Focused Extraction and Production Well Optimization System Startup Performance Monitoring Plan

Memorandum WP No. 69



Reynolds Metals Company TROUTDALE FACILITY

CH2MHILL

November 2005



Focused Extraction and Production Well Optimization System Startup Performance Monitoring Plan

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DATE: November 30, 2005

PROJECT NUMBER: 166034.07.14.02

1.0 Purpose and Scope

This work plan describes monitoring that will occur during and immediately following startup of the focused extraction and production well optimization (FE/PWO) system at the Reynolds Metals Company/Alcoa (RMC/Alcoa) Troutdale facility. This work plan covers the period between startup in October 2005 through April 2006, when long-term sitewide groundwater monitoring begins. The sitewide groundwater monitoring plan is described in *Memorandum WP No. 68: Sitewide Groundwater Monitoring Plan 2006 Through 2010 – RMC-Troutdale* (CH2M HILL, June 2005).

This performance monitoring plan (PMP) will be implemented to:

- Establish operation pumping rates at FE02-046 and FE03-045
- Determine fluoride and cyanide concentration trends during the focused extraction system startup
- Determine the area of influence of the focused extraction system
- Determine whether additional focused extraction wells are required to establish
 hydraulic control over the area where fluoride concentrations exceed the limits
 established in the Record of Decision (ROD)
- Determine whether additional piezometers are required to assess system performance

Well locations are shown in Figure 1.

2.0 Startup Performance Monitoring

The startup performance monitoring program will consist of a 2-hour, step-rate test at each of the focused extraction wells [FE02-046 and FE03-045 (well construction details are presented in Attachment 1)], a 1-week background observation period, a constant-rate test

of FE02-046, and a FE02-046 and FE03-045 combined constant-rate test. Groundwater levels will be monitored during the step-rate tests, background observation period, constant-rate tests, and during systems operation. The objectives of the PMP are as follows:

- Obtain pumping response data to finalize the operational pumping rate, the baseline performance of FE02-046 and FE03-045, and capture zone effectiveness.
- Obtain water quality data to evaluate fluoride and cyanide concentrations and trends during system operation.
- Obtain quantitative aquifer characteristic data that can be used to evaluate and, if necessary, modify the existing conceptual groundwater flow model in the scrap yard area.
- Obtain quantitative aquifer characteristic data that can be used to evaluate and, if necessary, modify the existing extraction system.
- Obtain hydraulic conductivity estimates for use in the groundwater flow model.

The PMP components are discussed in more detail below.

2.1 Two-Hour, Step-Rate Pumping Test

One 2-hour step-rate pumping test will be conducted separately at each of the focused extraction wells 1 week prior to the constant rate pumping tests. The purpose of the step-rate tests are primarily to select the pumping rate for the constant-rate test (80 to 90% of maximum production assuming the fluoride and cyanide concentrations do not result in an exceedance of the NPDES limits at this pumping rate) and establish baseline performance of the focused extraction wells. The step-rate test consists of pumping each well at increasingly higher pumping rates over similar time intervals, or steps. The pumping rate schedule is based on well development activities which provided preliminary well yield information. For planning purposes, it is assumed that the initial pumping rate will be 15 gpm. The pumping rate will be increased by 5 gpm for each subsequent 30-minute step. Therefore, the focused extraction well will be pumped at 20 gpm, 25 gpm, and the maximum pumping rate during the second, third, and fourth steps of the test. The test will be terminated after the fourth step of pumping. These pumping rates are preliminary and may be modified in the field based on observations.

Prior to starting the step-rate test, background water levels will be collected in the observation well network (see Table 1). During the step-rate tests, water level measurements will continue to be collected at each of the pumping wells. Datalogging equipment in the wells will be programmed to collect water level measurements every 15 seconds.

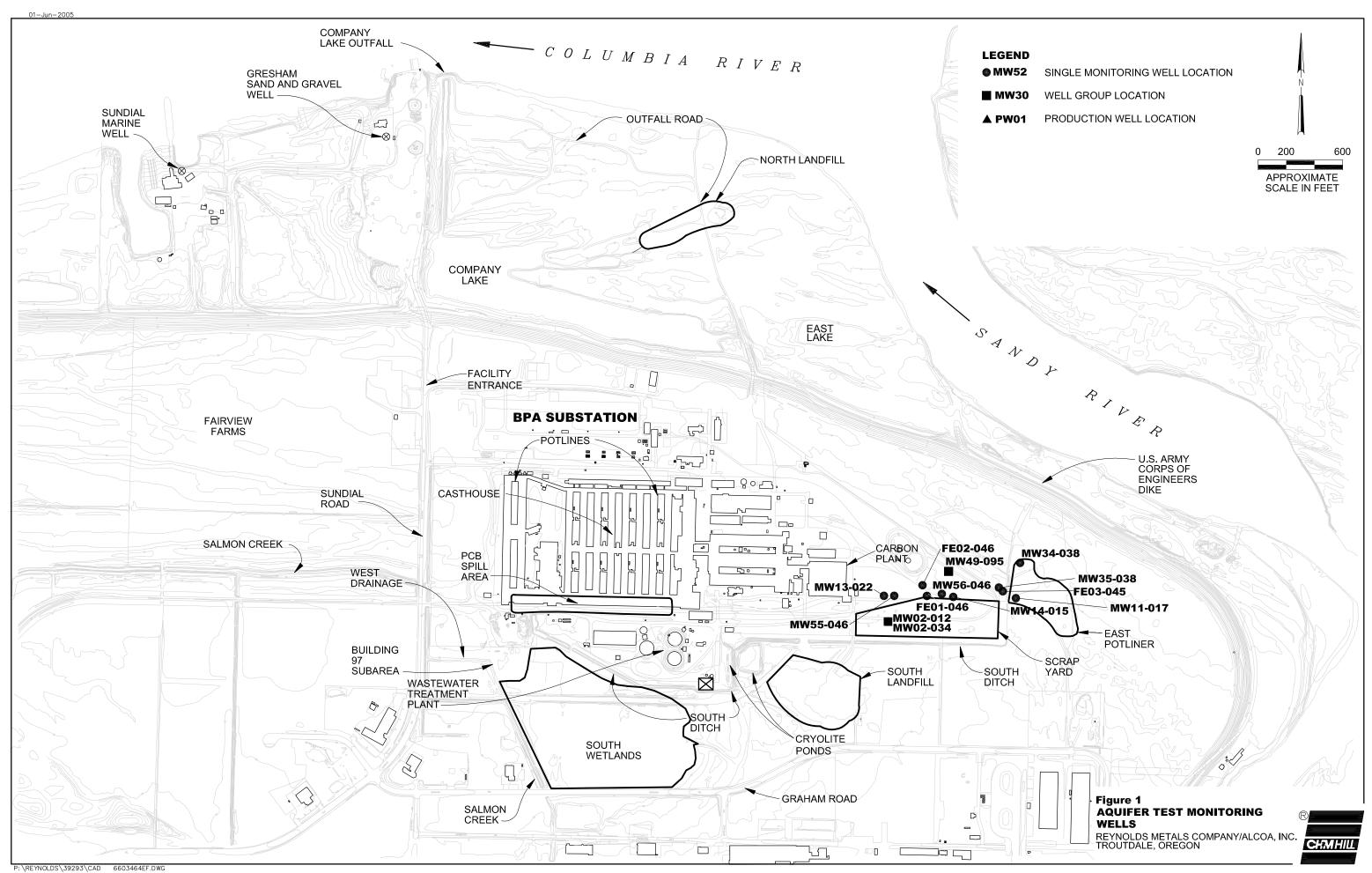


Table 1 Focused Extraction Performance Monitoring Program

		2-Hour	Step Te	est	Baseline \	Water L	evel	FE02 Coi Pump	nstant-F ing Tes		FE02 and FE03 Constant- Rate Pumping Test ^b		Monthly Monitoring for 5 Months ^c			
Well Location	Well ID	Water Levels	Fluoride	Cyanide	Water Levels	Fluoride	Cyanide	Water Levels	Fluoride	Cyanide	Water Levels	Fluoride	Cyanide	Water Levels	Fluoride	Cyanide
Columbia River	Columbia River- Gresham sand and gravel obs point				30-min. Intervals for 1 week (Transducer)			30-min Intervals During Test (Transducer)			30-min Intervals During Test (Transducer)			Monthly		
	FE02-046	Logarithmically During Test (Transducer)	1 (end)		30-min. Intervals for 1 week (Transducer)			Logarithmically During Test (Transducer)	3	1 (end)	Logarithmically During Test (Transducer)	1		Monthly	Monthly	Monthly
	FE03-045	Logarithmically During Test (Transducer)	1 (end)		1 (Beginning)			Logarithmically During Test (Transducer)			Logarithmically During Test (Transducer)	3	1 (end)	Monthly	Monthly	Monthly
Primary Observation	MW33-033				15 min. Intervals for 1 week (Transducer)			15 min. Intervals During Test (Transducer)			15 min. Intervals During Test (Transducer)					
Well Network	MW34-038	1 (Beginning)			1 (Beginning)	1		Logarithmically During Test (Transducer)			Logarithmically During Test (Transducer)			Monthly	1 (Jan)	
	MW55-046	1 (Beginning)			1 (Beginning)	1		Logarithmically During Test (Transducer)			Logarithmically During Test (Transducer)			Monthly	1 (Jan)	
	MW56-046	1 (Beginning)			1 (Beginning)	1		Logarithmically During Test (Transducer)			Logarithmically During Test (Transducer)			Monthly	1 (Jan)	
	FE01-046	1 (Beginning)			1 (Beginning)			Hourly (manually)			Hourly (manually)			Monthly		
Secondary Observation Well Network	MW35-038 MW49-095 MW02-034	1 (Beginning) 1 (Beginning) 1 (Beginning)			1 (Beginning) 1 (Beginning) 1 (Beginning)			Hourly (manually) 2 ^d 2 ^u			Hourly (manually) 2 ^d 2 ^u			Monthly Monthly Monthly		

Notes

a Assumes the facilities production wells have been pumping at a constant rate for a minimum of 1 month prior to the start of the observation period. If the production wells have not been pumping at a constant rate for 1 month prior to the observation period, a two-week baseline observation period may be required.

^b The duration of FE02 and FE03 combined pumping test may be shortened based on results of the 72-hour FE02 pumping test.

c The monthly monitoring is assumed to start in December and continue through April until the first quarterly sampling in May 2006.

d Water level will be measured at the beginning and end of the pump test.

Manual water level measurements will be collected at the pumping well during the 2-hour, step-rate test. These measurements serve as a backup data set should problems arise with the datalogging equipment. Manual water level measurements collected during the step-rate test will be recorded on the aquifer test report (contained in Attachment 2) according to the schedule shown in Table 2 for each step:

Table 2 Manual Water Level Measurement Intervals							
Time Since Beginning of Each Step (Minutes)	Interval Between Measurements (Minutes)						
0–10	0.5 (or as close as possible)						
10–15	1						
15–30	5						

The time of the water level observation, depth to water, and remarks will be recorded on the aquifer test report (Attachment 2). The instant the pump starts will be recorded as time zero for the test. All observers will have a watch with a second hand or digital seconds display. All watches will be synchronized before the pumping test begins. Water level readings will be recorded to the nearest 0.01 foot. It may not always be possible to obtain an accurate reading at the exact time indicated on the aquifer test report; therefore, it is critical that the actual time the reading is taken be recorded on the report form. This is particularly important at the beginning of the test, when reading intervals are 1 minute or less.

At the completion of the step tests a fluoride sample will be collected from the pumping well. Results from this sample will be used to determine the maximum pumping rates at each of the extraction wells during the constant rate pumping test.

2.2 Baseline Water Level Monitoring

Background water levels will be collected manually at observation wells at the start the baseline water level monitoring as shown in Table 1. Background water level data will be collected continuously in extraction well FE02-046 and the Columbia River, using datalogging equipment, for approximately 1 week before the start of the constant-rate pumping tests (see discussion below). Dataloggers will be set to record water levels at 30-minute intervals during the baseline monitoring period. Additionally, background water level data will be collected every 15 minutes at Company Lake well MW33-033 to account for any influence on water levels from recent activities at the lake.

The purpose of this monitoring period is to document groundwater level trends that may need to be corrected during the data analysis effort. Manual water level measurement will be taken at FE02-046 at the end of the baseline water level monitoring period to confirm the accuracy of the transducer.

The 1-week background observation period is appropriate only if the facilities production wells have been pumping at a constant rate for a minimum of 1 month prior to the start of the observation period. If the production wells have not been pumping at a constant rate for

1 month prior to the background observation period, a 2-week period may be necessary. Steve Shaw/RMC-Alcoa will be contacted to confirm that the production wells can be operated at a constant rate for 1 month prior to the start of the background observation period and this will be confirmed prior to the start of the PMP.

2.3 FE02-046 Constant-Rate Pumping Test and Recovery

A constant-rate pumping test will be conducted at FE02-046 after the 1-week background observation period. The duration of this test is expected to be between 48 and 72 hours based on well response (i.e., water level stabilization and trend equilibration).

Before the FE02-046 constant-rate test begins, manual water level measurements will be collected from all wells in the observation network identified in Table 1. Internal datalogger clocks, as well as data collection intervals, will be synchronized. The production wells will be operational in order for the focused extraction wells to operate due to safeguards built into the FE/PWO system.

During the constant-rate test, electronic water level measurements will continue to be collected from the pumping wells, primary observation wells, and the Columbia River. Datalogging equipment in the wells will be programmed to collect water level measurements at very short intervals at the start of the test (for example, every 10 seconds for the first 2 minutes). As the test progresses, measurement intervals will be gradually lengthened (at a minimum water levels will be recorded on a logarithmic scale starting at the being of the test). The Columbia River datalogging equipment will continue to collect river stage measurements every 30 minutes.

Manual water levels will be measured in FE02-046 and MW56-046 at the intervals shown in Table 3.

Table 3 Water Level Measurement Intervals at FE02-046 and MW56-046								
Time Since Pumping Started (Minutes)	Interval Between Measurements (Minutes)							
0–10	0.5–1							
10–15	1							
15–60	5							
60–300	30							
300–480	60							

Manual measurements will be collected at all primary observation wells periodically during the first 8 hours of the test. As previously noted, manual measurements provide backup data sets should problems arise with the datalogging equipment.

After the first 8 hours of the test, manual measurements will be discontinued in all wells; water level measurements will continue to be collected using the datalogging equipment. Before the constant-rate test is terminated, manual water level measurements will be collected from all wells in the network (as described in Section 4). Water quality samples

will be collected from FE02-046 during the constant-rate test (also as described in Section 4.2). After the test, the FE02-046 pump will be shut down overnight to allow the system to recover while the data logger records water level in the well.

Recordkeeping procedures used during the step-rate test will be applied to the constant-rate tests. Forms are presented in Attachment 1.

2.4 FE02-046 and FE03-045 Constant-Rate Pumping Test

A combined constant-rate pumping test will be conducted for wells FE02-046 and FE03-045 following the FE02-046 constant-rate pumping test and recovery period. This test will be initiated by starting pumping simultaneously at FE02-046 and FE03-045. The production wells will be operational in order for the focused extraction wells to operate due to safeguards built into the FE/PWO system. The FE/PWO system safeguard includes an interlock to prevent the FE wells from operating if the production wells are not operational. A programmable logic controller for the FE/PWO system will not allow an FE well pump to start unless at least one production well is operating.

Similar to the FE02-046 constant-rate pumping test, during the combined constant-rate test, electronic water level measurements will continue to be collected from the pumping wells, primary observation wells, and the Columbia River. Datalogging equipment in the wells will be re-programmed to collect water level measurements at very short intervals at the start of the test (for example, every 10 seconds for the first 2 minutes). And as the test progresses, measurement intervals will be gradually lengthened (at a minimum water levels will be recorded on a logarithmic scale starting at the beginning of the test). The Columbia River datalogging equipment will continue to collect river stage measurements every 30 minutes.

Manual water levels will be measured in FE03-045 and MW34-038 at the intervals shown in Table 4.

Table 4 Water Level Measurement Intervals at FE03-045 and MW34-038								
Time Since Pumping Started (Minutes)	Interval Between Measurements (Minutes)							
0–10	0.5–1							
10–15	1							
15–60	5							
60–300	30							
300–480	60							

Manual measurements will be collected at all primary observation wells periodically during the first 8 hours of the test. As previously noted, manual measurements provide backup data sets should problems arise with the datalogging equipment.

After the first 8 hours of the test, manual measurements will be discontinued in all wells; water level measurements will continue to be collected using the datalogging equipment. Before the combined constant-rate test is terminated, manual water level measurements will be collected from all wells in the network (as described in Section 4.1). Water quality samples will be collected from FE03-045 and FE02-046 during the combined pumping constant-rate test (also as described in Section 4.2).

Recordkeeping procedures used during the step-rate test will be applied to the constant-rate tests. Forms are presented in Attachment 1. It may be necessary for the observer monitoring the pumping well to adjust the discharge by partially opening or closing the discharge control valve. After the initial discharge rate has been stabilized, the discharge will be regularly checked and controlled to maintain a constant rate. The discharge rate will be recorded in the remarks column of the aquifer test report form.

2.5 Monthly Monitoring and System Optimization

Following completion of the combined pumping constant-rate test, water level data will be collected monthly for 5 months. Water level measurements will be collected at the nine wells identified in Table 1. During this time period, the pumping rate and fluoride concentrations will be used to determine the optimal pumping rate and whether cyclic pumping/nonpumping cycles are required. Lower pumping rates may be required at the extraction wells if fluoride concentrations will exceed 5.0 milligrams per liter (mg/L) after blending with water from the production wells. Pumping/nonpumping cycles may be implemented if fluoride concentration decreases substantially after long-term pumping and if adequate groundwater containment is possible.

3.0 Data Analysis

Water level data will be used to produce hydrographs for each of the monitored locations. The hydrographs will be used to compare well responses and to assess tidal influences. Previous aquifer tests performed at the site determined that the overall effect on ground-water elevations from barometric influences was very small. Therefore, barometric pressure monitoring will not be required during the aquifer test. Monitoring wells in the UGS are influenced by river stage and tidal influences; therefore, water level data will be corrected for these influences.

Drawdown and recovery data will be analyzed by using the AQTESOLV (Hydrosolv, Inc., Version 3.x) aquifer test analytical software package. AQTESOLV will be used to curve match the observed time-drawdown data using the Theis (1935), Cooper-Jacob (1946), and Theis Recovery (1935) solutions. A distance-drawdown analysis will be conducted using the FE02-046 constant-rate drawdown and recovery data if there is adequate response to pumping at three or more observation points.

4.0 Monitoring Network

4.1 Water Levels

Water level data will be collected from existing monitoring wells before, during, and after the aquifer test using a combination of manual measurement equipment and datalogger/pressure transducer assemblies. Datalogging equipment will be installed in FE02-046, FE03-045, MW33-033, MW55-046, MW56-046, MW34-038 and the Columbia River to monitor water levels.

Water levels will be measured manually at the wells and intervals specified in Table 1. Water levels will be measured manually at the following locations as often as practical:

- UGS wells: FE01-046, MW02-034, and MW35-038
- Intermediate well: MW49-095

The frequency of manual measurements may be adjusted during the test on the basis of observed aquifer response at each monitoring location. The locations of the monitoring wells to be monitored during the aquifer test are shown in Figure 1.

4.2 Water Quality

At the completion of each of the step test, a fluoride sample will be collected from each of the extraction wells. Results from this sample will be used to calculate the maximum pumping rate at which each of the extraction wells may be pumped with out exceeding the NPDES permit levels for the facilities.

During the FE02-046 constant-rate test water quality samples will be collected from FE02-046. Fluoride samples will be collected from FE02-046 at the beginning, middle, and end of the test. Cyanide samples will be collected from FE02-046 at the end of the test.

During the FE02-046 and FE03-045 combined constant-rate test water quality samples will be collected from FE02-046 and FE03-045. Fluoride samples will be collected from FE03-045 at the beginning, middle and end of the test. Cyanide samples will be collected from FE03-045 at the end of the test. Fluoride will be collected from FE02-046 at the end of the test.

Following completion of the combined pumping constant-rate test fluoride and cyanide samples will be collected monthly for 5 months from both FE02-046 and FE03-045. Fluoride samples will be collected from observation wells MW34-38, MW55-46, and MW56-046 once during the 5-month-long monitoring period, 2 months after the FE02 and FE03 constant-rate test.

Fluoride samples will be analyzed for total fluoride using field testing equipment. Samples with fluoride concentrations greater than 100 mg/L will be sent to ASL – Corvallis, Oregon, Laboratory, for confirmation testing using EPA Method 300.0. Groundwater samples will be analyzed for total cyanide analysis by EPA Method 335.2. If total cyanide is detected above 0.2 mg/L, the sample shall also be analyzed for both amenable cyanide using EPA Method 335.1 and metal-cyanide complex using EPA Method SW9015 to determine the amount of iron-cyanide complex (non-toxic) and free cyanide (toxic) present. This limit at 0.2 mg/L was established to ensure that the NPDES discharge limits are not exceeded

(0.05 mg/L maximum daily and 0.025 mg/L monthly maximum) once blended with production well water. The samples will be collected and handled according to the procedures described in the *Draft Sampling and Analysis Plan* (CH2M HILL, July 1997). The frequency of cyanide monitoring will be evaluated following the first few rounds of sampling to determine if the proposed analysis frequency requires modification.

4.2.1 Groundwater Sample Identification

Groundwater samples will be identified using the following sample nomenclature:

XXXX-000-DDDYY-q

XXXX = Four-digit well identification, for example, MW02, PW07, or FE03

000 = Three-digit well depth – bottom of screen interval, for example,

MW02-034

DDD = Modified Julian Day

YY = Last two digits of current year

q = qualifier (0 = normal environmental sample, 1 = field duplicate, 2 = field equipment rinsate blank, 3 = field trip blank which is associated with the

last VOC sample taken in the cooler to be shipped)

Example = MW02-244-06205-0: Normal sample collected from monitoring well 2, bottom of screened interval at 34 feet, on the 244nd day of 2005 (*equates to September 1, 2005*).

4.2.2 Laboratory Analysis

Groundwater samples shall be sent under chain-of-custody (COC) to the ASL – Corvallis, Oregon, Laboratory. Laboratory requirements for groundwater samples are shown in Table 5.

Table 5	
Laboratory Requirements for Groundwater Samples	S

Analysis	Method	Approx. No. of Samples	Bottle Size and Type	Preservative	Holding Time (Days)	Reporting Limit (mg/L)
Fluoride	EPA 300.0	20	250 mL poly	None	28	0.25
Total Cyanide*	EPA 335.2	12	500 mL poly	NaOH	14	0.02
Amenable Cyanide	EPA 335.1	NA	500 mL poly	NaOH	14	0.02
Metal Cyanide Complexes	SW 9015/ ASTM 6994	NA	250 mL poly covered with aluminum foil	NaOH	14	0.01

^{*} If total cyanide is detected above 0.2 mg/L, the sample will also be analyzed for amenable and metal-cyanide complex.

EPA = U.S. Environmental Protection Agency.

mL = milliliter(s)

mg/L = milligrams per liter. NA = not available.

ATTACHMENT 1 Focused Extraction Well Construction Details



Sheet: 1 of 4

Well ID: FE02-046

Client: RMC-Alcoa

Project: Focused Extraction Well

Location: Scrap Yard

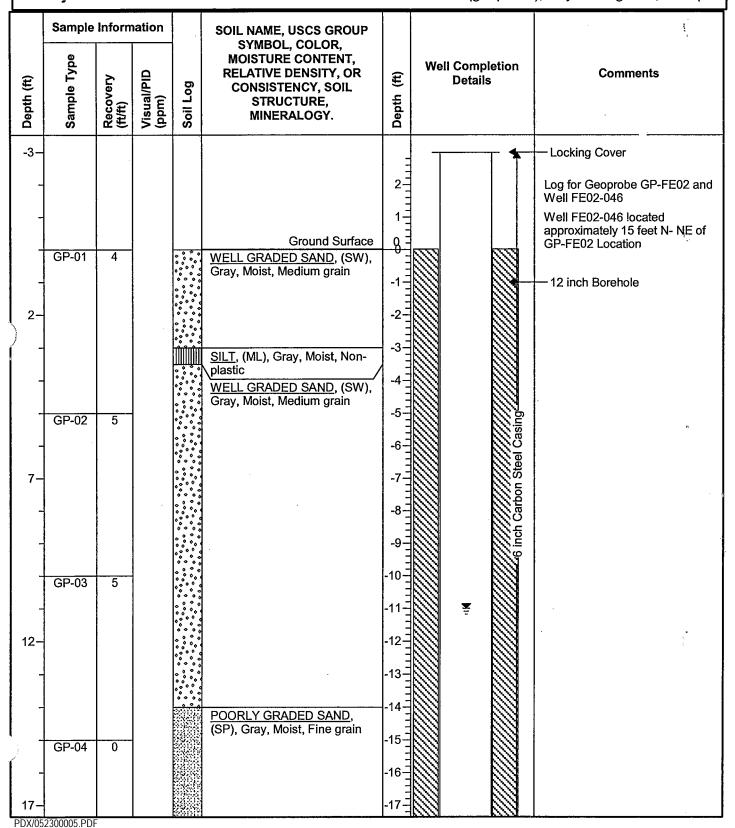
Project Number: 166034

Driller: GeoTech Exploration Inc. and Holt Drilling

Drilling Method: Geoprobe 6600 Track Mount/ Cable Tool

Sampling Method: 5-foot Geoprobe Sampler

Logged by: D. Lacey (geoprobe), E. Keene (well installation)





Well ID: FE02-046

Sheet: 2 of 4

Client: RMC-Alcoa

Driller: GeoTech Exploration Inc. and Holt Drilling

Project: Focused Extraction Well

Drilling Method: Geoprobe 6600 Track Mount/ Cable Tool

Location: Scrap Yard

Sampling Method: 5-foot Geoprobe Sampler **Logged by:** D. Lacey (geoprobe), E. Keene (well installation)

Project Number: 166034

	Sample	Inform	nation		SOIL NAME, USCS GROUP				
Depth (ft)	Sample Type	Recovery (ft/ft)	Visual/PID (ppm)	Soil Log	SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	Depth (ft)	Well Comp Details		Comments
-						-18			
-	GP-05	4	:		<u>Silt,</u> (ML), Gray, Wet, Medium plasticity	-20			·
22-					POORLY GRADED SAND WITH SILT, (SP-SM), Gray, Wet, Fine grain	-22 -23 -24			
-	GP-06	5				-25-			
27-					POORLY GRADED SAND WITH SILT, (SP-SM), Gray, Wet, Medium grain	-27- -27-			
-					SILT, (ML), Gray, Wet, Non- plastic POORLY GRADED SAND WITH SILT, (SP-SM), Gray, Wet, Medium grain	-29		<u> </u>	Sieve Sample: GP-FE-02-30-32.5
	GP-07	3			SILT, (ML), Gray, Wet, Non- plastic POORLY GRADED SAND WITH SILT, (SP-SM), Dark	-31			Sieve Sample. GF-FE-02-30-32.5
32-					gray, Wet, Fine grain, 2-inch band of organic staining at 38- feet	-33			
	GP-08	5				-34			Sieve Sample: GP-FE-02-35-37.5
37-						-36 -37			



Sheet: 3 of 4

Well ID: FE02-046

Client: RMC-Alcoa

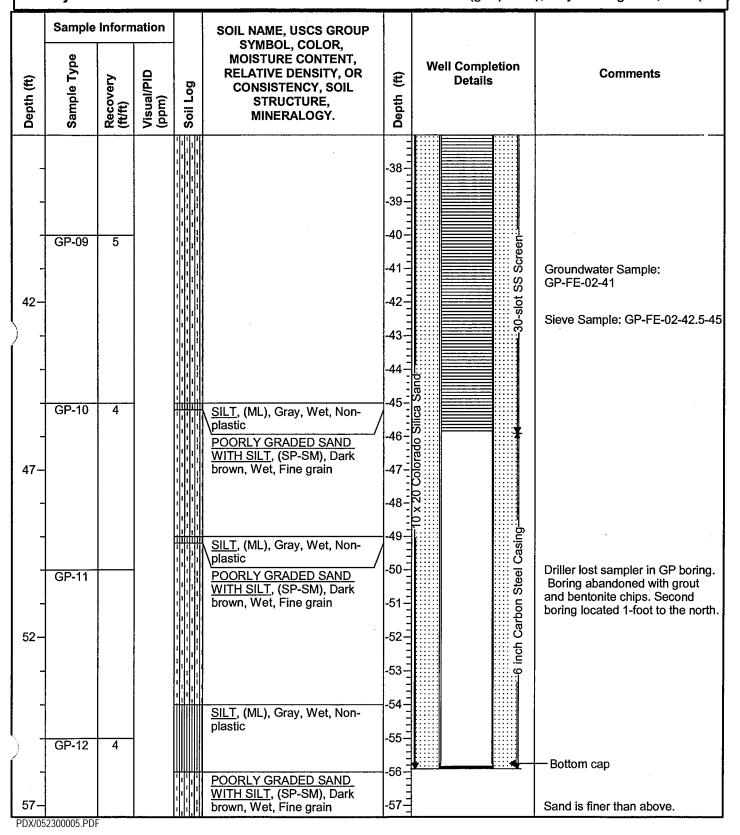
Project: Focused Extraction Well

Location: Scrap Yard Project Number: 166034 **Driller:** GeoTech Exploration Inc. and Holt Drilling

Drilling Method: Geoprobe 6600 Track Mount/ Cable Tool

Sampling Method: 5-foot Geoprobe Sampler

Logged by: D. Lacey (geoprobe), E. Keene (well installation)





Well ID: FE02-046

Sheet: 4 of 4

Client: RMC-Alcoa

Project: Focused Extraction Well

Location: Scrap Yard

Project Number: 166034

Driller: GeoTech Exploration Inc. and Holt Drilling **Drilling Method:** Geoprobe 6600 Track Mount/ Cable Tool

Sampling Method: 5-foot Geoprobe Sampler

Logged by: D. Lacey (geoprobe), E. Keene (well installation)

	Sample	Inform	nation		SOIL NAME, USCS GROUP		<u> </u>	
Depth (ft)	Sample Type	Recovery (ft/ft)	Visual/PID (ppm)	Soil Log	SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	Depth (ft)	Well Completion Details	Comments
62—	GP-13	4				-58 -59 -60 -61		Sieve Sample: GP-FE-02-56-60
- 67-	GP-14	5			SILT, (ML), Gray, Wet, Non- plastic POORLY GRADED SAND WITH SILT, (SP-SM), Dark brown, Wet, Fine grain	-63 -64 -65 -66		Sieve Sample: GP-FE-02-65-70
-					End of Log	-69 -70 -71		Total Depth = 70-feet
72-						-72 -73 -74 -75		Geoprobe Boring abandoned with bentonite grout from 70- to 25-feet and chipped to surface with 3/8 inch bentonite Holeplug.
77-						-76 -77		



Sheet: 1 of 3

Well ID: FE03-045

Client: RMC-Alcoa

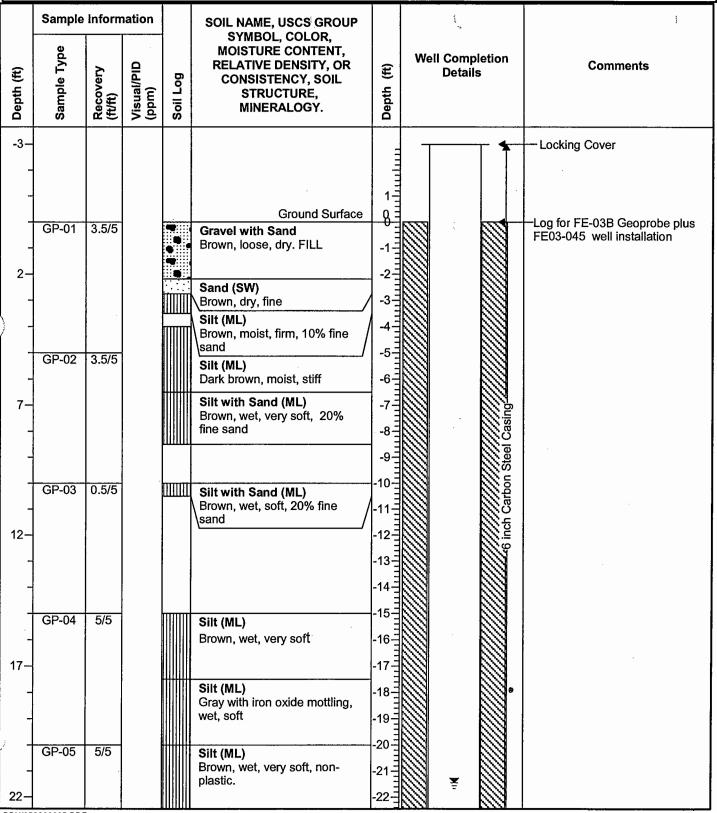
Project: Focused Extraction Well

Location: East Potliner Project Number: 166034 **Driller:** Holt Drilling

Drilling Method: Geoprobe (log) and Cable Tool (Well Installation) **Sampling Method:** Continuous Core Sampling with Geoprobe 6600

Logged by: Emily Keene

Start/ Finish: Geoprobe 7/19/2004. Well Installation 8/3 - 8/6/2004





Well ID: FE03-045

Sheet: 2 of 3

Client: RMC-Alcoa

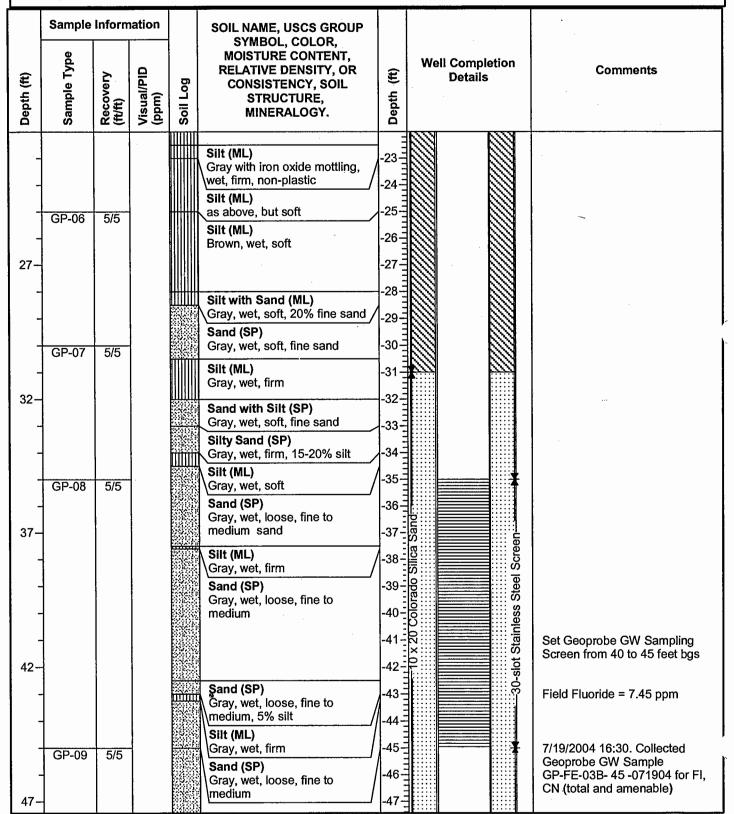
Project: Focused Extraction Well

Location: East Potliner Project Number: 166034 **Driller:** Holt Drilling

Drilling Method: Geoprobe (log) and Cable Tool (Well Installation) **Sampling Method:** Continuous Core Sampling with Geoprobe 6600

Logged by: Emily Keene

Start/ Finish: Geoprobe 7/19/2004. Well Installation 8/3 - 8/6/2004





Sheet: 3 of 3

Well ID: FE03-045

Client: RMC-Alcoa

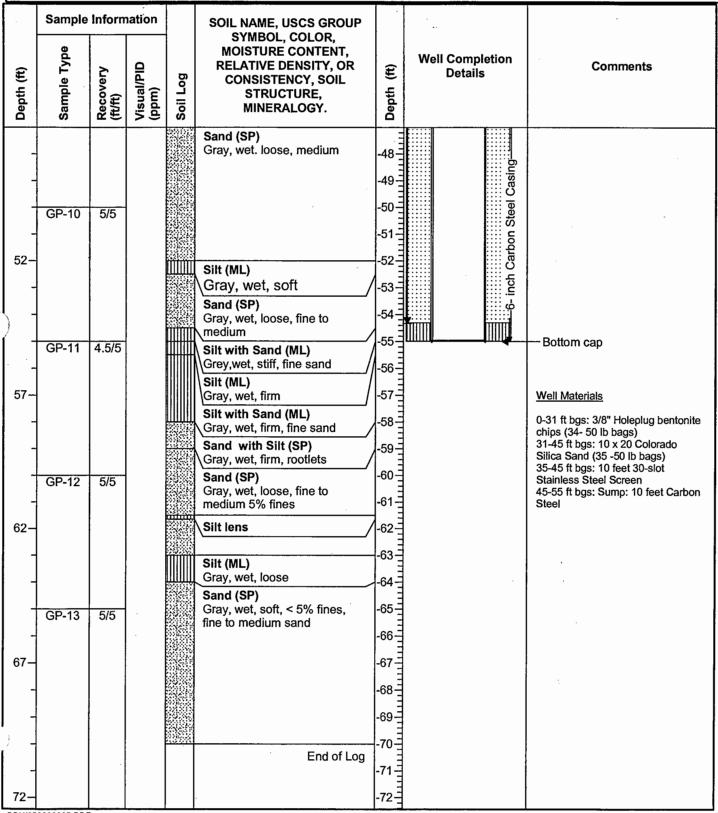
Project: Focused Extraction Well

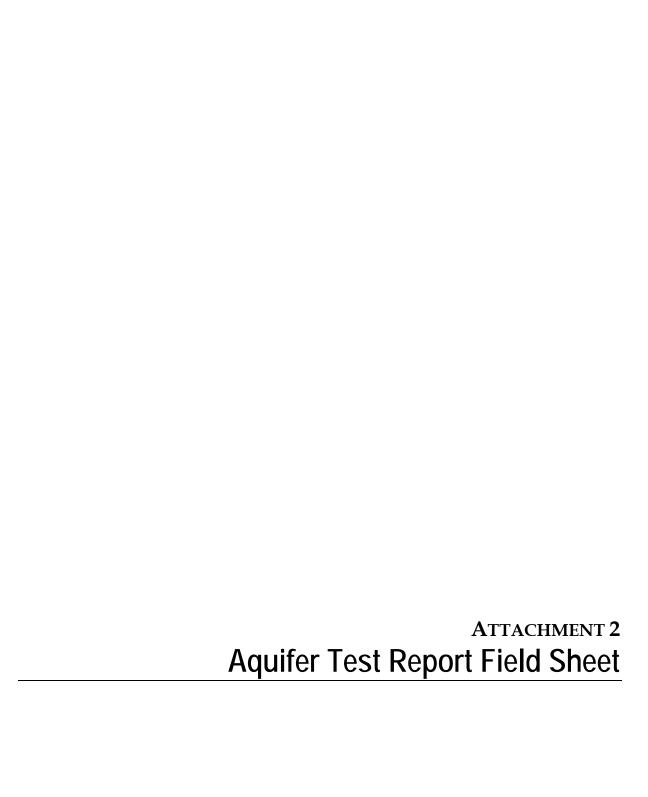
Location: East Potliner Project Number: 166034 **Driller:** Holt Drilling

Drilling Method: Geoprobe (log) and Cable Tool (Well Installation) **Sampling Method:** Continuous Core Sampling with Geoprobe 6600

Logged by: Emily Keene

Start/ Finish: Geoprobe 7/19/2004. Well Installation 8/3 - 8/6/2004







Aquifer Test Report

Type of Data:	
Data Collected By:	
How Q measured:	
How WL's measured:	
M.P.:	
M.P. Elevation:	-
Initial Depth to Water:	
Transducer/Datalogger Info:	
Comments:	
	Data Collected By: How Q measured: How WL's measured: M.P.: M.P. Elevation: Initial Depth to Water: Transducer/Datalogger Info:

Time Information		Water Level Data		Q	Remarks	
Clock Time	Elapsed Time	Depth to Water	Drawdown	Pump Rate	Pump on & off, rate change, water quality, etc.	
HH:MM:SS	(mins)	(ft)	(ft)	(gpm)		
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