
Amber Glass	/ /	:			250, 500, 1L	None	YES	NO			

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorous)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(AD) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 13:33 Fe++: 1.6 mg/l Hach / YSI Sulfide: ND mg/l Hach (YSI) 1 times dilution

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	---	5.0	19.08	6.52	671	13.47	0.99	-72.8	cloudy, brown
2	---	10.0	21.32	6.61	673	13.36	0.64	-85.2	↓ ↓ ↓
3	---	15.0	22.22	6.62	674	13.30	0.55	-88.8	↓ ↓
4	:		.	.					
5	:		.	.					
6	:		.	.					
7	:		.	.					
8	:		.	.					
9	:		.	.					
10	:		.	.					
11	:		.	.					
12	:		.	.					

[gallons or liters] Turbidity before sample collection (NTU): 1710 Turbidity required 2X dilution [Clarity, Color] Turbidity after sample collection (NTU): 1676

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME) Matthew Wilson (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: RL-5

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: RL-5-10

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>55</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/06/11	15:45	23.30	--	15.92	--	7.38		X 1	1.20
10/07/11	08:36	23.48	--	16.80	--	6.66		X 3	3.60
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: [] [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	
White Poly	10/6/11	08:40	B	38 (125,500, 1L)	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	1 (250,500, 1L)	H2SO4	YES	NO	--	X
Green Poly	/ /	:	↓	2 (125,500, 1L)	NaOH	YES	NO	--	X
Red Diss. Poly	/ /	:	↓	1 (250,500, 1L)	HNO3	YES	YES	--	X
Amber Glass	/ /	:		250,500, 1L	None	YES	NO		

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	WHITE - Poly	(Total Cl) (SO_{4}) (I, total and dissolved) (alkalinity) (TDS) (TSS)
YELLOW - Poly	YELLOW - Poly	(Total Phosphorous)
GREEN - Poly	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
RED TOTAL - Poly	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	RED DISSOLVED - Poly	(Al) (Mn) (Ca) (Fe) (Mg) (Mn) (K) (Na) (Si) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
AMBER GLASS	AMBER GLASS	PAHS by 8270C SIM <u>602-leave as is</u> Hach YSI <u>1</u> times dilution

WATER QUALITY DATA

Purge Start Time: 15:47 Fe++: 0.2 mg/l Sulfide: 0.02 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.4L	16.11	7.71	652	12.66	--	17.1	clear, colorless
2	0:06	0.6L	16.24	6.87	702	12.36	1.17	36.6	↓ ↓
3	0:09	0.85L	16.32	6.69	692	12.28	0.94	43.3	↓ ↓
4	0:12	1.10L	16.41	6.51	688	12.23	0.80	45.5	↓ ↓
5	0:15	1.30L	16.50	6.82	687	12.21	0.79	43.7	↓ ↓
6	:		could not	low-flow					
7	+	1.26	21.40	6.19	628	11.04	0.72	78.9	↓ ↓
8	:	1.56	DRY	6.49	628	11.01	1.03	82.5	↓ ↓
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 105

Turbidity after sample collection (NTU): 15.0

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
leave as is
 Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon

(PRINTED NAME)

(SIGNATURE)

could not low flow - purging 3 casing volumes - purged dry and 65 gallons
Matthew Wick

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: RLSW-1

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: RLSW-1-1010-11

DUP ID:

WIND FROM:	N	NE	E	<u>SE</u>	S	SW	W	NW	LIGHT	<u>MEDIUM</u>	HEAVY	
WEATHER:	SUNNY			<u>PRILY CLOUDY</u>		CLOUDY		RAIN		TEMPERATURE:	° F <u>55</u>	° C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/10/11	11:03	19.91	--	9.30	--	10.59		X 1	0.83
/ /	:	<u>1.05" = 0.078</u>						X 3	2.49
Gal/ft = (dia./2) ² x 0.163		1" = <u>0.041</u>	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth:		[If used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√	
White Poly	10/10/11	11:30	B	(3) 125, 500, 1L	None	YES	NO	NA	X	
Yellow Poly	/ /	:	↓	(1) 250, 500, 1L	H2SO4	YES	NO	-	X	
Green Poly	/ /	:	↓	(2) 125, 500, 1L	NaOH	YES	NO	-	X	
Red Diss. Poly	/ /	:	↓	(1) 250, 300, 1L	HNO3	YES	YES	-	X	
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO			

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	White - Poly	(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorus)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (M) (Ca) (Mg) (Fe) (Mn) (K) (Na) (Si) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 11:08 Fe++: 4.0 mg/l Sulfide: ND mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.25 L	9.48	7.18	1224	13.77	-	-65.4	clear, colorless, light turbidity
2	0:06	0.6 L	9.45	7.14	2432	13.55	2.37	-110.5	↓ ↓
3	0:09	0.95 L	9.46	7.12	2439	13.53	0.87	-118.0	↓ ↓
4	0:12	1.25 L	9.46	7.11	2438	13.60	0.48	-117.8	↓ ↓
5	0:15	1.65 L	9.53	7.12	2438	13.66	0.42	-117.9	↓ ↓
6	0:18	2.05 L	9.54	7.12	2436	13.65	0.40	-118.1	↓ ↓
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 104

Turbidity after sample collection (NTU): 24.2

Comments: ~~As, Cr, Cu, Ni, Na~~ - analyzed for Quarterly Groundwater Monitoring

Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon

(PRINTED NAME)

Matt Wilson

(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: RLSW-2

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: RLSW-2-10111

DUP ID:

WIND FROM:	N	NE	E	<u>SE</u>	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>CLOUDY</u>		RAIN		TEMPERATURE: °F <u>55</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate units] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DIP-DTW	DTB-DTW	Volume (gal)	
10/10/11	10:32	19.87	---	11.03	---	8.84	X 1 0.69	
10/11/11	09:11	<u>1.25" = 0.078</u>	---	11.50	---	8.37	X 3 2.07	
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√
White Poly	10/11/11	09:10	B	(3) 125, 500, 1L	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	(1) 250, 500, 1L	H2SO4	YES	NO	---	X
Green Poly	/ /	:	↓	(2) 125, 500, 1L	NaOH	YES	NO	---	X
Red Diss. Poly	/ /	:	↓	(1) 250, 500, 1L	HNO3	YES	YES	---	X
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		

Total Bottles (include duplicate count): (7)

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorous)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (3) (Ca) (4) (4) (Fe) (Mg) (Mn) (K) (Na) (5) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 10:39 Fe++: 0.3 mg/l Sulfide: 0.02 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.3L	11.61	7.30	1026	13.69	---	-70.4	clear, colorless
2	0:06	0.6L	11.92	---	---	---	---	---	↓ ↓
3	0:09	0.9L	12.50	7.20	2059	13.45	0.55	-83.0	↓ ↓
4	---	<u>0.7</u>	Could not low flow - Purged 3 casing volumes						
5	0:13	0.70	18.32	7.04	1515	13.21	0.39	-71.6	clear, colorless
6	0:15	1.06	19.80	7.01	1519	13.23	0.54	-73.3	↓ ↓
7	:	DRY	after 1.0 Gallons purged						
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 11.2

Turbidity after sample collection (NTU): 11.2

Comments: ~~As, Cr, Cu, Ni, Na~~ analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: RLSW-3

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: RLSW-3-10111

DUP ID:

WIND FROM:	N	NE	E	<u>SE</u>	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		<u>PRITLY CLOUDY</u>		<u>CLOUDY</u>		RAIN		TEMPERATURE: °F <u>55</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/10/11	09:57	19.97	--	8.56	--	11.41			X1 1.80
10/11/11	08:22	19.97 <u>19.28</u>	--	8.59	--				X3 5.40 <u>2.07</u>
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[if used]
Bottle Type	Date	Time	Method [§]	Amount & Volume mL		Preservative [circle]	Ice	Filter	pH	✓	
White Poly	10/11/11	08:30	B	3	(125, 500) 1L	None	YES	NO	NA	X	
Yellow Poly	/ /	:	↓	1	(250, 500) 1L	H2SO4	YES	NO	--	X	
Green Poly	/ /	:	↓	2	(125, 500) 1L	NaOH	YES	NO	--	X	
Red Diss. Poly	/ /	:	↓	1	(250, 500) 1L	HNO3	YES	YES	--	X	
Amber Glass	/ /	:			250, 500, 1L	None	YES	NO			

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorus)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
	RED TOYAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (As) (Ca) (Fe) (K) (Mn) (Ni) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)

WATER QUALITY DATA							Purge Start Time: <u>10:01</u>	Fe++: <u>4.2</u> mg/l	Sulfide: 4.00 mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	10:05	0.42	10.21	6.90	1350	12.52	2.11	-105	slight tan tint
2	10:12	0.96	14.75	6.72	1083	12.37	1.06	-103.9	clear, light amber tint
3	:			6.50	1375	12.10	1.16		
4	10:19	1.86	18.21	6.16	2020	11.70	1.45	-47.7	clear, colorless
5	10:	2.26	19.48	6.13	2099	11.56	1.46	-44.4	↓ ✓
6	:	Dry after 2.2 Gallons Purged.							
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 62.5

Turbidity after sample collection (NTU): 28.4

Comments: ~~As, Si, Cu, Ni, Na~~ - analyzed for Quarterly Groundwater Monitoring

Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon

(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: RLSW-4

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: RLSW-4-101011

DUP ID:

WIND FROM:	N	NE	<u>E</u>	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY	
WEATHER:	SUNNY		PRITLY CLOUDY		<u>CLOUDY</u>			RAIN		TEMPERATURE:	<u>50.3</u> °F	°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate units] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
<u>10/10/11</u>	<u>08:38</u>	<u>31.42</u>	--	<u>17.98</u>	--	<u>13.44</u>	X 1 <u>1.05</u>
/ /	:	<u>1.25" = 0.178</u>	--	.	--	.	X 3 <u>3.10</u>
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	<u>10/10/11</u>	<u>09:30</u>	<u>B</u>	<u>3</u> <u>225, 500, 1L</u>	None	<u>YES</u>	<u>NO</u>	NA	✓
Yellow Poly	<u>10/10/11</u>	<u>09:30</u>	<u>B</u>	<u>1</u> <u>250, 500, 1L</u>	H2SO4	<u>YES</u>	<u>NO</u>		✓
Green Poly	<u>10/10/11</u>	<u>09:30</u>	<u>B</u>	<u>2</u> <u>125, 500, 1L</u>	NaOH	<u>YES</u>	<u>NO</u>		✓
Red Diss. Poly	<u>10/10/11</u>	<u>09:30</u>	<u>B</u>	<u>1</u> <u>250, 500, 1L</u>	HNO ₃	<u>YES</u>	<u>YES</u>		✓
Amber Glass	<u>10/10/11</u>	:		<u>250, 500, 1L</u>	None	YES	NO		

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO₄) (E, total and dissolved) (alkalinity) (TDS) (TSS)</u>
Yellow Poly	<u>(Total Phosphorous)</u>	
GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved</u>	
RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>	
RED DISSOLVED - Poly	<u>(Al) (Cl) (Ca) (Co) (Cr) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Sulfate) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)</u>	
Amber Glass	<u>PAHS by 8270C SIM</u>	

WATER QUALITY DATA Purge Start Time: 08:32 Fe++: 1.6 mg/l Sulfide: 1.00 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>08:36</u>	<u>0.4 L</u>	<u>18.73</u>	<u>7.37</u>	<u>2887</u>	<u>13.25</u>	<u>3.08</u>	<u>-88</u>	<u>dark opaque</u>
2	:	<u>Stopped to change to smaller tubing</u>							
3	<u>08:49</u>	<u>0.8 L</u>	<u>18.89</u>	<u>7.22</u>	<u>2925</u>	<u>13.14</u>	<u>1.86</u>	<u>-98</u>	<u>dark opaque</u>
4	<u>08:54</u>	<u>1.3 L</u>	<u>18.80</u>	<u>7.22</u>	<u>2919</u>	<u>13.15</u>	<u>0.44</u>	<u>-95</u>	
5	<u>08:57</u>	<u>1.6 L</u>	<u>18.76</u>	<u>7.26</u>	<u>2921</u>	<u>13.21</u>	<u>0.36</u>	<u>-91</u>	
6	<u>09:01</u>	<u>2.0 L</u>	<u>18.77</u>	<u>7.29</u>	<u>2923</u>	<u>13.24</u>	<u>0.28</u>	<u>-90</u>	
7	<u>09:06</u>	<u>2.5 L</u>	<u>18.79</u>	<u>7.31</u>	<u>2970</u>	<u>13.25</u>	<u>0.43</u>	<u>-93</u>	
8	<u>09:09</u>	<u>2.3 L</u>	<u>18.82</u>	<u>7.33</u>	<u>2984</u>	<u>13.26</u>	<u>0.29</u>	<u>-92</u>	
9	<u>09:12</u>	<u>2.6 L</u>	<u>18.80</u>	<u>7.35</u>	<u>3004</u>	<u>13.29</u>	<u>0.27</u>	<u>-96</u>	
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 20.1

Turbidity after sample collection (NTU): 8.67

Comments: ~~As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring~~
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W1

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W1-101211

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY	PRTLY CLOUDY	CLOUDY			RAIN	TEMPERATURE: °F <u>55</u> °C				

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
									X 1 SURFACE
									X 3 WATER
Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH			
White Poly	10/2/11	15:10	B	(2) 125,500, 1L	None	YES	NO	NA		✓	
Yellow Poly	/ /	↓	↓	(1) 250,500, 1L	H2SO4	YES	NO	—		X	
Green Poly	/ /	↓	↓	(1) 125,500, 1L	NaOH	YES	NO	—		X	
Red Diss. Poly	✓ / /	↓	↓	(1) 250,500, 1L	HNO3	YES	YES	—		X	
Amber Glass	/ /	:	↓	1 250,500, 1L	None	YES	NO				
Total Bottles (include duplicate count):				5							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorous)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all dissolved only	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (Ca) (Fe) (Mg) (Mn) (K) (Na) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Cr) (Cu) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA										Purge Start Time: <u>14:56:15.08</u>	Hach / YSI	Hach / YSI	times dilution
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality	Fe++: <u>2.5</u> mg/l	Sulfide: <u>ND</u> mg/l		
1	0:03	—	—	6.15	674	14.87	1.95	33.9	cloudy, brown tint				
2	0:06	—	—	6.18	170	14.81	1.12	45.8	slightly cloudy, brown tint				
3	0:09	—	—	6.22	170	14.78	1.03	44.6	↓ ↓				
4	0:12	—	—	—	—	—	—	—	—				
5	:												
6	:												
7	:												
8	:												
9	:												
10	:												
11	:												
12	:												

Turbidity before sample collection (NTU): 131 Turbidity after sample collection (NTU): 126

Comments: Sample collected by throwing weighted line with tubing attached approximately 10 feet from south shore of ditch. Sample collected 0.5 feet above mudline.

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME) Matt Wilson (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update WELL ID: W2

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: W2-101211-

DUP ID:

WIND FROM:

N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
---	----	---	-----------	---	----	---	----	-------	--------	-------

WEATHER:

SUNNY	PRILY CLOUDY	CLOUDY	RAIN	TEMPERATURE: °F <u>60</u> °C
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HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate units) (Water Column x Gal/ft)	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)	
									X 1	<u>SURFACE</u>
									X 3	<u>WATER</u>
Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875			

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: [] (√ if used)

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√
White Poly	<u>10/12/11</u>	<u>11:10</u>	<u>B</u>	<u>2</u> (<u>125,500, 1L</u>)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>X</u>
Yellow Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>250,500, 1L</u>)	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>
Green Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>125,500, 1L</u>)	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>
Red Diss. Poly	<u>N /</u>	<u>↓ :</u>	<u>↓</u>	<u>1</u> (<u>250,500, 1L</u>)	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	<u>-</u>	<u>X</u>
Amber Glass	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>250,500, 1L</u>)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>

Total Bottles (include duplicate count): 5

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO4) (F, dissolved) (alkalinity) (TDS) (TSS)</u>
Yellow Poly	<u>(Total Phosphorous)</u>	
GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all dissolved only</u>	
RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>	
RED DISSOLVED - Poly	<u>(Al) (Ca) (Fe) (Mg) (Mn) (K) (Na) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Cr) (Cu) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)</u>	
Amber Glass	<u>PAHS by 8270C SIM</u>	

WATER QUALITY DATA Purge Start Time: 10:58 Fe++: 0.02 mg/l Sulfide: 0.00 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>0:03</u>	<u>-</u>	<u>-</u>	<u>7.20</u>	<u>207</u>	<u>13.69</u>	<u>3.00</u>	<u>90.6</u>	<u>cloudy, H-brown tint</u>
2	<u>0:06</u>	<u>-</u>	<u>-</u>	<u>6.60</u>	<u>210</u>	<u>13.63</u>	<u>2.26</u>	<u>105.4</u>	<u>↓ ↓</u>
3	<u>0:09</u>	<u>-</u>	<u>-</u>	<u>6.34</u>	<u>207</u>	<u>13.64</u>	<u>1.96</u>	<u>111.8</u>	<u>↓ ↓</u>
4	<u>0:12</u>	<u>-</u>	<u>-</u>	<u>6.34</u>	<u>206</u>	<u>13.66</u>	<u>1.81</u>	<u>108.5</u>	<u>↓ ↓</u>
5	:	.	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 16.6 Turbidity after sample collection (NTU): 16.5

Comments: Sample collected by throwing weighted line with tubing attached approximately 15 feet from south shore of ditch.
Sample collected 0.5 feet above mudline.

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333
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Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update WELL ID: W3

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: W3-101211

WIND FROM: NO WIND DUP ID: _____
WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 60 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
<u>10/12/11</u>	<u>10:03</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>			X1 <u>SURFACE</u>
<u>10/12/11</u>	<u>10:06</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>			X3 <u>WATER</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Watertrac (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	<u>10/12/11</u>	<u>10:20</u>	<u>B</u>	<u>2</u> (<u>125,500, 1L</u>)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>X</u>
Yellow Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>250,500, 1L</u>)	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>
Green Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>125,500, 1L</u>)	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>
Red Diss. Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>250,500, 1L</u>)	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	<u>-</u>	<u>X</u>
Amber Glass	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>250,500, 1L</u>)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>

Total Bottles (include duplicate count): 5

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO4) (F, dissolved) (alkalinity) (TDS) (TSS)</u>
Yellow Poly	<u>(Total Phosphorous)</u>	
GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all dissolved only</u>	
RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)</u>	
RBD DISSOLVED - Poly	<u>(Al) (Ca) (Fe) (Mg) (Mn) (K) (Na) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Cr) (Cu) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)</u>	
Amber Glass	<u>PAHS by 8270C SIM</u>	

WATER QUALITY DATA Purge Start Time: 10:05 Fe++: 0.02 mg/l Sulfide: 0.05 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>0:03</u>	<u>---</u>	<u>---</u>	<u>7.22</u>	<u>333</u>	<u>14.18</u>	<u>1.00</u>	<u>72.7</u>	<u>sl. cloudy, lt. brown</u>
2	<u>0:06</u>	<u>---</u>	<u>---</u>	<u>7.23</u>	<u>332</u>	<u>14.18</u>	<u>2.66</u>	<u>89.9</u>	<u>↓ ↓</u>
3	<u>0:09</u>	<u>---</u>	<u>---</u>	<u>7.17</u>	<u>331</u>	<u>14.20</u>	<u>2.35</u>	<u>89.9</u>	<u>↓ ↓</u>
4	<u>0:12</u>	<u>---</u>	<u>---</u>	<u>7.157-04</u>	<u>331</u>	<u>14.25</u>	<u>2.17</u>	<u>89.2</u>	<u>↓ ↓</u>
5	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
6	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
7	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
8	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
9	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
10	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
11	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
12	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>

Turbidity before sample collection (NTU): 14.6 Turbidity after sample collection (NTU): 16.4

Comments: Sample collected by throwing weighted line with tubing attached approximately 10 feet from south shore of ditch. Sample collected 0.5 feet above mudline. 14.6 on

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME) Matt Wilson (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W4

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W4-10/21

DUP ID:

WIND FROM: no wind N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 55 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/12/11									X1 SURFACE
									X3 WATER

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller Sampled via: (1) Low-flow (2) Purged & casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth:	[V if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	10/12/11	08:50	B	222 (125,500, 1L)	None	YES	NO	NA	X
Yellow Poly	/ /	:		250 (500, 1L)	H2SO4	YES	NO	-	X
Green Poly	/ /	:		221 (125,500, 1L)	NaOH	YES	NO	-	X
Red Diss. Poly	/ /	:		1 (250,500, 1L)	HNO3	YES	YES	-	X
Amber Glass	/ /	:		250,500, 1L	None	YES	NO	-	

Total Bottles (include duplicate count): 7

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER-BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Total Cl) (SO ₄) (F, dissolved) (alkalinity) (TDS) (TSS)
	Yellow Poly	(Total Phosphorus)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all dissolved only
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (Ca) (Fe) (Mg) (Mn) (K) (Na) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Cr) (Cu) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)

Amber Glass PAHS by 8270C SIM Hach / YSI Hach (YSI) / times dilution

WATER QUALITY DATA Purge Start Time: 08:38 Fe++: 0.2 mg/l Sulfide: 0.06 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03			7.88	429	13.81	2.27	26.3	sl. cloudy, lt brown tint
2	0:06			6.36	423	13.86	2.22	23.8	↓ ↓
3	0:09			6.17	423	13.89	2.30	24.1	↓ ↓
4	0:03			6.61	412	13.85	3.11	86.1	sl. cloudy, lt brown tint
5	0:06			6.90	411	13.87	2.47	83.0	↓ ↓
6	0:09			7.04	411	13.88	2.39	83.9	↓ ↓
7	0:12			7.11	410	13.88	2.31	82.4	↓ ↓
8	:			.	.	.	.	.
9	:			.	.	.	.	.
10	:			.	.	.	.	.
11	:			.	.	.	.	.
12	:			.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 31.4

Turbidity after sample collection (NTU): 13.1

Comments: Sample collected by throwing weighted line with tubing attached approximately 10 feet from East shore of ditch. Sample collected 0.5 feet above mudline. W4 is near pump house on SP10 ditch # 14

SAMPLER: Matt Wilson/Doug Laffoon

(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W5

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W5-101211

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>CLOUDY</u>		RAIN		TEMPERATURE: <u>60.5</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
<u>10/12/11</u>	<u>16:30</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>			X 1
<u>/ /</u>	<u>:</u>	<u>.</u>	<u>---</u>	<u>.</u>	<u>---</u>	<u>.</u>			X 3
Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = <u>NA</u> 5.875		

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baljet Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth: <u>2' below surface</u>	[if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	<u>10/12/11</u>	<u>16:30</u>	<u>C</u>	<u>(2)</u> <u>125,000, 1L</u>	None	<u>YES</u>	<u>NO</u>	<u>NA</u>	✓
Yellow Poly	<u>10/12/11</u>	<u>16:30</u>	<u>C</u>	<u>(1)</u> <u>250,000, 1L</u>	H2SO4	<u>YES</u>	<u>NO</u>		✓
Green Poly	<u>10/12/11</u>	<u>16:30</u>	<u>C</u>	<u>(1)</u> <u>125,000, 1L</u>	NaOH	<u>YES</u>	<u>NO</u>		✓
Red Diss. Poly	<u>10/12/11</u>	<u>16:30</u>	<u>C</u>	<u>(1)</u> <u>250,000, 1L</u>	HNO ₃	<u>YES</u>	<u>YES</u>		✓
Amber Glass	<u>/ /</u>	<u>:</u>		<u>10</u> <u>250,000, 1L</u>	None	<u>YES</u>	<u>NO</u>		
Total Bottles (include duplicate count):				<u>5</u>					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO₄) (F, dissolved) (alkalinity) (TDS) (TSS)</u>
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all dissolved only</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>
	RED DISSOLVED - Poly	<u>(Al) (Ca) (Fe) (Mg) (Mn) (K) (Na) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Cr) (Cu) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)</u>
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA			Purge Start Time: <u>16:25</u>	Fe++: <u>0.3</u> mg/l	Sulfide: <u>0.00</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
<u>1</u>	<u>16:25</u>	<u>---</u>	<u>---</u>	<u>7.56</u>	<u>144</u>	<u>16.50</u>	<u>8.18</u>	<u>58.3</u>	<u>Clear</u>
<u>2</u>	<u>16:37</u>	<u>---</u>	<u>---</u>	<u>7.70</u>	<u>146</u>	<u>16.46</u>	<u>8.83</u>	<u>69.2</u>	<u>↓</u>
<u>3</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	
<u>4</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	
<u>5</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	
<u>6</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	
<u>7</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	
<u>8</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	
<u>9</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	
<u>10</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	
<u>11</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	
<u>12</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 5.23 Turbidity after sample collection (NTU): NA

Comments: Collected from shoreward side of downstream end of dock.

SAMPLER: Matt Wilson/Doug Laffoon [Signature]

(PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W6

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W6-101211

DUP ID:

WIND FROM:	N	NE	E	<u>SE</u>	S	SW	W	NW	<u>(LIGHT)</u>	MEDIUM	HEAVY
WEATHER:	SUNNY			<u>(PARTLY CLOUDY)</u>		CLOUDY		RAIN		TEMPERATURE:	° F <u>60.</u> ° C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	[Circle appropriate unit] [Water Column x Gal/ft]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)	
<u>10/12/11</u>	<u>13:00</u>	<u>13</u>	<u>13</u>	<u>13</u>	<u>13</u>	<u>13</u>			X 1	<u>SURFACE</u>
									X 3	<u>WATER</u>

Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
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§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 rinsing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth:		[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√	
White Poly	<u>10/12/11</u>	<u>13:00</u>	<u>3</u>	<u>(2)</u> <u>125, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>X</u>	
Yellow Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>(1)</u> <u>250, 500, 1L</u>	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>	
Green Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>(1)</u> <u>125, 300, 1L</u>	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>	
Red Diss. Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>(1)</u> <u>250, 500, 1L</u>	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	<u>-</u>	<u>X</u>	
Amber Glass	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> <u>250, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>	

Total Bottles (include duplicate count):

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO4) (F, dissolved) (alkalinity) (TDS) (TSS)</u>
	Yellow Poly	<u>(Total Phosphorus)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all dissolved only</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>
	RED DISSOLVED - Poly	<u>(Al) (Ca) (Fe) (Mg) (Mn) (K) (Na) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Cr) (Cu) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)</u>
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 12:49 Fe++: 0.4 mg/l Sulfide: ND mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>0:03</u>	<u>---</u>	<u>---</u>	<u>7.02</u>	<u>225</u>	<u>14.18</u>	<u>1.48</u>	<u>77.0</u>	<u>sl. cloudy, H by brown tint</u>
2	<u>0:06</u>	<u>---</u>	<u>---</u>	<u>6.50</u>	<u>223</u>	<u>14.15</u>	<u>1.07</u>	<u>95.6</u>	<u>↓ ↓</u>
3	<u>0:09</u>	<u>---</u>	<u>---</u>	<u>6.44</u>	<u>227</u>	<u>14.11</u>	<u>0.87</u>	<u>98.7</u>	<u>↓ ↓</u>
4	<u>0:12</u>	<u>---</u>	<u>---</u>	<u>6.42</u>	<u>229</u>	<u>14.15</u>	<u>0.76</u>	<u>94.7</u>	<u>↓ ↓</u>
5	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
6	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
7	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
8	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
9	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
10	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
11	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>
12	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 37.8

Turbidity after sample collection (NTU): 31.7

Comments: sample collected off of north side of floating dock at pond at C.O.D main pump house

SAMPLER: Matt Wilson/Doug Laffoon
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

Fax:

(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W7

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W7-101211

DUP ID:

WIND FROM:	N	NE	E	<u>SE</u>	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		<u>PRILY CLOUDY</u>		CLOUDY		RAIN		TEMPERATURE: ° F _____ ° C _____		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
<u>10/12/11</u>	<u>14:00</u>								X 1
									X 3

Volume (gal) SURFACE WATER

Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
--	------------	------------	------------	------------	------------	-------------	-------------

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged-dry let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth:		[if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓	
White Poly	<u>10/12/11</u>	<u>14:00</u>	<u>B</u>	<u>2</u> (<u>250, 500, 1L</u>)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>X</u>	
Yellow Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>250, 500, 1L</u>)	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	<u>—</u>	<u>X</u>	
Green Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>125, 500, 1L</u>)	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	<u>—</u>	<u>X</u>	
Red Diss. Poly	<u>N /</u>	<u>↓</u>	<u>↓</u>	<u>1</u> (<u>250, 500, 1L</u>)	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	<u>—</u>	<u>X</u>	
Amber Glass	<u>/ /</u>	<u>:</u>	<u>—</u>	<u>250, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>			

Total Bottles (include duplicate count): _____

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO4) (F, dissolved) (alkalinity) (TDS) (TSS)</u>
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all dissolved only</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>
	RED DISSOLVED - Poly	<u>(Al) (Ca) (Fe) (Mg) (Mn) (K) (Na) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Cr) (Cu) (Pb) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (Hardness)</u>
	Amber Glass	<u>PAHS by 8270C.SIM</u>

WATER QUALITY DATA			Purge Start Time: <u>10:54</u>	Fe++: <u>2.6</u> mg/l	Sulfide: <u>ND</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>0:05</u>	<u>—</u>	<u>—</u>	<u>6.98</u>	<u>171</u>	<u>15.43</u>	<u>2.3</u>	<u>19.3</u>	<u>cloudy, brown tint</u>
2	<u>0:06</u>	<u>—</u>	<u>—</u>	<u>6.62</u>	<u>170</u>	<u>15.32</u>	<u>1.83</u>	<u>27.1</u>	<u>↓ ↓</u>
3	<u>0:09</u>	<u>—</u>	<u>—</u>	<u>6.49</u>	<u>171</u>	<u>15.28</u>	<u>1.61</u>	<u>30.7</u>	<u>↓ ↓</u>
4	<u>0:12</u>	<u>—</u>	<u>—</u>	<u>6.39</u>	<u>172</u>	<u>15.00</u>	<u>1.74</u>	<u>34.1</u>	<u>↓ ↓</u>
5	<u>0:15</u>	<u>—</u>	<u>—</u>	<u>6.35</u>	<u>172</u>	<u>15.11</u>	<u>1.48</u>	<u>36.1</u>	<u>↓ ↓</u>
6	<u>0:18</u>	<u>—</u>	<u>—</u>	<u>6.37</u>	<u>175</u>	<u>14.93</u>	<u>1.40</u>	<u>36.2</u>	<u>↓ ↓</u>
7	<u>:</u>								
8	<u>:</u>								
9	<u>:</u>								
10	<u>:</u>								
11	<u>:</u>								
12	<u>:</u>								

[gallons or liters] _____ [Clarity, Color] _____

Turbidity before sample collection (NTU): 272 Turbidity after sample collection (NTU): 264

Comments: Sample collected by throwing weighted line with tubing attached approximately 30 feet from south shore of ditch. Sample collected 0.5 feet above mudline, line thrown from W side of ditch.

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME) Matt Wilson (SIGNATURE)



WATER LEVEL SURVEY

Spent Pot Liner Area

Anchor QEA L.L.C.

Site: Millennium Bulk Terminals - Longview, WA Date: 7/22/11

Personnel: D. Laffoon

Project No.: 110730-01.04 T-01-A-14 01-C-01

Weather: *cloudy to partly cloudy, 60-70°F, W 1/2W* Water Level Meter # 25431

Well	Time (2400)	DTW (feet)	Comments	
Piezometers				
PZ-1S	0938	7.39	tubing installed no locks	
PZ-2D	0940	6.88	↓	
PZ-3	0935	5.23		
PZ-4	0931	4.37		
PZ-5	0918	3.69		
PZ-6	1200	6.72		
PZ-7	1205	10.81		no tubing - no cap ↓
"G" Wells				
G-1S	0824	15.72	tubing installed no locks	
G-1D	0826	16.91	↓	
G-2S	0836	6.20		
G-2D	0838	6.10		
G-3S	0849	4.64		
G-3D	0852	5.47		
G-4S	1022	4.97		
G-4D	1025	4.12		
G-5S	1150	11.81		
G-5D	1152	11.00		
G-6S	10:45	17.37		
G-6D	10:48	20.10		
G-7S	—	—		not installed
G-7D	1207	103.8		no tubing ↓

Notes:



Millennium Bulk Terminals - RI/FS Update

Longview, WA

TASK SHEET

Third Quarter 2011

Location ID	Total Depth (ft below TOC)	Date	Sample ID	Sample Time	Well Integrity
Piezometers					
PZ-1	16.28	7/26/11	PZ-1-072611	17:00	
PZ-2	27.78	7/26/11	PZ-2-072611	15:20	
PZ-3	13.03	7/27/11	PZ-3-072711	09:00	
PZ-4	20.94	7/27/11	PZ-4-072711	10:10	
PZ-5	25.49	7/25/11	PZ-5-072511	16:30	
PZ-6	15.12	7/27/11	PZ-6-072711	14:20	will not low flow
PZ-7	21.23	7/27/11	PZ-7-072711	12:10	will low flow only at lowest P pump setting
'G' wells					
G1-S	10.49	7/25/11	G1-S-072511	10:40	
G1-D	37.07	7/25/11	G1-D-072511	10:00	
G2-S	12.77	7/25/11	G2-S-072511	14:50	
G2-D	27.82	7/25/11	G2-D-072511	17:30	Add water fishing
G3-S	15.35	7/28/11	G3-S-072811	11:30	
G3-D	30.78	7/28/11	G3-D-072811	11:45	
G4-S	22.58	7/26/11	G4-S-072611	11:00	will not low flow
G4-D	37.57	7/28/11	G4-D-072811	09:40	Will not low flow - pumps dry
G5-S	21.65	7/28/11	G5-S-072811	14:20	will not low flow - purge slowly
G5-D	37.35	7/28/11	G5-D-072811	13:55	
G6-S	22.66	7/26/11	G6-S-072611	13:40	Takes long time for parameters to stabilize
G6-D	37.65	7/26/11	G6-D-072611	12:40	
G7-D	32.81	7/28/11	G7-D-072811	08:50	will not low flow - pumps dry
Surface Water					
W1	---	8/01/11	W1-080111	13:00	
W2	---	8/01/11	W2-080111	14:20	
W3	---	8/01/11	W3-080111	15:20	
W4	---	8/01/11	W4-080111	16:10	
W4-B	---	---	---	---	Pump not operating
W5	---	8/01/11	W5-080111	16:50	
W6	---	8/01/11	W6-080111	10:30	
W7	---	8/01/11	W7-080111	11:50	
QA/QC					
G1-S	10.49	7/25/11	G1-S-D-072511	10:45	
W2		8/01/11	W2-080111-D	14:25	
Notes: G6-S-072811 7/28/11 G6-S-072811 15:30 PAMs only					
G6-D 7/28/11 G6-D-072811 16:10 "					
PZ-5 7/28/11 PZ-5-072811 15:30 "					

2
3
4
2
6
5
1

Watera
1/8" poly
check valve

will not low flow
Add water fishing
will not low flow
Pumps dry
Purge slowly
Takes long time for parameters to stabilize
will not low flow - pumps dry

R2 8/02/11 R2-080211 08:50
R3 8/02/11 R3-080211 10:20
R1-D 8/02/11 R1-D-080211 11:00
R1-S 8/02/11 R1-S-080211 11:50
R4-D 8/02/11 R4-D-080211 12:20
R4-S 8/02/11 R4-S-080211 12:40

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333
Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update WELL ID: PZ-1 (Re-use sample for PAFs)

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: PZ1-072811

DUP ID: _____

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PARTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: 60 °F		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
7/28/11	08:35	17.29	---	7.52	---	9.77		X 1	1.59
/ /	:	.	---	---	---	.		X 3	4.77

Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
--	------------	--	------------	------------	------------	-------------	-------------

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA										Sample Depth:	(√ if used)
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH		√	
White-Poly	7/28/11	09:10	B	2 125, 500, 1L	None	YES	NO	NA		✓	
Yellow Poly	/ /	:		1 250, 500, 1L	H2SO4	YES	NO				
Green Poly	/ /	:		1 125, 500, 1L	NaOH	YES	NO				
Red Total Poly	/ /	:		250, 500, 1L	HNO ₃	YES	NO				
Red Diss. Poly	/ /	:		1 250, 500, 1L	HNO ₃	YES	YES				

Total Bottles (include duplicate count) 2

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO ₄) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

AMBER-GLASS (PAFs) by 8070 C SIM

WATER QUALITY DATA			Purge Start Time: 08:37	Fe++: _____ mg/l	Sulfide: _____ mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	08:42	0.5 L	7.81	9.35	3086	16.09	.54	14	black opaque
2	08:45	0.8 L	7.86	9.40	3080	15.90	.32	0.7	
3	08:48	1.1 L	7.90	9.42	3080	15.76	.23	-7.8	
4	08:51	1.4 L	7.87	9.41	3079	15.80	.20	-21	
5	08:54	1.7 L	7.84	9.42	3088	15.74	.19	-23	↓ sample
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU):

Turbidity after sample collection (NTU):

Comments: sampled via micro-purge

SAMPLER: Matt Wilson / Doug Luffoon

[Signature]

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

Fax:

(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: PZ-1

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: PZ-1-072611

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		<u>PRTLY CLOUDY</u>		CLOUDY		RAIN		TEMPERATURE: °F <u>75</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate units)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
7/26/11	16:12	17.29	--	7.59	--	9.70			X 1
/ /	:								X 3
Gal/ft = (dia./2) ² x 0.163									
1" =	0.041	2" =	0.163	3" =	0.367	4" =	0.653	6" =	1.469
10" =	4.080	12" =	5.875						

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA										Sample Depth:	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH		√	
White Poly	7/26/11	17:00	B	2 (25,500, 1L)	None	YES	NO	NA		√	
Yellow Poly	/ /	:	↑	250,500, 1L	H2SO4	YES	NO	--		√	
Green Poly	/ /	:	↑	125,500, 1L	NaOH	YES	NO	--		√	
Red Total Poly	/ /	:	↓	250,500, 1L	HNO3	YES	NO				
Red Diss. Poly	/ /	:	↓	250,500, 1L	HNO3	YES	YES			√	

Total Bottles (include duplicate count): 5

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorus)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA			Purge Start Time: 16:26	Fe++: <u>1.0</u> mg/l	Sulfide: <u>0.50</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.5L	7.83	9.54	3272	18.54	0.84	-375.8	block, opaque
2	0:06	0.7L	7.85	9.44	3234	17.78	0.05	-302.7	↓ ↓
3	0:09	1.1L	7.90	9.36	3200	17.49	0.07	-306.9	↓ ↓
4	0:12	1.45L	7.89	9.31	3197	17.52	0.07	-308.3	↓ ↓
5	0:15	1.85L	7.95	9.30	3235	16.79	0.07	-322.5	↓ ↓
6	0:18	2.3L	7.98	9.27	3246	16.24	0.08	-327.3	↓ ↓
7	0:21	2.7L	7.98	9.26	3234	16.23	0.08	-329.1	↓ ↓
8	0:24	3.05L	7.98	9.26	3231	16.47	0.08	-329.6	↓ ↓
9	0:27	3.45L	7.99	9.31	3228	16.67	0.09	-329.6	↓ ↓
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 2.30

Turbidity after sample collection (NTU): 2.16

Comments: Sampled via low-flow methods

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333
Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: PZ-2 (Sample Recharge for PAHs)

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: PZ2-072811

DUP ID: _____

WIND FROM:	N	NE	E	SE	S	SW	<input checked="" type="radio"/> W	NW	<input checked="" type="radio"/> LIGHT	MEDIUM	HEAVY	
WEATHER:	<input checked="" type="radio"/> SUNNY			<input type="radio"/> PARTLY CLOUDY		<input type="radio"/> CLOUDY		<input type="radio"/> RAIN		TEMPERATURE:	<input checked="" type="radio"/> °F 60's	°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate units) (Water Column x Gal/ft)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
7/28/11	09:00	24.73	---	7.05	---	17.68		X 1	2.88
/ /	:	.	---	.	---	.		X 3	8.64
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA								Sample Depth:		(√ if used)
Bottle Type	Date	Time	Method [§]	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√	
White Poly	7/28/11	09:45	B	2 125, 500 (1L)	None	<input checked="" type="radio"/> YES	<input checked="" type="radio"/> NO	NA	✓	
Yellow Poly	/ /	:		1 250, 500, 1L	H2SO4	YES	NO			
Green Poly	/ /	:		1 125, 500, 1L	NaOH	YES	NO			
Red Total Poly	/ /	:		250, 500, 1L	HNO ₃	YES	NO			
Red Diss. Poly	/ /	:		1 250, 500, 1L	HNO ₃	YES	YES			

Total Bottles (include duplicate count) 2

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO ₄) (H) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(AD) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

Amber-glass (PAHs) by 8070C SIM

WATER QUALITY DATA							Purge Start Time: 09:17		Fe++: _____ mg/l	Sulfide: _____ mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality	
1	09:22	0.5L	07.29	9.55	8628	16.21	.52	-55	Black opaque	
2	09:25	0.8L	07.30	9.50	8665	16.37	.22	-65		
3	09:28	1.1L	07.30	9.50	8680	16.44	.19	-79		
4	09:31	1.4L	07.31	9.50	8673	16.39	.18	-86	↓ sampled	
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU):

Turbidity after sample collection (NTU):

Comments: sample via micro-purge

SAMPLER: Matt Wilson / Doig Laffoon

[Signature]

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update WELL ID: PZ-2-D PZ-2

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: PZ-2-0726-11

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		<u>RTLY CLOUDY</u>		CLOUDY		RAIN		TEMPERATURE: °F <u>.75</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Water Column x Gal/ft)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DIW	DTB-DIW			Volume (gal)
7/26/11	14:36	24.73	---	7.01	---	17.72			X 1 2.89
/ /	:								X 3 8.67
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailer

GROUNDWATER SAMPLING DATA								Sample Depth:		[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH		
White Poly	7/26/11	15:20	B	2 (125, 500, 1L)	None	YES	NO	NA	X	
Yellow Poly	/ /	:	↓	1 (250, 500, 1L)	H2SO4	YES	NO	-	X	
Green Poly	/ /	:	↓	1 (125, 500, 1L)	NaOH	YES	NO	-	X	
Red Total Poly	/ /	:	↓	250, 500, 1L	HNO3	YES	NO	-		
Red Diss. Poly	✓ /	✓ :	✓ ↓	1 (250, 500, 1L)	HNO3	YES	YES	-	X	

Total Bottles (include duplicate count): 5

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA			Purge Start Time: <u>14:41</u>	Fe++: <u>0.4</u> mg/l	Sulfide: <u>5.0</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.5	7.19	9.17	9144	20.33	1.04	-311.9	black, opaque
2	0:06	0.8	7.32	9.33	9147	18.38	0.36	-341.6	↓ ↓
3	0:09	1.2	7.33	9.37	9031	17.78	0.32	-346.6	↓ ↓
4	0:12	1.6	7.35	9.35	8002	17.46	0.29	-347.4	↓ ↓
5	0:15	2.05	7.38	9.35	7063	17.03	0.27	-337.6	↓ ↓
6	0:18	2.55	7.42	9.34	7183	16.48	0.26	-337.8	↓ ↓
7	0:21	3.05	7.44	9.32	7611	16.25	0.25	-344.0	↓ ↓
8	0:24	3.55	7.43	9.31	7896	16.30	0.24	-349.2	↓ ↓
9	0:27	4.10	7.45	9.32	8096	16.42	0.23	-353.8	↓ ↓
10	0:30	4.60	7.43	9.35	8188	16.25	0.22	-356.8	↓ ↓
11	0:39	6.1	7.38	9.36	8352	16.55	0.19	-361.2	↓ ↓
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 5.14 Turbidity after sample collection (NTU): 13.1

Comments: sampled with low-flow methods

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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Portland, OR 97224

Office: (503) 670-1108

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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: PZ-3

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: PZ-3-072711

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRILY CLOUDY		CLOUDY		RAIN		TEMPERATURE:	°F .60 °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
7/27/11	08:15	13.11	--	5.48	--	7.63			X 1 7.63 124
/ /	:		--		--				X 3 3.72
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA										Sample Depth:	[if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL		Preservative [circle]	Ice	Filter	pH	✓	
White Poly	7/27/11	09:00	B	2	125, 500, 1L	None	YES	NO	NA	X	
Yellow Poly	/ /	:		1	250, 500, 1L	H2SO4	YES	NO	--	X	
Green Poly	/ /	:		1	125, 500, 1L	NaOH	YES	NO	--	X	
Red Total Poly	/ /	:		2	250, 500, 1L	None HNO3	YES	NO	--	X	
Red Diss. Poly	✓/ /	✓:	✓	1	250, 500, 1L	HNO3	YES	YES	--	✓	
Total Bottles (include duplicate count):				5	6	7					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO ₄) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA			Purge Start Time: 08:23		Fe++: 0.5 mg/l		Sulfide: 0.28 mg/l		
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.4L	5.55	7.60	6364	14.64	2.68	-126.6	sl/cloudy, Dark brown
2	0:06	0.8L	5.54	8.07	6281	14.68	0.32	-175.0	↓ ↓
3	0:09	1.25	5.56	8.20	5802	14.52	0.28	-202.1	↓ light brown
4	0:12	1.7	5.59	8.32	5256	14.50	0.26	-216.6	↓ ↓
5	0:15	2.2	5.59	8.41	4752	14.50	0.25	-227.3	↓ ↓
6	0:18	2.7	5.60	8.46	4363	14.52	0.26	-238.2	↓ light brown tint
7	0:21	3.2	5.61	8.49	4066	14.51	0.26	-246.4	↓ ↓
8	0:24	3.8	5.62	8.50	3895	14.52	0.23	-246.2	↓ ↓
9	0:27	4.4	5.62	8.50	3733	14.55	0.28	-249.1	↓ ↓
10	0:30	4.9	5.62	8.50	3677	14.57	0.27	-250.8	↓ ↓
11	0:36	5.9	---	8.50	3605	14.61	0.30	-257.9	↓ ↓
12	:								

Turbidity before sample collection (NTU): **5.14** Turbidity after sample collection (NTU): **6.36**

Comments: **Sampled with low-flow methods**

SAMPLER: Matt Wilson (PRINTED NAME) [Signature] (SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: PZ-4

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: PZ-4-072711

DUP ID:

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PARTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 70 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate units) (Water Column x Gal/ft)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
7/27/11	09:30	20.60	---	4.65	---	15.95		X 1	2.60
/ /	:	---	---	---	---	---		X 3	7.80
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√ [if used]
White Poly	7/27/11	10:10	B	(2) (250, 500, 1L)	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	(1) (250, 500, 1L)	H2SO4	YES	NO	---	X
Green Poly	/ /	:	↓	(1) (250, 500, 1L)	NaOH	YES	NO	---	X
Amber Glass Red Total Poly	/ /	:	↓	(2) (250, 500, 1L)	HNO3	YES	NO	---	X
Red Diss. Poly	/ /	:	↓	(1) (250, 500, 1L)	HNO3	YES	YES	---	X
Total Bottles (include duplicate count):				(5) (7)					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
Yellow Poly	(Total Phosphorous)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)	
Amber Glass RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (PAHs) (BZOC) (SIM)	
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA		Purge Start Time: 09:38	Fe++: 0.2 mg/l	Sulfide: 2.30 mg/l					
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.5	4.94	---	---	---	---	---	black, opaque
2	0:06	0.75	5.03	9.73	13733	15.11	0.47	-392.7	↓ ↓
3	0:09	1.15	5.14	9.78	13853	15.14	0.37	-392.2	↓ ↓
4	0:12	1.55	5.15	9.80	13924	15.27	0.30	-392.4	↓ ↓
5	0:15	1.9	5.15	9.82	13902	15.45	0.26	-392.7	↓ ↓
6	0:18	2.3	5.19	9.83	13956	15.03	0.24	-397.0	↓ ↓
7	0:21	2.75	5.19	9.83	13885	15.01	0.25	-395.0	↓ ↓
8	0:24	3.0	5.03	9.83	13680	15.66	0.22	-401.8	↓ ↓
9	0:27	3.25	4.84	9.83	13788	16.44	0.24	-392.8	↓ ↓
10	0:38	3.75	5.10	9.86	13832	15.35	0.24	-392.3	↓ ↓
11	0:42	4.75	---	9.86	13798	14.46	0.22	-413.7	↓ ↓
12	:								

Turbidity before sample collection (NTU): 4.17 Turbidity after sample collection (NTU): 4.01
 Comments: (1) Pump had stopped. sampled via low-flow methods.

SAMPLER: Matt Wilson (PRINTED NAME) *Matt Wilson* (SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333
Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update WELL ID: PZ-5 (Resample for PAHs)

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: PZ-5-072811-

DUP ID: _____

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	<u>LIGHT</u>	MEDIUM	HEAVY	
WEATHER:	<u>SUNNY</u>	PRTY CLOUDY			CLOUDY			RAIN	TEMPERATURE: <u>80.5</u> °F			

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate unit)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
7/28/11	14:58	22.32	---	3.86	---	18.46	X 1		3.01
/ /	:	.	---	.	---	.	X 3		9.03

Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
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§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	Sample Depth:	(if used)
White Poly	<u>7/28/11</u>	15:30	<u>(B)</u>	<u>2</u> 125, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>		✓
Yellow Poly	<u>7/28/11</u>	:		1 250, 500, 1L	H2SO4	YES	NO			
Green Poly	/ /	:		1 125, 500, 1L	NaOH	YES	NO			
Red Total Poly	/ /	:		250, 500, 1L	HNO3	YES	NO			
Red Diss. Poly	/ /	:		1 250, 500, 1L	HNO3	YES	YES			

Total Bottles (include duplicate count) 2

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

AMBER GLASS (PAHs) by B270C SIM

WATER QUALITY DATA

WATER QUALITY DATA		Purge Start Time: <u>15:03</u>	Fe++: _____ mg/l		Sulfide: _____ mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	15:08	1.2 L	4.09	10.45	2081	15.52	7.8	-255	black opaque
2	15:10	1.3 L	4.08	10.47	2066	15.38	23	-282	↑
3	15:14	1.6 L	4.11	10.49	2074	15.55	16	-294	↑
4	15:17	1.9 L	4.10	10.50	2080	15.72	14	-292	↓
5	15:20	2.2 L	4.08	10.51	2084	15.90	13	-293	↓
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU):

Turbidity after sample collection (NTU):

Comments: lowered speed sample via macro-purge

SAMPLER: Matt Wilson Doug Laffoon Jay Reff

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: PZ-5

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: PZ-5-072511

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY	PRTLY CLOUDY	<u>CLOUDY</u>			RAIN	TEMPERATURE: °F		75	°C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
									Volume (gal)
7/25/11	16:02	22.32	--	3.85	--	18.47			X 1
/ /	:	---							X 3
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA								Sample Depth:	[if used]
Bottle Type	Date	Time	Method ^s	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	7/25/11	16:30	B	② 125, 500, 1L	None	YES	NO	NA	✓
Yellow Poly	/ /	:	↓	① 250, 500, 1L	H2SO4	YES	NO	--	✓
Green Poly	/ /	:	↓	① 125, 500, 1L	NaOH	YES	NO	--	✓
Red Total Poly	/ /	↓:	↓	250, 500, 1L	HNO3	YES	NO	--	
Red Diss. Poly	✓/ /	↓:	↓	① 250, 500, 1L	HNO3	YES	YES	--	X
Total Bottles (include duplicate count):				⑤					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA			Purge Start Time: 16:08	Fe++: 1.0 mg/l	Sulfide: NA mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.5L	4.15	10.05	21018	14.76	0.19	-396.1	black, opaque
2	0:06	1.0L	4.11	10.28	20942	14.58	0.12	-396.0	↓ ↓
3	0:09	1.45L	4.11	10.32	20948	14.49	0.11	-392.1	↓ ↓
4	0:12	1.85L	4.13	10.34	20943	14.57	0.10	-389.2	↓ ↓
5	0:15	2.35L	4.15	10.36	20975	14.27	0.14	-388.9	↓ ↓
6	0:18	2.85L	4.15	10.36	20942	14.20	0.11	-386.2	↓ ↓
7	0:21	3.35L	--	10.37	20947	14.04	0.12	-385.3	↓ ↓
8	:		.	.		.			
9	:		.	.		.			
10	:		.	.		.			
11	:		.	.		.			
12	:		.	.		.			

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 15.0

Turbidity after sample collection (NTU): 253

Comments: ① Sample was too opaque - the YSI could not read the samples. Could not analyze sample. → Sample should be diluted at least 10 times in order to analyze via low-flow methods.

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: PZ-6

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: PZ-6-072711

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PARTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>75</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
7/27/11	13:27	15.35	---	7.07	---	8.28	X 1 1.35
/ /	:	.	---	.	---	.	X 3 4.05

Gal/ft = (dia./2)² × 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	Sample Depth	[if used]	
White Poly	7/27/11	14:20	B	2 (2) 125,500, 1L	None	YES	NO	NA		X	
Yellow Poly	/ /	:		1 (1) 250,500, 1L	H2SO4	YES	NO	-		X	
Green Poly	/ /	:		1 (1) 125,500, 1L	NaOH	YES	NO	-		X	
Red Total Poly	/ /	:		250,500, 1L	HNO3	YES	NO	-		X	
Red Diss. Poly	/ /	:		1 (1) 250,500, 1L	HNO3	YES	YES	-		X	
Total Bottles (include duplicate count):				5							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (B) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA		Purge Start Time: 13:26	Fe++: 0.8 mg/l	Sulfide: 1.20 mg/l					
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.035	7.43	9.48	3328	16.92	12.91	322.3	black, opaque
2	0:06	0.6L	7.70	9.78	3303	16.76	0.63	322.4	↓ ↓
3	0:09	0.9L	7.90	9.61	3167	16.75	0.57	322.7	↓ ↓
4	0:12	1.2L	8.17	9.72	3060	16.58	0.44	322.7	↓ ↓
5	0:25	5.2L	10.68	9.70	2589	13.40	0.34	322.1	↓ ↓
6	0:28	10.4L	11.52	9.68	2621	13.18	0.34	322.3	↓ ↓
7	---	15.6L	12.77	9.72	2800	12.73	0.30	322.6	↓ ↓
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

1 vol
2 vol
3 vol

Turbidity before sample collection (NTU): 35.4 Turbidity after sample collection (NTU): 39.2

Comments: could not low flow - purged 3 volumes and sampled

SAMPLER: Matt Wilson (PRINTED NAME) *Matt Wilson* (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: PZ-7

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: PZ-7-072711

DUP ID:

WIND FROM:	N	NE	E	<u>SE</u>	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>75</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							Product Thickness	Water Column	Volume (gal)	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			X1	X3
7/27/11	11:17	19.16	---	10.63	---	8.53				1.39
/ /	:	.	---	.	---	.				4.17

Gal/ft = (dia./2)² × 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA								Sample Depth:		(√ if used)
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√	
White Poly	7/27/11	12:10	B	(2) 125, 500, 1L	None	YES	NO	NA	X	
Yellow Poly	/ /	:	↓	(1) 250, 500, 1L	H2SO4	YES	NO	-	X	
Green Poly	/ /	:	↓	(1) 125, 500, 1L	NaOH	YES	NO	-	X	
Red Total Poly	/ /	:	↓	250, 500, 1L	HNO3	YES	NO	-	X	
Red Diss. Poly	✓ /	✓ :	✓ ↓	(1) 250, 500, 1L	HNO3	YES	YES	-	X	

Total Bottles (include duplicate count): 5

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(C) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (B) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA			Purge Start Time: 11:24	Fe++: <u>2.2</u> mg/l	Sulfide: <u>0.11</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.5 L	10.98	8.08	3181	15.69	1.47	-205.5	black, opaque
2	0:06	0.8 L	11.08	7.43	3131	15.71	3.73	-204.4	↓ ↓
3	0:09	1.2 L	11.11	7.11	3037	15.85	1.03	-208.9	↓ ↓
4	0:12	1.5 L	11.12	6.97	2867	16.18	0.64	-205.8	↓ ↓
5	0:15	1.8 L	11.13	7.01	2792	16.59	0.44	-221.9	↓ ↓
6	0:18	2.05 L	11.13	7.04	2718	17.39	0.40	-237.2	↓ ↓
7	0:21	2.25 L	11.19	7.04	2731	16.69	0.33	-238.7	↓ ↓
8	0:24	2.55 L	11.25	7.02	2685	16.21	0.28	-248.3	↓ ↓
9	0:27	2.85 L	11.30	7.06	2674	16.44	0.26	-208.0	clear, dark brown
10	0:30	3.1 L	11.31	7.08	2636	16.57	0.23	-245.0	↓ ↓
11	0:33	3.35 L	11.32	7.09	2598	16.75	0.21	-250.8	↓ ↓
12	0:36	3.6	11.33	7.09	2577	16.98	0.18	-251.8	↓ ↓

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 4.40

Turbidity after sample collection (NTU): 4.03

Comments: sampled via low-flow methods

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update WELL ID: G-1-D

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: G-1-D-072511

DUP ID:

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY	
WEATHER:	SUNNY			PRTLY CLOUDY		<u>CLOUDY</u>		RAIN		TEMPERATURE: °F <u>65</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)	
<u>7/25/11</u>	<u>08:47</u>	<u>34.95</u>	--	<u>17.10</u>	--	<u>17.85</u>			X 1	<u>2.91</u>
/ /	:	.	--	.	--	.			X 3	<u>8.73</u>

Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
--	------------	------------	------------	------------	------------	-------------	-------------

§ METHODS: (A) Watertr (B) Peristaltic Pump (C) Disposable Daller

GROUNDWATER SAMPLING DATA Sample Depth: [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
White Poly	<u>7/25/11</u>	<u>10:00</u>	<u>B</u>	<u>(2)</u> <u>(125)</u> 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>X</u>
Yellow Poly	/ /	:	<u>B</u>	<u>(1)</u> <u>(250)</u> 500, 1L	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	--	<u>X</u>
Green Poly	/ /	:	<u>B</u>	<u>(1)</u> <u>(125)</u> 500, 1L	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	--	<u>X</u>
Red Total Poly	/ /	:	<u>B</u>	250, 500, 1L	<u>HNO3</u>	<u>YES</u>	<u>NO</u>	--	
Red Diss. Poly	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>(1)</u> <u>(250)</u> 500, 1L	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	--	<u>X</u>

Total Bottles (include duplicate count): 5

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	Yellow Poly	<u>(Total Phosphorus)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)</u>
RED DISSOLVED - Poly	<u>(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)</u>	

WATER QUALITY DATA Purge Start Time: 08:52 Fe++: 5.0 mg/l Sulfide: 0.0 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>08:58</u>	<u>0.5 L</u>	<u>17.53</u>	<u>6.11</u>	<u>3730</u>	<u>14.44</u>	<u>2.30</u>	<u>-94.0</u>	<u>cloudy, gray</u>
2	<u>09:02</u>	<u>0.9 L</u>	<u>17.52</u>	<u>6.07</u>	<u>3759</u>	<u>13.78</u>	<u>0.86</u>	<u>-99.7</u>	<u>↓ ↓</u>
3	<u>09:08</u>	<u>1.35 L</u>	<u>17.54</u>	<u>6.09</u>	<u>3752</u>	<u>13.60</u>	<u>0.79</u>	<u>-103.9</u>	<u>sl. cloudy, gray tint</u>
4	<u>09:13</u>	<u>2.05 L</u>	<u>17.55</u>	<u>6.12</u>	<u>3680</u>	<u>13.53</u>	<u>0.65</u>	<u>-112.6</u>	<u>↓</u>
5	<u>09:18</u>	<u>2.8 L</u>	<u>17.56</u>	<u>6.14</u>	<u>3520</u>	<u>13.52</u>	<u>0.62</u>	<u>-119.8</u>	<u>sl. cloudy, h. pale tint</u>
6	<u>09:23</u>	<u>3.6 L</u>	<u>17.57</u>	<u>6.15</u>	<u>3388</u>	<u>13.59</u>	<u>0.59</u>	<u>-128.3</u>	<u>clear, h. pale tint</u>
7	<u>09:28</u>	<u>4.5</u>	--	<u>6.18</u>	<u>3268</u>	<u>13.63</u>	<u>0.61</u>	<u>-134.5</u>	<u>↓ ↓</u>
8	<u>09:33</u>	<u>5.3</u>	<u>17.58</u>	<u>6.20</u>	<u>3206</u>	<u>13.80</u>	<u>0.59</u>	<u>-136.5</u>	<u>↓ ↓</u>
9	<u>09:38</u>	<u>6.1</u>	<u>17.60</u>	<u>6.22</u>	<u>3087</u>	<u>13.60</u>	<u>0.51</u>	<u>-142.3</u>	<u>↓ ↓</u>
10	<u>09:43</u>	<u>6.8</u>	--	<u>6.23</u>	<u>3013</u>	<u>13.99</u>	<u>0.54</u>	<u>-148.4</u>	<u>↓ ↓</u>
11	<u>09:48</u>	<u>7.6</u>	--	<u>6.28</u>	<u>2941</u>	<u>13.95</u>	<u>0.54</u>	<u>-156.2</u>	<u>clear, sl. pale tint</u>
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): > 1000

Turbidity after sample collection (NTU): > 1000

Comments: sampled via low-flow methods

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: G1-S

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G1-S-072511-

DUP ID: G1-S-D-072511 (1045)

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY	PRTLY CLOUDY	CLOUDY			RAIN	TEMPERATURE: °F		65		°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
07/25/11	09:56	19.67	---	15.89	---	3.78	X1 0.62
/ /	:	.	---	.	---	.	X3 1.86

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√ [if used]
White Poly	7/25/11	10:40	B	(2) 125, 500, 1L	None	YES	NO	NA	✓
Yellow Poly	/ /	:	↓	(1) 250, 500, 1L	H2SO4	YES	NO	-	X
Green Poly	/ /	:	↓	(1) 125, 500, 1L	NaOH	YES	NO	-	X
Red Total Poly	/ /	:	↓	250, 500, 1L	HNO3	YES	NO	-	X
Red Diss. Poly	N/	√:	√	(1) 250, 500, 1L	HNO3	YES	YES	-	X

Total Bottles (include duplicate count): 8 10

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (B) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA		Purge Start Time: 10:13	Fe++: 1.8 mg/l		Sulfide: 0.02 mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:05	0.65L	15.89	7.14	840	14.52	1.70	-104.9	cloudy, dark gray
2	0:10	1.45L	15.89	6.61	776	13.68	0.67	-78.0	sl. cloudy, sit dark gray tint
3	0:13	2.0L	---	6.84	750	13.52	0.56	-87.3	v.sl. cloudy, h. pale tint
4	0:16	2.55L	15.89	6.89	735	13.38	0.55	-87.9	clear, colorless
5	0:19	3.1L	---	6.89	722	13.26	0.53	-81.9	↓ ↓
6	0:22	3.65	15.89	6.89	695	13.33	0.50	-77.6	↓ ↓
7	0:29	4.95	---	6.93	660	13.27	0.60	-74.5	↓ ↓
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 14.2

Turbidity after sample collection (NTU): 15.7

Comments: Sampled via low-flow methods

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: G2-5

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G2-5-072511

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY	PRTLY CLOUDY	<u>CLOUDY</u>			RAIN			TEMPERATURE: °F <u>70</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
7/25/11	11:34	13.49	---	6.57	---	6.92	X1: 1.13
/ /	:	---	---	.	---	.	X3: 3.39

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√ if used
White Poly	7/25/11	14:50	B	<u>2</u> (250, 500, 1L)	None	YES	NO	NA	X
Yellow Poly	/ /	:		<u>1</u> (250, 500, 1L)	H2SO4	YES	NO	---	X
Green Poly	/ /	:		<u>1</u> (250, 500, 1L)	NaOH	YES	NO	---	X
Red Total Poly	/ /	:		250, 500, 1L	HNO3	YES	NO	---	
Red Diss. Poly	/ /	:		<u>1</u> (250, 500, 1L)	HNO3	YES	YES	---	X

Total Bottles (include duplicate count): 5

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA			Purge Start Time: 14:04	Fe++: <u>2.9</u> mg/l	Sulfide: <u>0.0</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.5L	7.25	7.68	3607	15.40	3.99	-170.4	clear, brown tint
2	0:06	0.8L	7.49	7.52	3581	15.76	0.83	-184.4	↓ ↓
3	0:09	1.1L	7.66	7.37	3583	16.05	0.55	-185.4	↓ ↓
4	0:12	1.4L	7.78	7.35	3587	16.16	0.43	-193.9	↓ ↓
5	0:15	1.7L	7.83	7.33	3586	16.29	0.38	-199.3	↓ ↓
6	0:18	2.1L	8.70	---	---	---	---	---	↓ ↓
7	0:24	5.7L	9.47	7.28	3475	14.35	0.33	-201.9	↓ ↓ L brown tint
8	0:31	8.6L	10.57	7.27	3526	13.89	0.33	-202.8	↓ ↓
9	0:38	12.8L	11.18	7.22	3519	13.84	0.32	-203.0	↓ ↓
10	:								
11	:								
12	:								

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 97.9 Turbidity after sample collection (NTU): 105

Comments: could not low-flow purge. - purged 3 volumes and sampled

SAMPLER: Matt Wilson (PRINTED NAME) Matthew Wilson (SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update WELL ID: G2-D

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: G2-D-072511

DUP ID:

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY	PRTLY CLOUDY	<u>CLOUDY</u>		RAIN				TEMPERATURE: <u>F</u>	<u>70</u>	°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
7/25/11	11:37	28.50	---	6.42	---	22.08		X1	3.60
/ /	:		---		---			X3	10.80
Gal/ft = (dia./2) ² x 0.163	1" = 0.041	<u>2" = 0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA								Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	7/25/11	13:30	B	<u>2</u> (125, 500, 1L)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	X
Yellow Poly	//	:	↓	<u>1</u> (250, 500, 1L)	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	—	X
Green Poly	//	:	↓	<u>1</u> (125, 500, 1L)	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	—	X
Red Total Poly	//	:	↓	250, 500, 1L	<u>HNO3</u>	YES	NO	—	X
Red Diss. Poly	//	:	↓	<u>1</u> (250, 500, 1L)	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	—	X
Total Bottles (include duplicate count):				<u>5</u>					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO ₄) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorus)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA							Purge Start Time: <u>12:08</u>	Fe ⁺⁺ : <u>2.6</u> mg/l	Sulfide: <u>0.65</u> mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.7L	7.35	7.23	3559	14.52	1.41	-162.0	sl. cloudy, dark grey
2	0:06	1.4L	7.8 7.99	6.99	3565	13.57	0.98	-160.5	cloudy, dark grey
3	0:09	1.65L	8.24	6.96	3530	13.67	0.67	-167.7	↓ ↓
4	0:15	2.5L	9.79	6.97	3383	12.77	0.54	-182.4	cloudy, dark grey
5	0:18	3.8L	10.70	6.95	3338	12.60	0.46	-201.1	↓ ↓
6	0:25	7.6L	12.34	6.96	3319	12.46	0.48	-236.1	↓ ↓
7	0:36	13.7L	13.30	—	—	—	—	—	↓ ↓
8	0:60	27.4L	17.13	6.98	3501	12.63	1.26	-236.0	sl. cloudy, dark grey + reduced suspended particles + odor
9	—	41.0L	17.50	6.99	3544	12.92	0.38	-247.7	↓ ↓
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 12.1 Turbidity after sample collection (NTU): 32.8

Comments: could not low-flow. purged 3 casing volumes and collected sample
Installed Waterra tubing for next sampling event

SAMPLER: Matt Wilson
 (PRINTED NAME)

Matt Wilson
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: G-3-S

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-3-S-072812

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>			PARTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>75</u> °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
7/28/11	10:40	15.48	---	5.18	---	10.30			X 1 1.68
/ /	:		---		---				X 3 5.04
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA										Sample Depth:	[if used]
Bottle Type	Date	Time	Method [§]	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH		✓	
White Poly	7/28/11	11:30	B	② - 250, 500, 1L	None	YES	NO	NA		X	
Yellow Poly	/ /	:	↓	① - 250, 500, 1L	H2SO4	YES	NO	-		X	
Green Poly	/ /	:	↓	① - 250, 500, 1L	NaOH	YES	NO	-		X	
Red Total Poly	/ /	:	↓	250, 500, 1L	HNO3	YES	NO	-			
Red Diss. Poly	/ /	:	↓	① - 250, 500, 1L	HNO3	YES	YES	-		X	
Total Bottles (include duplicate count):				⑤							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA							Purge Start Time: 10:50	Fe++: 3.2 mg/l	Sulfide: N/D mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.3L	5.61	6.91	2233	15.54	9.46	-123.4	cloudy, dark red tint
2	0:06	0.7L	5.77	6.92	2173	14.54	0.66	-167.6	cloudy, red tint
3	0:09	1.0L	5.75	6.93	2161	14.46	0.61	-165.3	↓ ↓
4	0:12	1.3L	5.80	6.87	2165	14.51	1.97	-161.1	↓ ↓
5	0:15	1.6L	5.80	6.89	2207	14.61	1.53	-163.5	↓ ↓
6	0:18	1.9L	5.84	6.93	2228	14.61	0.82	-167.4	↓ ↓
7	0:21	2.2L	5.76	6.91	2240	15.04	0.52	-167.1	↓ ↓
8	0:24	2.4L	5.77	6.91	2251	15.20	0.46	-166.3	↓ ↓
9	0:27	2.7L	5.82	6.91	2280	14.62	0.36	-168.8	↓ ↓
10	0:30	3.0	---	6.90	2268	14.63	0.32	-171.1	↓ ↓
11	:								
12	:								

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 44.4 Turbidity after sample collection (NTU): 37.3

Comments:

SAMPLER: Matt Wilson Matt Wilson
 (PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: G-4-S

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-4-S-072611

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	(W)	NW	(LIGHT)	MEDIUM	HEAVY
WEATHER:	SUNNY		(PARTLY CLOUDY)		CLOUDY		RAIN		TEMPERATURE: °F 7.0 °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
									Volume (gal)
7/26/11	09:24	22.89	--	5.02	--	17.87			X 1
/ /	:	.	---	.	---	.			X 3
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA								Sample Depth:		[√ if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√	
White Poly	7/26/11	11:00	B	(2) (125) 500, 1L	(None)	(YES)	(NO)	(NA)	X	
Yellow Poly	/ /	:	↓	(1) (250) 500, 1L	(H2SO4)	(YES)	(NO)	--	X	
Green Poly	/ /	:	↓	(1) (125) 300, 1L	(NaOH)	(YES)	(NO)	--	X	
Red Total Poly	/ /	:	↓	250, 500, 1L	(HNO3)	(YES)	(NO)	--		
Red Diss. Poly	/ /	:	↓	(1) (250) 500, 1L	(HNO3)	(YES)	(YES)	--	X	
Total Bottles (include duplicate count):				(5)						

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (As) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA			Purge Start Time: 09:32	Fe++: 4.2 mg/l	Sulfide: ND mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.8	6.18	6.35	1104	12.52	0.91	-65.5	sl cloudy, h pale tint
2	0:06	1.45	6.75	--	--	--	--	--	
3	0:12	4.0	9.43	6.11	1092	11.76	0.31	-91.7	clear, colorless
4	0:15	5.7	10.90	6.00	1091	11.71	0.30	-88.9	↓ ↓
5	--	11.0	16.30	6.10	1077	12.15	0.30	-91.4	sl cloudy, h pale tint
6	--	22.0	19.60	6.28	1073	12.07	0.32	-107.6	↓ ↓
7	--	33.0	19.75	6.33	1066	12.90	0.44	-124.2	↓ ↓
8	:		.	.					
9	:		.	.					
10	:		.	.					
11	:		.	.					
12	:		.	.					

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): > 1000

Turbidity after sample collection (NTU): > 1000

Comments: Would not low flow - purging 3 volumes

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: G4-D

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G4-D-070811

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	<u>(W)</u>	NW	<u>(LIGHT)</u>	MEDIUM	HEAVY
WEATHER:	<u>(SUNNY)</u>			PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE:	°F <u>65</u> °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
7/27/11	19:37	37.54	--	4.79	--	32.75		X1	5.34
7/28/11	09:33	37.54	--	16.11	--	21.43		X3	16.02
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA								Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method ^s	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	7/28/11	09:40	A	(2) (125, 500, 1L)	None	YES	NO	NA	√
Yellow Poly	//	:	↓	(1) (250, 500, 1L)	H2SO4	YES	NO	--	√
Green Poly	//	:	↓	(1) (125, 500, 1L)	NaOH	YES	NO	--	√
Red Total Poly	//	:	↓	250, 500, 1L	HNO3	YES	NO	--	√
Red Diss. Poly	//	:	↓	(1) (250, 500, 1L)	HNO3	YES	YES	--	√
Total Bottles (include duplicate count):				(5)					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA				Purge Start Time: <u>15:49</u>	Hach	YSI <<			
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	:	<u>5.46</u>	---	---	---	---	---	---	---
2	:	<u>10.86</u>	---	---	---	---	---	---	---
3	:	<u>16.26</u>	---	---	---	---	---	---	---
4	:	<u>3.06</u>	---	<u>6.65</u>	<u>1245</u>	<u>12.43</u>	<u>0.71</u>	<u>-160.1</u>	cloudy, dark brown/green
5	:	<u>4.06</u>	<u>28.50</u>	<u>6.75</u>	<u>1220</u>	<u>12.26</u>	<u>0.64</u>	<u>-166.1</u>	↓ ↓
6	:	<u>5.46</u>	<u>33.00</u>	<u>6.76</u>	<u>1222</u>	<u>12.36</u>	<u>0.59</u>	<u>-172.2</u>	↓ ↓
7	:	<u>6.06</u>	---	<u>6.53</u>	<u>1238</u>	<u>12.96</u>	<u>0.56</u>	<u>-166.8</u>	↓ ↓
8	:	<u>7.06</u>	---	<u>6.63</u>	<u>1326</u>	<u>12.52</u>	<u>0.51</u>	<u>-184.4</u>	↓ ↓
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): >1000

Turbidity after sample collection (NTU): 372

Comments: Purged dry after 7.0 gallons purged - let recover overnight and sampled

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

NOR Dry

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: 65-D-65-S

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: 65-D-65-S-072811

DUP ID:

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 80 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DIB-DTW	Volume (gal)
7/28/11	13:06	22.20	---	12.02	---	10.18	X1: 10.18, X3: 4.98
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	7/28/11	14:20	B	② (250, 500, 1L)	None	YES	NO	NA	✓
Yellow Poly	/ /	:	↓	① (250, 500, 1L)	H2SO4	YES	NO	---	✓
Green Poly	/ /	:	↓	① (125, 300, 1L)	NaOH	YES	NO	---	✓
Red Total Poly	/ /	:	↓	250, 500, 1L	HNO3	YES	NO	---	✓
Red Diss. Poly	N/A	↓	✓	① (250, 500, 1L)	HNO3	YES	YES	---	✓

Total Bottles (include duplicate count): 5

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
Yellow Poly	(Total Phosphorus)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA		Purge Start Time: 13:14	Fe++: 3.8 mg/l	Sulfide: 0.03 mg/l					
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.3L	12.48	6.89	713	17.14	10.64	-105.6	cloudy, L brown tint
2	0:06	0.7L	12.72	6.66	682	14.74	0.63	-105.5	cloudy, L pale tint
3	0:09	0.95L	12.90	6.26	668	14.50	0.56	-89.4	↓ ↓ ↓
4	0:12	1.3L	13.03	5.89	663	14.76	1.13	-75.3	↓ ↓
5	0:27	1.76	17.82	5.91	631	11.84	0.54	-55.8	clear, L pale tint
6	0:40	3.46	19.52	6.23	646	11.62	0.56	-71.9	clear, sh. pale tint
7	0:60	5.16	20.27	6.71	623	11.76	1.43	-72.3	clear ↓
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 8.18

Turbidity after sample collection (NTU): 4.27

Comments: could not low flow - purging 3 volumes.

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: G5-D

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G5-D-0728H

DUP ID: _____

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>		PRTY CLOUDY		CLOUDY		RAIN		TEMPERATURE: <u>70.5</u> °F		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
7/28/11	13:02	36.90	---	11.07	---	25.83			X1 <u>4,212.5 - 667</u>
/ /	:	.	---	.	---	.			X3 <u>127 - 12.63</u>
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Daller

GROUNDWATER SAMPLING DATA								Sample Depth: <u>35.5</u>	[N if used]
Bottle Type	Date	Time	Method [§]	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
White Poly	7/28/11	13:55	B	<u>2</u> <u>125, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>	NA	✓
Yellow Poly	7/28/11	13:55	B	<u>1</u> <u>250, 500, 1L</u>	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	---	✓
Green Poly	7/28/11	13:55	B	<u>1</u> <u>125, 500, 1L</u>	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	---	✓
Red Total Poly	/ /	:		250, 500, 1L	HNO ₃	YES	NO		
Red Diss. Poly	7/28/11	13:55	B	<u>1</u> <u>250, 500, 1L</u>	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	---	✓
Total Bottles (include duplicate count):				<u>5</u>					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cd) (SO₄) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>
RED DISSOLVED - Poly	<u>(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)</u>	

WATER QUALITY DATA						Purge Start Time: <u>13:10</u>	Fe++: <u>4.8</u> mg/l	Sulfide: <u>0.0</u> mg/l	
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	13:15	0.50L	11.09	6.84	396	14.38	2.71	46	clear
2	13:18	1.0L	11.13	5.99	397	13.99	2.43	76	
3	13:22	2.0L	11.12	5.48	425	13.73	2.24	71	
4	13:25	2.5L	11.13	5.08	469	13.75	1.16	58	
5	13:29	3.5L	11.14	5.22	479	13.46	0.56	21	
6	13:33	4.5L	11.14	5.48	484	13.38	0.32	-5.8	
7	13:37	5.5L	11.12	5.64	487	13.23	0.26	-23	
8	13:41	6.5L	11.12	5.76	488	13.22	0.27	-37	
9	13:45	7.5L	11.12	5.86	489	13.28	0.27	-41	✓
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 17.5

Turbidity after sample collection (NTU): 11.2

Comments: increase speed - sampled via low-flow methods.

SAMPLER: Matt Wilson
(PRINTED NAME)

Dorey Laffoon

(SIGNATURE)

[Signature]

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: G-6-5

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-6-5-072611-

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>			PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE:	° F <u>75</u> ° C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
<u>7/26/11</u>	<u>12:56</u>	<u>22.60</u>	--	<u>17.43</u>	--	<u>5.17</u>		X 1	<u>0.84</u>
<u>7/28/11</u>	<u>14:57</u>	<u>22.60</u>	--	<u>17.63</u>	--			X 3	<u>2.52</u>
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailer

GROUNDWATER SAMPLING DATA								Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	<u>7/26/11</u>	<u>13:40</u>	<u>B</u>	<u>2</u> (<u>125, 500, 1L</u>)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>X</u>
Yellow Poly	<u>1/1</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>250, 500, 1L</u>)	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>✓</u>
Green Poly	<u>1/1</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>125, 500, 1L</u>)	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>
Amber Glass Red Total Poly	<u>7/28/11</u>	<u>15:30</u>	<u>↓</u>	<u>1</u> (<u>250, 500, 1L</u>)	<u>HNO3/None</u>	<u>YES</u>	<u>NO</u>	<u>-</u>	<u>X</u>
Red Diss. Poly	<u>✓/1</u>	<u>✓:</u>	<u>✓</u>	<u>1</u> (<u>250, 500, 1L</u>)	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	<u>-</u>	<u>X</u>
Total Bottles (include duplicate count):				<u>5</u>	<u>7</u>	<u>5</u>			

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(CB) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)</u>	
RED DISSOLVED - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)</u>	

WATER QUALITY DATA							Purge Start Time: <u>12:59</u>	Fe++: <u>0.4</u> mg/l	Sulfide: <u>0.10</u> mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>0:03</u>	<u>0.5</u>	<u>17.41</u>	<u>7.55</u>	<u>3082</u>	<u>16.40</u>	<u>0.88</u>	<u>-187.0</u>	<u>cloudy, dark gray</u>
2	<u>0:06</u>	<u>0.85</u>	<u>17.40</u>	<u>7.58</u>	<u>2973</u>	<u>15.91</u>	<u>0.34</u>	<u>-191.5</u>	<u>↓ ↓</u>
3	<u>0:09</u>	<u>1.2</u>	<u>17.40</u>	<u>7.57</u>	<u>2903</u>	<u>15.74</u>	<u>0.24</u>	<u>-187.0</u>	<u>↓ ↓</u>
4	<u>0:12</u>	<u>1.7</u>	<u>17.41</u>	<u>7.48</u>	<u>2801</u>	<u>14.98</u>	<u>0.27</u>	<u>-163.5</u>	<u>st. cloudy, Amber</u>
5	<u>0:15</u>	<u>2.3</u>	<u>17.41</u>	<u>7.42</u>	<u>2649</u>	<u>14.48</u>	<u>0.30</u>	<u>-151.6</u>	<u>↓ L Amber</u>
6	<u>0:18</u>	<u>3.0</u>	<u>17.41</u>	<u>7.41</u>	<u>2510</u>	<u>14.04</u>	<u>0.37</u>	<u>-138.2</u>	<u>clear, L Amber</u>
7	<u>0:21</u>	<u>3.7</u>	<u>17.41</u>	<u>7.38</u>	<u>2339</u>	<u>14.16</u>	<u>0.57</u>	<u>-126.7</u>	<u>↓ ↓</u>
8	<u>0:24</u>	<u>4.3</u>	<u>17.41</u>	<u>7.40</u>	<u>2243</u>	<u>14.24</u>	<u>0.73</u>	<u>-126.0</u>	<u>↓ st. Amber tint</u>
9	<u>0:27</u>	<u>4.9</u>	<u>17.41</u>	<u>7.36</u>	<u>2091</u>	<u>14.20</u>	<u>1.07</u>	<u>-112.5</u>	<u>↓ ↓</u>
10	<u>0:33</u>	<u>6.1</u>	<u>17.41</u>	<u>7.36</u>	<u>2045</u>	<u>13.96</u>	<u>1.02</u>	<u>-101.0</u>	<u>↓ ↓</u>
11	<u>0:36</u>	<u>6.7</u>	<u>17.41</u>	<u>7.35</u>	<u>2027</u>	<u>13.87</u>	<u>1.07</u>	<u>-95.0</u>	<u>↓ ↓</u>
12	<u>:</u>								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 1.92

Turbidity after sample collection (NTU): 1.48

Comments:

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333
Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminal - RI/FS update WELL ID: 66-5 (Report) Resample for AHTs
 SITE ADDRESS: 4029 Industrial Way, Longview WA BLIND ID: 66-5-072811

DUP ID: NA

WIND FROM:	N	NE	E	SE	S	SW	(W)	NW	(LIGHT)	MEDIUM	HEAVY
WEATHER:	(SUNNY)			CLOUDY		RAIN		?	TEMPERATURE: °F <u>80</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
7/28/11	14:57	22.60	---	17.63	---	4.97		X 1	0.81
/ /	14:5							X 3	2.43
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Submersible Pump (B) Peristaltic Pump (C) Disposable Bailor (D) PVC/Teflon Bailor (E) Dedicated Bailor (F) Dedicated Pump (G) Other =

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample)								Sample Depth:		[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√	
VOA Glass	/ /	:		3 40 ml	HCl	YES	NO			
Amber Glass	7/28/11	15:30	B	(2) 250, 500, 1L	(None) (HCl) (H ₂ SO ₄)	(YES)	(NO)	-	✓	
White Poly	/ /	:		250, 500, 1L	None	YES	NO	NA		
Yellow Poly	/ /	:		250, 500, 1L	H ₂ SO ₄	YES	NO			
Green Poly	/ /	:		250, 500, 1L	NaOH	YES	NO			
Red Total Poly	/ /	:		250, 500, 1L	HNO ₃	YES	NO			
Red Diss. Poly	/ /	:		250, 500, 1L	HNO ₃	YES	YES			
	/ /	:		250, 500, 1L		YES				

Total Bottles (include duplicate count): (2)

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	VOA - Glass	(8021) (8260B) (BTEX) (NWTPH-Gx)
	AMBER - Glass	(PAH) (TPH-HCID) (NWTPH-Dx) (TPH-418.1) (Oil & Grease) (8081A) <u>80270C SIM</u>
	WHITE - Poly	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO ₃ /CO ₃) (Cl) (SO ₄) (NO ₃) (NO ₂) (F)
	YELLOW - Poly	(COD) (TOC) (Total PO ₄) (Total Keldahl Nitrogen) (NH ₃) (NO ₃ /NO ₂)
	GREEN - Poly	(Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

WATER QUALITY DATA						Purge Start Time: <u>15:02</u>	DO	Pump/Bailor Inlet Depth:	
Meas.	Method	Purged (gal)	pH	E Cond (µS)	°F Temp °C	Other	Diss. O ₂ (mg/L)	Water Quality	
4	0:0.3	0.5	7.65	725	1201	15.98	4.27	-36.1	clear, colorless
3	0:0.6	1.1	7.66	728	1376	15.99	4.97	-35.0	sl. Amber tint
2	0:1.0	1.6	7.62	730	1499	16.02	4.73	-27.15	↓ ↓
1	0:1.5	2.5	7.62	726	1640	14.85	4.67	-15.7	↓ ↓
0	0:2.0	3.0	7.62	729	1685	14.88	4.65	-14.8	↓ ↓
[Casing]	[Select A-G]	[Cumulative Totals]				[Circle units]			[Clarity, Color]
	0:25	4.5	7.62	7.35	1699	14.77	4.67	-15.7	↓ ↓

SAMPLER: Math Wilson
(PRINTED NAME)

Math Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: G-6-D

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-6-D-072611

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	<input checked="" type="radio"/> W	NW	<input checked="" type="radio"/> LIGHT	MEDIUM	HEAVY
WEATHER:	<input checked="" type="radio"/> SUNNY			<input type="radio"/> PARTLY CLOUDY		<input type="radio"/> CLOUDY		<input type="radio"/> RAIN		TEMPERATURE:	°F <u>75</u> °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DIW	DTB-DIW			[Water Column x Gal/ft]
7/26/11	12:06	36.35	---	20.30	---	16.05		X 1	2.62
7/28/11	15:32	36.35	---	20.51	---	15.84		X 3	7.86
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	[if used]	
White Poly	7/24/11	12:40	B	(2) 125, 500, 1L	None	YES	NO	NA	X	
Yellow Poly	/	:	↓	(1) 250, 500, 1L	H2SO4	YES	NO	-	X	
Green Poly	/	:	↓	(1) 125, 500, 1L	NaOH	YES	NO	-	X	
Red Total Poly	7/26/11	16:10	↓	(2) 250, 500, 1L	HNO3/None	YES	NO	-	X	
Red Diss. Poly	/	:	↓	(1) 250, 500, 1L	HNO3	YES	YES	-	X	
Total Bottles (include duplicate count):				5	7	9				

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO ₄) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorus)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA						Purge Start Time: 12:10	Fe++: 6.5 mg/l	Sulfide: 0.06 mg/l	
Meas.	Time	Cum. Volume	DIW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.5L	20.36	6.59	2819	16.38	3.85	-91.0	clear, colorless
2	0:06	0.8L	20.38	6.54	2743	14.71	0.18	-99.6	↓ ↓
3	0:09	1.2L	20.38	6.44	2738	14.59	0.56	-97.2	↓ ↓
4	0:12	1.55L	20.38	6.42	2735	15.03	0.42	-102.0	↓ ↓
5	0:15	2.0L	20.39	6.48	2737	14.84	0.34	-107.1	↓ ↓
6	0:18	2.5L	20.40	6.49	2727	14.81	0.31	-107.7	↓ ↓
7	0:21	3.0L	20.40	6.48	2730	14.66	0.27	-112.3	↓ ↓
8	0:24	3.5L	20.40	6.48	2749	14.68	0.27	-113.9	↓ ↓
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 720

Turbidity after sample collection (NTU): 766

Comments:

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



ANCHOR
ENVIRONMENTAL, L.L.C.

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PROJECT NAME: Milkenum Bulk Terminals - RI/FS Update

WELL ID: G-6-D (Re-purge) Resample for PAFs

SITE ADDRESS: 4029 Industrial Way, Longview WA

BLIND ID: G-6-D-072811

DUP ID: _____ NA

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	<u>LIGHT</u>	MEDIUM	HEAVY	
WEATHER:	<u>SUNNY</u>			LOUDY	RAIN			?	TEMPERATURE: °F <u>80</u> °C			

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
<u>7/28/11</u>	<u>15:32</u>	<u>36.35</u>	<u>---</u>	<u>20.51</u>	<u>---</u>	<u>15.84</u>			X 1 <u>2.58</u>
<u>/ /</u>	<u>:</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>	<u>.</u>			X 3 <u>7.74</u>
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Submersible Pump (B) Peristaltic Pump (C) Disposable Bailer (D) PVC/Teflon Bailer (E) Dedicated Bailer (F) Dedicated Pump (G) Other =

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample)								Sample Depth:		[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√	
VOA Glass	<u>/ /</u>	<u>:</u>		<u>40 ml</u>	<u>HCl</u>	YES	NO			
Amber Glass	<u>7/28/11</u>	<u>16:10</u>	<u>B</u>	<u>250, 500, 1L</u>	<u>(None)</u> (HCl) (H ₂ SO ₄)	<u>YES</u>	<u>NO</u>	<u>---</u>	<u>Y</u>	
White Poly	<u>/ /</u>	<u>:</u>		<u>250, 500, 1L</u>	<u>None</u>	YES	NO	NA		
Yellow Poly	<u>/ /</u>	<u>:</u>		<u>250, 500, 1L</u>	<u>H₂SO₄</u>	YES	NO			
Green Poly	<u>/ /</u>	<u>:</u>		<u>250, 500, 1L</u>	<u>NaOH</u>	YES	NO			
Red Total Poly	<u>/ /</u>	<u>:</u>		<u>250, 500, 1L</u>	<u>HNO₃</u>	YES	NO			
Red Diss. Poly	<u>/ /</u>	<u>:</u>		<u>250, 500, 1L</u>	<u>HNO₃</u>	YES	YES			
	<u>/ /</u>	<u>:</u>		<u>250, 500, 1L</u>		YES				

Total Bottles (include duplicate count): 2

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	VOA - Glass	(8021) (8260B) (BTEX) (NWTPH-Gx)
	AMBER - Glass	(PAH) (TPH-HCID) (NWTPH-Dx) (TPH-418.1) (Oil & Grease) (8081A) <u>8270C SIM PAHs</u>
	WHITE - Poly	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO ₃ /CO ₃) (Cl) (SO ₄) (NO ₃) (NO ₂) (F)
	YELLOW - Poly	(COD) (TOC) (Total PO ₄) (Total Keldahl Nitrogen) (NH ₃) (NO ₃ /NO ₂)
	GREEN - Poly	(Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

WATER QUALITY DATA							Purge Start Time: <u>15:42</u>		Pump/Bailer Inlet Depth:	
Meas.	Method	Purged (gal)	pH	E Cond (µS)	°F Temp °C	Other	Diss O ₂ (mg/l)	Water Quality		
<u>4</u>	<u>0:05</u>	<u>0.9</u>	<u>20.65</u>	<u>6.81</u>	<u>2792</u>	<u>15.69</u>	<u>0.99</u>	<u>-86.4</u>	<u>clear, colorless</u>	
<u>3</u>	<u>0:10</u>	<u>1.8</u>	<u>20.66</u>	<u>6.64</u>	<u>2803</u>	<u>15.65</u>	<u>0.58</u>	<u>-84.6</u>	<u>↓ ↓</u>	
<u>2</u>	<u>0:15</u>	<u>2.7</u>	<u>20.66</u>	<u>6.60</u>	<u>2810</u>	<u>15.58</u>	<u>0.27</u>	<u>-90.0</u>	<u>↓ ↓</u>	
<u>1</u>	<u>0:20</u>	<u>3.7</u>	<u>20.66</u>	<u>6.59</u>	<u>2837</u>	<u>15.59</u>	<u>0.23</u>	<u>-94.9</u>	<u>↓ ↓</u>	
<u>0</u>	<u>0:25</u>	<u>0.00</u>	<u>20.66</u>	<u>6.59</u>	<u>2867</u>	<u>15.62</u>	<u>0.14</u>	<u>-99.8</u>	<u>↓ ↓</u>	

[Casing] [Select A-G] [Cumulative Totals] [Circle units] [Clarity, Color]

SAMPLER: Matt Wilson
(PRINTED NAME)

Matthew Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: G 7 d

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-7-D-0728-11

DUP ID: ---

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	<u>LIGHT</u>	MEDIUM	HEAVY	
WEATHER:	<u>PARTLY CLOUDY</u>			LOUDY	RAIN			TEMPERATURE: <u>70.5</u> °C				

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)	
7/27/11	13:20	32.65	---	10.43	---	22.22			X 1	3.62
7/28/11	08:36	32.65	---	13.77	---	18.88			X 3	10.86
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA								Sample Depth:			[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH			√
White Poly	<u>7/28/11</u>	<u>08:50</u>	<u>A</u>	<u>2</u> (<u>125,500, 1L</u>)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>			✓
Yellow Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>250,500, 1L</u>)	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	<u>---</u>			✓
Green Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>1</u> (<u>125,500, 1L</u>)	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	<u>---</u>			✓
Red Total Poly	<u>/ /</u>	<u>:</u>	<u>↓</u>	<u>250, 500, 1L</u>	<u>HNO3</u>	<u>YES</u>	<u>NO</u>	<u>---</u>			✓
Red Diss. Poly	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>1</u> (<u>250,500, 1L</u>)	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	<u>---</u>			✓
Total Bottles (include duplicate count):				<u>5</u>							

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>
RED DISSOLVED - Poly	<u>(Al) (B) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)</u>	

WATER QUALITY DATA			Purge Start Time: <u>13:38</u>	Fe++: <u>5.4</u> mg/l	Sulfide: <u>ND</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>13:40</u>	<u>0.5 g</u>	<u>14.97</u>	<u>5.38</u>	<u>1402</u>	<u>12.98</u>	<u>.38</u>	<u>-29</u>	<u>cloudy brown grey</u>
2	<u>13:42</u>	<u>1.0 g</u>	<u>16.46</u>	<u>5.32</u>	<u>1389</u>	<u>12.97</u>	<u>.38</u>	<u>-27</u>	<u>almost clear, tan</u>
3	<u>13:44</u>	<u>2.0 g</u>	<u>19.02</u>	<u>5.23</u>	<u>1371</u>	<u>12.88</u>	<u>.41</u>	<u>-30</u>	<u>↓</u>
4	<u>13:47</u>	<u>3.0 g</u>	<u>23.43</u>	<u>5.40</u>	<u>1366</u>	<u>12.91</u>	<u>.41</u>	<u>-41</u>	<u>↓</u>
5	<u>13:50</u>	<u>4.0 g</u>	<u>25.68</u>	<u>5.58</u>	<u>1337</u>	<u>12.85</u>	<u>.27</u>	<u>-54</u>	<u>↓</u>
6	<u>13:53</u>	<u>5.0 g</u>	<u>27.14</u>	<u>5.77</u>	<u>1328</u>	<u>13.03</u>	<u>.16</u>	<u>-66</u>	<u>light cloudy, tan, grey</u>
7	<u>13:56</u>	<u>6.0 g</u>	<u>28.90</u>	<u>5.97</u>	<u>1347</u>	<u>13.02</u>	<u>.13</u>	<u>-79</u>	<u>↓</u>
8	<u>14:00</u>	<u>7.0 g</u>	<u>31.27</u>	<u>6.16</u>	<u>1400</u>	<u>12.95</u>	<u>.10</u>	<u>-92</u>	<u>↓</u>
9	<u>14:03</u>	<u>7.75 g</u>	<u>Well went dry, allow to recharge</u>			<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 125

Turbidity after sample collection (NTU): 15.1

Comments:

SAMPLER: Matt Wilson

(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: R1-S

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: R1-S-080211

DUP ID:

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: <u>70</u> °F °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
08/02/11	11:43	12.55	---	4.67	---	7.88	X 1 1.28
/ /	:	.	---	.	---	.	X 3 3.84

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓ (if used)
White Poly	8/2/11	11:50	B	<u>2</u> 125, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	NA	✓
Yellow Poly	/ /	:		250, 500, 1L	H2SO4	YES	NO		
Green Poly	/ /	:		125, 500, 1L	NaOH	YES	NO		
Red Total Poly	/ /	:		250, 500, 1L	HNO ₃	YES	NO		
Red Diss. Poly	/ /	:		250, 500, 1L	HNO ₃	YES	YES		

Total Bottles (include duplicate count): 2

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysts below)
	WHITE - Poly	(Cl) (SO ₄) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

AMBER GLASS (CAH) - 8270C SIM hach YSI

WATER QUALITY DATA Purge Start Time: 11:16 Fe++: 3.0 mg/l Sulfide: 0.16 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.6L	4.88	9.82	1543	14.49	12.42	-332.1	sl. cloudy, Ambient tint
2	0:06	1.2L	4.89	9.43	1331	14.67	12.4	-284	↓
3	0:09	1.8L	4.90	8.86	1093	14.74	9.8	-240	↓
4	0:12	2.0L	4.92	8.41	832	14.65	8.7	-203	light amber tint
5	0:15	2.8L	4.94	8.09	683	14.30	7.6	-179	very light amber tint
6	0:18	3.2L	4.93	7.79	612	14.16	6.5	-164	↓
7	0:21	3.8L	4.93	7.60	592	14.03	6.1	-156	clear, colorless
8	0:24	3.4L	4.94	7.44	568	13.96	5.5	-152	↓ ↓
9	0:27	4.1L	4.95	7.33	543	13.92	0.54	-151.8	↓ ↓
10	0:30	4.8L	4.94	7.28	536	14.00	0.46	-158.4	↓ ↓
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 2.62

Turbidity after sample collection (NTU): 1.96

Comments:

SAMPLER: Matt Wilson

(PRINTED NAME)

(SIGNATURE)

Matt Wilson

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: R-10

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: R-10-0802-1

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	<u>(LIGHT)</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>		PRITLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>65</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							Product Thickness	Water Column	Volume (gal)	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			X 1	X 3
8/11/11	17:10	24.82	---	5.78	---	19.04				310 0.78
/ /	:	:	---		---					9.32

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA								Sample Depth:	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
White Poly	8/11/11	11:00	B	125, 500, 1L	None	YES	NO	NA	X
Yellow Poly	/ /	:	+	250, 500, 1L	H2SO4	YES	NO		
Green Poly	/ /	:	+	125, 500, 1L	NaOH	YES	NO		
Red Total Poly	/ /	:	+	250, 500, 1L	HNO3	YES	NO		
Red Diss. Poly	/ /	:	+	250, 500, 1L	HNO3	YES	YES		

Total Bottles (include duplicate count): 2

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	<u>White Poly</u>	(Cl) (SO ₄) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) <u>PAHs 8270 C. SIM</u>
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA Purge Start Time: 17:18 Fe⁺⁺: 5.3 mg/l Sulfide: ND mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	17:16	2L	18.83	5.84	2041	14.25	3.0	-75	slight orange tint
2	17:20	4L	21.22	5.82	2018	13.62	.93	-76	light cloudy orange
3	17:24	6L	23.50	5.94	1985	13.95	1.0	-75	light cloudy orange
4	17:25	well is dry - re-charge							
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 181 Turbidity after sample collection (NTU): 30.8

Comments: Will take 2 well volumes to collect sample if collecting PAHs, will take 2 times of collecting sample volume till well goes dry to get total sample volume

SAMPLER: Matt Wilson

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update WELL ID: R2

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: R2-080211

DUP ID:

WIND FROM: (N) NE E SE S SW W NW (LIGHT) MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY (CLOUDY) RAIN TEMPERATURE: °F 60 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate unit] [Water Column x Gall/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)	
08/08/11	08:27	14.86	---	4.71	---	10.15	X 1 1.65	
/ /	:	.	---	.	---	.	X 3 4.95	
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875

§ METHODS: (A) Waiver (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA Sample Depth: [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	/ /	:		2 125, 500, 1L	None	YES	NO	NA	
Yellow Poly	/ /	:		1 250, 500, 1L	H2SO4	YES	NO		
Green Poly	/ /	:		1 125, 500, 1L	NaOH	YES	NO		
Red Total Poly	08/08/11	08:50	(B) (2)	250, 500 (1) (None)	HNO3	(YES)	(NO)	-	X
Red Diss. Poly	/ /	:		1 250, 500, 1L	HNO3	YES	YES		

Total Bottles (include duplicate count): 7 (2)

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
RED-TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)	PAHs 8270C 571
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	Hard 451

WATER QUALITY DATA Purge Start Time: 08:38 Fe++: 3.7 mg/l Sulfide: 0.07 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.5L	4.99	6.01	493	11.93	1.92	-27.3	clear, colorless
2	0:06	0.8L	5.00	4.88	471	11.71	1.25	7.6	↓ ↓
3	0:09	1.1L	5.03	4.66	457	11.56	1.94	13.4	↓ ↓
4	0:12	1.5L	5.04	4.73	452	11.43	1.06	7.4	↓ ↓
5	0:15	1.9L	5.04	4.94	441	11.37	0.89	-3.4	↓ ↓
6	0:18	2.4L	5.04	5.21	427	11.36	0.78	-16.2	↓ ↓
7	0:21	2.85L	5.04	5.43	422	11.34	0.73	-26.0	↓ ↓
8	0:24	3.40	5.05	5.62	418	11.32	0.66	-34.2	↓ ↓
9	0:27	3.85	5.04	5.71	414	11.37	0.62	-38.6	↓ ↓
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 3.01

Turbidity after sample collection (NTU): 3.12

Comments:

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333
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Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update WELL ID: R3
SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: R3-080211

DUP ID:

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
WEATHER: SUNNY PRTY CLOUDY CLOUDY RAIN TEMPERATURE: high 60's °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate units)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
8/2/11	09:38	24.65	---	3.09	---	21.56		X 1	3.51
/ /	:	.	---	.	---	.		X 3	10.53

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Daller

GROUNDWATER SAMPLING DATA										Sample Depth:	(N/A used)
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓		
White Poly Amber Glass	08/02/11	10:20	B	<u>2</u> 125, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>		X	
Yellow Poly	/ /	:		± 250, 500, 1L	H2SO4	YES	NO				
Green Poly	/ /	:		⊥ 125, 500, 1L	NaOH	YES	NO				
Red Total Poly	/ /	:		⊥ 250, 500, 1L	HNO ₃	YES	NO				
Red Diss. Poly	/ /	:		⊥ 250, 500, 1L	HNO ₃	YES	YES				

Total Bottles (include duplicate count): 2

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE Poly <u>Amber Glass</u>	(Cl) (SO ₄) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) <u>8270C SIM PAHs</u>
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA Purge Start Time: 09:45 Fe⁺⁺: 0.2 mg/l Sulfide: 34.65 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	0.4	3.47	10.09	22850	15.58	8.25	-362	black, opaque
2	0:06	0.7	3.45	10.28	22968	15.44	0.58	-403.6	↓ ↓
3	0:09	1.1	3.47	10.30	22771	15.76	0.48	-419.0	↓ ↓
4	0:12	1.4	3.80	10.31	22670	15.76	0.43	-421.0	↓ ↓
5	0:15	1.7	3.82	10.32	22609	15.88	0.39	-419.8	↓ ↓
6	0:18	2.0	3.83	10.32	22613	16.15	0.36	-418.8	↓ ↓
7	0:21	2.35	3.95	10.32	22635	15.69	0.36	-423.4	↓ ↓
8	:		.	.					
9	:		.	.					
10	:		.	.					
11	:		.	.					
12	:		.	.					

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 3.21

Turbidity after sample collection (NTU): 5.44

Comments:

SAMPLER: Matt Wilson

Matt Wilson

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: R-4s

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: R4-S-080011-

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>			PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F	70 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
8/1/11	17:30	19.56	--	7.51	--	12.05		X 1	1.96
8/02/11	12:13	19.56	--	8.43	--	11.13		X 3	5.88
Gal/ft = (dla./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA								Sample Depth:		[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH		
White Poly Anchor Glass	08/02/11	12:20	B	2 125, 500 (1L)	None	YES	NO	NA	X	
Yellow Poly	/ /	:	/	250, 500, 1L	H2SO4	YES	NO			
Green Poly	/ /	:	/	125, 500, 1L	NaOH	YES	NO			
Red Total Poly	/ /	:	/	250, 500, 1L	HNO3	YES	NO			
Red Diss. Poly	/ /	:	/	250, 500, 1L	HNO3	YES	YES			

Total Bottles (include duplicate count): 5 (2)

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO ₄) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Ce) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

Anchor Glass (PAHs 8270C SIM) Hach 4SE <<

WATER QUALITY DATA			Purge Start Time: 17:33	Fe++: 4.7 mg/l	Sulfide: ND mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	17:36	2L	10.20	6.73	1828	13.39	0.5	-110	clear
2	17:39	4L	13.81	6.46	1712	13.30	4.6	-107	clear
3	17:42	6L	16.66	6.43	1665	13.45	0.41	-102	clear
4	17:45	8L	19.07	6.50	1708	13.63	1.17	-103	clear
5	17:46	well dry - recharge							
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 33.3

Turbidity after sample collection (NTU): 26.8

Comments:

SAMPLER: Matt Wilson

Matt Wilson

FIELD SAMPLING DATA SHEET



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Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W4

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W4-080111-

DUP ID:

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRITLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 70 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
/ /	:	---	---	.	---	.	X1 SURFACE
/ /	:	---	---	.	---	.	X3 WATER
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080
							12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	<u>8/01/11</u>	<u>13:00</u>	<u>B</u>	<u>2</u> (<u>250, 500, 1L</u>)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>X</u>
Yellow Poly	/ /	:	↓	<u>1</u> (<u>250, 500, 1L</u>)	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	---	<u>X</u>
Green Poly	/ /	:	↓	<u>1</u> (<u>125, 500, 1L</u>)	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	---	<u>X</u>
Red Poly Poly	/ /	:	↓	<u>1</u> (<u>250, 500, 1L</u>)	<u>HNO3</u>	<u>YES</u>	<u>NO</u>	---	<u>X</u>
Red Diss. Poly	<u>N</u>	<u>↓</u>	<u>↓</u>	<u>1</u> (<u>250, 500, 1L</u>)	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	---	<u>X</u>

Total Bottles (include duplicate count): 5

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
Yellow Poly	(Total Phosphorous)	
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA Purge Start Time: 12:50 Fe++: 2.8 mg/l Sulfide: 0.06 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>0:03</u>	---	---	<u>6.64</u>	<u>235</u>	<u>18.69</u>	<u>2.17</u>	<u>-29.8</u>	<u>cloudy, brown tint</u>
2	<u>0:06</u>	---	---	<u>6.59</u>	<u>233</u>	<u>18.87</u>	<u>2.71</u>	<u>-19.1</u>	<u>sl. cloudy, brown tint</u>
3	<u>0:09</u>	---	---	<u>6.54</u>	<u>233</u>	<u>18.52</u>	<u>2.67</u>	<u>-14.0</u>	↓ ↓
4	<u>0:12</u>	---	---	<u>6.51</u>	<u>233</u>	<u>18.54</u>	<u>2.62</u>	<u>-12.4</u>	↓ ↓
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters] Turbidity before sample collection (NTU): 37.2 Turbidity after sample collection (NTU): 36.1

Comments: Sample collected by throwing weighted line with tubing attached into ditch.
Sample collected 10 feet channel ward of the south shore

SAMPLER: Matt Wilson (PRINTED NAME) Matthew Wilson (SIGNATURE)

Some TS ↓ ↓ ↓

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W2

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W2-080111

DUP ID: W2-080111-D (1425)

WIND FROM: N NE E SE S SW W (NW) (LIGHT) MEDIUM HEAVY
 WEATHER: (SUNNY) PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 75% °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
/ /	:	.	---	.	---	.			X1 SURFACE
/ /	:	.	---	.	---	.			X3 WATER
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA							Sample Depth:			[√ if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√	
White Poly	8/01/11	14:00	B	(2) 125, 500, 1L	None	YES	NO	NA	X	
Yellow Poly	///			(1) 250, 500, 1L	H2SO4	YES	NO	---	X	
Green Poly	///			(1) 125, 500, 1L	NaOH	YES	NO	---	X	
Red Total Poly	///			250, 500, 1L	HNO3	YES	NO	---	X	
Red Diss. Poly	///			(1) 250, 500, 1L	HNO3	YES	YES	---	X	
Total Bottles (include duplicate count):				10						

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Bb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA			Purge Start Time: 14:03	Hach		45I			
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	---	---	6.77	235	21.24	3.95	45.4	clear, colorless
2	0:06	---	---	6.73	235	21.18	3.67	48.4	↓ ↓
3	0:09	---	---	6.84	235	21.20	3.55	50.5	↓ ↓
4	0:12	---	---	6.75	235	21.14	3.69	55.4	↓ ↓
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] [Clarity, Color]
 Turbidity before sample collection (NTU): 19.0 Turbidity after sample collection (NTU): 19.2

Comments: sample collected by throwing weighted line with tubing attached approx 15 feet from south shore of ditch. Sample collected 0.5 feet above mud line.

SAMPLER: Matt Wilson
 (PRINTED NAME)

Matt Wilson
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: 03

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: 03-080111

DUP ID:

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PARTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 80 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
/ /	:	.	---	.	---	.	X 1 SURFACE
/ /	:	.	---	.	---	.	X 3 WATER

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√ if used
White Poly	8/01/11	15:20	B	(2) 125, 500, 1L	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	(1) 250, 500, 1L	H2SO4	YES	NO	—	X
Green Poly	/ /	:	↓	(1) 125, 500, 1L	NaOH	YES	NO	—	X
Red Total Poly	/ /	:	↓	250, 500, 1L	HNO3	YES	NO	—	
Red Diss. Poly	/ /	:	↓	(1) 250, 500, 1L	HNO3	YES	YES	—	X

Total Bottles (include duplicate count): 5

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA Purge Start Time: 15:01 Fe++: 0.2 mg/l Sulfide: 0.6 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	—	—	6.95	316	23.39	2.60	163.1	clear, slight brown tint
2	0:06	—	—	6.94	314	22.86	2.22	137.6	↓ ↓
3	0:09	—	—	6.95	313	22.86	2.10	124.0	↓ ↓
4	0:12	—	—	6.94	313	22.70	2.27	127.7	↓ ↓
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

Turbidity before sample collection (NTU): 25.4 Turbidity after sample collection (NTU): 22.8

Comments: Sample collected by throwing weighted line with tubing attached 10 feet from shore south shore of ditch. Sample collected only feet above mudline.

SAMPLER: Matt Wilson (PRINTED NAME) Matt Wilson (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W4

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W4-080111

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>		PRITLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>80</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
/ /	:	.	---	.	---	.	X 1 <u>SURFACE</u>
/ /	:	.	---	.	---	.	X 3 <u>WATER</u>

Gal/ft = (dia./2)² × 0.163
 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailer

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√ if used
White Poly	<u>8/11</u>	<u>16:10</u>	<u>B</u>	<u>2</u> (<u>250, 500, 1L</u>)	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>X</u>
Yellow Poly	/ /	:	↓	<u>1</u> (<u>250, 500, 1L</u>)	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>	-	<u>X</u>
Green Poly	/ /	:	↓	<u>1</u> (<u>250, 500, 1L</u>)	<u>NaOH</u>	<u>YES</u>	<u>NO</u>	-	<u>X</u>
Red Total Poly	/ /	:	↓	250, 500, 1L	<u>HNO3</u>	YES	NO	-	
Red Diss. Poly	<u>✓/✓</u>	<u>✓:</u>	<u>✓</u>	<u>1</u> (<u>250, 500, 1L</u>)	<u>HNO3</u>	<u>YES</u>	<u>YES</u>	-	<u>X</u>
Total Bottles (include duplicate count):				<u>5</u>					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	Yellow Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	<u>(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)</u>

WATER QUALITY DATA			Purge Start Time: <u>15:54</u>	Fe++: <u>0.2</u> mg/l	Sulfide: <u>0.05</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>0:03</u>	---	---	<u>7.22</u>	<u>420</u>	<u>22.42</u>	<u>3.01</u>	<u>21.9</u>	<u>clear, sl. light brown tint</u>
2	<u>0:06</u>	---	---	<u>7.21</u>	<u>418</u>	<u>22.29</u>	<u>2.47</u>	<u>22.8</u>	↓ ↓
3	<u>0:09</u>	---	---	<u>7.23</u>	<u>416</u>	<u>22.41</u>	<u>1.94</u>	<u>24.3</u>	↓ ↓
4	<u>0:12</u>	---	---	<u>7.22</u>	<u>418</u>	<u>22.28</u>	<u>1.79</u>	<u>26.2</u>	↓ ↓
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

Turbidity before sample collection (NTU): 16.8 Turbidity after sample collection (NTU): 13.6

Comments: Sample collected by throwing weighted line 10 feet out from east shore of ditch.
Sample collected 0.5 feet above mudline.

SAMPLER: Matt Wilson
 (PRINTED NAME)

Matt Wilson
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



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Portland, OR 97224

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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W5

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W5-080111

DUP ID:

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 80 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

{Product Thickness} {Water Column}

{Circle appropriate unit} {Water Column x Gal/ft}

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)	
/ /	:	.	---	.	---	.	X 1 SURFACE	
/ /	:	.	---	.	---	.	X 3 WATER	
Gal/ft = (dia./2) ² × 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA

Sample Depth:

[√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√
White Poly	8/5/11	16:50	C	2 (125, 500, 1L)	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	1 (250, 500, 1L)	H2SO4	YES	NO	---	X
Green Poly	/ /	:	↓	1 (125, 500, 1L)	NaOH	YES	NO	---	X
Red Total Poly	/ /	:	↓	250, 500, 1L	HNO3	YES	NO	---	X
Red Diss. Poly	/ /	:	↓	1 (250, 500, 1L)	HNO3	YES	YES	---	X
Total Bottles (include duplicate count):				5					

Analysis Allowed per Bottle Type

BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSN) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
Yellow Poly	(Total Phosphorous)
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

WATER QUALITY DATA

Purge Start Time: NA Fe++: 0.1 mg/l Sulfide: 0.03 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	---	---	---	6.96	131	19.90	8.36	200.8	clear, colorless
2	:
3	:
4	:
5	:
6	:
7	:
8	:
9	:
10	:
11	:
12	:

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 4.30 Turbidity after sample collection (NTU): 4.43

Comments: Sample collected from 0-4 foot interval below water surface with a bailor lobed from downstream end of dock on shoreward side of dock.

SAMPLER: Matt Wilson
 (PRINTED NAME)

Matt Wilson
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W-6

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W6-080111

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY	
WEATHER:	SUNNY			PARTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE:	° F: 65	° C:

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate units)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/t]
/ /	:	.	---	---	---	---			X 1 SURFACE
/ /	:	.	---	---	---	---			X 3 WATER
Gal/ft - (dia, 2)² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Walerra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA								Sample Depth:	(If used)
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
White Poly	8/01/11	10:30	B	2 (250, 500, 1L)	None	YES	NO	NA	X
Yellow Poly	/ /	:	↓	1 (250, 500, 1L)	H2SO4	YES	NO	-	X
Green Poly	/ /	:	↓	1 (250, 500, 1L)	NaOH	YES	NO	-	X
Red Total Poly	/ /	:	↓	1 (250, 500, 1L)	HNO3, None	YES	NO	-	X
Red Diss. Poly	/ /	:	↓	1 (250, 500, 1L)	HNO3	YES	YES	-	X
Total Bottles (include duplicate count):				5					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (TDS)
RED DISSOLVED - Poly	(Al) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA			Purge Start Time: 10:14	Fe++: 0.2 mg/l	Sulfide: 0.08 mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	---	---	6.46	244	20.89	2.48	112.9	sl. cloudy, brown tint
2	0:06	---	---	6.57	233	20.91	2.10	103.5	clear, ↓
3	0:09	---	---	6.59	235	20.86	1.67	100.6	↓ ↓
4	0:12	---	---	6.63	233	20.85	1.61	94.1	↓ ↓
5	0:15	---	---	6.64	230	20.89	1.76	92.0	↓ ↓
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

Turbidity before sample collection (NTU): 16.8 | Turbidity after sample collection (NTU): 16.3

Comments: Sample collected by throwing peristaltic line with tubing attached. Sample collected 0.5 feet above mudline from floating dock.

SAMPLER: Matt Wilson (PRINTED NAME) | (SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

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PROJECT NAME: Millennium Bulk Terminals RI/FS Update

WELL ID: W7

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: W7-08011-

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY	
WEATHER:	SUNNY			PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE:	°F: 70	°C:

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate units] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
/ /	:	.	---	.	---	.			X1 SURFACE
/ /	:	.	---	.	---	.			X3 WATER
Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA								Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√
White Poly	8/11	11:50	B	2 (2) 125, 500, 1L	None	YES	NO	NA	X
Yellow Poly	//	:	↓	1 (1) 250, 500, 1L	H2SO4	YES	NO	---	X
Green Poly	//	:	↓	1 (1) 125, 500, 1L	NaOH	YES	NO	---	X
Red Total Poly	//	:	↓	1 (1) 250, 500, 1L	HNO3, None	YES	NO	---	X
Red Diss. Poly	//	:	↓	1 (1) 250, 500, 1L	HNO3	YES	YES	---	X
Total Bottles (include duplicate count):				8 (5)					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cl) (SO4) (F) (alkalinity) (TDS) (TSS) (Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	Yellow Poly	(Total Phosphorous)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na) TDS
RED DISSOLVED - Poly	(Al) (Bb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (I) (V) (Zn) (Hg) (K) (Na) Hardness (Silica)	

WATER QUALITY DATA			Purge Start Time: 11:33	Fe++: 2.6 mg/l	Sulfide: 0.08 mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	0:03	---	---	6.53	237	17.10	3.47	1.3	clear, 6 brown tint
2	0:06	---	---	6.49	235	17.16	3.19	-3.1	↓ ↓
3	0:09	---	---	6.49	236	17.31	3.05	-5.6	↓ ↓
4	0:12	---	---	6.47	236	17.19	2.95	-6.9	↓ ↓
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 37.1

Turbidity after sample collection (NTU): 47.2

Comments: Sample collected by throwing weighted line with tubing attached 15 feet from south side of ditch. Site accessed from North side of ditch. Sample collected 0.9 feet above mudline.

SAMPLER: Matt Wilson
(PRINTED NAME)

Matt Wilson
(SIGNATURE)

some s.s.

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

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Office: (503) 670-1108

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PROJECT NAME: Millennium Bulk Terminals-Longview (BMP) WELL ID: COID DOWN @ PUMP STA

SITE ADDRESS: 4029 Industrial way, Longview, WA

BLIND ID: MBT- 072611 - 09

DUP ID: _____

WIND FROM:	N	NE	E	SE	S	<u>(SW)</u>	W	NW	<u>(LIGHT)</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>(CLOUDY)</u>		RAIN		TEMPERATURE: <u>(°F)</u> <u>60.5</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
/ /	:	.	<u>N</u>	<u>---</u>	<u>---</u>	<u>---</u>			X 1 <u>surface</u>
/ /	:	.	<u>---</u>	<u>A</u>	<u>---</u>	<u>---</u>			X 3 <u>water</u>
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: NA [√ if used]

Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	<u>7/26/11</u>	<u>10:40</u>	<u>C</u>	<u>1</u> 250, 500 mL	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>✓</u>
Green Poly	<u>7/26/11</u>	<u>10:40</u>	<u>C</u>	<u>2</u> 125, 500, 1L	<u>NaOH / None</u>	<u>YES</u>	<u>NO</u>		<u>✓</u>
Red Total Poly	<u>7/24/11</u>	<u>10:40</u>	<u>C</u>	<u>1</u> 250, 500, 1L	<u>HNO₃</u>	<u>YES</u>	<u>NO</u>		<u>✓</u>
Red Diss. Poly	<u>1/1</u>	<u>:</u>		250, 500, 1L	HNO ₃	YES	YES		

Total Bottles (include duplicate count): 4

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cd) (SO₄) (P)</u>
	YELLOW - Poly	<u>(COD), (TOC), (Total PO₄), (Total Kjeldahl Nitrogen), (NH₃), (NO₃/NO₂)</u>
	GREEN - Poly	<u>(Total Cyanide), (Free Cyanide), (Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>
RED DISSOLVED - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)</u>	

WATER QUALITY DATA Purge Start Time: NA Hach 0.1 mg/L Fe²⁺ 451 ug/L

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality
1	<u>10:36</u>	<u>NA</u>	<u>NA</u>	<u>7.36</u>	<u>422</u>	<u>31.1</u>	<u>20.69</u>	<u>-1.9</u>	<u>lt brn, orange opaque</u>
2	<u>10:49</u>	<u>NA</u>	<u>NA</u>	<u>7.29</u>	<u>420</u>	<u>283</u>	<u>20.77</u>	<u>17.1</u>	<u>↓ ↓ ↓</u>
3	:	.	.	.	.	.	.	.	.
4	:	.	.	.	.	.	.	.	.
5	:	.	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU) 10

Turbidity after sample collection (NTU) 12

SAMPLER: Douglas Laffoon
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

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Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals-Longview (BMP) WELL ID: CP1D UP

SITE ADDRESS: 4029 Industrial way, Longview, WA BLIND ID: MBT- 072611 - 10

DUP ID:

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY	<u>PRTLY CLOUDY</u>	<u>CLOUDY</u>				RAIN		TEMPERATURE:	<u>60</u>	°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							Product Thickness	Water Column	(Circle appropriate unit) [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
/ /	:	<u>NA</u>	<u>NA</u>	<u>A</u>					X1 <u>SURFACE</u>
/ /	:								X3 <u>WATER</u>
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: NA [if used]

Bottle Type	Date	Time	Method [§]	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	<u>7/26/11</u>	<u>11:50</u>	<u>C</u>	<u>1</u> 250, <u>500</u> 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>✓</u>
Green Poly	<u>7/26/11</u>	<u>11:50</u>	<u>C</u>	<u>2</u> <u>125</u> , 500, 1L	<u>NaOH / None</u>	<u>YES</u>	<u>NO</u>		<u>✓</u>
Red Total Poly	<u>7/26/11</u>	<u>11:50</u>	<u>C</u>	<u>1</u> 250, <u>500</u> 1L	<u>HNO₃</u>	<u>YES</u>	<u>NO</u>		<u>✓</u>
Red Diss. Poly	/ /	:		250, 500, 1L	HNO ₃	YES	YES		

Total Bottles (include duplicate count): 4

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(C)</u> <u>(S)</u> <u>(P)</u>
	YELLOW - Poly	<u>(COD)</u> <u>(TOC)</u> <u>(Total PO₄)</u> <u>(Total Keldahl Nitrogen)</u> <u>(NH₃)</u> <u>(NO₂/NO₃)</u>
	GREEN - Poly	<u>(Total Cyanide)</u> <u>(Free Cyanide)</u> <u>(Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	<u>(As)</u> <u>(Sb)</u> <u>(Ba)</u> <u>(Be)</u> <u>(Ca)</u> <u>(Cd)</u> <u>(Co)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(Pb)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Ni)</u> <u>(Ag)</u> <u>(Se)</u> <u>(Tl)</u> <u>(V)</u> <u>(Zn)</u> <u>(Hg)</u> <u>(K)</u> <u>(Na)</u>
RED DISSOLVED - Poly	<u>(As)</u> <u>(Sb)</u> <u>(Ba)</u> <u>(Be)</u> <u>(Ca)</u> <u>(Cd)</u> <u>(Co)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(Pb)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Ni)</u> <u>(Ag)</u> <u>(Se)</u> <u>(Tl)</u> <u>(V)</u> <u>(Zn)</u> <u>(Hg)</u> <u>(K)</u> <u>(Na)</u> <u>(Hardness)</u> <u>(Silica)</u>	

WATER QUALITY DATA Purge Start Time: NA Hach 451

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality
1	<u>11:42</u>	<u>NA</u>	<u>NA</u>	<u>7.25</u>	<u>327</u>	<u>73.1</u>	<u>20.48</u>	<u>3.43</u>	<u>almost clear, slight orange</u>
2	<u>11:55</u>	<u>NA</u>	<u>NA</u>	<u>7.06</u>	<u>326</u>	<u>65.9</u>	<u>20.33</u>	<u>2.37</u>	<u>↓</u>
3	:	.	.	.	.	.	.	.
4	:	.	.	.	.	.	.	.
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU) 22

Turbidity after sample collection (NTU) 12

SAMPLER: Donna Laffan
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals-Longview (BMP) WELL ID: RL-15

SITE ADDRESS: 4029 Industrial way, Longview, WA BLIND ID: MBT- 072711 - 15

DUP ID: _____

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	<u>(LIGHT)</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>CLOUDY</u>		RAIN		TEMPERATURE: <u>60's</u> °F °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
7/26/11	09:10	19.06	---	9.56	---	9.5		X 1	1.55
7/27/11	08:35	19.06	---	9.61	---	9.45		X 3	4.65
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: 18.5' [if used]

Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	7/27/11	08:50	B	1 250, 500, 1L	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>	NA	✓
Green Poly	7/27/11	08:50	B	2 <u>(125)</u> 500, 1L	<u>(NaOH + None)</u>	<u>(YES)</u>	<u>(NO)</u>		✓
Red Total Poly	1/1	:		250, 500, 1L	HNO ₃	YES	NO		
Red Diss. Poly	7/27/11	08:50	B	1 <u>(250)</u> 500, 1L	<u>(HNO₃)</u>	<u>(YES)</u>	<u>(YES)</u>		✓
Total Bottles (include duplicate count):				<u>4</u>					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cl)</u> <u>(SO₄)</u> <u>(F)</u>
	YELLOW - Poly	(COD) (TOC) (Total PO ₄) (Total Keldahl Nitrogen) (NH ₃) (NO ₃ /NO ₂)
	GREEN - Poly	<u>(Total Cyanide)</u> <u>(Free Cyanide)</u> <u>(Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	<u>(As)</u> <u>(Sb)</u> <u>(Ba)</u> <u>(Be)</u> <u>(Ca)</u> <u>(Cd)</u> <u>(Co)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(Pb)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Ni)</u> <u>(Ag)</u> <u>(Se)</u> <u>(Tl)</u> <u>(V)</u> <u>(Zn)</u> <u>(Hg)</u> <u>(K)</u> <u>(Na)</u> <u>(Hardness)</u> (Silica)	

WATER QUALITY DATA		Purge Start Time: <u>09:14</u>		Hach		45E			
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality
1	09:18	0.4 L	* 11.13	4.77	364	1.14	12.98	117	almost clear
2	09:22	2 L	13.44	4.31	372	.51	11.80	95.8	light cloudy, brown
3	09:28	1.75 L	19.06	4.12	366	.64	11.47	131	" " "
4	:	well dry - allow to recharge							
5	:								
6	08:42	Restart purge on 7-27-11							
7	08:55	1 L	17.97	5.48	498	.33	11.37	-34	slight orange tint
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] 19.7 [Clarity, Color] 17.7

* - unable to micro purge - sample by pumping well dry & recharge

Turbidity before sample collection (NTU) 19.7 Turbidity after sample collection (NTU) 17.7

SAMPLER: Doug Luffoon
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

Fax:

(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals-Longview (BMP) WELL ID: RL-1D

SITE ADDRESS: 4029 Industrial way, Longview, WA

BLIND ID: MBT-072611 - 08

DUP ID:

WIND FROM: N NE E SE S (SW) W NW (LIGHT) (MEDIUM) HEAVY
 WEATHER: SUNNY PRTLY CLOUDY (CLOUDY) RAIN TEMPERATURE: (60) °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
7/25/11	14:06	39.40	---	8.44	---	30.96	→ X1 5.05
7/26/11	09:32	39.40	---	9.72	---	29.68	X3 15.15

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = (0.163) 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: 37' [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	7/26/11	09:45	A	1 250, 500 <u>(1L)</u>	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>	NA	✓
Green Poly	7/26/11	09:45	A	2 <u>(125, 500, 1L)</u>	<u>(NaOH/NaO₂)</u>	<u>(YES)</u>	<u>(NO)</u>		✓
Red Total Poly	1/1	:		250, 500, 1L	<u>(HNO₃)</u>	YES	NO		✓
Red Diss. Poly	7/26/11	09:45	A	1 250, 500, 1L	<u>(HNO₃)</u>	<u>(YES)</u>	<u>(YES)</u>		✓

Total Bottles (include duplicate count): 4

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cl)</u> <u>(SO₄)</u> <u>(F)</u>
	YELLOW - Poly	(COD) (TOC) (Total PO ₄) (Total Kjeldahl Nitrogen) (NH ₃) (NO ₃ /NO ₂)
	GREEN - Poly	<u>(Total Cyanide)</u> <u>(Free Cyanide)</u> <u>(Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	<u>(As)</u> <u>(Sb)</u> (Ba) (Be) <u>(Ca)</u> <u>(Cd)</u> <u>(Co)</u> <u>(Cr)</u> <u>(Cu)</u> (Fe) (Pb) (Mg) (Mn) <u>(Ni)</u> (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) <u>(Na)</u> (Hardness) (Silica)	

WATER QUALITY DATA Purge Start Time: 14:10 Hach 4.5 mg/L 5 = ND mg/L

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality	
1	14:14	1g	14.96	5.58	1364	.64	12.33	-106	very cloudy, brn-grey	
2	14:20	2g	21.86	5.64	1358	.55	12.26	-115	cloudy, brn-grey	
3	14:26	3g	28.02	5.89	1352	.24	12.33	-142	dark cloudy - grey	
4	14:32	4g	32.27	6.12	1353	.15	12.49	-160	cloudy - grey	
5	14:38	5g	37.31	6.27	1352	.17	12.45	-124	" "	
6	14:40	5.25g	- well dry, allow to recharge							
7	:									
8	09:56	2g	22.54	6.46	1285	.79	13.82	-97	very dark cloudy - grey	
9	:									
10	:									
11	:									
12	:									

[gallons or liters]

pumped well dry - recharge & sample

[Clarity, Color]

Turbidity before sample collection (NTU) >1,000

Turbidity after sample collection (NTU) >1,000

SAMPLER: Douglas Luffoon
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

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Office: (503) 670-1108

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(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals-Longview (BMP) WELL ID: RL-25

SITE ADDRESS: 4029 Industrial way, Longview, WA

BLIND ID: MBT-072711 - 16

DUP ID: _____

WIND FROM:	N	NE	E	SE	S (<u>SW</u>)	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY	<u>PRTYLY CLOUDY</u>	CLOUDY	RAIN	TEMPERATURE: <u>70s</u> °F	°C				

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)					Product Thickness	Water Column	
Date	Time	DT-Bottom	DT-Product	DT-Water	DIP-DTW	DTB-DTW	Volume (gal)
<u>7/26/11</u>	<u>12:25</u>	<u>19.78</u>	---	<u>9.17</u>	---	<u>10.61</u>	X 1 <u>1.73</u>
<u>7/26/11</u>	<u>09:27</u>	<u>19.78</u>	---	<u>9.15</u>	---	<u>10.63</u>	X 3 <u>5.19</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water, (B) Peristaltic Pump, (C) Disposable Buffer

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample)							Sample Depth: <u>18.5</u>	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH
White Poly	<u>7/27/11</u>	<u>09:35</u>	<u>B</u>	<u>1</u> 250, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	NA
Green Poly	<u>7/27/11</u>	<u>09:35</u>	<u>B</u>	<u>2</u> <u>125, 500, 1L</u>	<u>NaOH + No 2%</u>	<u>YES</u>	<u>NO</u>	
Red Total Poly	<u>1/1</u>	:		250, 500, 1L	<u>HNO₃</u>	YES	NO	
Red Diss. Poly	<u>7/27/11</u>	<u>09:35</u>	<u>B</u>	<u>1</u> <u>250, 500, 1L</u>	<u>HNO₃</u>	<u>YES</u>	<u>YES</u>	

Total Bottles (include duplicate count): 4

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cd) (SO₄) (F)</u>
	YELLOW - Poly	<u>(COD) (TOC) (Total PO₄) (Total Kjeldahl Nitrogen) (NH₃) (NO₃/NO₂)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)</u>	

WATER QUALITY DATA		Purge Start Time: <u>12:32</u>	Hach		YSE				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality
1	<u>12:34</u>	<u>2 g</u>	<u>12.02</u>	<u>9.44</u>	<u>6818</u>	<u>0.71</u>	<u>12.03</u>	<u>-178</u>	<u>black opaque</u>
2	<u>12:37</u>	<u>1 g</u>	<u>15.78</u>	<u>9.37</u>	<u>6840</u>	<u>0.28</u>	<u>12.12</u>	<u>-172</u>	
3	<u>12:40</u>	<u>1.75g</u>	<u>18.92</u>	<u>9.65</u>	<u>7208</u>	<u>0.39</u>	<u>11.95</u>	<u>-161</u>	<u>↓</u>
4	<u>12:41</u>	<u>-well dry - recharging</u>							
5	:								
6	<u>09:28</u>	<u>Restart purge - 7/27/11</u>							
7	<u>09:46</u>	<u>1 g</u>	<u>15.99</u>	<u>9.74</u>	<u>6116</u>	<u>0.05</u>	<u>13.64</u>	<u>-213</u>	<u>black opaque</u>
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Pumped well dry - recharge p sample

Turbidity before sample collection (NTU) 6.94

Turbidity after sample collection (NTU) 7.59

SAMPLER: Doug Luffoon
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals-Longview (BMP) WELL ID: RL-2D

SITE ADDRESS: 4029 Industrial way, Longview, WA BLIND ID: MBT-072611 - 11

DUP ID:

WIND FROM:	N	NE	E	SE	S	<u>(SW)</u>	W	NW	LIGHT	<u>(MEDIUM)</u>	HEAVY
WEATHER:	SUNNY		<u>(PRTLY CLOUDY)</u>		CLOUDY		RAIN		TEMPERATURE: <u>(°F)</u> 70° °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Water Column x Gal/ft)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
7/26/11	12:55	33.00	---	8.71	---	24.29			X 1 3.96
1/1	:	.	---	.	---	.			X 3 11.88
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>(0.163)</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: 28' [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	7/26/11	13:40	A	1 250, 500, <u>(1L)</u>	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>	NA	✓
Green Poly	7/26/11	13:40	A	2 <u>(25)</u> 500, 1L	<u>(NaOH/None)</u>	<u>(YES)</u>	<u>(NO)</u>		✓
Red Total Poly	1/1	:		250, 500, 1L	HNO ₃	YES	NO		
Red Diss. Poly	7/26/11	13:40	A	1 250, <u>(500)</u> 1L	<u>(HNO₃)</u>	<u>(YES)</u>	<u>(YES)</u>		✓

Total Bottles (include duplicate count): 4

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cl)</u> <u>(SO₄)</u> <u>(F)</u>
	YELLOW - Poly	(COD) (TOC) (Total PO ₄) (Total Keldahl Nitrogen) (NH ₃) (NO ₃ /NO ₂)
	GREEN - Poly	<u>(Total Cyanide)</u> <u>(Free Cyanide)</u> <u>(Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	<u>(As)</u> (Sb) (Ba) (Be) <u>(Ca)</u> (Cd) (Co) <u>(Cu)</u> (Fe) (Pb) <u>(Mg)</u> (Mn) <u>(Ni)</u> (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) <u>(Na)</u> (Hardness) (Silica)	

WATER QUALITY DATA Purge Start Time: 12:58 Hach 4SI
 $Fe^{2+} = 3.0 \text{ mg/L}$ $S^{2-} = 0.60 \text{ mg/L}$

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality
1	13:01	1 g	16.05	6.55	25.21	.53	12.13	-128	brown opaque
2	13:06	2.5 g	18.90	6.56	2416	.95	12.25	-127	↓
3	13:11	4.5 g	20.74	6.46	2296	.64	12.33	-123	light brown opaque
4	13:16	6.5 g	21.41	6.45	2315	.47	12.44	-124	↓
5	13:21	8.5 g	21.06	6.44	2247	.29	12.42	-119	tan opaque
6	13:26	10.5 g	20.59	6.47	2326	.36	12.48	-123	tea opaque
7	13:31	12.5 g	20.21	6.49	2339	.30	12.51	-125	↓
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Sampled by 3 volumes - unable to micro purge

Turbidity before sample collection (NTU) 4.22

Turbidity after sample collection (NTU) 1.76

SAMPLER: Douglas Laffoon
 (PRINTED NAME)

[Signature]
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals-Longview (BMP) WELL ID: RL-35

SITE ADDRESS: 4029 Industrial way, Longview, WA

BLIND ID: MBT-072611-12

DUP ID:

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	LIGHT	<u>MEDIUM</u>	HEAVY
WEATHER:	SUNNY		<u>PRTTY CLOUDY</u>		CLOUDY		RAIN		TEMPERATURE: <u>70</u> °F °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							Product Thickness	Water Column	(Circle appropriate unit) [Water Column x Gal/ft]				
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)				
<u>7/26/11</u>	<u>14:13</u>	<u>19.81</u>	---	<u>7.34</u>	---	<u>12.47</u>			X 1 2.03				
<u>1/1</u>	:		---		---				X 3 6.09				
Gal/ft = (dia./2) ² x 0.163	1" =	0.041	2" = <u>0.163</u>	3" =	0.367	4" =	0.653	6" =	1.469	10" =	4.080	12" =	5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: 18' [if used]

Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	<u>7/26/11</u>	<u>14:40</u>	<u>B</u>	<u>1</u> 250, 500 mL	<u>None</u>	<u>YES</u>	<u>NO</u>	NA	✓
Green Poly	<u>7/26/11</u>	<u>14:40</u>	<u>B</u>	<u>2</u> <u>125, 500, 1L</u>	<u>NaOH/None</u>	<u>YES</u>	<u>NO</u>		✓
Red Total Poly	<u>1/1</u>	:		250, 500, 1L	<u>HNO₃</u>	YES	NO		
Red Diss. Poly	<u>7/26/11</u>	<u>14:40</u>	<u>B</u>	<u>1</u> 250, 500, 1L	<u>HNO₃</u>	<u>YES</u>	<u>YES</u>		✓

Total Bottles (include duplicate count): 4

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cl) (SO₄) (F)</u>
	YELLOW - Poly	<u>(COD) (TOC) (Total PO₄) (Total Kjeldahl Nitrogen) (NH₃) (NO₃/NO₂)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)</u>
RED DISSOLVED - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)</u>	

WATER QUALITY DATA Purge Start Time: 14:15 Hach 45E
 $Fe^{2+} = 2.8 mg/L$ $S^{2-} = 0.05 mg/L$

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality
1	<u>14:20</u>	<u>1.2 L</u>	<u>7.83</u>	<u>6.68</u>	<u>1570</u>	<u>0.89</u>	<u>16.80</u>	<u>-127</u>	<u>clear w/ solid debris</u>
2	<u>14:23</u>	<u>1.4 L</u>	<u>7.86</u>	<u>6.67</u>	<u>1575</u>	<u>1.0</u>	<u>16.52</u>	<u>-121</u>	<u>clear</u>
3	<u>14:26</u>	<u>1.8 L</u>	<u>7.87</u>	<u>6.65</u>	<u>1575</u>	<u>0.61</u>	<u>16.39</u>	<u>-121</u>	
4	<u>14:29</u>	<u>2.2 L</u>	<u>7.86</u>	<u>6.62</u>	<u>1579</u>	<u>0.53</u>	<u>15.67</u>	<u>-111</u>	
5	<u>14:32</u>	<u>2.6 L</u>	<u>7.87</u>	<u>6.64</u>	<u>1582</u>	<u>0.25</u>	<u>15.84</u>	<u>-127</u>	
6	<u>14:35</u>	<u>3.0 L</u>	<u>7.87</u>	<u>6.65</u>	<u>1582</u>	<u>0.27</u>	<u>15.84</u>	<u>-133</u>	
7	<u>14:38</u>	<u>3.4 L</u>	<u>7.87</u>	<u>6.62</u>	<u>1583</u>		<u>15.81</u>	<u>-131</u>	
8	:		.	.	.	.	.	.
9	:		.	.	.	.	.	.
10	:		.	.	.	.	.	.
11	:		.	.	.	.	.	.
12	:		.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

lower speed

sampled by micro-purge

Turbidity before sample collection (NTU) 8.38

Turbidity after sample collection (NTU) 2.72

SAMPLER: Doug Laffoon
 (PRINTED NAME)

[Signature]
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

Fax:

(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals-Longview (BMP) WELL ID: RL-3D

SITE ADDRESS: 4029 Industrial way, Longview, WA BLIND ID: MBT- 072711 - 17

DUP ID:

WIND FROM:	N	NE	<u>E</u>	SE	S	<u>(SW)</u>	W	NW	LIGHT	<u>(MEDIUM)</u>	HEAVY
WEATHER:	SUNNY			<u>(PRTLY CLOUDY)</u>		CLOUDY		RAIN		TEMPERATURE	<u>70</u> °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DIW	DTB-DIW			Volume (gal)
7/26/11	15:00	39.23	---	7.04	---	32.19		X 1	5.25
7/27/11	10:18	39.23	---	13.91	---	25.32		X 3	15.75
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample)								Sample Depth:	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	7/27/11	10:35	A	1 250, 500, 1L	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>	NA	✓
Green Poly	7/27/11	10:35	A	2 <u>(125)</u> 500, 1L	<u>(NaOH + NaOH)</u>	<u>(YES)</u>	<u>(NO)</u>		✓
Red Total Poly	/ /	:		250, 500, 1L	<u>(HNO₃)</u>	YES	NO		
Red Diss. Poly	7/27/11	10:35	A	1 <u>(250)</u> 500, 1L	<u>(HNO₃)</u>	<u>(YES)</u>	<u>(YES)</u>		✓
Total Bottles (include duplicate count):			<u>4</u>						

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cd)</u> <u>(SO₄)</u> <u>(F)</u>
	YELLOW - Poly	(COD) (TOC) (Total PO ₄) (Total Kjeldahl Nitrogen) (NH ₃) (NO ₂ /NO ₃)
	GREEN - Poly	<u>(Total Cyanide)</u> <u>(Free Cyanide)</u> <u>(Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	<u>(As)</u> <u>(Sb)</u> (Ba) (Be) <u>(Ca)</u> (Cd) (Co) <u>(Cr)</u> <u>(Cu)</u> (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	

WATER QUALITY DATA		Purge Start Time:	Hach		USE				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality
1	15:06	1g	16.03	5.72	11.32	1.35	12.83	-27	cloudy grey
2	15:11	2g	21.00	5.80	10.93	0.57	13.10	-31	↓
3	15:16	3g	27.09	6.04	1074	245	13.11	-44	light ↓
4	15:22	4g	33.33	6.20	1053	0.3	13.15	-46	light cloudy grey
5	15:25	4.5g	35.98	6.31	1046	0.3	13.15	-46	
6	15:28	5g	38.18	6.43	1041	24	13.17	-48	↓
7	15:29	well is dry - let recharge							
8	:								
9	10:24	Restart purge - 7/27/11							
10	10:30	1g	18.85	5.27	1248	.75	12.79	-34	cloudy grey
11	10:42	2g	24.07	6.18	1214	.78	13.43	-68	cloudy grey
12	:								

[gallons or liters]

Pumped well dry - recharge for sample

[Clarity, Color]

Turbidity before sample collection (NTU) 1000

Turbidity after sample collection (NTU) > 1000

SAMPLER: Doug Luffoon
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals-Longview (SPT) WELL ID: RL-45

SITE ADDRESS: 4029 Industrial way, Longview, WA (BMP) BLIND ID: MBT-072711 - 18

DUR ID: RL45-072711 (for PAHs)

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	LIGHT	<u>MEDIUM</u>	HEAVY
WEATHER:	SUNNY			<u>PRTY CLOUDY</u>		CLOUDY		RAIN		TEMPERATURE: <u>70.5</u> °F °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							Product Thickness	Water Column	Volume (gal)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			
7/26/11	16:33	19.60	--	6.25	--	13.35	X 1		2.18
7/27/11	11:49	19.60	--	6.42	--	13.18	X 3		6.54
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water, (B) Peristaltic Pump, (C) Disposable Bailor

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: 19' [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓	
White Poly	7/27/11	12:00	B	1 250, 500 (1L)	None	YES	NO	NA	✓	
Green Poly	7/27/11	12:00	B	2 (250) 500, 1L	NaOH	YES	NO		✓	
Red Total Poly	7/27/11	12:00	B	2 250, 500 (1L)	HNO₃ None	YES	NO		✓	
Red Diss. Poly	7/27/11	12:06	B	1 (250) 500, 1L	HNO ₃	YES	YES		✓	
Total Bottles (include duplicate count):				6						

AMBER

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(Cd) (SO ₄) (P)
	YELLOW - Poly	(COD) (TOC) (Total PO ₄) (Total Kjeldahl Nitrogen) (NH ₃) (NO ₂ /NO ₃)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)	
	AMBER	PAHs

WATER QUALITY DATA		Purge Start Time: 16:35		Fe ²⁺ = 2.8 mg/L		S ²⁻ = ND mg/L			
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality
1	16:37	2 L	9.63	6.17	803	.41	14.41	-73	clear
2	16:41	6 L	15.53	6.20	582	.27	14.65	-59	
3	16:43	8 L	17.60	6.29	548	.43	15.49	-55	↓
4	16:44	well pump dry - allow to recharge							
5	:								
6	11:55	Restart purge - 7/27/11							
7	12:11	1.5 g	16.74	6.23	537	.62	15.83	-67	almost clear, slight turbid
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

Pumped well dry - recharge & sample

Turbidity before sample collection (NTU) 44.2

Turbidity after sample collection (NTU) 131

SAMPLER: Doug Laffoon
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals-Longview (SPL) WELL ID: RL-4D

SITE ADDRESS: 4029 Industrial way, Longview, WA (BMP) BLIND ID: MBT-072611 - 14

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PARTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: 70 °F °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
7/26/11	16:50	39.00	---	8.12	---	30.88	X1 5.03
1/1	:	.	---	.	---	.	X3 15.09

Gal/ft = (dia./2) ² x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
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§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Baller

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: 38' [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	7/26/11	17:25	A	1 250, 500, 1L	None	YES	NO	NA	✓
Green Poly	7/26/11	17:25	A	2 125, 500, 1L	NaOH + None	YES	NO		✓
Red Total Poly	1/1	:		250, 500, 1L	HNO ₃	YES	NO		
Red Diss. Poly	7/26/11	17:25	A	1 250, 500, 1L	HNO ₃	YES	YES		✓

Total Bottles (include duplicate count): 4

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	(C) (SO ₄) (M)
	YELLOW - Poly	(COD) (TOC) (Total PO ₄) (Total Kjeldahl Nitrogen) (NH ₃) (NO ₃ /NO ₂)
	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide)
	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	RED DISSOLVED - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

WATER QUALITY DATA Purge Start Time: 16:51 Fe²⁺ = 4.1 mg/L S²⁻ = 0.04 mg/L

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality
1	16:54	1.5g	15.79	6.10	656	.22	13.85	-73	light cloudy brown
2	17:00	4.5g	17.12	6.05	651	.13	14.51	-84	light cloudy brown, grey
3	17:05	7g	17.47	6.23	650	.09	14.48	-96	
4	17:10	9.5g	17.80	6.27	652	.27	14.26	-100	
5	17:15	12g	19.38	6.27	652	.33	13.97	-100	
6	17:20	14.5g	20.36	6.24	653	.23	13.91	-98	
7	17:22	15.5g	20.43	6.24	653	.24	13.90	-90	stop sample
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters] unable to successfully purge - sample after 3 volumes [Clarity, Color]

Turbidity before sample collection (NTU) 18.7

Turbidity after sample collection (NTU) 15.3

SAMPLER: Douglas Luffoon
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals-Longview (BMP) WELL ID: RL-5

SITE ADDRESS: 4029 Industrial way, Longview, WA BLIND ID: MBT- 072611 - 13

DUP ID:

WIND FROM:	N	NE	E	SE	S	<u>SW</u>	W	NW	<u>LIGHT</u>	<u>MEDIUM</u>	HEAVY
WEATHER:	<u>SUNNY</u>			<u>PARTLY CLOUDY</u>			CLOUDY		RAIN		TEMPERATURE: <u>70.5</u> °F °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DIB-DTW			Volume (gal)
<u>7/26/11</u>	<u>15:40</u>	<u>23.30</u>	<u>---</u>	<u>14.34</u>	<u>---</u>	<u>8.96</u>	X 1		<u>1.46</u>
<u>1/1</u>	<u>:</u>	<u>.</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>.</u>	X 3		<u>4.38</u>
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = <u>0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: 22' (If used)

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
White Poly	<u>7/26/11</u>	<u>16:15</u>	<u>B</u>	<u>1</u> 250, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>✓</u>
Green Poly	<u>7/26/11</u>	<u>16:15</u>	<u>B</u>	<u>2</u> <u>125</u> , 500, 1L	<u>NaOH/None</u>	<u>YES</u>	<u>NO</u>		<u>✓</u>
Red Total Poly	<u>1/1</u>	<u>:</u>		250, 500, 1L	<u>HNO₃</u>	<u>YES</u>	<u>NO</u>		<u>✓</u>
Red Diss. Poly	<u>7/26/11</u>	<u>16:15</u>	<u>B</u>	<u>1</u> 250, <u>500</u> , 1L	<u>HNO₃</u>	<u>YES</u>	<u>YES</u>		<u>✓</u>
Total Bottles (include duplicate count):				<u>4</u>					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Cl)</u> <u>(SO₄)</u> <u>(F)</u>
	YELLOW - Poly	<u>(COD)</u> <u>(TOC)</u> <u>(Total PO₄)</u> <u>(Total Kjeldahl Nitrogen)</u> <u>(NH₃)</u> <u>(NO₃/NO₂)</u>
	GREEN - Poly	<u>(Total Cyanide)</u> <u>(Free Cyanide)</u> <u>(Weak and Dissociable Cyanide)</u>
	RED TOTAL - Poly	<u>(As)</u> <u>(Sb)</u> <u>(Ba)</u> <u>(Be)</u> <u>(Ca)</u> <u>(Cd)</u> <u>(Co)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(Pb)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Ni)</u> <u>(Ag)</u> <u>(Se)</u> <u>(Tl)</u> <u>(V)</u> <u>(Zn)</u> <u>(Hg)</u> <u>(K)</u> <u>(Na)</u>
	RED DISSOLVED - Poly	<u>(As)</u> <u>(Sb)</u> <u>(Ba)</u> <u>(Be)</u> <u>(Ca)</u> <u>(Cd)</u> <u>(Co)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(Pb)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Ni)</u> <u>(Ag)</u> <u>(Se)</u> <u>(Tl)</u> <u>(V)</u> <u>(Zn)</u> <u>(Hg)</u> <u>(K)</u> <u>(Na)</u> <u>(Hardness)</u> <u>(Silica)</u>

WATER QUALITY DATA		Purge Start Time: <u>15:45</u>		Fe ^{tot} = <u>0.5 mg/L</u> / <u>5' = 0.03 mg/L</u>		HACH		VSI	
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	DO	Temperature	ORP	Water Quality
1	<u>15:49</u>	<u>0.4 L</u>	<u>14.89</u>	<u>6.33</u>	<u>686</u>	<u>.96</u>	<u>14.81</u>	<u>37</u>	<u>clear</u>
2	<u>15:53</u>	<u>0.8 L</u>	<u>15.05</u>	<u>6.18</u>	<u>682</u>	<u>.65</u>	<u>14.61</u>	<u>43</u>	
3	<u>15:57</u>	<u>1.2 L</u>	<u>15.11</u>	<u>6.11</u>	<u>673</u>	<u>.50</u>	<u>14.47</u>	<u>46</u>	
4	<u>16:01</u>	<u>1.6 L</u>	<u>15.13</u>	<u>5.95</u>	<u>652</u>	<u>.32</u>	<u>14.15</u>	<u>59</u>	
5	<u>16:05</u>	<u>2.0 L</u>	<u>15.14</u>	<u>5.91</u>	<u>643</u>	<u>.26</u>	<u>14.00</u>	<u>66</u>	
6	<u>16:09</u>	<u>2.4 L</u>	<u>15.16</u>	<u>5.90</u>	<u>638</u>	<u>.22</u>	<u>13.92</u>	<u>70</u>	<u>↓</u>
7	:		.	.	.	.	.	.
8	:		.	.	.	.	.	.
9	:		.	.	.	.	.	.
10	:		.	.	.	.	.	.
11	:		.	.	.	.	.	.
12	:		.	.	.	.	.	.

[gallons or liters]

sample via macro purge

[Clarity, Color]

Turbidity before sample collection (NTU) 11.7

Turbidity after sample collection (NTU) 8.0

SAMPLER: Doug Laffoon
(PRINTED NAME)

[Signature]
(SIGNATURE)

Water Quality Sample Form

Station ID: W1 Date: 8/01/11 Time: 1300

Project Name: MBT RI/FS Addendum Project Number: 110730-02.01

Coordinates: Datum: NAD 83/91 12 point generic

Lat/Northing: 303638.26 Long/Easting: 1009643.31

Depth of Sample: 2 feet (0.5 feet above mudline)

Location Description: 10 feet channel-ward of south shore (along Industrial way) of ditch, at point of telephone pole ~ 100 feet E of Power substation

Weather Observations: Sunny, light breeze, warm (~70°F)

Field Parameters

Temperature: 18.54 °C Turbidity: 36.1 NTU

pH: 6.51 DO: 2 mg/L

TSS Collected: Y/N ORP: - -12.4 mV

Evidence of floating or suspended materials: Y/N Description: Floating algae

Evidence of oil/hydrocarbon sheen: Y/N Description:

Discoloration and Turbidity:

Color: light brown

Source: NA

Area: NA

Plume: Y/N

Odor: none slight, moderate, strong
H₂S, petroleum, septic

Volume collected: 2 L

Comments:

Samples collected for:

- Fluoride
- Free, WAD, and Total Cyanides
- Sulfate
- Total Chloride
- Alkalinity
- Total Phosphorous
- Total Dissolved Solids
- Total Suspended Solids
- Geochemical (dissolved metals -- Al, Ca, Fe, Mg, Mn, K, Si, Na)

Recorded by: Matthew D. Wilk



720 Olive Way, Suite 1900
 Seattle, Washington 98101
 Phone 206.287.9130
 Fax 206.287.9131
 www.anchorqea.com

Water Quality Sample Form			
Station ID: W2	Date: 8/01/11	Time: 1420	
Project Name: MBT RI/FS Addendum		Project Number: 110730-02.01	
Coordinates: Datum: NAD 83/91			
Lat/Northing	307327.24	Long/Easting	1003793.03
Depth of Sample: 0.5 feet above mudline			
Location Description: 15 feet channel ward of shoreline from the south side of ditch			
Weather Observations: Sunny, light breeze, warm (~75°F)			
Field Parameters			
Temperature	21.14 °C	Turbidity	19.2 NTU
pH	6.75	DO	3.69 mg/L
TSS Collected	Y/N	ORP	+55.4 mV
Evidence of floating or suspended materials:	<input checked="" type="radio"/> Y <input type="radio"/> N	Description: Algae	
Evidence of oil/hydrocarbon sheen:	Y/ <input checked="" type="radio"/> N	Description:	
Discoloration and Turbidity:			
	Color: clear		
	Source: NA		
	Area: NA		
	Plume:	Y/ <input checked="" type="radio"/> N	
Odor	<input checked="" type="radio"/> none, <input type="radio"/> slight, <input type="radio"/> moderate, <input type="radio"/> strong H ₂ S, petroleum, septic		
Volume collected:	4L (Duplicate collected at this location)		
Comments: Samples collected for: Fluoride Free, WAD, and Total Cyanides Sulfate Total Chloride Alkalinity Total Phosphorous Total Dissolved Solids Total Suspended Solids Geochemical (dissolved metals – Al, Ca, Fe, Mg, Mn, K, Si, Na)			
Recorded by: Matthew Wilson			

Water Quality Sample Form

Station ID: ~~122~~ W3 Date: 8/01/11 Time: 1520

Project Name: MBT RI/FS Addendum Project Number: 110730-02.01

Coordinates: Datum: NAD 83/91 14 point generic

Lat/Northing: 307004.24 Long/Easting: 1003148.99

Depth of Sample: 0.5 feet off of mudline

Location Description: 10 feet channel ward from south side (Millenium-ward) of Ditch

Weather Observations: Sunny, light breeze, very warm (~80°F)

Field Parameters

Temperature: 22.70 °C Turbidity: 22.8 ~~25.4~~ NTU

pH: 6.94 DO: 2.27 mg/L

TSS Collected: Y/N ORP: +112.7 mV

Evidence of floating or suspended materials: Y N Description: Algae

Evidence of oil/hydrocarbon sheen: Y N Description:

Discoloration and Turbidity:

Color: BROWN

Source: NA

Area: NA

Plume: Y N

Odor: none, slight, moderate, strong
 H₂S, petroleum, septic

Volume collected: 2 L

Comments:
 Samples collected for:
 Fluoride
 Free, WAD, and Total Cyanides
 Sulfate
 Total Chloride
 Alkalinity
 Total Phosphorous
 Total Dissolved Solids
 Total Suspended Solids
 Geochemical (dissolved metals -- Al, Ca, Fe, Mg, Mn, K, Si, Na)

Recorded by: Matthew Wil



720 Olive Way, Suite 1900
 Seattle, Washington 98101
 Phone 206.287.9130
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 www.anchorqea.com

Water Quality Sample Form			
Station ID: W4	Date: 8/01/11	Time: 1610	
Project Name: MBT RI/FS Addendum		Project Number: 110730-02.01	
Coordinates: Datum: NAD 83/91 15 point generic			
Lat/Northing	305136.73	Long/Easting	1002911.45
Depth of Sample: 0.5 ft above mudline			
Location Description: 10 feet channelward from east shore of ditch.			
Weather Observations: Sunny, light breeze, warm (~80°F)			
Field Parameters			
Temperature	22.28 °C	Turbidity	13.6 NTU
pH	7.22	DO	1.79 mg/L
TSS Collected	Y/N	ORP	+26.2 mV
Evidence of floating or suspended materials:		Y/N	Description:
Evidence of oil/hydrocarbon sheen:		Y/N	Description:
Discoloration and Turbidity:			
	Color:	Brown	
	Source:	NA	
	Area:	NA	
	Plume:	Y/N	
Odor	none H ₂ S,	slight, petroleum,	moderate, strong septic
Volume collected:	2L		
Comments: Samples collected for: Fluoride Free, WAD, and Total Cyanides Sulfate Total Chloride Alkalinity Total Phosphorous Total Dissolved Solids Total Suspended Solids Geochemical (dissolved metals – Al, Ca, Fe, Mg, Mn, K, Si, Na)			
Recorded by:			



720 Olive Way, Suite 1900
 Seattle, Washington 98101
 Phone 206.287.9130
 Fax 206.287.9131
 www.anchorqea.com

Water Quality Sample Form

Station ID: W5 Date: 8/01/01 Time: 1650

Project Name: MBT RI/FS Addendum Project Number: 110730-02.01

Coordinates: Datum: NAD 83/91

Lat/Northing 302668.04 Long/Easting 1006054.49

Depth of Sample: 2 feet below water surface

Location Description: Along catwalk on downstream end of dock on shoreward side of docks.

Weather Observations:
Sunny, light breeze, very warm

Field Parameters

Temperature 19.90 °C Turbidity 4.43 NTU

pH 6.96 DO ~~8.36~~ 8.36 mg/L

TSS Collected (Y)N ORP 200.8 +200.8 mV

Evidence of floating or suspended materials: Y(N) Description:

Evidence of oil/hydrocarbon sheen: Y(N) Description:

Discoloration and Turbidity:

Color: clear

Source: NA

Area: NA

Plume: NA Y(N)

Odor none slight, moderate, strong
H₂S, petroleum, septic

Volume collected: 2L

Comments:
 Samples collected for:
 Fluoride
 Free, WAD, and Total Cyanides
 Sulfate
 Total Chloride
 Alkalinity
 Total Phosphorous
 Total Dissolved Solids
 Total Suspended Solids
 Geochemical (dissolved metals -- Al, Ca, Fe, Mg, Mn, K, Si, Na)

Recorded by: Matthew White



720 Olive Way, Suite 1900
 Seattle, Washington 98101
 Phone 206.287.9130
 Fax 206.287.9131
 www.anchorqea.com

Water Quality Sample Form			
Station ID: W-6	Date: 8/01/11	Time: 1030	
Project Name: MBT RI/FS Addendum		Project Number: 110730-02.01	
Coordinates: Datum: NAD 83/91 Point Generic 10			
Lat/Northing	318671.64	Long/Easting	1003603.14
Depth of Sample: ~ 3 feet below water surface - 0.5 ft above mudline			
Location Description: on floating dock, on main ditch side, at wide point on dock.			
Weather Observations: Sunny, no breeze, warm (~65°F)			
Field Parameters			
Temperature	20.89 °C	Turbidity	16.3 NTU
pH	6.64	DO	1.76 mg/L
TSS Collected	Y/N	ORP	92.0 mV
Evidence of floating or suspended materials:	Y/N	Description: Much algae and plants	
Evidence of oil/hydrocarbon sheen:	Y(N)	Description:	
Discoloration and Turbidity:			
	Color:	L. brown tint	
	Source:	NA	
	Area:	NA	
	Plume:	Y(N)	
Odor	none H ₂ S,	slight, petroleum,	moderate, strong septic
Volume collected:	2L		
Comments: Samples collected for: Fluoride Free, WAD, and Total Cyanides Sulfate Total Chloride Alkalinity Total Phosphorous Total Dissolved Solids Total Suspended Solids Geochemical (dissolved metals - Al, Ca, Fe, Mg, Mn, K, Si, Na)			
Recorded by: <i>Matthew White</i>			



720 Olive Way, Suite 1900
 Seattle, Washington 98101
 Phone 206.287.9130
 Fax 206.287.9131
 www.anchorqea.com

Water Quality Sample Form			
Station ID: W7	Date: 08/01/11	Time: 1150	
Project Name: MBT RI/FS Addendum		Project Number: 110730-02.01	
Coordinates: Datum: NAD 83/91 Point Genoa II			
Lat/Northing	302796.96	Long/Easting	1010639.92
Depth of Sample: ~ 2 feet (0.5 feet above mudline)			
Location Description: on N. side of ditch. Sample collected about 15 feet from north side of ditch at edge of floating plants			
Weather Observations: sunny, warm, light breeze south			
Field Parameters			
Temperature	17.19 °C	Turbidity	47.2 NTU
pH	6.47	DO	2.95 mg/L
TSS Collected	Y/N	ORP	-6.9 mV
Evidence of floating or suspended materials:	Y/N	Description:	
Evidence of oil/hydrocarbon sheen:	Y/N	Description:	
Discoloration and Turbidity:			
	Color:	slight brown tint	
	Source:	NA	
	Area:	NA	
	Plume:	Y/N	
Odor	none	slight, moderate, strong H ₂ S, petroleum, septic	
Volume collected:	2 L		
Comments: Samples collected for: Fluoride Free, WAD, and Total Cyanides Sulfate Total Chloride Alkalinity Total Phosphorous Total Dissolved Solids Total Suspended Solids Geochemical (dissolved metals – Al, Ca, Fe, Mg, Mn, K, Si, Na)			
Recorded by:			

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G1-S

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G1-S-100412

DUP ID: -

WIND FROM:

N	<u>NE</u>	E	SE	S	SW	W	NW
---	-----------	---	----	---	----	---	----

LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 45 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/4/12	08:27	19.35	---	16.30	---	3.05		X1	0.5
/ /	:	.	---	.	---	.		X3	1.5

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/4/12	08:52	LF	1 125, 500, <u>1L</u>	<u>None</u>	YES <u>NO</u>			✓
1 L HDPE	10/4/12	:	↓	1 125, 500, <u>1L</u>	<u>None</u>	YES <u>NO</u>			✓
250 mL HDPE	10/4/12	:	↓	1 <u>250</u> , 500, 1L	<u>None</u>	YES <u>YES</u>			✓
250 mL HDPE	10/4/12	:	↓	1 <u>190</u> , 500, 1L	<u>H2SO4</u>	YES <u>NO</u>			✓
250 mL HDPE	10/4/12	:	2	1 <u>250</u> , 500, 1L	<u>HNO3</u>	YES <u>NO</u> <u>yes</u>			T/D metals ✓
100 mL HDPE	10/4/12	:	↓	1 125, 500, 1L	<u>NaOH</u>	YES <u>YES</u>			✓
100 mL HDPE	10/4/12	↓:	↓	1 <u>125</u> , 500, 1L	<u>NaOH</u>	YES <u>NO</u>			✓
Amber Glass	/ /	:		250, 500, 1L	None	YES YES			
Amber Glass	/ /	:	BH	250, 500, 1L	None	YES NO			
VOA vials	/ /	:		40 mL	HCl	YES NO			

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	<u>(Total Cl)</u> <u>(SO4)</u> <u>(Total and Dissolved Fluoride)</u> <u>(Alkalinity)</u> <u>(TDS)</u> <u>(TSS)</u> <u>-All</u>
250 mL HDPE	<u>(Total Phosphorous)</u> <u>-All</u> <u>DIST. FT</u>	
100 mL HDPE	<u>(Total Cyanide)</u> <u>(WAD Cyanide)</u> <u>(Free Cyanide)</u> <u>TOTAL and DISSOLVED</u> <u>-All</u>	
250 mL HDPE	<u>Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)</u>	
Amber Glass	<u>(SVOCs)</u> <u>(PAHs)</u> <u>(NWTPH-Dx)</u> <u>(EPH)</u> <u>(PCBs- low level)</u> <u>-NA</u>	
40 mL VOA vials	<u>(VOCs)</u> <u>-NA</u>	

WATER QUALITY DATA Purge Start Time: 08:28 Fe++: 2.4 mg/l Sulfide: 0.02 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	08:34	1 L	16.31	7.05	2,012	12.06	0.55	2.9	slight orange/yellow
2	08:37	1.8 L	16.31	7.03	1,900	12.33	0.25	1.2	clear
3	08:40	2.4 L	16.31	6.86	1,682	12.43	0.20	8.1	
4	08:43	3.1 L	16.31	6.80	1,523	12.55	0.20	12.8	
5	08:47	3.7 L	16.31	6.79	1,502	12.74	0.17	14.0	
6	08:50	4.3 L	16.31	6.80	1,496	12.81	0.12	14.9	
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	BH	.	.	.	
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 4.00

Turbidity after sample collection (NTU):

Comments:

SAMPLER: Ben Howard
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G1-D

SITE ADDRESS: 4029 Industrial Way, Longview, WA

SAMPLE ID: ~~G1-D~~ G1-D-100412

DUP ID:

WIND FROM:	N	<input checked="" type="radio"/> NE	E	SE	S	SW	W	NW	<input checked="" type="radio"/> LIGHT	MEDIUM	HEAVY
WEATHER:	<input checked="" type="radio"/> SUNNY			<input type="radio"/> PRTLY CLOUDY		<input type="radio"/> CLOUDY		<input type="radio"/> RAIN		TEMPERATURE: °F <u>50</u> °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/4/12	09:20	35.20	---	19.65	---	15.55			X 1
/ /	:	.	---	.	---	.			X 3
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	<u>(2")</u> 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√		
1 L HDPE	10/4/12	09:45	B	1 125, 500, 1L	None	YES	NO		✓		
1 L HDPE	10/4/12			1 125, 500, 1L	None	YES	NO		✓		
250 mL HDPE	10/4/12			1 250, 500, 1L	None	YES	YES		✓		
250 mL HDPE	10/4/12			1 125 500, 1L	H2SO4	YES	NO		✓		
250 mL HDPE	10/4/12		2	1 125 500, 1L	HNO3	YES	NO/yes		✓	T/D metals ✓	
100 mL HDPE	10/4/12			1 125, 500, 1L	NaOH	YES	YES		✓		
100 mL HDPE	10/4/12			1 125 500, 1L	NaOH	YES	NO		✓		
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES				
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO				
VOA vials	/ /	:		40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) <u>D.S.F.I.</u>	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: Al (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 09:19 Fe++: 4.8 mg/l Sulfide: 0.05 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	09:26	1L	20.22	6.53	3,795	12.99	0.34	-13.1	slight orange/yellow
2	09:29	2.0L	20.26	6.44	28,77	12.96	0.19	-18.6	clear/yellow tint
3	09:32	3.0L	20.24	6.44	3,714	13.03	0.17	-19.0	clear/yellow tint
4	09:35	4.0L	20.28	6.40	3626	12.95	0.14	-18.9	clear/yellow tint
5	09:39	5.0L	20.29	6.34	3600	13.03	0.16	-18.5	clear/yellow tint
6	09:42	6.0L	20.30	6.37	3594	13.03	0.19	-18.3	clear/yellow tint
7	:		.	.					
8	:		.	.					
9	:		.	.					
10	:		.	.					
11	:		.	.					
12	:		.	.					

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 5.1

Turbidity after sample collection (NTU): 6.2

Comments:

SAMPLER: Ben Howard
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900
Seattle, Washington 98101
Office: (206) 287-9130 Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS **WELL ID:** G2-D
SITE ADDRESS: 4029 Industrial Way, Longview, WA **SAMPLE ID:** G2-D-100312

DUP ID: _____
WIND FROM: N NE E SE S SW W (NW) (LIGHT) MEDIUM HEAVY
WEATHER: (SUNNY) PRTLY CLOUDY CLOUDY RAIN **TEMPERATURE:** 60.0 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/3/12	11:17	28.24	---	8.40	---	19.84		X 1	3.23
1/1	:		---		---			X 3	9.70

Gal/ft = (dia./2)² x 0.163 1" = 0.041 (2") = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√		
1 L HDPE	10/3/12	12:25	A	2	125, 500, 1L	(None)	(YES)	(NO)			
1 L HDPE	1/1	:			125, 500, 1L	None	YES	NO			
250 mL HDPE	10/3/12	12:25	A	1	250, 500, 1L	(None)	(YES)	(YES)			
250 mL HDPE	10/3/12	12:25	1	1	125, 500, 1L	(H2SO4)	(YES)	(NO)			
250 mL HDPE	10/3/12	12:25	1	2	125, 500, 1L	(HNO3)	(YES)	(NO/yes)			
100 mL HDPE	10/3/12	12:25	1	1	125, 500, 1L	(NaOH)	(YES)	(YES)			
100 mL HDPE	10/3/12	12:25	1	1	250, 500, 1L	(NaOH)	(YES)	(NO)			
Amber Glass	1/1	:			250, 500, 1L	None	YES	YES			
Amber Glass	1/1	:			250, 500, 1L	None	YES	NO			
VOA vials	1/1	:			40 mL	HCl	YES	NO			

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) (Diss Pb)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)	
250 mL HDPE	(Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs-low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 11:50 Fe++: 2.5 mg/l Sulfide: 0.80 mg/l

1x
2x
3x

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	12:01	3.3gal	22.48	6.73	3272	12.84	0.22	21.5	dark gray, turbid (clarity)
2	12:09	6.6gal	23.80	6.83	3214	12.68	0.32	0.4	med gray, cloudy
3	12:20	9.7gal	22.85	6.96	3237	13.43	1.74	-2.9	↓ ↓
4	:		.	.		.			
5	:		.	.		.			
6	:		.	.		.			
7	:		.	.		.			
8	:		.	.		.			
9	:		.	.		.			
10	:		.	.		.			
11	:		.	.		.			
12	:		.	.		.			

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 635 **Turbidity after sample collection (NTU):** Some.

Comments: Had difficulty w/ Waterra - changed check valve & replaced it.

SAMPLER: Julia Labadie
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G3-S

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G3-S-100412

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: <u>62</u> °F °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/4/12	10:45	15.52		6.79					X 1
/ /	:								X 3

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH			
1 L HDPE	10/4/12	11:25	B	1, 125, 500, (1L)	None	YES	NO			√	
1 L HDPE	/ /	:		1, 125, 500, (1L)	None	YES	NO			√	
250 mL HDPE	/ /	:		1, 250, 500, 1L	None	YES	YES			√	
250 mL HDPE	/ /	:		1, 250, 500, 1L	H2SO4	YES	NO			√	
250 mL HDPE	/ /	:		2, 250, 500, 1L	HNO3	YES	NO	YES		√	
100 mL HDPE	/ /	:		1, 125, 500, 1L	NaOH	YES	YES			√	
100 mL HDPE	/ /	:		1, 125, 500, 1L	NaOH	YES	NO			√	
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES				
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO				
VOA vials	/ /	:		40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) <u>DISS FL</u>	
100 mL HDPE	(Total Cyanide) (VAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)	
250 mL HDPE	Total and Dissolved Metals (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA		Purge Start Time: <u>10:48</u>	Fe++: <u>2.2</u> mg/l	Sulfide: <u>0.06</u> mg/l					
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	10:48	0.06	6.79						
2	10:51	0.3	6.98	6.78	2031	12.77	0.30	19.3	Clean / yellow tint
3	10:54	0.6	6.99	6.77	2033	12.73	0.24	14.2	"
4	10:58	0.9	7.06	6.74	2037	12.71	0.21	6.6	"
5	11:01	1.2	7.14	6.73	2040	12.67	0.26	6.4	"
6	11:04	1.5	7.13	6.69	2042	12.62	0.18	5.9	"
7	11:07	1.8	7.17	6.66	2045	12.63	0.17	6.1	"
8	11:10	2.1	7.15	6.64	2044	12.64	0.17	-1.3	"
9	11:13	2.4	7.16	6.61	2047	12.63	0.15	-1.6	"
10	11:16	2.7	7.18	6.60	2046	12.63	0.14	-1.7	"
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 3.55

Turbidity after sample collection (NTU): 1.98

Comments:

SAMPLER:

TIM STONE
(PRINTED NAME)

(SIGNATURE)

[Signature]

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G-3D

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G-3D-100412

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY			PRTL Y CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>62</u> °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate unit] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
10/4/12	11:00	30.02		7.34			X 1
/ /	:						X 3

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/4/12	11:45	B	1 125,500 (1L)	None	YES	NO		✓
1 L HDPE	/ /			1 125,500 (1L)	None	YES	NO		✓
250 mL HDPE	/ /			1 (250,500, 1L)	None	YES	YES		✓
250 mL HDPE	/ /			1 (125,500, 1L)	H2SO4	YES	NO		✓
250 mL HDPE	/ /			2 (125,500, 1L)	HNO3	YES	NO	YES	✓
100 mL HDPE	/ /			1 (125,500, 1L)	NaOH	YES	YES		✓
100 mL HDPE	/ /			1 (125,500, 1L)	NaOH	YES	NO		✓
Amber Glass	/ /			250,500, 1L	None	YES	YES		
Amber Glass	/ /			250,500, 1L	None	YES	NO		
VOA vials	/ /			40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) (Dis. FL)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA

Purge Start Time: 11:05 Fe++: mg/l Sulfide: 0.14 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	11:05	0.0(L)	7.34	6.39	1144	13.21	0.10	11.8	Clear/light yellow tint
2	11:08	0.3	7.69	6.39	1143	13.20	0.11	11.8	"
3	11:11	0.6	7.68	6.40	1143	13.22	0.10	11.7	"
4	11:14	0.9	7.70	6.40	1143	13.22	0.10	11.6	"
5	11:17	1.2	7.72	6.40	1143	13.19	0.10	11.5	"
6	11:20	1.5	7.73	6.40	1143	13.19	0.12	11.5	"
7	11:24	1.8	7.75	6.40	1143	13.20	0.11	11.5	"
8	11:27	2.1	7.76	6.40	1142	13.18	0.10	11.4	"
9	11:30	2.4	7.77	6.40	1142	13.19	0.11	11.4	"
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 39.1

Turbidity after sample collection (NTU): 47.7

Comments:

SAMPLER:

(PRINTED NAME)

Tim Stone

(SIGNATURE)

[Signature]

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G4-S

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G4-S-100312

DUP ID: ---

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: <u>67.2</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate unit) (Water Column x Gal/ft)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/3/12	14:28	22.71	---	6.43	---	16.28		X 1	2.65
1/1	:	---	---	---	---	---		X 3	7.96

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH		√	
1 L HDPE	10/3/12	15:46	B	2	125, 500, 1L	None	YES	NO			
1 L HDPE	1/1	:			125, 500, 1L	None	YES	NO			
250 mL HDPE	10/3/12	15:46	B	1	250, 500, 1L	None	YES	YES			
250 mL HDPE	10/3/12	:	1	1	250, 500, 1L	H2SO4	YES	NO			
250 mL HDPE	10/3/12	:	1	2	250, 500, 1L	HNO3	YES	NO/YES			
100 mL HDPE	10/3/12	:	1	1	125, 500, 1L	NaOH	YES	YES			
100 mL HDPE	10/3/12	:	1	1	250, 500, 1L	NaOH	YES	NO			
Amber Glass	10/3/12	:	2	250, 500, 1L	None	YES	YES/NO				
Amber Glass	10/3/12	:	2	250, 500, 1L	None	YES	NO				
VOA vials	10/3/12	:	3	40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): 15

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) (Dissolved Pb)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)	
250 mL HDPE	(Total and Dissolved Metals) (Al) (As) (Ca) (Co) (Cr) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)	
Amber Glass (12)	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs-low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 14:33 Fe++: 2.0 mg/l Sulfide: 0.46 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality	
1	14:35	0.8L	7.33	6.41	992	14.41	0.44	-24.4	clear, colorless	
2	14:38	1.5	8.16	6.45	989	14.34	0.22	-29.6	↓ ↓	
3	14:41	2.2	8.65	6.50	987	14.34	0.19	-23.3	↓ ↓	
4	14:44	2.9	9.27	6.42	992	14.05	0.16	-20.7	↓ ↓	
5	14:47	3.6	9.49	6.46	988	14.46	0.14	-23.9		
6	14:48	switched to 3X purge				too much drawdown				
7	15:14	0.5 gal.	18.42	6.48	1,023	13.68	1.47	-34.1	"	
8	15:43	7.9 gal.	19.91	6.49	1,016	13.32	0.16	-29.9	"	
9	:									
10	:									
11	:									
12	:									

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 144

Turbidity after sample collection (NTU): 77.2

Comments:

SAMPLER: Julia Labadie
(PRINTED NAME)

Julia Labadie
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G4-D

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G4-D-100512

DUP ID: N/A

WIND FROM: N NE E SE S SW W (NW) LIGHT (MEDIUM) HEAVY
 WEATHER: (SUNNY) PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: 67 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/04/12	11:55	37.85	---	5.60	---	32.25		X 1	5.3
10/5/12	11:42	37.85	---	14.94	---	22.91		X 3	15.9

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterr (B) Peristaltic Pump (C) Disposable Batter Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: See comments [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
1 L HDPE	10/5/12	11:50	B	1 125, 500, 1L	(None)	(YES)	(NO)		✓
1 L HDPE	10/5/12	11:50	B	1 125, 500, 1L	(None)	(YES)	(NO)		✓
250 mL HDPE	10/5/12	11:50	B	1 250, 500, 1L	(None)	(YES)	(YES)		✓
250 mL HDPE	10/5/12	11:50	B	1 125, 500, 1L	(H2SO4)	(YES)	(NO)		✓
250 mL HDPE	10/5/12	11:50	B	2 125, 500, 1L	(HNO3)	(YES)	(NO)		✓
100 mL HDPE	10/5/12	11:50	B	1 125, 500, 1L	(NaOH)	(YES)	(YES)		✓
100 mL HDPE	10/5/12	11:50	B	1 250, 500, 1L	(NaOH)	(YES)	(NO)		✓
Amber Glass	1/1	:		250, 500, 1L	None	YES	YES		
Amber Glass	1/1	:		250, 500, 1L	None	YES	NO		
VOA vials	1/1	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Pb) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA

Purge Start Time: 12:00

Fe⁺⁺: 3.8 mg/l Sulfide: 0.04 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	12:00	0.0	5.60						
2	12:05	1 gal	12.45	6.74	1234	12.62	0.14	21.6	slight brown/turbid
3	12:10	2	19.62	6.87	1192	13.28	2.64	7.6	slight cloudy/grey
4	12:15	3	23.69	7.02	1157	13.61	2.96	2.2	slight cloudy/white tint
5	12:20	4	29.45	6.63	1207	13.68	1.60	11.6	"
6	12:25	5	32.22	6.66	1206	13.72	1.22	7.4	"
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 42.6

Turbidity after sample collection (NTU): 59.7

Comments: Pumped dry on 10/4/2012. Sample 10/5/2012. New tube installed not measured. Approx. 10.24 off bottom

SAMPLER: TIM STONE
 (PRINTED NAME)

[Signature]
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G-5-5

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G-5-5-100412

DUP ID: N/A

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY	
WEATHER:	SUNNY			PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: <u>(°F) 72</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/04/12	16:50	22.44	---	12.98	---	9.46		X 1	1.6
1/1	:	.	---	.	---	.		X 3	4.8

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH			
1 L HDPE	10/11/12	17:50	B	125, 500, 1L	None	YES	NO			✓	
1 L HDPE	1/1	:	1	125, 500, 1L	None	YES	NO			✓	
250 mL HDPE	1/1	:	1	250, 500, 1L	None	YES	YES			✓	
250 mL HDPE	1/1	:	1	125, 500, 1L	H2SO4	YES	NO			✓	
250 mL HDPE	1/1	:	2	125, 500, 1L	HNO3	YES	NO	YES		✓	
100 mL HDPE	1/1	:	1	125, 500, 1L	NaOH	YES	YES			✓	
100 mL HDPE	1/1	↓	↓	250, 500, 1L	NaOH	YES	NO			✓	
Amber Glass	1/1	:		250, 500, 1L	None	YES	YES			✓	
Amber Glass	1/1	:		250, 500, 1L	None	YES	NO			✓	
VOA vials	1/1	:		40 mL	HCl	YES	NO			✓	

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) <u>DISS FID</u>	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 16:55 Fe++: 1.8 mg/l Sulfide: 0.04 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	16:55	0.0	12.98	8.0	---	---	---	---	---
2	17:08	1.6	15.99	6.17	603	11.50	0.09	42.5	clear, colorless
3	17:20	3.2	17.50	6.18	546	11.52	0.07	36.0	↓
4	17:36	4.8	.	6.15	523	11.77	0.10	33.7	↓
5	:	.	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 6.02

Turbidity after sample collection (NTU): 8.91

Comments:

SAMPLER: Bentward
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G5-D

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G5-D-100412

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	<u>NW</u>	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>	PRTLY CLOUDY			CLOUDY			RAIN	TEMPERATURE: <u>72</u> °F °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate unit] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
10/4/12	16:00	37.0	---	12.17	---	.	X 1
/ /	:	---	---	.	---	.	X 3

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/4/12	16:45	B	1 125, 500, 1L	None	YES	NO		✓
1 L HDPE	/ /	:	|	1 125, 500, 1L	None	YES	NO		✓
250 mL HDPE	/ /	:	|	1 250, 500, 1L	None	YES	YES		✓
250 mL HDPE	/ /	:	|	1 250, 500, 1L	H2SO4	YES	NO		✓
250 mL HDPE	/ /	:	|	2 250, 500, 1L	HNO3	YES	NO/YES		✓
100 mL HDPE	/ /	:	|	1 125, 500, 1L	NaOH	YES	YES		✓
100 mL HDPE	/ /	:	|	1 250, 500, 1L	NaOH	YES	NO		✓
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES		
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		
VOA vials	/ /	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) <u>DISSOLVED</u>	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	(Total and Dissolved Metals) (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 16:15 Fe++: mg/l Sulfide: 0.07 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality	
1	16:15	0.06	12.17	---	---	---	---	---	---	
2	16:18	0.3	12.18	6.31	420	11.91	0.08	60.5	Clear/Colorless	
3	16:21	0.6	12.19	6.26	426	11.83	0.08	60.2	↓	
4	16:24	0.9	12.21	6.22	429	11.81	0.07	60.1		
5	16:27	1.2	12.22	6.05	439	11.81	0.08	59.5		
6	16:30	1.5	12.21	6.11	434	11.79	0.08	59.0		
7	16:33	1.8	12.23	6.14	436	11.80	0.09	58.8		
8	:		
9	:		
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 14.1 Turbidity after sample collection (NTU): 4.73

Comments:

SAMPLER: Tim Stone
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

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PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G-6-S

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G-6-S-100212

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	<u>NW</u>	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>	PRTLY CLOUDY	CLOUDY	RAIN	TEMPERATURE: <u>65</u> °C						

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

(Product Thickness) (Water Column)

(Circle appropriate unit)
[Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
10/21/12	16:30	22.42	---	18.36	---	.	X 1
1/1	:	.	---	.	---	.	X 3

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√ if used
1 L HDPE	10/21/12	16:55	B 2	125, 500, 1L	None	YES	NO		
1 L HDPE	1/1	:		125, 500, 1L	None	YES	NO		
250 mL HDPE	10/21/12	16:55	B 1	250, 500, 1L	None	YES	YES		
250 mL HDPE	10/21/12	:	1	125, 500, 1L	H2SO4	YES	NO		
250 mL HDPE	10/21/12	:	2	125, 500, 1L	HNO3	YES	NO		
100 mL HDPE	10/21/12	:	1	125, 500, 1L	NaOH	YES	YES		
100 mL HDPE	10/21/12	:	1	250, 500, 1L	NaOH	YES	NO		
Amber Glass	1/1	:		250, 500, 1L	None	YES	YES		
Amber Glass	1/1	:		250, 500, 1L	None	YES	NO		
VOA vials	1/1	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count):

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
1 L HDPE	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	250 mL HDPE	(Total Phosphorous) <u>DISS. FL.</u>
100 mL HDPE	100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)
250 mL HDPE	250 mL HDPE	(Total and Dissolved Metals) (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)
Amber Glass	Amber Glass	(SVOCs) (PAHs) (NWTPh-Dx) (EPH) (PCBs- low level)
40 mL VOA vials	40 mL VOA vials	(VOCs)

WATER QUALITY DATA Purge Start Time: 16:32 Fe++: 0.2 mg/l Sulfide: 0.14 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	16:35	0.8L	18.40	7.61	2812	13.27	0.46	-106.0	slightly cloudy
2	16:38	1.6L	18.38	7.56	2740	13.07	0.39	-70.0	light yellow, mostly clear
3	16:41	2.2L	18.39	7.54	2663	13.00	0.37	-94.1	↓ ↓
4	16:44	2.9L	18.40	7.48	2603	12.98	0.36	-77.7	clear, pale yellow
5	16:47	3.6L	18.39	7.49	2567	12.97	0.36	-70.8	↓ ↓
6	16:50	4.3L	18.40	7.48	2552	12.98	0.35	-65.6	↓ ↓
7	:		.	.	.	.	.	.
8	:		.	.	.	.	.	.
9	:		.	.	.	.	.	.
10	:		.	.	.	.	.	.
11	:		.	.	.	.	.	.
12	:		.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 3.94

Turbidity after sample collection (NTU): 3.71

Comments:

SAMPLER: Julia Labadie
(PRINTED NAME)

Julia Labadie
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G6-D

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G6-D-100212

DUP ID: _____

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: <u>64</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
1/1	17:21	22	---	21.76	---	.			X 1
1/1	:	36.20	---	.	---	.			X 3

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√		
1 L HDPE	10/2/12	17:38	B	2 125, 500, 1L	(None)	(YES)	(NO)				
1 L HDPE	1/1	:		125, 500, 1L	None	YES	NO				
250 mL HDPE	10/2/12	17:38	B	1 250, 500, 1L	(None)	(YES)	(YES)				
250 mL HDPE	10/2/12	↓	↓	1 125, 500, 1L	(H2SO4)	(YES)	(NO)				
250 mL HDPE	10/2/12	↓	↓	2 125, 500, 1L	(HNO3)	(YES)	(NO)			4pc	
100 mL HDPE	10/2/12	↓	↓	1 125, 500, 1L	(NaOH)	(YES)	(YES)				
100 mL HDPE	10/2/12	↓	↓	1 250, 500, 1L	(NaOH)	(YES)	(NO)				
Amber Glass	1/1	:		250, 500, 1L	None	YES	YES				
Amber Glass	1/1	:		250, 500, 1L	None	YES	NO				
VOA vials	1/1	:		40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): _____

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) (DISS FL)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)	
250 mL HDPE	(Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWIPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA			Purge Start Time: 17:22	Fe++: 2.4 mg/l	Sulfide: 0.08 mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	17:26	1L	21.95	6.60	2793	12.89	2.45	57.2	clear, colorless
2	17:29	1.7L	21.95	6.58	2839	12.83	0.35	-48.0	↓ ↓
3	17:32	2.4	21.95	6.56	2868	12.76	0.34	-45.8	↓ ↓
4	17:35	3.1	21.95	6.54	2885	12.71		-47.0	↓ ↓
5	:		.	.	.	.	.	.
6	:		.	.	.	.	.	.
7	:		.	.	.	.	.	.
8	:		.	.	.	.	.	.
9	:		.	.	.	.	.	.
10	:		.	.	.	.	.	.
11	:		.	.	.	.	.	.
12	:		.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 9.47

Turbidity after sample collection (NTU): 2.85

Comments: _____

SAMPLER: Julia Labadie
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G7-D

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G7-D-100512

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: 72 °F °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/4/12	15:00	33.22		11.19		22.03		X1	3.6
10/5/12	09:57	33.22		13.48		19.74		X3	10.8

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 27.22 [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	
1 L HDPE	10/5/12	10:00	AB	1 125, 500, 1L	None	YES	NO		√
1 L HDPE	10/5/12	10:00		1 125, 500, 1L	None	YES	NO		√
250 mL HDPE	10/5/12	10:00		1 250, 500, 1L	None	YES	YES		√
250 mL HDPE	10/5/12	10:00		1 250, 500, 1L	H2SO4	YES	NO		√
250 mL HDPE	10/5/12	10:00		2 250, 500, 1L	HNO3	YES	NO	MS	√
100 mL HDPE	10/5/12	10:00		1 125, 500, 1L	NaOH	YES	YES		√
100 mL HDPE	10/5/12	10:00		1 250, 500, 1L	NaOH	YES	NO		√
Amber Glass	1/1	:		250, 500, 1L	None	YES	YES		
Amber Glass	1/1	:		250, 500, 1L	None	YES	NO		
VQA vials	1/1	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorus) <u>DIS, FI</u>	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VQA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 15:05 - 10/4/12 Fe++: 1.2 mg/l Sulfide: 0.16 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	15:05	0.0(g)	11.19						
2	15:10	1.2	15.94	6.43	1496	13.22	0.84	22.9	Clear / slight yellow tint
3	15:15	2.4	24.62	6.36	1384	12.84	0.27	21.7	Clear / slight yellow tint
4	15:20	3.6	33.22	6.36	1349	12.80	0.13	19.3	"
5	15:20	DRY							
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] 70.0 [Clarity, Color] 55.40

Turbidity before sample collection (NTU): 70.0 Turbidity after sample collection (NTU): 55.40

Comments:

SAMPLER: Tom STONE
 (PRINTED NAME)

[Signature]
 (SIGNATURE)

10/19 - 2 PM

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: P2-1

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: P2-1-100212

DUP ID: NA

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F . °C 12.4

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
<u>10/02/12</u>	<u>10:15</u>	<u>16.28</u>	---	<u>8.51</u>	---	<u>7.77</u>		X 1	<u>1.27</u>
/ /	:	.	---	.	---	.		X 3	<u>3.81</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√ (if used)
1 L HDPE	<u>10/02/12</u>	<u>10:40</u>	<u>B</u>	<u>125,500, 1L</u>	None	<u>YES</u>	NO		
1 L HDPE	<u>10/02/12</u>	<u>10:40</u>	|	<u>125,500, 1L</u>	None	<u>YES</u>	NO		
250 mL HDPE	<u>10/02/12</u>	<u>10:40</u>	|	<u>250,500, 1L</u>	None	<u>YES</u>	YES		
250 mL HDPE	<u>10/02/12</u>	<u>10:40</u>	|	<u>125,500, 1L</u>	H2SO4	<u>YES</u>	NO		
250 mL HDPE	<u>10/02/12</u>	<u>10:40</u>	|	<u>125,500, 1L</u>	HNO ₃	<u>YES</u>	NO	<u>YES</u>	<u>Geochem.</u>
100 mL HDPE	<u>10/02/12</u>	<u>10:40</u>	|	<u>125,500, 1L</u>	NaOH	<u>YES</u>	YES		
100 mL HDPE	<u>10/02/12</u>	<u>10:40</u>	|	<u>250,500, 1L</u>	NaOH	<u>YES</u>	NO		
Amber Glass	/ /	:		<u>250,500, 1L</u>	None	YES	YES		
Amber Glass	/ /	:		<u>250,500, 1L</u>	None	YES	NO		
VOA vials	/ /	:		<u>40 mL</u>	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	<u>(Total Cl)</u> <u>(SO₄)</u> <u>(Total and Dissolved Fluoride)</u> <u>(Alkalinity)</u> <u>(TDS)</u> <u>(TSS)</u>
250 mL HDPE	<u>(Total Phosphorous)</u>	
100 mL HDPE	<u>(Total Cyanide)</u> <u>(WAD Cyanide)</u> <u>(Free Cyanide)</u> <u>TOTAL and DISSOLVED</u>	
250 mL HDPE	Total and Dissolved Metals: <u>(Al)</u> <u>(As)</u> <u>(Ca)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(K)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Na)</u> <u>(Ni)</u> <u>(Sb)</u> <u>(Ag)</u> <u>(Be)</u> <u>(Cd)</u> <u>(Hg)</u> <u>(Pb)</u> <u>(Se)</u> <u>(Ti)</u> <u>(Zn)</u>	
Amber Glass	<u>(SVOCs)</u> <u>(PAHs)</u> <u>(NWWPH Dx)</u> <u>(EPI)</u> <u>(PCBs low level)</u>	
40 mL VOA vials	<u>(VOCs)</u>	

WATER QUALITY DATA Purge Start Time: 10:19 Fe++: 0.40 mg/l Sulfide: << mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>10:23</u>	<u>0.6 L</u>	<u>8.88</u>	<u>9.26</u>	<u>2804</u>	<u>15.48</u>	<u>15.33</u>	<u>-32.1</u>	
2	<u>10:27</u>	<u>1.2 L</u>	<u>9.01</u>	<u>9.37</u>	<u>33</u>	<u>16.38</u>	<u>8.86</u>	<u>-78.5</u>	<u>Flow thru cell knocked over</u>
3	<u>10:31</u>	<u>1.8 L</u>	<u>9.01</u>	<u>9.42</u>	<u>3170</u>	<u>15.15</u>	<u>8.20</u>	<u>-135</u>	
4	<u>10:35</u>	<u>2.4 L</u>	<u>9.05</u>	<u>9.43</u>	<u>3196</u>	<u>15.00</u>	<u>7.50</u>	<u>-220</u>	
5	<u>10:39</u>	<u>3.0</u>	<u>9.06</u>	<u>9.42</u>	<u>3179</u>	<u>15.09</u>	<u>8.23</u>	<u>-257</u>	
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 2.13

Turbidity after sample collection (NTU): 2.46

Comments:

SAMPLER: Self Payson
 (PRINTED NAME)

Self Payson
 (SIGNATURE)

Result lower than young

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: PZ-2

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: PZ-2-100212

WIND FROM: NONE DUP ID: N/A

N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY	
WEATHER: SUNNY			PRILY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>12.4</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
10/02/12	11:06	08.11	---	<u>08.11</u>	---	<u>19.67</u>	X 1 <u>3.21</u>
/ /	:	<u>27.78</u>	---	..	---	.	X 3 <u>9.62</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 25.0 [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/02/12	11:24	B	125, 500, 1L	None	YES	NO		
1 L HDPE	10/02/12	11:24		125, 500, 1L	None	YES	NO		
250 mL HDPE	10/02/12	11:24		250, 500, 1L	None	YES	YES		
250 mL HDPE	10/02/12	11:24		125, 500, 1L	H2SO4	YES	NO		
250 mL HDPE	10/02/12	11:24		125, 500, 1L	HNO3	YES	NO	YES	Geochem.
100 mL HDPE	10/02/12	11:24		125, 500, 1L	NaOH	YES	YES		
100 mL HDPE	10/02/12	11:24		250, 500, 1L	NaOH	YES	NO		
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES		
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		
VOA vials	/ /	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)	
250 mL HDPE	(Total Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (S) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs-low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 11:06 Fe++: 0.25 mg/l Sulfide: 0.70 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	11:00	1.0L	8.45	9.42	7821	14.46	379	-241	Dark brown (rust/iron) opaque
2	11:15	2.0L	8.49	9.43	7551	14.36	697	-273	
3	11:19	3.0L	8.46	9.44	7460	14.32	862	-297	
4	11:23	3.8L	8.45	9.46	7456	14.49	850	-311	
5	:		.	.		.			
6	:		.	.		.			
7	:		.	.		.			
8	:		.	.		.			
9	:		.	.		.			
10	:		.	.		.			
11	:		.	.		.			
12	:		.	.		.			

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 1.49

Turbidity after sample collection (NTU): 74.45

Comments: Tubing dropped in well during field filtering of dissolved bottles. Discovered after removal of the filter.

SAMPLER: Jeff Payson
(PRINTED NAME)

Jeff Payson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900
Seattle, Washington 98101
Office: (206) 287-9130 Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: PZ-3

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: PZ-3-100212

DUP ID: N/A

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 14.5°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness [Water Column] (Circle appropriate unit) [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
10/02/12	:	<u>20.94</u>	---	<u>5.96</u>	---	<u>44.98</u>	X 1 <u>2.44 1.15</u>
/ /	:	<u>13.03</u>	---	.	---	<u>7.07</u>	X 3 <u>7.33 3.45</u>

Gal/ft = (dia./2)² × 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 17.0 [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/02/12	12:26	<u>B</u>	125, 500, 1L	None	<u>YES</u>	NO		
1 L HDPE	10/02/12	12:26		125, 500, 1L	None	<u>YES</u>	NO		
250 mL HDPE	10/02/12	12:26		250, 500, 1L	None	<u>YES</u>	YES		
250 mL HDPE	10/02/12	12:26		125, 500, 1L	H2SO4	<u>YES</u>	NO		
250 mL HDPE	10/02/12	12:26		125, 500, 1L	HNO ₃	<u>YES</u>	NO	<u>YES</u>	<u>Geochem.</u>
100 mL HDPE	10/02/12	12:26		125, 500, 1L	NaOH	<u>YES</u>	YES		
100 mL HDPE	10/02/12	12:26		250, 500, 1L	NaOH	<u>YES</u>	NO		
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES		
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		
VOA vials	/ /	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	<u>(Total Cl)</u> <u>(SO₄)</u> <u>(Total and Dissolved Fluoride)</u> <u>(Alkalinity)</u> <u>(TDS)</u> <u>(TSS)</u>
250 mL HDPE	<u>(Total Phosphorous)</u>	
100 mL HDPE	<u>(Total Cyanide)</u> <u>(WAD Cyanide)</u> <u>(Free Cyanide)</u> <u>TOTAL and DISSOLVED</u>	
250 mL HDPE	Total and Dissolved Metals: <u>(Al)</u> <u>(As)</u> <u>(Ca)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(K)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Na)</u> <u>(Ni)</u> <u>(Si)</u> (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	<u>(SVOCs)</u> <u>(PAHs)</u> <u>(NWTTH D_x)</u> <u>(EPI)</u> <u>(PCBs low level)</u>	
40 mL VOA vials	<u>(VOCs)</u>	

WATER QUALITY DATA Purge Start Time: 12:14 Fe⁺⁺: 0.90 mg/l Sulfide: 0.24 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (μS)	Temp °C	DO	ORP	Water Quality
1	<u>12:17</u>	<u>1.2 L</u>	<u>6.10</u>	<u>8.24</u>	<u>2471</u>	<u>17.34</u>	<u>691</u>	<u>-187</u>	<u>light yellow, clear</u>
2	<u>12:21</u>	<u>2.4 L</u>	<u>6.13</u>	<u>8.31</u>	<u>2500</u>	<u>17.26</u>	<u>697</u>	<u>-211</u>	
3	<u>12:24</u>	<u>3.6 L</u>	<u>6.12</u>	<u>8.35</u>	<u>2587</u>	<u>17.14</u>	<u>702</u>	<u>-233</u>	
4	12:28		.	.					
5	12:		.	.					
6	:		.	.					
7	:		.	.					
8	:		.	.					
9	:		.	.					
10	:		.	.					
11	:		.	.					
12	:		.	.					

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 5.89

Turbidity after sample collection (NTU): 5.15

Comments:

SAMPLER: Jeff Payson
(PRINTED NAME)

Jeff Payson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: P2-4

SITE ADDRESS: 4029 Industrial Way, Longview, WA

SAMPLE ID: P2-4-100212

DUP ID: N/A

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>58.9</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
<u>10/02/12</u>	<u>12:50</u>	<u>20.94</u>	---	<u>5.82</u>	---	<u>13.15</u>		X 1	<u>2.47</u>
/ /	:	.	---	.	---	.		X 3	<u>7.41</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth: <u>18.0</u>	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√
1 L HDPE	<u>10/02/12</u>	<u>13:17</u>	<u>B</u>	125, 500, 1L	None	<u>YES</u>	NO		
1 L HDPE	<u>10/02/12</u>	<u>13:17</u>		125, 500, 1L	None	<u>YES</u>	NO		
250 mL HDPE	<u>10/02/12</u>	<u>13:17</u>		250, 500, 1L	None	<u>YES</u>	YES		
250 mL HDPE	<u>10/02/12</u>	<u>13:17</u>		125, 500, 1L	H2SO4	<u>YES</u>	NO		
250 mL HDPE	<u>10/02/12</u>	<u>13:17</u>		125, 500, 1L	HNO3	<u>YES</u>	NO	<u>YES</u>	<u>Geochem.</u>
100 mL HDPE	<u>10/02/12</u>	<u>13:17</u>		125, 500, 1L	NaOH	<u>YES</u>	YES		
100 mL HDPE	<u>10/02/12</u>	<u>13:17</u>		250, 500, 1L	NaOH	<u>YES</u>	NO		
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES		
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		
VOA vials	/ /	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total C) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TD5) (TSS)
250 mL HDPE	(Total Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPI) (PCBs low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA			Purge Start Time: <u>12:55</u>	Fe++: <u>1.0</u> mg/l	Sulfide: <u>0.02</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>12:59</u>	<u>0.8 L</u>	<u>6.23</u>	<u>9.04</u>	<u>7840</u>	<u>15.82</u>	<u>788</u>	<u>-196</u>	<u>DO</u>
2	<u>01:03</u>	<u>1.6 L</u>	<u>6.33</u>	<u>9.21</u>	<u>8262</u>	<u>15.53</u>	<u>788</u>	<u>-258</u>	<u>Red beer colored, clear</u>
3	<u>01:07</u>	<u>2.4 L</u>	<u>6.30</u>	<u>9.56</u>	<u>13,423</u>	<u>15.76</u>	<u>752</u>	<u>-332</u>	
4	<u>01:11</u>	<u>3.2 L</u>	<u>6.37</u>	<u>9.57</u>	<u>13,804</u>	<u>15.76</u>	<u>752</u>	<u>-362</u>	
5	<u>01:15</u>	<u>4.0 L</u>	<u>6.39</u>	<u>9.57</u>	<u>13,901</u>	<u>15.67</u>	<u>757</u>	<u>-378</u>	
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 2.06

Turbidity after sample collection (NTU): 1.11

Comments:

SAMPLER: Jeff Payson
(PRINTED NAME)

Jeff Payson
(SIGNATURE)

01-13
24hr clock

764

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900
Seattle, Washington 98101
Office: (206) 287-9130 Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: PZ-5
SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: PZ-5-100212

DUP ID: N/A
WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 12.4C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/02/12	09:00	22.20	---	4.98	---	17.22		X 1	2.81
/ /	:	.	---	.	---	.		X 3	8.42

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: <u>20.0</u>	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√		
1 L HDPE	10/02/12	09:20	B	125, 500, 1L	None	YES	NO				
1 L HDPE	10/02/12	09:20	|	125, 500, 1L	None	YES	NO				
250 mL HDPE	10/02/12	09:20	|	250, 500, 1L	None	YES	YES				
250 mL HDPE	10/02/12	09:20	|	125, 500, 1L	H2SO4	YES	NO				
250 mL HDPE	10/02/12	09:28	|	125, 500, 1L	HNO3	YES	NO/YES			Geochem	
100 mL HDPE	10/02/12	09:20	|	125, 500, 1L	NaOH	YES	YES				
100 mL HDPE	10/02/12	09:20	+	250, 500, 1L	NaOH	YES	NO				
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES				
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO				
VOA vials	/ /	:		40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPI) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

Result lower than range

WATER QUALITY DATA										Purge Start Time: <u>09:02</u>	Fe++: <u>2.0</u> mg/l	Sulfide: <u><<</u> mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality			
1	09:06	0.8 L	5.26	10.28	20,994	13.29	890.55	-253.0	Dark brown, opaque			
2	09:10	1.6 L	5.21	10.24	20,982	13.19	896	-324	" "			
3	09:14	2.4 L	5.21	10.22	20,979	13.14	900	-368	" "			
4	09:18	3.2 L	5.21	10.22	20,976	13.08	904	-377				
5	:		.	.		.						
6	:		.	.		.						
7	:		.	.		.						
8	:		.	.		.						
9	:		.	.		.						
10	:		.	.		.						
11	:		.	.		.						
12	:		.	.		.						

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 2.04

Turbidity after sample collection (NTU): 0.94

Comments:

SAMPLER: JEFF PAYSON
(PRINTED NAME)

Jeff Payson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: PZ-6

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: PZ-6-100212

DUP ID: N/A

WIND FROM:	N	NE	E	SE	S	SW	<u>W</u>	NW	LIGHT	<u>MEDIUM</u>	HEAVY
WEATHER:	<u>SUNNY</u>		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F _____ °C _____		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

[Product Thickness] [Water Column]

(Circle appropriate unit)
[Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
<u>10/02/12</u>	<u>15:55</u>	<u>13.12</u>	---	<u>7.72</u>	---	<u>7.40</u>	X 1 <u>1.20</u>
/ /	:	.	---	.	---	.	X 3 <u>3.60</u>

Gal/ft = (dia./2) ² x 0.163	1" = 0.041	<u>(2")</u> = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
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§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: 13.12 [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	<u>10/02/12</u>	<u>16:27</u>		125, 500, 1L	None	<u>YES</u>	NO		
1 L HDPE	<u>10/02/12</u>	:		125, 500, 1L	None	<u>YES</u>	NO		
250 mL HDPE	<u>10/02/12</u>	:		250, 500, 1L	None	<u>YES</u>	YES		
250 mL HDPE	<u>10/02/12</u>	:		125, 500, 1L	H2SO4	<u>YES</u>	NO		
250 mL HDPE	<u>10/02/12</u>	:		125, 500, 1L	HNO ₃	<u>YES</u>	NO	<u>YES</u>	<u>Geochem.</u>
100 mL HDPE	<u>10/02/12</u>	:		125, 500, 1L	NaOH	<u>YES</u>	YES		
100 mL HDPE	<u>10/02/12</u>	✓		250, 500, 1L	NaOH	<u>YES</u>	NO		
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES		
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		
VOA vials	/ /	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Pb) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWWPH-Dx) (EPI) (PCBs-low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 15:57 Fe⁺⁺: 1.2 mg/l Sulfide: 0.52 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>16:01</u>	<u>0.15 L</u>	<u>8.54</u>	<u>7.27</u>	<u>3056</u>	<u>15.60</u>	<u>791</u>	<u>185</u>	
2	<u>16:05</u>	<u>0.25 L</u>	<u>8.90</u>	<u>7.38</u>	<u>3052</u>	<u>15.71</u>	<u>783</u>	<u>-248</u>	
3	<u>16:06</u>	<u>Unable to low flow, purge 3 volumes</u>							
4	<u>16:15</u>	<u>1.5 gal</u>	<u>10.39</u>	<u>7.72</u>	<u>2918</u>	<u>14.72</u>	<u>848</u>	<u>-101</u>	<u>Vol. 1*</u>
5	<u>16:20</u>	<u>2.75 gal</u>	<u>10.97</u>	<u>8.60</u>	<u>2741</u>	<u>14.79</u>	<u>844</u>	<u>-195</u>	<u>Vol. 2</u>
6	<u>16:25</u>	<u>4.0 gal</u>	<u>12.48</u>	<u>8.43</u>	<u>2722</u>	<u>14.37</u>	<u>814</u>	<u>-223</u>	<u>Vol. 3</u>
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 58.19

Turbidity after sample collection (NTU): 80.88

Comments:

Doug Gatoon * increased pump speed

SAMPLER:

Jeff Payson
(PRINTED NAME)

(SIGNATURE)

Jeff Payson

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: P2-7

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: P2-7-100212

DUP ID: _____

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY	PRTLY CLOUDY	CLOUDY	RAIN	TEMPERATURE: °F		17.3°C				

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/02/12	:	19.13	---	11.20	---	7.93		X 1	1.29
/ /	:	.	---	.	---	.		X 3	3.87

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth: 18.13	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/02/12	17:30	B	125, 500, 1L	None	YES	NO		
1 L HDPE	10/02/12	:	|	125, 500, 1L	None	YES	NO		
250 mL HDPE	10/02/12	:	|	250, 500, 1L	None	YES	YES		
250 mL HDPE	10/02/12	:	|	125, 500, 1L	H2SO4	YES	NO		
250 mL HDPE	10/02/12	:	|	125, 500, 1L	HNO3	YES	NO	YES	Geochem.
100 mL HDPE	10/02/12	:	|	125, 500, 1L	NaOH	YES	YES		
100 mL HDPE	10/02/12	:	|	250, 500, 1L	NaOH	YES	NO		
Amber Glass	10/1/12	:	|	250, 500, 1L	None	YES	YES		
Amber Glass	/ /	:	|	250, 500, 1L	None	YES	NO		
VOA vials	/ /	:	|	40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): _____

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorus)	
100 mL HDPE	(Total Cyanide) (AD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs-low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 16:50 / 1711 Fe++: 2.2 mg/l Sulfide: 0.06 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	16:53	150 mL	10.42	6.85	2738	14.01	898	-152	Root beer brown, clear
2	16:57	300 mL	11.58	6.84	2732	13.97	904	-154	
3	17:01	450 mL	11.70	6.92	2700	13.88	908	-160	
4	17:05	550 mL	11.84	7.06	2486	14.04	895	-159	
5	17:09	650 mL	11.93	7.09	2339	14.13	890	-154	
6	17:10	Cur't low flow.			2182	13.70	31.4	-136	Purged 3 Vols.
7	17:14	1.3	12.3	7.07	↓	↓	↓	↓	Vol. 1
8	17:21	2.6	13.21	7.10	2125	13.97	620	-142	Vol. 2
9	17:27	3.9	13.93	7.19	2136	13.74	600	-144	Vol. 3
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 10.32

Turbidity after sample collection (NTU): 24.10

Comments:

SAMPLER: Doug Larson Jeff Payson

(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: R-2

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: R-2-100312

WIND FROM: NO WIND DUP ID: _____
 WEATHER: SUNNY PRTY CLOUDY CLOUDY RAIN TEMPERATURE: °F _____ °C 10.4

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/03/12	09:14	7.23	---	7.23	---	7.69		X 1	1.25
---	---	14.92	---	---	---	---		X 3	3.76

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 11.92 [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/03/12	09:38	B	125, 500, 1L	None	<u>YES</u>	NO		
1 L HDPE	10/03/12	09:38		125, 500, 1L	None	<u>YES</u>	NO		
250 mL HDPE	10/03/12	09:38		250, 500, 1L	None	<u>YES</u>	<u>YES</u>		
250 mL HDPE	10/03/12	09:38		125, 500, 1L	H2SO4	<u>YES</u>	NO		
250 mL HDPE	10/03/12	09:38	2	125, 500, 1L	HNO ₃	<u>YES</u>	NO	<u>YES</u>	Geochem.
100 mL HDPE	10/03/12	09:38		125, 500, 1L	NaOH	<u>YES</u>	<u>YES</u>		
100 mL HDPE	10/03/12	09:38		250, 500, 1L	NaOH	<u>YES</u>	NO		
Amber Glass	10/03/12	09:38	4	250, 500, 1L	None	<u>YES</u>	YES NO		
Amber Glass	1/1	:		250, 500, 1L	None	<u>YES</u>	NO		
VOA vials	10/03/12	09:38	3	40 mL	HCl	<u>YES</u>	NO		

Total Bottles (include duplicate count): 15

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	<u>(Total Cl)</u> <u>(SO₄)</u> <u>(Total and Dissolved Fluoride)</u> <u>(Alkalinity)</u> <u>(TDS)</u> <u>(TSS)</u>
250 mL HDPE	<u>(Total Phosphorous)</u>	
100 mL HDPE	<u>(Total Cyanide)</u> <u>(WAD Cyanide)</u> <u>(Free Cyanide)</u> <u>TOTAL and DISSOLVED</u>	
250 mL HDPE	Total and Dissolved Metals: <u>(Al)</u> <u>(As)</u> <u>(Ca)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(K)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Na)</u> <u>(Ni)</u> <u>(S)</u> <u>(Ag)</u> <u>(Be)</u> <u>(Cd)</u> <u>(Hg)</u> <u>(Pb)</u> <u>(Sb)</u> <u>(Se)</u> <u>(Ti)</u> <u>(Zn)</u>	
Amber Glass	<u>(SVOCs)</u> <u>(PAHs)</u> <u>(NWTPH-Dx)</u> <u>(EPH)</u> <u>(PCBs- low level)</u>	
40 mL VOA vials	<u>(VOCs)</u>	

WATER QUALITY DATA Purge Start Time: 09:17 Fe++: 1.6 mg/l Sulfide: 0.01 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	09:21	0.8L	7.72	6.52	380	11.66	999	-58	Very pale yellow, clear
2	09:25	1.6L	7.89	6.53	396	11.46	999	-63	
3	09:29	2.4L	7.89	6.67	414	11.48	999	-74	
4	09:33	3.2L	7.88	6.74	418	11.48	999	-81	
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 3.66

Turbidity after sample collection (NTU): 1.62

Comments:

SAMPLER: Doug Lafoon
Jeff Payson
 (PRINTED NAME)

Jeff Payson
 (SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: RL-15

SITE ADDRESS: 4029 Industrial Way, Longview, WA

SAMPLE ID: RL-15-100412

DUP ID: N/A

WIND FROM: (N) NE E SE S SW W NW LIGHT (MEDIUM) HEAVY
 WEATHER: (SUNNY) PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 20.4°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

[Product Thickness] [Water Column]

[Circle appropriate unit] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
10/03/12	14:52	19.06	---	10.25	---	8.81	X 1 1.43
10/04/12	09:10	19.06	---	10.30	---	8.78	X 3 4.36

Gal/ft = (dia./2)² x 0.163 1" = 0.041 (2) 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: 18.50 [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√
1 L HDPE	10/04/12	09:15	B	1 125, 500 <u>(1L)</u>	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>		✓
1 L HDPE	10/04/12	09:15	B	1 125, 500 <u>(1L)</u>	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>		✓
250 mL HDPE	10/04/12	09:15	B	1 250, 500, 1L	<u>(None)</u>	<u>(YES)</u>	<u>(YES)</u>		
250 mL HDPE	10/04/12	09:15	B	1 125, 500, 1L	<u>(H2SO4)</u>	<u>(YES)</u>	<u>(NO)</u>		
250 mL HDPE	10/04/12	09:15	B	2 125, 500, 1L	<u>(HNO3)</u>	<u>(YES)</u>	<u>(NO)</u>		YES Geochem
100 mL HDPE	10/04/12	09:15	B	1 125, 500, 1L	<u>(NaOH)</u>	<u>(YES)</u>	<u>(YES)</u>		
100 mL HDPE	10/04/12	09:15	B	1 250, 500, 1L	<u>(NaOH)</u>	<u>(YES)</u>	<u>(NO)</u>		
Amber Glass	/ /	:	1	250, 500, 1L	None	YES	YES		
Amber Glass	10/04/12	09:15	B	4 250, 500 <u>(1L)</u>	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>		
VOA vials	10/04/12	09:15	B	3 <u>(40 mL)</u>	<u>(HCl)</u>	<u>(YES)</u>	<u>(NO)</u>		

Total Bottles (include duplicate count): 15

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	<u>(Total C)</u> <u>(SO₄)</u> <u>(Total and Dissolved Fluoride)</u> (Alkalinity) <u>(DS)</u> <u>(TSS)</u>
250 mL HDPE	<u>(Total Phosphorus)</u>	
100 mL HDPE	<u>(Total Cyanide)</u> <u>(WAD Cyanide)</u> <u>(Free Cyanide)</u> TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: <u>(Al)</u> <u>(As)</u> <u>(Ca)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(K)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Na)</u> <u>(Ni)</u> <u>(Si)</u> (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	<u>(SVOCs)</u> <u>(PAHs)</u> (NWTPH-Dx) (EPH) <u>(TCBs- low level)</u> <u>(2)</u>	
40 mL VOA vials	<u>(VOCs)</u>	

WATER QUALITY DATA

Purge Start Time: : Fe++: mg/l Sulfide: mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality	
1	14:40	0.1 gal	15.30	6.40	321	12.23	0.11	-21	Slight yellow, clear	
2	14:42	0.5 gal	18.60	6.40	313	12.30	0.24	0.5		
3	14:43		Well dry, allow to recharge							
4	:									
5	:									
6	:									
7	:									
8	:									
9	:									
10	:									
11	:									
12	:									

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU):

Turbidity after sample collection (NTU):

Comments:

Doug Labeon

SAMPLER:

Jeff Payson

(PRINTED NAME)

Jeff Payson

(SIGNATURE)



WATER LEVEL SURVEY

Former Reynolds Metals Reduction Plant RI / FS

Anchor QEA, L.L.C. Site: Millennium Bulk Terminals - Longview, WA Date: 10/01/12

Personnel: *Payson, Saffron* Project No.: 110730-02.01

Weather: *Clear, sunny,* Water Level Meter #

Well ID	Time	DTW (ft btoc)	Comments
---------	------	---------------	----------

PZ Series Wells

PZ-1	0918	8.52	Bollards knocked over (2 of 3)
PZ-2	0921	8.06	Bollard knocked over (1 of 3)
PZ-3	0927 0931	5.81 5.99	
PZ-4	0927	5.81	
PZ-5	0946	5.00	
PZ-6			
PZ-7			

G Series Wells

G1-S	1115	16.29	
G1-D	1117	19.47	
G2-S	1051	8.50	
G2-D	1053	8.29	
G3-S	1104	6.61	
G3-D	1105	7.19	
G4-S	1040	6.42	
G4-D	1042	5.22	
G5-S			
G5-D			
G6-S			
G6-D			
G-7D			

R and RL Series Wells

R-2	1032	7.14	Stakes in field, orange flagged route
RL-1S			

Notes:



WATER LEVEL SURVEY

Former Reynolds Metals Reduction Plant RI / FS

Anchor QEA, L.L.C. Site: Millennium Bulk Terminals - Longview, WA Date:

Personnel: Project No.: 110730-02.01

Weather: Water Level Meter #

Well ID	Time	DTW (ft btoc)	Comments
---------	------	---------------	----------

RLSW Series Wells

RLSW-1			
RLSW-2			
RLSW-3			
RLSW-4			

SSA Series Wells

SSA4-MW-01			
SSA 6-MW-01	1141	7.89	
SSA7-MW-01	1133	11.71	

Surface Water - Staff Gauges

Staff Gauge	Time	Elevation (ft, NAVD88)	Comments
			On dolphin in Columbia River by Reynolds Pump Station
			At Stillwell-01 in CDID ditch No. 14 on floating bridge
			On metal pipe in U-ditch by gate to CBMP
			In leachate/recirculation ditch by gate to CBMP
	0938	9.12	Attached to pump in Railroad ditch (East Cryolite)
	0940	9.48	In SPL area ditch south of railroad tracks by E Cryolite
	1047	6.57	In ditch leading to 004 pump station (parallel to road) by BMPs
	1044	2.26	Attached to cement wall at 004 pump station north of WMP

Notes:



Former Reynolds Metals Reduction Plant - RI/FS
Millennium Bulk Terminals - Longview, WA

Task Sheet
October 2012

Well ID	Total Depth (ft BTOC)	Date	Sample ID (Well ID-MMDDYY)	Sample Time	Well Integrity
PZ Series Wells					
PZ-1	16.28	10/02/12	PZ-1-100212	1040	
PZ-2	27.78	10/02/12	PZ-2-100212	1124	
PZ-3	13.03	10/02/12	PZ-3-100212	1226	
PZ-4	20.94	10/02/12	PZ-4-100212	1317	
PZ-5	25.49	10/02/12	PZ-5-100212	0920	
PZ-6	15.12	10/07/12	PZ-6-100212	1527	
PZ-7	21.23	10/02/12	PZ-7-100212	1730	
G Series Wells					
G1-S	10.49				
G1-D	37.07				
G2-S	12.77				
G2-D	27.82				
G3-S	15.35				
G3-D	30.78				
G4-S	22.58				
G4-D	37.57	10/05/12	G4-D-100512	1150	
G5-S	21.65			1655	
G5-D	37.35			1738	
G6-S	22.66				
G6-D	37.65				
G7-D	32.81	10/05/12	G7-D-100512	1000	
R and RL Series Wells					
R-2	15.63	10/03/12	R-2-100312	0938	
RL-1S	18.83	10/04/12			
SSA Series Wells					
SSA4-MW-01	17.50	10/05/12	SSA4-MW-01-100512	1057	
SSA6-MW-01	15.25	10/05/12	SSA6-MW-01-100512	1339	
SSA7-MW-01	18.90				

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900
Seattle, Washington 98101
Office: (206) 287-9130 Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: RLSW-2

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: RLSW-2-100512

DUP ID: N/A

WIND FROM:

N	NE	E	SE	S	SW	W	NW
---	----	---	----	---	----	---	----

 LIGHT MEDIUM HEAVY
WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 10.8 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/14/12	19:57	20.11	---	11.06	---	9.05		X 1	0.81
10/15/12	09:30	20.11	---	12.18	---	7.93		X 3	2.94

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 19.5 (√ if used)

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/15/12	09:35	B	1 125, 500, 1L	None	YES	NO		✓
1 L HDPE	10/15/12	09:35	B	1 125, 500, 1L	None	YES	NO		✓
250 mL HDPE	10/15/12	09:35	B	1 250, 500, 1L	None	YES	YES		✓
250 mL HDPE	10/15/12	09:35	B	1 125, 500, 1L	H2SO4	YES	NO		✓
250 mL HDPE	10/15/12	09:35	B	2 125, 500, 1L	HNO3	YES	NO		✓
100 mL HDPE	10/15/12	09:35	B	1 125, 500, 1L	NaOH	YES	YES		✓
100 mL HDPE	10/15/12	09:35	B	1 250, 500, 1L	NaOH	YES	NO		✓
Amber Glass	///	///	///	250, 500, 1L	None	YES	YES		
Amber Glass	///	///	///	250, 500, 1L	None	YES	NO		
VOA vials	///	///	///	40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total-Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 13:58 Fe++: 1.1 mg/l Sulfide: 0.02 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	14:01	0.25 gal	---	7.29	1,706	14.24	0.57	30.2	slight orange/yellow
2	14:04	0.8 gal	20.11	7.05	1,407	14.58	1.74	34.2	"
3	:		(dry)	.		.			
4	:		.	.		.			
5	:		.	.		.			
6	:		.	.		.			
7	:		.	.		.			
8	:		.	.		.			
9	:		.	.		.			
10	:		.	.		.			
11	:		.	.		.			
12	:		.	.		.			

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 14.8 Turbidity after sample collection (NTU): 10.6

Comments: Pumped dry on 10/14/2012. Sample 10/15/2012.

SAMPLER: Ben Howard
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: RLSW-3

SITE ADDRESS: 4029 Industrial Way, Longview, WA

SAMPLE ID: RLSW-3-100512

DUP ID: N/A

WIND FROM:

N	NE	E	SE	S	SW	W	NW
---	----	---	----	---	----	---	----

 LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: 68 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/4/12	12:45	19.90	---	8.73	---	11.17		X1	1.02
10/5/12	08:46	19.90	---	8.67	---	11.23		X3	3.07
Gal/ft = (dia./2) ² x 0.163		1.5" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
1 L HDPE	10/5/12	09:00	B	1 125, 500, 1L	None	YES	NO		✓
1 L HDPE	10/5/12	09:00	B	1 125, 500, 1L	None	YES	NO		✓
250 mL HDPE	10/5/12	09:00	B	1 250, 500, 1L	None	YES	YES		✓
250 mL HDPE	10/5/12	09:00	B	1 250, 500, 1L	H2SO4	YES	NO		✓
250 mL HDPE	10/6/12	09:00	B	2 250, 500, 1L	HNO3	YES	NO/YES		✓
100 mL HDPE	10/5/12	09:00	B	1 125, 500, 1L	NaOH	YES	YES		✓
100 mL HDPE	10/5/12	09:00	B	1 250, 500, 1L	NaOH	YES	NO		✓
Amber Glass	10/5/12	09:00	B	4 250, 500, 1L	None	YES	YES/NO		✓
Amber Glass				250, 500, 1L	None	YES	NO		
VOA vials	10/5/12	09:00	B	3 40 mL	HCl	YES	NO		✓

Total Bottles (include duplicate count): 15

Analysis Allowed per Bottle Type	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous)
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)
40 mL VOA vials	(VOCs)

WATER QUALITY DATA Purge Start Time: 12:50 Fe++: 2.6 mg/l Sulfide: 0.02 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	12:50	0(g)	8.73						
2	12:55	1.01	11.17	6.32	1815	12.26	0.31	44.4	Clear/Colorless
3	:		(dry)	.				44.4	(very slight yellow tint)
4	:		.	.					
5	:		.	.					
6	:		.	.					
7	:		.	.					
8	:		.	.					
9	:		.	.					
10	:		.	.					
11	:		.	.					
12	:		.	.					

[gallons or liters] Turbidity before sample collection (NTU): 62.5

[Clarity, Color] Turbidity after sample collection (NTU): 28.4

Comments: pumped by on 10/4/2012. Sample 10/5/2012.

SAMPLER: TIM STONE
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G4-D

SITE ADDRESS: 4029 Industrial Way, Longview, WA

SAMPLE ID: G4-D-100512

DUP ID: N/A

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY			PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: <u>67</u> °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/04/12	11:55	37.85	---	5.60	---	32.25		X1	5.3
10/05/12	11:42	37.83	---	14.94	---	22.91		X3	15.9

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: <u>See comments</u>	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√		
1 L HDPE	10/5/12	11:50	B	1 125, 500, 1L	None	YES	NO		✓		
1 L HDPE	10/5/12	11:50	B	1 125, 500, 1L	None	YES	NO		✓		
250 mL HDPE	10/5/12	11:50	B	1 250, 500, 1L	None	YES	YES		✓		
250 mL HDPE	10/5/12	11:50	B	1 125, 500, 1L	H2SO4	YES	NO		✓		
250 mL HDPE	10/5/12	11:50	B	2 125, 500, 1L	HNO3	YES	NO		✓		
100 mL HDPE	10/5/12	11:50	B	1 125, 500, 1L	NaOH	YES	YES		✓		
100 mL HDPE	10/5/12	11:50	B	1 250, 500, 1L	NaOH	YES	NO		✓		
Amber Glass	1/1	:		250, 500, 1L	None	YES	YES				
Amber Glass	1/1	:		250, 500, 1L	None	YES	NO				
VOA vials	1/1	:		40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA		Purge Start Time: <u>12:00</u>	Fe++: <u>3.8</u> mg/l	Sulfide: <u>0.04</u> mg/l					
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	12:00	0.0	5.60						
2	12:05	1 gal	12.45	6.74	1,234	12.62	0.14	21.6	slight brown/turbid
3	12:10	2	19.62	6.87	1,192	13.28	2.64	7.6	slight cloudy/grey
4	12:15	3	23.69	7.02	1,187	13.61	3.96	2.2	slight cloudy/white tint
5	12:20	4	29.45	6.63	1,207	13.68	1.60	11.6	"
6	12:25	5	32.22	6.66	1,206	13.72	1.22	7.4	"
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 42.6

Turbidity after sample collection (NTU): 59.7

Comments: Pumped dry on 10/4/2012. Sample 10/5/2012. New tube installed not measured. Approx. 10.2 ft off bottom

SAMPLER: TIM STOWE
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: G7-D

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: G7-D-100512

DUP ID: N/A

WIND FROM:	N	NE	E	SE	S	SW	W	<input checked="" type="radio"/> NW	LIGHT	<input checked="" type="radio"/> MEDIUM	HEAVY
WEATHER:	<input checked="" type="radio"/> SUNNY		<input type="radio"/> PRTLY CLOUDY		<input type="radio"/> CLOUDY		<input type="radio"/> RAIN		TEMPERATURE: <u>72</u> °F °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							(Product Thickness)	(Water Column)	(Circle appropriate unit)
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			(Water Column x Gal/ft)
10/4/12	15:00	33.22		11.19		22.03			X1
10/5/12	09:57	33.22		13.48		19.74			X3
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: <u>27.22</u>	(N if used)
Bottle Type	Date	Time	Method	Amount & Volume mL		Preservative (circle)	Ice	Filter	pH		
1 L HDPE	10/5/12	10:00	AB	1	125, 500, 1L	None	YES	NO		✓	
1 L HDPE	10/5/12	10:00		1	125, 500, 1L	None	YES	NO		✓	
250 mL HDPE	10/5/12	10:00		1	250, 500, 1L	None	YES	YES		✓	
250 mL HDPE	10/5/12	10:00		1	250, 500, 1L	H2SO4	YES	NO		✓	
250 mL HDPE	10/5/12	10:00		2	250, 500, 1L	HNO3	YES	NO	YES	✓	
100 mL HDPE	10/5/12	10:00		1	125, 500, 1L	NaOH	YES	YES		✓	
100 mL HDPE	10/5/12	10:00		1	125, 500, 1L	NaOH	YES	NO		✓	
Amber Glass	1/1	:			250, 500, 1L	None	YES	YES			
Amber Glass	1/1	:			250, 500, 1L	None	YES	NO			
VOA vials	1/1	:			40 mL	HCl	YES	NO			

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) (DIS.FI)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA		Purge Start Time: <u>15:05 - 10/4/12</u>	Fe++: <u>1.2</u> mg/l	Sulfide: <u>0.16</u> mg/l					
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	15:05	0.0(g)	11.19						
2	15:10	1.2	15.94	6.43	1496	13.22	0.84	22.9	Clear / slight yellow tint
3	15:15	2.4	24.62	6.36	1384	12.84	0.27	21.7	Clear / slight yellow tint
4	15:20	3.6	33.22	6.36	1349	12.80	0.13	19.3	"
5	15:20	DRY							
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 70.0

Turbidity after sample collection (NTU): 55.40

Comments:

SAMPLER: Tim Stone
(PRINTED NAME)

(SIGNATURE)

10/19 - 2 PM

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: SSA4 - MW-01

SITE ADDRESS: 4029 Industrial Way, Longview, WA

SAMPLE ID: SSA4 - MW-01 - 100512

DUP ID: N/A

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 13.6 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

[Product Thickness] [Water Column]

[Circle appropriate unit] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
10/05/12	10:22	15.62	---	9.41	---	6.21	X 1 1.01
---	---	---	---	---	---	---	X 3 3.03

Gal/ft = (dia./2)² x 0.163
 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor

Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: 12.62

[√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/5/12	10:57	B	1 125, 500, 1L	None	YES	NO		✓
1 L HDPE	10/5/12	10:57	B	1 125, 500, 1L	None	YES	NO		✓
250 mL HDPE	10/5/12	10:57	B	1 250, 500, 1L	None	YES	YES		✓
250 mL HDPE	10/5/12	10:57	B	1 125, 500, 1L	H2SO4	YES	NO		✓
250 mL HDPE	10/5/12	10:57	B	2 125, 500, 1L	HNO3	YES	NO		✓
100 mL HDPE	10/5/12	10:57	B	1 125, 500, 1L	NaOH	YES	YES		✓
100 mL HDPE	10/5/12	10:57	B	1 250, 500, 1L	NaOH	YES	NO		✓
Amber Glass	10/5/12	10:57	B	2 250, 500, 1L	None	YES	YES		✓
Amber Glass	1/1	:		250, 500, 1L	None	YES	NO		
VOA vials	1/1	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8 → 10

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
1 L HDPE	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	250 mL HDPE	(Total Phosphorous)
100 mL HDPE	100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED
250 mL HDPE	250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)
Amber Glass	Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)
40 mL VOA vials	40 mL VOA vials	(VOCs)

WATER QUALITY DATA

Purge Start Time: 10:23

Fe++: 2.0 mg/l

Sulfide: 0.02 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	10:28	1L	9.61	6.52	522	15.56	213	30	Clear, colorless
2	10:32	2L	9.63	6.52	519	15.50	119	25	
3	10:36	3L	9.64	6.34	518	15.54	89	25	
4	10:40	4L	9.65	6.48	517	15.55	66	17	
5	10:44	5L	9.67	6.52	517	15.55	67	14	
6	10:48	6L	9.68	6.49	514	15.56	54	14	
7	10:52	7L	9.68	6.51	515	15.56	53	13.5	
8	10:56	8L	9.68	6.50	514	15.56	51	13.5	
9	:		.	.	.	.	.	.
10	:		.	.	.	.	.	.
11	:		.	.	.	.	.	.
12	:		.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 11.70

Turbidity after sample collection (NTU): 6.94

Comments:

Doug Larson

SAMPLER:

Jeff Payson
(PRINTED NAME)

(SIGNATURE)

Jeff Payson

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: 55AG - MW-01 - 100512

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: 55AG - MW-01 - 100512

WIND FROM: NO WIND DUP ID: N/A

N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY	
WEATHER: <u>SUNNY</u>			PRTLY CLOUDY			CLOUDY			RAIN		

TEMPERATURE: °F 19.6 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
<u>10/05/12</u>	<u>12:56</u>	<u>13.93</u>	<u>---</u>	<u>7.73</u>	<u>---</u>	<u>6.20</u>			Volume (gal)
									X 1
									X 3
									<u>1.01</u>
									<u>3.03</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: <u>13.0</u>	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH			
1 L HDPE	<u>10/05/12</u>	<u>13:39</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>			<u>✓</u>	
1 L HDPE	<u>10/05/12</u>	<u>13:39</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>			<u>✓</u>	
250 mL HDPE	<u>10/05/12</u>	<u>13:39</u>	<u>B</u>	<u>1</u> 250, 500, 1L	<u>None</u>	<u>YES</u>	<u>YES</u>			<u>✓</u>	
250 mL HDPE	<u>10/05/12</u>	<u>13:39</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>			<u>✓</u>	
250 mL HDPE	<u>10/05/12</u>	<u>13:39</u>	<u>B</u>	<u>2</u> 125, 500, 1L	<u>HNO3</u>	<u>YES</u>	<u>NO</u>			<u>✓</u>	
100 mL HDPE	<u>10/05/12</u>	<u>13:39</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>NaOH</u>	<u>YES</u>	<u>YES</u>			<u>✓</u>	
100 mL HDPE	<u>10/05/12</u>	<u>13:39</u>	<u>B</u>	<u>1</u> 250, 500, 1L	<u>NaOH</u>	<u>YES</u>	<u>NO</u>			<u>✓</u>	
Amber Glass	<u>10/05/12</u>	<u>13:39</u>	<u>B</u>	<u>2</u> 250, 500, 1L	<u>None HCl</u>	<u>YES</u>	<u>NO</u>			<u>✓</u>	
Amber Glass	<u>1/1</u>	<u>:</u>		250, 500, 1L	None	YES	NO				
VOA vials	<u>1/1</u>	<u>:</u>		40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): 10

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	<u>(Total Cl)</u> <u>(SO4)</u> <u>(Total and Dissolved Fluoride)</u> <u>(Alkalinity)</u> <u>(TDS)</u> <u>(TSS)</u>
250 mL HDPE	<u>(Total Phosphorous)</u>	
100 mL HDPE	<u>(Total Cyanide)</u> <u>(WAD Cyanide)</u> <u>(Free Cyanide)</u> <u>TOTAL and DISSOLVED</u>	
250 mL HDPE	Total and Dissolved Metals: <u>(Al)</u> <u>(As)</u> <u>(Ca)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(K)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Na)</u> <u>(Ni)</u> <u>(Pb)</u> <u>(Se)</u> <u>(Ti)</u> <u>(Zn)</u>	
Amber Glass	<u>(SVOCs)</u> <u>(PAHs)</u> <u>(NWTPH-Dx)</u> <u>(EPH)</u> <u>(PCBs- low level)</u>	
40 mL VOA vials	<u>(VOCs)</u>	

WATER QUALITY DATA			Purge Start Time: <u>13:00:03</u>	Fe++: <u>1.8</u> mg/l	Sulfide: <u>0.07</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>13:07</u>	<u>1.5L</u>	<u>7.79</u>	<u>6.66</u>	<u>529</u>	<u>12.77</u>	<u>51</u>	<u>9</u>	<u>Clean, colorless</u>
2	<u>13:11</u>	<u>3.0L</u>	<u>7.79</u>	<u>6.73</u>	<u>509</u>	<u>12.80</u>	<u>40</u>	<u>-10</u>	
3	<u>13:15</u>	<u>4.75L</u>	<u>7.80</u>	<u>6.83</u>	<u>505</u>	<u>12.89</u>	<u>30</u>	<u>-26</u>	
4	<u>13:19</u>	<u>6.75</u>	<u>7.83</u>	<u>6.89</u>	<u>504</u>	<u>12.90</u>	<u>45</u>	<u>-30</u>	
5	<u>13:24</u>	<u>8.75</u>	<u>7.83</u>	<u>6.88</u>	<u>506</u>	<u>12.91</u>	<u>51</u>	<u>-37</u>	
6	<u>13:28</u>	<u>10.75</u>	<u>7.83</u>	<u>6.89</u>	<u>506</u>	<u>12.94</u>	<u>67</u>	<u>-44</u>	
7	<u>13:32</u>	<u>12.75</u>	<u>7.83</u>	<u>6.90</u>	<u>499</u>	<u>12.94</u>	<u>74</u>	<u>-50</u>	
8	<u>13:36</u>	<u>14.75</u>	<u>7.83</u>	<u>6.90</u>	<u>492</u>	<u>12.94</u>	<u>67</u>	<u>-54</u>	
9	<u>:</u>								
10	<u>:</u>								
11	<u>:</u>								
12	<u>:</u>								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 11.4

Turbidity after sample collection (NTU): 5.55

Comments: Doug Larson

SAMPLER: Jeff Payson

(SIGNATURE) [Signature]

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: RLSW-1

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: RLSW-1-100412

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY	
WEATHER:	SUNNY			PRTL Y CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>70</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate unit] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
10/4/12	14:10	20.01	---	9.43	---	---	X 1
1/1	:	:	---	---	---	---	X 3

Gal/ft = (dia./2)² x 0.163 1" = 0.081 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
1 L HDPE	10/4/12	14:45	B	1 125, 500, 1L	None	YES	NO		✓
1 L HDPE	1/1	:	:	1 125, 500, 1L	None	YES	NO		✓
250 mL HDPE	1/1	:	:	1 250, 500, 1L	None	YES	YES		✓
250 mL HDPE	1/1	:	:	1 250, 500, 1L	H2SO4	YES	NO		✓
250 mL HDPE	1/1	:	2	1 250, 500, 1L	HNO3	YES	NO	YES	✓
100 mL HDPE	1/1	:	:	1 125, 500, 1L	NaOH	YES	YES		✓
100 mL HDPE	1/1	:	:	1 250, 500, 1L	NaOH	YES	NO		✓
Amber Glass	1/1	:	:	250, 500, 1L	None	YES	YES		
Amber Glass	1/1	:	:	250, 500, 1L	None	YES	NO		
VOA vials	1/1	:	:	40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) (Dis. El)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA

Purge Start Time: 14:15 Fe++: 2.4 mg/l Sulfide: 0.09 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	14:15	0.06	9.43						
2	14:18	0.3	9.73	6.90	2178	14.64	0.70	25.5	clear / yellow tint
3	14:21	0.6	9.72	6.94	2174	14.58	0.18	10.2	
4	14:24	0.9	9.73	7.17	2157	14.43	0.08	-9.1	
5	14:27	1.2	9.74	7.18	2154	14.45	0.09	-10.1	
6	14:30	1.5	9.73	7.19	2150	14.54	0.09	-11.0	
7	14:33	1.8	9.72	7.18	2155	14.52	0.09	-11.2	
8	:	:	:	:	:	:	:	:	
9	:	:	:	:	:	:	:	:	
10	:	:	:	:	:	:	:	:	
11	:	:	:	:	:	:	:	:	
12	:	:	:	:	:	:	:	:	

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 14.7

Turbidity after sample collection (NTU): 0.09 TSS 3.97

Comments:

SAMPLER:

TIM STONE
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: RLSW-2

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: RLSW-2-100512

DUP ID: N/A

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY			PRTY CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F <u>10.8</u> °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]
10/14/12	19:57	20.11	---	11.06	---	9.05		X 1	0.81
10/15/12	09:30	20.11	---	12.18	---	7.93		X 3	2.44

Gal/ft = (dia./2)² x 0.163 1.5 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: <u>19.5</u>	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH			
1 L HDPE	10/15/12	09:35	B	1 125, 500, 1L	None	YES	NO			✓	
1 L HDPE	10/15/12	09:35	B	1 125, 500, 1L	None	YES	NO			✓	
250 mL HDPE	10/15/12	09:35	B	1 250, 500, 1L	None	YES	YES			✓	
250 mL HDPE	10/15/12	09:35	B	1 125, 500, 1L	H2SO4	YES	NO			✓	
250 mL HDPE	10/15/12	09:35	B	2 125, 500, 1L	HNO3	YES	NO			✓	
100 mL HDPE	10/15/12	09:35	B	1 125, 500, 1L	NaOH	YES	YES			✓	
100 mL HDPE	10/15/12	09:35	B	1 250, 500, 1L	NaOH	YES	NO			✓	
Amber Glass	---	---	---	250, 500, 1L	None	YES	YES				
Amber Glass	---	---	---	250, 500, 1L	None	YES	NO				
VOA vials	---	---	---	40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA			Purge Start Time: <u>13:58</u>	Fe ⁺⁺ : <u>1.1</u> mg/l	Sulfide: <u>0.02</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	14:01	0.25 gal	---	7.29	1,706	14.24	0.57	30.2	slight orange/yellow
2	14:04	0.8 gal	20.11	7.05	1,407	14.58	1.74	34.2	"
3	:		(dry)	.	.	.	.	.	.
4	:		.	.	.	.	.	.	.
5	:		.	.	.	.	.	.	.
6	:		.	.	.	.	.	.	.
7	:		.	.	.	.	.	.	.
8	:		.	.	.	.	.	.	.
9	:		.	.	.	.	.	.	.
10	:		.	.	.	.	.	.	.
11	:		.	.	.	.	.	.	.
12	:		.	.	.	.	.	.	.

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 14.8 Turbidity after sample collection (NTU): 10.6

Comments: Pumped dry on 10/14/2012. Sample 10/15/2012.

SAMPLER: Ben Howard
(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900
Seattle, Washington 98101

Office: (206) 287-9130 Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: RLSW-3
SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: RLSW-3-100512

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: 68 °F °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/4/12	12:45	19.90	---	8.73	---	11.17		X1	1.02
10/5/12	08:46	19.90	---	8.67	---	11.23		X3	3.07
Gal/ft = (dia./2) ² x 0.163		1.5" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged drv. let recover, and sampled

GROUNDWATER SAMPLING DATA										[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH		
1 L HDPE	10/5/12	09:00	B	1 125, 500, <u>1L</u>	None	YES	NO			✓
1 L HDPE	10/5/12	09:00	B	1 125, 500, <u>1L</u>	None	YES	NO			✓
250 mL HDPE	10/5/12	09:00	B	1 250, 500, 1L	None	YES	YES			✓
250 mL HDPE	10/5/12	09:00	B	1 25, 500, 1L	H2SO4	YES	NO			✓
250 mL HDPE	10/6/12	09:00	B	2 25, 500, 1L	HNO3	YES	NO	YES		✓
100 mL HDPE	10/5/12	09:00	B	1 125, 500, 1L	NaOH	YES	YES			✓
100 mL HDPE	10/5/12	09:00	B	1 250, 500, 1L	NaOH	YES	NO			✓
Amber Glass	10/5/12	09:00	B	4 250, 500, 1L	None	YES	YES	NO		✓
Amber Glass				250, 500, 1L	None	YES	NO			✓
VOA vials	10/5/12	09:00	B	3 40 mL	HCl	YES	NO			✓

Total Bottles (include duplicate count): 15

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (DS) (SS)
250 mL HDPE	(Total Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA		Purge Start Time: 12:50	Fe++: 2.6 mg/l	Sulfide: 0.02 mg/l					
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	12:50	0 (g)	8.73						
2	12:55	1.1	11.17	6.32	1815	12.26	0.31	44.4	Clear/Colorless
3	:		(dry)						(very slight yellow tint)
4	:								
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] Turbidity before sample collection (NTU): 62.5 [Clarity, Color] Turbidity after sample collection (NTU): 28.4

Comments: Pumped by on 10/4/2012. Sample 10/5/2012.

SAMPLER: TIM STONE (PRINTED NAME) Tim Stone (SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: RLSW-4

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: RLSW-4-100212

Windy
 WIND FROM: N (NE) E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: (SUNNY) PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: 64 °C
 DUP ID: _____

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/02/12	14:55	31.15	---	17.85	---	313.30		X 1	2.17094
1/1	:	.	---	.	---	.		X 3	6.50595

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875
 § METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√		
1 L HDPE	10/02/12	15:40	B	2 125, 500, 1L	None	YES	NO				
1 L HDPE	1/1	:		125, 500, 1L	None	YES	NO				
250 mL HDPE	10/02/12	15:40	B	1 250, 500, 1L	None	YES	YES				
250 mL HDPE	10/02/12	15:40	↓	1 125, 500, 1L	H2SO4	YES	NO				
250 mL HDPE	10/02/12	↓	↓	2 125, 500, 1L	HNO3	YES	NO				
100 mL HDPE	10/02/12	↓	↓	1 125, 500, 1L	NaOH	YES	YES				
100 mL HDPE	10/02/12	↓	↓	1 250, 500, 1L	NaOH	YES	NO				
Amber Glass	1/1	:		250, 500, 1L	None	YES	YES				
Amber Glass	1/1	:		250, 500, 1L	None	YES	NO				
VOA vials	1/1	:		40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): _____

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (ISS)	
250 mL HDPE	(Total Phosphorus) Diss Fluoride	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (SD) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA										Purge Start Time: 15:04	Fe++: 1.3 mg/l	Sulfide: 0.64 mg/l
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality			
1	15:08	400 mL	19.55	7.60	2714	14.62	0.84	-121.2	dark gray, v. cloudy			
2	15:16	1.1 L	19.41	7.51	2706	14.85	0.81	-109.9	yellow-gray, cloudy			
3	15:20	1.8 L	19.94	7.47	2729	14.06	0.25	-99.3	↓			
4	15:23	2.4 L	20.09	7.44	2740	13.96	0.21	-96.2	yellow-brown, slightly cloudy			
5	15:26	3.0 L	21.50	7.42	2747	13.90	0.18	-89.7	light golden yellow, slightly cloudy			
6	15:29	3.6 L	20.19	7.41	2763	13.81	0.18	-86.3	↓			
7	15:35	4.2	20.18	7.38	2781	13.79	0.20	-83.7	↓			
8	15:38	4.8	20.20	7.38	2790	13.77	0.19	-84.0	↓			
9	:		.	.	.	.	.	.
10	:		.	.	.	.	.	.
11	:		.	.	.	.	.	.
12	:		.	.	.	.	.	.

[gallons or liters] _____ [Clarity, Color] _____
 Turbidity before sample collection (NTU): 6.5 Turbidity after sample collection (NTU): 2.41

Comments: _____

SAMPLER: Julia Labadie (PRINTED NAME) [Signature] (SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: SSA4 - MW-01

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: SSA4 - MW-01 - 100912

DUP ID: N/A

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PARTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 13.6 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/Hr]
<u>10/05/12</u>	<u>10:22</u>	<u>15.62</u>	---	<u>9.41</u>	---	<u>6.21</u>			X1
									X3
Gal/ft = (dia./2) ² x 0.163									5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 12.62 [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	[if used]
1 L HDPE	<u>10/5/12</u>	<u>10:57</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>		<input checked="" type="checkbox"/>
1 L HDPE	<u>10/5/12</u>	<u>10:57</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>		<input checked="" type="checkbox"/>
250 mL HDPE	<u>10/5/12</u>	<u>10:57</u>	<u>B</u>	<u>1</u> 250, 500, 1L	<u>None</u>	<u>YES</u>	<u>YES</u>		<input checked="" type="checkbox"/>
250 mL HDPE	<u>10/5/12</u>	<u>10:57</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>		<input checked="" type="checkbox"/>
250 mL HDPE	<u>10/5/12</u>	<u>10:57</u>	<u>B</u>	<u>2</u> 125, 500, 1L	<u>HNO3</u>	<u>YES</u>	<u>NO</u>		<input checked="" type="checkbox"/>
100 mL HDPE	<u>10/5/12</u>	<u>10:57</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>NaOH</u>	<u>YES</u>	<u>YES</u>		<input checked="" type="checkbox"/>
100 mL HDPE	<u>10/5/12</u>	<u>10:57</u>	<u>B</u>	<u>1</u> 250, 500, 1L	<u>NaOH</u>	<u>YES</u>	<u>NO</u>		<input checked="" type="checkbox"/>
<u>Amber Glass</u>	<u>10/5/12</u>	<u>10:57</u>	<u>B</u>	<u>2</u> 250, 500, 1L	<u>None</u>	<u>YES</u>	<u>YES</u>		<input checked="" type="checkbox"/>
<u>Amber Glass</u>	<u>1/1</u>	<u>:</u>		250, 500, 1L	None	YES	NO		
<u>VOA vials</u>	<u>1/1</u>	<u>:</u>		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8 → 10

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (SS)
250 mL HDPE	(Total Phosphorus)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
<u>Amber Glass</u>	(SVOCs) (PAHs) (NWTFH-Dx) (EPH) (PCBs- low level)	
<u>40 mL VOA vials</u>	(VOCs)	

WATER QUALITY DATA Purge Start Time: 10:23 Fe⁺⁺: 2.0 mg/l Sulfide: 0.02 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>10:28</u>	<u>1L</u>	<u>9.61</u>	<u>6.52</u>	<u>522</u>	<u>15.56</u>	<u>213</u>	<u>30</u>	Clean, colorless
2	<u>10:32</u>	<u>2L</u>	<u>9.63</u>	<u>6.52</u>	<u>519</u>	<u>15.50</u>	<u>119</u>	<u>25</u>	
3	<u>10:36</u>	<u>3L</u>	<u>9.64</u>	<u>6.34</u>	<u>518</u>	<u>15.54</u>	<u>89</u>	<u>25</u>	
4	<u>10:40</u>	<u>4L</u>	<u>9.65</u>	<u>6.48</u>	<u>517</u>	<u>15.53</u>	<u>66</u>	<u>17</u>	
5	<u>10:44</u>	<u>5L</u>	<u>9.67</u>	<u>6.52</u>	<u>517</u>	<u>15.55</u>	<u>67</u>	<u>14</u>	
6	<u>10:48</u>	<u>6L</u>	<u>9.68</u>	<u>6.49</u>	<u>514</u>	<u>15.56</u>	<u>54</u>	<u>14</u>	
7	<u>10:52</u>	<u>7L</u>	<u>9.68</u>	<u>6.51</u>	<u>515</u>	<u>15.56</u>	<u>53</u>	<u>13.5</u>	
8	<u>10:56</u>	<u>8L</u>	<u>9.68</u>	<u>6.50</u>	<u>514</u>	<u>15.56</u>	<u>51</u>	<u>13.5</u>	
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 11.70

Turbidity after sample collection (NTU): 6.74

Comments:

Doug Larson

SAMPLER: Jeff Payson
(PRINTED NAME)

Jeff Payson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900
Seattle, Washington 98101

Office: (206) 287-9130 Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: 55A6-MW-01-100512

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: 55A6-MW-01-100512

NO WIND
DUP ID: N/A

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY	PRTLY CLOUDY	CLOUDY	RAIN	TEMPERATURE: °F			19.6 °C			

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/05/12	12:56	13.93	---	7.73	---	6.20			X1 1.01
									X3 3.03

Gal/ft = (dia./2)² x 0.163
 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: 13.0	[N if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH			
1 L HDPE	10/05/12	13:39	B	1 125, 500, 1L	None	YES	NO			✓	
1 L HDPE	10/05/12	13:39	B	1 125, 500, 1L	None	YES	NO			✓	
250 mL HDPE	10/05/12	13:39	B	1 250, 500, 1L	None	YES	YES			✓	
250 mL HDPE	10/05/12	13:39	B	1 125, 500, 1L	H2SO4	YES	NO			✓	
250 mL HDPE	10/05/12	13:39	B	2 125, 500, 1L	HNO3	YES	NO			✓	
100 mL HDPE	10/05/12	13:39	B	1 125, 500, 1L	NaOH	YES	YES			✓	
100 mL HDPE	10/05/12	13:39	B	1 250, 500, 1L	NaOH	YES	NO			✓	
Amber Glass	10/05/12	13:39	B	2 250, 500, 1L	None HCl	YES	NO			✓	
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO				
VOA vials	/ /	:		40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): 10

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cr) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Pb) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA			Purge Start Time: 13:00-03	Fe++:	.8 mg/l	Sulfide:	0.07 mg/l		
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	13:07	1.5L	7.79	6.66	529	12.77	51	9	Clear, colorless
2	13:11	3.0L	7.79	6.73	509	12.80	40	-10	
3	13:15	4.75L	7.80	6.83	505	12.89	30	-26	
4	13:19	6.75	7.83	6.89	504	12.90	45	-30	
5	13:24	8.25	7.83	6.88	506	12.91	51	-37	
6	13:28	10.75	4.83	6.89	506	12.94	67	-44	
7	13:32	12.75	7.83	6.90	499	12.94	74	-50	
8	13:36	14.75	7.83	6.90	492	12.94	67	-54	
9	:								
10	:								
11	:								
12	:								

[gallons or liters] Turbidity before sample collection (NTU): 11.4 [Clarity, Color] Turbidity after sample collection (NTU): 5.55

Comments: _____

SAMPLER: Doug Larson
Jeff Payson
 (PRINTED NAME)

(SIGNATURE) [Signature]

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

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PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: SSA7-MW-01

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: SSA7-MW-01-100512

DUP ID: SSA7-MW-51-100512

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTL CLOUDY		CLOUDY		RAIN		TEMPERATURE: °F 50 °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
10/5/12	08:39	17.40	---	12.02	---	5.38		X1	0.88
/ /	:		---		---			X3	2.63

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth:	[√ if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH		√	
1 L HDPE	10/5/12	09:07	B	1, 125, 500 (11)	None	YES	NO			✓	
1 L HDPE	/ /	:		1, 125, 500 (11)	None	YES	NO			✓	
250 mL HDPE	/ /	:		1, 250, 500, 1L (11)	None	YES	YES			✓	
250 mL HDPE	/ /	:		1, 125, 500, 1L (11)	H2SO4	YES	NO			✓	
250 mL HDPE	/ /	:		2, 125, 500, 1L (11)	HNO3	YES	NO	yes - T/D metals		✓	
100 mL HDPE	/ /	:		1, 125, 500, 1L (11)	NaOH	YES	YES			✓	
100 mL HDPE	/ /	:		1, 250, 500, 1L (11)	NaOH	YES	NO			✓	
Amber Glass	/ /	:		2, 250, 500 (11)	None	YES	YES			✓	
Amber Glass	/ /	:		2, 250, 500 (11)	None	YES	NO			✓	
VOA vials	/ /	:		40 mL	HCl	YES	NO			✓	

Total Bottles (include duplicate count): 12 Duplicate sample = 12 containers (Dup time = 0908)

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) (Dissolved Fe)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs - low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 08:42 Fe++: 3.4 mg/l Sulfide: 0.02 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	08:42								
2	08:48	1.5L	12.11	6.78	1,168	11.75	0.22	27.1	slight orange/yellow
3	08:51	2.1L	12.11	6.79	1,166	11.91	0.10	27.9	
4	08:54	2.7L	12.11	6.79	1,164	11.98	0.11	28.8	
5	08:57	3.1L	12.11	6.79	1,161	12.05	0.10	29.0	
6	09:00	3.6L	12.11	6.79	1,161	12.07	0.11	29.2	
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 10.8 Turbidity after sample collection (NTU): 4.76

Comments: Duplicate collection at SSA7-MW-01 = SSA7-MW-51

SAMPLER: Ben Howard
(PRINTED NAME)

[Signature]
(SIGNATURE)



JL

Former Reynolds Metals Reduction Plant - RI/FS
Millennium Bulk Terminals - Longview, WA
Task Sheet
October 2012

Well ID	Total Depth (ft BTOC)	Date	Sample ID (Well ID-MMDDYY)	Sample Time	Well Integrity	total # bottles
PZ Series Wells						
PZ-1	16.28	10/02/2012	PZ-1 -100212	1040		8
PZ-2	27.78		PZ-2 -100212	1124		8
PZ-3	13.03		PZ-3 -100212	1226		8
PZ-4	20.94		PZ-4 -100212	1317		8
PZ-5	25.49		PZ-5 -100212	10920		8
PZ-6	15.12		PZ-6 -100212	1527		8
PZ-7	21.23		PZ-7 -100212	1730		8
G Series Wells						
G1-S	10.49	10/4/2012	G1-S-100412	0852	good	8
G1-D	37.07	10/4/2012	G1-D-100412	0945	good	8
G2-S	12.77	10/3/2012	G2-S-100312	0930	good	15
G2-D	27.82	10/3/2012	G2-D-100312	1225	replaced water in crack valve	8
G3-S	15.35	10/4/2012	G3-S-100412	1125	good	8
G3-D	30.78	10/4/2012	G3-D-100412	1145	good	8
G4-S	22.58	10/03/2012	G4-S-100312	1546	good	15
G4-D	37.57	10/05/2012	G4-D-100512	1150	-	8
G5-S G6-S	21.65	10/02/2012	G5-S G6-S-100212	1655	good	8
G5-D G6-D	37.35	10/02/2012	G5-D G6-D-100212	1738	good	8
G5-S G5-S	22.66	10/4/2012	G5-S G5-S-100412	1645	good	8
G6-D G5-D	37.65	10/4/2012	G6-D G5-D-100412	1750	good	8
G7-D	32.81	10/05/12	G7-D-100512	1000	-	8
R and RL Series Wells (RI samples only)						
R-2	15.63	10/03/2012	R-2-100312	0937	good	15
RL-1S	18.83	10/04/2012	RL-1S-100412	0915	good	15
SSA Series Wells						
SSA4-MW-01	17.50	10/05/12	SSA4-MW-01-100512	1057	-	10
SSA6-MW-01	15.25	10/05/2012	SSA6-MW-01-100512	1339	-	10
SSA7-MW-01	18.90	10/5/2012	SSA7-MW-01-100512	0907	good	12

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900
Seattle, Washington 98101
Office: (206) 287-9130 Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: W1

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: W1-100/12

DUP ID: N/A

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: °F 26.1 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
/ /	:	.	---	.	---	.		X 1	.
/ /	:	.	---	.	---	.		X 3	.
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	[√ if used]
1 L HDPE	<u>10/01/12</u>	<u>17:40</u>	<u>B</u>	125, 500, 1L	None	<u>YES</u>	NO		
1 L HDPE	<u>10/01/12</u>	<u>17:40</u>	<u>B</u>	125, 500, 1L	None	<u>YES</u>	NO		
250 mL HDPE	<u>10/01/12</u>	<u>17:40</u>	<u>B</u>	250, 500, 1L	None	<u>YES</u>	YES		
250 mL HDPE	<u>10/01/12</u>	<u>17:40</u>	<u>B</u>	125, 500, 1L	H2SO4	<u>YES</u>	NO		
250 mL HDPE	<u>10/01/12</u>	<u>17:40</u>	<u>B</u>	125, 500, 1L	HNO ₃	<u>YES</u>	NO	<u>YES</u>	<u>Geochem</u>
100 mL HDPE	<u>10/01/12</u>	<u>17:40</u>	<u>B</u>	125, 500, 1L	NaOH	<u>YES</u>	YES		
100 mL HDPE	<u>10/01/12</u>	<u>17:40</u>	<u>B</u>	250, 500, 1L	NaOH	<u>YES</u>	NO		
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES		
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		
VOA vials	/ /	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count):

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
	250 mL HDPE	(Total Phosphorous)
	100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED
	250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)
	Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPI) (PCBs low-level)
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 17:20 Fe⁺⁺: 2.2 mg/l Sulfide: 0.01 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>17:24</u>	<u>---</u>	<u>---</u>	<u>6.41</u>	<u>203</u>	<u>19.42</u>	<u>544.4</u>	<u>25.2</u>	<u>Slightly cloudy</u>
2	<u>17:27</u>	<u>---</u>	<u>---</u>	<u>6.47</u>	<u>203</u>	<u>19.16</u>	<u>605.90</u>	<u>25.6</u>	<u>" "</u>
3	<u>17:30</u>	<u>---</u>	<u>---</u>	<u>6.60</u>	<u>204</u>	<u>19.27</u>	<u>605.55</u>	<u>19.2</u>	<u>" "</u>
4	<u>17:33</u>	<u>---</u>	<u>---</u>	<u>6.77</u>	<u>203</u>	<u>19.29</u>	<u>599.7</u>	<u>11.3</u>	<u>" "</u>
5	<u>17:36</u>	<u>---</u>	<u>---</u>	<u>6.84</u>	<u>203</u>	<u>19.21</u>	<u>603.20</u>	<u>9.3</u>	<u>" "</u>
6	:	.	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 50.74

Turbidity after sample collection (NTU): 49.24

Comments:

SAMPLER: Jeff Payson

(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900
Seattle, Washington 98101
Office: (206) 287-9130 Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS **WELL ID:** W2
SITE ADDRESS: 4029 Industrial Way, Longview, WA **SAMPLE ID:** W2-10012

DUP ID: _____

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTRY CLOUDY		CLOUDY		RAIN		TEMPERATURE: (°F) 76 °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate units] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
/ /	:	.	---	.	---	.	X 1
/ /	:	.	---	.	---	.	X 3

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ **METHODS:** (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: See below [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/6/12	:	B	2	125, 500, 1L	(None)	(YES)	(NO)	
1 L HDPE	/ /	:			125, 500, 1L	(None)	YES	NO	
250 mL HDPE	10/6/12	:	B	1	250, 500, 1L	(None)	(YES)	(YES)	
250 mL HDPE	10/6/12	:	|	1	125, 500, 1L	(H2SO4)	(YES)	(NO)	
250 mL HDPE	10/6/12	:	|	2	125, 500, 1L	(HNO3)	(YES)	(NO)	(yes)
100 mL HDPE	10/6/12	:	|	1	125, 500, 1L	(NaOH)	(YES)	(YES)	
100 mL HDPE	10/6/12	:	|	1	250, 500, 1L	(NaOH)	(YES)	(NO)	
Amber Glass	/ /	:			250, 500, 1L	None	YES	YES	
Amber Glass	/ /	:			250, 500, 1L	None	YES	NO	
VOA vials	/ /	:			40 mL	HCl	YES	NO	

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) Dissolved E	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)	
250 mL HDPE	(Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWIPH-Dx) (EPI) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: : Fe++: 0.4 mg/l Sulfide: 0.00 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	16:40	—	—	6.84	205	19.11	3.99	28.1	mostly clear
2	16:43	—	—	6.74	206	18.41	3.19	29.6	↓ ↓
3	16:46	—	—	6.73	201	18.14	3.11	33.5	↓ ↓
4	:	.	.	.	.	.	.	.
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 15.6 **Turbidity after sample collection (NTU):** 15.2

Comments: 6" above mudline

SAMPLER: Suzie Labadie [Signature]
(PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: W3

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: W3-100112

DUP ID: ---

WIND FROM:	N	NE	E	SE	<u>S</u>	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		CLOUDY		RAIN		TEMPERATURE: <u>74</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

[Product Thickness] [Water Column]

[Circle appropriate unit]
[Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
/ /	:	.	---	.	---	.	X 1
/ /	:	.	---	.	---	.	X 3

Gal/ft = (dia./2)² x 0.163
 1" = 0.041 gal
 2" = 0.163 gal
 3" = 0.367 gal
 4" = 0.653 gal
 6" = 1.469 gal
 10" = 4.080 gal
 12" = 5.875 gal

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer

Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: Surface [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	✓
1 L HDPE	10/01/12	15:42	B	2	125, 500, 1L	None	YES	NO	
1 L HDPE	/ /	:		2	125, 500, 1L	None	YES	NO	
250 mL HDPE	10/01/12	15:42	B	1	250, 500, 1L	None	YES	YES	
250 mL HDPE	10/01/12	| : |	|	1	125, 500, 1L	H2SO4	YES	NO	
250 mL HDPE	10/01/12	| : |	|	2	125, 500, 1L	HNO3	YES	NO	yes
100 mL HDPE	10/01/12	| : |	|	1	125, 500, 1L	NaOH	YES	YES	
100 mL HDPE	10/01/12	↓ : ↓	↓	1	250, 500, 1L	NaOH	YES	NO	
Amber Glass	/ /	:			250, 500, 1L	None	YES	YES	
Amber Glass	/ /	:			250, 500, 1L	None	YES	NO	
VOA vials	/ /	:			40 mL	HCl	YES	NO	

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) <u>DISS. B</u>	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)	
250 mL HDPE	(Total and Dissolved Metals (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA

Purge Start Time: 15:32 Fe++: 0.6 mg/l Sulfide: 0.01 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	15:34	—	—	6.97	218	17.47	4.90	11.8	mostly clear
2	15:37	—	—	6.85	217	17.24	1.92	17.7	↓ ↓
3	15:40	—	—	6.84	215	17.21	1.74	6.84	↓ ↓
4	:	.	.	.	.	.	.	.
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 16.9

Turbidity after sample collection (NTU): 17.4

Comments:

6" from mudline

SAMPLER:

Tula Labadie

(PRINTED NAME)

(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: W4-100112

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: W4-100112

DUP ID: _____

WIND FROM:	N	NE	E	SE	<u>S</u>	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	<u>SUNNY</u>	PRTLY CLOUDY	CLOUDY	RAIN	TEMPERATURE: <u>74</u> °C						

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate unit] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
<u>10/01/12</u>	<u>14:08</u>						X 1
<u>1/1</u>	<u>:</u>						X 3

Gal/ft = (dia./2) ² x 0.163	1" = <u>0.041</u>	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
--	-------------------	------------	------------	------------	------------	-------------	-------------

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: See below [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	<u>10/01/12</u>	<u>14:22</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>		
1 L HDPE	<u>10/01/12</u>	<u>14:22</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>(None)</u>	<u>(YES)</u>	<u>(NO)</u>		
250 mL HDPE	<u>10/01/12</u>	<u>14:22</u>	<u>B</u>	<u>1</u> 250, 500, 1L	<u>(None)</u>	<u>(YES)</u>	<u>(YES)</u>		
250 mL HDPE	<u>10/01/12</u>	<u>14:22</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>(H2SO4)</u>	<u>(YES)</u>	<u>(NO)</u>		
250 mL HDPE	<u>10/01/12</u>	<u>14:22</u>	<u>B</u>	<u>2</u> 125, 500, 1L	<u>(HNO3)</u>	<u>(YES)</u>	<u>(NO)</u>	<u>YES</u>	
100 mL HDPE	<u>10/01/12</u>	<u>14:22</u>	<u>B</u>	<u>1</u> 125, 500, 1L	<u>(NaOH)</u>	<u>(YES)</u>	<u>(YES)</u>		
100 mL HDPE	<u>10/01/12</u>	<u>14:22</u>	<u>B</u>	<u>1</u> 250, 500, 1L	<u>(NaOH)</u>	<u>(YES)</u>	<u>(NO)</u>		
Amber Glass	<u>1/1</u>	<u>:</u>		250, 500, 1L	None	YES	YES		
Amber Glass	<u>1/1</u>	<u>:</u>		250, 500, 1L	None	YES	NO		
VOA vials	<u>1/1</u>	<u>:</u>		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	<u>(Total Cl)</u> <u>(SO₄)</u> <u>(Total and Dissolved Fluoride)</u> <u>(Alkalinity)</u> <u>(TDS)</u> <u>(TSS)</u>
250 mL HDPE	<u>(Total Phosphorous)</u> <u>(DISS. F)</u>	
100 mL HDPE	<u>(Total Cyanide)</u> <u>(WAD Cyanide)</u> <u>(Free Cyanide)</u> <u>TOTAL and DISSOLVED</u>	
250 mL HDPE	Total and Dissolved Metals: <u>(Al)</u> <u>(As)</u> <u>(Ca)</u> <u>(Cr)</u> <u>(Cu)</u> <u>(Fe)</u> <u>(K)</u> <u>(Mg)</u> <u>(Mn)</u> <u>(Na)</u> <u>(Ni)</u> <u>(Si)</u> <u>(Ag)</u> <u>(Be)</u> <u>(Cd)</u> <u>(Hg)</u> <u>(Pb)</u> <u>(Sb)</u> <u>(Se)</u> <u>(Tl)</u> <u>(Zn)</u>	
Amber Glass	<u>(SVOCs)</u> <u>(PAHs)</u> <u>(NWTPh-Dx)</u> <u>(EPH)</u> <u>(PCBs-low level)</u>	
40 mL VOA vials	<u>(VOCs)</u>	

WATER QUALITY DATA

Purge Start Time: 14:08 Fe++: 0.08 mg/l Sulfide: 0.00 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>14:09</u>	<u>—</u>	<u>.</u>	<u>6.87</u>	<u>252</u>	<u>18.30</u>	<u>3.13</u>	<u>25.8</u>	<u>clear colorless</u>
2	<u>14:12</u>	<u>—</u>	<u>.</u>	<u>6.92</u>	<u>258</u>	<u>17.89</u>	<u>2.82</u>	<u>21.3</u>	<u>↓ ↓</u>
3	<u>14:15</u>	<u>—</u>	<u>.</u>	<u>6.88</u>	<u>263</u>	<u>17.78</u>	<u>2.38</u>	<u>11.0</u>	<u>↓ ↓</u>
4	<u>14:18</u>	<u>—</u>	<u>.</u>	<u>6.87</u>	<u>260</u>	<u>17.72</u>	<u>2.36</u>	<u>4.0</u>	<u>↓ ↓</u>
5	<u>:</u>		<u>.</u>	<u>.</u>					
6	<u>:</u>		<u>.</u>	<u>.</u>					
7	<u>:</u>		<u>.</u>	<u>.</u>					
8	<u>:</u>		<u>.</u>	<u>.</u>					
9	<u>:</u>		<u>.</u>	<u>.</u>					
10	<u>:</u>		<u>.</u>	<u>.</u>					
11	<u>:</u>		<u>.</u>	<u>.</u>					
12	<u>:</u>		<u>.</u>	<u>.</u>					

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 9.83

Turbidity after sample collection (NTU): 5.52

Comments: 0.5' above mud line 9.94

SAMPLER: Julia Labadie
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900
Seattle, Washington 98101
Office: (206) 287-9130 Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS **WELL ID:** W6 100112
SITE ADDRESS: 4029 Industrial Way, Longview, WA **SAMPLE ID:** W6 100112

DUP ID: N/A

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN **TEMPERATURE:** °F 75.1°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit] [Water Column x Gal/ft]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			X 1	X 3
/ /	:	.	---	.	---	.			.	.
/ /	:	.	---	.	---	.			.	.
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: <u>6" above mud line</u> ^[if used]	
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√		
1 L HDPE	10/10/12	15:50	B	125, 500, 1L	None	YES	NO				
1 L HDPE	10/10/12	15:50	B	125, 500, 1L	None	YES	NO				
250 mL HDPE	10/10/12	15:50	B	250, 500, 1L	None	YES	YES				
250 mL HDPE	10/10/12	15:50	B	125, 500, 1L	H2SO4	YES	NO				
250 mL HDPE	10/10/12	15:50	B	125, 500, 1L	HNO3	YES	NO	YES		Deochem	
100 mL HDPE	10/10/12	15:50	B	125, 500, 1L	NaOH	YES	YES				
100 mL HDPE	10/10/12	15:50	B	250, 500, 1L	NaOH	YES	NO				
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES				
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO				
VOA vials	/ /	:		40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous)	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED	
250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWWPH-Dx) (EPI) (PCBs low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA			Purge Start Time: <u>15:23</u>		Fe++: <u>0.00</u> mg/l		Sulfide: <u>0.01</u> mg/l		
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	15:26	/	/	6.12	236	18.15	31.92	140.3	Slightly cloudy
2	15:29	/	/	6.45	236	18.08	29.90	133.8	"
3	15:32	/	/	6.65	236	17.89	26.49	113.7	"
4	15:35	/	/	6.73	235	17.87	28.96	96.9	"
5	15:38	/	/	6.86	235	17.84	26.95	85.3	"
6	15:41	/	/	6.94	235	17.75	31.32	94.3	"
7	15:45	/	/	6.78	235	17.90	33.01	77.7	"
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 21.26 **Turbidity after sample collection (NTU):** 21.60

Comments:

SAMPLER: Jeff Payson
(PRINTED NAME)

Jeff Payson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: W-7

SITE ADDRESS: 4029 Industrial Way, Longview, WA

SAMPLE ID: W7-100112

DUP ID: N/A

WIND FROM:

N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
---	----	---	----	---	----	---	----	-------	--------	-------

 WEATHER:

SUNNY	PRTLY CLOUDY	CLOUDY	RAIN
-------	--------------	--------	------

 TEMPERATURE: °F 75 °C 25.1

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
/ /	:	.	---	.	---	.		X 1	.
/ /	:	.	---	.	---	.		X 3	.

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra ~~AD~~ Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA								Sample Depth: <u>6" above mud line</u> <small>(√ if used)</small>	
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/01/12	16:50	B	125, 500, 1L	None	YES	NO		
1 L HDPE	10/01/12	16:50	I	125, 500, 1L	None	YES	NO		
250 mL HDPE	10/01/12	16:50	I	250, 500, 1L	None	YES	YES		
250 mL HDPE	10/01/12	16:50	I	125, 500, 1L	H2SO4	YES	NO		
250 mL HDPE	10/01/12	16:50	I	125, 500, 1L	HNO3	YES	NO	YES	Hexchem.
100 mL HDPE	10/01/12	16:50	I	125, 500, 1L	NaOH	YES	YES		
100 mL HDPE	10/01/12	16:50	I	250, 500, 1L	NaOH	YES	NO		
Amber Glass	---	---	---	250, 500, 1L	None	YES	YES		
Amber Glass	---	---	---	250, 500, 1L	None	YES	NO		
VOA vials	---	---	---	40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
	250 mL HDPE	(Total Phosphorous) <u>Fl</u>
	100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) TOTAL and DISSOLVED
	250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)
	Amber Glass	(SVOCs) (PAHs) (NWTH-EX) (EPI) (PCBs-low level)
	40 mL VOA vials	(VOCs)

WATER QUALITY DATA			Purge Start Time: <u>16:28</u>	Fe++: <u>2.9</u> mg/l	Sulfide: <u><<</u> mg/l				
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	16:33	---	---	6.40	205	21.16	521.52	14.3	Slight, cloudiness
2	16:36	---	---	6.48	206	20.98	528.03	11.2	" "
3	16:39	---	---	6.48	206	20.90	531.14	6.4	" "
4	16:42	---	---	6.40	205	20.82	534.11	-2.0	" "
5	16:46	---	---	6.44	205	20.85	533.46	-4.9	" "
6	16:49	---	---	6.49	206	20.76	532.68	-7.4	" "
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 46.76

Turbidity after sample collection (NTU): 52.84

Comments: << = result lower than meters range

SAMPLER: Jeff Payson
(PRINTED NAME)

Jeff Payson
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: W8

SITE ADDRESS: 4029 Industrial Way, Longview, WA SAMPLE ID: W8-100312

Columbia River Shoreline by RWBY DUP ID: ---

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY

WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: 68 °F °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate unit] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
/ /	:	.	---	.	---	.	X 1
/ /	:	.	---	.	---	.	X 3

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/3/12	13:45	B	2 125, 500, 1L	None	YES	NO		
1 L HDPE	1/1	:		125, 500, 1L	None	YES	NO		
250 mL HDPE	10/3/12	13:45	B	1 250, 500, 1L	None	YES	YES		
250 mL HDPE	10/3/12	13:45	1	1 125, 500, 1L	H2SO4	YES	NO		
250 mL HDPE	10/3/12	13:45	2	2 125, 500, 1L	HNO3	YES	NO		
100 mL HDPE	10/3/12	13:45	1	1 125, 500, 1L	NaOH	YES	YES		
100 mL HDPE	10/3/12	13:45	✓	1 250, 500, 1L	NaOH	YES	NO		
Amber Glass	1/1	:		250, 500, 1L	None	YES	YES		
Amber Glass	1/1	:		250, 500, 1L	None	YES	NO		
VOA vials	1/1	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO ₄) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
250 mL HDPE	(Total Phosphorous) <u>DISS-FID</u>	
100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)	
250 mL HDPE	(Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)	
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA

Purge Start Time: 13:34

Fe++: 0.00 mg/l Sulfide: 0.02 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	13:38	—	—	7.33	146	19.63	7.29	50.9	Clear, colorless
2	13:41	—	—	7.35	146	19.50	6.63	54.3	↓ ↓
3	13:43	—	—	7.40	146	19.77	7.22	56.6	↓ ↓
4	:	.	.	.	.	.	.	.
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 2.70

Turbidity after sample collection (NTU): 1.94

Comments: Sample tubing had to stick, placed ~0.8' above the mud line, approx. 12 ft. offshore. Tide coming in.

SAMPLER: Julia Labadie
(PRINTED NAME)

[Signature]
(SIGNATURE)

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900

Seattle, Washington 98101

Office: (206) 287-9130

Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS WELL ID: W9

SITE ADDRESS: 4029 Industrial Way, Longview, WA

SAMPLE ID: W9-100212

DUP ID: W59-100212

WIND FROM: (N) NE E SE S SW W NW (LIGHT) MEDIUM HEAVY
 WEATHER: (SUNNY) PRTLY CLOUDY (CLOUDY) RAIN TEMPERATURE: (67.0) °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

[Product Thickness] [Water Column]

[Circle appropriate unit] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
/ /	:	.	---	.	---	.	X 1
/ /	:	.	---	.	---	.	X 3

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA tubing tied to stick on station Sample Depth: See below [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
1 L HDPE	10/2/12	11:15	B	<u>4</u> 125, 500, 1L	None	<u>(YES)</u>	<u>(NO)</u>		
1 L HDPE	<u>1/1</u>	:		125, 500, 1L	None	YES	NO		
250 mL HDPE	10/2/12	11:15	B	<u>2</u> 250, 500, 1L	None	<u>(YES)</u>	<u>(YES)</u>		
250 mL HDPE	10/2/12	11:15	|	<u>2</u> 125, 500, 1L	H2SO4	<u>(YES)</u>	<u>(NO)</u>		
250 mL HDPE	10/2/12	11:15	|	<u>4</u> 125, 500, 1L	HNO ₃	<u>(YES)</u>	<u>(NO)</u>	<u>(YES)</u>	
100 mL HDPE	10/2/12	11:15	|	<u>2</u> 125, 500, 1L	NaOH	<u>(YES)</u>	<u>(YES)</u>		
100 mL HDPE	10/2/12	11:15	↓	<u>2</u> 250, 500, 1L	NaOH	<u>(YES)</u>	<u>(NO)</u>		
Amber Glass	/ /	:		250, 500, 1L	None	YES	YES		
Amber Glass	/ /	:		250, 500, 1L	None	YES	NO		
VOA vials	/ /	:		40 mL	HCl	YES	NO		

Total Bottles (include duplicate count): 16

ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)

BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE
1 L HDPE	<u>(Total Cl)</u> <u>(SO₄)</u> <u>(Total and Dissolved Fluoride)</u> <u>(Alkalinity)</u> <u>(TDS)</u> <u>(TSS)</u>
250 mL HDPE	<u>(Total Phosphorous)</u> <u>(DISS.FD)</u>
100 mL HDPE	<u>(Total Cyanide)</u> <u>(WAD Cyanide)</u> <u>(Free Cyanide)</u> <u>(TOTAL and DISSOLVED)</u>
250 mL HDPE	<u>(Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Tl) (Zn)</u>
Amber Glass	<u>(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)</u>
40 mL VOA vials	<u>(VOCs)</u>

WATER QUALITY DATA

Purge Start Time: : Fe++: 0.10 mg/l Sulfide: 0.00 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	11:02	—	—	7.55	140	17.25	6.68	26.5	Mostly Clear
2	11:05	—	—	7.60	141	17.35	6.30	32.9	↓ ↓
3	11:08	—	—	7.57	140	17.38	6.31	27.4	↓ ↓
4	:	.	.	.	.	.	.	.
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 6.72

Turbidity after sample collection (NTU): 2.90

Comments:

collected approx. 0.8' above mudline, 25.5' offshore. Dup at this station

SAMPLER: Julia Labadie

(PRINTED NAME)

(SIGNATURE)

Tide going out

FIELD SAMPLING DATA SHEET



720 Olive Way, Suite 1900
Seattle, Washington 98101
Office: (206) 287-9130 Fax: (206) 287-9131

PROJECT NAME: Former Reynolds Metals Reduction Plant RI/FS **WELL ID:** W10
SITE ADDRESS: 4029 Industrial Way, Longview, WA **SAMPLE ID:** W10-100212

WIND FROM: Windy N (NE) E SE S SW W NW LIGHT MEDIUM HEAVY
WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN **TEMPERATURE:** °F 60. °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	[Circle appropriate unit] [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
/ /	:	.	---	.	---	.		X 1	.
/ /	:	.	---	.	---	.		X 3	.
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875	

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer
Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA										Sample Depth: See below!	[if used]
Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√		
1 L HDPE	10/12/12	12:35	B	2 125, 500, 1L	(None)	YES	(NO)				
1 L HDPE	1/1	:		125, 500, 1L	None	YES	NO				
250 mL HDPE	10/12/12	12:35	B	1 250, 500, 1L	(None)	YES	(YES)				
250 mL HDPE	10/12/12	12:35	1	1 125, 500, 1L	(H2SO4)	YES	(NO)				
250 mL HDPE	10/12/12	12:35	2	2 125, 500, 1L	(HNO3)	YES	(NO) / yes				
100 mL HDPE	10/12/12	12:35	1	1 125, 500, 1L	(NaOH)	YES	(YES)				
100 mL HDPE	10/12/12	12:35	√	1 250, 500, 1L	(NaOH)	YES	(NO)				
Amber Glass	1/1	:		250, 500, 1L	None	YES	YES				
Amber Glass	1/1	:		250, 500, 1L	None	YES	NO				
VOA vials	1/1	:		40 mL	HCl	YES	NO				

Total Bottles (include duplicate count): 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	1 L HDPE	(Total Cl) (SO4) (Total and Dissolved Fluoride) (Alkalinity) (TDS) (TSS)
	250 mL HDPE	(Total Phosphorous) Diss F
	100 mL HDPE	(Total Cyanide) (WAD Cyanide) (Free Cyanide) (TOTAL and DISSOLVED)
	250 mL HDPE	Total and Dissolved Metals: (Al) (As) (Ca) (Cr) (Cu) (Fe) (K) (Mg) (Mn) (Na) (Ni) (Si) (Ag) (Be) (Cd) (Hg) (Pb) (Sb) (Se) (Ti) (Zn)
Amber Glass	(SVOCs) (PAHs) (NWTPH-Dx) (EPH) (PCBs- low level)	
40 mL VOA vials	(VOCs)	

WATER QUALITY DATA Purge Start Time: 12:27 Fe++: 0.2 mg/l Sulfide: 0.03 mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	12:28	---	---	7.55	151	17.54	7.00	28.9	mostly clear
2	12:31	---	---	7.51	148	17.56	6.74	29.3	↓ ↓
3	12:34	---	---	7.50	148	17.49	7.00	29.2	↓ ↓
4	:	.	.	.	.	.	.	.
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 10.8 **Turbidity after sample collection (NTU):** .

Comments: Collected approx. 0.8' above mudline, approx 13.2 ft offshore. Slope is slightly steeper here than at W9.

SAMPLER: Suhail Abdie
(PRINTED NAME)

(SIGNATURE)



WATER LEVEL SURVEY

Former Reynolds Metals Reduction Plant RI / FS

Anchor QEA, L.L.C.

Site: Millennium Bulk Terminals - Longview, WA

Date: 10-01-2012

Personnel: JL, BH

Project No.: 110730-02.01

Weather: sunny, 68°F, calm

Water Level Meter # Bham

Well ID	Time	DTW (ft btoc)	Comments
---------	------	---------------	----------

PZ Series Wells

PZ-1			
PZ-2			
PZ-3			
PZ-4			
PZ-5			
PZ-6	0952	7.64	-
PZ-7	0947	11.17'	has transducer

G Series Wells

G1-S			
G1-D			
G2-S			
G2-D			
G3-S			
G3-D			
G4-S			
G4-D			
G5-S	1015	12.73	has transducer
G5-D	1014	11.97	has transducer
G6-S	1056	18.36	has transducer
G6-D	1059	21.93	has transducer
G-7D	0949	11.00	has transducer

R and RL Series Wells

R-2			
RL-1S	0939	10.17	has transducer

Notes:



WATER LEVEL SURVEY

Former Reynolds Metals Reduction Plant RI / FS

Anchor QEA, L.L.C. Site: Millennium Bulk Terminals - Longview, WA Date: 10/06/2017

Personnel: JL, BH Project No.: 110730-02.01

Weather: sunny, 68°F, calm Water Level Meter # 181tam

Well ID	Time	DTW (ft btoc)	Comments
---------	------	---------------	----------

RLSW Series Wells

RLSW-1	1112	9.21	—
RLSW-2	1108	10.82	—
RLSW-3	1118	8.51	—
RLSW-4	1053	17.85	has transducer

SSA Series Wells

SSA4-MW-01	1141	9.30	—
SSA 6-MW-01			
SSA7-MW-01			

Surface Water - Staff Gauges

Staff Gauge Time ft NAVD88	Time	Elevation (ft, NAVD88)	Comments
—	1739	8.5	On dolphin in Columbia River by Reynolds Pump Station
1803 0.98	0932	0.98'	At Stillwell-01 in CDID ditch No. 14 on floating bridge
1726 5.66	1038	5.66	On metal pipe in U-ditch by gate to CBMP
1726 5.48	1037	5.48	In leachate/recirculation ditch by gate to CBMP
1757 8.79			Attached to pump in Railroad ditch (East Cryolite)
1755 9.48			In SPL area ditch south of railroad tracks by E Cryolite
1747 6.57		6	In ditch leading to 004 pump station (parallel to road) by BMPs
1749 2.25			Attached to cement wall at 004 pump station north of WMP
Stillwell-03	0922	DTW=5.06' (btoc)	Stilling well @ Reynolds outfall (in CR)
Still-well-01	0931	DTW=3.64' (btoc)	stilling well

Notes:

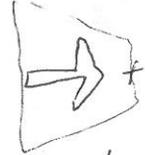
Reynolds dock

water levels

10/2

0915

DTW = 16' below arrow



16.5 below yellow dot





WATER LEVEL SURVEY

Former Reynolds Metals Reduction Plant RI / FS

Anchor QEA, L.L.C. Site: Millennium Bulk Terminals - Longview, WA Date: 10/01/12

Personnel: *Payson, Johnson* Project No.: 110730-02.01

Weather: *Clear, sunny,* Water Level Meter #

Well ID	Time	DTW (ft btoc)	Comments
---------	------	---------------	----------

PZ Series Wells

PZ-1	<i>0918</i>	<i>8.52</i>	<i>Bollards knocked over (2 of 3)</i>
PZ-2	<i>0921</i>	<i>8.06</i>	<i>Bollard knocked over (1 of 3)</i>
PZ-3	<i>0927</i> <i>0931</i>	<i>5.81</i> <i>5.99</i>	
PZ-4	<i>0927</i>	<i>5.81</i>	
PZ-5	<i>0946</i>	<i>5.00</i>	
PZ-6			
PZ-7			

G Series Wells

G1-S	<i>1115</i>	<i>16.29</i>	
G1-D	<i>1117</i>	<i>19.47</i>	
G2-S	<i>1051</i>	<i>8.50</i>	
G2-D	<i>1053</i>	<i>8.29</i>	
G3-S	<i>1104</i>	<i>6.61</i>	
G3-D	<i>1105</i>	<i>7.19</i>	
G4-S	<i>1040</i>	<i>6.42</i>	
G4-D	<i>1042</i>	<i>5.22</i>	
G5-S			
G5-D			
G6-S			
G6-D			
G-7D			

R and RL Series Wells

R-2	<i>1032</i>	<i>7.14</i>	<i>Stakes in field, orange flagged route</i>
RL-1S			

Notes:



WATER LEVEL SURVEY

RI/FS Update

Anchor QEA L.L.C.

Site: Millennium Bulk Terminals - Longview, WA Date: 12-3-12

Personnel: LAFFOON / PAYSON

Project No.: 110730-01.04 T-01-A-14

Weather: CLOUDY / RAIN 40s °F

Water Level Meter # 23069

Well	Time (2400)	DTW (feet)	Comments
Piezometers			
PZ-1S			
PZ-2D			
PZ-3			
PZ-4			
PZ-5			
PZ-6			
PZ-7			
"G" Wells			
G-1S	15:20	19.29	12-3-12
G-1D	14:33	18.26	12-3-12
G-2S	10:43	5.61	12-3-12
G-2D	09:00	06.04	12-3-12
G-3S			
G-3D			
G-4S	09:20	3.22	12-4-12
G-4D			
G-5S			
G-5D			
G-6S			
G-6D			
G-7S			
G-7D			
RLSW-3	13:40	6.48	12-3-12
SSAG-MW-01	12:10	5.39	12-4-12

Notes:



Millennium Bulk Terminals - RI/FS Update
 Longview, WA
 TASK SHEET
 Fourth Quarter 2011

Location ID	Total Depth (ft below TOC)	Date	Sample ID	Sample Time	Well Integrity
<i>Piezometers</i>					
PZ-1	16.28			:	
PZ-2	27.78			:	
PZ-3	13.03			:	
PZ-4	20.94			:	
PZ-5	25.49			:	
PZ-6	15.12			:	
PZ-7	21.23			:	
<i>'G' wells</i>					
G1-S	10.49	12-3-12	G-1s-120312	15:48	OK
G1-D	37.07	12-3-12	G-1d-120312	15:05	
G2-S	12.77	12-3-12	G-2s-120312	11:40	
G2-D	27.82	12-3-12	G-2d-120312	10:20	
G3-S	15.35		NA	:	
G3-D	30.78		NA	:	
G4-S	22.58	12-4-12	G-4s-120412	11:00	OK
G4-D	37.57			:	
G5-S	21.65			:	
G5-D	37.35			:	
G6-S	22.66			:	
G6-D	37.65			:	
G7-D	32.81			:	
<i>Spent Potliner Monitoring Wells</i>					
R-1S	12.55			:	
R-1D	24.82			:	
R-2	14.86			:	
R-3	24.65			:	
R-4S	19.56			:	
R-4D	29.05			:	

SSA6-mw01 13.90 12-4-12 SSA6-mw01-120412 12:50 OK



Millennium Bulk Terminals - RI/FS Update
 Longview, WA
 TASK SHEET
 Fourth Quarter 2011

Location ID	Total Depth (ft below TOC)	Date	Sample ID	Sample Time	Well Integrity
<i>Black Mud Pond Wells</i>					
RL-1S	19.06	12-3-12	:	:	
RL-1D	39.40	12-3-12	:	:	
RL-2S	19.78	12-3-12	:	:	
RL-2D	33.00	12-3-12	:	:	
RL-3S	19.81		:	:	
RL-3D	39.23		:	:	
RL-4S	18.35		:	:	
RL-4D	39.00		:	:	
RL-5	23.30		:	:	
RLSW-1	18.00		:	:	
RLSW-2	18.00		:	:	
RLSW-3	18.00	12-4-12	RLSW-3-120412	11:35	OK
RLSW-4	28.50		:	:	
<i>Surface Water</i>					
W1	---			:	
W2	---			:	
W3	---			:	
W4-A	---			:	
W4-B	---			:	
W5	---			:	
W6	---			:	
W7	---			:	
CDID Up	---			:	
CDID Down	---			:	
<i>QA/QC</i>					
G-2 d		12-3-12	G-2 d-120312-D	10:30	OK
G-1 d		12-3-12	G-1 d-120312-D	15:10	OK
Rinse Blank	—	12-4-12	RB-120412	13:30	NA
				:	
Notes:					

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

Fax:

(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: G-2d

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: G-2d-120312

DUP ID: G-2d-120312-DC1030

WIND FROM:	N	NE	<u>SE</u>	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY	PRTLY CLOUDY	<u>CLOUDY</u>	<u>RAIN</u>	TEMPERATURE: <u>40's</u> °F		°C			

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness] [Water Column]		[Circle appropriate unit] [Water Column x Gal/ft]	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)	
<u>12/3/12</u>	<u>09:20</u>	<u>28.55</u>	<u>---</u>	<u>6.04</u>	<u>---</u>	<u>22.51</u>			X 1	<u>3.67</u>
/ /	:	.	---	.	---	.			X 3	<u>11.01</u>
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	<u>2" = 0.163</u>	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	<u>12/3/12</u>	<u>10:20</u>	<u>A</u>	<u>1</u> 125,500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>✓</u>
White Poly	<u>12/3/12</u>	<u>10:20</u>	<u>A</u>	<u>1</u> 125,500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	<u>✓</u>
White Poly	/ /	:		1 125,500, 1L	None	YES	YES	NA	
Yellow Poly	/ /	:		1 250,500, 1L	H2SO4	YES	NO		
Green Poly	/ /	:		1 125,500, 1L	NaOH	YES	NO		
Green Poly	/ /	:		1 125,500, 1L	NaOH	YES	YES		
Red-Diss. Poly	/ /	:		1 250,500, 1L	HNO3	YES	YES		
Amber Glass	<u>12/3/12</u>	<u>10:20</u>	<u>A</u>	<u>4</u> 250,500, 1L	<u>None</u>	<u>YES</u>	<u>NO</u>		<u>✓</u>

Total Bottles (include duplicate count): 4 + 4 = 8

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	White Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorous)	
Green Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED-TOTAL Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)	
RED-DISSOLVED Poly	(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM	

WATER QUALITY DATA Purge Start Time: 09:25 Fe++: --- mg/l Sulfide: --- mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>09:29</u>	<u>2 gal</u>	<u>13.92</u>	<u>6.11</u>	<u>3421</u>	<u>12.44</u>	<u>0.2</u>	<u>-11</u>	<u>cloudy gray cloudy</u>
2	<u>09:36</u>	<u>4 gal</u>	<u>16.67</u>	<u>6.54</u>	<u>3408</u>	<u>12.36</u>	<u>0.21</u>	<u>-40</u>	<u>↓</u>
3	<u>09:50</u>	<u>8 gal</u>	<u>19.70</u>	<u>6.80</u>	<u>3282</u>	<u>12.06</u>	<u>0.21</u>	<u>-88</u>	<u>↓</u>
4	<u>10:15</u>	<u>14 gal</u>	<u>19.66</u>	<u>6.86</u>	<u>3328</u>	<u>12.19</u>	<u>0.21</u>	<u>-102</u>	<u>gray cloudy</u>
5	:	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): > 1000 Turbidity after sample collection (NTU): 1000

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon / T Jeff Rayson
 (PRINTED NAME) (SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

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(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: 62-5-

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: 62-5-120312-

DUP ID: _____

WIND FROM:	N	NE	E	SE	<u>S</u>	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PRTLY CLOUDY		<u>CLOUDY</u>		RAIN		TEMPERATURE: <u>6 F</u> <u>40.5</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							Product Thickness	Water Column	Volume (gal)	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			X 1	X 3
<u>12/3/12</u>	<u>10:43</u>	<u>13.50</u>	---	<u>5.01</u>	---	<u>7.89</u>				<u>7.29</u>
/ /	:		---		---					<u>3.85</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 12.50 [√ if used]

Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√
White Poly	<u>12/3/12</u>	<u>10:43</u>	<u>B</u>	<u>1</u> <u>125, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	
White Poly	<u>12/3/12</u>	<u>10:43</u>	<u>B</u>	<u>1</u> <u>125, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>NO</u>	<u>NA</u>	
White Poly	<u>12/3/12</u>	<u>10:43</u>	<u>B</u>	<u>1</u> <u>125, 500, 1L</u>	<u>None</u>	<u>YES</u>	<u>YES</u>	<u>NA</u>	
Yellow Poly	<u>12/3/12</u>	<u>10:43</u>	<u>B</u>	<u>1</u> <u>250, 500, 1L</u>	<u>H2SO4</u>	<u>YES</u>	<u>NO</u>		
Green Poly	<u>12/3/12</u>	<u>10:43</u>	<u>B</u>	<u>1</u> <u>125, 500, 1L</u>	<u>NaOH</u>	<u>YES</u>	<u>NO</u>		
Green Poly	<u>12/3/12</u>	<u>10:43</u>	<u>B</u>	<u>1</u> <u>125, 500, 1L</u>	<u>NaOH</u>	<u>YES</u>	<u>YES</u>		
Red Diss. Poly	<u>12/3/12</u>	<u>10:43</u>	<u>B</u>	<u>1</u> <u>250, 500, 1L</u>	<u>HNO3</u>	<u>YES</u>	<u>YES</u>		
Amber Glass	<u>12/03/12</u>	<u>11:40</u>	<u>B</u>	<u>2,2</u> <u>250, 500, 1L</u>	<u>None</u> / <u>HCl</u>	<u>YES</u>	<u>NO</u>		

Total Bottles (include duplicate count): 42

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (TSS)</u>
	Yellow - Poly	<u>(Total Phosphorous)</u>
	GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved</u>
	RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)</u>
RED DISSOLVED - Poly	<u>(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)</u>	
Amber Glass	<u>PAHS by 8270C SIM, NWTPH, DE, EPH</u>	Hach / YSI _____ times dilution

WATER QUALITY DATA Purge Start Time: 10:45 Fe++: _____ mg/l Sulfide: _____ mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>10:50</u>	<u>1L</u>	<u>7.32</u>	<u>7.32</u>	<u>3805</u>	<u>13.13</u>	<u>0.2</u>	<u>-115</u>	<u>Can't low flow, purge</u>
2	<u>11:02</u>	<u>1.5 gal</u>	<u>9.23</u>	<u>7.32</u>	<u>3792</u>	<u>13.24</u>	<u>1.9</u>	<u>-130</u>	<u>golden opaque</u>
3	<u>11:10</u>	<u>2.5 gal</u>	<u>10.00</u>	<u>7.28</u>	<u>3762</u>	<u>13.33</u>	<u>1.9</u>	<u>-140</u>	<u>light gold, clear</u>
4	<u>11:18</u>	<u>3.5 gal</u>	<u>10.96</u>	<u>7.26</u>					
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 64.0

Turbidity after sample collection (NTU): 32.0

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon

(PRINTED NAME)

Jeff Payson

(SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

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(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: G1-5
 SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: G1-5-120312-

DUP ID:

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: 50.8 °F °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate unit] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
<u>12/03/12</u>	<u>15:20</u>	<u>19.49</u>	---	<u>15.04</u>	---	<u>4.45</u>	X 1 <u>0.72</u>
/ /	:	.	---	.	---	.	X 3 <u>2.17</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 18.49 [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	YES	NA	
Yellow Poly	/ /	:	/	1 250, 500, 1L	H2SO4	YES	NO		
Green Poly	<u>12/03/12</u>	<u>15:48</u>	<u>B</u>	1 <u>125</u> 500, 1L	<u>NaOH</u>	<u>YES</u>	<u>NO</u>		
Green Poly	<u>12/03/12</u>	<u>15:48</u>	<u>B</u>	1 <u>125</u> 500, 1L	<u>NaOH</u>	<u>YES</u>	<u>YES</u>		
Red Diss. Poly	/ /	:	/	1 250, 500, 1L	HNO3	YES	YES		
Amber Glass	/ /	:	/	250, 500, 1L	None	YES	NO		

Total Bottles (include duplicate count): 2

Analysis Allowed per Bottle Type	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
WHITE - Poly	(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (FSS)
Yellow Poly	(Total Phosphorous)
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
RED TOTAL - Poly	(Ag) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Si) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	PARIS by 8270C SIM

WATER QUALITY DATA Purge Start Time: 15:22 Fe++ mg/l Sulfide: mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>15:26</u>	<u>1L</u>	<u>15.04</u>	<u>7.14</u>	<u>1413</u>	<u>12.85</u>	<u>0.19</u>	<u>-99.4</u>	<u>Clear, pale, yellow</u>
2	<u>15:30</u>	<u>2L</u>	<u>15.04</u>	<u>7.19</u>	<u>1340</u>	<u>13.11</u>	<u>0.18</u>	<u>-96.7</u>	" "
3	<u>15:34</u>	<u>3L</u>	<u>15.04</u>	<u>7.21</u>	<u>1321</u>	<u>13.27</u>	<u>0.17</u>	<u>-88.0</u>	" "
4	<u>15:38</u>	<u>4L</u>	<u>15.04</u>	<u>7.10</u>	<u>1320</u>	<u>13.25</u>	<u>0.19</u>	<u>-86.0</u>	" "
5	<u>15:42</u>	<u>5L</u>	<u>15.04</u>	<u>7.08</u>	<u>1321</u>	<u>13.34</u>	<u>0.18</u>	<u>-83.0</u>	" "
6	<u>15:46</u>	<u>6L</u>	<u>15.</u>	<u>7.07</u>	<u>1320</u>	<u>13.47</u>	<u>0.18</u>	<u>-80.5</u>	" "
7	:	.	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 4.87 Turbidity after sample collection (NTU): 1.95

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
 Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon (PRINTED NAME) Logan (SIGNATURE)

Jeff Jayson

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

Fax:

(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: G-45

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G-45-120412

DUP ID:

WIND FROM:	<input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> NE	<input type="checkbox"/> E	<input type="checkbox"/> SE	<input type="checkbox"/> S	<input type="checkbox"/> SW	<input type="checkbox"/> W	<input type="checkbox"/> NW	<input type="checkbox"/> LIGHT	<input type="checkbox"/> MEDIUM	<input type="checkbox"/> HEAVY	
WEATHER:	<input type="checkbox"/> SUNNY			<input type="checkbox"/> PRTLY CLOUDY		<input checked="" type="checkbox"/> CLOUDY		<input type="checkbox"/> RAIN		TEMPERATURE: <u>51.5</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							Product Thickness	Water Column	(Circle appropriate unit) [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
<u>12/04/2009</u>	<u>20</u>	<u>22.83</u>	---	<u>3.22</u>	---	<u>19.61</u>		X 1	<u>3.19</u>
/ /	:	.	---	.	---	.		X 3	<u>9.58</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 20.83 [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	YES	NA	
Yellow Poly	/ /	:	/	1 250, 500, 1L	H2SO4	YES	NO		
Green Poly	/ /	:	/	1 125, 500, 1L	NaOH	YES	NO		
Green Poly	/ /	:	/	1 125, 500, 1L	NaOH	YES	YES		
Red Diss. Poly	/ /	:	/	1 250, 500, 1L	HNO3	YES	YES		
Amber Glass	<u>12/04/12</u>	<u>11:00</u>	<u>B</u>	<u>2</u> 250, 500, <u>1L</u>	None/ <u>HCl</u>	<u>YES</u>	<u>NO</u>		

Total Bottles (include duplicate count): 2

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	White Poly	WHITE - Poly	(Total Cl) (SO_{4}) (F, total and dissolved) (alkalinity) (FDS) (FSS)
Yellow Poly	Yellow Poly	(Total Phosphorous)
Green Poly	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
Red Total Poly	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
Red Dissolved Poly	RED DISSOLVED - Poly	(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	Amber Glass	BAHS by 8270C 91M <u>NWTPH-D_x, EPH</u>

WATER QUALITY DATA Purge Start Time: 09:46 Ferr: _____ mg/l Sulfide: _____ mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>09:51</u>	<u>0.5L</u>	<u>4.40</u>	<u>6.13</u>	<u>1085</u>	<u>12.04</u>	<u>0.19</u>	<u>0.1</u>	<u>Unable to low flow</u>
2	<u>10:13</u>	<u>3.5 gal</u>	<u>13.05</u>	<u>6.46</u>	<u>1012</u>	<u>12.59</u>	<u>0.19</u>	<u>-92.6</u>	<u>Clear, tan w/ sheen</u>
3	<u>10:35</u>	<u>6.75 gal</u>	<u>18.27</u>	<u>6.45</u>	<u>1031</u>	<u>12.23</u>	<u>0.19</u>	<u>-109.6</u>	<u>"</u>
4	<u>10:58</u>	<u>9.75</u>	<u>19.14</u>	<u>6.46</u>	<u>1052</u>	<u>12.20</u>	<u>0.21</u>	<u>-105</u>	<u>"</u>
5	:	.	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 156

Turbidity after sample collection (NTU): 238

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon

(PRINTED NAME)

Jeff Rayson

(SIGNATURE)

[Signature]

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108

Fax:

(503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: RLSW-3

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: RLSW-3-120412

DUP ID: _____

WIND FROM:	N	NE	E	SE	<u>S</u>	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY			PRTLY CLOUDY		CLOUDY		<u>RAIN</u>		TEMPERATURE: <u>50.6</u> °F °C	

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate units] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
12/03/12	13:40	19.80	---	6.48	---	13.32	X 1 1.22
12/04/12	11:30	19.80	---	6.18	---	13.62	X 3 3.66

Gal/ft = (dia./2)² x 0.163
 1" = 0.041
 2" = 0.163
 3" = 0.367
 4" = 0.653
 6" = 1.469
 10" = 4.080
 12" = 5.875

1.5"
0.09%

METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 19.80 [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	YES	NA	
Yellow Poly	/ /	:	/	1 250, 500, 1L	H2SO4	YES	NO		
Green Poly	/ /	:	/	1 125, 500, 1L	NaOH	YES	NO		
Green Poly	/ /	:	/	1 125, 500, 1L	NaOH	YES	YES		
Red Diss. Poly	/ /	:	/	1 250, 500, 1L	HNO3	YES	YES		
Amber Glass	12/03/12	11:35	B	4 250, 500, 1L	(2) None / (2) HCl	YES	NO		

Total Bottles (include duplicate count): 4

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
White Poly	WHITE Poly	(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	YELLOW Poly	(Total Phosphorous)
Green Poly	GREEN Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
RED TOTAL Poly	RED TOTAL Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED Poly	RED DISSOLVED Poly	(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	AMBER Glass	PAHS by 8270C SIM / NWT PH-Dx / EPH

WATER QUALITY DATA Purge Start Time: 13:43 Fe++: _____ mg/l Sulfide: _____ mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	13:46	0.32	9.84	7.40	1997	11.62	0.21	-19.1	Clear, yellowish.
2	13:51	0.6 gal	13.15	7.18	1510	11.81	0.21	-38.8	" "
3	13:56	1.0 gal	17.07	7.12	1278	11.88	0.20	-53.3	" "
4	14:01	1.25 gal	19.55	6.92	1769	11.73	0.20	-49.3	Purged dry, allow to reg. air
5	:	.	.	.	.	.	.	.	.
6	:	.	.	.	.	.	.	.	.
7	:	.	.	.	.	.	.	.	.
8	:	.	.	.	.	.	.	.	.
9	:	.	.	.	.	.	.	.	.
10	:	.	.	.	.	.	.	.	.
11	:	.	.	.	.	.	.	.	.
12	:	.	.	.	.	.	.	.	.

[gallons or liters] [Clarity, Color]

Turbidity before sample collection (NTU): 250 Turbidity after sample collection (NTU): 69.0

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
 Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon / Jeff Payson (PRINTED NAME) [Signature] (SIGNATURE)

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333
Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: SSAG-MW-01
SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: SSAG-MW-01--120412

WIND FROM:

N	NE	E	SE	S	SW	W	NW
SUNNY	PRTY CLOUDY	CLOUDY	RAIN	LIGHT	MEDIUM	HEAVY	

WEATHER:

TEMPERATURE: <u>40.5</u> °F	°C
-----------------------------	----

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							TEMPERATURE: °F	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	°C	
<u>12/04/12</u>	<u>12:10</u>	<u>13.90</u>	---	<u>5.39</u>	---	<u>8.51</u>		
/	/	:	---	.	---	.		

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA									
Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	[√ if used]
White Poly	/ /	:		1 125, 500, 1L	None	YES	NO	NA	√
White Poly	/ /	:		1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:		1 125, 500, 1L	None	YES	YES	NA	
Yellow Poly	/ /	:		1 250, 500, 1L	H2SO4	YES	NO	NA	
Green Poly	/ /	:		1 125, 500, 1L	NaOH	YES	NO	NA	
Green Poly	/ /	:		1 125, 500, 1L	NaOH	YES	YES	NA	
Red Diss. Poly	/ /	:		1 250, 500, 1L	HNO3	YES	YES	NA	
Amber Glass	<u>12/04/12</u>	<u>12:50</u>	<u>B</u>	<u>1</u> 250, 500, 1L	<u>None HCl</u>	<u>YES</u>	<u>NO</u>		

Total Bottles (include duplicate count): 1

Analysis Allowed per Bottle Type	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
WHITE - Poly	(Total Cl) (SO ₄) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorous)
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(Al) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Silica) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	PAHS by 8270C SIM <u>NWTPH-Dx</u>

WATER QUALITY DATA									
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>12:10</u>	<u>Found evidence of rain water leaking into well - perform</u>							
2	:	<u>3x well volume purge vs. low flow</u>							
3	<u>12:26</u>	<u>1.5 g</u>	<u>5.46</u>	<u>6.81</u>	<u>369</u>	<u>12.58</u>	<u>0.18</u>	<u>-3.2</u>	<u>clear, colorless</u>
4	<u>12:40</u>	<u>3.0 g</u>	<u>5.50</u>	<u>6.67</u>	<u>375</u>	<u>12.61</u>	<u>0.19</u>	<u>-16.7</u>	<u>"</u>
5	<u>12:42</u>	<u>4.75 g</u>	<u>5.50</u>	<u>6.57</u>	<u>378</u>	<u>12.59</u>	<u>0.26</u>	<u>-27.4</u>	<u>"</u>
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

Turbidity before sample collection (NTU): 3.51 Turbidity after sample collection (NTU): 3.09
 Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
 Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum
 SAMPLER: Matt Wilson/Doug Laffoon / Jeff Payson (PRINTED NAME)
 (SIGNATURE)

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: AnchorSEA Project Mgr: Julia Labadie Project Name: Former Reynolds Metals Project # 110730-02.01
 Address: 1605 Cornwall Ave Bellingham, WA 98225 Phone: (360)715-2708 Fax: (360)733-4312 Email: labadie@anchorsea.com
 Sampled by: Jeff Payson / Doug Lafoon

Reduction Plant RI/FS

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 VOC	8260 RBDM VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCRA Metals (8)	TCLP Metals (8)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, TL, V, Zn	TOTAL DISS TCLP	1200-COLS	1200-Z	EPA	(CYANIDE TOTAL + DISOLVE) (FREE TOTAL, WAD)	
																							ANALYSIS REQUEST
1	12/04/12	1100	H ₂ O	2	✓	✓																	
2	12/04/12	1136	H ₂ O	4	✓	✓																	
3	12/04/12	1250	H ₂ O	1	✓	✓																	
4	12/04/12	1930	H ₂ O	6	✓	✓																	
5																							
6																							
7																							
8																							
9																							
10																							

Normal Turn Around Time (TAT) = 7-10 Business Days YES NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: _____

SPECIAL INSTRUCTIONS: With and without silica gel clean-up + NWTPH-DX Extract and hold (archive) for NWTPH-DX and EPA 645-120412 Analyze SIM PAH upon receipt extract and RLSW-3-120412 hold (archive) NWTPH-DX and EPA. 55AG-MW-01-120412 Analyze upon receipt

RELINQUISHED BY: _____ RECEIVED BY: _____

Signature: [Signature] Date: 12/4/12 Signature: [Signature] Date: _____

Printed Name: Doug Lafoon Time: 12:47 Printed Name: Cam O'Brien Time: 1:19

Company: AnchorSEA Company: Apex



WATER LEVEL SURVEY

RI/FS Update

Anchor QEA L.L.C.

Site: Millennium Bulk Terminals - Longview, WA Date: 12-3/4-12

Personnel: LAFFOON / PAYSON

Project No.: 110730-01.04 T-01-A-14

Weather: CLOUDY / RAIN 40s °F

Water Level Meter # 23069

Well	Time (2400)	DTW (feet)	Comments
Piezometers			
PZ-1S			
PZ-2D			
PZ-3			
PZ-4			
PZ-5			
PZ-6			
PZ-7			
"G" Wells			
G-1S	15:20	19.49	12-3-12
G-1D	14:33	18.26	12-3-12
G-2S	10:43	5.61	12-3-12
G-2D	09:00	06.04	12-3-12
G-3S			
G-3D			
G-4S	09:20	3.22	12-4-12
G-4D			
G-5S			
G-5D			
G-6S			
G-6D			
G-7S			
G-7D			
RLSW-3	13:40	6.48	12-3-12
SSAG-MW-01	12:10	5.39	12-4-12

Notes:

Location ID	Total Depth (ft below TOC)	Date	Sample ID	Sample Time	Well Integrity
<i>Piezometers</i>					
PZ-1	16.28			:	
PZ-2	27.78			:	
PZ-3	13.03			:	
PZ-4	20.94			:	
PZ-5	25.49			:	
PZ-6	15.12			:	
PZ-7	21.23			:	
<i>'G' wells</i>					
G1-S	10.49	12-3-12	G-1s-120312	15:48	OK
G1-D	37.07	12-3-12	G-1d-120312	15:05	↓
G2-S	12.77	12-3-12	G-2s-120312	11:40	
G2-D	27.82	12-3-12	G-2d-120312	10:20	↓
G3-S	15.35		NA	:	
G3-D	30.78		NA	:	
G4-S	22.58	12-4-12	G-4s-120412	11:00	OK
G4-D	37.57			:	
G5-S	21.65			:	
G5-D	37.35			:	
G6-S	22.66			:	
G6-D	37.65			:	
G7-D	32.81			:	
<i>Spent Potliner Monitoring Wells</i>					
R-1S	12.55			:	
R-1D	24.82			:	
R-2	14.86			:	
R-3	24.65			:	
R-4S	19.56			:	
R-4D	29.05			:	

SSA6-MW01 13.90 12-4-12 SSA6-MW01-120412 12:50 OK



Location ID	Total Depth (ft below TOC)	Date	Sample ID	Sample Time	Well Integrity
<i>Black Mud Pond Wells</i>					
RL-1S	19.06	12-3-12	:	:	
RL-1D	39.40	12-3-12	:	:	
RL-2S	19.78	12-3-12	:	:	
RL-2D	33.00	12-3-12	:	:	
RL-3S	19.81		:	:	
RL-3D	39.23		:	:	
RL-4S	18.35		:	:	
RL-4D	39.00		:	:	
RL-5	23.30		:	:	
RLSW-1	18.00		:	:	
RLSW-2	18.00		:	:	
RLSW-3	18.00	12-4-12	RLSW-3-120412	11:35	OK
RLSW-4	28.50		:	:	
<i>Surface Water</i>					
W1	---		:	:	
W2	---		:	:	
W3	---		:	:	
W4-A	---		:	:	
W4-B	---		:	:	
W5	---		:	:	
W6	---		:	:	
W7	---		:	:	
CDID Up	---		:	:	
CDID Down	---		:	:	
<i>QA/QC</i>					
G-2 d		12-3-12	G-2d-120312-D	10:30	OK
G-1 d		12-3-12	G-1d-120312-D	15:10	OK
Rinse Blank	---	12-4-12	RB-120412	13:30	NA
			:	:	
Notes:					

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

Office: (503) 670-1108 Fax: (503) 670-1128

PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: 62-5-

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: 62-5-120312-

DUP ID: _____

WIND FROM:	N	NE	E	SE	<u>(S)</u>	SW	W	NW	<u>(LIGHT)</u>	MEDIUM	HEAVY	
WEATHER:	SUNNY			PRTY CLOUDY		<u>(CLOUDY)</u>		RAIN		TEMPERATURE: <u>(F)</u> 40.5 °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							[Product Thickness]	[Water Column]	(Circle appropriate unit) [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			Volume (gal)
12/3/12	10:43	13.50	---	5.61	---	7.89		X1	1.29
/ /	:	---	---	.	---	.		X3	3.85

Gal/ft = (dia./2) ² x 0.163	1" = 0.041	<u>(2")</u> = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875
--	------------	---------------------	------------	------------	------------	-------------	-------------

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailor Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Sample Depth: 12.50 [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	
White Poly	++	---	---	1 125, 500, 1L	None	YES	NO	NA	✓
White Poly	++	---	---	1 125, 500, 1L	None	YES	NO	NA	
White Poly	++	---	---	1 125, 500, 1L	None	YES	YES	NA	
Yellow Poly	++	---	---	1 250, 500, 1L	H2SO4	YES	NO		
Green Poly	++	---	---	1 125, 500, 1L	NaOH	YES	NO		
Green Poly	++	---	---	1 125, 500, 1L	NaOH	YES	YES		
Red Diss. Poly	++	---	---	1 250, 500, 1L	HNO3	YES	YES		
Amber Glass	12/03/12	11:40	B	2,2 250, 500 (1L)	None / HCl	<u>(YES)</u>	<u>(NO)</u>		

Total Bottles (include duplicate count): 42

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
White Poly	WHITE - Poly	(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	YELLOW - Poly	(Total Phosphorus)
Green Poly	GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
Red Total - Poly	RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (B) (Na)
Red Dissolved - Poly	RED DISSOLVED - Poly	(Al) (As) (Ca) (Cd) (Cu) (Fe) (Mg) (Mn) (Ni) (Pb) (Sb) (Ba) (Be) (B) (Co) (Cr) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	AMBER GLASS	PAHS by 8270C SIM, NWTPH P, EPH

WATER QUALITY DATA Purge Start Time: 10:45 Hach / YSI mg/l Sulfide: mg/l

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	10:50	1L	7.32	---	---	---	---	---	Can't low flow, purge
2	11:02	1.5 gal	9.23	7.32	3805	13.13	0.2	-115	golden opaque
3	11:10	2.5 gal	10.00	7.28	3792	13.24	1.9	-130	" "
4	11:18	3.5 gal	10.96	7.26	3762	13.33	1.9	-116	Slight gold, clear
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 64.0

Turbidity after sample collection (NTU): 32.0

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon

(PRINTED NAME)
Jeff. Payson

(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: G-1d

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: G-1d-120312-

DUP ID: G-1D-120312-D 15:10

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRTLY CLOUDY CLOUDY RAIN TEMPERATURE: 40.5 °F °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)							Product Thickness	Water Column	(Circle appropriate units)	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW			[Water Column x Gal/ft]	
									Volume (gal)	
12/3/12	14:33	35.00	---	18.26	---	16.74			X 1	2.13
/ /	:	.	---	.	---	.			X 3	8.18
Gal/ft = (dia./2) ² x 0.163		1" = 0.041	<u>2"</u> = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875		

§ METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	[if used]
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	✓
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	YES	NA	
Yellow Poly	/ /	:	/	1 250, 500, 1L	H2SO4	YES	NO	NA	
Green Poly	12/03/12	15:05	B	1 <u>(125)</u> 500, 1L	<u>(NaOH)</u>	<u>(YES)</u>	<u>(NO)</u>		
Green Poly	12/03/12	15:05	B	1 <u>(125)</u> 500, 1L	<u>(NaOH)</u>	<u>(YES)</u>	<u>(YES)</u>		
Red Diss. Poly	/ /	:	/	1 250, 500, 1L	HNO3	YES	YES		
Amber Glass	/ /	:	/	1 250, 500, 1L	None	YES	NO		

Total Bottles (include duplicate count): 2

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	WHITE - Poly	<u>(Total Cr) (SLO) (F, total and dissolved) (alkalinity) (FDS) (TSS)</u>
Yellow Poly	<u>(Total Phosphorus)</u>	
GREEN - Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved</u>	
RED TOTAL - Poly	<u>(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (TH) (V) (Zn) (Hg) (K) (Na)</u>	
RED DISSOLVED - Poly	<u>(As) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (Ni) (Ag) (Se) (TH) (V) (Zn) (Hg) (K) (Na) (Hardness)</u>	
Amber Glass	<u>PAHS by 82/0C SIM</u>	

WATER QUALITY DATA

Purge Start Time: <u>14:34</u>		Fe++: _____ mg/l		Sulfide: _____ mg/l					
Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	14:38	0.6 L	18.71	6.70	4219	12.23	0.21	-39.1	almost clear
2	14:42	1.2 L	18.82	6.63	4278	12.28	0.21	-53.4	" "
3	14:46	1.8 L	18.82	6.61	4231	12.25	0.21	-65.1	(clear w/ sheen
4	14:50	2.4 L	18.89	6.60	4126	12.14	0.20	-70.8	" "
5	14:54	3.0 L	18.93	6.58	3946	12.05	0.21	-79.6	" "
6	14:58	3.6 L	18.93	6.57	3800	12.01	0.21	-82.6	" "
7	15:02	4.2 L	18.94	6.57	3726	11.99	0.20	-84.3	" "
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 16.4

Turbidity after sample collection (NTU): 8.34

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
 Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
 (PRINTED NAME)
Jeff Payson

(SIGNATURE)

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum

WELL ID: G1-5

SITE ADDRESS: 4029 Industrial way, Longview, WA

SAMPLE ID: G1-5-120312

DUP ID:

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY	
WEATHER:	SUNNY			PRITLY CLOUDY		CLOUDY		RAIN		TEMPERATURE:	50.8	°C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
12/03/12	15:20	19.49	---	15.04	---	9.45	X 1 0.72
/ /	:	.	---	.	---	.	X 3 2.17

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 18.49 [√ if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	YES	NA	
Yellow Poly	/ /	:	/	1 250, 500, 1L	H2SO4	YES	NO	NA	
Green Poly	12/03/12	15:48	B	1 (25) 500, 1L	NaOH	YES	NO		
Green Poly	12/03/12	15:48	B	1 (25) 500, 1L	NaOH	YES	YES		
Red Diss. Poly	/ /	:	/	1 250, 500, 1L	HNO3	YES	YES		
Amber Glass	/ /	:	/	1 250, 500, 1L	None	YES	NO		

Total Bottles (include duplicate count): 2

Analysis Allowed per Bottle Type	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE. (Circle applicable or write non-standard analysis below)
WHITE - Poly	(Total Cd) (60) (E, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow - Poly	(Total Phosphorus)
GREEN - Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved
RED - TOTAL - Poly	(Ag) (Sb) (Ba) (Be) (Ca) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (As) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(All ions) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (Sulfate) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Pb) (As) (Se) (Ti) (V) (Zn) (Hg) (Hardness)
Amber Glass	Partic by 82/0C SIM

WATER QUALITY DATA Purge Start Time: 15:22 Hach / YSI Hach / YSI times dilution

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	15:26	1L	15.04	7.14	1415	12.85	0.19	-99.4	Clear, pale, yellow
2	15:30	2L	15.04	7.19	1340	13.11	0.18	-96.7	" "
3	15:34	3L	15.04	7.21	1321	13.27	0.17	-88.0	" "
4	15:38	4L	15.04	7.10	1320	13.25	0.19	-88.0	" "
5	15:42	5L	15.04	7.08	1321	13.34	0.18	-83.0	" "
6	15:46	6L	15.	7.07	1320	13.47	0.18	-80.5	" "
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters]

[Clarity, Color]

Turbidity before sample collection (NTU): 4.87

Turbidity after sample collection (NTU): 1.95

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon

(PRINTED NAME)
Jeff Payson

(SIGNATURE)
[Signature]

FIELD SAMPLING DATA SHEET



6650 SW Redwood Lane, Suite 333

Portland, OR 97224

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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: G-45

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: G-45-120412

DUP ID: _____

WIND FROM: N NE E SE S SW W NW LIGHT MEDIUM HEAVY
 WEATHER: SUNNY PRITLY CLOUDY CLOUDY RAIN TEMPERATURE: 51.5 °C

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)						Product Thickness	Water Column	(Circle appropriate unit) [Water Column x Gal/ft]
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW		Volume (gal)
<u>12/04/2009</u>	<u>20</u>	<u>22.83</u>	<u>--</u>	<u>3.22</u>	<u>--</u>	<u>19.61</u>	X 1	<u>3.19</u>
							X 3	<u>9.58</u>

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

§ METHODS: (A) Water (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA Sample Depth: 20.83 [if used]

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	✓
White Poly	/ /	:		1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:		1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:		1 125, 500, 1L	None	YES	YES	NA	
Yellow Poly	/ /	:		1 250, 500, 1L	H2SO4	YES	NO		
Green Poly	/ /	:		1 125, 500, 1L	NaOH	YES	NO		
Green Poly	/ /	:		1 125, 500, 1L	NaOH	YES	YES		
Red Diss. Poly	/ /	:		1 250, 500, 1L	HNO3	YES	YES		
Amber Glass	<u>12/04/12</u>	<u>11:00</u>	<u>B</u>	<u>2</u> 250, 500, <u>1L</u>	<u>None/HCl</u>	<u>YES</u>	<u>NO</u>		
Total Bottles (include duplicate count):				<u>2</u>					

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	White Poly	<u>(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (FDS) (FSS)</u>
Yellow Poly	<u>(Total Phosphorous)</u>	
Green Poly	<u>(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved</u>	
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (H) (V) (Zn) (Hg) (S) (Na)	
RED DISSOLVED - Poly	<u>(As) (As) (Ca) (Cr) (Cu) (Fe) (Mg) (Mn) (K) (Na) (Ni) (S) (Pb) (Sb) (Ba) (Be) (Cd) (Co) (Pb) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)</u>	
Amber Glass	<u>BATH by 02702-914 NWTPH-Dx, EPH</u>	

WATER QUALITY DATA Purge Start Time: 09:46 Ferr: _____ mg/L Sulfide: _____ mg/L

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	<u>09:51</u>	<u>0.5L</u>	<u>4.40</u>	<u>6.13</u>	<u>1085</u>	<u>12.04</u>	<u>0.19</u>	<u>0.1</u>	<u>Unable to low flow</u>
2	<u>10:13</u>	<u>3.5 gal</u>	<u>13.05</u>	<u>6.46</u>	<u>1012</u>	<u>12.59</u>	<u>0.19</u>	<u>-92.6</u>	<u>Clear, tan w/ sheen</u>
3	<u>10:35</u>	<u>6.75 gal</u>	<u>18.27</u>	<u>6.45</u>	<u>1031</u>	<u>12.23</u>	<u>0.19</u>	<u>-109.6</u>	<u>"</u>
4	<u>10:58</u>	<u>9.75</u>	<u>19.14</u>	<u>6.46</u>	<u>1052</u>	<u>12.20</u>	<u>0.21</u>	<u>-105</u>	<u>"</u>
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

[gallons or liters] Turbidity before sample collection (NTU): 156 [Clarity, Color] Turbidity after sample collection (NTU): 238

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
 Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon
 (PRINTED NAME) Jeff Rayson
 (SIGNATURE) [Signature]

FIELD SAMPLING DATA SHEET



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PROJECT NAME: Millennium Bulk Terminals RI/FS Addendum WELL ID: RLSW-3

SITE ADDRESS: 4029 Industrial way, Longview, WA SAMPLE ID: RLSW-3-120412

DUP ID: _____

WIND FROM:	N	NE	E	SE	<u>S</u>	SW	W	NW	<u>LIGHT</u>	MEDIUM	HEAVY
WEATHER:	SUNNY		PARTLY CLOUDY		CLOUDY		<u>RAIN</u>		TEMPERATURE: °F <u>50.6</u> °C		

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft) [Product Thickness] [Water Column] [Circle appropriate units] [Water Column x Gal/ft]

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (gal)
12/03/12	13:40	19.80	--	6.78	--	13.32	X 1 1.22
12/04/12	11:36	19.80	--	6.18	--	13.62	X 3 3.66

Gal/ft = (dia./2)² x 0.163 1" = 0.041 2 1/2" = 0.163 3" = 0.367 4" = 0.653 6" = 1.469 10" = 4.080 12" = 5.875

METHODS: (A) Waterra (B) Peristaltic Pump (C) Disposable Bailer Sampled via: (1) Low-flow (2) Purged 3 casing volumes (3) Purged dry, let recover, and sampled

GROUNDWATER SAMPLING DATA

Bottle Type	Date	Time	Method	Amount & Volume mL	Preservative (circle)	Ice	Filter	pH	√ if used
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	NO	NA	
White Poly	/ /	:	/	1 125, 500, 1L	None	YES	YES	NA	
Yellow Poly	/ /	:	/	1 250, 500, 1L	H2SO4	YES	NO		
Green Poly	/ /	:	/	1 125, 500, 1L	NaOH	YES	NO		
Green Poly	/ /	:	/	1 125, 500, 1L	NaOH	YES	YES		
Red Diss. Poly	/ /	:	/	1 250, 500, 1L	HNO3	YES	YES		
Amber Glass	12/03/12	11:35	B 4	250, 500 (1L)	(2) None (3) HCl	YES	NO		

Total Bottles (include duplicate count): 4

Analysis Allowed per Bottle Type	BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	White Poly	(Total Cl) (SO4) (F, total and dissolved) (alkalinity) (TDS) (TSS)
Yellow Poly	(Total Phosphorus)	
Green Poly	(Total Cyanide) (Free Cyanide) (Weak and Dissociable Cyanide) all total and dissolved	
RED TOTAL Poly	(As) (B) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (K) (Na)	
RED DISSOLVED Poly	(Al) (As) (Ca) (Cd) (Cu) (Fe) (Mg) (Mn) (Ni) (Ag) (Se) (Ti) (V) (Zn) (Hg) (Hardness)	
Amber Glass	PAHS by 8270C SIM / NWTPH-DK / EPH	

WATER QUALITY DATA

Meas.	Time	Cum. Volume	DTW(ft TOC)	pH	E Cond (µS)	Temp °C	DO	ORP	Water Quality
1	13:46	0.3L	9.84	7.40	1997	11.62	0.21	-19.1	Clean, yellowish.
2	13:51	0.6 gal	13.15	7.18	1510	11.81	0.21	-38.8	" "
3	13:56	1.0 gal	17.07	7.12	1278	11.88	0.20	-53.3	" "
4	14:01	1.25 gal	19.55	6.92	1769	11.73	0.20	-49.3	Purged dry, allow to re-charge
5	:								
6	:								
7	:								
8	:								
9	:								
10	:								
11	:								
12	:								

Turbidity before sample collection (NTU): 250 Turbidity after sample collection (NTU): 69.0

Comments: As, Cr, Cu, Ni, Na - analyzed for Quarterly Groundwater Monitoring
Ca, Mg, Al, Fe, K, Mn, Na, Si - analyzed for RI/FS Addendum

SAMPLER: Matt Wilson/Doug Laffoon / Jeff Payson

[Signature]
(SIGNATURE)

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Company: **Anchor GEA** Project Mgr: **Julia Labadie** Project Name: **FORMER Reynolds Metals** Project # **110730-02.01**
 Address: **1605 Cornwall Ave Bellingham, WA 98225** Phone: **(360) 715-2708** Fax: **(360) 733-4312** Email: **j.labadie@anchorgea.com**
 Sampled by: **Doug Laffoon / Jeff Payson**

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 VOC	8260 RBDM VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs *	8082 PCBs	600 TTO	RCRA Metals (8)	TCP Metals (8)	Al, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, TL, V, Zn, TOTAL DISS TCFP	1200-COLS	1200-Z	Total/Dissolved (Sample)	(Free/Total WAD)	EPA *
61-S-120312	12/03/12	15:30	H ₂ O	2																		
61-D-120312		15:05		2																		
61-D-120312-D		15:10		2																		
62-S-120312		11:40		4																		
62-D-120312		10:45		4																		
62-D-120312-D		10:30		4																		

Normal Turn Around Time (TAT) = 7-10 Business Days YES NO

TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: _____

SPECIAL INSTRUCTIONS:
 * 62-S and 62-D - Analyze SIM PAN's upon receipt, no extract and hold (archive) for NWTPH-Dx and 61-S and 61-D - Analyze samples upon receipt.
 Total + dissolved cyanide = Free total WAD

RELINQUISHED BY: **Doug Laffoon** Signature: *[Signature]* Date: **12-3-12**
 RECEIVED BY: **Anchor GEA** Signature: *[Signature]* Date: **12/12/12**
 Printed Name: **Doug Laffoon** Time: **1728** Printed Name: **Conn O'Brien** Time: **730**
 Company: **Anchor GEA** Company: **Apex**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: AnchorSEA Project Mgr: Julia Labadie Project Name: FORMER Reynolds Metals Project # 110730-02.01
 Address: 1605 Cornwall Ave Bellingham, WA 98225 Phone: (360)715-2708 Fax: (360)733-4312 Email: labadie@anchoragea.com
 Sampled by: Jeff Payson / Doug Luffon

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HClD	NWTPH-Dx *	NWTPH-Gx	8260 VOC	8260 RBDM VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TIO	RCRA Metals (8)	TCIP Metals (8)	Al, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, TL, V, Zn	TOTAL DISS TCIP	1200-COLS	1200-Z	EPA	(CYANIDE TOTAL + DISSOLVE)	(FREE TOTAL WAD)	
																								LAB ID #
1	12/04/12	1100	H ₂ O	2	✓																			
2	12/04/12	1136	H ₂ O	4	✓							✓												
3	12/04/12	1250	H ₂ O	1	✓																			
4	12/04/12	1930	H ₂ O	6	✓																			
5																								
6																								
7																								
8																								
9																								
10																								

SPECIAL INSTRUCTIONS:
 * NWTPH-Dx → With and without silica gel clean-up
 645-120412 Extract and hold (archive) for NWTPH-Dx and EPA
 RLSW-3-120412 Analyze SIM PAH upon receipt, extract and hold (archive) NWTPH-Dx and EPA.
 55AG-MW-01-120412 Analyze upon receipt

RECEIVED BY: _____
 Signature: _____ Date: _____
 Printed Name: _____ Time: _____

RELINQUISHED BY: _____
 Signature: Doug Luffon Date: 12/4/12
 Printed Name: Doug Luffon Time: 1619
 Signature: AnchorSEA Date: 12/4/12
 Printed Name: AnchorSEA Time: 1619

RECEIVED BY: _____
 Signature: _____ Date: _____
 Printed Name: _____ Time: _____

RELINQUISHED BY: _____
 Signature: _____ Date: _____
 Printed Name: _____ Time: _____

APPENDIX D-2

SLUG TEST ANALYSIS

MEMORANDUM

TO: File
DATE: March 2, 2007
PROJECT: Chinook T4

FROM: Jonathan D. Williams, Groundwater Science Applications

RE: Slug Testing Data Collection and Evaluation Methods, Chinook Ventures,
Longview, Washington

This memorandum documents the methods used to collect and evaluate slug test data for the Chinook Ventures site in Longview, Washington (the site). All field work was performed by Mr. Obie Strickler of Environmental Management Services, Inc. (EMS). Field tasks included manual collection of depth to water data, programming and deployment of pressure transducers and dataloggers, and downloading of water level measurements recorded by the dataloggers. All data evaluation was completed by Mr. Jonathan Williams of Groundwater Science Applications.

Slug Testing Field Methods

EMS personnel completed slug tests at 10 site monitoring wells on October 23 through 25, 2006. The following monitoring wells were tested: G1D, G2D, G3D, G4D, G5D, G6D, G7D, R1D, RL-3D, and RL-4D. It should be noted that prior to slug testing, all of these monitoring wells were developed in 2006 in order to maximize the hydraulic communication between the well and the surrounding formation. Slug tests were conducted at each well location by adding and/or removing a "slug" of known volume from each well and measuring the response of the water table as it returned to pre-test static conditions. Introduction and removal of the slug resulted in an approximate water level change of 3 feet at most of the wells. Both a falling head (inserting a slug) and a rising head (removing a slug) test were performed on all but three of the monitoring wells. A rising head test was not performed at monitoring wells G4D, G7D, and RL-3D due to the relatively long recovery time noted in the falling head test. With the following exceptions, a 7-foot long by 1-inch diameter PVC pipe was filled with sand and acted as the slug. In monitoring well RL-4D, a 3-foot long piece of 0.5-inch diameter galvanized steel pipe acted as the slug because well casing was not large enough to use the 1-inch diameter PVC pipe slug. In monitoring well R1D, a 5-foot long by 3/8-inch diameter PVC pipe was filled with sand and acted as the slug because the well had only a 1 inch casing.

An In-Situ, Inc. Level Troll 700™ was used to monitor changes in water level over time. The Level Troll 700 was attached to a laptop computer to allow EMS personnel performing the test to monitor the change in water level as it returned to static conditions.

At each well, EMS personnel first removed the sampling tube in the well, took a depth to water measurement, and then placed the Level Troll 700 into the well. The Level Troll 700 was placed deep enough to eliminate contact with the slug while allowing the slug to be completely submerged. When applicable the slug was placed within the screened interval of the well. The cable from the Level Troll 700 was then clamped to a solid object near the well opening to minimize movement of the transducer as the slug was either inserted or removed from the well. A disposable line was attached to the top of the PVC slug and then tied to a solid object so the slug could be lowered into the well and fully submerged.

Once the water level had stabilized, the slug was rapidly inserted into the well for the falling head portion of the test. The Level Troll 700 was set to record times logarithmically. This setting allowed approximately four readings per second to be taken during the early stages of the tests when the largest changes in water level occurred. Once the water level had returned to the approximate pre-test static level, the slug was rapidly removed from the well for the rising head portion of the test. After completing both the falling head and rising head portions of the test at each well, the slug and the Level Troll 700 were cleaned in order to avoid possible cross-contamination of the wells. In addition, the disposable line used to hang the slug was removed and properly disposed.

No problems were encountered during the slug testing; however, the following should be noted:

- On the slow recovering wells (monitoring wells G4D, G7D, and RL-3D) it was difficult to determine a pre-slug insertion static water level due to the dedicated sample tubing present in the well, which had to be removed prior to slug testing. Recovery was often measured in hundredths of a foot over multi-minute periods, and without knowing the recovery time EMS personnel assumed the static water level had been reached. After starting the test and becoming aware of the very slow recovery, it was recognized that perhaps the static water level had not been reached prior to starting the test. Each well with relatively slow recovery was tested for a minimum of three hours to establish enough data to create a representative slope of recovering water levels.
- At monitoring well RL-4D, EMS personnel noted some sort of concrete or other material around the casing opening which would not allow the 1-inch diameter PVC slug to enter the casing.
- At monitoring well RL-3D, the slug encountered some form of resistance within the casing, so that the slug was not completely submerged. EMS personnel could not readily identify what caused the resistance within the casing.

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Slug test data were reviewed in the field with the use of a laptop computer to confirm the tests results were acceptable. At the conclusion of field work, EMS personnel converted the datalogger data into spreadsheet format and provided copies of these files to GSA. Copies of slug test data forms filled out in the field are attached.

Slug Testing Evaluation Methods

Water level data were evaluated using the Bouwer and Rice (1976) method to estimate the horizontal hydraulic conductivity at each well. Hydraulic conductivity estimates for the 10 monitoring wells are presented in the attached Table. In addition, copies of the slug test analysis graphs are attached following the Table. Slug test data were analyzed with the assistance of the AquiferWin32 program, which was developed by Environmental Simulations, Inc. (ESI, 2004).

The estimated hydraulic conductivities based on these slug test analyses range between 0.0025 feet per day for the falling head test from monitoring well RL-3D and 16 feet per day for the falling head test from monitoring well G5D. The average estimated hydraulic conductivity based on these slug test analyses, calculated using the geometric mean, is 0.22 feet per day.

The estimated average hydraulic conductivity of 0.22 feet per day is typical of unconsolidated sediment comprised of silty sand (Freeze and Cherry, 1979). The attached Table also includes lithologic descriptions of the screened interval materials encountered during drilling. The estimated hydraulic conductivities corroborate well with the screened interval lithologies, with coarser-grained materials (e.g. sand) having higher estimated hydraulic conductivities than much finer-grained materials (e.g. clay).

The Bouwer and Rice method is applicable to both fully and partially penetrating wells, and assumes the aquifer is unconfined. It should be noted that no site-specific storage coefficient data are available, so it is unknown if the formations encountered during slug testing are unconfined. While some of the formations encountered during slug testing may be semi-confined or even confined, the good correlation between estimated hydraulic conductivity and the screened interval lithologies suggest this potential limitation associated with application of the Bouwer and Rice method is not significant.

Attachments

Slug Test Data Forms

Table

Slug Test Analysis Graphs, 17 total

March 2, 2007

Page 4 of 4

References

Bouwer, H. and R.C. Rice, 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells, *Water Resources Research*, 12:423-428.

Environmental Simulations, Inc (ESI). 2004. AquiferWin32 computer software, Version 3.01.

Freeze, R.A, and J.A. Cherry. 1979. Groundwater. Published by Prentice Hall, Inc., Upper Saddle River, New Jersey.

APPENDIX A

Slug Test Data Form

Page __ of __

FIGURE 1. Slug Test Data Form

DATE: 10/25/06
SITE ID: CHINOOK VENTURES SLUG VOLUME (ft³): _____
LOCATION ID: RL-3D LOGGER: JOS

TEST METHOD: _____ SLUG INJECTION _____ SLUG WITHDRAWAL

COMMENTS: TRAP-DUXER 25' BGS
SLUG WOULD NOT GO ALL WAY DOWN
15.87 PROBE BELOW H₂O LINE

Time Beginning of Test #1 _____ Time Beginning of Test #2 _____
Time End of Test #1 _____ Time End of Test #2 _____

ELAPSED TIME (MIN)	DEPTH TO WATER (FT)	ELAPSED TIME (MIN)	DEPTH TO WATER (FT)
--------------------	---------------------	--------------------	---------------------

10.56

APPENDIX A

Slug Test Data Form

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FIGURE 1. Slug Test Data Form

DATE: 10/25/06

SITE ID: CHINOOK VENTURES

SLUG VOLUME (ft³): _____

LOCATION ID: G-50

LOGGER: JOS

TEST METHOD: _____ SLUG INJECTION _____ SLUG WITHDRAWAL

COMMENTS: TRANSDUCER @ 25' LOG

PROBE 13.02' BLW H₂O LINE

Time Beginning of Test #1 _____ Time Beginning of Test #2 _____

Time End of Test #1 _____ Time End of Test #2 _____

ELAPSED TIME (MIN)	DEPTH TO WATER (FT)	ELAPSED TIME (MIN)	DEPTH TO WATER (FT)
--------------------	---------------------	--------------------	---------------------

12.45

APPENDIX A

Slug Test Data Form

Page __ of __

FIGURE 1. Slug Test Data Form

DATE: 10/23/06

SITE ID: CHINOOK VENTURES

SLUG VOLUME (ft³): _____

LOCATION ID: B-1-D G1-D

LOGGER: JUS

TEST METHOD:

SLUG INJECTION

SLUG WITHDRAWAL

COMMENTS: SET TRANSDUCER @ 30'

Time Beginning of Test #1 _____

Time Beginning of Test #2 _____

Time End of Test #1 _____

Time End of Test #2 _____

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

19.90

APPENDIX A

Slug Test Data Form

Page of

FIGURE 1. Slug Test Data Form

DATE: 10/23/06

SITE ID: CHINDOK VENTURES

SLUG VOLUME (ft³):

LOCATION ID: G20-

LOGGER: JOS

TEST METHOD: SLUG INJECTION SLUG WITHDRAWAL

COMMENTS: TRANSDUCER @ 18'

10.89 PROBE DEPTH BELOW WATER

Time Beginning of Test #1

Time Beginning of Test #2

Time End of Test #1

Time End of Test #2

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

7.68'

APPENDIX A

Slug Test Data Form

Page __ of __

FIGURE 1. Slug Test Data Form

DATE: 10/25/06

SITE ID: CHIMBOR VENTURES

SLUG VOLUME (ft³): _____

LOCATION ID: G-7D

LOGGER: JUS

TEST METHOD: _____ SLUG INJECTION _____ SLUG WITHDRAWAL

COMMENTS: TRANSducer @ 25' DGS

PROB 13.50 DLW H₂O LINE

Time Beginning of Test #1 _____

Time Beginning of Test #2 _____

Time End of Test #1 _____

Time End of Test #2 _____

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

12.15

APPENDIX A

Slug Test Data Form

Page __ of __

FIGURE 1. Slug Test Data Form

DATE: 10/24/06
SITE ID: CHINOOK VENTURES SLUG VOLUME (ft³): _____
LOCATION ID: R10 LOGGER: J05
TEST METHOD: _____ SLUG INJECTION _____ SLUG WITHDRAWAL
COMMENTS: TRANSDUCER @ 18'

R.H. 10.91' DLW H₂O LEVEL

Time Beginning of Test #1 _____ Time Beginning of Test #2 _____
Time End of Test #1 _____ Time End of Test #2 _____

ELAPSED TIME (MIN)	DEPTH TO WATER (FT)	ELAPSED TIME (MIN)	DEPTH TO WATER (FT)
--------------------	---------------------	--------------------	---------------------

9.97

STOPPED F.H. TEST BEFORE EQUILIBRIUM. TUBING IN HOLE PULLED PRIOR TO SLUG TEST AFFECTED STATIC H₂O LEVEL. PULLED TUBING LET SIT FOR 15 MIN. TO EQUILIBRATE. HIGH PROBABILITY THAT STATIC H₂O LEVEL WAS NOT REACHED BEFORE SLUG TEST STARTED. THE 10.91' (PROBE DLW H₂O LINE) IS PROBABLY CLOSE TO STATIC H₂O LEVEL AND NOT 29.7 (PROBE DLW H₂O LINE) WHEN F.H TEST WAS STARTED

APPENDIX A

Slug Test Data Form

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FIGURE 1. Slug Test Data Form

DATE: 10/24

SITE ID: CHINOOK VENTURES

SLUG VOLUME (ft³): _____

LOCATION ID: G-4D

LOGGER: JOS

TEST METHOD: SLUG INJECTION SLUG WITHDRAWAL

COMMENTS: TRANSDUCER @ 10' BFD

Time Beginning of Test #1 _____

Time Beginning of Test #2 _____

Time End of Test #1 _____

Time End of Test #2 _____

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

5.50

SEE NOTE FOR R-ID

APPENDIX A

Slug Test Data Form

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FIGURE 1. Slug Test Data Form

DATE: 10/23

SITE ID: CHINOOK VENTURES

SLUG VOLUME (ft³): _____

LOCATION ID: G-3D

LOGGER: JSS

TEST METHOD: _____ SLUG INJECTION _____ SLUG WITHDRAWAL

COMMENTS: TRANSDUCER 18' BGS

11.66 PROBE Bw H₂O

Time Beginning of Test #1 _____

Time Beginning of Test #2 _____

Time End of Test #1 _____

Time End of Test #2 _____

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

6.97

APPENDIX A

Slug Test Data Form

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FIGURE 1. Slug Test Data Form

DATE: 10/23/06

SITE ID: CHINOOK VENTURES

SLUG VOLUME (ft³): _____

LOCATION ID: G6-D

LOGGER: JJS

TEST METHOD:

SLUG INJECTION

SLUG WITHDRAWAL

COMMENTS: TRANSDUCER 35'

12.92 PROBE BLW H₂O

Time Beginning of Test #1 _____

Time Beginning of Test #2 _____

Time End of Test #1 _____

Time End of Test #2 _____

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

22.59

APPENDIX A

Slug Test Data Form

FIGURE 1. Slug Test Data Form

DATE: 10/23/06

SITE ID: CHINOOK VENTURES

SLUG VOLUME (ft³): _____

LOCATION ID: RL-4D

LOGGER: JOS

TEST METHOD: _____ SLUG INJECTION _____ SLUG WITHDRAWAL

COMMENTS: TRANS DUCEL @ 20'

HAD TO USE 3' 1/2" D. SLUG CASING NOT 2"

11.2' ~~WATER~~ PROBE BLW H₂O

Time Beginning of Test #1 _____

Time Beginning of Test #2 _____

Time End of Test #1 _____

Time End of Test #2 _____

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

ELAPSED TIME
(MIN)

DEPTH TO
WATER (FT)

9.79

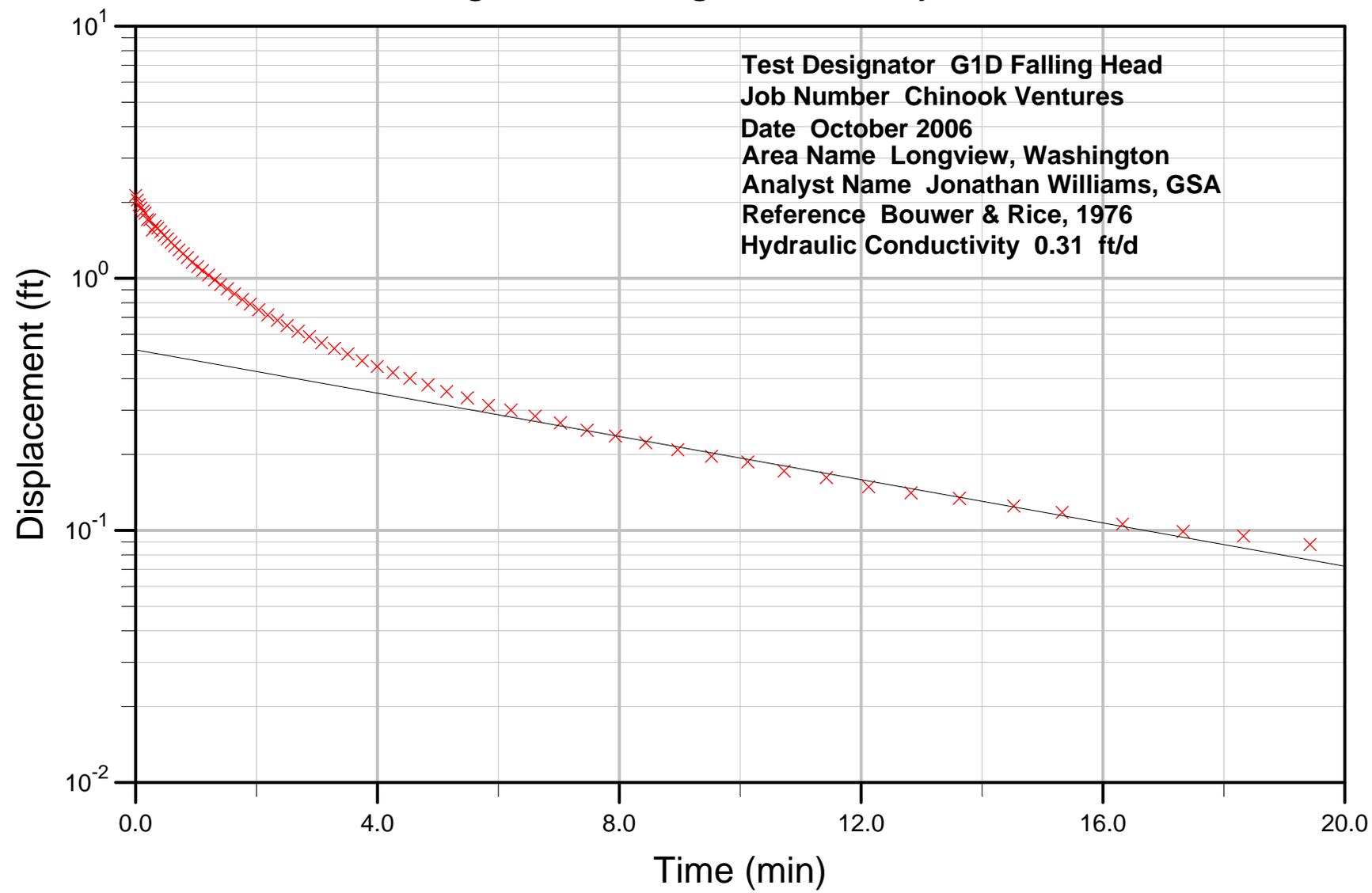
Table
Hydraulic Conductivity Estimates Based on Slug Testing Completed in October 2006
Chinook Ventures Site
Longview, Washington

Well ID.	Lithologic Description of Screened Interval	Method of Analysis	Hydraulic Conductivity (ft/day)	Hydraulic Conductivity (cm/sec)
G1D	Clay, silty clay	Bouwer & Rice, Falling Head	0.31	1.1E-04
		Bouwer & Rice, Rising Head	0.11	3.9E-05
G2D	Silty sand, sandy silt	Bouwer & Rice, Falling Head	0.30	1.1E-04
		Bouwer & Rice, Rising Head	0.27	9.5E-05
G3D	Silty sand	Bouwer & Rice, Falling Head	2.4	8.5E-04
		Bouwer & Rice, Rising Head	2.7	9.5E-04
G4D	Silt	Bouwer & Rice, Falling Head	0.0034	1.2E-06
		No Rising Head Test	--	--
G5D	Sand	Bouwer & Rice, Falling Head	16	5.6E-03
		Bouwer & Rice, Rising Head	11	3.9E-03
G6D	Sand	Bouwer & Rice, Falling Head	3.3	1.2E-03
		Bouwer & Rice, Rising Head	3.7	1.3E-03
G7D	Silt	Bouwer & Rice, Falling Head	0.0053	1.9E-06
		No Rising Head Test	--	--
R1D	Sandy silt, sandy silt with clay	Bouwer & Rice, Falling Head	0.0053	1.9E-06
		Bouwer & Rice, Rising Head	0.012	4.2E-06
RL-3D	Clayey silt, sand	Bouwer & Rice, Falling Head	0.0025	8.8E-07
		No Rising Head Test	--	--
RL-4D	Sandy silt	Bouwer & Rice, Falling Head	0.26	9.2E-05
		Bouwer & Rice, Rising Head	0.30	1.1E-04
Geometric Mean of Hydraulic Conductivity =			0.22	7.9E-05

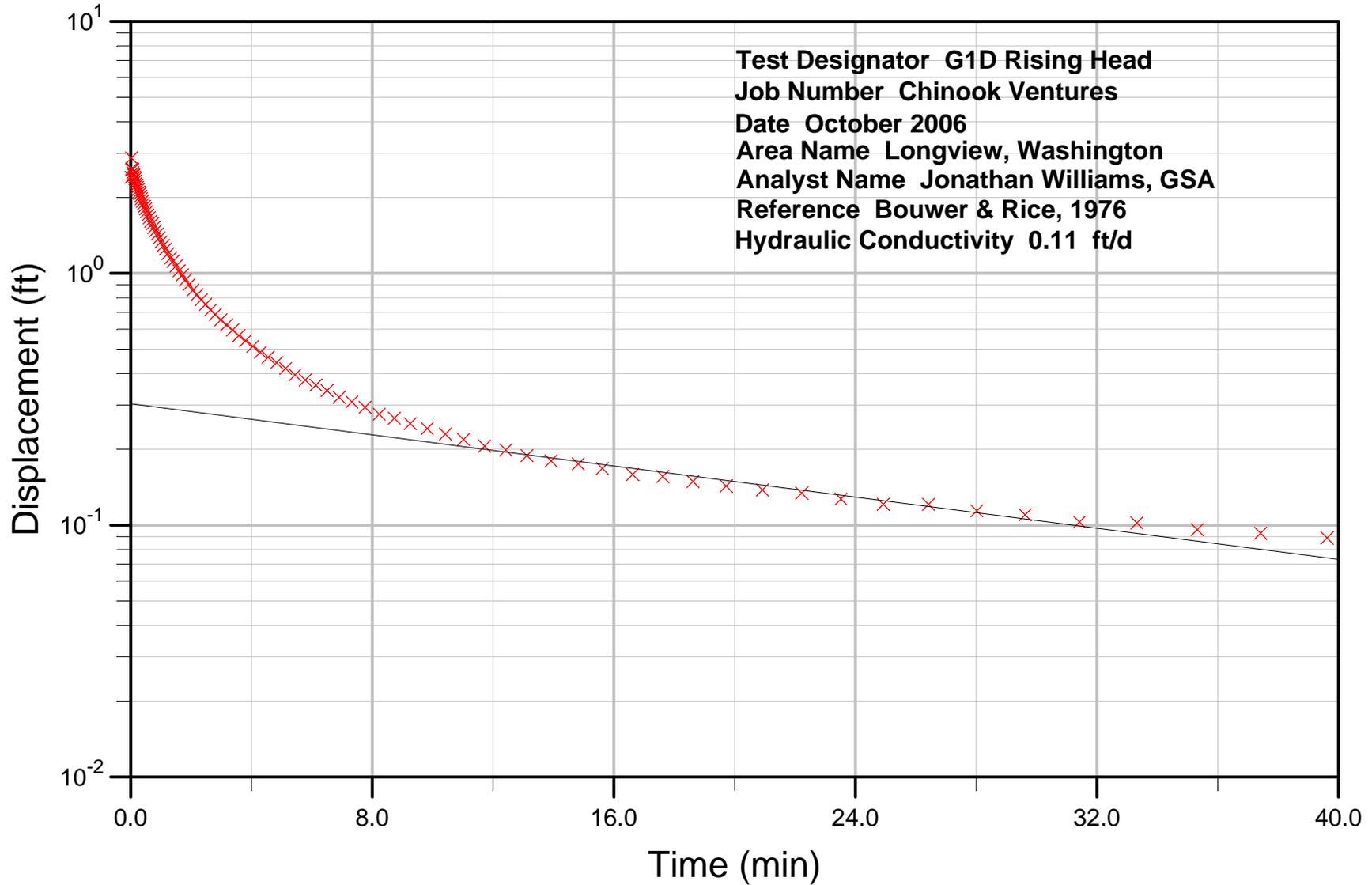
Notes: No Rising Head Test = No rising head test performed due to long recovery time observed during falling head test
ft/day = feet per day
cm/sec = centimeters per second

G1D Falling Head Slug Test Analysis, Manual Fit

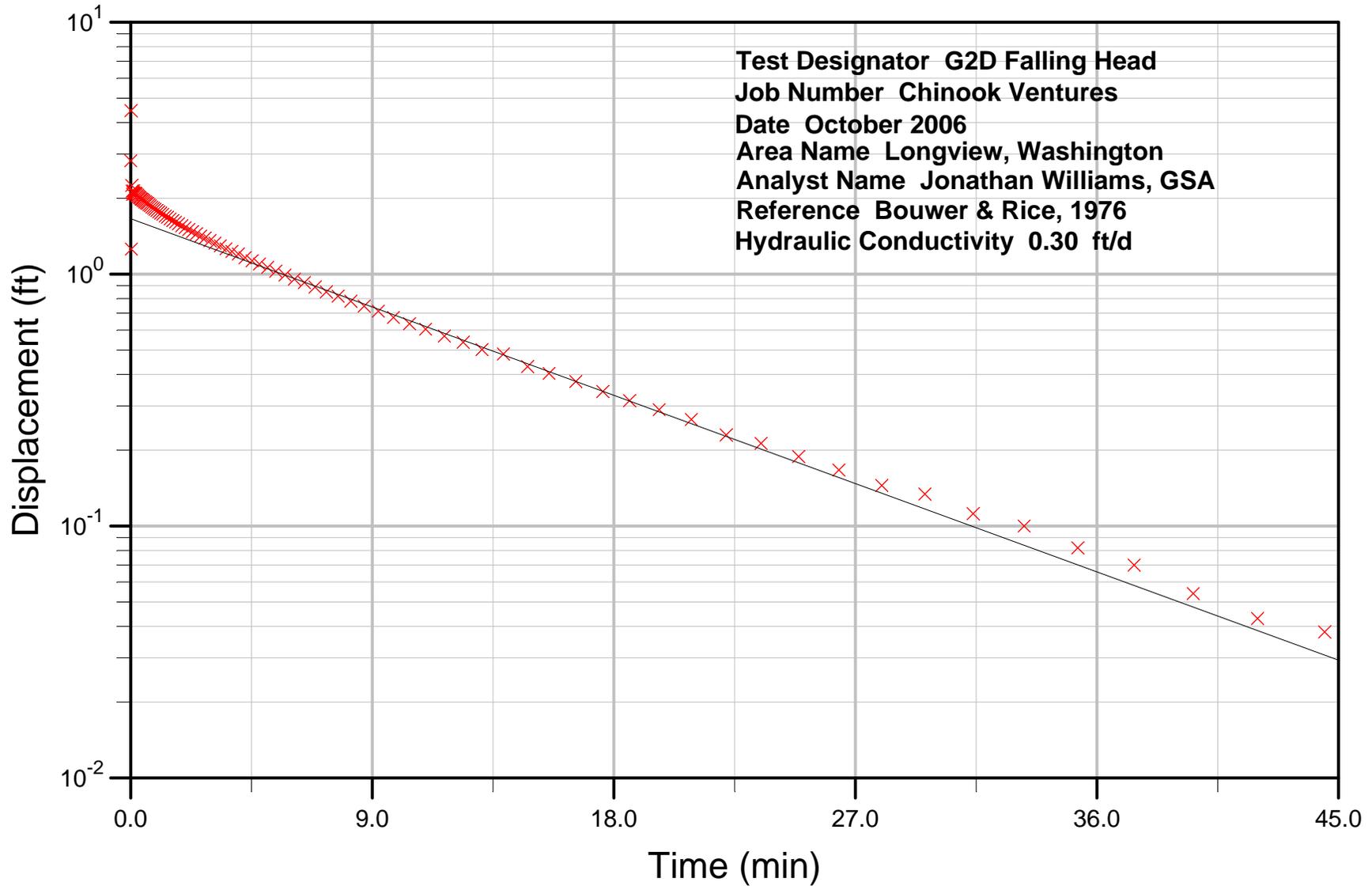
Test Designator G1D Falling Head
Job Number Chinook Ventures
Date October 2006
Area Name Longview, Washington
Analyst Name Jonathan Williams, GSA
Reference Bouwer & Rice, 1976
Hydraulic Conductivity 0.31 ft/d



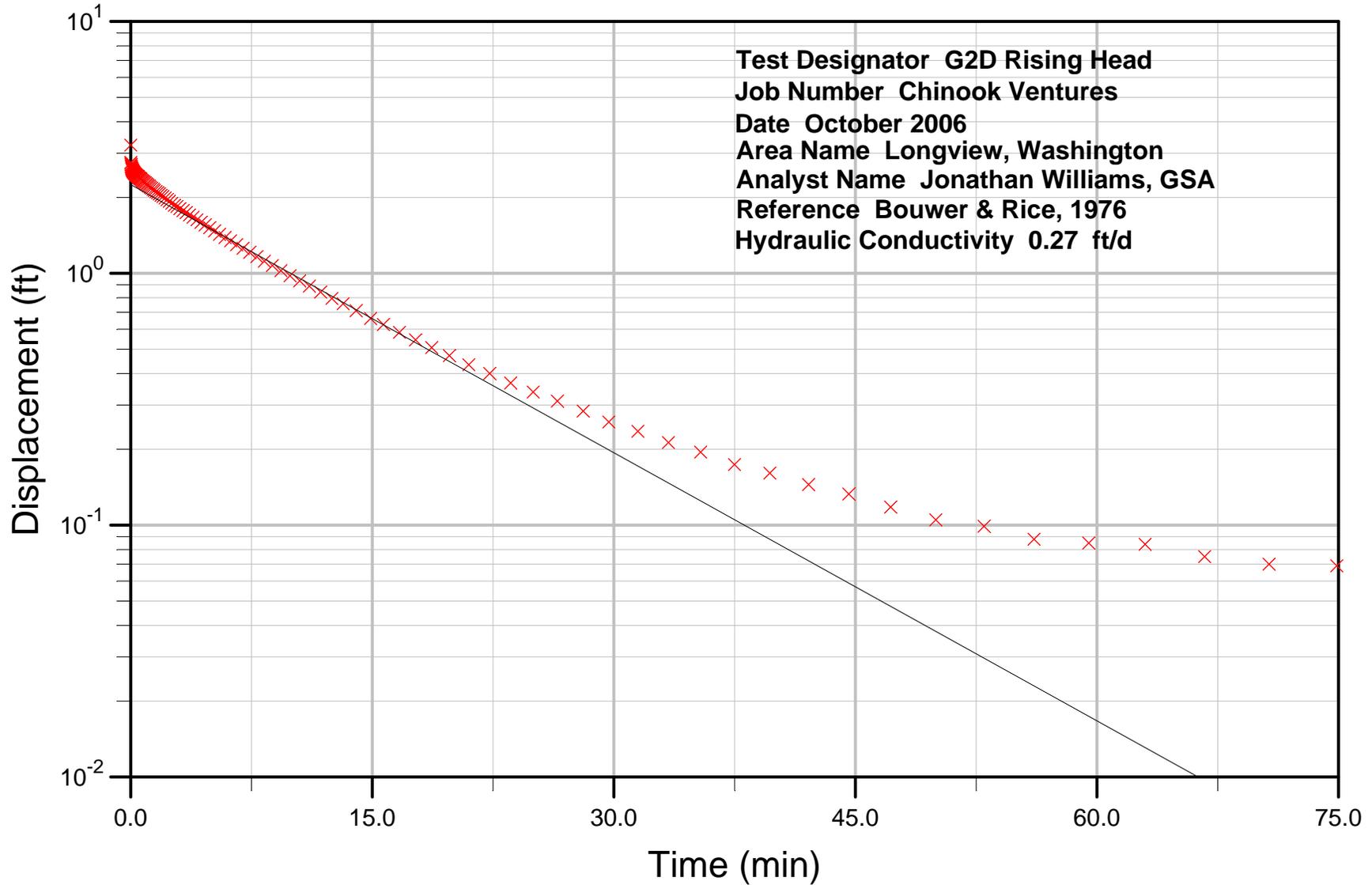
G1D Rising Head Slug Test Analysis, Manual Fit



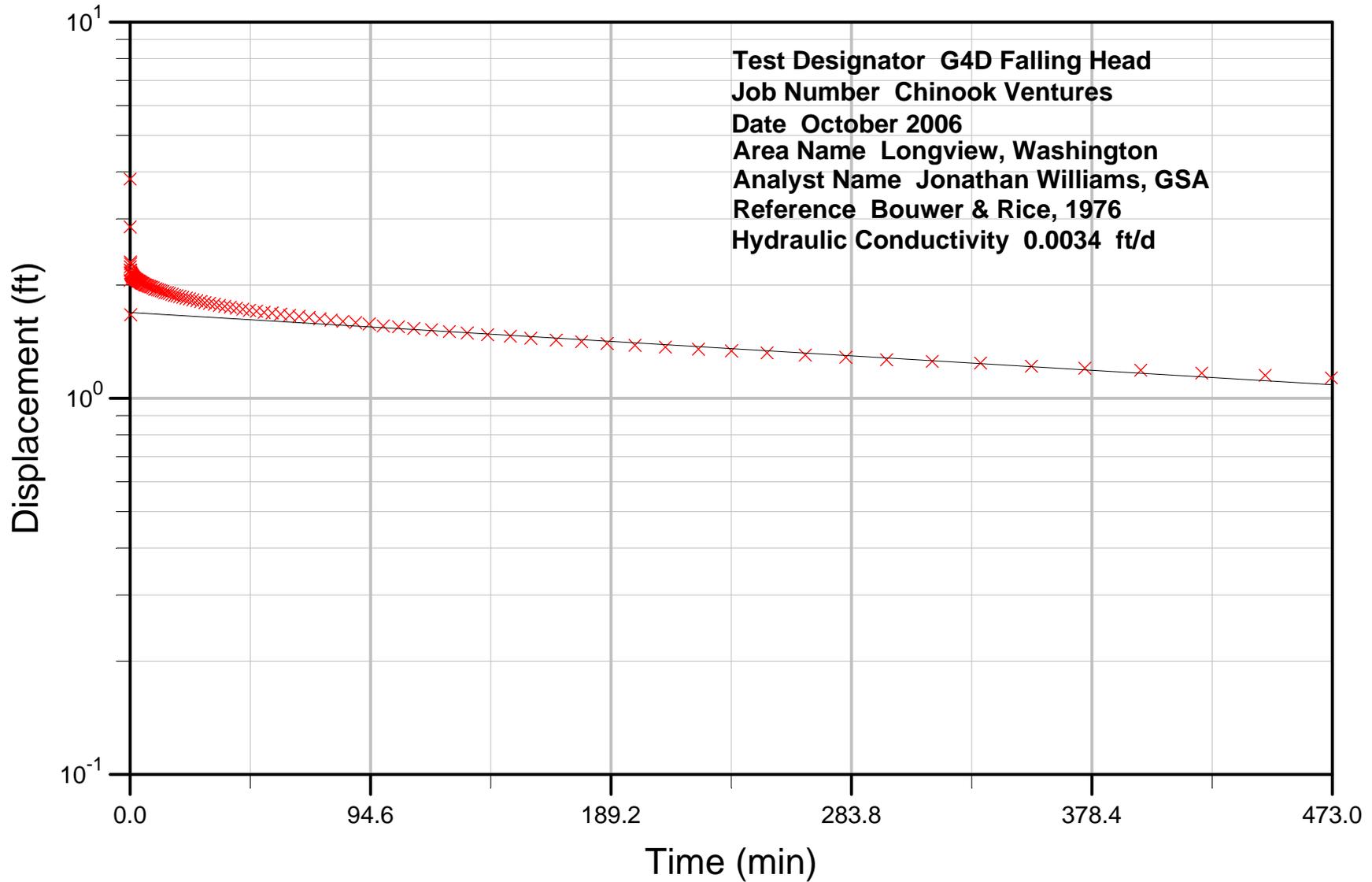
G2D Falling Head Slug Test Analysis, Manual Fit



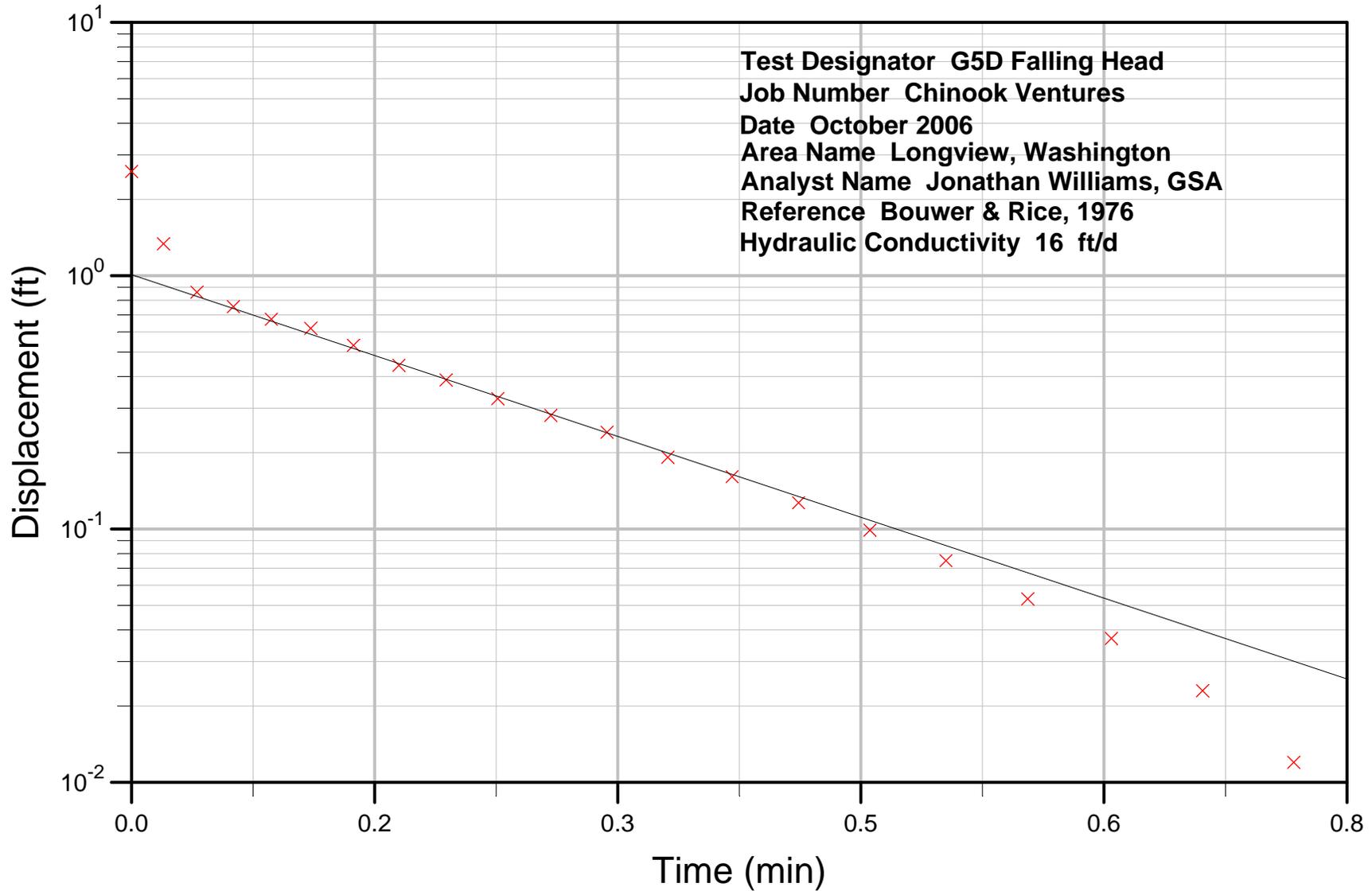
G2D Rising Head Slug Test Analysis, Manual Fit



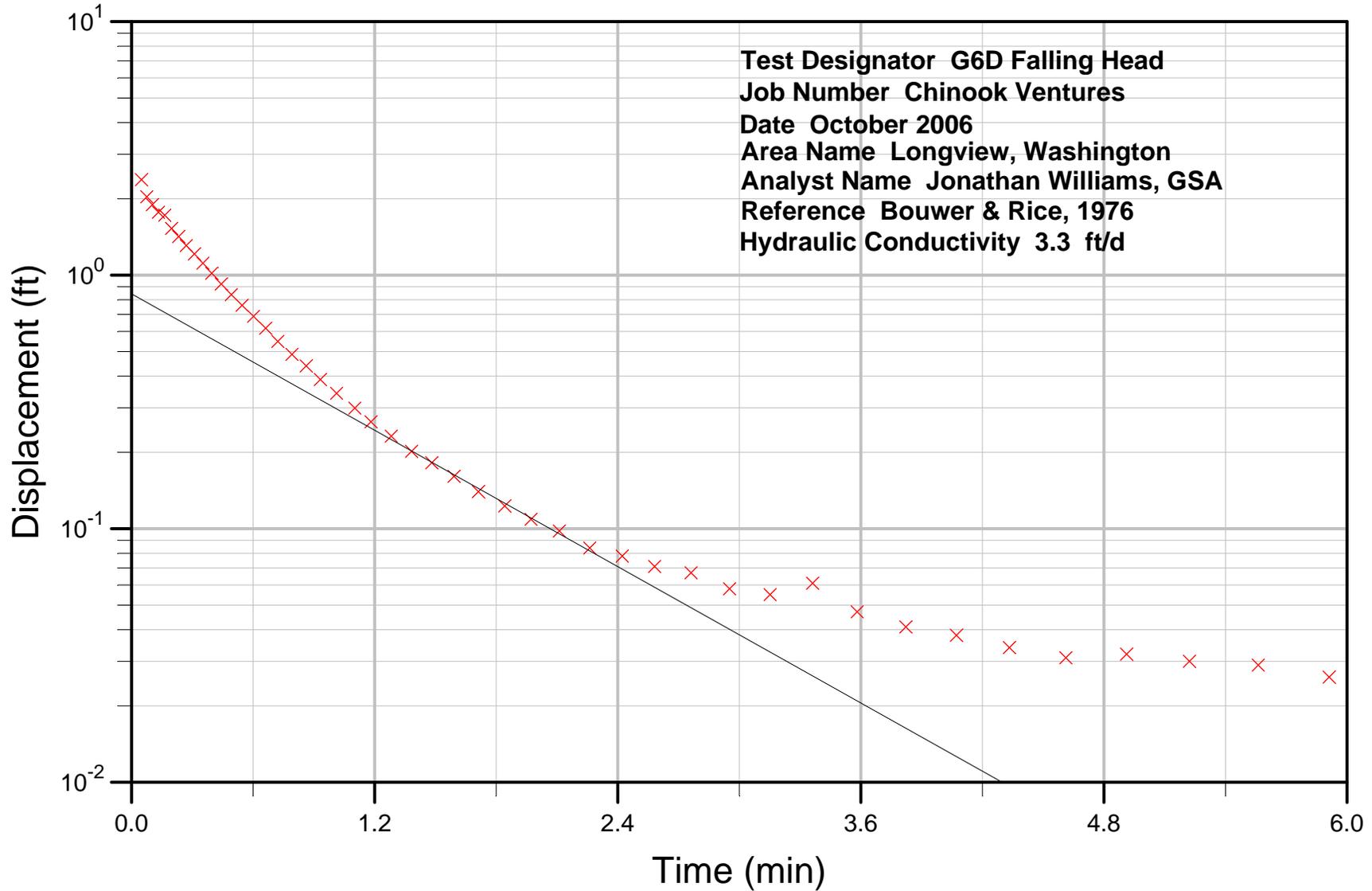
G4D Falling Head Slug Test Analysis, Manual Fit



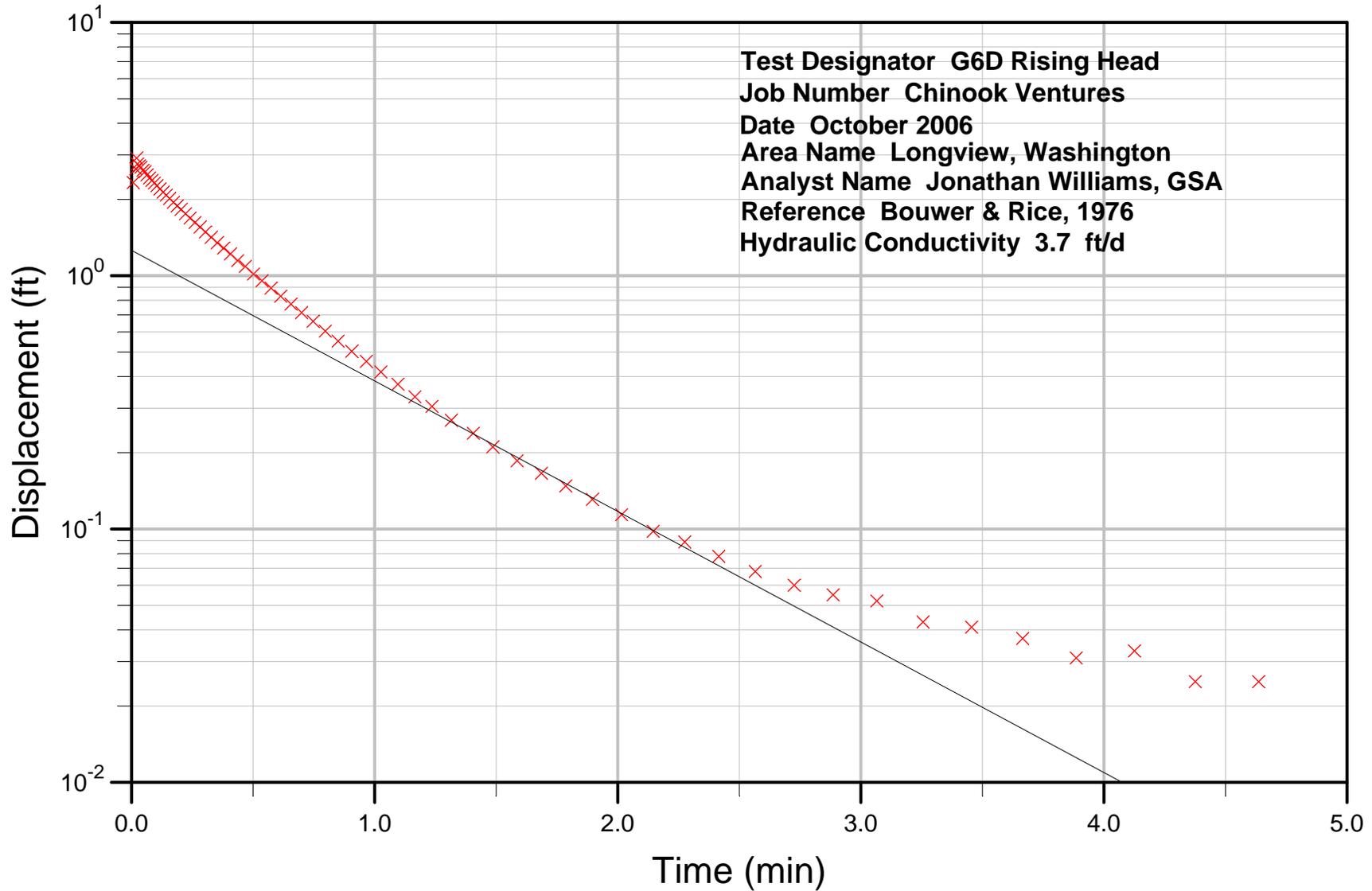
G5D Falling Head Slug Test Analysis, Manual Fit



G6D Falling Head Slug Test Analysis, Manual Fit

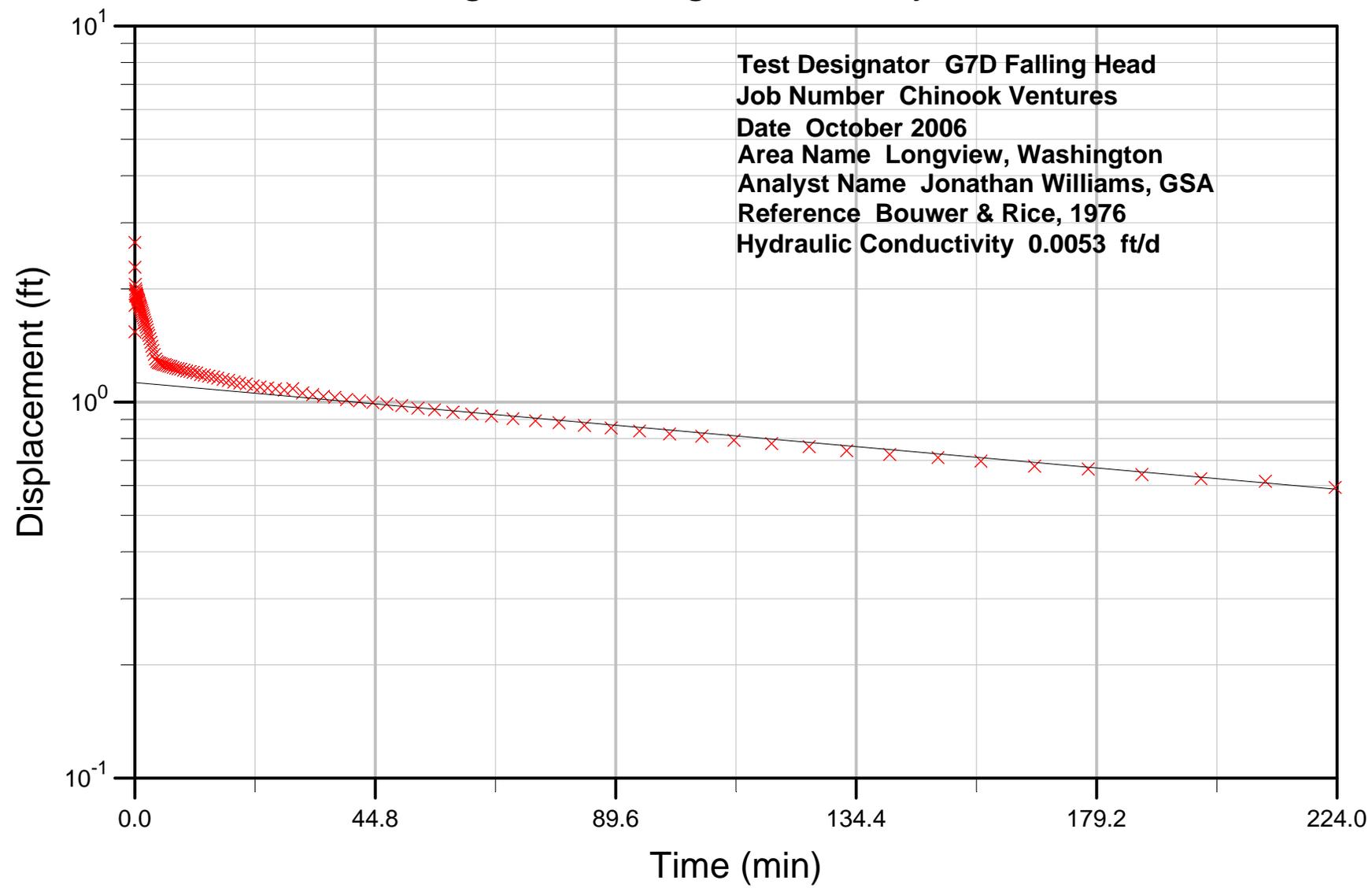


G6D Rising Head Slug Test Analysis, Manual Fit

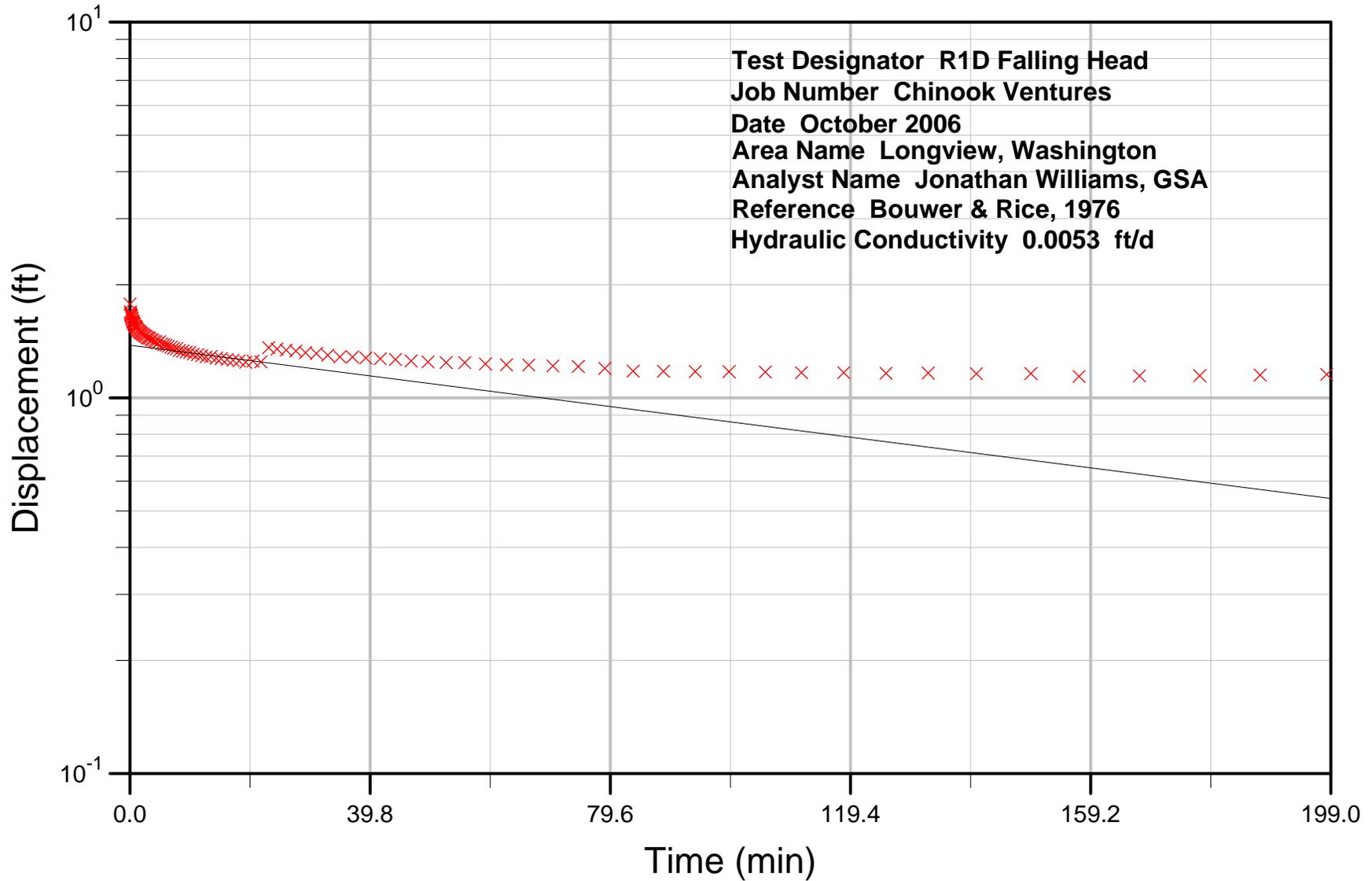


G7D Falling Head Slug Test Analysis, Manual Fit

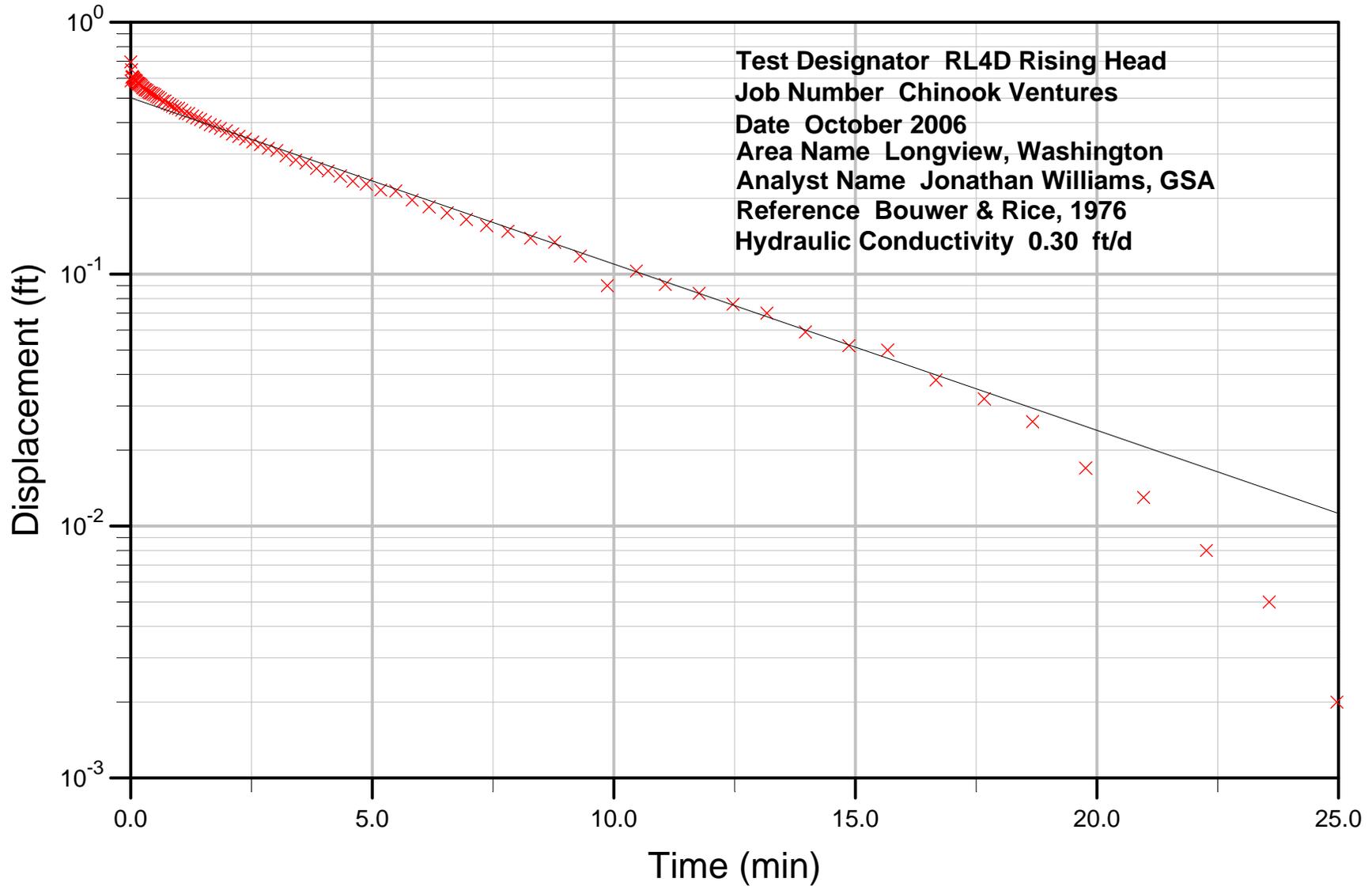
Test Designator G7D Falling Head
Job Number Chinook Ventures
Date October 2006
Area Name Longview, Washington
Analyst Name Jonathan Williams, GSA
Reference Bouwer & Rice, 1976
Hydraulic Conductivity 0.0053 ft/d



R1D Falling Head Slug Test Analysis, Manual Fit



RL4D Rising Head Slug Test Analysis, Manual Fit



APPENDIX D-3
AERIAL PHOTOGRAPHS

As requested, I reviewed historical aerial photographs that included the former Longview Reduction Plant property that is located across Industrial Way from the reduction plant proper. This property is primarily vacant land, although the building previously occupied by the Reynolds Credit Union is located on one corner of the property, and a softball field is also located on the property. The photographs were reviewed to look for past industrial activity and storage piles on the property over time.

No industrial activities were visible in the aerial photographs. Earth moving activity occurred on the property during the construction of the North Plant, and during construction of a baseball field. One area of interest was noted in the NE corner of the property in the 6/29/74 and 9/29/80 photographs.

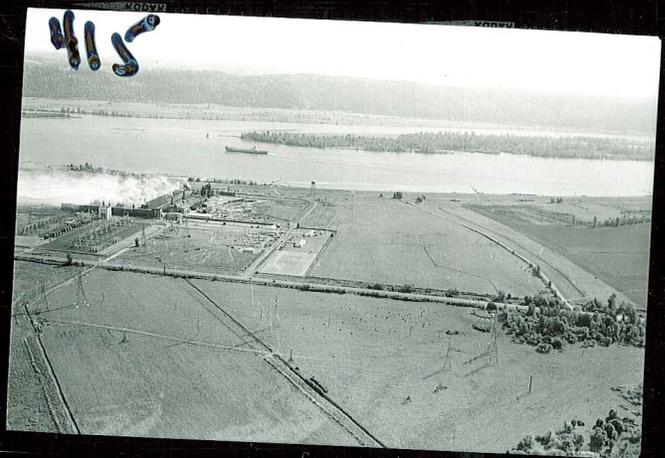
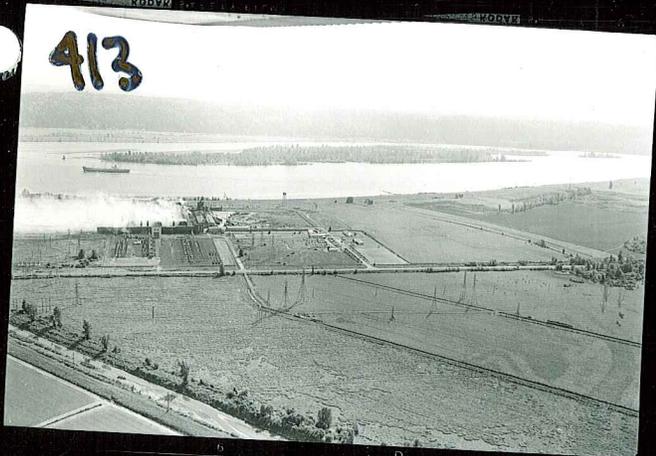
The photographs reviewed included the following:

<u>Photo Date</u>	<u>Photo Identification / Comment on Content</u>
5/19/66	Pictures # 412 through #415, in binder labeled "Reynolds Vol. 1." Shows area of North Plant construction and subject property before construction began.
9/13/66	Picture # 449, in binder labeled "Progress Photos – Sep.-Oct. 66." Shows earth-moving activity on property during construction.
9/22/66	Picture # 461, in binder labeled "Progress Photos – Sep.-Oct. 66." Shows earth-moving activity on property during construction.
8/22/67	Pictures # 918 and # 921, in binder labeled "Reynolds Vol. 3." Shows property after passage of time following earth-moving activity.
11/10/67	Pictures # 51 and # 53, in binder labeled "Reynolds Vol. 4." Shows property after passage of time following earth-moving activity.
1/1/68	Pictures # 203 through # 210, in binder labeled "Reynolds Vol. 4." Shows property after passage of time following earth-moving activity.
7/8/69	Pictures # 776 and # 777, in binder labeled "Reynolds Vol. 5." Shows property after passage of time following earth-moving activity.
6/29/74	Picture marked SW-74 36.7 Large black and white poster size print. Origin unknown. Shows a somewhat circular area of different appearance than surrounding area. This area is located in the vicinity of the NE corner of the property. Since the photo is black and white, the color of the area is unknown,

making it infeasible to assess whether the noted area is soil or another material.

<u>Photo Date</u>	<u>Photo Identification / Comment on Content</u>
7/7/75	Picture # 1328, in binder labeled "Reynolds Vol. 10." Small 2" X 2" photo. Shows property after passage of time.
9/29/80	Picture # 45 -Jan Fardell. In manila envelope with Reynolds photo binders. Shows property after baseball field construction. A somewhat semi-circular area of a brownish color appears in the NE corner of the property in the general vicinity of the area noted in the 6/29/74 photo. Area may have been a "borrow" area for fill used in construction of the baseball field, thus accounting for the earth color.
7/7/93	Bergman Photo Services Inc. File No.V5226. (503) 239-6010. Large poster size print. Shows property after passage of time. Considerable vegetation growth since last photo date.
Summer 2003	Prepared by Cowlitz County GIS Dept. Large poster size print/map Actual date of aerial photos used by GIS Dept. isn't known. Shows property after passage of time. After plant shutdown. Considerable vegetation growth since last photo date.
Aug.-Sep. 2005	Prepared by Cowlitz County GIS Dept. Large poster size print/map Actual date of aerial photos used by GIS Dept. isn't known. Shows property after passage of time. After plant shutdown.





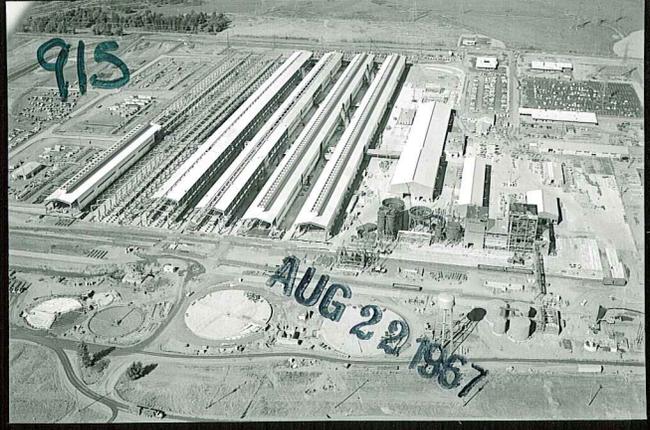






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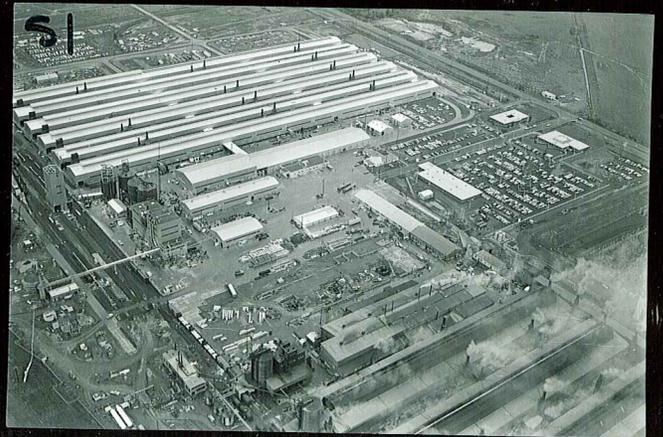
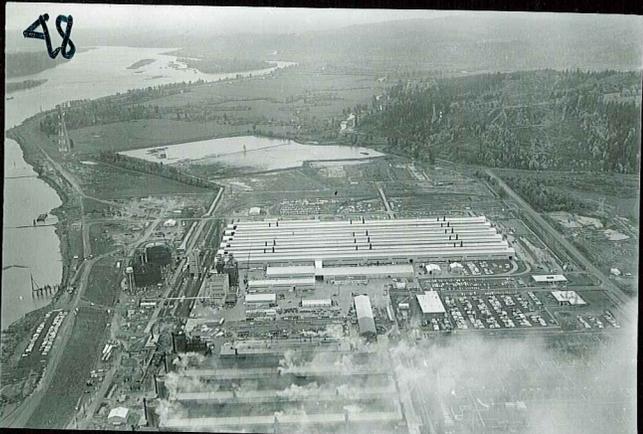
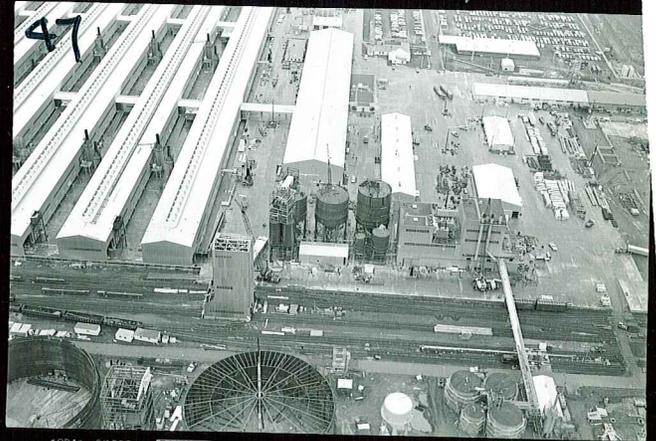
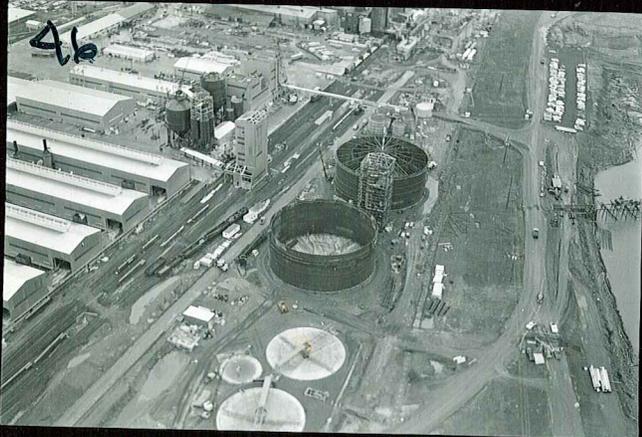
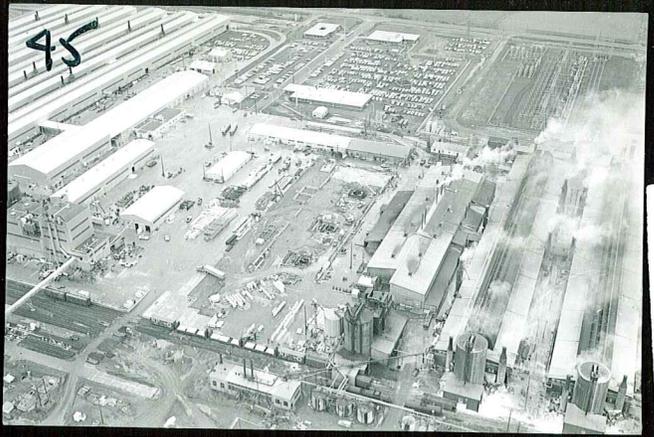


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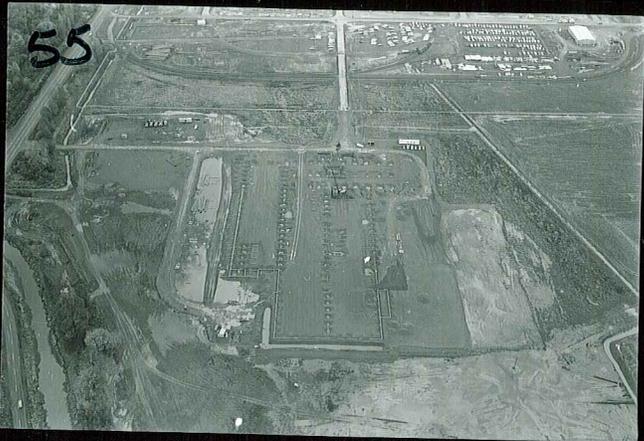
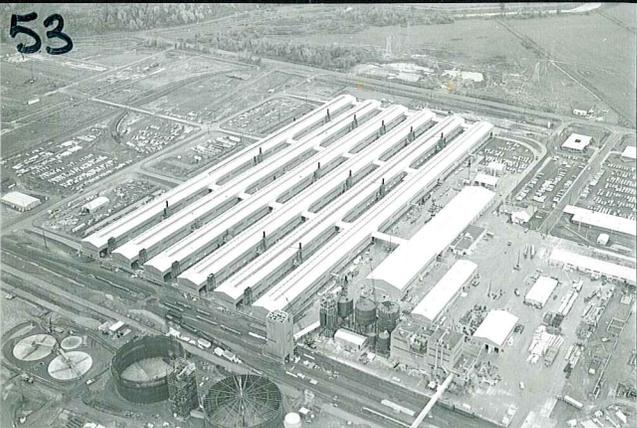


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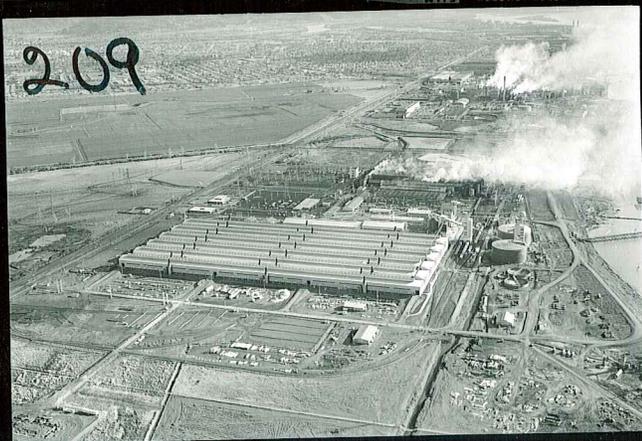
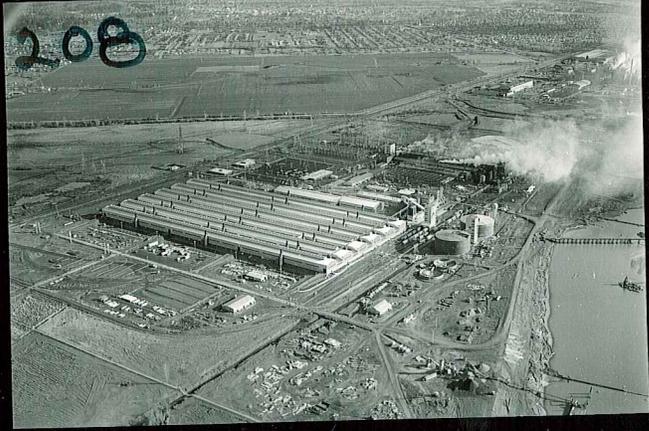
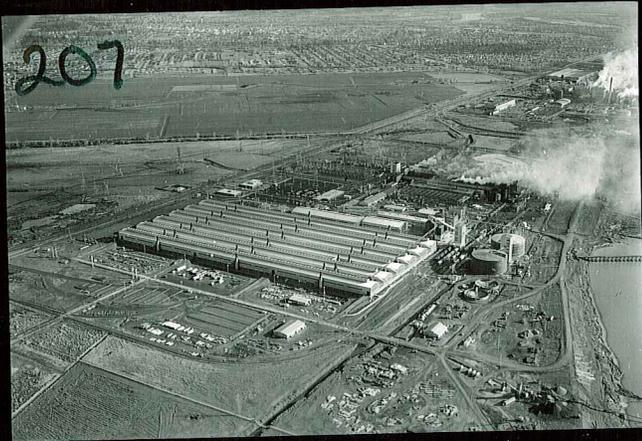
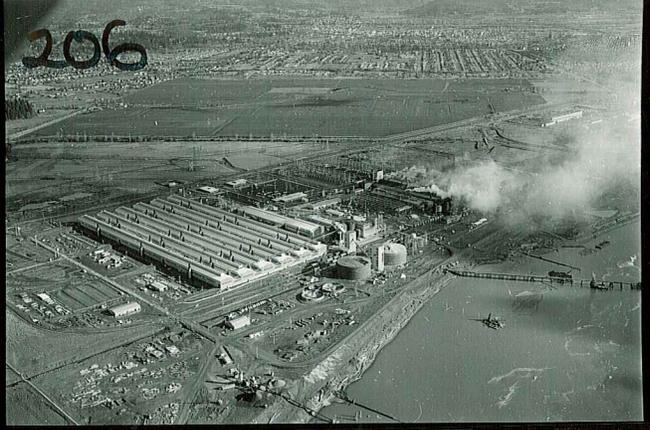
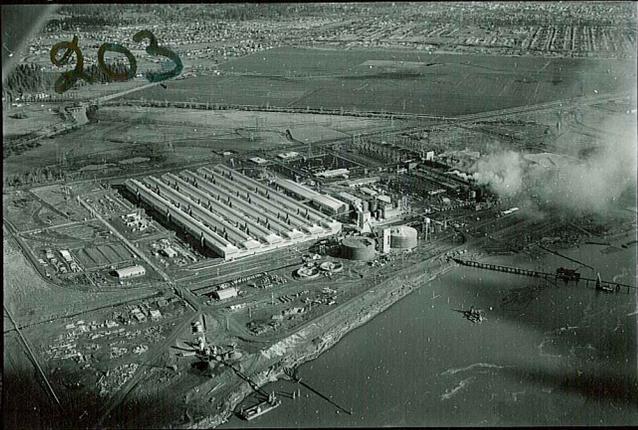
KODAK SAFETY FILM

KODAK SAFETY FILM

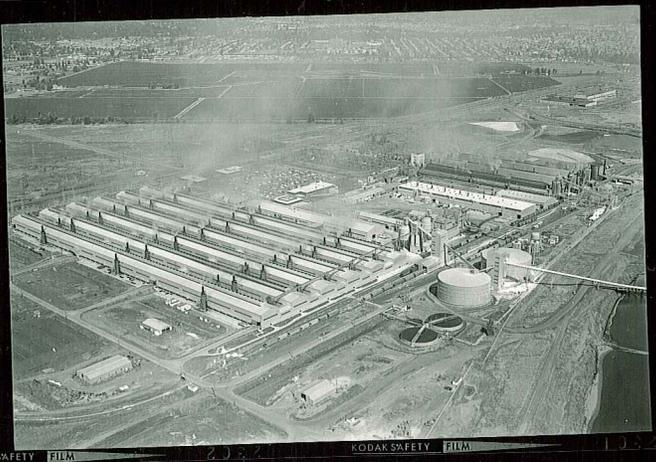
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APPENDIX D-4
SUMMARY TABLES

Summary of Exploratory Test Pits: February 2012

Area and Test Pit	Number of test pits	Horizontal Delineation (Y/N)	Maximum Depth of Material (ft bgs)	Overburden (sand fill) Depth (ft bgs)	Material Description ^{1,2}	Notes ^{1,2}
Fill Deposit B-2 (Residual Carbon)						
TP-J	1	Y	None present	4	N/A	No black silt observed; fill contained trace brick fragments.
TP-K	1	N	8	--	Black silt mixed with fill	Fill contains sand and gravel; no black silt below 8 ft bgs.
TP-L	1	N	5	1.5	Black silt	Native clay at 5 ft bgs.
TP-M	1	Y	2	--	Black silt mixed with fill	Eastern edge of fill deposit - black silt only on west side of pit; black silt underlain by fill (silt, sand & gravel).
TP-R	1	Assumed Y	4	1.5	Black silt with thin white silt (white and gray) interbeds	Likely eastern edge of fill deposit - couldn't move east due to utilities. Native clay at 4 ft bgs.
TP-Q	1	N	6	3 - 5.25	Black silt with trace gray layers	West side of pit (under GC-LY-01): black silt at 5.25-6 ft bgs; east side has black silt at 3-6 ft bgs; native clay at 6 ft bgs.
TP-P	1	Y	7	1.5	Carbon (1.5-3 ft bgs); black & white silt (4-7 ft bgs)	Western edge of fill deposit; black and white silt pockets at 4-7 ft bgs - only in east side of pit.
TP-U	1	Y	4	--	Debris (0-4 ft); white silt at 1 ft bgs	Eastern edge of fill deposit; fill contains bricks, pipes, wood, etc., and occasional pockets of white material at 1 ft bgs (on west side of pit only). Native clay at 4 ft bgs.
TP-T	1	Y	None present	3.5	N/A	No black silt observed; native clay at 3.5 ft bgs.
TP-S	1	Y	None present	4	N/A	No black silt observed; fill sand to 4 ft bgs.
Former Stockpile Area						
TP-V	1	--	None present	6	N/A	No debris or black silt observed; gravel & sand to 6 ft bgs. Native clay at 6 ft bgs.
TP-W	1	--	2.5	--	Debris in fill (0-2.5 ft bgs)	Fill with debris (bricks, rebar, concrete); native clay at 4.5 ft bgs.
Fill Deposit B-3 (Residual Carbon)						
TP-B	2	Y	0.5 - 2	0.5	Black silt	Northern edge of fill deposit; wedge of black silt thins toward northern edge of pit; overlain and underlain by silty f-sand.
TP-A	3	Y	3	1	Black silt	Western and northern edges (corner) of fill deposit; wedge of black silt thins toward road (west). No black silt in northern pit.
TP-G	3	Y	4	1.5	Black silt; debris	Southern edge of fill deposit; black silt is mixed with debris (concrete; metals scrap; bricks); large boulders at 4 ft bgs (base of deposit) - wedge thins to 0.5 inches thick in southern pit.
TP-F	2	Y	5	1	Black silt	Southern edge of fill deposit; black silt deposit thins to 1 ft thick (at 1-2 ft bgs) in southern pit; native clay underlies black silt.
TP-E	2	Y	4	1	Black silt	Eastern edge of fill deposit is 2 ft from fence line; black silt deposit pinches out in eastern test pit; underlain by clay.
TP-D	4	Y	3.5	1.5	Black silt	NE corner of black silt deposit; black silt pinches out in eastern pit; no black silt in two northern pits (by rail).
TP-C	2	Y	2.5	0.5	Black silt	Northern edge of fill deposit; no black silt in northern pit.
Landfill #2 (Industrial)						
TP-I	2	N	8	1.5	Black silt	Debris fill sits 0-8 ft ags; fill 0-1.5 ft bgs; black silt with trace metal scraps, pipes (in top 1 ft) at 1.5-8 ft bgs. Clay at 8 ft bgs.
TP-H	3	N	9	1.5	Black silt	Debris fill sits 0-8 ft ags; fill sand at 0-1.5 ft bgs; black silt with trace white mottling at 1.5-9 ft bgs. Clay at 9 ft bgs.

Notes:

1. "Black silt" refers to residual carbon. 2. "White silt" refers to spent lime.
Y/N = yes/no ags = above ground surface bgs = below ground surface ft = feet

Groundwater Monitoring Well Construction Information

Well/ Piezometer Number	Easting*	Northing*	Construction	Total Depth of Borehole (ft bgs)	Borehole Diameter (inches)	Screen Slot Size (inches)	Steel Casing Stickup (ft ags)	PVC Casing Stickup (ft ags)	Sand pack Interval (ft bgs)	Screened Interval (ft bgs)	Screened Interval Elevation (ft NAVD88)	Measuring Point Elevation** (Top of PVC Casing) (ft NAVD88)	Ground Surface Elevation (ft NAVD88)
R 1D	1007697.12	302582.4	2-inch PVC	24	--	0.010	0.90	0.79	--	20-24	-3.18-(-7.18)	17.69	16.82
R 1S	1007703.79	302575.97	2-inch PVC	12	--	0.010	0.47	0.30	--	7-12	9.84-4.84	17.13	16.84
R 2	1008794.48	303565.6	2-inch PVC	14	--	0.010	2.05	1.63	--	9-14	-1.22-(-6.22)	9.37	7.78
R 3	1008030.74	302689.09	2-inch PVC	24	--	0.010	0.54	0.39	--	19-24	-6.26-(-11.26)	13.15	12.74
R 4D	1007916.23	302368.85	2-inch PVC	27	--	0.010	1.14	0.97	--	23-27	-4.83-(-8.83)	18.97	18.17
R 4S	1007914.58	302370.26	2-inch PVC	19	--	0.010	1.07	0.94	--	14-19	4.03-(-0.97)	18.82	18.03
RL-1D	1003078.65	305242.58	2-inch PVC	38	--	0.010	1.92	1.77	--	28-38	-16.96-(-26.96)	12.61	11.04
RL-1S	1003078.7	305242.74	2-inch PVC	17	--	0.010	1.96	1.83	--	8-18	2.95-(-7.05)	12.57	10.95
RL-2D	1003090.83	306914.68	2-inch PVC	33	--	0.010	2.00	1.93	--	23-33	-13.87-(-23.87)	10.89	9.13
RL-2S	1003087.21	306911.05	2-inch PVC	17.5	--	0.010	2.66	2.45	--	7.5-17.5	1.38-(-8.62)	11.35	8.88
RL-3D	1004052.27	305291.42	2-inch PVC	38	--	0.010	2.45	2.35	--	23-38	-17.27-(-27.27)	12.97	10.73
RL-3S	1004055.78	305291.95	2-inch PVC	17.5	--	0.010	2.59	2.33	--	7.5-17.5	3.41-(-6.59)	13.03	10.91
RL-4D	1006236.7	305658.02	2-inch PVC	35	--	0.010	1.39	1.28	--	25-35	-12.47-(-22.47)	14.03***	12.53
RL-4S	1006242.94	305652.76	2-inch PVC	13.5	--	0.010	1.70	1.58	--	8.5-13.5	3.83-(-1.17)	14.26***	12.33
RL-5	1004098.84	306842.49	2-inch PVC	22	--	0.010	3.42	3.24	--	12-22	2.4-(-7.60)	17.68	14.40
RLSW1	1004328.55	305045.01	1.5-inch PVC	18	--	0.010	1.91	1.77	--	9-18	5.3-(-3.7)	16.24	14.30
RLSW2	1004130.45	305041.6	1.5-inch PVC	18	--	0.010	2.02	2.02	--	9-18	6.96-(-2.04)	17.82	15.96
RLSW3	1003879.21	305040.25	1.5-inch PVC	18	--	0.010	1.75	1.48	--	9-18	5.24-(-3.76)	15.30	14.24
RLSW4	1004014.08	304416.09	1.5-inch PVC	28.5	--	0.010	1.69	1.51	--	18-28.5	10.17-(-0.33)	29.55	28.17
PZ-1	1008299.05	302744.72	2-inch PVC	13.7	--	0.010	2.96	2.58	--	8.6-13	6.26-1.86	17.53	14.86
PZ-2	1008300.8	302751.01	2-inch PVC	25.3	--	0.010	3.15	2.48	--	20.2-24.6	-5.62-(-10.02)	17.06	14.58
PZ-3	1008251.97	302972.98	2-inch PVC	10.3	--	0.010	3.10	2.73	--	5.1-9.5	7.91-3.51	15.66	13.01
PZ-4	1008584.21	303050.14	2-inch PVC	18.2	--	0.010	3.14	2.74	--	13-17.4	-1.61-(-6.01)	14.04	11.39
PZ-5	1007993.58	302595.68	2-inch PVC	23.5	--	0.010	2.61	1.99	--	18.4-22.8	-6.17-(-10.57)	14.33	12.23
PZ-6	1002978.72	306391.57	2-inch PVC	12.6	--	0.010	2.99	2.52	--	7.5-11.9	-0.49-(-4.89)	9.43	7.01
PZ-7	1002976.47	305858.71	2-inch PVC	18.6	--	0.010	3.06	2.63	--	8.4-17.8	1.84-(-7.56)	13.08	10.24
G1-D	1008426.65	301724.96	2-inch PVC	34.5	8 3/4 OD / 4 1/4 ID	0.010	--	2.57	27-33.5	28-33	-0.96-(-5.96)	29.61	27.04
G1-S	1008434.98	301735.48	2-inch PVC	8	8 3/4 OD / 4 1/4 ID	0.010	--	2.49	2-8	3-8	24.18-19.18	29.67	27.18
G2-D	1008676.2	302086.19	2-inch PVC	25	8 1/2 OD / 4 1/4 ID	0.010	--	2.82	18.5-25	20-25	-4.73-(-9.73)	18.09	15.27
G2-S	1008669.75	302089.07	2-inch PVC	10	8 1/2 OD / 4 1/4 ID	0.010	--	2.77	4.75-10	5-10	10.37-5.37	18.14	15.37
G3-D	1009095.1	302362.57	2-inch PVC	28	8 1/2 OD / 4 1/4 ID	0.010	--	2.78	21.5-28	23-28	-9.59-(-14.59)	16.19	13.41
G3-S	1009089.69	302357.83	2-inch PVC	13	8 1/2 OD / 4 1/4 ID	0.010	--	2.35	7.5-13	8-13	5.35-0.35	15.70	13.35
G4-D	1009474.41	303628.96	2-inch PVC	35	8 3/4 OD / 5 1/4 ID	0.010	--	2.57	30-35	30-35	-23.61-(-28.61)	8.96	6.39
G4-S	1009468.74	303634.29	2-inch PVC	20	8 3/4 OD / 5 1/4 ID	0.010	--	2.58	14-20	15-20	-8.89-(-13.89)	8.69	6.11
G5-D	1003757.06	307255.93	2-inch PVC	35	8 1/2 OD / 4 1/4 ID	0.010	--	2.35	28-35	29-34	-17.22-(-22.22)	14.13	11.78
G5-S	1003755.69	307264.44	2-inch PVC	19	8 1/2 OD / 4 1/4 ID	0.010	--	2.65	12.5-19	14-19	-1.91-(-6.91)	14.74	12.09

Groundwater Monitoring Well Construction Information

Well/ Piezometer Number	Easting*	Northing*	Construction	Total Depth of Borehole (ft bgs)	Borehole Diameter (inches)	Screen Slot Size (inches)	Steel Casing Stickup (ft ags)	PVC Casing Stickup (ft ags)	Sand pack Interval (ft bgs)	Screened Interval (ft bgs)	Screened Interval Elevation (ft NAVD88)	Measuring Point Elevation** (Top of PVC Casing) (ft NAVD88)	Ground Surface Elevation (ft NAVD88)
G6-D	1004094.38	304524.33	2-inch PVC	35	8 1/2 OD / 4 1/4 ID	0.010	--	2.65	28.5-35	30-35	-2.75-(-7.75)	29.90	27.25
G6-S	1004092.36	304519.02	2-inch PVC	20	8 1/2 OD / 4 1/4 ID	0.010	--	2.66	14-20	15-20	12.74-7.74	30.40	27.74
G7-D	1002976.73	305867.5	2-inch PVC	30	8 3/4 OD / 4 1/4 ID	0.010	--	2.81	18-30	20-30	-9.87-(-19.87)	12.94	10.13
SSA4-MW-01	1006430.83	305483.94	2-inch PVC	15	8 1/4	0.010	--	2.50	2-13	2.7-12.7	10.03-(-0.03)	15.35	12.73
SSA6-MW-01	1006762.77	303588.88	2-inch PVC	15	8 1/4	0.010	--	0.25	2.5-14.2	3.9-13.9	8.94-(-1.06)	13.08	12.84
SSA7-MW-01	1006958.35	302695.83	2-inch PVC	16.5	8 1/4	0.010	--	2.40	4-16.5	5-15	11.31-1.31	19.02	16.31

Notes:

*Washington South Zone, NAD 83/91 geographic and state plane coordinates – US survey feet

**Data collected December 22 and 27, 2006 by use of total station Leica 802, except wells G1-G7. Elevations for wells SSA4-MW-01, SSA6-MW-01, and SSA7-MW-01 surveyed February 23, 2012.

Horizontal Datum: NAVD88

***The top of the steel casing is the current point of measurement for Wells RL-4D and RL-4S.

ft ags = feet above ground surface

ft bgs = feet below ground surface

NAVD88 = North American Vertical Datum of 1988

OD/ID = outer/inner diameter

**RI Soil Sampling Details
Field Southwest of the Cable Plant**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Soil Chemistry ³
	Easting	Northing				
AQ-SSA1-01	1004612.54	305483.36	No samples collected	--	--	--
AQ-SSA1-02	1004728.18	305465.84	No samples collected	--	--	--
AQ-SSA1-03	1004563.11	305382.18	AQ-SSA1-04-3-4	3 - 4 feet bgs	Test Pit	PAHs, Total CN, FL, TPH, TOC
AQ-SSA1-04	1004688.57	305340.44	No samples collected	--	--	--
AQ-SSA1-05	1004845.21	305382.07	No samples collected	--	--	--
AQ-SSA1-06	1004502.10	305380.56	AQ-SSA1-06-3-3.5	3 - 3.5 feet bgs	Test Pit	PAHs, Total CN, FL, TPH, TOC
AQ-SSA1-07	1004603.05	305340.31	No samples collected	--	--	--
AQ-SSA1-08	1004529.93	305345.46	No samples collected	--	--	--

Notes:

1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.

2 bgs = below ground surface. Soil testing depth interval was determined in the field based on visual observations.

3 Chemical testing: PAHs = polycyclic aromatic hydrocarbons, FL = fluoride, CN = cyanide, TPH = Total Petroleum Hydrocarbons, TOC = total organic carbon

**RI Soil Sampling Details
Former Thin Stillage Application Areas**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Soil Chemistry ³
	Easting	Northing				
AQ-SSA2-01	1003995.21	306047.68	AQ-SSA2-01-0-0.5	0-0.5 feet bgs	Test Plot	Nutrients
AQ-SSA2-02	1004043.35	305977.41	AQ-SSA2-02-0-0.5	0-0.5 feet bgs		
AQ-SSA2-03	1004006.24	305860.71	AQ-SSA2-03-0-0.5	0-0.5 feet bgs		
AQ-SSA2-04	1004053.23	305801.54	AQ-SSA2-04-0-0.5	0-0.5 feet bgs		
AQ-SSA2-05	1004011.45	305680.42	AQ-SSA2-05-0-0.5	0-0.5 feet bgs		
AQ-SSA2-06	1004053.89	305612.88	AQ-SSA2-06-0-0.5	0-0.5 feet bgs		
AQ-SSA2-07	1004016.86	305498.28	AQ-SSA2-07-0-0.5	0-0.5 feet bgs		
AQ-SSA2-08	1004069.13	305444.24	AQ-SSA2-08-0-0.5	0-0.5 feet bgs		
AQ-SSA2-REF-01	1003549.73	304509.41	AQ-SSA2-REF-01-0-0.5	0-0.5 feet bgs		
AQ-SSA2-REF-02	1003338.47	304597.02	AQ-SSA2-REF-02-0-0.5	0-0.5 feet bgs		

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface
- 3 Nutrients: Total Kjeldahl Nitrogen (TKN), nitrate, nitrite, ammonia, total phosphorous, orthophosphate, potassium, total organic carbon, total solids

**RI Soil Sampling Details
Northwest Site Area**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Soil Chemistry ³	Observations
	Easting	Northing					
AQ-SSA3-01	1002954.54	305613.91	AQ-SSA3-01-2-3	2-3 feet bgs	Test Pit	FL, CN (WAD and Total)	No observations of impacted fill material
AQ-SSA3-02	1002953.16	306149.12	AQ-SSA3-02-2-3	2-3 feet bgs			No observations of impacted fill material
AQ-SSA3-03	1003008.18	306164.82	AQ-SSA3-03-2-3	2-3 feet bgs			No observations of impacted fill material
AQ-SSA3-04	1002957.94	306498.66	AQ-SSA3-04-2-3	2-3 feet bgs			No observations of impacted fill material
AQ-SSA3-05	1003028.45	306504.50	AQ-SSA3-05-2-3	2-3 feet bgs			No observations of impacted fill material
AQ-SSA3-06	1002961.63	306841.00	AQ-SSA3-06-2-3	2-3 feet bgs			No observations of impacted fill material
AQ-SSA3-07	1003053.24	306833.50	AQ-SSA3-07-2-3	2-3 feet bgs			Trace quantity of fill material, gravel and concrete pieces
AQ-SSA3-08	1003124.14	306832.84	AQ-SSA3-08-2-3	2-3 feet bgs			No observations of impacted fill material

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Soil testing depth intervals were determined in the field based on visual observations.
- 3 Chemical testing: FL = fluoride, CN = cyanide, WAD = weak acid dissociable

**RI Soil Sampling Details
Flat Storage Area**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ³	Observations
	Easting	Northing					
AQ-SSA4-01	1005934.68	305677.85	AQ-SSA4-01-0-1	0-1 feet bgs	Direct Push Boring	PAHs	No impacted fill observed
			AQ-SSA4-01-1-2	1-2 feet bgs			
AQ-SSA4-02	1006010.12	305612.66	AQ-SSA4-02-0-1	0-1 feet bgs			
			AQ-SSA4-02-1-2	1-2 feet bgs			
AQ-SSA4-03	1006184.00	305629.55	AQ-SSA4-03-0-1	0-1 feet bgs			
			AQ-SSA4-03-1-2	1-2 feet bgs			
AQ-SSA4-04	1006224.28	305382.05	AQ-SSA4-04-0-1	0-1 feet bgs			
			AQ-SSA4-04-1-2	1-2 feet bgs			
AQ-SSA4-05	1006437.10	305379.51	AQ-SSA4-05-0-1	0-1 feet bgs			
			AQ-SSA4-05-1-2	1-2 feet bgs			
			AQ-SSA4-05-2-3	2-3 feet bgs			
			AQ-SSA4-05-3-4	3-4 feet bgs			
AQ-SSA4-06	1005833.69	305281.99	AQ-SSA4-06-0-1	0-1 feet bgs			
			AQ-SSA4-06-1-2	1-2 feet bgs			
AQ-SSA4-07	1005959.35	305124.01	AQ-SSA4-07-0-1	0-1 feet bgs			
			AQ-SSA4-07-1-2	1-2 feet bgs			
AQ-SSA4-08	1006105.31	305092.91	AQ-SSA4-08-0-1	0-1 feet bgs			
			AQ-SSA4-08-1-2	1-2 feet bgs			
AQ-SSA4-09	1005681.01	305067.36	AQ-SSA4-09-0-1	0-1 feet bgs			
			AQ-SSA4-09-1-2	1-2 feet bgs			
AQ-SSA4-10	1005741.20	304905.63	AQ-SSA4-10-0-1	0-1 feet bgs			
			AQ-SSA4-10-1-2	1-2 feet bgs			
AQ-SSA4-11	1005855.06	304788.01	AQ-SSA4-11-0-1	0-1 feet bgs			
			AQ-SSA4-11-1-2	1-2 feet bgs			
AQ-SSA4-12A	1006068.99	305558.76	AQ-SSA4-12A-0-1	0-1 feet bgs			
			AQ-SSA4-12A-1-2	1-2 feet bgs			
AQ-SSA4-12B	1006208.42	305605.72	AQ-SSA4-12B-0-1	0-1 feet bgs			
			AQ-SSA4-12B-1-2	1-2 feet bgs			
AQ-SSA4-13	1006069.00	305558.76	AQ-SSA4-13-0-1	0-1 feet bgs			
			AQ-SSA4-13-1-2	1-2 feet bgs			
AQ-SSA4-14	1006208.42	305605.73	AQ-SSA4-14-0-1	0-1 feet bgs			
			AQ-SSA4-14-1-2	1-2 feet bgs			
AQ-SSA4-15	1006258.38	305442.06	AQ-SSA4-15-0-1	0-1 feet bgs			
			AQ-SSA4-15-1-2	1-2 feet bgs			
AQ-SSA4-16	1006264.79	305292.57	AQ-SSA4-16-0-1	0-1 feet bgs			
			AQ-SSA4-16-1-2	1-2 feet bgs			
AQ-SSA4-17	1005908.97	305345.60	AQ-SSA4-17-0-1	0-1 feet bgs			
			AQ-SSA4-17-1-2	1-2 feet bgs			
AQ-SSA4-18	1006097.06	305263.56	AQ-SSA4-18-0-1	0-1 feet bgs			
			AQ-SSA4-18-1-2	1-2 feet bgs			

**RI Soil Sampling Details
Flat Storage Area**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ³	Observations	
	Easting	Northing						
AQ-SSA4-19	1006062.46	305067.29	AQ-SSA4-19-0-1	0-1 feet bgs	Test Pit	PAHs	No impacted fill observed	
			AQ-SSA4-69-0-1					
			AQ-SSA4-19-1-2	1-2 feet bgs				
			AQ-SSA4-69-1-2					
AQ-SSA4-20	1005835.16	305127.77	AQ-SSA4-20-0-1	0-1 feet bgs				
			AQ-SSA4-20-1-2	1-2 feet bgs				
AQ-SSA4-21	1006369.35	305399.09	no samples collected	--				Observations only
AQ-SSA4-22	1006351.56	305348.48		--				Observations only
AQ-SSA4-23	1006372.50	305310.86		--				Observations only
AQ-SSA4-24	1005860.24	305008.09	AQ-SSA4-24-0-1	0-1 feet bgs				
			AQ-SSA4-24-1-2	1-2 feet bgs				
AQ-SSA4-25	1005951.97	304937.74	AQ-SSA4-25-0-1	0-1 feet bgs				
			AQ-SSA4-25-1-2	1-2 feet bgs				
AQ-SSA4-26	1006452.53	305379.00	AQ-SSA4-26-0-1	0-1 feet bgs				
			AQ-SSA4-76-0-1					
			AQ-SSA4-26-1-2	1-2 feet bgs				
			AQ-SSA4-76-1-2					
AQ-SSA4-27	1006430.96	305352.91	AQ-SSA4-27-0-1	0-1 feet bgs				
			AQ-SSA4-27-1-2	1-2 feet bgs				
AQ-SSA4-RB	--	--	AQ-SSA4-RB-110912	--	Rinsate Blank	--		
			AQ-SSA4-RB-011113					

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Soil testing depth intervals were determined in the field based on visual observations.
- 3 Chemical testing: PAHs = polycyclic aromatic hydrocarbons

**RI Soil Sampling Details
Casting Pit Fill Soils**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Soil Chemistry ³
	Easting	Northing				
AQ-SSA5-01	1007428.93	303707.37	AQ-SSA5-01-8-10	8-10 feet bgs	Direct Push Boring	PAHs, FL
			AQ-SSA5-01-14-16	14-16 feet bgs		
AQ-SSA5-02	1007432.10	303692.81	AQ-SSA5-02-8-10	8-10 feet bgs		
			AQ-SSA5-02-14-16	14-16 feet bgs		
AQ-SSA5-03	1007421.98	303699.65	AQ-SSA5-03-8-10	8-10 feet bgs		
			AQ-SSA5-03-14-16	14-16 feet bgs		
AQ-SSA5-04	1007319.48	303592.21	AQ-SSA5-04-8-10	8-10 feet bgs		
			AQ-SSA5-04-14-16	14-16 feet bgs		
AQ-SSA5-05	1007323.35	303577.82	AQ-SSA5-05-5-7	5-7 feet bgs		
			AQ-SSA5-05-14-16	14-16 feet bgs		
AQ-SSA5-06	1007312.79	303584.78	AQ-SSA5-06-8-10	8-10 feet bgs		
			AQ-SSA5-06-14-16	14-16 feet bgs		
AQ-SSA5-RB01-083111	--	--	AQ-SSA5-RB01-083111	--	Rinsate Blank	PAHs, FL, NWTPH-Dx

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Soil testing depth intervals were determined in the field based on visual observations.
- 3 Chemical testing: PAHs = polycyclic aromatic hydrocarbons, FL = fluoride, NWTPH-Dx = diesel-range total petroleum hydrocarbons

**RI Soil Sampling Details
HTM Oil Area**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ³
	Easting	Northing				
AQ-SSA6-01	1006749.20	303570.22	AQ-SSA6-01-3-4	3-4 feet bgs	Limited Access Direct Push Borings	NWTPH-Dx, EPH
			AQ-SSA6-01-7-8	7-8 feet bgs		
AQ-SSA6-02	1006710.32	303573.20	AQ-SSA6-02-3-4	3-4 feet bgs		NWTPH-Dx
			AQ-SSA6-02-4-5	4-5 feet bgs		
			AQ-SSA6-02-5-6	5-6 feet bgs		
AQ-SSA6-03	1006751.49	303537.47	AQ-SSA6-03-3-4	3-4 feet bgs		NWTPH-Dx, EPH
			AQ-SSA6-03-6-7	6-7 feet bgs		
AQ-SSA6-04	1006706.17	303524.57	AQ-SSA6-04-1-2	1-2 feet bgs		NWTPH-Dx
			AQ-SSA6-04-3-4	3-4 feet bgs		
AQ-SSA6-05	1006692.31	303534.01	AQ-SSA6-05-1-2	1-2 feet bgs		
			AQ-SSA6-05-3-4	3-4 feet bgs		
			AQ-SSA6-05-7-8	7-8 feet bgs		
AQ-SSA6-06	1006730.56	303494.88	AQ-SSA6-06-1-2	1-2 feet bgs		
			AQ-SSA6-06-3-4	3-4 feet bgs		
AQ-SSA6-07	1006759.41	303519.07	AQ-SSA6-07-1-2	1-2 feet bgs		
			AQ-SSA6-07-5-6	5-6 feet bgs		
AQ-SSA6-08	1006696.08	303583.89	AQ-SSA6-08-4-5	4-5 feet bgs		
			AQ-SSA6-08-7-8	7-8 feet bgs		
AQ-SSA6-09	1006766.27	303586.13	AQ-SSA6-09-2-3	2-3 feet bgs		
			AQ-SSA6-09-4-5	4-5 feet bgs		
			AQ-SSA6-09-11-12	11-12 feet bgs		
			AQ-SSA6-09-13-14	13-14 feet bgs		
AQ-SSA6-10	1006790.74	303557.61	AQ-SSA6-10-0-1	0-1 feet bgs		
			AQ-SSA6-10-1-2	1-2 feet bgs		
			AQ-SSA6-10-2-3	2-3 feet bgs		
AQ-SSA6-11	1006733.38	303614.70	AQ-SSA6-11-2-3	2-3 feet bgs		
			AQ-SSA6-11-5-6	5-6 feet bgs		

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Soil testing depth intervals were determined in the field based on visual observations.
- 3 Chemical testing: NWTPH-Dx = Diesel-range total petroleum hydrocarbons, EPH = extractable petroleum hydrocarbons

RI Soil Sampling Details (2006-2007)
North Field Area, Rectifier Yards, Lysimeter and SPLP Locations

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Soil Chemistry ³
	Easting	Northing			
LYS1	1007861.11	302549.67	LY1-SO	0 - 0.5 ft bgs	TS, CN (WAD & Total), FL
LYS2	1008061.62	302466.00	LY2-SO	0 - 0.5 ft bgs	TS, CN (WAD & Total), FL
LYS3	1008479.32	302019.21	LY3-SO	0 - 0.5 ft bgs	TS, CN (WAD & Total), FL
RY1	1008028.71	303762.58	RY1-092806	0 - 0.5 ft bgs	TS, pH, Mercury, PCB Aroclors, TPH
RY2	1008124.96	303676.90	RY2-092806	0 - 0.5 ft bgs	TS, pH, Mercury, PCB Aroclors, TPH
RY3	1008219.78	303606.62	RY3-092806	0 - 0.5 ft bgs	TS, pH, Mercury, PCB Aroclors, TPH
RY4	1007520.69	305201.87	RY4-092806	0 - 0.5 ft bgs	TS, TPH
RY5	1007394.53	305315.41	RY5-092806	0 - 0.5 ft bgs	TS, pH, Mercury, PCB Aroclors, TPH
RY6	1007251.55	305441.57	RY6-092806	0 - 0.5 ft bgs	TS, TPH
S1	1009097.47	306564.51	S1-A-092806	0 - 0.5 ft bgs	TS, pH, CN (WAD & Total), FL, PAHs
			S1-B-092806	1.5 - 2 ft bgs	
S2	1008414.70	301976.45	S2-A-022707	0 - 0.5 ft bgs	TS, CN (WAD & Total), FL, Metals, VOCs, PAHs, SVOCs, PCB Aroclors, Pesticides
S3	1004127.67	304844.09	S3-A-022707	0 - 0.5 ft bgs	
SPLP1	1008447.88	301995.44	SPLP1-S-022707	0 - 0.5 ft bgs	pH, CN (Total), FL
SPLP2	1008447.88	301995.44	SPLP2-S-022707	0 - 0.5 ft bgs	pH, CN (Total), FL
SPLP3	1007860.55	302515.54	SPLP3-S-022707	0 - 0.5 ft bgs	pH, CN (Total), FL
SPLP4	1008851.22	302901.19	SPLP4-WM-022707	0 - 0.5 ft bgs	TS, FL

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 ft bgs = feet below ground surface.
- 3 Chemical testing: TPH = Total Petroleum Hydrocarbons, TS = Total Solids, PCB = polychlorinated biphenyl, PAHs = polycyclic aromatic hydrocarbons, WAD = weak acid dissociable, CN = cyanide, FL = fluoride, SVOC = semi-volatile organic compound, VOC = volatile organic compound
Metals = 13 priority pollutant [antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc]

**RI Groundwater
Sampling Details**

Station ID	Coordinates ¹		Sample ID ²	Screened Interval ³	Sample Method	Well Diameter	Groundwater Chemistry ^{4,5,6}
	Easting	Northing					
G Series Monitoring Wells							
G1-S	1008434.98	301735.48	G1-S-100206	3-8 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G1-S-010507				PAHs
			G1-S-072511				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G1-S-D-072511				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G1-S-101111				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G51-S-101111				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G1-S-100412				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G1-S-120312				Total and Dissolved CN (WAD, Free and Total)
G1-D	1008426.65	301724.96	G1-D-100206	28-33 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G1-D-072511				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G1-D-101111				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G1-D-100412				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G1-D-120312				Total and Dissolved CN (WAD, Free and Total)
			G1-D-120312-D				Total and Dissolved CN (WAD, Free and Total)
G2-S	1008669.75	302089.07	G2-S-100206	5-10 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G2-S-010507				PAHs
			G2-S-072511				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G2-S-101111				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G2-S-100312				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, Total and Dissolved Metals, SVOCs, PCB Aroclors, VOCs
			G2-S-120312				PAHs
G2-D	1008676.20	302086.19	G2-D-100206	20-25 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G2-D-072511				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G2-D-101111				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G2-D-100312				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G2-D-120312				PAHs
			G2-D-120312-D				PAHs
G3-S	1009089.69	302357.83	G3-S-100206	8-13 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G43-S-100206				Total FL, Total CN (WAD, Free and Total)
			G3-S-072811				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G3-S-101111				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G3-S-100412				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
G3-D	1009095.10	302362.57	G3-D-100206	23-28 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G3-D-072811				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G3-D-101111				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G3-D-100412				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS

**RI Groundwater
Sampling Details**

Station ID	Coordinates ¹		Sample ID ²	Screened Interval ³	Sample Method	Well Diameter	Groundwater Chemistry ^{4,5,6}
	Easting	Northing					
G4-S	1009468.74	303634.29	G4-S-091906	15-20 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G4-S-072611				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G4-S-101011				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G4-S-100312				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, Total and Dissolved Metals, SVOCs, PCB Aroclors, VOCs
			G4-S-120412				NWTPH-Dx, EPH
G4-D	1009474.41	303628.96	G4-D-091906	30-35 feet bgs	Low Flow	2-Inch	Total CN (WAD, Free and Total)
			G4-D-091906				Total CN (WAD, Free and Total)
			G4-D-072811				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G4-D-101111				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G4-D-100512				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
G5-S	1003755.69	307264.44	G5-S-091806	14-19 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G5-S-072811				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G5-S-100711				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G5-S-100412				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
G5-D	1003757.06	307255.93	G5-D-091806	29-34 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G5-D-072811				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G5-D-100711				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G5-D-100412				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
G6-S	1004092.36	304519.02	G6-S-091906	15-20 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G6-S-010507				PAHs
			G6-S-072611				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G6-S-072811				PAHs
			G6-S-101011				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			G6-S-100212				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
G6-D	1004094.38	304524.33	G6-D-091906	30-35 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G6-D-072611				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G6-D-072811				PAHs
			G6-D-101011				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			G6-D-100212				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
G7-D	1002976.73	305867.50	G7-D-091806	20-30 feet bgs	Low Flow	2-Inch	Total FL, Total CN (WAD, Free and Total)
			G7-D-072811				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G7-D-100711				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			G7-D-100512				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS

**RI Groundwater
Sampling Details**

Station ID	Coordinates ¹		Sample ID ²	Screened Interval ³	Sample Method	Well Diameter	Groundwater Chemistry ^{4,5,6}
	Easting	Northing					
PZ Series Monitoring Wells							
PZ-1	1008299.05	302744.72	PZ-1-092606	8.6-13 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			PZ-1-022707				PAHs
			PZ-1-072611				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			PZ-1-072811				PAHs
			PZ-1-100711				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			PZ-1-100212				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
PZ-2	1008300.80	302751.01	PZ-2-092706	20.2-24.6 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			PZ-2-072611				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			PZ-2-072811				PAHs
			PZ-2-100711				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			PZ-2-100212				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			PZ-3				1008251.97	302972.98	PZ-3-092606	5.1-9.5 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
PZ-3-022707	PAHs						
PZ-3-072711	Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs						
PZ-3-100711	Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs						
PZ-3-100212	Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS						
PZ-4	1008584.21	303050.14	PZ-4-092606	13-17.4 feet bgs	Low Flow	2-Inch			Fluoride, CN (WAD, Free and Total),
PZ-4-022707			PAHs				
PZ-4-072711			Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs				
PZ-4-101011			Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs				
PZ-4-100212			Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS				
PZ-5			1007993.58				302595.68
PZ-45-100206	Fluoride, CN (WAD, Free and Total),						
PZ-5-022707	PAHs						
PZ-5-072511	Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS						
PZ-5-072811	PAHs						
PZ-5-101011	Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs						
PZ-5-100212	Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS						
PZ-6	1002978.72	306391.57	PZ-6-091806	7.5-11.9 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
PZ-6-072711			Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS				
PZ-6-100711			Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS				
PZ-6-100212			Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS				

**RI Groundwater
Sampling Details**

Station ID	Coordinates ¹		Sample ID ²	Screened Interval ³	Sample Method	Well Diameter	Groundwater Chemistry ^{4,5,6}
	Easting	Northing					
PZ-7	1002976.47	305858.71	PZ-7-091806	8.4-17.8 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			PZ-7-072711				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			PZ-7-100711				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			PZ-7-100212				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
R Series Monitoring Wells⁷							
R-1S	1007690.16	302585.06	R-1S-091906	7-12 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			R-1S-080211				PAHs
			MBT-072511-02				Total CL, Total FL, CN (WAD, Free and Total)
			R-1S-100511				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			SPL-100312-06				Total CL, Total FL, Total CN (WAD, Free and Total)
R-1D	1007692.58	302584.67	R-1D-091906	20-24 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			R-1D-080211				PAHs
			MBT-072511-04				Total CL, Total FL, CN (WAD, Free and Total)
			R-1D-100511				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			SPL-100312-05				Total CL, Total FL, Total CN (WAD, Free and Total),
R-2	1008794.48	303565.60	R-2-100206	9-14 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			R-2-080211				PAHs
			MBT-072511-07				Total CL, Total FL, CN (WAD, Free and Total)
			R-2-100511				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			R-2-100312				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, Total and Dissolved Metals, SVOCs, PCB Aroclors, VOCs
			SPL-100312-01				Total CL, Total FL, Total CN (WAD, Free and Total)
R-3	1008030.74	302689.09	R-3-092706	19-24 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			R-43-092706				Fluoride, CN (WAD, Free and Total),
			R-3-080211				PAHs
			MBT-072511-03				Total CL, Total FL, CN (WAD, Free and Total)
			R-3-100511				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			R-53-100511				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			SPL-100312-07				Total CL, Total FL, Total CN (WAD, Free and Total)
R-4S	1007914.58	302370.26	R-4S-092706	14-19 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			R-4S-080211				PAHs
			MBT-072511-05				Total CL, Total FL, CN (WAD, Free and Total)
			MBT-072511-06				Total CL, Total FL, CN (WAD, Free and Total)
			R-4S-100511				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			SPL-100312-02				Total CL, Total FL, Total CN (WAD, Free and Total)
R-4D	1007916.23	302368.85	R-4D-092706	23-27 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			R-4D-080211				PAHs
			MBT-072511-01				Total CL, Total FL, CN (WAD, Free and Total)
			R-4D-100511				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, PAHs
			SPL-100312-03				Total CL, Total FL, Total CN (WAD, Free and Total)
			SPL-100312-04				

**RI Groundwater
Sampling Details**

Station ID	Coordinates ¹		Sample ID ²	Screened Interval ³	Sample Method	Well Diameter	Groundwater Chemistry ^{4,5,6}
	Easting	Northing					
RL Series Monitoring Wells⁷							
RL-1S	1003078.70	305242.74	RL-1S-091906	8-18 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			MBT-072711-15				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), Dissolved Metals
			RL-1S-100611				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			RL-1S-100412				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, Total and Dissolved Metals, SVOCs, PCB Aroclors, VOCs
RL-1D	1003078.65	305242.58	RL-1D-091906	28-38 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			MBT-072611-08				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), Dissolved Metals
			RL-1D-100611				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			BMP-100412-02				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), Ar, Cr, Cu, Ni, Ca, Mg, Na
RL-2S	1003087.21	306911.05	RL-2S-091806	7.5-17.5 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			MBT-072711-16				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), Dissolved Metals
			RL-2S-100611				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			BMP-100412-05				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), As, Cr, Cu, Ni
RL-2D	1003090.83	306914.68	RL-2D-091806	23-33 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			MBT-072611-11				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), Dissolved Metals
			RL-2D-100611				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			BMP-100412-06				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), As, Cr, Cu, Ni
RL-3S	1004055.78	305291.95	RL-3S-091906	7.5-17.5 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			MBT-072711-12				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), Dissolved Metals
			RL-3S-100611				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			BMP-100412-09				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), Ar, Cr, Cu, Ni
RL-3D	1004052.27	305291.42	RL-3D-091906	23-38 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			MBT-072711-17				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), Dissolved Metals
			RL-3D-100611				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			BMP-100412-08				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), As, Cr, Cu, Ni
RL-4S	1006242.94	305652.76	RL-4S-091906	8.5-13.5 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			RL-4S-072711				PAHs
			MBT-072711-18				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), Dissolved Metals
			RL-4S-100611				PAHs, Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			BMP-100412-10				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), As, Cr, Cu, Ni
RL-4D	1006236.70	305658.02	RL-4D-091906	25-35 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			MBT-072611-14				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), Dissolved Metals
			RL-4D-100611				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			BMP-100412-11				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), As, Cr, Cu, Ni

**RI Groundwater
Sampling Details**

Station ID	Coordinates ¹		Sample ID ²	Screened Interval ³	Sample Method	Well Diameter	Groundwater Chemistry ^{4,5,6}
	Easting	Northing					
RL-5	1004098.84	306842.49	RL-5-091806	12-22 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			MBT-072611-13				Total CL, SO ₄ , Total FL, CN (WAD, Free and Total), Dissolved Metals
			RL-5-100711				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			BMP-100412-12				Total CL, SO ₄ , Total FL, Total CN (WAD, Free and Total), As, Cr, Cu, Ni
RLSW Series Monitoring Wells⁷							
RLSW-1	1004328.55	305045.01	RLSW-1-092706	9-18 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			RLSW-1-101011				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			RLSW-1-100412				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
RLSW-2	1004130.45	305041.60	RLSW-2-092706	9-18 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			RLSW-2-101111				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			RLSW-2-100512				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
RLSW-3	1003879.21	305040.25	RLSW-3-092706	9-18 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			RLSW-3-101111				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			RLSW-3-100512				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, Total and Dissolved Metals, SVOCs, PCB Aroclors, VOCs
			RLSW-3-120412				PAHs
RLSW-4	1004014.08	304416.09	RLSW-4-091906	18-28.5 feet bgs	Low Flow	2-Inch	Fluoride, CN (WAD, Free and Total),
			RLSW-4-101011				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
			RLSW-4-100212				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS
SSA Series Monitoring Wells							
SSA4-MW-01	1006430.83	305483.94	SSA4-MW-01-011212	2.7 - 12.7 feet bgs	Low Flow	2-Inch	PAHs
			SSA4-MW-01-100512				PAHs, Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, As, Cr, Cu, Ni
SSA6-MW-01	1006762.77	303588.88	SSA6-MW-011212	3.9 - 13.9 feet bgs	Low Flow	2-Inch	NWTPH-Dx, EPH
			SSA6-MW-01-100512				NWTPH-Dx, EPH, Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS, As, Cr, Cu, Ni
			SSA6-MW-01-120412				NWTPH-Dx
SSA7-MW-01	1006958.35	302695.83	SSA7-MW-01-022312	5-15 feet bgs	Low Flow	2-Inch	Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free & Total), GeoChem, PAHs, PCB Aroclors, TSS, TDS, Alkalinity, Total P
			SSA7-MW-01-100512				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, PAHs, PCB Aroclors, Alkalinity, Total P, TDS, TSS
			SSA7-MW-51-100512				Total CL, SO ₄ , Total and Dissolved FL, Total and Dissolved CN (WAD, Free and Total), GeoChem, PAHs, PCB Aroclors, Alkalinity, Total P, TDS, TSS

Notes:

- Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- Sample ID includes sample date in MMDDYY format
- bgs = below ground surface
- Cl = chloride, SO₄ = sulfate, FL = fluoride, CN = cyanide, WAD = weak acid dissociable, P = phosphorous, SVOCs = semivolatile organic compounds
TDS = Total Dissolved solids, TSS = total suspended solids, EPH = extractable petroleum hydrocarbons, NWTPH-Dx = diesel range total petroleum hydrocarbons
PAHs = polycyclic aromatic hydrocarbons, PCB = polychlorinated biphenyl, VOCs = volatile organic compounds
- GeoChem = total and dissolved metals including aluminum, calcium (Ca), iron, magnesium (Mg), manganese, potassium, silicon, and sodium (Na)
Metals = total and dissolved priority pollutant metals including antimony, arsenic (As), beryllium, cadmium, chromium (Cr), copper (Cu), lead, mercury, nickel (Ni), selenium, silver, thallium, and zinc
- Field parameters analyzed at each groundwater/surface water location include: temperature, pH, sulfide, dissolved oxygen, oxidation reduction potential, conductivity, and ferrous iron (Fe²⁺)
- These wells are sampled for other constituents as part of an ongoing quarterly monitoring program.

**RI Surface Water and Ditch Water
Sampling Details**

Station ID	Coordinates ¹		Sample ID	Sampling Interval	Sample Method	Surface Water Chemistry ^{2,3}	Field Analyses ⁴
	Easting	Northing					
W1	1009643.30	303638.30	W1-080111	0.5 feet above mudline	Weighted Peristaltic Pump	Total CL, SO ₄ , FL, CN (WAD, Free and Total), GeoChem, Alkalinity, Total P, TDS, TSS	Temperature, pH, Turbidity, Sulfide, DO, ORP, Conductivity, and Ferrous iron (Fe ²⁺)
			W1-101211				
			W1-100112				
W2	1003793.00	307327.20	W2-080111	0.5 feet above mudline	Weighted Peristaltic Pump		
			W2-080111-D				
			W2-101211				
W3	1003149.00	307004.30	W2-100112	0.5 feet above mudline	Weighted Peristaltic Pump		
			W3-080111				
			W3-101211				
W4	1002911.50	305136.70	W3-100112	0.5 feet above mudline, prior to Reynolds pump operation	Weighted Peristaltic Pump		
			W4-080111				
			W4-101211				
W5	1006054.50	302668.00	W4-100112	2 feet below water surface	Grab-Disposable Bailer		
			W5-080111				
			W5-101211				
W6	1003603.20	318671.70	W5-110212	0.5 feet above mudline	Weighted Peristaltic Pump		
			W6-080111				
			W6-101211				
W7	1010639.90	302797.00	W6-100112	0.5 feet above mudline	Weighted Peristaltic Pump		
			W7-080111				
			W7-101211				
W8	1004021.87	304327.65	W7-100112	0.5 feet above mudline	Weighted Peristaltic Pump		
			W8-100312				
			W9-100212				
W9	1006802.46	302545.57	W59-100212	0.5 feet above mudline	Weighted Peristaltic Pump		
			W10-100212				
W10	1007225.50	302148.75	W10-100212	0.5 feet above mudline	Weighted Peristaltic Pump		

Notes:

1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.

RI Surface Water and Ditch Water Sampling Details

- 2 Water chemistry: CL = chloride, SO₄ = sulfate, FL = fluoride, CN = cyanide, WAD = weak acid dissociable, P = phosphorous, TDS = total dissolved solids, TSS = total suspended solids, GeoChem = dissolved metals including aluminum, calcium, iron, magnesium, manganese, potassium, silicon, and sodium
- 3 October 2011 sampling event included testing for only dissolved FL and CN (WAD, Free, and Total).
- 5 Field Analyses: DO = dissolved oxygen, ORP = oxidation reduction potential. Field parameters were measured by HACH and YSI field meters.

**RI Soil Sampling Details
Outfall Drainage Pathway Soils**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ³
	Easting	Northing				
AQ-SO-OF3	1006157.52	306622.73	AQ-SO-OF3-0-10	0-10 cm bgs	Hand trowel	SVOCs, Metals, PCB Aroclors, TS
AQ-SO-OF5	1004226.28	306934.65	AQ-SO-OF5-0-10	0-10 cm bgs		
AQ-SO-OF5D	1003430.75	307033.19	AQ-SO-OF5D-0-10	0-10 cm bgs		

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 cm bgs = centimeters below ground surface
- 3 Chemical testing: SVOCs = semi-volatile organic compounds, PCB = polychlorinated biphenyl, TS = total solids, Metals = antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc

**RI Sampling Details
Landfill No. 1 (Floor Sweeps)**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ^{3,4}
	Easting	Northing				
AQ-FSL-01	1008621.64	302008.55	AQ-FSL-01-4-6	4-6 feet bgs	Test Pit	VOCs, NWTPH-Dx
			AQ-FSL-01-8-10	8-10 feet bgs		NWTPH-Dx
			AQ-FSL-01-0-12	0-12 feet bgs		FL, CN (WAD & Total), Metals (Total & TCLP), SVOCs, PCB Aroclors, TOC, NWTPH-Dx, EPH
AQ-FSL-02	1008499.40	301886.21	AQ-FSL-02-14-16	14-16 feet bgs		VOCs, NWTPH-Dx
			AQ-FSL-02-0-16	0-16 feet bgs		FL, CN (WAD & Total), Metals (Total & TCLP), SVOCs, PCB Aroclors, TOC
AQ-FSL-03	1008399.07	302026.68	AQ-FSL-03-5-7	5-7 feet bgs		VOCs, NWTPH-Dx
			AQ-FSL-03-1-8.5	1-8.5 feet bgs	FL, CN (WAD & Total), Metals (Total & TCLP), SVOCs, PCB Aroclors, TOC, NWTPH-Dx, EPH	

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Sampling intervals were determined in the field based on visual observations.
- 3 Chemical testing: FL = fluoride, CN = cyanide, PCB = polychlorinated biphenyl, WAD = weak acid dissociable, EPH = extractable petroleum hydrocarbons
NWTPH-Dx = Diesel-range total petroleum hydrocarbons, SVOCs = semi-volatile organic compounds, VOCs = volatile organic compounds,
Total & TCLP Metals = antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.
- 4 TCLP = toxicity characteristic leaching procedure

**RI Sampling Details
Landfill No. 2 (Industrial)**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ^{3,4}
	Easting	Northing				
AQ-ILF-01	1003995.82	304884.35	AQ-ILF-01-0-11	0-11 feet bgs	Test Pit	FL, CN (WAD & Total), Metals (Total & TCLP), SVOCs, PCB Aroclors, TOC
AQ-ILF-02	1004128.74	304863.63	AQ-ILF-02-6-8	6-8 feet bgs		VOCs, NWTPH-Dx
			AQ-ILF-02-0-12	0-12 feet bgs		FL, CN (WAD & Total), Metals (Total & TCLP), SVOCs, PCB Aroclors, TOC
AQ-ILF-03	1004248.56	304709.28	AQ-ILF-03-8-10	8-10 feet bgs		VOCs, NWTPH-Dx
			AQ-ILF-03-0-12	0-12 feet bgs		FL, CN (WAD & Total), Metals (Total & TCLP), SVOCs, PCB Aroclors, TOC
AQ-ILF-04	1004058.45	304765.75	AQ-ILF-04-12-14	12-14 feet bgs		VOCs, NWTPH-Dx
			AQ-ILF-04-0-14	0-14 feet bgs		FL, CN (WAD & Total), Metals (Total & TCLP), SVOCs, PCB Aroclors, TOC
AQ-ILF-05	1003942.50	304742.31	AQ-ILF-05-10-12	10-12 feet bgs		VOCs, NWTPH-Dx
			AQ-ILF-05-0-14	0-14 feet bgs		FL, CN (WAD & Total), Metals (Total & TCLP), SVOCs, PCB Aroclors, TOC

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Sampling intervals were determined in the field based on visual observations.
- 3 Chemical testing: FL = fluoride, CN = cyanide, PCB = polychlorinated biphenyl, WAD = weak acid dissociable, NWTPH-Dx = Diesel-range total petroleum hydrocarbons, SVOCs = semi-volatile organic compounds, VOCs = volatile organic compounds, Total and TCLP Metals = antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.
- 4 TCLP = toxicity characteristic leaching procedure

**RI Soil and Fill Sampling Details
Landfill No. 3 (Construction Debris) and Adjacent Soils**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Soil/Fill Chemistry ³	Soil/Fill Observations ⁴
	Easting	Northing					
AQ-SSA7-01	1006651.03	303148.57	AQ-SSA7-01-3-4	3-4 feet bgs	Test Pit	PAHs, FL, Total CN, SO ₄ , PCB Aroclors	No impacted fill observed
AQ-SSA7-02	1006766.89	303053.39	AQ-SSA7-02-3-4	3-4 feet bgs			No impacted fill observed
AQ-SSA7-03	1006888.12	302965.33	AQ-SSA7-03-4-5	4-5 feet bgs			Limited construction debris
AQ-SSA7-04	1007029.95	302876.33	AQ-SSA7-04-1.5-2	1.5-2 feet bgs		Plant process waste	
			AQ-SSA7-04-8-9	8-9 feet bgs			
AQ-SSA7-05	1007117.84	302795.21	AQ-SSA7-05-0-1	0-1 feet bgs		PAHs, FL, Total CN, SO ₄ , PCB Aroclors, HClD	Plant process waste
			AQ-SSA7-05-2-3	2-3 feet bgs			
			AQ-SSA7-05-6-7	6-7 feet bgs			
AQ-SSA7-06	1007233.68	302788.90	AQ-SSA7-05-12-13	12-13 feet bgs		PAHs, FL, Total CN, SO ₄ , PCB Aroclors	Plant process waste
			AQ-SSA7-06-0-1	0-1 feet bgs			
			AQ-SSA7-06-4-5	4-5 feet bgs			
AQ-SSA7-06-8-9	8-9 feet bgs	No impacted fill observed					
AQ-SSA7-07	1007127.37	302896.70	AQ-SSA7-07-0-1	0-1 feet bgs	Plant process waste		
			AQ-SSA7-07-3-4	3-4 feet bgs			
			AQ-SSA7-07-6-7	6-7 feet bgs			
AQ-SSA7-08	1007007.23	302960.13	AQ-SSA7-08-3-4	3-4 feet bgs	No impacted fill observed		
AQ-SSA7-09	1006965.54	302713.59	AQ-SSA7-09-3-4	3-4 feet bgs	No impacted fill observed		
AQ-SSA7-10	1007069.24	302671.76	AQ-SSA7-10-3-4	3-4 feet bgs	No impacted fill observed		

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Soil and fill testing depth intervals were determined in the field based on visual observations.
- 3 Chemical testing: PAHs = polycyclic aromatic hydrocarbons, FL = fluoride, CN = cyanide, PCB = polychlorinated biphenyl, HClD = hydrocarbon identification, SO₄ = sulfate
- 4 Former Reynolds staff supervised excavations.

**RI Sampling Details
Fill Deposit A (Spent Lime)**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ^{3,4}
	Easting	Northing				
AQ-WMP-01	1009175.49	303308.07	AQ-WMP-01-2.5-7.5	2.5-7.5 feet bgs	Test Pit	FL, CN (WAD and Total), Total Metals, PAHs, TOC
AQ-WMP-02	1009400.04	303214.41	AQ-WMP-02-6-8	6-8 feet bgs		VOCs
			AQ-WMP-02-2-8	2-8 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC
AQ-WMP-03	1009055.99	303103.49	AQ-WMP-03-2-6	2-6 feet bgs		FL, CN (WAD and Total), Metals (Total and TCLP), PAHs, TOC
AQ-WMP-04	1009359.77	303024.99	AQ-WMP-04-2-8	2-8 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, SVOCs, PCB Aroclors, TOC

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Sampling intervals were determined in the field based on visual observations.
- 3 Chemical testing: PAHs = polycyclic aromatic hydrocarbons, FL = fluoride, CN = cyanide, PCB = polychlorinated biphenyl, WAD = weak acid dissociable, VOCs = volatile organic compounds, TOC = total organic carbon, Total & TCLP metals = antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.
- 4 TCLP = toxicity characteristic leaching procedure

RI Sampling Details
Fill Deposit B-1 (Residual Carbon)

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ^{3,4}
	Easting	Northing				
AQ-BMP-01	1008854.81	302840.44	AQ-BMP-01-2-16	2-16 feet bgs	Test Pit	FL, CN (WAD and Total), Total Metals, PAHs, TOC
AQ-BMP-02	1008920.94	302569.98	AQ-BMP-02-11-13	11-13 feet bgs		VOCs
			AQ-BMP-02-1-15	1-15 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC, NWTPH-Dx, EPH
AQ-BMP-03	1008774.70	302545.40	AQ-BMP-03-2-16	2-16 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC
AQ-BMP-04	1008546.90	302535.65	AQ-BMP-04-1.5-13.5	1.5-13.5 feet bgs		FL, CN (WAD and Total), Metals (Total and TCLP), PAHs, SVOCs, PCB Aroclors, TOC
AQ-BMP-05	1008757.91	302387.40	AQ-BMP-05-1.5-15.5	1.5-15.5 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC, NWTPH-Dx, EPH

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Sampling intervals were determined in the field based on visual observations.
- 3 Chemical testing: PAHs = polycyclic aromatic hydrocarbons, FL = fluoride, CN = cyanide, PCB = polychlorinated biphenyl, WAD = weak acid dissociable, VOCs = volatile organic compounds, SVOCs = semi-volatile organic compounds
NWTPH-Dx = diesel range total petroleum hydrocarbons, EPH = extractable petroleum hydrocarbons,
Total & TCLP Metals = antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.
- 4 TCLP = toxicity characteristic leaching procedure

RI Sampling Details
Fill Deposit B-2 (Residual Carbon)

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ^{3,4}
	Easting	Northing				
AQ-ECA-01	1008536.14	303134.33	AQ-ECA-01-2-5	2-5 feet bgs	Test Pit	FL, CN (WAD and Total), Total Metals, PAHs, TOC
AQ-ECA-02	1008524.69	302911.78	AQ-ECA-02-3-5	3-5 feet bgs		NWTPH-Dx
			AQ-ECA-02-1-5	1-5 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC, NWTPH-Dx, EPH
AQ-ECA-03	1008285.58	302901.57	AQ-ECA-03-5-7	5-7 feet bgs		VOCs, NWTPH-Dx
			AQ-ECA-03-1-7	1-7 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, SVOCs, PCB Aroclors, TOC
AQ-ECA-04	1008356.66	302650.04	AQ-ECA-04-2-8	2-8 feet bgs		FL, CN (WAD and Total), Metals (Total and TCLP), PAHs, TOC

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Sampling intervals were determined in the field based on visual observations.
- 3 Chemical testing: PAHs = polycyclic aromatic hydrocarbons, FL = fluoride, CN = cyanide, WAD = weak acid dissociable, VOCs = volatile organic compounds, SVOCs = semi-volatile organic compounds, PCBs = polychlorinated biphenyl, NWTPH-Dx = diesel range total petroleum hydrocarbons, EPH = extractable petroleum hydrocarbons, Total & TCLP Metals = antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.
- 4 TCLP = toxicity characteristic leaching procedure

**RI Sampling Details
Fill Deposit B-3 (Residual Carbon)**

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ³
	Easting	Northing				
AQ-BMD-01	1003256.83	304853.73	AQ-BMD-01-4-5	4-5 feet bgs	Test Pit	VOCs
			AQ-BMD-01-2-5	2-5 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC
AQ-BMD-02	1003520.49	304753.40	AQ-BMD-02-3.5-5.5	3.5-5.5 feet bgs		VOCs
			AQ-BMD-02-1.5-5.5	1.5-5.5 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC
AQ-BMD-03	1003748.81	304928.45	AQ-BMD-03-4-6	4-6 feet bgs		VOCs
			AQ-BMD-03-2-8	2-8 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, SVOCs, PCBs, TOC
AQ-BMD-04	1004510.45	304511.10	AQ-BMD-04-3-5	3-5 feet bgs		VOCs
			AQ-BMD-04-1-7	1-7 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC
AQ-BMD-05	1004543.39	304789.27	AQ-BMD-05-3-5	3-5 feet bgs		VOCs
			AQ-BMD-05-1-6	1-6 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC
AQ-BMD-06	1004770.29	304634.30	AQ-BMD-06-3.5-5.5	3.5-5.5 feet bgs		VOCs
			AQ-BMD-06-1.5-5.5	1.5-5.5 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC
AQ-BMD-07	1004744.74	304923.41	AQ-BMD-07-1-3	1-3 feet bgs		FL, CN (WAD and Total), Metals (Total and TCLP), PAHs, TOC, VOCs
AQ-BMD-08	1005013.02	304930.10	AQ-BMD-08-2-4	2-4 feet bgs		FL, CN (WAD and Total), Total Metals, PAHs, TOC

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 bgs = below ground surface. Soil testing depth intervals were determined in the field based on visual observations.
- 3 Chemical testing: PAHs = polycyclic aromatic hydrocarbons, FL = fluoride, CN = cyanide, PCBs = polychlorinated biphenyls, WAD = weak acid dissociable, TOC = total organic carbon, VOCs = volatile organic compound, SVOCs = semi-volatile organic compound
Total & TCLP Metals = antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.
- 4 TCLP = toxicity characteristic leaching procedure

RI Sediment Sampling Details

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ³
	Easting	Northing				
Nearshore Sediments						
AQ-SE-01	1003578.48	304413.44	AQ-SE-01-10	0 - 10 cm	Hydraulic Van Veen Grab	TOC, TS, SMS Metals, SVOCs, PAHs, PCB Congeners
AQ-SE-02	1004243.90	304236.22	AQ-SE-02-10	0 - 10 cm		TOC, TS, SMS Metals, SVOCs, PAHs, PCB Congeners
AQ-SE-03	1004675.24	304072.23	AQ-SE-03-10	0 - 10 cm		TOC, TS, SMS Metals, SVOCs, PAHs, PCB Congeners
AQ-SE-04	1005298.68	303714.45	AQ-SE-04-10	0 - 10 cm		TOC, TS, SMS Metals, SVOCs, PAHs, PCB Congeners
AQ-SE-05	1006116.51	303194.42	AQ-SE-05-10	0 - 10 cm		TOC, TS, SMS Metals, SVOCs, PAHs, PCB Congeners
AQ-SE-06	1006619.37	302834.36	AQ-SE-06-10	0 - 10 cm		TOC, TS, SMS Metals, SVOCs, PAHs, PCB Congeners
AQ-SE-07	1006957.01	302525.52	AQ-SE-07-10	0 - 10 cm		TOC, TS, SMS Metals, SVOCs, PAHs, PCB Congeners
			AQ-SE-57-10	0 - 10 cm		TOC, TS, SMS Metals, SVOCs, PAHs, PCB Congeners
AQ-SE-08	1007542.77	301897.62	AQ-SE-08-10	0 - 10 cm		TOC, TS, SMS Metals, SVOCs, PAHs, PCB Congeners
AQ-SE	--	--	AQ-SE-RB	--		Rinse Blank	SMS Metals, SVOCs, TS, TOC
			AQ-SE-FB	--	Field Blank	SMS Metals, SVOCs, TS, TOC
River Sediments						
AQ-SS-03	1006277.14	302786.72	AQ-SS-03-10	0 - 10 cm	Hydraulic Van Veen Grab	SVOCs, PAHs SMS Metals, TS, TOC, PCB Congeners, PCB Aroclors
			AQ-SS-03-10CONF	0 - 10 cm		PCB Congeners
AQ-SS-04	1006107.29	302873.35	AQ-SS-04-10	0 - 10 cm		SVOCs, PAHs SMS Metals, TS, TOC, PCB Congeners
AQ-SS-09	1005727.03	303196.02	AQ-SS-09-10	0 - 10 cm		SVOCs, PAHs SMS Metals, TS, TOC, PCB Congeners, PCB Aroclors
			AQ-SS-09-AB	18 - 24 cm		PAHs, TS, PCB Aroclors
AQ-SS-10	1005539.12	303247.53	AQ-SS-10-10	0 - 10 cm		SVOCs, PAHs SMS Metals, TS, TOC, PCB Congeners, PCB Aroclors
AQ-SS-14	1002805.13	304600.64	AQ-SS-14-10	0 - 10 cm		SVOCs, PAHs, SMS Metals, TS, TOC, PCB Congeners

Notes:

- 1 Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- 2 Depth below mudline. cm = centimeter
- 3 Chemical testing: PAH = polycyclic aromatic hydrocarbon, PCB = polychlorinated biphenyl, TOC = total organic carbon, TS = total solids, SVOC = semi-volatile organic compound, SMS Metals = arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc

NPDES Sediment Sampling Details

Station ID	Coordinates ¹		Sample ID	Sampling Interval ²	Sample Method	Chemistry ³
	Easting	Northing				
SS-01	1006562.25	302578.17	MBTL12-SS-01-02	0 - 2 cm	Hydraulic Van Veen Grab	GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
	1006557.95	302577.33	MBTL12-SS-01-10	0 - 10 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
SS-02	1006416.38	302690.66	MBTL12-SS-02-02	0 - 2 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
	1006412.59	302688.23	MBTL12-SS-02-10	0 - 10 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
SS-03	1006277.16	302789.94	MBTL12-SS-03-02	0 - 2 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
	1006276.77	302791.05	MBTL12-SS-03-10	0 - 10 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
			MBTL12-SS-03-10CONF	0 - 10 cm		TS, PCB Aroclors
SS-04	1006122.75	302876.99	MBTL12-SS-04-02	0 - 2 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
	1006094.52	302873.14	MBTL12-SS-04-10	0 - 10 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
			MBTL12-SS-54-10	0 - 10 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
SS-05	1006164.61	302954.41	MBTL12-SS-05-02	0 - 2 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
	1006160.16	302946.16	MBTL12-SS-05-10	0 - 10 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
SS-06	1005945.99	302980.07	MBTL12-SS-06-02	0 - 2 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
	1005945.96	302977.76	MBTL12-SS-06-10	0 - 10 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
SS-07	1005996.10	303060.69	MBTL12-SS-07-02	0 - 2 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
	1005995.43	303063.39	MBTL12-SS-07-10	0 - 10 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
SS-08	1005846.66	303128.19	MBTL12-SS-08-02	0 - 2 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
	1005843.56	303129.14	MBTL12-SS-08-10	0 - 10 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
SS-09	1005726.10	303194.65	MBTL12-SS-09-02	0 - 2 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide
	1005732.46	303192.50	MBTL12-SS-09-10	0 - 10 cm		GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide, Bioassay
			MBTL12-SS-09-10CONF	0 - 10 cm	TS, PAHs, PCB Aroclors	
SS-10	1005528.44	303253.47	MBTL12-SS-10-02	0 - 2 cm	GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide	
	1005535.08	303250.88	MBTL12-SS-10-10	0 - 10 cm	GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide, Bioassay	
			MBTL12-SS-10-10CONF	0 - 10 cm	TS, PAHs, PCB Aroclors	
SS-11	1005566.87	303328.13	MBTL12-SS-11-02	0 - 2 cm	GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide	
	1005570.55	303326.68	MBTL12-SS-11-10	0 - 10 cm	GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide	
			MBTL12-SS-11-10CONF	0 - 10 cm	TS, PAHs	
SS-12	1005351.69	303344.70	MBTL12-SS-12-02	0 - 2 cm	GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide	
	1005355.72	303342.62	MBTL12-SS-12-10	0 - 10 cm	GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide, Bioassay	
			MBTL12-SS-12-10CONF	0 - 10 cm	TS, PAHs	
SS-13	1005394.88	303424.14	MBTL12-SS-13-02	0 - 2 cm	GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide	
	1005392.30	303420.27	MBTL12-SS-13-10	0 - 10 cm	GS, FL, Al, CN, PAHs, TS, TOC, NH ₃ , PCB Aroclors, Sulfide	
			MBTL12-SS-13-10CONF	0 - 10 cm	TS, PAHs	
SS-16	1005699.45	303098.27	SS-16-10	0 - 10 cm	TS, PCB Aroclors	
SS-17	1005631.84	303221.60	SS-17-10	0 - 10 cm	TS, PCB Aroclors	
MBTL12	--	--	MBTL12-RB	--	Rinse Blank	FL, Al, CN, Sulfide, PAHs, TS, TOC, NH ₃ , PCB Aroclors
	--	--	MBTL12-FB	--	Field Blank	FL, Al, CN, Sulfide, PAHs, TS, TOC, NH ₃ , PCB Aroclors

Notes:

- Horizontal datum: Washington State Plane South, NAD83, US Survey feet.
- Depth below mudline. cm = centimeter
- Chemical testing: PAHs = polycyclic aromatic hydrocarbons, FL = fluoride, CN = cyanide, Al = aluminum, PCB = polychlorinated biphenyl, TOC = total organic carbon, NH₃ = ammonia, TS = total solids, GS = grain size

APPENDIX D-5
LYSIMETER AND GEOCHEMICAL
SAMPLING DETAILS

Summary of Geochemical Soil Boring Installation: December 2011

Soil Boring ID	Coordinates ¹		Depth Interval (feet below ground surface)	Material Description ²
	Easting (X)	Northing (Y)		
GC-SB-01	1008329.00	302765.97	0-2.5	Sand, minor clay, and plant debris
			2.5-5	Sand, minor clay, and cobbles
			5-7.5	Stiff, wet clay (black)
			7.5-10	Stiff, wet clay (black and red)
			10-12.5	Stiff, wet clay
			12.5-15	Sand
			15-17.5	Sand
			17.5-20	Sand
GC-SB-02	1008435.29	302889.11	0-2.5	Sand, minor black silt, and plant debris
			2.5-5	Black silty clay
			5-7.5	Black silty clay
			7.5-10	Red-brown stiff clay, minor black silty clay
			10-12.5	Fine sand and clay
			12.5-15	Fine sand and clay
			15-17.5	Fine sand, minor clay
			17.5-20	Fine sand, minor clay
GC-SB-03	1008623.91	303098.16	0-2.5	Sand, black silty clay
			2.5-5	Silt, black silty clay
			5-7.5	Red-brown stiff clay, minor black silty clay
			7.5-10	Red-brown stiff clay
			10-12.5	Gray-brown stiff clay
			12.5-15	Gray stiff clay, minor sand
			15-17.5	Fine sand, gray
			17.5-20	Gray silt
GC-SB-04	1008802.96	303300.68	0-2.5	Sand with plant detritus
			2.5-5	Gray-red clay, minor sand, and organic detritus
			5-7.5	Organic-rich clay, minor gray clay
			7.5-10	Gray clay, minor organic detritus
			10-12.5	Gray clay, organic detritus
			12.5-15	Brown-gray clay, peat layer, minor silty sand
			15-17.5	Gray clay, minor silt, and organic detritus
			17.5-20	Brown-gray clay

Notes:

1. Horizontal Datum: NAD 83/91 WA State Plane South
2. Black silty clay refers to residual carbon.

Summary of Lysimeter Installation: January 2012

Lysimeter ID	Coordinates ¹		Target Material Collected ^{2,3}	Depth of Installation ^{4,5} (feet bgs)	Sample ID	Depth to Groundwater (feet bgs)	Observations ^{2,3}
	Easting (X)	Northing (Y)					
GC-LY-01	1009190.96	303289.59	White silt	3	GC-LY-01-2.5-3	1	White, clayey silt, no odor.
GC-LY-02	1009314.03	303031.41	White silt	3	GC-LY-02-2.5-3	1.5	White clayey silt, no odor.
GC-LY-03	1008855.03	302714.81	Black silt	4.6	GC-LY-03-4-4.6	--	Black silt, slight odor.
GC-LY-04	1008604.31	302447.42	Black silt	4.3	GC-LY-04-3.6-4.3	--	Black silt, slight odor.
GC-LY-05	1008434.41	302904.39	Black silt	2	GC-LY-05-1.4-2	0.5	Sample is of black, sandy silt, no odor, slight gray sheen in pooled water.
GC-LY-06	1008332.23	302774.76	Black silt	3.3	GC-LY-06-2.7-3.3	3.3	Water pooled at bottom of boring. Depth to groundwater in nearby PZ-2: 6.52 feet bgs. Sample is of dark brown-gray, silty sand, no odor.
GC-LY-07	1004570.96	304788.56	Black silt	3.5	GC-LY-07-3-3.5	--	Black, slightly fine sandy silt.
GC-LY-08	1003526.33	304855.36	Black silt	2.5	GC-LY-08-2-2.5	1.5	Black, slightly very fine sandy silt, slight odor.

Notes:

1. Horizontal Datum: NAD 83/91 WA State Plane South
2. Black silt refers to residual carbon.
3. White silt refers to spent lime.
4. Lysimeter borings completed using a 2.25" diameter hand auger.

APPENDIX D-6
DETERMINATION OF FILL DEPOSITS IN
CONTACT WITH GROUNDWATER

MEMORANDUM

To: James Demay, P.E.,
Washington State Department of Ecology

Date: February 4, 2014

From: Mark Larsen and Julia Fitts, Anchor QEA, LLC

Project: 130730-01.01

Re: Former Reynolds Metals Reduction Plant RI/FS
Determination of Fill Deposits in Contact with Groundwater

This memorandum summarizes the methodology and assumptions used to determine which landfill or fill deposits at the Former Reynolds Metals Reduction Plant in Longview, Washington, are in contact with groundwater during wet weather conditions. Seven site fill deposits were investigated as part of the Remedial Investigation/Feasibility Study (RI/FS; see Figure D-6-1). In order to determine the horizontal and vertical extent of fill materials, soil test pits were excavated throughout each deposit. RI test pit observations are summarized in Table D-6-1. Test pit locations are shown on Figure D-6-1.

Depths of fill deposit materials (in feet below the ground surface) were recorded in the field based on visual observations of known fill materials and the contact depth (if reached) with native soils. For any test pit location where the base of fill materials was not reached, the estimated maximum elevation of the fill bottom is used (see Figure D-6-1). Bottom-of-fill deposit elevations were determined using field test pit observations and ground surface elevations from the 2010 American Land Title Association (ALTA) survey performed at the site. Groundwater, surface water, and ditch water elevation measurements were collected during a site-wide gauging event in December 2012 and are assumed to represent typical wet weather conditions at the site. Water elevations are contoured across the east and west portions of the site based on point measurements (e.g., from adjacent monitoring wells) and approximate groundwater flow patterns (see Figure D-6-1).

The bottom-of-fill elevations from each deposit were compared with the December 2012 groundwater table elevations; the relationship of each fill deposit with the maximum water table elevation is presented on Figure D-6-1. Cross sections that transect each site fill deposit were created using RI test pit observations and typical groundwater levels for wet weather conditions and are included as Figures D-6-2 through D-6-5.

TABLE

**Table D-6-1
Test Pit Locations, Elevations, and Observations**

Station ID	Ground Surface Elevation (feet, NAVD88) ¹	Depth to Base of Fill Deposit (feet bgs)	Bottom-of-Fill Deposit elevation (feet, NAVD88) ¹	Base of Deposit Reached?	Date of Observations
East Plant					
SU10 (Landfill #3 – Construction Debris)					
AQ-SSA7-03	25	8	17	Yes	10/27/2011
AQ-SSA7-04	24.79	2	22.79	Yes	10/27/2011
AQ-SSA7-05	27.31	9	18.31	Yes	10/27/2011
AQ-SSA7-06	29.03	6	23.03	Yes	10/27/2011
AQ-SSA7-07	28.74	5	23.74	Yes	10/28/2011
SU3 (Fill Deposit B-2 – Residual Carbon)					
AQ-ECA-01	11.48	5	6.48	Yes	10/19/2012
AQ-ECA-02	12.33	5	7.33	Yes	10/19/2012
AQ-ECA-03	12.79	7	5.79	Yes	10/19/2012
AQ-ECA-04	12.35	8	4.35	Yes	10/19/2012
TP-K	12.14	8	4.14	Yes	2/13/2012
TP-L	11.44	5	6.44	Yes	2/13/2012
TP-M	11.47	2	9.47	Yes	2/13/2012
TP-R	12.05	4	8.05	Yes	2/13/2012
TP-Q	13.95	6	7.95	Yes	2/13/2012
TP-P	13.5	7	6.5	Yes	2/14/2012
TP-U	12.09	4	8.09	Yes	2/14/2012
SU6 (Fill Deposit B-1 – Residual Carbon)					
AQ-BMP-01	21	> 15	< 6	No	10/24/2012
AQ-BMP-02	23.79	> 15	< 8.79	No	10/24/2012
AQ-BMP-03	24.8	> 16	< 8.8	No	10/23/2012
AQ-BMP-04	22.96	> 13.5	< 9.46	No	10/23/2012
AQ-BMP-05	25.5	> 15.5	< 10	No	10/23/2012
SU7 (Fill Deposit A – Spent Lime)					
AQ-WMP-01	11.39	7.5	3.89	Yes	10/24/2012
AQ-WMP-02	11.47	> 8	< 3.47	No	10/24/2012
AQ-WMP-03	10.81	7	3.81	Yes	10/24/2012
AQ-WMP-04	11.95	8	3.95	Yes	10/24/2012
SU8 (Landfill #1 – Floor Sweeps)					
AQ-FSL-01	19.36	> 12	< 7.36	No	10/18/2012
AQ-FSL-02	25.86	15.5	10.36	Yes	10/18/2012
AQ-FSL-03	16.26	8	8.26	Yes	10/18/2012
West Plant					
SU1 (Landfill #2 – Industrial)					
AQ-ILF-01	25.67	> 11	< 14.67	No	10/17/2012
AQ-ILF-02	25.3	> 12	< 13.3	No	10/17/2012
AQ-ILF-03	25.74	> 12	< 13.74	No	10/17/2012
AQ-ILF-04	27.6	> 9	< 18.6	No	10/17/2012
AQ-ILF-05	27.55	14	13.55	Yes	10/18/2012

**Table D-6-1
Test Pit Locations, Elevations, and Observations**

Station ID	Ground Surface Elevation (feet, NAVD88) ¹	Depth to Base of Fill Deposit (feet bgs)	Bottom-of-Fill Deposit elevation (feet, NAVD88) ¹	Base of Deposit Reached?	Date of Observations
TP-I-2	16.37	8	8.37	Yes	2/14/2012
TP-H-1	19.9	> 2	< 17.9	No	2/14/2012
TP-H-2	20.09	> 3	< 17.09	No	2/14/2012
TP-H-3	23.22	> 9	< 14.22	No	2/14/2012
SU2 (Fill Deposit B-3 – Residual Carbon)					
AQ-BMD-01	24.15	5	19.15	Yes	10/22/2012
AQ-BMD-02	25.43	5.5	19.93	Yes	10/22/2012
AQ-BMD-03	20.61	8	12.61	Yes	10/22/2012
AQ-BMD-04	22.57	7	15.57	Yes	10/22/2012
AQ-BMD-05	15.73	6	9.73	Yes	10/22/2012
AQ-BMD-06	16.86	5.5	11.36	Yes	10/22/2012
AQ-BMD-07	13.37	4	9.37	Yes	10/22/2012
AQ-BMD-08	14.02	4	10.02	Yes	10/23/2012
TP-B-2	14.37	2	12.37	Yes	2/14/2012
TP-A-1	14.53	3	11.53	Yes	2/14/2012
TP-A-2	13.64	2	11.64	Yes	2/14/2012
TP-G-1	25.56	3	22.56	Yes	2/14/2012
TP-G-2	23.36	> 3.5	< 19.86	No	2/14/2012
TP-G-3	23.66	> 4	< 19.66	No	2/14/2012
TP-F-1	25.71	2	23.71	Yes	2/14/2012
TP-F-2	23.41	5	18.41	Yes	2/14/2012
TP-E-1	15.42	4	11.42	Yes	2/14/2012
TP-E-2	14.04	1	13.04	Yes	2/14/2012
TP-D-1	13.67	3.5	10.17	Yes	2/14/2012
TP-D-2	13	2	11	Yes	2/14/2012
TP-C-2	12.2	2.5	9.7	Yes	2/14/2012

Notes:

1 = Ground surface elevations are from ALTA 2010 survey.

bgs = below ground surface

NAVD88 = North American Vertical Datum of 1988

FIGURES

K:\Projects\0730-MBT-Longview\MBT-2011 Capex\RI-FS\0730-RP-026 (Key Study Areas_GW_TP).dwg Figure D-6-1

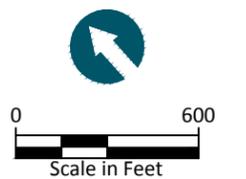


SOURCE: Drawing prepared from Alta Survey (Minister & Glaeser Surveying, Inc.) by November 11, 2010. Aerial image from Aerometric dated June 2013.

- NOTES:**
1. Test pit depths are summarized in Table D-6-1. Ground surface elevations from 2010 survey by Minister & Glaeser Surveying, Inc..
 2. Groundwater, surface water, and ditch water elevation measurements collected during wet weather conditions in December, 2012.

LEGEND:

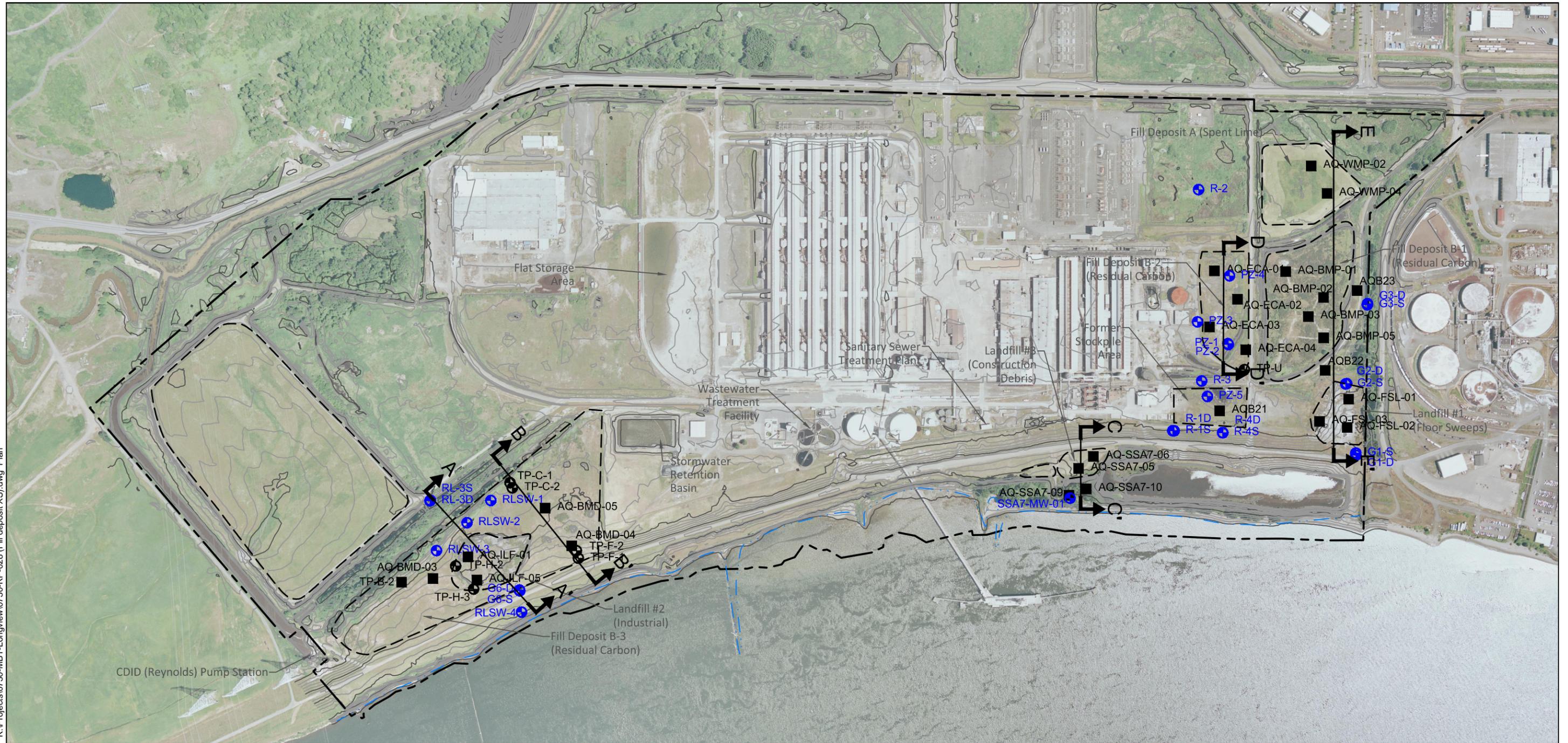
- Landfill or Fill Deposit Present Predominantly Above the Groundwater Table
- Landfill or Fill Deposit with Fill Material Below the Groundwater Table
- Groundwater Elevation Contour in Feet (NAVD88)
- 25.8** Test Pit Location and Estimated Base of Fill Deposit Elevation in Feet (NAVD88)
- △<23.1** Test Pit Location Where Base of Fill Deposit Was Not Reached - Estimated Maximum Elevation in Feet (NAVD88)



Feb 09, 2015 4:12pm chawett

Figure D-6-1
Fill Material in Contact with Groundwater During Wet Weather Conditions
Remedial Investigation/Feasibility Study
Former Reynolds Metals Reduction Plant – Longview

K:\Projects\0730-MBT-Longview\0730-RP-028 (Fill deposit XS).dwg Plan



May 22, 2014 8:54am cheswet

SOURCE: Upland topography from ALTA survey dated January 2011. Aerial image by Aerometric, dated May 2013.
HORIZONTAL DATUM: Washington State Plane South, NAD83, U.S. Feet.
VERTICAL DATUM: North American Vertical Datum 1988 (NAVD88).

LEGEND:

- Property Boundary
- Existing Topography (2' and 10' Contours)
- - - Ordinary High Water Line
- ⊕ RI Monitoring Well
- RI Test Pit Location

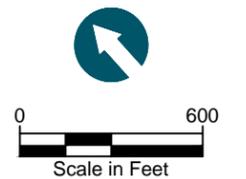
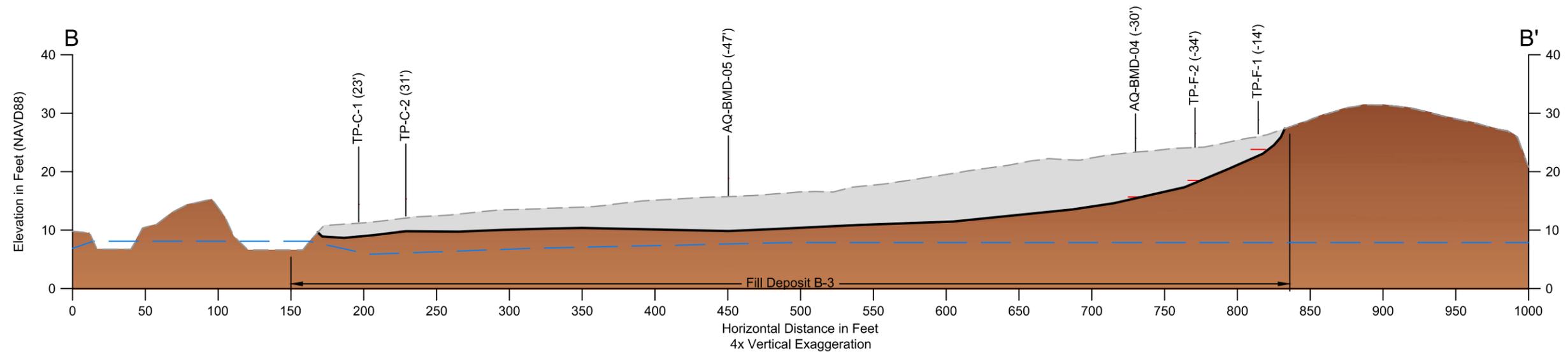
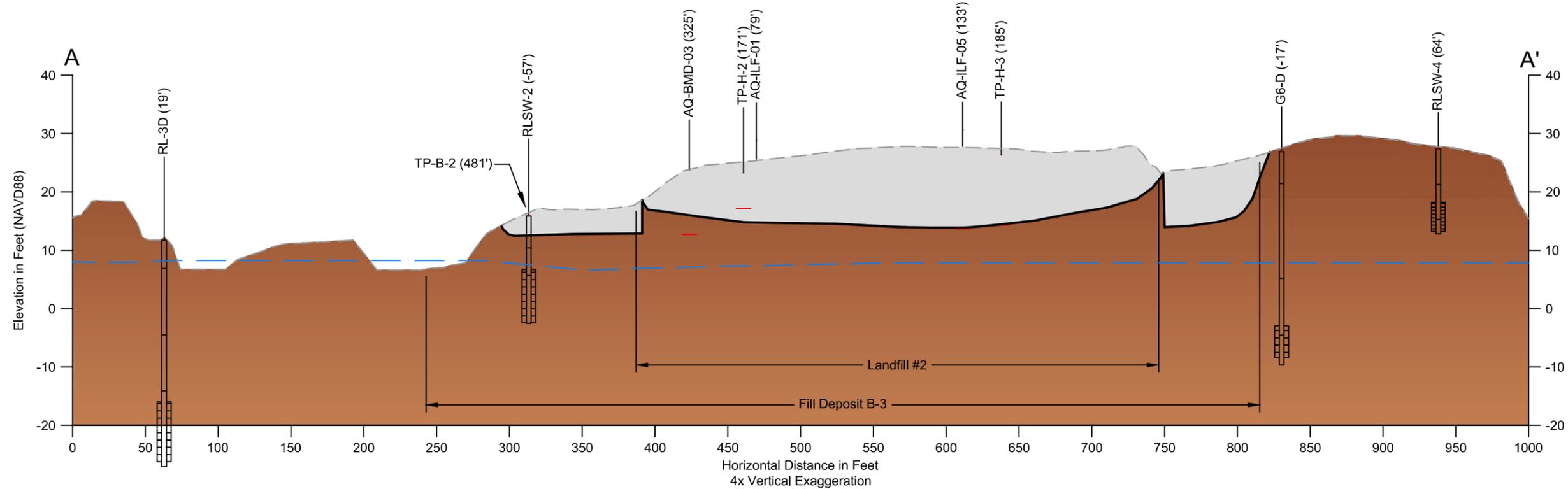


Figure D-6-2
 Cross-Section Locations
 Remedial Investigation/Feasibility Study Fill Deposit Detail
 Former Reynolds Metals Reduction Plant – Longview

K:\Projects\0730-MBT-Longview\0730-RP-028 (Fill deposit XS).dwg XS A AND B



Feb 09, 2015 4:16pm chawett

SOURCE: Upland topography from ALTA survey dated January 2011.
VERTICAL DATUM: North American Vertical Datum 1988 (NAVD88).
NOTE: For additional test pit observations, see Table D-6-1.

- LEGEND:**
- Existing Surface
 - Approximate Groundwater Elevation During Wet Weather Conditions
 - Bottom of Fill Deposit (As Observed in Test Pits) Elevation
 - █ Fill Deposit
 - █ Upper Alluvium

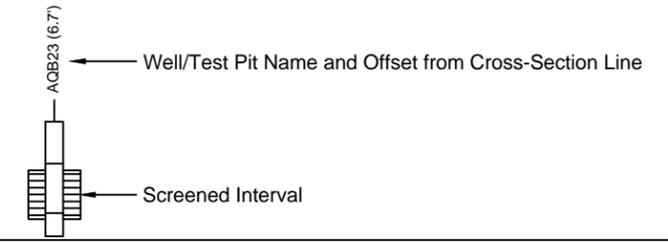
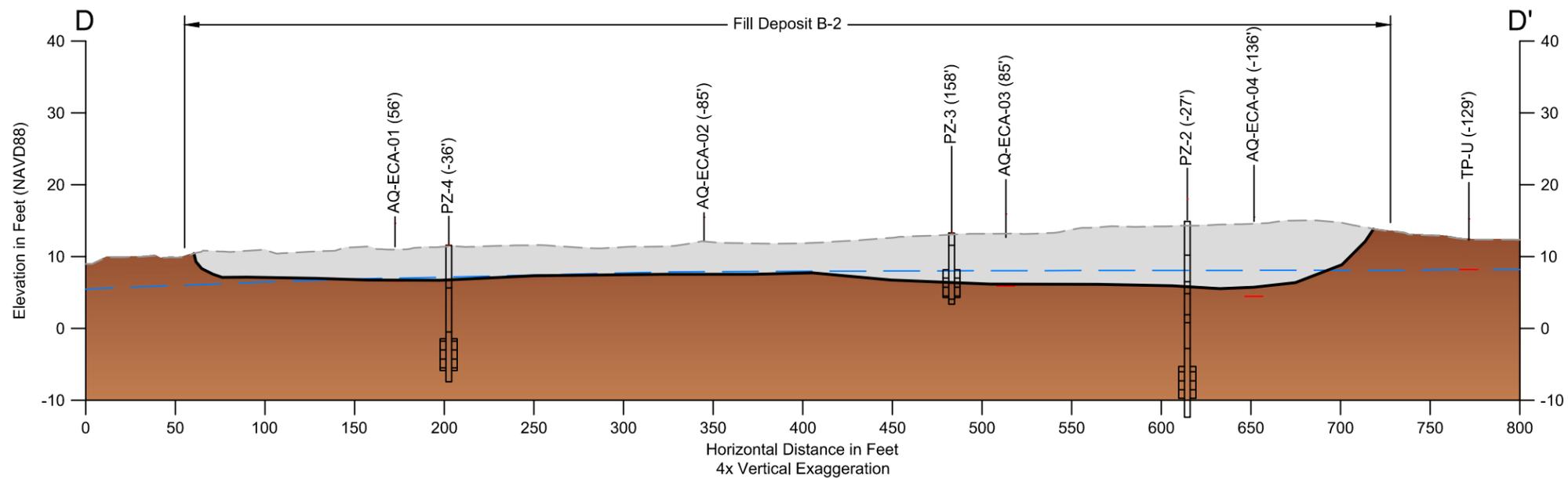
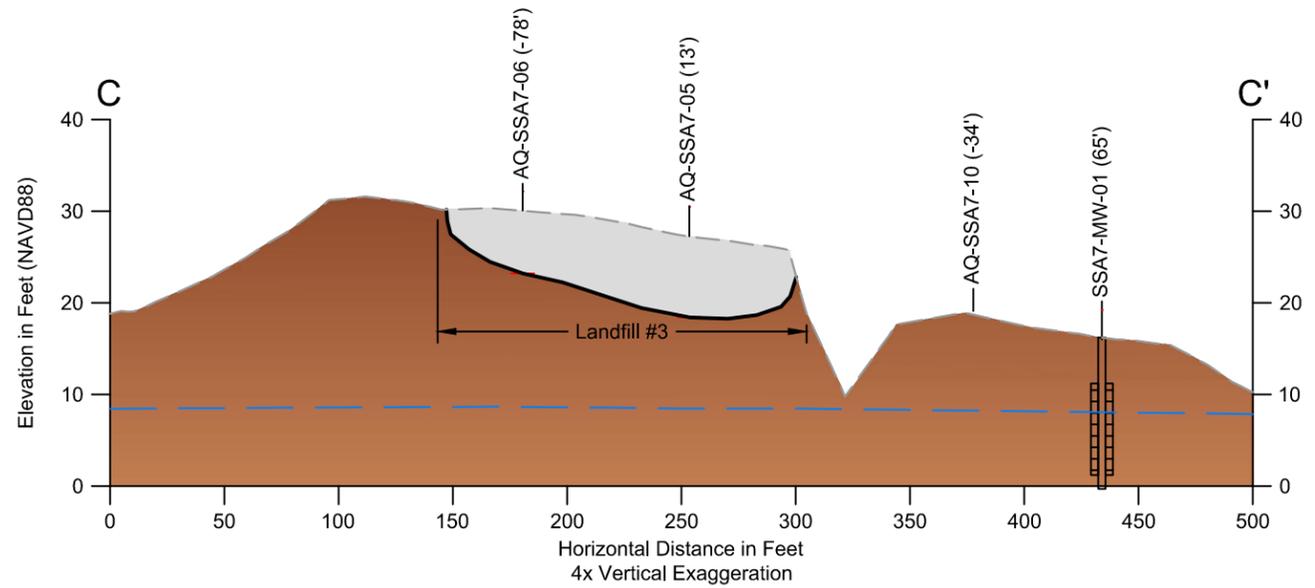


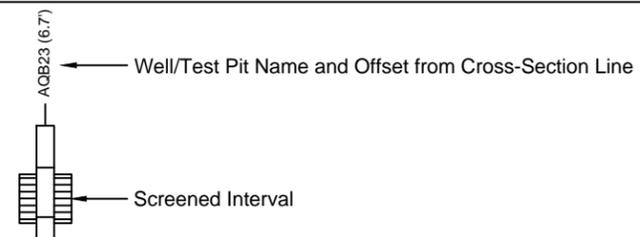
Figure D-6-3
 Cross-Sections A-A' and B-B'
 Remedial Investigation/Feasibility Study Fill Deposit Detail
 Former Reynolds Metals Reduction Plant – Longview





LEGEND:

- Existing Surface
- Approximate Groundwater Elevation During Wet Weather Conditions
- Bottom of Fill Deposit (As Observed in Test Pits) Elevation
- █ Fill Deposit
- █ Upper Alluvium



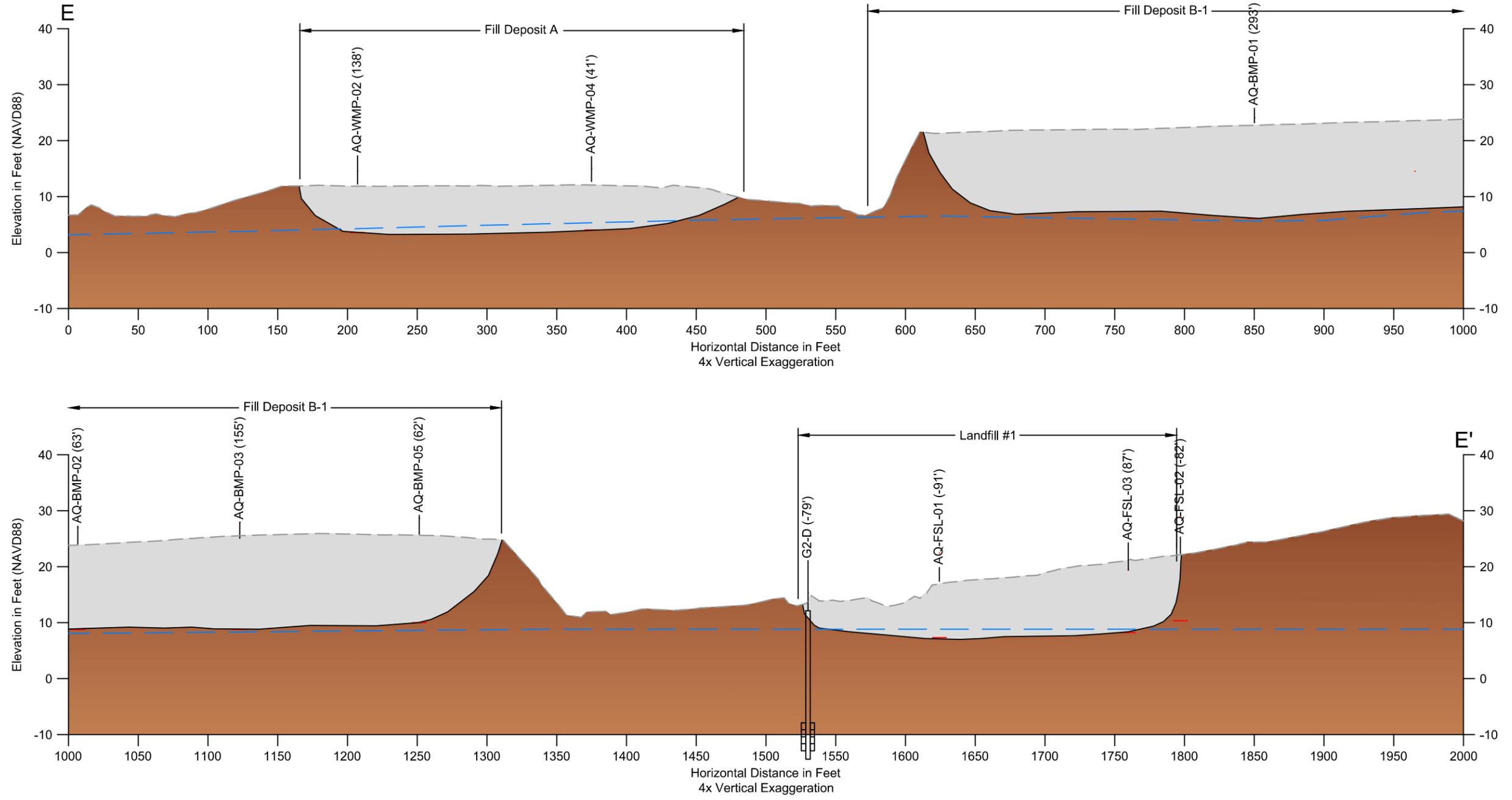
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Feb 09, 2015 4:16pm chewart

SOURCE: Upland topography from ALTA survey dated January 2011.
VERTICAL DATUM: North American Vertical Datum 1988 (NAVD88).
NOTE: For additional test pit observations, see Table D-6-1.

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Feb 09, 2015 4:16pm chewart



SOURCE: Upland topography from ALTA survey dated January 2011.
VERTICAL DATUM: North American Vertical Datum 1988 (NAVD88).
NOTE: For additional test pit observations, see Table D-6-1.

LEGEND:

- Existing Surface
- Approximate Groundwater Elevation During Wet Weather Conditions
- Bottom of Fill Deposit (As Observed in Test Pits) Elevation
- █ Fill Deposit
- █ Upper Alluvium

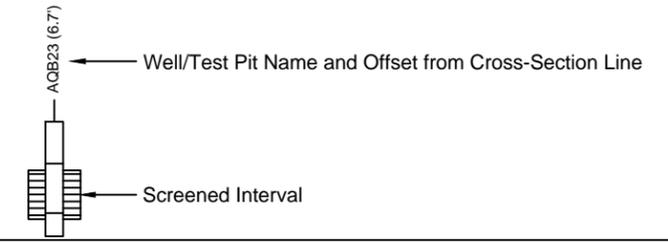


Figure D-6-5
 Cross-Section E-E'
 Remedial Investigation/Feasibility Study Fill Deposit Detail
 Former Reynolds Metals Reduction Plant – Longview