APPENDIX A

Boring and Well Construction Logs
Well Development Logs
Geophysical Logs

EPA Boring and Well Construction Logs
including Geophysical Logs

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-120 SHEET 1 OF 6

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 700 N. Whitnall Hwy, Burbank, CA
ELEVATION : 564.38 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882052, E 6457705.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8 Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/9/12 12:00
END : 8/10/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 6 inches thick.	0-0.5 ft bgs: Asphalt saw cut.		Traffic-Rated Well Box
				POORLY GRADED SAND (SP) olive brown (2.5Y 4/4), predominately fine sand, few medium sand, subangular, trace fines.	0.5-10.0 ft bgs: Air knifing for utility clearance.		4 SCH 80 PVC Cement-Bentonite Grout
5	5.0						
	5.5						
10	10.0						
	10.5				10:45 hrs: Drilled to 10 ft bgs. 10:55 hrs: Resume drilling.		PVC Centralizer (10 ft bgs)
15	15.0						
	15.5			**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/4), to multi-colored, predominately fine to coarse sand, subrounded to subangular, some fine subangular granitic gravel and cobble fragments.	At 15.0 ft bgs: Rig chatter.		
20	20.0						
	20.5				At 20.0 ft bgs: Rig chatter.		
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-120 SHEET 2 OF 6

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 700 N. Whitnall Hwy, Burbank, CA
ELEVATION : 564.38 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882052, E 6457705.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8 Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/9/12 12:00
END : 8/10/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0–25.5			**INTERBEDDED SILTY SAND (SM) WITH SANDY SILT (ML)** olive brown (2.5Y 4/4), fine sand, micaceous, fines as silt, trace medium to coarse sand.			
30	30.0–30.5						
35	35.0–35.5						
40	40.0–40.5			**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/4), to multi-colored, predominately fine to medium sand, some coarse sand, little fine gravel.	At 40.0 ft bgs: Rig chatter.		
45	45.0–45.5			**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/4), to multi-colored, predominately fine to coarse sand, some coarse gravel and cobbles, subrounded to subangular, granitic composition, little fine subrounded gravel.	At 45.0 ft bgs: Hard drilling, gravel and cobbles present, rig chatter, angular rock fragments in cuttings.		
50							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-120 SHEET 3 OF 6

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 700 N. Whitnall Hwy, Burbank, CA
ELEVATION : 564.38 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882052, E 6457705.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8 Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/9/12 12:00
END : 8/10/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	50.0 50.5				At 50.0 ft bgs: Very hard drilling, rig chatter.		PVC Centralizer (50 ft bgs)
55	55.0 55.5			**POORLY GRADED GRAVEL (GP) WITH SAND** dark gray (2.5Y 4/1), to multi-colored, subrounded to subangular, little medium to coarse sand.			
60	60.0 60.5				At 60.0 ft bgs: Very hard drilling, gravel and cobbles present, rig chatter, angular rock fragments in cuttings.		
65	65.0 65.5				At 65.0 ft bgs: Rig chatter.		
70	70.0 70.5						
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-120 SHEET 4 OF 6

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 700 N. Whitnall Hwy, Burbank, CA
ELEVATION : 564.38 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882052, E 6457705.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8 Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/9/12 12:00
END : 8/10/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	75.0 / 75.5						
80	80.0						PVC Centralizer (79 ft bgs)
	80.5			**POORLY GRADED SAND (SP) WITH GRAVEL INTERBEDDED WITH SILTY SAND (SM)** olive brown (2.5Y 4/4), predominately fine to coarse sand, some gravel.	At 80.0 ft bgs: Smooth drilling; less gravel and cobbles.		Hydrated Bentonite Pellets
85	85.0						#3 Filter Pack
	85.5						
90	90.0						
	90.5			At 90.0 ft bgs: fines as silt, subangular gravel, subrounded medium to coarse sand.			0.02 Slotted 4 SCH 80 PVC
95	95.0						
	95.5			**POORLY GRADED SAND WITH GRAVEL (SP)** light olive brown (2.5Y 5/3), to multi-colored, predominately medium to coarse sand, some subangular to subrounded gravel.	At 95.0 ft bgs: Rig chatter, gravel and cobbles present.		
100							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-120 SHEET 5 OF 6

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 700 N. Whitnall Hwy, Burbank, CA
ELEVATION : 564.38 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882052, E 6457705.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8 Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/9/12 12:00
END : 8/10/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	100.0				At 100.0 ft bgs: Smooth drilling.		
	100.5						
105	105.0				At 105.0 ft bgs: Smooth drilling.		
	105.5						
110	110.0						
	110.5			**SILTY SAND (SM)** light olive brown (2.5Y 5/4), predominately fine to coarse sand, micaceous fine sand, some fines as silt, little fine subangular gravel.			
115	115.0						
	115.5						
120	120.0						
	120.5			**SANDY SILT (ML)** light olive brown (2.5Y 5/4), predominately fines as silt, some fine to medium sand, subrounded medium sand, micaceous.			2.5' SCH 80 PVC sump and PVC Centralizer (120 ft bgs)
125							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-120 SHEET 6 OF 6

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation

LOCATION : 700 N. Whitnall Hwy, Burbank, CA

ELEVATION : 564.38 ft msl (ground surface) NAVD 88

DRILLING CONTRACTOR : Gregg Drilling and Testing

COORDINATES : N 1882052, E 6457705.3 ft (NAD 83)

DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8 Button Nose Drill Bit

WATER LEVEL: N/A

START : 8/9/12 12:00

END : 8/10/12 12:00

LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	125.0 / 125.5				At 125.0 ft bgs: Drill string bouncing up and down, hard drilling with few cuttings off shaker.		
	128.5 / 129.0						Hydrated Bentonite Pellets
				Boring terminated at 129.0 ft bgs.	08:38 hrs: Drilled to 129 ft bgs.		
130							
135							
140							
145							
150							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-200 SHEET 1 OF 9

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~700 N Whitnall Hwy., Burbank, CA
ELEVATION : 564.50 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882066.5, E 6457688.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8" Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/6/12 12:00
END : 8/7/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 6 inches thick.	0-0.5 ft bgs: Asphalt saw cut.		Traffic-Rated Well Box
				Soil not logged 0.5 - 5 ft bgs.	0.5-10.0 ft bgs: Air knifing for utility clearance.		4" SCH 80 PVC
							Cement-Bentonite Grout
5	5.0						
	5.5			**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/4), fine sand.			
10	10.0						
	10.5						SS Centralizer (10 ft bgs)
15	15.0						
	15.5			**POORLY GRADED SAND WITH GRAVEL AND COBBLES (SP)** olive brown (2.5Y 4/4), fine to coarse sand, broken fragments of gravel and cobble.	At 15.0 ft bgs: Auger cuttings contain cobbles		
20	20.0						
	20.5			**POORLY GRADED GRAVEL WITH SAND AND COBBLES (GP)** olive brown (2.5Y 4/4) to multi-colored, fine to coarse sand.	At 20.0 ft bgs: Auger cuttings contain cobbles		
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-200 SHEET 2 OF 9

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~700 N Whitnall Hwy., Burbank, CA
ELEVATION : 564.50 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882066.5, E 6457688.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8" Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/6/12 12:00
END : 8/7/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0–25.5			**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/4) to multi-colored, fine to coarse sand, some cobbles present.			
30	30.0–30.5			At 30.0 ft bgs: Trace sedimentary fragments of shale and siltstone.			
35	35.0–35.5						
40	40.0–40.5			**POORLY GRADED GRAVEL WITH SAND (GP)** fine to coarse granitic gravel, angular, some fine to coarse sand.	At 40.0 ft bgs: Auger cuttings contain cobbles		SS Centralizer (40 ft bgs)
45	45.0–45.5			At 45.0 ft bgs: Some fine to medium sand.			
50							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-200 SHEET 3 OF 9

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~700 N Whitnall Hwy., Burbank, CA
ELEVATION : 564.50 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882066.5, E 6457688.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8" Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/6/12 12:00
END : 8/7/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	50.0–55.5			**POORLY GRADED GRAVEL WITH SAND AND COBBLES (GP)** fine to coarse granitic gravel, angular, some fine to medium sand.			
55	55.0–55.5						
60	60.0–60.5						
65	65.0–65.5						
70	70.0–70.5						
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-200 SHEET 4 OF 9

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~700 N Whitnall Hwy., Burbank, CA
ELEVATION : 564.50 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882066.5, E 6457688.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8" Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/6/12 12:00
END : 8/7/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	75.0 / 75.5			**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/4) to multi-colored, fine to coarse sand, granitic gravel.	At 75.0 ft bgs: Auger cuttings contain trace cobbles		
80	80.0 / 80.5						
85	85.0 / 85.5						
90	90.0 / 90.5						
95	95.0 / 95.5						
100							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-200 SHEET 5 OF 9

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~700 N Whitnall Hwy., Burbank, CA
ELEVATION : 564.50 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882066.5, E 6457688.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8" Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/6/12 12:00
END : 8/7/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	100.0 / 100.5						
105	105.0 / 105.5						
110	110.0 / 110.5						
115	115.0 / 115.5			**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/4), fine to coarse sand, trace gravel, some fines.			
120	120.0 / 120.5			**SILTY SAND (SM)** olive brown (2.5Y 4/4), and light olive brown (2.5Y 5/6), fine to medium sand, some plastic fines, micaceous.			
125							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-200 SHEET 6 OF 9

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation

LOCATION : ~700 N Whitnall Hwy., Burbank, CA

ELEVATION : 564.50 ft msl (ground surface) NAVD 88

DRILLING CONTRACTOR : Gregg Drilling and Testing

COORDINATES : N 1882066.5, E 6457688.6 ft (NAD 83)

DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8" Button Nose Drill Bit

WATER LEVEL: N/A

START : 8/6/12 12:00

END : 8/7/12 12:00

LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	125.0 / 125.5						
130	130.0						
	130.5			**CLAYEY SAND (SC)** olive brown (2.5Y 4/4), and light olive brown (2.5Y 5/6), medium plasticity, some silt, some plastic fines, trace gravel.			
135	135.0						
	135.5						
140	140.0						
	140.5						
145	145.0						
	145.5						
150							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-200 SHEET 7 OF 9

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
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DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882066.5, E 6457688.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8" Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/6/12 12:00
END : 8/7/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	150.0			**POORLY GRADED SAND WITH SILT AND GRAVEL AND COBBLES (SP-SM)** olive brown (2.5Y 4/4), fine to coarse sand, 15% gravel and cobbles, fines as silt.	At 150.0 ft bgs: Auger cuttings contain cobbles		
	150.5						
155	155.0						
	155.5						
160	160.0						
	160.5						SS Centralizer (160 ft bgs)
165	165.0						
	165.5			**CLAYEY SAND (SC)** olive brown (2.5Y 4/4), and light olive brown (2.5Y 5/6), medium plasticity, some silt, some plastic fines, trace gravel.			
170	170.0						
	170.5						Hydrated Bentonite Pellets
175							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-200 SHEET 8 OF 9

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~700 N Whitnall Hwy., Burbank, CA
ELEVATION : 564.50 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882066.5, E 6457688.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8" Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/6/12 12:00
END : 8/7/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	175.0 / 175.5						#3 Filter Pack
180	180.0 / 180.5			**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/4), fine to coarse sand, subangular to subround, trace gravel.			0.02" Slotted 4" SCH 80 PVC
185	185.0 / 185.5						
190	190.0 / 190.5						
195	195.0 / 195.5			At 195.0 ft bgs: Grayish\ brown (2.5Y 5/2), medium to coarse sand, some fine sand, trace gravel.			
200							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C30-200 SHEET 9 OF 9

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~700 N Whitnall Hwy., Burbank, CA
ELEVATION : 564.50 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1882066.5, E 6457688.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Versa-Drill V100, Direct Mud Rotary, w/ 9 7/8" Button Nose Drill Bit
WATER LEVEL: N/A
START : 8/6/12 12:00
END : 8/7/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	200.0 / 200.5						2.5' SCH 80 PVC sump and endap. PVC Centralizer (120 ft bgs).
205	205.0 / 205.5						
210	210.0 / 210.5			**SILTY SAND (SM)** light olive brown (2.5Y 5/3), 70% fine to coarse sand, subrounded with trace subangular, 30% fines.			
215	215.0 / 215.5			**SANDY SILT (ML)** light olive brown (2.5Y 5/3), 55% fines, 45% fine to coarse sand.			
220	220.0 / 220.5			**SILT WITH SAND (ML)** light olive brown (2.5Y 5/3), 85% fines, 15% fine to medium sand.			
225	224.5 / 225.0						

Boring terminated at 225.0 ft bgs.

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C31-102 SHEET 1 OF 5

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 100 N. Florence St., Burbank, CA
ELEVATION : 539.30 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1880562.4, E 6461145.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Marl M11, HSA Rig w/ 8" & 10" Augers and CA Mod Split Spoon
WATER LEVEL: Water ATD: 82 ft bgs
START : 8/15/12 12:00
END : 8/16/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 6 inches thick.	0 - 0.5 ft bgs: Asphalt saw cut		Traffic-Rated Well Box
				Soil not logged 0.5 ft to 9 ft bgs.	0.5-9.0 ft bgs: Air knifing to 10 ft bgs for utility clearance. Borehole drilled/sampled to 102.0 ft bgs and reamed to 103.0 ft bgs		4" SCH 80 PVC
5							Cement-Bentonite Grout
	9.0	NR		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), dry.			
10	10.5				PID = 0.3		
	14.0	6-7-7		At 14.0 ft bgs: Medium dense.			
15	15.0				PID = 0.3		
	19.0	6-10-15		At 19.0 ft bgs: Grayish brown (2.5Y 5/2), fine to medium sand, trace coarse sand.			
20	20.0				PID = 1.2		
	24.0	8-30					
25	25.0						

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C31-102 SHEET 2 OF 5

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 100 N. Florence St., Burbank, CA
ELEVATION : 539.30 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1880562.4, E 6461145.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Marl M11, HSA Rig w/ 8" & 10" Augers and CA Mod Split Spoon
WATER LEVEL: Water ATD: 82 ft bgs
START : 8/15/12 12:00
END : 8/16/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				POORLY GRADED SAND WITH GRAVEL (SP) grayish brown (2.5Y 5/2), dry, 85% fine to coarse sand, 25% fine to coarse gravel.	PID = 1.1		
	29.0	NR					
30	30.5			**POORLY GRADED SAND WITH SILT (SP-SM)** olive brown (2.5Y 4/3), moist, 90% fine to coarse sand, 10% fines.	PID = 1.1		
	34.0	NR					
35	35.5			**POORLY GRADED SAND WITH GRAVEL (SP)** grayish brown (2.5Y 5/2), dry, 85% fine to coarse sand, 25% fine to coarse gravel. **SILTY SAND (SM)** olive brown (2.5Y 4/3), moist, 70% fine sand, 30% fines.	PID = 1.1		
	39.0	50/6"					
40	39.5			**INTERBEDDED POORLY GRADED SAND (SP) WITH POORLY GRADED GRAVEL WITH SAND (GP)** light yellowish brown (2.5Y 6/3), dry, very dense, fine to medium sand, fine to coarse subrounded gravel (granitic composition) with fine to coarse sand.	At 39.5 ft bgs: Auger cuttings contain cobbles PID = 3.2 At 40.0 ft bgs: Gravel in shoe		
	44.0	50/6"					
45	44.5				PID = 3.0 At 45 ft bgs: Gravel in shoe		
	49.0	50/6"-50/6"					
50	50.0						

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C31-102 SHEET 3 OF 5

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 100 N. Florence St., Burbank, CA
ELEVATION : 539.30 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1880562.4, E 6461145.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Marl M11, HSA Rig w/ 8" & 10" Augers and CA Mod Split Spoon
WATER LEVEL: Water ATD: 82 ft bgs
START : 8/15/12 12:00
END : 8/16/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
					PID = 3.6 At 50 ft bgs: Gravel in shoe		
	54.0–54.5	50/6"		**SILTY SAND (SM)** brown (10YR 4/3), moist, very dense, 85% fine to medium sand, 15% fines.	PID = 4.1		
55							
	59.0–59.5	50/6"					
60					PID = 3.2		Hydrated Bentonite Chips
	64.0–64.5	50/6"		**INTERBEDDED POORLY GRADED SAND (SP) WITH POORLY GRADED GRAVEL (GP)** light yellowish brown (2.5Y 6/3), dry, very dense, fine sand, trace medium sand, fine to coarse subrounded gravel.	PID = 1.0		
65							#3 Filter Pack
	69.0–69.5	50/6"		At 69.0 ft bgs: Pale brown (10YR 6/3), moist.			
70					PID = 1.6		0.02" Slotted 4" SCH 80 PVC
	74.0–74.5	50/6"					
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C31-102 SHEET 4 OF 5

Soil Boring Log

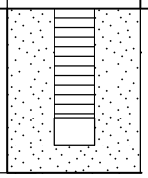
PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 100 N. Florence St., Burbank, CA
ELEVATION : 539.30 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1880562.4, E 6461145.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Marl M11, HSA Rig w/ 8" & 10" Augers and CA Mod Split Spoon
WATER LEVEL: Water ATD: 82 ft bgs
START : 8/15/12 12:00
END : 8/16/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				INTERBEDDED POORLY GRADED SAND WITH SILT (SP-SM) WITH POORLY GRADED GRAVEL (GP) dark yellowish brown (10YR 4/4), moist, very dense, 90% fine to coarse sand, 10% fines.	PID = 2.8		
	79.0	50/6"					
	79.5			**POORLY GRADED SAND WITH GRAVEL (SP)** light olive brown (2.5Y 5/3), moist, very dense, 85% fine to medium sand, 15% fine to coarse gravel.	PID = 2.5		
80					At 82.0 ft bgs: Groundwater encountered		
	84.0	50/6"-50/6"					
	85.0			**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/3), wet, very dense, fine to medium sand, micaceous, trace fines.	PID = 3.5		
85							
	89.0	50/6"-50/6"					
90	90.0			**SILTY SAND (SM)** yellowish brown (10YR 5/4), very dense, 70% fine sand, 30% fines.	PID = 2.5		
	94.0	50/6"-50/6"		At 94.0 ft bgs: Light olive brown (2.5Y 5/4), moist, 65% fine sand, micaceous, 35% fines.			
95	95.0			**SANDY SILT (ML)** dark gray (2.5Y 4/1), hard, micaceous.	PID = 2.5		
	99.0	50/6"-50/6"					
100	100.0			**SILTY SAND (SM)** yellowish brown (10YR 5/4), very dense, 30% fines.			

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C31-102 SHEET 5 OF 5

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 100 N. Florence St., Burbank, CA
ELEVATION : 539.30 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling and Testing
COORDINATES : N 1880562.4, E 6461145.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : Marl M11, HSA Rig w/ 8" & 10" Augers and CA Mod Split Spoon
WATER LEVEL: Water ATD: 82 ft bgs
START : 8/15/12 12:00
END : 8/16/12 12:00
LOGGER : M. Mayry

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	100.5	50/6"-50/6"		At 100.5 ft bgs: 15% fines, micaceous.	PID = 3.0		4" SCH 80 PVC endcap
	101.5				PID = 4.5		
				Boring terminated at 103.0 ft bgs.			
105							
110							
115							
120							
125							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C32-120 SHEET 1 OF 5

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~690 Rosemary Lane, Burbank, CA
ELEVATION : 567.78 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling
COORDINATES : N 1882933.7, E 6458859.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 102 ft bgs
START : 12/10/12 12:00
END : 12/12/12 12:00
LOGGER : C. Carter/J. Ockerman

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 6 inches thick.	0-0.5 ft bgs: Asphalt saw cut.		Traffic-Rated Well Box
				Soil 0.0 - 10.0 ft bgs not logged.	0.5-10. ft bgs: Air knifing for utility clearance.		4" SCH 80 PVC
5							Cement-Bentonite Grout
					PID = 0.0		
10	10.0	7-9-11		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), to light olive brown (2.5Y 5/3), dry, medium dense, trace silt. At 10.0 ft bgs: 1-inch diameter rock fragment. At 10.6 ft bgs: Fine to medium grained sand with trace coarse grained sand. At 10.8 ft bgs: Fine grained sand.	At 9.8 ft bgs: Cobbles. PID = 0.5		
	11.5						
15	15.0	4-6-9		At 15.0 ft bgs: Fine to medium grained sand, ~10-15% coarse grained sand and fine to coarse gravel (up to 1-inch), gravel and coarse grained sand are angular to subangular.	PID = 2.2		
	16.5			**CLAYEY SILT (CL/ML)** light olive brown (2.5Y 5/3), , brown (10YR 5/3), and very dark grayish brown (10YR 3/2), very stiff, moist, no to low plasticity, mottled with strong oxidation staining, slightly micaceous. Gravel and coarse grained sand are angular to subangular.			
20	20.0	6-7-10		**SANDY SILT (ML)** light olive brown (2.5Y 5/3), dry to moist, very stiff, moderately micaceous, no plasticity, trace clay. At 20.6 ft bgs: Yellowish brown (10YR 5/4), dry, no clay.	PID = 2.6		
	21.5						
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C32-120 SHEET 2 OF 5

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~690 Rosemary Lane, Burbank, CA
ELEVATION : 567.78 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling
COORDINATES : N 1882933.7, E 6458859.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 102 ft bgs
START : 12/10/12 12:00
END : 12/12/12 12:00
LOGGER : C. Carter/J. Ockerman

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0–26.0	37-50/6"		**POORLY GRADED SAND (SP)** brown (10YR 5/3), to pale brown (10YR 6/3), dry, very dense, fine to medium grained sand, trace to 5% silt.	PID = 1.2		
30	30.0–31.0	36-50/6"		At 30.0 ft bgs: Multi-color with predominately pale brown (10YR 6/3), medium to coarse grained sand, 10% fine to coarse gravel, angular to subangular. At 30.2 ft bgs: 1.5- inch granitic rock fragment.	PID = 2.9		
35	35.0–36.5	27-39-50/6"		At 35.0 ft bgs: Brown (10YR 5/3) to light brown with gray (10YR 6/2), medium grained sand, trace fine grained sand, ~5-10% coarse grained sand, trace fine gravel, subangular. At 35.3 ft bgs: Granitic rock 1.5-inch long and 1-inch wide.	PID = 1.4		
40	40.0–41.0	40-50/6"		At 40.0 ft bgs: No gravel or coarse grained sand, ~5% fine grained sand. At 40.5 ft bgs: Metamorphic rock fragment >1.5-inch.	PID = 1.2		
45	45.0–46.0	37-50/6"		**POORLY GRADED SAND WITH SILT (SP-SM)** light olive brown (2.5Y 5/3), to olive brown (2.5Y 4/3), dry to moist, very dense, fine to medium grained sand, 10% silt, ~5-10% fine angular to subangular gravel. At 45.5 ft bgs: 0.1 ft thick layer of coarse gravel (GP). At 45.6 ft bgs: Brown (10YR 5/3), 0.1' layer of medium to coarse grained sand, ~5-10% fine grained sand.	PID = 0.9		
50							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C32-120 SHEET 3 OF 5

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~690 Rosemary Lane, Burbank, CA
ELEVATION : 567.78 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling
COORDINATES : N 1882933.7, E 6458859.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 102 ft bgs
START : 12/10/12 12:00
END : 12/12/12 12:00
LOGGER : C. Carter/J. Ockerman

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	50.0 – 51.5	19-31-50/6"		**SILT (ML)** grayish brown (2.5Y 5/2), moist to wet, hard, slow to rapid dilatancy, trace fine grained sand, trace clay, slightly micaceous. At 50.6 ft bgs: 6-inch thick zone of strong oxidation staining.	PID = 2.6		
55	55.0 – 55.5	50/6"		**SILTY SAND (SM)** brown (10YR 5/3), dry, very dense, poorly graded, fine to medium grained sand, trace to 5% coarse sand, trace fine gravel. At 55.4 ft bgs: Igneous and metamorphic rock fragments.	PID = 1.2		
60	60.0 – 60.5	50/6"		**POORLY GRADED GRAVEL (GP) WITH SILT AND SAND** dark grayish brown (10YR 4/2), to very dark grayish brown (10YR 3/2), dry to moist, fine to coarse gravel (up to 1-inch), ~10-15% silt, ~20-25% coarse grained sand, gravel is angular to subangular (igneous and metamorphic).	PID = 0.0 At 60.0 ft bgs: Very poor recovery. Auger cuttings contain cobbles, elongated, flattened, angular to subangular up to 4 inches in width (igneous).		
65	65.0 – 65.5	50/6"		At 65.0 ft bgs: Increased gravel size to 1.5 inch diameter.	PID = 0.1 At 65.0 ft bgs: Poor recovery.		
70	70.0 – 70.5	50/6"			At 70.0 ft bgs: No recovery.		
75					At 73.5 ft bgs: Large cobble present.		

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C32-120 SHEET 4 OF 5

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~690 Rosemary Lane, Burbank, CA
ELEVATION : 567.78 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling
COORDINATES : N 1882933.7, E 6458859.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 102 ft bgs
START : 12/10/12 12:00
END : 12/12/12 12:00
LOGGER : C. Carter/J. Ockerman

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	75.0	NR			At 75.0 ft bgs: No recovery, driller attempted sampling but split spoon sampler is bouncing around (likely cobble).		
80	80.0 80.5	50/6"		At 80.0 ft bgs: Brown (7.5YR 5/4), increased coarse grained sand content, decreased silt content.	PID = 0.0		Hydrated Bentonite Chips
85	85.0 85.5	50/6"		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), dry, very dense, fine to medium grained, ~5-10% coarse sand, ~5% fine angular to subangular gravel.	At 84.0 ft bgs: Drilling sounds smoother. PID = 0.0		#3 Filter Pack
90	90.0 90.5	50/6"		At 90.0 ft bgs: Light olive brown (2.5Y 5/6), poorly to moderately graded, medium to coarse grained sand, ~10-15% fine grained sand, gravel size increased to 1-inch long and 1/2-inch diameter.	PID = 0.1		0.02" Slotted 4" SCH 80 PVC
95	95.0 96.0	36-50/6"		**SANDY SILT (ML)** light olive brown (2.5Y 5/3), moist, hard, ~35-40% fine grained sand, trace clay, no to low plasticity.	PID = 0.1		
100							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C32-120 SHEET 5 OF 5

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~690 Rosemary Lane, Burbank, CA
ELEVATION : 567.78 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling
COORDINATES : N 1882933.7, E 6458859.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 102 ft bgs
START : 12/10/12 12:00
END : 12/12/12 12:00
LOGGER : C. Carter/J. Ockerman

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	100.0	18-21-29		At 100 ft bgs: Olive gray (5Y 5/2), moist, no plasticity.	PID = 0.0 At 100.0 ft bgs: Start continuous sampling.		
	101.5	37-50/6"		At 101.5 ft bgs: 0.25 foot thick layer of clayey silt. At 101.8 ft bgs: Strong oxide staining through 102.2', increasing moisture.	PID = 0.1 At 102-103 ft bgs: Groundwater encountered.		
	102.5 103.0	39-50/6"		At 103 ft bgs: Grades into Silty Sand (SM) at 103.6 ft bgs..	PID = 0.4		
	104.0			**SILTY SAND (SM)** light olive brown (2.5Y 5/4), moist to wet, very dense, poorly graded, fine grained sand, mottled with strong oxidation staining, ~20-25% silt.			
105	105.0	50/6"		At 105.0 ft bgs: Dark yellowish brown (10YR 4/6), wet, 80% fine to medium sand, 20% fines.	PID = 0.1		
	106.5	31-50/2"		**WELL GRADED SAND (SW)** yellowish brown (10YR 5/4), wet, very dense, 90% fine to coarse sand, 10% gravel, up to 20 mm, subangular to subrounded.			
	108.0	18-21-50		**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), wet, dense to very dense.			
110	110.0	12-18-17			PID = 0.1		
	111.5	10-13-17					
				SANDY CLAY (CL) yellowish brown (10YR 5/4), wet, hard.			
	113.0	15-50/6"		**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/4), wet, very dense.			
115	115.0	18-24-29			PID = 0.2		
				LEAN CLAY (CL) olive brown (2.5Y 4/4), wet, low to medium plasticity.			
	116.5	18-50/6"		**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/4), wet.			
	118.0	50/6"-50/6"					
120	120.0				PID = 0.1		4" SCH 80 PVC endcap
				Boring terminated at 120.5 ft bgs.			
125							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C33-059 SHEET 1 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~4521 Brunswick Ave., Los Angeles, CA
ELEVATION : 436.24 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling
COORDINATES : N 1871305.7, E 6480270.9 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 39 ft bgs
START : 12/12/2012
END : 12/14/2012
LOGGER : J. Ockerman

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 6 inches thick.	0 - 0.5 ft bgs: Asphalt saw cut.		Traffic-Rated Well Box
				Soil not logged 0.5 - 10 ft bgs.	0.5 - 10.0 ft bgs: Air knifing for utility clearance.		4" SCH 80 PVC
							Cement-Bentonite Grout
5							
10	10.0	4-7-9		**POORLY GRADED SAND (SP)** dark yellowish brown (10YR 4/6), moist, medium dense.	PID = 0.2		
	11.5						
15	15.0	50/1"		At 15.0 ft bgs: Very dense.	At 15.0 - 16.5 ft bgs: No recovery.		
	16.5						
20	20.0	8-11-17		At 20.0 ft bgs: Medium dense.	PID = 0.1		Hydrated Bentonite Chips
	21.5						
25							#3 Monterey

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C33-059 SHEET 2 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~4521 Brunswick Ave., Los Angeles, CA
ELEVATION : 436.24 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling
COORDINATES : N 1871305.7, E 6480270.9 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 39 ft bgs
START : 12/12/2012
END : 12/14/2012
LOGGER : J. Ockerman

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0	9-17-21		At 25.0 ft bgs: Yellowish brown (10YR 5/4), dense.	PID = 0.2		Sand
	26.5						
30	30.0	16-37-50		At 30.0 ft bgs: Dense to very dense.	PID = 0.2		0.02" Slotted 4" SCH 80 PVC
	31.5						
35	35.0	50/6"		**POORLY GRADED SAND WITH GRAVEL (SP)** yellowish brown (10YR 5/4), moist, very dense, 70% fine to medium sand, 30% gravel up to 8 mm, subangular to subrounded.	PID = 0.2		
	36.5						
					At 39.0 ft bgs: Groundwater encountered.		
40	40.0	11-17-24		**WELL GRADED SAND WITH GRAVEL (SW)** yellowish brown (10YR 5/4), wet, dense, 70% fine to coarse sand, 30% gravel up to 50 mm, subangular to subrounded.	PID = 0.2		
	41.5	14-50/6"		At 41.5 ft bgs: Very dense.	PID = 0.1		
	43.0	49-50			PID = 0.2		
45	45.0	17-50		**POORLY GRADED SAND (SP)** brown (10YR 5/3), wet, dense to very dense.			
	46.5	10-14-17		**WELL GRADED GRAVEL WITH SAND (GW)** brown (10YR 5/3), wet, dense to very dense, 50% gravel up to 50 mm, subangular to subrounded, 50% fine to coarse sand.	PID = 0.1		
	48.0	7-8-14-14		**SILTY SAND (SM)** yellowish brown (10YR 5/4), with strong brown (7.5YR 5/6) staining 1/4" thick, wet, medium dense to dense, 70% fine sand, 30% fines.	PID = 0.1		
50					PID = 0.2		

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C33-059 SHEET 3 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~4521 Brunswick Ave., Los Angeles, CA
ELEVATION : 436.24 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : Gregg Drilling
COORDINATES : N 1871305.7, E 6480270.9 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 39 ft bgs
START : 12/12/2012
END : 12/14/2012
LOGGER : J. Ockerman

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	50.0	5-7-13		**WELL GRADED SAND WITH GRAVEL (SW)** yellowish brown (10YR 5/4), wet, medium dense, 70% fine to coarse sand, 30% gravel up to 30 mm, subangular to subrounded.	PID = 0.1		
	51.5	4-5-7		**LEAN CLAY (CL)** pale brown (10YR 6/3), wet, very stiff, medium plasticity, 100% fines.	PID = 0.1		
	53.0	4-6-7-11		**WELL GRADED SAND WITH GRAVEL (SW)** yellowish brown (10YR 5/4), with strong brown (7.5YR 5/6) staining, medium dense, 70% fine to coarse sand, 30% fine gravel up to 70 mm, subangular to subrounded.	PID = 0.1		
55	55.0	4-5-7		**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), wet, medium dense.	PID = 0.2		
	56.5	4-7-7		**WELL GRADED SAND WITH GRAVEL (SW)** yellowish brown (10YR 5/4), with strong brown (7.5YR 5/6) staining, wet, loose to medium dense, 70% fine to coarse sand, 30% gravel up to 60 mm, subangular to subrounded.	PID = 0.2		
	58.0	5-7-9-9		**SILTY SAND (SM)** yellowish brown (10YR 5/4), with strong brown (7.5YR 4/6), wet, medium dense, 30% fines.	PID = 0.1		0.5' SCH 80 PVC End Cap
60	60.0			**WELL GRADED SAND WITH GRAVEL (SW)** yellowish brown (10YR 5/4), wet, medium dense, 80% fine to coarse sand, 20% gravel up to 40 mm. At 59.0 ft bgs: 60% fine to coarse sand, 40% gravel up to 60mm, subangular to subrounded.			
				Boring terminated at 60.0 ft bgs.			
65							
70							
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C34-065 SHEET 1 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 4165 Beemis St., Los Angeles, CA
ELEVATION : 442.68 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1871368.7, E 6480953.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig with 12" dia. Augers and CA Modified split spoon
WATER LEVEL: Water ATD: 41 ft bgs
START : 5/7/13 09:30
END : 5/8/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 2 inches thick.	0 - 0.5 ft bgs: Saw Cut.		Traffic-Rated Well Box
				Concrete - 4 inches thick..	0.5 - 10.0 ft bgs: Air knifing for utility clearance.		
				SILTY SAND (SM) light brown (7.5YR 6/3), dry, medium dense, well graded, 5% fine gravel, subangular.			4" SCH 80 PVC
				POORLY GRADED SAND (SP) brown (7.5YR 5/3), dry, medium dense, angular to subangular.			Cement-Bentonite Grout
5							
				WELL GRADED SAND WITH GRAVEL (SW) brown (7.5YR 5/3), dry, medium dense to dense, fine to coarse sand, 15% fine to coarse gravel, with trace granitic cobbles up to 5" length.		
10	10.0	10-18-23		**POORLY GRADED SAND WITH SILT (SW-SM)** light yellowish brown (10YR 6/4), dry, dense, trace fine gravel.	PID = 0.2		
	11.5			**POORLY GRADED SAND (SP)** light yellowish brown (10YR 6/4), dry, dense.			
15	15.0	8-13-17		**WELL GRADED SAND (SW)** light yellowish brown (10YR 6/4), dry, medium dense to dense, fine to coarse sand, trace fine gravel.	PID = 0.1		
	16.5						
20	20.0	35-50/4"		At 20.0 ft bgs: Very dense.	PID = 0.1		
	21.5			**WELL GRADED GRAVEL WITH SAND (GW)** very pale brown (10YR 7/3), dry, very dense.			
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C34-065 SHEET 2 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 4165 Beemis St., Los Angeles, CA
ELEVATION : 442.68 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1871368.7, E 6480953.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig with 12" dia. Augers and CA Modified split spoon
WATER LEVEL: Water ATD: 41 ft bgs
START : 5/7/13 09:30
END : 5/8/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0	23-30-35		**WELL GRADED SAND (SW)** light yellowish brown (10YR 6/4), dry, dense to very dense, fine to coarse sand, trace fine gravel.	PID = 0.1		Hydrated Bentonite Chips
	26.5			**WELL GRADED SAND WITH GRAVEL (SW)** very pale brown (10YR 7/3), dry, dense to very dense, medium to coarse sand, 20% fine to coarse gravel.			
30	30.0	20-50/6"		**WELL GRADED SAND (SW)** light yellowish brown (10YR 6/4), dry, very dense, fine to coarse sand, trace fine gravel. At 30.5 ft bgs: Very pale brown (10YR 7/3), very dense.	PID = 0.3		#3 Monterey Sand
	31.5						
35	35.0	28-50/6"		**WELL GRADED SAND WITH SILT (SW-SM)** light yellowish brown (10YR 6/4), dry, dense, fine to medium sand, fine gravel.	PID = 0.1		0.02" Slotted 4" SCH 80 PVC
	36.5			**WELL GRADED SAND WITH GRAVEL (SW)** pale yellow (2.5Y 8/3), dry, dense, medium to coarse sand, fine to coarse gravel.			
40	40.0	12-18-23		**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM)** light yellowish brown (10YR 6/4), dry, dense, fine to coarse sand, fine to coarse gravel.	PID = 0.2		
	41.5			**POORLY GRADED SAND (SP)** very pale brown / very pale orange (10YR 8/2), dry, dense, trace gravel.	At 41.0 ft bgs: Auger Cuttings contain trace granitic cobbles up to 3 inches in length. At 41.3 ft bgs: Groundwater encountered.		
				WELL GRADED GRAVEL WITH SAND (GW) very pale brown / very pale orange (10YR 8/2), dry , dense, fine to coarse gravel, fine to coarse sand. At 41.3 ft bgs: Wet.			
45	45.0	20-25-30		At 45.0 ft bgs: Brown (10YR 5/3), dense, fine gravel, fine to coarse sand.	PID = 0.3		
	46.5	18-23-30		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), wet, dense, homogenous.	At 45.0 ft bgs: Continuous sampling 45.0 - 67.5 ft bgs.		
	48.0	25-50		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/3), wet, dense, fine to medium sand, fine to coarse gravel.			
				POORLY GRADED SAND (SP) light olive brown (2.5Y 5/3), wet, very dense, trace fine gravel.			
	49.5	40-50/6"					
50							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C34-065 SHEET 3 OF 3

Soil Boring Log

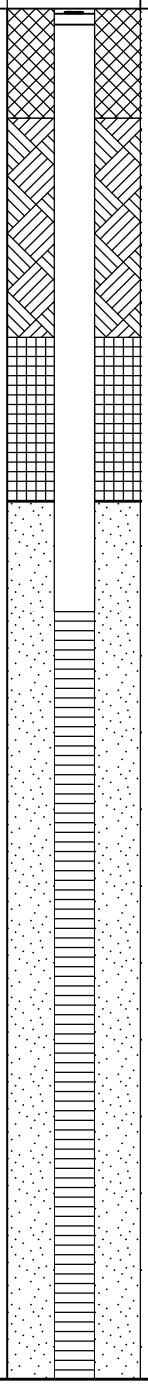
PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 4165 Beemis St., Los Angeles, CA
ELEVATION : 442.68 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1871368.7, E 6480953.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig with 12" dia. Augers and CA Modified split spoon
WATER LEVEL: Water ATD: 41 ft bgs
START : 5/7/13 09:30
END : 5/8/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	51.0	28-50/6"					
	52.5	12-15-18		At 52.5 ft bgs: Dense.			
	54.0	18-20-20			PID = 0.1		
55	55.5	15-18-24					
	57.0	14-17-21		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/4), wet, dense, medium to coarse sand, fine to coarse gravel.	At 57.0 ft bgs: Trace cobbles in auger cuttings.		
	58.5	15-20-25					
60	60.0	13-15-19			PID = 0.2 PID = 0.2		
	61.5	18-20-25					
	63.0	25-25-30					
	64.5	17-24-27					
65					PID = 0.1		0.5' SCH 80 PVC End Cap
	66.0	25-30-30					
	67.5			Boring terminated at 67.5 ft bgs.			
70							
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C35-041 SHEET 1 OF 2

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 4278 Brunswick Avenue, Los Angeles, CA
ELEVATION : 414.81 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1870174.2, E 6480242.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 21 ft bgs
START : 5/10/13 10:00
END : 5/10/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 2 inches thick. Concrete - 4 inches thick. **POORLY GRADED SAND WITH SILT (SP-SM)** brown (7.5YR 4/3), dry, loose.	0 - 0.5 ft bgs: Asphalt and Concrete saw cut. 0.5 - 10.0 ft bgs: Air knifing for utility clearance.		Traffic-Rated Well Box 4" SCH 80 PVC Cement-Bentonite Grout
5				**SILTY SAND (SM)** light brown (7.5YR 6/3), dry, loose, poorly graded.			
				WELL GRADED SAND WITH GRAVEL (SW) pinkish gray (5YR 7/2), dry, loose, fine to medium sand, little cobbles up to 5" in length of granitic origin.			Hydrated Bentonite Chips
10	10.0	5-9-11		**SILTY SAND (SM)** light brownish gray (10YR 6/2), dry, loose, poorly graded.	PID = 0.5		#3 Monterey Sand
	11.5						0.02" Slotted 4" SCH 80 PVC
15	15.0	18-25-35		**POORLY GRADED SAND (SP)** light gray (10YR 7/2), dry, loose.	PID = 0.3		
	16.5						
20	20.0	7-10-10			PID = 0.2 No recovery (20.0 - 21.5 ft bgs). At 20 ft bgs: Continuous sampling from 20.0 - 45.0 ft bgs. At 21.0 ft bgs: Groundwater encountered. At 21.5 ft bgs: Auger cuttings contain cobbles up to 3 inches diameter.		
	21.5	25-50/6"		**WELL GRADED SAND WITH GRAVEL (SW)** dark yellowish brown (10YR 4/4), wet, dense, medium to coarse sand. At 21.5 ft bgs: Strong brown (7.5YR 4/6), dense to very dense. At 23.0 ft bgs: Dense.			
	23.0	25-28-30					
25	24.5	18-23-25					

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C35-041 SHEET 2 OF 2

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 4278 Brunswick Avenue, Los Angeles, CA
ELEVATION : 414.81 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1870174.2, E 6480242.3 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 21 ft bgs
START : 5/10/13 10:00
END : 5/10/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	26.0	20-20-20		At 26.0 ft bgs: Brown (7.5YR 4/4).	At 23.0 ft bgs: Auger cuttings contain cobbles up to 4 inches diameter. PID = 0.1		
	27.5	14-17-21		At 27.5 ft bgs: Dark yellowish brown (10YR 4/4), medium dense to dense.	At 27.5 ft bgs: Auger cuttings contain cobbles up to 3 inches diameter.		
	29.0	15-15-20		At 29.0 ft bgs: Medium dense.			
30	30.5	9-11-13			PID = 0.1		
	32.0	12-14-17					
	33.5	17-19-24		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), wet, medium dense.			
35	35.0	13-17-20		**WELL GRADED SAND WITH GRAVEL (SW)** light olive brown (2.5Y 5/4), wet, dense, medium to coarse sand.	PID = 0.2		
	36.5	20-23-25					
	38.0	16-19-21					
	39.5	10-15-17		**POORLY GRADED SAND (SP)** grayish brown (2.5Y 5/2), wet, dense.			
40	41.0	11-13-15		**WELL GRADED SAND WITH GRAVEL (SW)** light olive brown (2.5Y 5/3), wet, dense, medium to coarse sand.	PID = 0.3		4" SCH 80 PVC endcap
	42.5	10-12-14		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), wet, medium dense.			
	44.0	NR		**WELL GRADED SAND WITH GRAVEL (SW)** light olive brown (2.5Y 5/3), wet, dense, fine to coarse sand.	PID = 0.2		
45	45.0			Boring terminated at 45.0 ft bgs.			
50							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C36-055 SHEET 1 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 4323 Perlita Avenue, Los Angeles, CA
ELEVATION : 431.55 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1870440.7, E 6480612.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 35 ft bgs
START : 6/12/13 07:30
END : 6/12/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Concrete - 6 inches thick.	0 - 0.5 ft bgs: Concrete saw cut. 0.5 - 10.0 ft bgs: Air knifing for utility clearance.		Traffic-Rated Well Box
				SILTY SAND (SM) light brown (7.5YR 6/3), dry, well graded, subangular.			4" SCH 80 PVC
5				**POORLY GRADED SAND (SP)** brown (7.5YR 5/3), dry, angular to subangular.			Cement-Bentonite Grout
				WELL GRADED SAND WITH GRAVEL (SW) brown (7.5YR 5/3), dry, fine to coarse gravel, fine to coarse sand, trace granitic cobbles up to 5" diameter.			
10	10.0	5-5-7		**POORLY GRADED SAND WITH SILT (SP-SM)** light yellowish brown (10YR 6/4), dry, loose to medium dense, trace fine gravel. At 11.3 ft bgs: 0.2 ft thick layer of Poorly Graded Sand (SP).	PID = 0.3		
	11.5						
15	15.0	11-18-25		**WELL GRADED SAND WITH SILT** pale brown (10YR 6/3), dry, dense, fine to coarse sand, 5% fine gravel.	PID = 0.4		Hydrated Bentonite Chips
	16.5				PID = 0.1		
20	20.0	25-50/6"		**SILTY SAND WITH GRAVEL (SM)** pale brown (10YR 6/3), dry, very dense, well graded, fine to coarse sand, 20% fine gravel.			#3 Monterey Sand
	21.5				PID = 0.4		
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C36-055 SHEET 2 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 4323 Perlita Avenue, Los Angeles, CA
ELEVATION : 431.55 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1870440.7, E 6480612.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 35 ft bgs
START : 6/12/13 07:30
END : 6/12/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0	38-30/5"		**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM)** light brownish gray (2.5Y 6/2), dry, very dense, fine to coarse sand, 15% fine gravel.	At 25.0 ft bgs: Auger cuttings contain trace granitic cobbles up to 3 inches diameter.		0.02" Slotted 4" SCH 80 PVC
	26.5						
30	30.0	28-50/6"		**WELL GRADED SAND WITH GRAVEL (SW)** light yellowish brown (2.5Y 6/3), dry, very dense, fine to coarse sand, 20% fine gravel.	PID = 0.2 At 30.0 ft bgs: Auger cuttings contain trace granitic cobbles up to 3 inches diameter.		
	31.5						
35	35.0	23-28-40		**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/3), wet, very dense, 15% fine gravel.	PID = 0.5 At 35.0 ft bgs: Groundwater encountered. Continuous sampling 35.0 - 60.5 ft bgs.		
	36.5	35-50/6"		**WELL GRADED SAND (SW)** olive brown (2.5Y 4/3), very dense, fine to coarse sand, 10% fine gravel.	PID = 0.3		
	38.0	40-50/6"					
	39.5	20-20-20		At 39.5 ft bgs: Light olive brown (2.5Y 5/3), wet, dense.			
40	41.0	14-17-25		**WELL GRADED SAND WITH GRAVEL (SW)** light olive brown (2.5Y 5/3), wet, dense, fine to coarse sand, 15% fine gravel.	PID = 0.3		
	42.5	18-20-23					
	44.0	20-23-25			PID = 0.2		
45	45.5	15-18-20		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), wet, dense.			
	47.0	17-23-25		**WELL GRADED GRAVEL WITH SAND (GW)** light olive brown (2.5Y 5/3), wet, dense, fine to coarse sand, fine gravel.			
	48.5	20-23-25		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/3), wet, medium to coarse sand, 5% fine gravel.			
50							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C36-055 SHEET 3 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 4323 Perlita Avenue, Los Angeles, CA
ELEVATION : 431.55 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1870440.7, E 6480612.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 35 ft bgs
START : 6/12/13 07:30
END : 6/12/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	50.0	7-11-15		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), wet, dense, 5% fine gravel.	PID = 0.1		
	51.5	12-15-17		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/3), wet, dense, medium to coarse sand, 5% fine gravel.			
	53.0	15-18-20		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), dense.			
	54.5	17-22-24		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/3), wet, dense, medium to coarse sand, 5% fine gravel.	PID = 0.4		4" SCH 80 PVC endcap
55	56.0	10-10-12					
	57.5	10-15-18					
	59.0	13-16-20					
60	60.5			At 60.0 ft bgs: Increased fine gravel content.			
				Boring terminated at 60.5 ft bgs.			
65							
70							
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C37-035 SHEET 1 OF 2

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 4016 Brunswick Ave., Los Angeles, CA
ELEVATION : 407.00 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 186815.9, E 6481139.5 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 15 ft bgs
START : 5/13/13 10:00
END : 5/13/13 18:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 2 inches thick.	0 - 0.5 ft bgs: Asphalt saw cut. 0.5 - 10.0 ft bgs: Air knifing for utility clearance.		Traffic-Rated Well Box
				CONCRETE Concrete - 4 inches thick.			
				POORLY GRADED SAND WITH SILT (SP-SM) brown (7.5YR 4/3), dry, with trace roots/organics.			4" SCH 80 PVC
				POORLY GRADED SAND (SP) brown (7.5YR 5/3), dry, angular to subangular.			Cement-Bentonite Grout Hydrated Bentonite Chips
5							
				SILTY SAND (SM) grayish brown (10YR 5/2), dry, poorly graded, 5% fine gravel, trace roots/organics.			
10	10.0	5-8-10		At 10.0 ft bgs: Medium dense, subangular to subrounded.	PID = 0.2		#3 Monterey Sand 0.02" Slotted 4" SCH 80 PVC
				WELL GRADED SAND (SW) light gray (10YR 7/2), dry, medium dense, 5% gravel, trace coarse sand.			
	11.5						
15	15.0	20-50/5"		**WELL GRADED SAND WITH GRAVEL (SW)** olive brown (2.5Y 4/3), wet, very dense, fine to coarse sand, 20% fine to coarse gravel.	PID = 0.3 At 15.0 ft bgs: Groundwater encountered. Auger cuttings contain trace cobbles up to 3 inches diameter. At 15.0 - 40.5 ft bgs: Continuous sampling.		
	16.5	30-50/6"					
	18.0	25-29-33		**WELL GRADED SAND (SW)** yellowish brown (10YR 5/4), wet, dense, medium to coarse sand, 10% fine gravel.	PID = 0.1 PID = 0.1 At 18.0 ft bgs: Auger cuttings contain cobbles up to 4 inches diameter.		
	19.5	21-23-25			At 19.0 - 19.5 ft bgs: No recovery.		
20							
	21.0	18-25-30			PID = 0.0 PID = 0.0		
	22.5	20-20-25			PID = 0.1 At 22.5 ft bgs: Auger cuttings contain trace cobbles up to 5 inches diameter.		
	24.0	17-21-24			PID = 0.0		
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C37-035 SHEET 2 OF 2

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 4016 Brunswick Ave., Los Angeles, CA
ELEVATION : 407.00 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 186815.9, E 6481139.5 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 15 ft bgs
START : 5/13/13 10:00
END : 5/13/13 18:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.5	23-28-30			PID = 0.1		
	27.0	33-35-40			PID = 0.0		
	28.5	25-25-25		At 28.5 ft bgs: light olive brown (2.5Y 5/4), wet, 10% fine to coarse gravel.	PID = 0.1		
30	30.0	15-18-22			PID = 0.0		
	31.5	20-24-30			PID = 0.0		
	33.0	16-24-27			PID = 0.1		
35	34.5	20-23-30			PID = 0.0		4" SCH PVC End Cap
	36.0	17-19-21			PID = 0.1		
	37.5	25-28-33			PID = 0.0		
40	39.0	20-20-23			PID = 0.1		
	40.5			Boring terminated at 40.5 ft bgs.			
45							
50							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C38-051 SHEET 1 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : John Ferraro Athletic Fields, Griffiths Park, Los Angeles, CA
ELEVATION : 456.40 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1878304.7, E 6476829.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 30 ft bgs
START : 5/20/13 10:00
END : 5/20/13 16:30
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Topsoil - 3 inches thick.	0 - 10 ft bgs: Air knifing for utility clearance.		Traffic-Rated Well Box
				POORLY GRADED SAND WITH SILT (SP-SM) brown (7.5YR 5/4), moist, fine grained.			4" SCH 80 PVC
							Cement-Bentonite Grout
5				**POORLY GRADED SAND (SP)** brown (10YR 4/3), moist, trace mica.			
10	10.0	7-9-11		At 10.0 ft bgs: Light olive brown (2.5Y 5/3), medium dense.			
	11.5						Hydrated Bentonite Chips
15	15.0	7-7-9		At 15.0 ft bgs: Light yellowish brown (2.5Y 6/4), dry.			
	16.5						#3 Monterey Sand
20	20.0	5-7-8		At 20.0 ft bgs: Loose to medium dense.			
	21.5			**LEAN CLAY (CL)** dark olive gray (5Y 3/2), moist, stiff to very stiff, low plasticity.			0.02" Slotted 4" SCH 80 PVC
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C38-051 SHEET 2 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation

LOCATION : John Ferraro Athletic Fields, Griffiths Park, Los Angeles, CA

ELEVATION : 456.40 ft msl (ground surface) NAVD 88

DRILLING CONTRACTOR : National EWP

COORDINATES : N 1878304.7, E 6476829.2 ft (NAD 83)

DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon

WATER LEVEL: Water ATD: 30 ft bgs

START : 5/20/13 10:00

END : 5/20/13 16:30

LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0	8-12-14		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), dry, medium dense.	At 25.25 ft bgs: Top of capillary fringe.		
	26.5			**SILTY SAND (SM)** olive gray (5Y 5/2), mottled with yellowish brown (10YR 5/6), moist, medium dense, poorly graded.			
30	30.0	10-11-13		**WELL GRADED SAND (SW)** brown (10YR 4/3), wet, medium dense, trace granitic fragments up to 2" diameter, trace fine gravel.	At 30.0 ft bgs: Groundwater encountered. Continuous sampling from 30.0 - 54.0 ft bgs		
	31.5	20-23-25		At 32.0 ft bgs: Olive brown (2.5Y 4/4), dense, trace coarse sand.			
	33.0	25-50/6"		At 33.0 ft bgs: Light olive brown (2.5Y 5/4), wet, very dense.			
	34.5	20-20-20		At 34.5 ft bgs: Dense.			
35	36.0	14-17-21		At 36.0 ft bgs: Medium dense to dense.			
	37.5	15-18-20		**SILTY SAND (SM)** olive brown (2.5Y 4/3), wet, medium dense to dense, poorly graded.			
	39.0	16-19-21		**WELL GRADED SAND (SW)** olive brown (2.5Y 4/3), wet, medium dense to dense.			
40				**WELL GRADED SAND WITH SILT (SW-SM)** olive brown (2.5Y 4/3), wet, medium dense to dense, trace gravel.			
	40.5	10-15-20		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/4), wet, medium dense to dense. At 40.0 ft bgs: Light olive brown (2.5Y 5/3), medium dense, trace granitic fragments up to 2" diameter.			
	42.0	13-18-20		At 40.5 ft bgs: Medium dense. At 42.0 ft bgs: Medium dense to dense.			
	43.5	17-20-22		At 43.0 ft bgs: Light olive brown (2.5Y 5/6), no gravel. At 43.5 ft bgs: Light olive brown (2.5Y 5/4), dense.			
45	45.0	14-18-20		**WELL GRADED SAND WITH GRAVEL (SW)** light olive brown (2.5Y 5/4), wet, medium dense to dense, fine to coarse gravel.			
	46.5	10-10-14		At 46.5 ft bgs: 0.5 ft thick layer of well graded sand (SP), no gravel, medium dense.			
	48.0	12-14-16		At 48.0 ft bgs: Medium dense to dense.			
50	49.5	18-20-23		At 49.5 ft bgs: Dense.			

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C38-051 SHEET 3 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation

LOCATION : John Ferraro Athletic Fields, Griffiths Park, Los Angeles, CA

ELEVATION : 456.40 ft msl (ground surface) NAVD 88

DRILLING CONTRACTOR : National EWP

COORDINATES : N 1878304.7, E 6476829.2 ft (NAD 83)

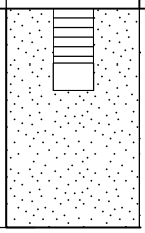
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon

WATER LEVEL: Water ATD: 30 ft bgs

START : 5/20/13 10:00

END : 5/20/13 16:30

LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	51.0	20-23-25		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/4), wet, dense.			4" SCH 80 PVC endcap
	52.5	20-23-27					
	54.0			Boring terminated at 54.0 ft bgs.			
55							
60							
65							
70							
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C39-073 SHEET 1 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~ 4947 W. San Fernando Rd, Los Angeles, CA
ELEVATION : 459.58 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1873705.4, E 6480189.4 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 55 ft bgs
START : 5/24/13 10:00
END : 5/24/13 19:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 18 inches thick.	0 - 1.5 ft bgs: Asphalt saw cut. 1.5 - 10.0 ft bgs: Air knifing for utility clearance.		Traffic-Rated Well Box
				POORLY GRADED SAND (SP) brown (10YR 5/3), dry, subangular to angular, trace (<5%) coarse sand.			4" SCH 80 PVC Cement-Bentonite Grout
5					PID = 0.1		
				SILTY SAND (SM) dark yellowish brown (10YR 4/4), moist, well graded, subrounded.			
10	10.0	7-9-11		**POORLY GRADED SAND (SP)** brown (10YR 4/3), moist, medium dense, subrounded to rounded, homogenous.	PID = 0.1		
	11.5						
15	15.0	13-18-23		At 15.0 ft bgs: Dense.	PID = 0.1		
	16.5			**WELL GRADED SAND (SW)** yellowish brown (10YR 5/6), dry, dense, fine to coarse gravel, trace small granitic fragments.			
20	20.0	20-20-25		At 20.0 ft bgs: Brown (10YR 5/3).	PID = 0.0		
				WELL GRADED SAND WITH GRAVEL (SW) very pale brown (10YR 7/3), dry, dense, fine to coarse gravel.			
	21.5			**POORLY GRADED SAND (SP)** brown (10YR 5/3), moist, dense.			
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C39-073 SHEET 2 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~ 4947 W. San Fernando Rd, Los Angeles, CA
ELEVATION : 459.58 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1873705.4, E 6480189.4 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 55 ft bgs
START : 5/24/13 10:00
END : 5/24/13 19:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0	25-50/6"		At 25.0 ft bgs: Very dense.	PID = 0.1		
	26.5			**WELL GRADED GRAVEL (GW)** pale yellow (2.5Y 8/2), dry, very dense, fine to coarse gravel, granitic gravel, trace fine sand.			
30	30.0	30-50/6"		At 30.0 ft bgs: Gravel up to 2" diameter.	PID = 0.1		
	31.5			**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/3), dry, very dense, 10% fine to coarse gravel.			Hydrated Bentonite Chips
35	35.0	38-50/6"		At 35.0 ft bgs: Trace fine grained. At 35.3 ft bgs: 0.2 ft thick layer of well graded sand with gravel (SW).	PID = 0.0		
	36.5			**SILTY SAND (SM)** brown (7.5YR 4/4), moist, very dense, well graded.			#3 Monterey Sand
40	40.0	14-17-21		**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM)** yellowish brown (10YR 5/6), moist, dense.	PID = 0.1		
	41.5			**WELL GRADED SAND WITH GRAVEL (SW)** light yellowish brown (10YR 6/4), dense.			0.02" Slotted 4" SCH 80 PVC
45	45.0	11-15-19		**SILTY SAND (SM)** dark yellowish brown (10YR 4/4), moist, medium dense.	PID = 0.2		
	46.5			**LEAN CLAY WITH SAND (CL)** brown (10YR 4/3), moist, very stiff, low plasticity.			
50							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C39-073 SHEET 3 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~ 4947 W. San Fernando Rd, Los Angeles, CA
ELEVATION : 459.58 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1873705.4, E 6480189.4 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 55 ft bgs
START : 5/24/13 10:00
END : 5/24/13 19:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	50.0	10-10-12		**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM)** dark yellowish brown (10YR 4/4), moist, medium dense.	PID = 0.1		
	51.5			**SILTY SAND (SM)** dark yellowish brown (10YR 4/4), mottled with light olive brown (2.5Y 5/3), moist, medium dense.			
55	55.0	18-20-20		**WELL GRADED SAND WITH SILT (SW-SM)** light olive brown (2.5Y 5/4), wet, dense.	PID = 0.1 At 55.0 ft bgs: Groundwater encountered. Continuous sampling from 55.0 - 79.9 ft bgs.		
	56.5	14-17-20		**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM)** light olive brown (2.5Y 5/4), wet, dense.			
	58.0	15-15-23		**LEAN CLAY (CL)** olive brown (2.5Y 4/4), moist, very stiff, low plasticity.			
				WELL GRADED SAND (SW) light olive brown (2.5Y 5/4), wet, medium dense to dense.			
	59.5	20-23-25		**SILT WITH SAND (ML)** light olive brown (2.5Y 5/4), wet, very stiff to hard.	PID = 0.2		
60	61.0	13-19-23		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/4), dense.			
				WELL GRADED SAND WITH SILT (SW-SM) light olive brown (2.5Y 5/3), wet, dense.			
	62.5	20-20-20		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/4), wet, medium dense to dense.			
	64.0	13-15-18		At 64.0 ft bgs: Medium dense.			
65	65.5	10-12-14			PID = 0.1		
				LEAN CLAY (CL) olive brown (2.5Y 4/4), moist to wet, very stiff.			
	67.0	17-19-21		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/4), wet, medium dense, 5% lean clay. At 67.0 ft bgs: Medium dense to dense.			
	68.5	16-18-20					
70	70.0	15-18-21		**WELL GRADED SAND (SW)** olive brown (2.5Y 4/4), wet, medium dense to dense, trace clay. At 70 ft bgs: No clay.	PID = 0.0		
	71.5	11-14-17		At 71.5 ft bgs: Trace silt, medium dense.	At 72.0 - 73.0 ft bgs: No recovery.		
	73.0	15-17-20		At 73.0 ft bgs: Trace clay.			4" SCH 80 PVC endcap
	74.5	16-18-23		**WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC)** light olive brown (2.5Y 5/4), wet, medium dense.			
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C39-073 SHEET 4 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : ~ 4947 W. San Fernando Rd, Los Angeles, CA
ELEVATION : 459.58 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1873705.4, E 6480189.4 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 55 ft bgs
START : 5/24/13 10:00
END : 5/24/13 19:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				At 74.4 ft bgs: 0.1 ft thick layer of Lean Clay (CL).	PID = 0.1		
	76.0	15-15-20		**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/3), trace silt and clay, dense.			
	77.5	13-14-15		**WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC)** olive brown (2.5Y 4/3), wet, dense, fine to coarse gravel, trace silt and clay.			
				At 76.0 ft bgs: Medium dense.			
	79.0			**LEAN CLAY (CL)** olive brown (2.5Y 4/4), moist, very stiff.			
				Boring terminated at 79.0 ft bgs.			
80							
85							
90							
95							
100							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C40-079 SHEET 1 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 247 W. Linden Ave., Burbank, CA.
ELEVATION : 501.97 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1882860.7, E 646742.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 60 ft bgs
START : 6/6/13 11:00
END : 6/7/13 11:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt: 5" thick.	0 - 0.4 ft bgs: Asphalt saw cut. 0.4 - 10.0 ft bgs: Air knifing for utility clearance. At 0.4 ft bgs: Fill		Traffic-Rated Well Box
				POORLY GRADED SAND (SP) light brownish gray (2.5Y 6/2), moist, 10% fine gravel, subangular to subrounded.			4" SCH 80 PVC Cement-Bentonite Grout
5	5.0			**SILTY SAND (SM)** light olive brown (2.5Y 5/3), moist, poorly graded.	PID = 0.2 At 5.0 ft bgs: Native		
10	10.0	10-10-12		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/3), moist, medium dense, 5% fine gravel.	PID = 0.2		
	11.5						
15	15.0	5-7-9		**LEAN CLAY (CL)** dark yellowish brown (10YR 4/4), moist, very stiff.	PID = 0.1		
	16.5						
20	20.0	8-8-10		**SILTY SAND (SM)** brown (10YR 4/3), moist, medium dense, poorly graded.	PID = 0.2		
	21.5						
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C40-079 SHEET 2 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 247 W. Linden Ave., Burbank, CA.
ELEVATION : 501.97 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1882860.7, E 646742.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 60 ft bgs
START : 6/6/13 11:00
END : 6/7/13 11:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0–26.5	10-10-10			PID = 0.3		
30	30.0–31.5	8-12-16		**WELL GRADED SAND (SW)** light yellowish brown (2.5Y 6/3), moist, medium dense to dense. **POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), moist, medium dense to dense.	PID = 0.2		
35	35.0–36.5	5-7-9		**SILTY SAND (SM)** yellowish brown (10YR 5/4), moist, medium dense, poorly graded.	PID = 0.2		
40	40.0–41.5	8-10-12		**SANDY SILT (ML)** dark yellowish brown (10YR 4/4), moist, very stiff.	PID = 0.2		Hydrated Bentonite Chips
45	45.0–46.0	30-50/6"		**WELL GRADED SAND WITH SILT (SW-SM)** yellowish brown (10YR 5/4), moist, very dense.	PID = 0.2		#3 Monterey Sand
50							0.02" Slotted 4"

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C40-079 SHEET 3 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 247 W. Linden Ave., Burbank, CA.
ELEVATION : 501.97 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1882860.7, E 646742.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 60 ft bgs
START : 6/6/13 11:00
END : 6/7/13 11:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	50.0	35-50/6"					SCH 80 PVC
	51.5			**POORLY GRADED SAND (SP)** light yellowish brown (10YR 6/4), moist, very dense, trace fine to coarse gravel.	PID = 0.1		
55	55.0	27-33-40		At 55.0 ft bgs: 0.5 ft thick layer of Well Graded Sand with Silt (SW-SM). At 55.5 ft bgs: No gravel.	PID = 0.2		
	56.5						
60	60.0	30-50/6"		**POORLY GRADED SAND WITH SILT (SP-SM)** dark yellowish brown (10YR 4/4), wet, very dense.	PID = 0.2 At 60.0ft bgs: Groundwater encountered		
	61.5						
65	65.0	15-15-20		**WELL GRADED SAND (SW)** yellowish brown (10YR 5/4), wet, dense, 5% fine coarse gravel.	PID = 0.3 At 65.0 ft bgs: Continuous sampling 65.0 - 80.5 ft bgs		
	66.5	27-29-30		At 66.5 ft bgs: Dense to very dense.			
	68.0	29-50/6"		At 68.0 ft bgs: Very dense.			
	69.5	14-17-25		At 69.5 ft bgs: Dense.			
70	71.0	20-20-25		**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), wet, dense.	PID = 0.2		
	72.5	15-17-21					
	74.0	12-16-19		**WELL GRADED SAND WITH GRAVEL (SW)** yellowish brown (10YR 5/4), wet, dense, 15% fine gravel.			
75				**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), wet, dense.	PID = 0.2		

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C40-079 SHEET 4 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 247 W. Linden Ave., Burbank, CA.
ELEVATION : 501.97 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1882860.7, E 646742.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 60 ft bgs
START : 6/6/13 11:00
END : 6/7/13 11:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	75.5	10-13-18		**SILT (ML)** olive (5Y 5/3), mottled with dark olive gray (5Y 3/2), moist, hard.			
	77.0	12-14-16		**POORLY GRADED SAND WITH SILT (SP-SM)** yellowish brown (10YR 5/4), moist to wet, medium dense to dense.			
	78.5	10-10-14		At 78.5 ft bgs: Medium dense.			
80	80.0	15-20-20		At 80.0 bgs: Dense.			0.5' SCH 80 PVC End Cap
	81.5			Boring terminated at 81.5 ft bgs.			
85							
90							
95							
100							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C41-058 SHEET 1 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : Across from 620 Paula Ave.., Glendale, CA.
ELEVATION : 469.85 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1880777.6, E 6474132.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig with 12" dia. Augers and CA Modified split spoon
WATER LEVEL: Water ATD: 40 ft bgs
START : 6/11/13 07:30
END : 6/11/13 18:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 5.5 inches thick over base over base (1.5 inches thick).	0 - 0.45 ft bgs: Asphalt saw cut.		Traffic-Rated Well Box
				POORLY GRADED SAND (SP) olive brown (2.5Y 4/3), moist.	0.45 - 10.0 ft bgs: Air knifing for utility clearance. At 0.58 ft bgs: Native soil.		4" SCH 80 PVC
							Cement-Bentonite Grout
5				**POORLY GRADED SAND WITH SILT (SP-SM)** olive brown (2.5Y 4/3), moist.			
10	10.0	7-9-12		**SILTY SAND (SM)** pale brown (10YR 6/3), dry, medium dense, poorly graded.	PID = 0.1		
	11.5						
15	15.0	8-8-10		At 15.0 ft bgs: Light yellowish brown (10YR 6/4).	PID = 0.1		
	16.5						
							Hydrated Bentonite Chips
20	20.0	10-12-16		**POORLY GRADED SAND WITH SILT (SP-SM)** light yellowish brown (2.5Y 6/3), dry, dense.	PID = 0.0		
	21.5						
							#3 Monterey Sand
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C41-058 SHEET 2 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : Across from 620 Paula Ave.., Glendale, CA.
ELEVATION : 469.85 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1880777.6, E 6474132.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig with 12" dia. Augers and CA Modified split spoon
WATER LEVEL: Water ATD: 40 ft bgs
START : 6/11/13 07:30
END : 6/11/13 18:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0	13-15-23		**POORLY GRADED SAND (SP)** olive (5Y 5/3), moist, medium dense to dense. At 25.5 ft bgs: Light olive gray (5Y 6/2).	PID = 0.1		
	26.5						0.02" Slotted 4" SCH 80 PVC
30	30.0	17-19-21		At 30.0 ft bgs: Light yellowish brown (2.5Y 6/3).	PID = 0.2		
	31.5			**SILT (ML)** dark olive gray (5Y 3/2), moist, hard. **WELL GRADED SAND WITH GRAVEL (SW)** pale yellow (2.5Y 7/3), dry, dense, fine gravel.			
35	35.0	14-18-23		**WELL GRADED SAND (SW)** light gray (2.5Y 7/2), dry, dense, trace fine gravel.	PID = 0.0		
	36.5						
40	40.0	25-50/6"		At 40.0 ft bgs: 0.25 foot thick layer of Clay (CL). At 40.25 ft bgs: Olive brown (2.5Y 4/3), wet, very dense.	PID = 0.1 At 40.0 ft bgs: Groundwater encountered		
	41.5			**WELL GRADED SAND WITH GRAVEL (SW)** light yellowish brown (2.5Y 6/3), wet, very dense, fine to coarse gravel.			
45	45.0	8-10-12		At 45.0 ft bgs: Light olive brown (2.5Y 5/3), medium dense, fine gravel.	PID = 0.2 At 45.0 ft bgs: Continuous sampling 45.0 - 63.0 ft bgs.		
	46.5	8-8-10		At 46.5 ft bgs: Increased coarse sand content, increased gravel content (20% fine gravel).			
	48.0	18-23-25		**FAT CLAY (CH)** brown (10YR 4/3), wet, very stiff, medium plasticity. **WELL GRADED SAND (SW)** light olive brown (2.5Y 5/3), wet, dense, fine gravel.			
	49.5	20-20-20		At 49.5 ft bgs: Decreased fine gravel content.			
50							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C41-058 SHEET 3 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : Across from 620 Paula Ave.., Glendale, CA.
ELEVATION : 469.85 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1880777.6, E 6474132.2 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig with 12" dia. Augers and CA Modified split spoon
WATER LEVEL: Water ATD: 40 ft bgs
START : 6/11/13 07:30
END : 6/11/13 18:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	51.0	23-25-28					
	52.5	15-17-20		**WELL GRADED SAND WITH GRAVEL (SW)** light gray (2.5Y 7/2), dense, fine to coarse gravel. At 52.3 ft bgs: Light olive brown (2.5Y 5/3), wet, decreased gravel content.			
	54.0	12-14-16		At 54.0 ft bgs: Medium dense.	PID = 0.1		
55	55.5	15-18-25		At 55.5 ft bgs: Dense.	At 55.0 ft bgs: No recovery 55.0 - 55.5 ft bgs.		
	57.0	20-25-25					
	58.5	30-50/6"		At 58.5 ft bgs: Very dense.			0.5' SCH 80 PVC End Cap
60	60.0	15-20-25		At 60.0 ft bgs: Dense.	PID = 0.1 PID = 0.0		
	61.5	17-19-22					
	63.0			Boring terminated at 63.0 ft bgs.			
65							
70							
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C42-059 SHEET 1 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 1232 Airway, Glendale, CA
ELEVATION : 471.18 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 4881735.1, E 6475163.9 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 40 ft bgs
START : 5/9/13 11:45
END : 5/10/13 10:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 6 inches thick.	0 - 0.5 ft bgs: Asphalt saw cut. 0.5 - 10.0 ft bgs: Air knifing for utility clearance.		Traffic-Rated Well Box
				SILTY SAND (SM) light olive brown (2.5Y 5/3), moist.			4" SCH 80 PVC
							Cement-Bentonite Grout
5							
10	10.0	8-10-12		**WELL GRADED SAND (SW)** dark yellowish brown (10YR 4/4), moist, medium dense, trace fine gravel.			
	11.5						
15	15.0	13-15-18		**WELL GRADED SAND WITH SILT (SW-SM)** very pale brown (10YR 7/3), dry, medium dense, 5% fine gravel.			
	16.5						
20	20.0	15-20-23		**POORLY GRADED SAND WITH SILT (SP-SM)** yellowish brown (10YR 5/4), moist, dense.			Hydrated Bentonite Chips
	21.5						
25							#3 Monterey

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C42-059 SHEET 2 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 1232 Airway, Glendale, CA
ELEVATION : 471.18 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 4881735.1, E 6475163.9 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 40 ft bgs
START : 5/9/13 11:45
END : 5/10/13 10:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0	8-10-12		**SILTY SAND (SM)** dark yellowish brown (10YR 4/4), moist, medium dense, poorly graded.			Sand
	26.5						
30	30.0	16-19-23		**POORLY GRADED SAND (SP)** pale yellow (2.5Y 8/3), moist, dense.			0.02" Slotted 4" SCH 80 PVC
	31.5						
35	35.0	25-28-30		**WELL GRADED SAND WITH SILT (SP-SM)** light olive brown (2.5Y 5/3), dry, dense, 10% fine gravel with trace coarse gravel.			
	36.5						
40	40.0	16-18-20		**CLAYEY SAND (SC)** brown (10YR 5/3), wet, medium dense.	At 40.0 ft bgs: Groundwater encountered.		
	41.5			**LEAN CLAY (CL)** dark olive brown (2.5Y 3/3), moist, very stiff to hard.			
45	45.0	8-12-16		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), wet, medium dense.	At 45.0 ft bgs: Continuous sampling from 45.0 - 61.5' bgs.		
	46.5	13-15-18					
	48.0	18-23-25		**CLAYEY SAND (SC)** dark olive brown (2.5Y 3/3), wet, medium dense. **WELL GRADED SAND (SW)** light olive brown (2.5Y 5/3), wet, medium dense, 10% fine gravel. At 48.0 ft bgs: Dense.			
50	49.5	10-10-14		At 49.5 ft bgs: Medium dense.			

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C42-059 SHEET 3 OF 3

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 1232 Airway, Glendale, CA
ELEVATION : 471.18 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 4881735.1, E 6475163.9 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 40 ft bgs
START : 5/9/13 11:45
END : 5/10/13 10:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	51.0	10-11-13					
	52.5	12-14-15					
	54.0	15-15-20		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), mottled with strong brown (7.5YR 4/6), wet, medium dense. At 54.0 ft bgs: No mottling with strong brown.			
55	55.5	7-9-11					
	57.0	16-18-23		At 57.0 ft bgs: Dense. At 57.5 ft bgs: Strong brown (7.5YR 4/6).			
	58.5	30-50/6"		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/3), wet, very dense.			
60	60.0	NR		At 59.5 ft bgs: 0.5 ft thick layer of silt and clay.			4" SCH 80 PVC endcap
	61.5			Boring terminated at 61.5 ft bgs.			
65							
70							
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C43-083 SHEET 1 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 647 W Harvard St., Glendale, CA
ELEVATION : 475.05 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1875040.1, E 6480236.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 61.7 ft bgs
START : 6/13/13 08:30
END : 6/13/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
				Asphalt - 6 inches thick.	0 - 0.5 ft bgs: Asphalt saw cut.		Traffic-Rated Well Box
				Soil not logged 0.5 - 10 ft bgs.	0.5 - 10.0 ft bgs: Air knifing for utility clearance.		4" SCH 80 PVC
							Cement-Bentonite Grout
5							
10	10.0	20-23-25		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/4), dry, dense, 5% fine gravel.			
	11.5						
15	15.0	25-50/6"		At 15.0 ft bgs: Very dense, 5% fine to coarse gravel.			
	16.5						
20	20.0	20-20-25		**WELL GRADED GRAVEL WITH SAND (GW)** light olive brown (2.5Y 5/4), dry, dense, 60% fine to coarse gravel.			
	21.5			**SILTY SAND (SM)** yellowish brown (10YR 5/6), moist, dense, poorly graded.			
25							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C43-083 SHEET 2 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 647 W Harvard St., Glendale, CA
ELEVATION : 475.05 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1875040.1, E 6480236.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 61.7 ft bgs
START : 6/13/13 08:30
END : 6/13/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	25.0	18-15-22		At 25.0 ft bgs: Medium dense, well graded, 5% fine gravel.			
	26.5						
30	30.0	20-25-30		At 30.0 ft bgs: Dense, poorly graded, 10% fine gravel. **POORLY GRADED SAND (SP)** very pale brown (10YR 7/3), dry, dense.			
	31.5						
35	35.0	20-20-23					
	36.5						
40	40.0	18-25-28					
	41.5						Hydrated Bentonite Chips
45	45.0	14-20-23		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), dry, dense, poorly graded, 10% fine gravel.			
	46.5			**POORLY GRADED SAND (SP)** very pale brown (10YR 7/3), dry, dense.			#3 Monterey Sand
50							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C43-083 SHEET 3 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 647 W Harvard St., Glendale, CA
ELEVATION : 475.05 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1875040.1, E 6480236.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 61.7 ft bgs
START : 6/13/13 08:30
END : 6/13/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	50.0	17-21-25		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), dry, dense, poorly graded, 5% fine gravel.			
	51.5			**WELL GRADED SAND (SW)** very pale brown (10YR 8/3), dry, dense.			0.02" Slotted 4" SCH 80 PVC
55	55.0	20-25-25		**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), moist, dense.			
	56.5						
60	60.0	30-50/6"		**WELL GRADED GRAVEL (GW)** pinkish white (5YR 8/2), dry, very dense.	At 60.0 - 88.8 ft bgs: Continuous sampling.		
	61.5	35-50/6"		At 61.25 ft bgs: 0.25 ft thick layer of Poorly Graded Sand (SP). At 61.5 ft bgs: 0.25 ft thick layer of Poorly Graded Sand with Silt (SP-SM).	At 61.7 ft bgs: Groundwater encountered.		
	63.0	30-50/6"		**WELL GRADED SAND (SW)** strong brown (7.5YR 5/6), wet, very dense, 10% of fine gravel.			
65	64.5	25-25-30		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/4), wet, very dense, 5% gravel. At 64.8 ft bgs: Dense, no gravel.			
	66.0	23-50/6"		At 66.0 ft bgs: Very dense.			
	67.5	40-50/6"					
	69.0	25-28-33					
70	70.5	27-30-30		**WELL GRADED SAND (SW)** yellowish brown (10YR 5/4), wet, dense.			
	72.0	25-27-30		**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/4), wet, dense.			
	73.5	20-20-20		**WELL GRADED SAND (SW)** yellowish brown (10YR 5/4), wet, dense, 10% fine gravel. **WELL GRADED SAND WITH SILT (SW-SM)** dark yellowish brown (10YR 4/6), wet, dense, 10% fine gravel.			
75							

PROJECT NUMBER:	BORING NUMBER:
427727.FI.01	CS-C43-083 SHEET 4 OF 4

Soil Boring Log

PROJECT : Glendale Chromium OU Remedial Investigation
LOCATION : 647 W Harvard St., Glendale, CA
ELEVATION : 475.05 ft msl (ground surface) NAVD 88
DRILLING CONTRACTOR : National EWP
COORDINATES : N 1875040.1, E 6480236.6 ft (NAD 83)
DRILLING METHOD AND EQUIPMENT : CME 95 HSA Rig w/ 12" dia. augers/CA Modified Split Spoon
WATER LEVEL: Water ATD: 61.7 ft bgs
START : 6/13/13 08:30
END : 6/13/13 17:00
LOGGER : N. Alkov

DEPTH BELOW SURFACE (ft)	INTERVAL (ft)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL/PROBE COMPLETION DIAGRAM	WELL/PROBE DETAILS
	75.0	12-15-18		At 76.25 ft bgs: 0.25 ft thick layer or Poorly Graded Sand (SP).			
	76.5	23-25-22		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), 70% sand, 30% fines.			
	78.0	23-25-25		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/4), dense.			
	79.5	20-20-24		**SILT (ML)** yellowish brown (10YR 5/4), wet, hard.			
80	81.0	19-23-26		**SILTY SAND (SM)** yellowish brown (10YR 5/4), wet, dense.			
	82.5	14-12-18		**POORLY GRADED SAND (SP)** dark yellowish brown (10YR 4/4), wet, dense. At 82.5 ft bgs: Light olive brown (2.5Y 5/4), medium dense.	At 82.0 - 82.5 ft bgs: No recovery.		
	84.0	25-29-33		At 84.0 ft bgs: Dense.			0.5' SCH 80 PVC End Cap
85	85.5	17-21-23		**WELL GRADED SAND (SW)** light olive brown (2.5Y 5/4), wet, dense.			
	87.0	25-27-30					
	88.5			Boring terminated at 88.5 ft bgs.			
90							
95							
100							

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No.
16721

File No.

Company GREGG DRILLING AND TESTING
Well CSC30 BH-1
Field BURBANK
County LOS ANGELES State CA

Location:

WHITNALL PARK
GPS: N34o09.805' W118o20.618'

Sec. Twp. Rge.

Other Services:

GR/LL3
SONIC/VDL
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	08-07-2012		
Run Number	ONE		
Depth Driller	225'		
Depth Logger	225'		
Bottom Logged Interval	225'		
Top Log Interval	0'		
Casing Driller	N/A		
Casing Logger	N/A		
Bit Size	9 7/8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	N/A		
Rm @ Meas. Temp	6.8 @ 77F		
Rmf @ Meas. Temp	7.3 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	10:00		
Time Logger on Bottom	12:00		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	SCHUMACHER	WATKINS	
Witnessed By	M. MAYRY		

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Comments

Calibration Report

Database File 16721.db
Dataset Pathname elog1
Dataset Creation Tue Aug 07 12:18:01 2012

ELOG Calibration Report

Serial:	D1
Model:	DTQ
Shop Calibration Performed:	Fri Sep 02 10:21:35 2011
Before Survey Verification Performed:	Wed May 18 15:44:28 2011
After Survey Verification Performed:	Wed May 18 15:45:08 2011

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	8.723	99.406		10.200	102.200	Ohm-m	1.015	1.350
Long	7.680	96.048		10.200	102.200	Ohm-m	1.041	-17.600
IEE	52.920	3270.320	counts	0.058	3.579	A		
VSN	49.080	5373.320	counts	0.936	102.490	V		
VLN	204.820	45711.480	counts	3.907	871.891	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	80.215	146.194		82.548	146.243	Ohm-m	0.965	5.112
Long	1342.350	4974.190		4976.440	4976.440	Ohm-m	0.991	47.934
IEE	54.260	3251.500	counts	0.059	3.558	A		
VSN	48.900	5340.600	counts	0.933	101.865	V		
VLN	204.580	45427.860	counts	3.902	866.481	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	79.445	146.186		80.215	146.194	Ohm-m	0.989	1.677
Long	1341.850	4973.840		4974.190	4974.190	Ohm-m	1.000	0.554
IEE	54.360	3249.300	counts	0.059	3.556	A		
VSN	48.520	5336.700	counts	0.925	101.791	V		
VLN	204.880	45393.900	counts	3.908	865.833	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	82.548	80.215	Ohm-m	146.243	146.194	Ohm-m
Long	1377.960	1342.350	Ohm-m	4976.440	4974.190	Ohm-m

Gamma Ray Calibration Report

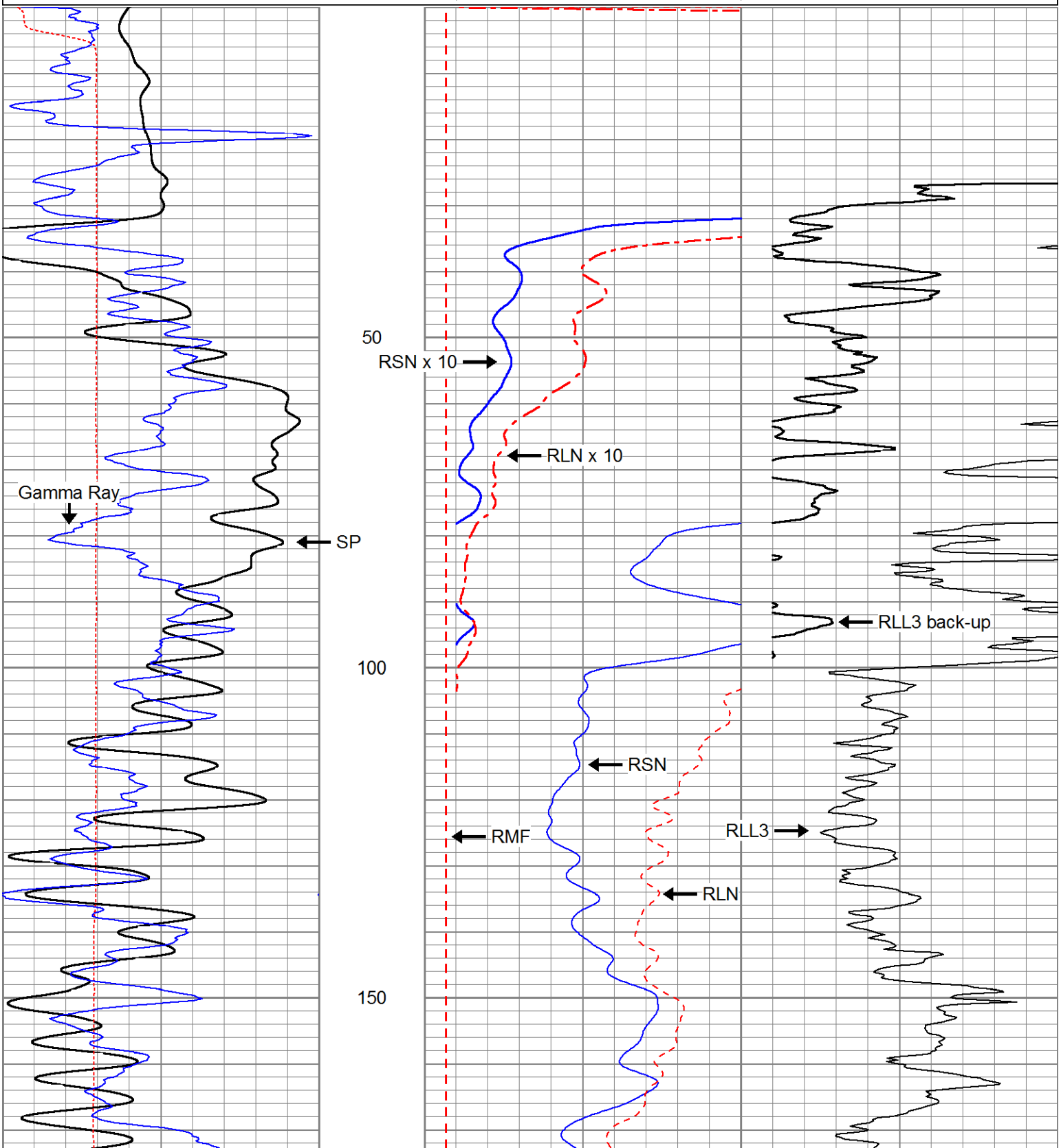
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Sat Apr 09 12:21:07 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	212.4	cps
Calibrator Reading:	707.5	cps
Sensitivity:	0.3272	GAPI/cps

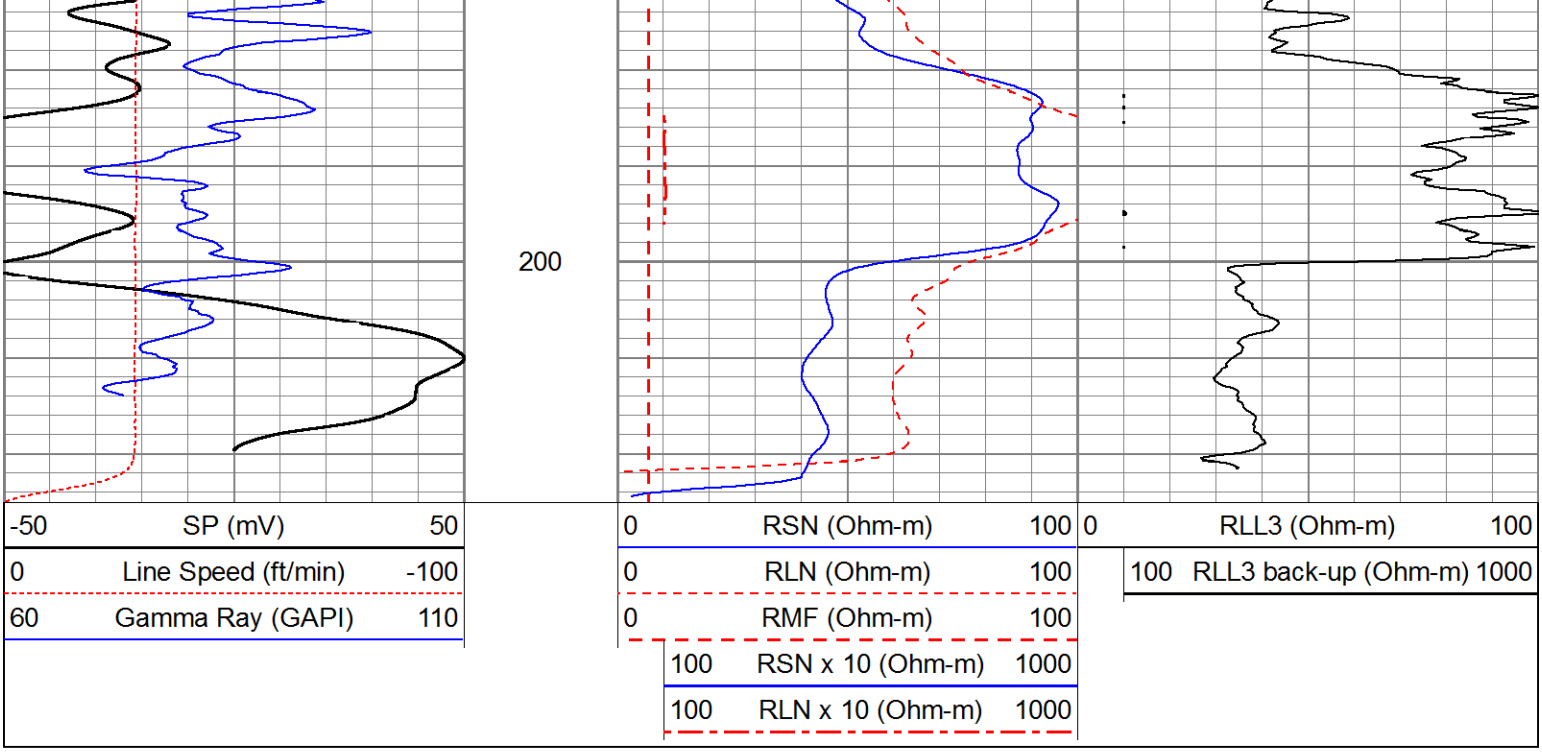
Database File	16721.db
Dataset Pathname	elog1
Presentation Format	elog
Dataset Creation	Tue Aug 07 12:18:01 2012
Charted by	Depth in Feet scaled 1:240

-50	SP (mV)	50
0	Line Speed (ft/min)	-100
60	Gamma Ray (GAPI)	110

0	RSN (Ohm-m)	100
0	RLN (Ohm-m)	100
0	RMF (Ohm-m)	100
100	RSN x 10 (Ohm-m)	1000
100	RLN x 10 (Ohm-m)	1000

0	RLL3 (Ohm-m)	100
100	RLL3 back-up (Ohm-m)	1000




200
-50 SP (mV) 50
0 Line Speed (ft/min) -100
60 Gamma Ray (GAPI) 110
0 RSN (Ohm-m) 100
0 RLN (Ohm-m) 100
0 RMF (Ohm-m) 100
100 RSN x 10 (Ohm-m) 1000
100 RLN x 10 (Ohm-m) 1000
0 RLL3 (Ohm-m) 100
100 RLL3 back-up (Ohm-m) 1000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
16721

File No.

Company	GREGG DRILLING AND TESTING
Well	CSC30 BH-1
Field	BURBANK
County	LOS ANGELES State CA

Location:

WHITNALL PARK
GPS: N34o09.805' W118o20.618'

Sec. Twp. Rge.

Other Services:

ELOG
SONIC/VDL
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	08-07-2012		
Run Number	ONE		
Depth Driller	225'		
Depth Logger	225'		
Bottom Logged Interval	225'		
Top Log Interval	0'		
Casing Driller	N/A		
Casing Logger	N/A		
Bit Size	9 7/8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	N/A		
Rm @ Meas. Temp	6.8 @ 77F		
Rmf @ Meas. Temp	7.3 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	10:00		
Time Logger on Bottom	12:00		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	SCHUMACHER	WATKINS	
Witnessed By	M. MAYRY		

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Comments

Calibration Report

Database File 16721.db
Dataset Pathname LL3
Dataset Creation Tue Aug 07 12:39:16 2012

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Fri Apr 15 07:10:16 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	43.7	
Calibrator Reading:	168.2	
Sensitivity:	1.3020	GAPI/

RLL3 (Resistivity Laterolog 3) Calibration Report:

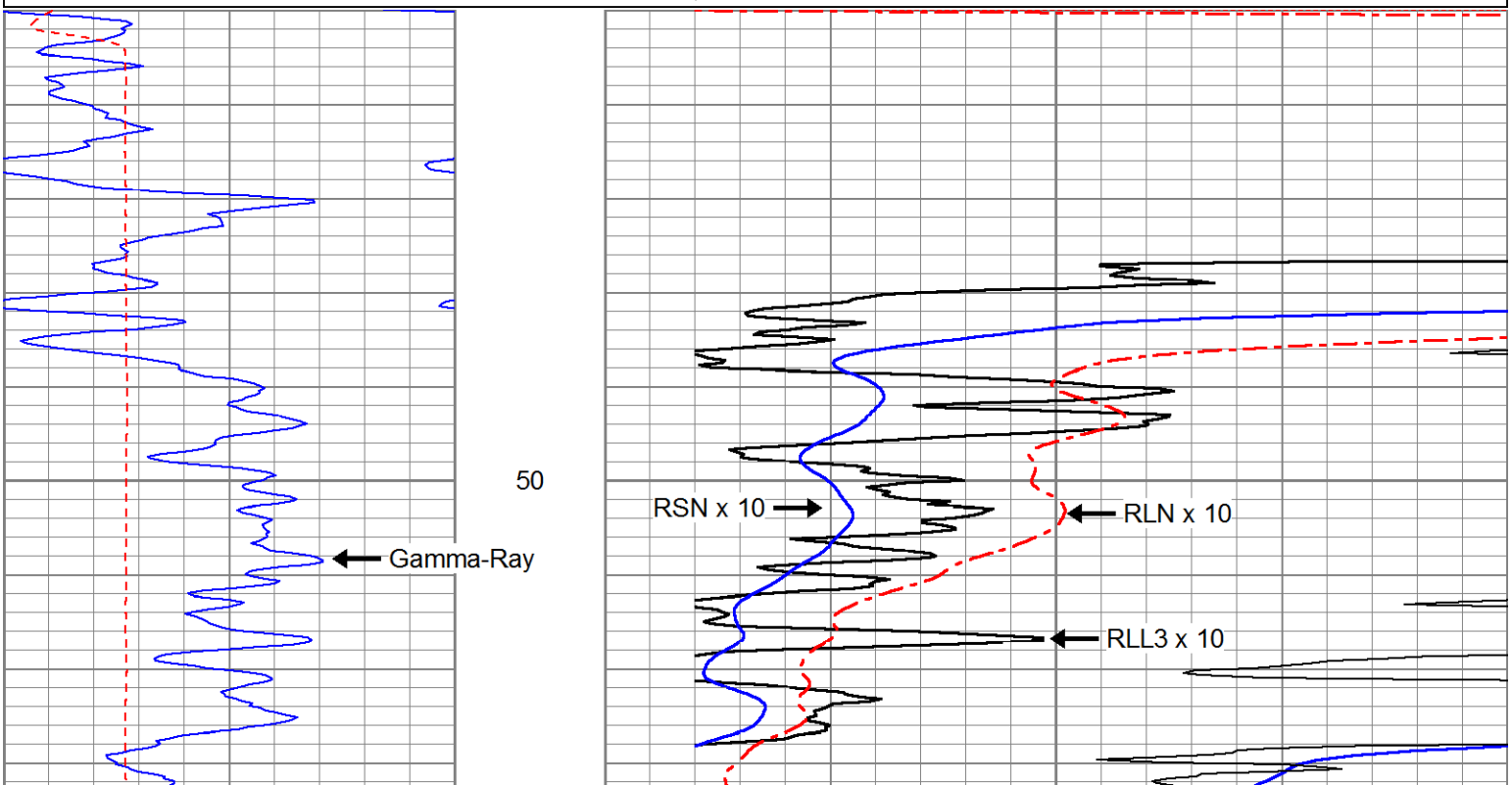
Serial Number:	130	
Tool Model:	M&W	
Performed:	Sat Apr 09 11:30:57 2011	

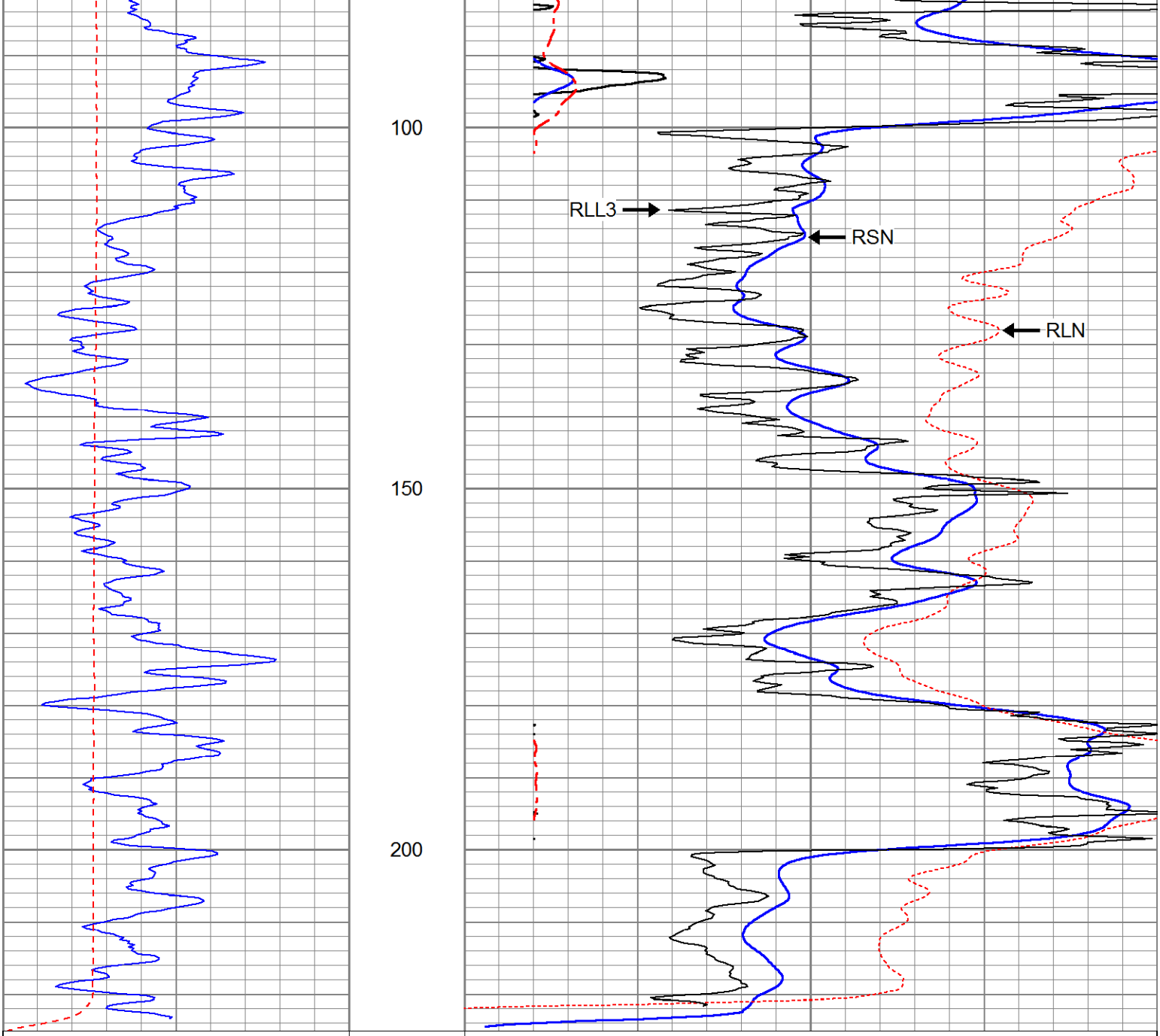
System Reading	Calibration Reference	
0.004	2.500	Ohm-m
0.007	5.000	
0.068	50.000	
0.361	250.000	
0.712	500.000	

Database File	16721.db
Dataset Pathname	LL3
Presentation Format	guard
Dataset Creation	Tue Aug 07 12:39:16 2012
Charted by	Depth in Feet scaled 1:240

60	Gamma-Ray (GAPI)	110
0	Line Speed (ft/min)	-100

0	RSN (Ohm-m)	100
0	RLN (Ohm-m)	100
0	RLL3 (Ohm-m)	100
100	RLL3 x 10 (Ohm-m)	1000
100	RSN x 10 (Ohm-m)	1000
100	RLN x 10 (Ohm-m)	1000





60	Gamma-Ray (GAPI)	110
0	Line Speed (ft/min)	-100

0	RSN (Ohm-m)	100
0	RLN (Ohm-m)	100
0	RLL3 (Ohm-m)	100
100	RLL3 x 10 (Ohm-m)	1000
100	RSN x 10 (Ohm-m)	1000
100	RLN x 10 (Ohm-m)	1000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No.
16721

File No.

Company GREGG DRILLING AND TESTING
Well CSC30 BH-1
Field BURBANK
County LOS ANGELES State CA

Location:

WHITNALL PARK
GPS: N34o09.805' W118o20.618'

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	08-07-2012		
Run Number	ONE		
Depth Driller	225'		
Depth Logger	225'		
Bottom Logged Interval	225'		
Top Log Interval	0'		
Casing Driller	N/A		
Casing Logger	N/A		
Bit Size	9 7/8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	N/A		
Rm @ Meas. Temp	6.8 @ 77F		
Rmf @ Meas. Temp	7.3 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	10:00		
Time Logger on Bottom	12:00		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	SCHUMACHER	WATKINS	
Witnessed By	M. MAYRY		

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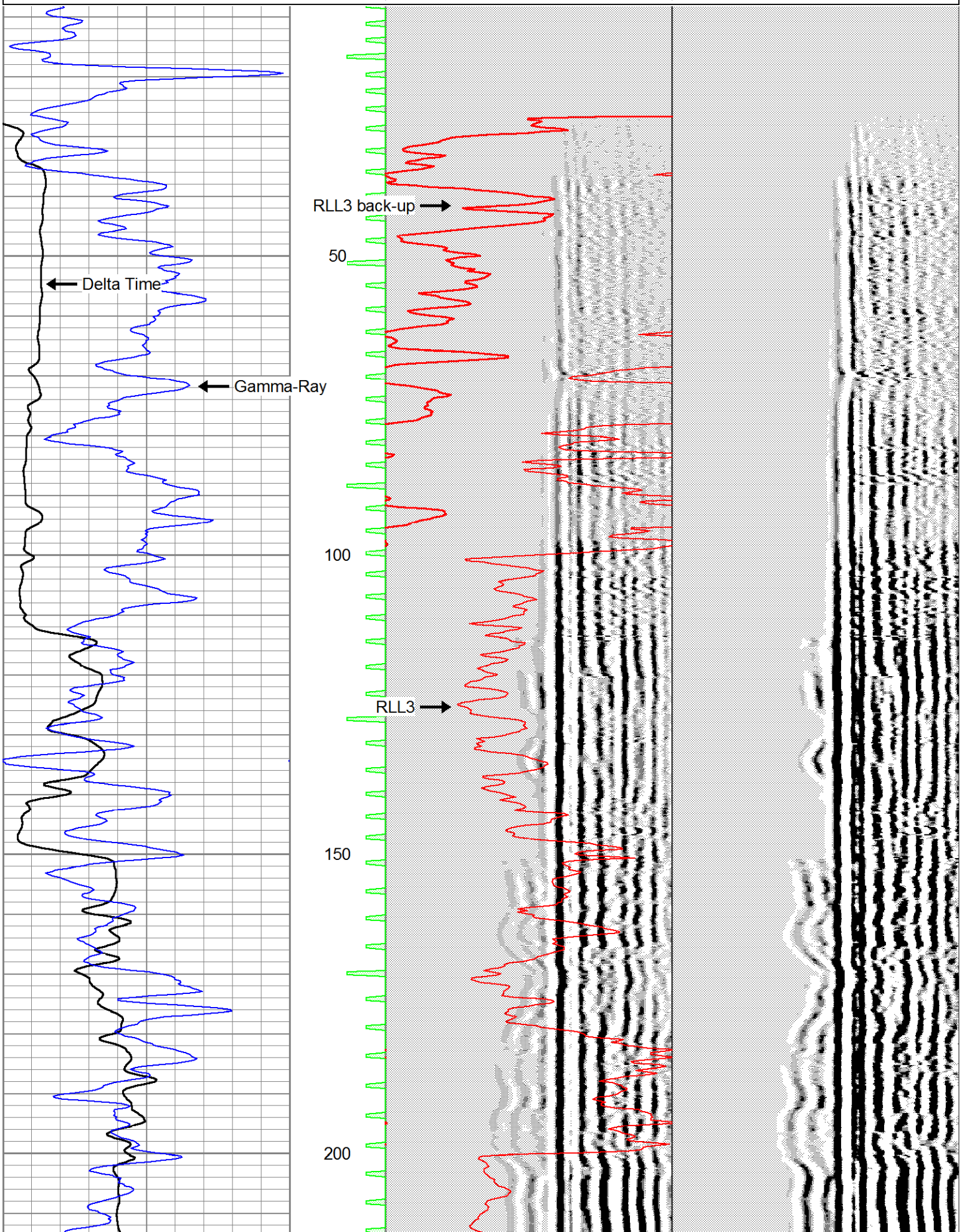
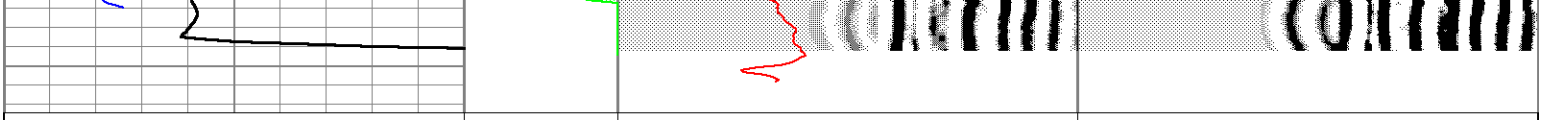
Comments

Database File 16721.db
Dataset Pathname snc/snc
Presentation Format slt
Dataset Creation Tue Aug 07 14:05:05 2012
Charted by Depth in Feet scaled 1:240

290	Delta Time (usec/ft)	90	ITT	600	Variable Density 5 ft	1600	600	Variable Density 5 ft	1600
60	Gamma-Ray (GAPI)	110	5 (msec) 0	0	RLL3 (Ohm-m)	100			
				100	RLL3 back-up (Ohm-m)	1000			





290	Delta Time (usec/ft)	90	ITT	600	Variable Density 5 ft	1600	600	Variable Density 5 ft	1600
60	Gamma-Ray (GAPI)	110	5 (msec) 0	0	RLL3 (Ohm-m)	100			
				100	RLL3 back-up (Ohm-m)	1000			

PACIFIC SURVEYS

CALIPER
BOREHOLE VOLUMES

Job No.
16721

File No.

Company	GREGG DRILLING AND TESTING
Well	CSC30 BH-1
Field	BURBANK
County	LOS ANGELES State CA

Location:

WHITNALL PARK
GPS: N34o09.805' W118o20.618'

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
SONIC

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	08-07-2012		
Run Number	ONE		
Depth Driller	225'		
Depth Logger	225'		
Bottom Logged Interval	225'		
Top Log Interval	0'		
Casing Driller	N/A		
Casing Logger	N/A		
Bit Size	9 7/8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	N/A		
Rm @ Meas. Temp	6.8 @ 77F		
Rmf @ Meas. Temp	7.3 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	10:00		
Time Logger on Bottom	12:00		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	SCHUMACHER	WATKINS	
Witnessed By	M. MAYRY		

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Comments

Calibration Report

Database File 16721.db
Dataset Pathname CAL1/CAL1.1
Dataset Creation Tue Aug 07 15:36:19 2012

Temperature Calibration Report

Serial Number:	PS-4_Medium
Tool Model:	GRPH_CAL
Performed:	Tue Jan 24 15:13:45 2012

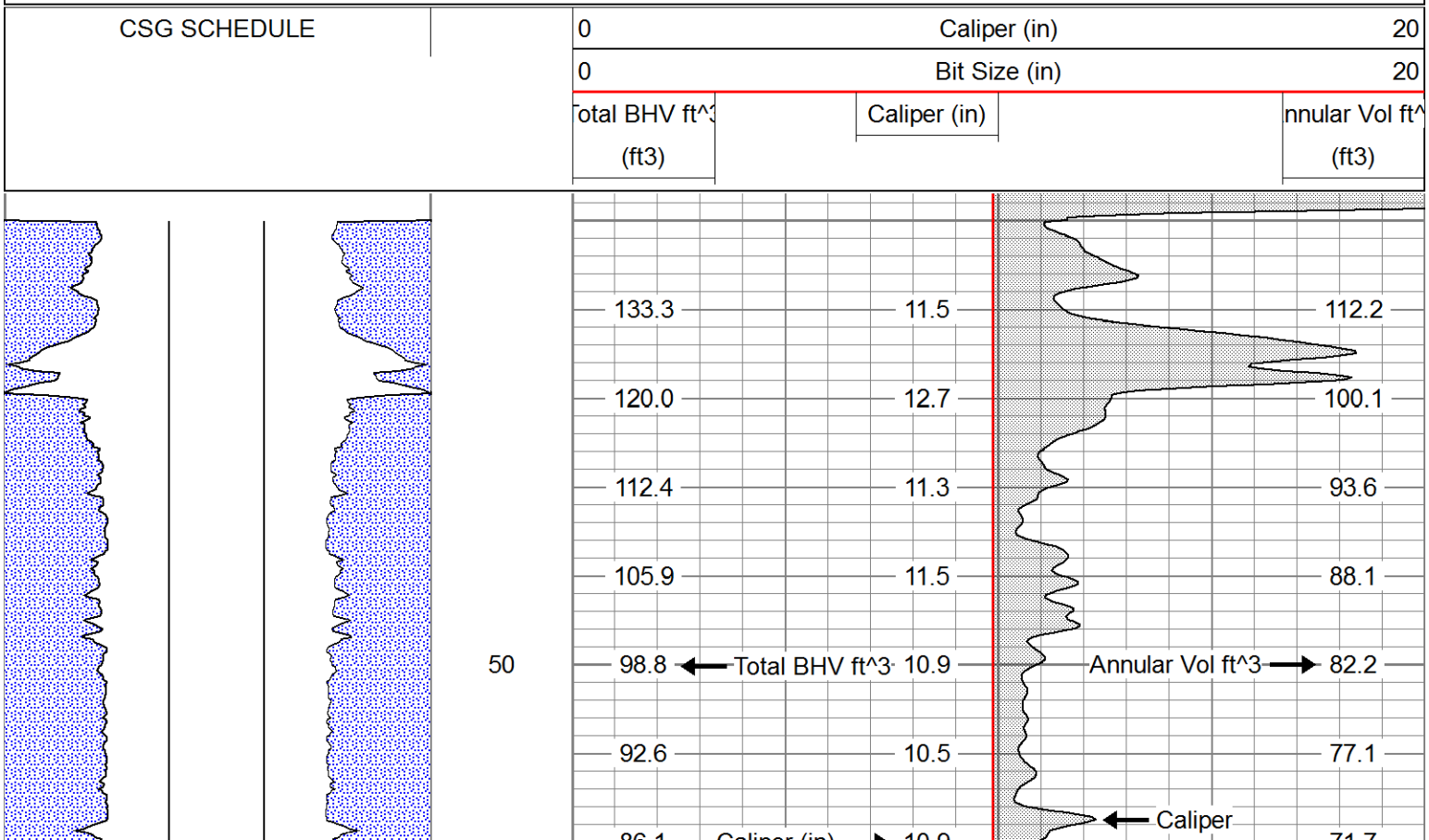
Point #	Reading		Reference	
1	557.90	cps	7.00	degF
2	1970.82	cps	16.00	degF
3		cps		degF
4		cps		degF
5		cps		degF
6		cps		degF
7		cps		degF
8		cps		degF
9		cps		degF
10		cps		degF

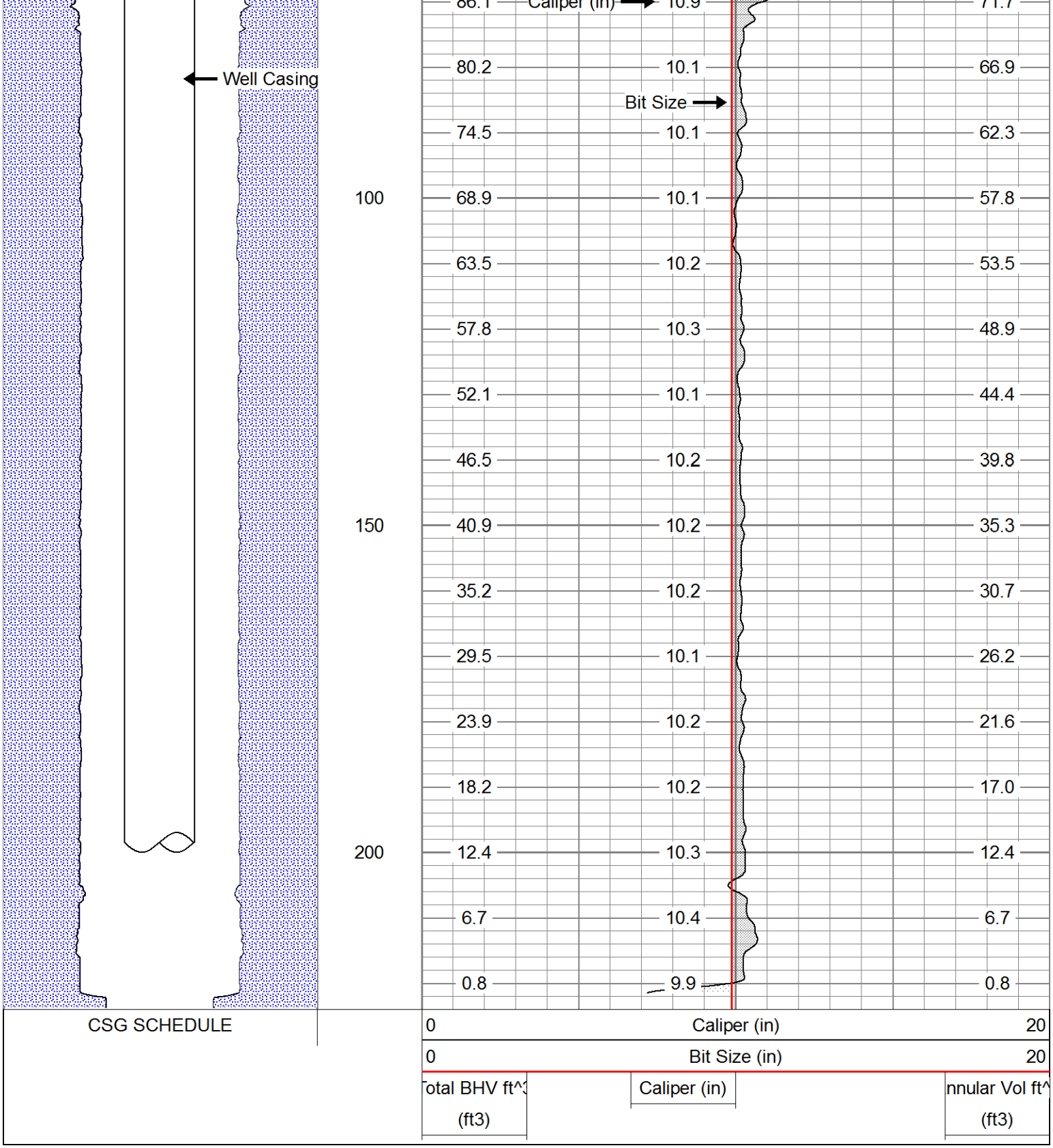
XY Caliper Calibration Report

Serial Number/Model:	PS-4_Medium-Comprobe
Performed:	Tue Jan 24 15:13:08 2012

	Ring		X Caliper		Y Caliper	
1:	8	in	84.0188	cps	84.0188	cps
2:	14	in	557.901	cps	557.901	cps
3:	20	in	1029.28	cps	1029.28	cps
4:	26	in	1479.37	cps	1479.37	cps
5:	32	in	1970.82	cps	1970.82	cps
6:		in		cps		cps

Database File	16721.db
Dataset Pathname	CAL1/CAL1.1
Presentation Format	xyc_gph
Dataset Creation	Tue Aug 07 15:36:19 2012
Charted by	Depth in Feet scaled 1:240




Well Casing
Caliper (in)
Bit Size
100
150
200
86.1
10.9
71.7
80.2
10.1
66.9
74.5
10.1
62.3
68.9
10.1
57.8
63.5
10.2
53.5
57.8
10.3
48.9
52.1
10.1
44.4
46.5
10.2
39.8
40.9
10.2
35.3
35.2
10.2
30.7
29.5
10.1
26.2
23.9
10.2
21.6
18.2
10.2
17.0
12.4
10.3
12.4
6.7
10.4
6.7
0.8
9.9
0.8
CSG SCHEDULE
0
Caliper (in)
20
0
Bit Size (in)
20
Total BHV ft^3
(ft3)
Caliper (in)
Annular Vol ft^
(ft3)

Project: Glendale Chromium Operable Unit | Boring: **CS-C44-120** | Pg. 1 of 9

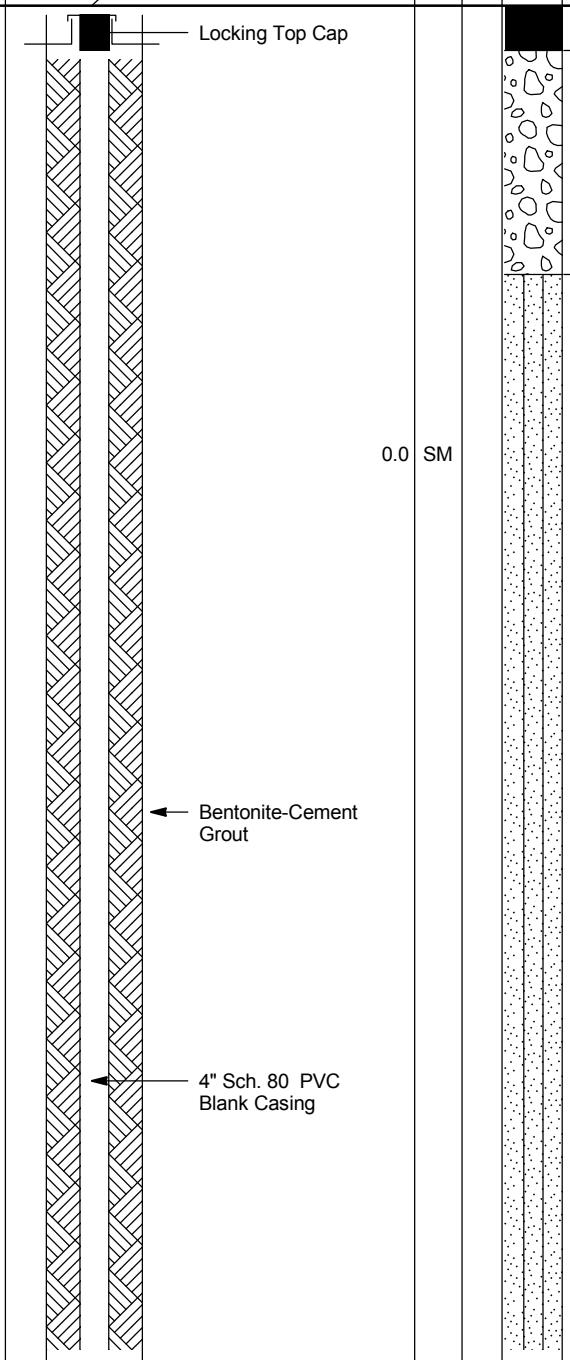
Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/27/14

Location: 100 South Flower St | Sampler / Drop: | Date Completed: 5/28/14

Northing/Easting: 1887060.8 N / 6467366.5 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 555.75 ft amsl | Water Depths: ▽ ATD 90.51

DEPTH - FT.	PID	USCS SYMBOL	SAMPLES	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
0				ASPHALT			
1				Road base/layered asphalt			
2							
3				Dark yellowish-brown (10YR, 3/4) silty fine SAND with trace gravel. Moist			
4							
5	0.0	SM					
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							



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Lithologic and Well Construction Log of CS-C44-120

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C44-120** | Pg. 2 of 9

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/27/14

Location: 100 South Flower St | Sampler / Drop: | Date Completed: 5/28/14

Northing/Easting: 1887060.8 N / 6467366.5 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 555.75 ft amsl | Water Depths: ▽ ATD 90.51

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
15						Dark yellowish-brown (10YR, 3/4) silty fine SAND with trace gravel. Moist			
16									
17									
18	← Bentonite-Cement Grout								
19									
20		0.0	SM						
21									
22	← 4" Sch. 80 PVC Blank Casing								
23									
24									
25						- Becomes brown (10YR, 4/3)			
26									
27									
28									
29									
30						*(continued)*			

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Lithologic and Well Construction Log of CS-C44-120

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C44-120** | Pg. 3 of 9

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/27/14

Location: 100 South Flower St | Sampler / Drop: | Date Completed: 5/28/14

Northing/Easting: 1887060.8 N / 6467366.5 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 555.75 ft amsl | Water Depths: ▽ ATD 90.51

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
30		0.0	SM			Dark yellowish-brown (10YR, 3/4) silty fine SAND with trace gravel. Moist			
31									
32									
33									
34	← Bentonite-Cement Grout								
35									
36									
37									
38									
39									
40	← 4" Sch. 80 PVC Blank Casing	0.0	SM			- Becomes increased silt content			
41									
42									
43									
44									
45						*(continued)*			

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Lithologic and Well Construction Log of CS-C44-120

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C44-120** | Pg. 4 of 9

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/27/14

Location: 100 South Flower St | Sampler / Drop: | Date Completed: 5/28/14

Northing/Easting: 1887060.8 N / 6467366.5 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 555.75 ft amsl | Water Depths: ▽ ATD 90.51

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
45						Dark yellowish-brown (10YR, 3/4) silty fine SAND with trace gravel. Moist			
46									
47									
48									
49	← Bentonite-Cement Grout								
50		0.0	SM						
51									
52									
53									
54									
55	← 4" Sch. 80 PVC Blank Casing								
56									
57									
58									
59									
60						*(continued)*			

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Lithologic and Well Construction Log of CS-C44-120

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C44-120** | Pg. 5 of 9

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/27/14

Location: 100 South Flower St | Sampler / Drop: | Date Completed: 5/28/14

Northing/Easting: 1887060.8 N / 6467366.5 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 555.75 ft amsl | Water Depths: ▽ ATD 90.51

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
60		0.0	SM			Dark yellowish-brown (10YR, 3/4) silty fine SAND with trace gravel. Moist			
61									
62									
63	← Bentonite-Cement Grout								
64									
65									
66									
67									
68									
69									
70		0.0	CL			Brown (10YR, 4/3) sandy CLAY. Moist.			
71	← WyoBen Med. Bentonite Chips								
72									
73									
74	← #0/30 Transition Sand								
75						*(continued)*			

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Lithologic and Well Construction Log of CS-C44-120

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C44-120** | Pg. 6 of 9

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/27/14

Location: 100 South Flower St | Sampler / Drop: | Date Completed: 5/28/14

Northing/Easting: 1887060.8 N / 6467366.5 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 555.75 ft amsl | Water Depths: ▽ ATD 90.51

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
75						Brown (10YR, 4/3) sandy CLAY. Moist.			
76	#0/30 Transition Sand								
77									
78	#2/12 Filter Sand					Brown (10YR, 4/3) silty fine SAND. Moist.			
79									
80		0.0	SM						
81									
82									
83						- Becomes olive-brown (2.5Y, 4/3) with gravel and clay			
84	4" Sch. 80 PVC 0.020"-Slot Screen								
85		0.0	GP			Brown (7.5YR, 4/4) sandy GRAVEL with silt. Moist. Gravel and cobbles to 5" diameter. Substantial drill chatter.			
86									
87									
88									
89						- Drill chatter subsides			
90									

(continued)

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Lithologic and Well Construction Log of CS-C44-120

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C44-120** | Pg. 7 of 9

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/27/14

Location: 100 South Flower St | Sampler / Drop: | Date Completed: 5/28/14

Northing/Easting: 1887060.8 N / 6467366.5 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 555.75 ft amsl | Water Depths: ∇ ATD 90.51

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
90	∇	0.0	SM			Brown (10 YR, 4/3) gravelly SAND with silt. Moist			
91									
92									
93									
94									
95									
96						Olive-brown (10YR, 4/3) clayey fine to medium SAND with gravel and silt. Wet.			
97									
98	#2/12 Filter Sand								
99									
100	4" Sch. 80 PVC 0.020"-Slot Screen	0.0	SC						
101									
102									
103									
104									
105									

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Lithologic and Well Construction Log of CS-C44-120

Project Location	Contract Number
GCOU SFV Superfund Site	2013152

Project: Glendale Chromium Operable Unit | Boring: **CS-C44-120** | Pg. 8 of 9

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/27/14

Location: 100 South Flower St | Sampler / Drop: | Date Completed: 5/28/14

Northing/Easting: 1887060.8 N / 6467366.5 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 555.75 ft amsl | Water Depths: ▽ ATD 90.51

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
105						Brown (10YR, 4/3) fine to medium SAND with gravel and sit. Wet.			
106									
107									
108									
109									
110		0.0	SM						
111	4" Sch. 80 PVC 0.020"-Slot Screen								
112									
113									
114									
115	#2/12 Filter Sand					- End of drilling 5/27/2014			
116									
117									
118		0.0	SM						
119									
120	Stainless Steel Cap								

(continued)

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Lithologic and Well Construction Log of CS-C44-120

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C44-120** | Pg. 9 of 9

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/27/14

Location: 100 South Flower St | Sampler / Drop: | Date Completed: 5/28/14

Northing/Easting: 1887060.8 N / 6467366.5 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 555.75 ft amsl | Water Depths: ▽ ATD 90.51

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
						Boring completed to 120.5' bgs on 5/28/2014 and converted to monitoring well CS-C44-120 on 5/28/2014. Bottom of boring at 120 feet			

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Lithologic and Well Construction Log of CS-C44-120

Project Location	Contract Number
GCOU SFV Superfund Site	2013152

Project: Glendale Chromium Operable Unit | Boring: **CS-C45-54** | Pg. 1 of 4

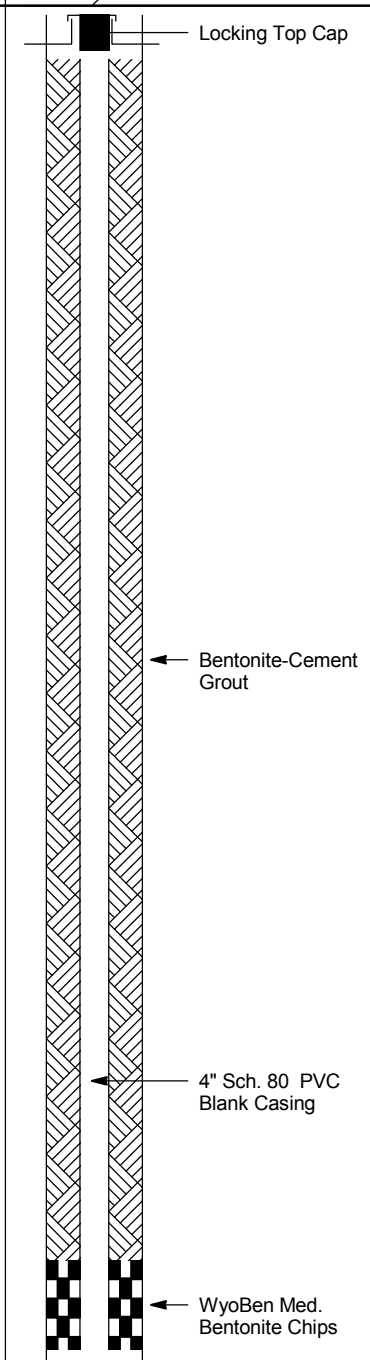
Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/29/14

Location: 3621 Brunswick Ave | Sampler / Drop: | Date Completed: 5/29/14

Northing/Easting: 1865886.3 N / 6482732.3 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 412.48 ft amsl | Water Depths: ▽ ATD 33.55

DEPTH - FT.	PID	USCS SYMBOL	SAMPLES	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
0				0.5' Asphalt			
				0.7' Concrete			
1				Dark yellowish-brown (10YR, 4/6) silty fine to medium SAND. Moist.			
2							
3							
4	0.0	SM					
5							
6							
7							
8							
9							
10	0.0	SM		- Becomes decreased silt, with gravel			
11							
12							
13							
14							
15							



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Lithologic and Well Construction Log of CS-C45-54

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C45-54** | Pg. 2 of 4

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/29/14

Location: 3621 Brunswick Ave | Sampler / Drop: | Date Completed: 5/29/14

Northing/Easting: 1865886.3 N / 6482732.3 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 412.48 ft amsl | Water Depths: ▽ ATD 33.55

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
15						Dark yellowish-brown (10YR, 4/6) silty fine to medium SAND. Moist.			
16									
	WyoBen Med. Bentonite Chips								
17									
18	4" Sch. 80 PVC Blank Casing					- Gravel/cobbles to 4" diameter. Drill chatter			
19		0.0	SM						
	#0/30 Transition Sand								
20						- Becomes yellowish-brown (10YR, 5/6), fine to coarse SAND			
21									
22	#2/12 Filter Sand								
23									
24									
25									
26									
27	4" Sch. 80 PVC Blank Casing								
28									
29									
30									

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Lithologic and Well Construction Log of CS-C45-54

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C45-54** | Pg. 3 of 4

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/29/14

Location: 3621 Brunswick Ave | Sampler / Drop: | Date Completed: 5/29/14

Northing/Easting: 1865886.3 N / 6482732.3 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 412.48 ft amsl | Water Depths: ∇ ATD 33.55

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
30						Dark yellowish-brown (10YR, 4/6) silty fine to medium SAND. Moist.			
31									
32						- Becomes gravelly. Wet.			
33		0.1	SM						
34	∇								
35									
36									
37	← #2/12 Filter Sand								
38									
39	← 4" Sch. 80 PVC 0.020"-Slot Screen								
40									
41									
42									
43									
44									
45						*(continued)*			

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Lithologic and Well Construction Log of CS-C45-54

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C45-54** | Pg. 4 of 4

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/29/14

Location: 3621 Brunswick Ave | Sampler / Drop: | Date Completed: 5/29/14

Northing/Easting: 1865886.3 N / 6482732.3 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 412.48 ft amsl | Water Depths: ▽ ATD 33.55

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
45		0.1	SM			Dark yellowish-brown (10YR, 4/6) silty fine to medium SAND. Moist.			
46									
47									
48									
49									
50									
51									
52									
53									
54	Stainless Steel Cap	0.1	SM						

Boring completed to 54' bgs on 5/29/2014 and converted to monitoring well CS-C45-54.
Bottom of boring at 54 feet

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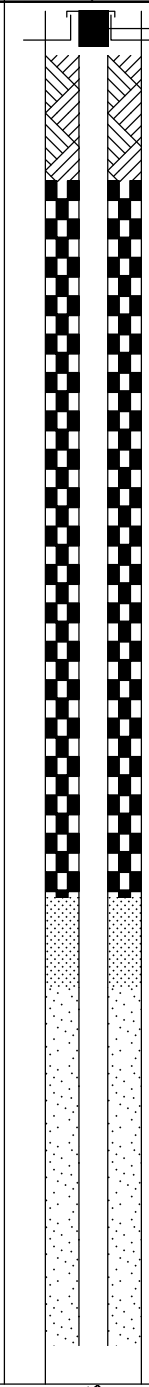
Lithologic and Well Construction Log of CS-C45-54

Project Location	Contract Number
GCOU SFV Superfund Site	2013152

Project: Glendale Chromium Operable Unit | Boring: **CS-C46-45** | Pg. 1 of 4

Drilling Co:	Gregg Drilling	Drilling Method:	HSA
Date Started:	5/30/14	Location:	3930 Edenhurst Ave
Sampler / Drop:		Date Completed:	5/30/14
Northing/Easting:	1867258.9 N / 6481281.1 E	Logged by:	Mark Wanek
Reviewed by:	JDL	Surface Elev.:	411.95 ft amsl
Water Depths:	▽ ATD 23.80		



DEPTH - FT.	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
0					Asphalt			
					Brown (10YR, 4/3) silty fine SAND. Moist.			
1								
2	0.1	SM						
3								
4								
5								
6								
7								
8								
9								
10	0.1	SM			- Becomes dark brown (10YR, 3/3)			
11								
12								
13								
14								
15					*(continued)*			

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Lithologic and Well Construction Log of CS-C46-45

Project Location	Contract Number
GCOU SFV Superfund Site	2013152

Project: Glendale Chromium Operable Unit | Boring: **CS-C46-45** | Pg. 2 of 4

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/30/14

Location: 3930 Edenhurst Ave | Sampler / Drop: | Date Completed: 5/30/14

Northing/Easting: 1867258.9 N / 6481281.1 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 411.95 ft amsl | Water Depths: ∇ ATD 23.80

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
15						Brown (10YR, 4/3) silty fine SAND. Moist.			
16									
17									
18	#2/12 Filter Sand								
19									
20		0.0	SM			- Substantial drill chatter, gravel and cobbles to 4" diameter at approx. 20'.			
21									
22						- Becomes gravelly			
23	4" Sch. 80 PVC Blank Casing								
24	∇								
25		0.5	SM			- Water apparent in bottom of auger			
26									
27									
28	#2/12 Filter Sand								
29									
30									

(continued)

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Lithologic and Well Construction Log of CS-C46-45

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C46-45** | Pg. 3 of 4

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/30/14

Location: 3930 Edenhurst Ave | Sampler / Drop: | Date Completed: 5/30/14

Northing/Easting: 1867258.9 N / 6481281.1 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 411.95 ft amsl | Water Depths: ▽ ATD 23.80

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
30	4" Sch. 80 PVC 0.020"-Slot Screen	0.2	SM			- Becomes gravelly			
31									
32									
33									
34									
35									
36	#2/12 Filter Sand								
37									
38	4" Sch. 80 PVC 0.020"-Slot Screen								
39									
40		0.1	SM						
41									
42									
43									
44									
45	Stainless Steel Cap								

(continued)

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Lithologic and Well Construction Log of CS-C46-45

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C46-45** | Pg. 4 of 4

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 5/30/14

Location: 3930 Edenhurst Ave | Sampler / Drop: | Date Completed: 5/30/14

Northing/Easting: 1867258.9 N / 6481281.1 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 411.95 ft amsl | Water Depths: ▽ ATD 23.80

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
45						- Becomes gravelly			
46									
						Boring completed to 46' bgs on 05/30/2014 and converted to monitoring well CS-C46-45 on 6/02/2014			
						Bottom of boring at 46 feet			

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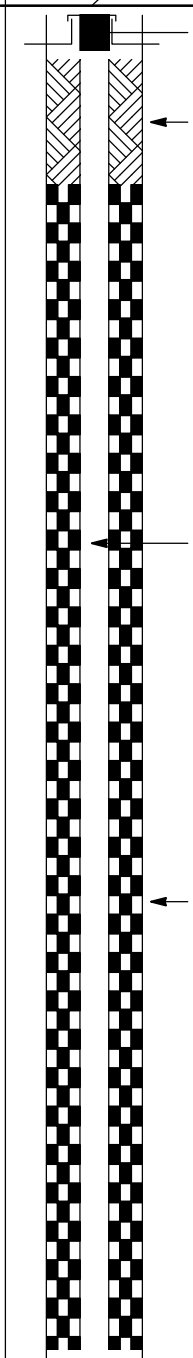
Lithologic and Well Construction Log of CS-C46-45

Project Location	Contract Number
GCOU SFV Superfund Site	2013152

Project: Glendale Chromium Operable Unit | Boring: **CS-C47-53** | Pg. 1 of 4

Drilling Co:	Gregg Drilling	Drilling Method:	HSA
Date Started:	6/1/14	Location:	3932 Boyce St
Sampler / Drop:		Date Completed:	6/4/14
Northing/Easting:	1867723.7 N / 6481847.1 E	Logged by:	Mark Wanek
Reviewed by:	JDL	Surface Elev.:	418.39 ft amsl
Water Depths:	▽ ATD 32.25		

DEPTH - FT.	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
0					Asphalt			
1					Concrete			
					Brown silty SAND, fine-grained. Moist			
4	0.0	SM						
10	0.0	SM						
					(continued)			



OTIE
317 E Main St
Telephone: 805.585.2110
www.otie.com

Lithologic and Well Construction Log of CS-C47-53

Project Location	Contract Number
GCOU SFV Superfund Site	2013152

Project: Glendale Chromium Operable Unit | Boring: **CS-C47-53** | Pg. 2 of 4

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 6/1/14

Location: 3932 Boyce St | Sampler / Drop: | Date Completed: 6/4/14

Northing/Easting: 1867723.7 N / 6481847.1 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 418.39 ft amsl | Water Depths: ▽ ATD 32.25

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
15						Brown silty SAND, fine-grained. Moist			
16									
	WyoBen Med. Bentonite Chips								
17									
18						Rig chatter. Gravel layer			
	#0/30 Transition Sand								
19		0.2	SM						
20	4" Sch. 80 PVC Blank Casing								
21									
22	#2/12 Filter Sand								
23									
24									
25									
26									
27	4" Sch. 80 PVC Blank Casing								
28						Rig chatter - gravel and cobbles			
29						- Cobbles in cuttings range from 1 to 3 inches in diameter			
30									

(continued)

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Lithologic and Well Construction Log of CS-C47-53

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit		Boring: **CS-C47-53**	Pg. 3 of 4
Drilling Co: **Gregg Drilling**	Drilling Method: **HSA**	Date Started: **6/1/14**	
Location: **3932 Boyce St**	Sampler / Drop:	Date Completed: **6/4/14**	
Northing/Easting: **1867723.7 N / 6481847.1 E**	Logged by: **Mark Wanek**	Reviewed by: **JDL**	
Surface Elev.: **418.39 ft amsl**	Water Depths: ▽ ATD **32.25**		

DEPTH - FT.	(CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
30		0.0	SM			- Becomes dark yellowish-brown (10YR, 3/4), fine ot medium-grained sand with gravel. Few cobbles. Gravel/cobbles up to 4" diameter.			
31									
32	▽								
33									
34	4" Sch. 80 PVC 0.020"-Slot Screen								
35						Water apparent at the bottom of the auger string			
36						- End drilling on 6/2/2014.			
	#2/12 Filter Sand								
37									
38	4" Sch. 80 PVC 0.020"-Slot Screen								
39									
40		0.1	SM						
41									
42									
43									
44									
45						*(continued)*			

OTIE
317 E Main St
Telephone: 805.585.2110
www.otie.com

Lithologic and Well Construction Log of CS-C47-53

Project Location	Contract Number
GCOU SFV Superfund Site	**2013152**

Project: Glendale Chromium Operable Unit | Boring: **CS-C47-53** | Pg. 4 of 4

Drilling Co: Gregg Drilling | Drilling Method: HSA | Date Started: 6/1/14

Location: 3932 Boyce St | Sampler / Drop: | Date Completed: 6/4/14

Northing/Easting: 1867723.7 N / 6481847.1 E | Logged by: Mark Wanek | Reviewed by: JDL

Surface Elev.: 418.39 ft amsl | Water Depths: ▽ ATD 32.25

DEPTH - FT.	amsl (CONTINUED)	PID	USCS SYMBOL	SAMPLES	GRAPHIC LOG	DESCRIPTION	ELEVATION-FT.	MOISTURE	Remarks
45						- Becomes dark yellowish-brown (10YR, 3/4), fine ot medium-grained sand with gravel. Few cobbles. Gravel/cobbles up to 4" diameter.			
46									
47									
48									
49									
50									
51									
52									
53	Stainless Steel End Cap								
54						Borng completed to 54; bgs on 6/04/2014 and converted to monitoring well CS-C47-53 on 6/04/2014. Bottom of boring at 54 feet			

OTIE
317 E Main St
Telephone: 805.585.2110
www.otie.com

Lithologic and Well Construction Log of CS-C47-53

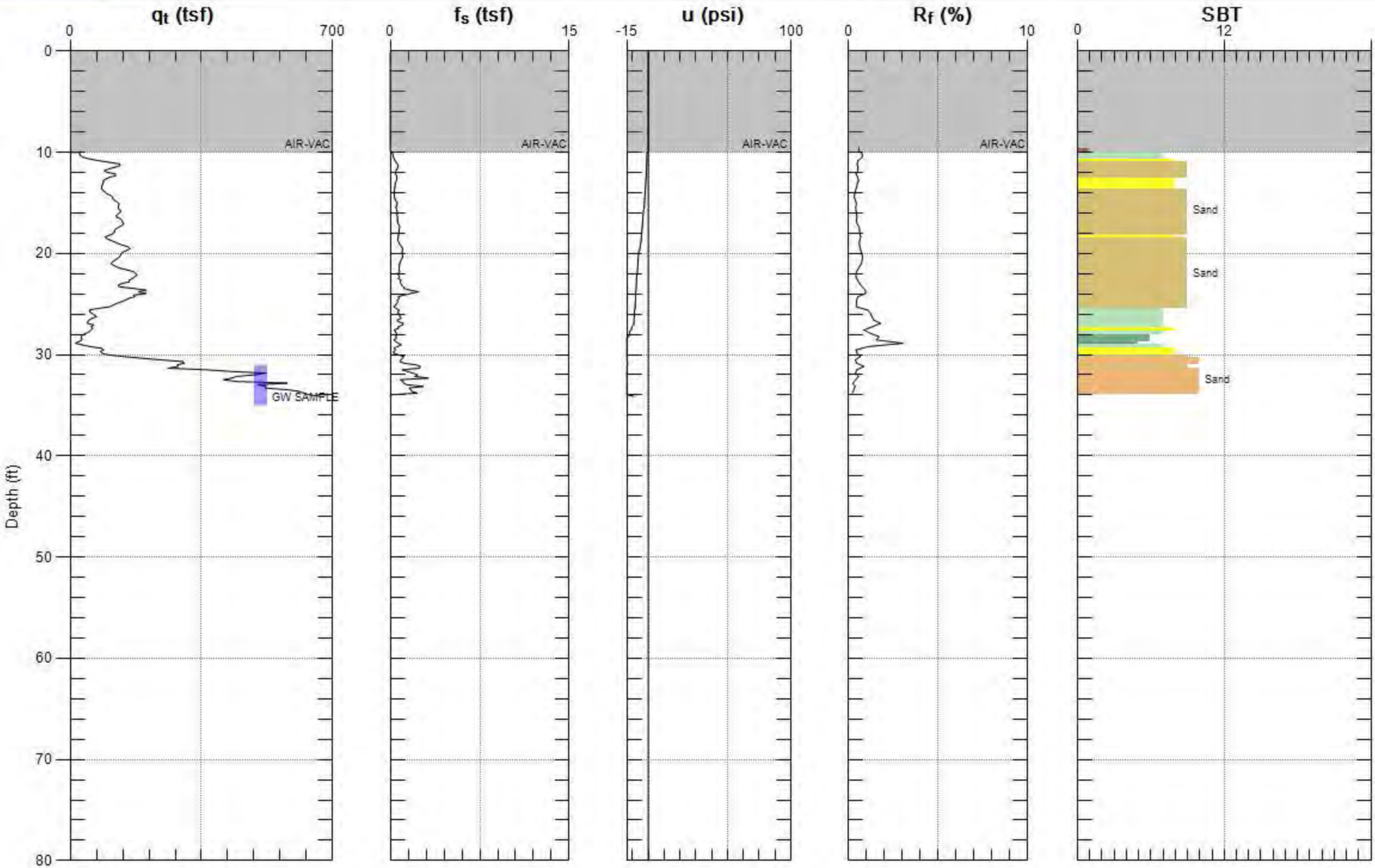
Project Location	Contract Number
GCOU SFV Superfund Site	2013152

EPA Cone Penetrometer Logs

OTIE

Site: GLENDALE
Sounding: CPT-1

Engineer: J.DE LOERA
Date: 4/14/2014 08:19



Max. Depth: 34.121 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

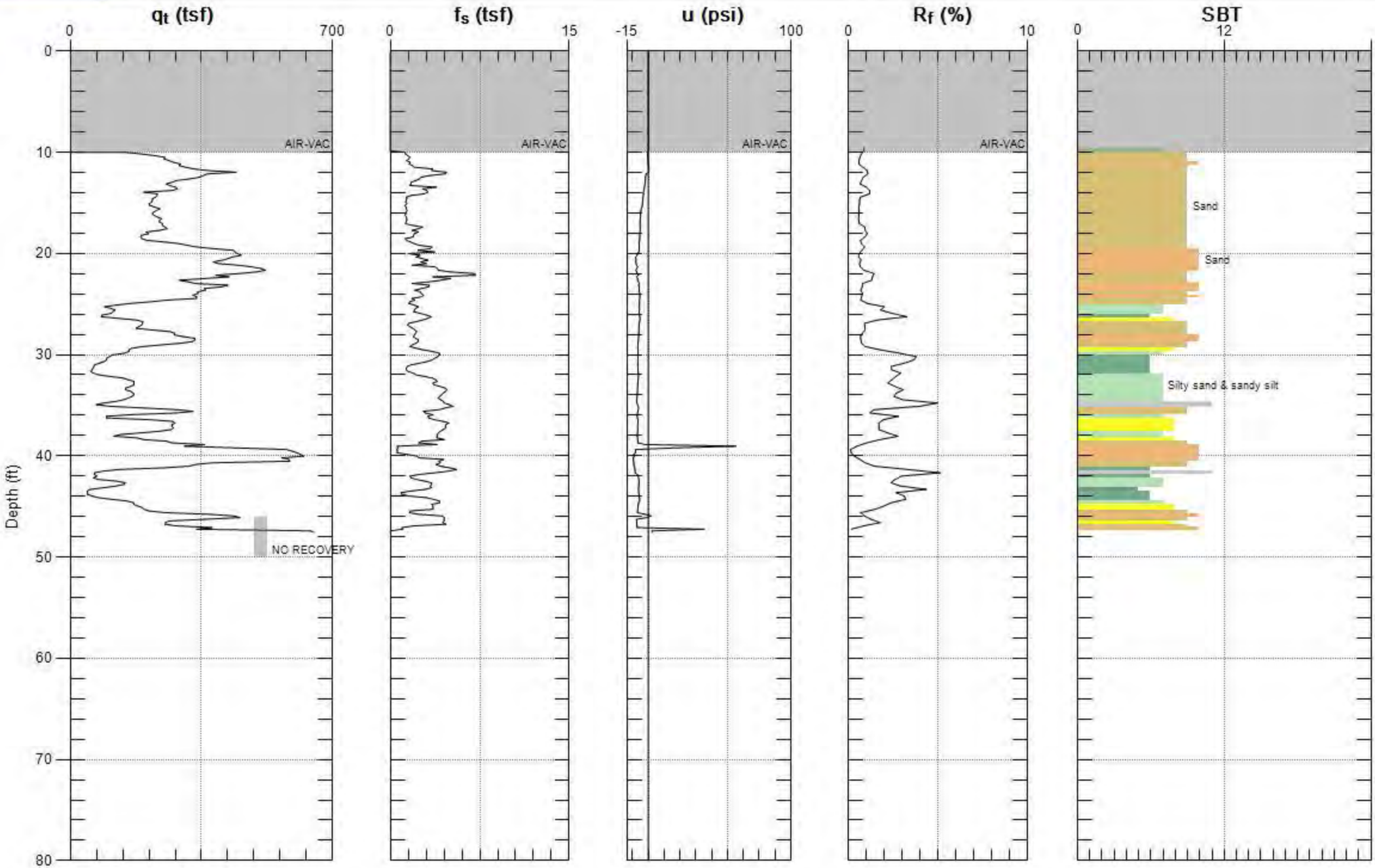
OTIE

Site: GLENDALE

Sounding: CPT-2

Engineer: J.DE LOERA

Date: 4/14/2014 09:33



Max. Depth: 47.572 (ft)
Avg. Interval: 0.328 (ft)

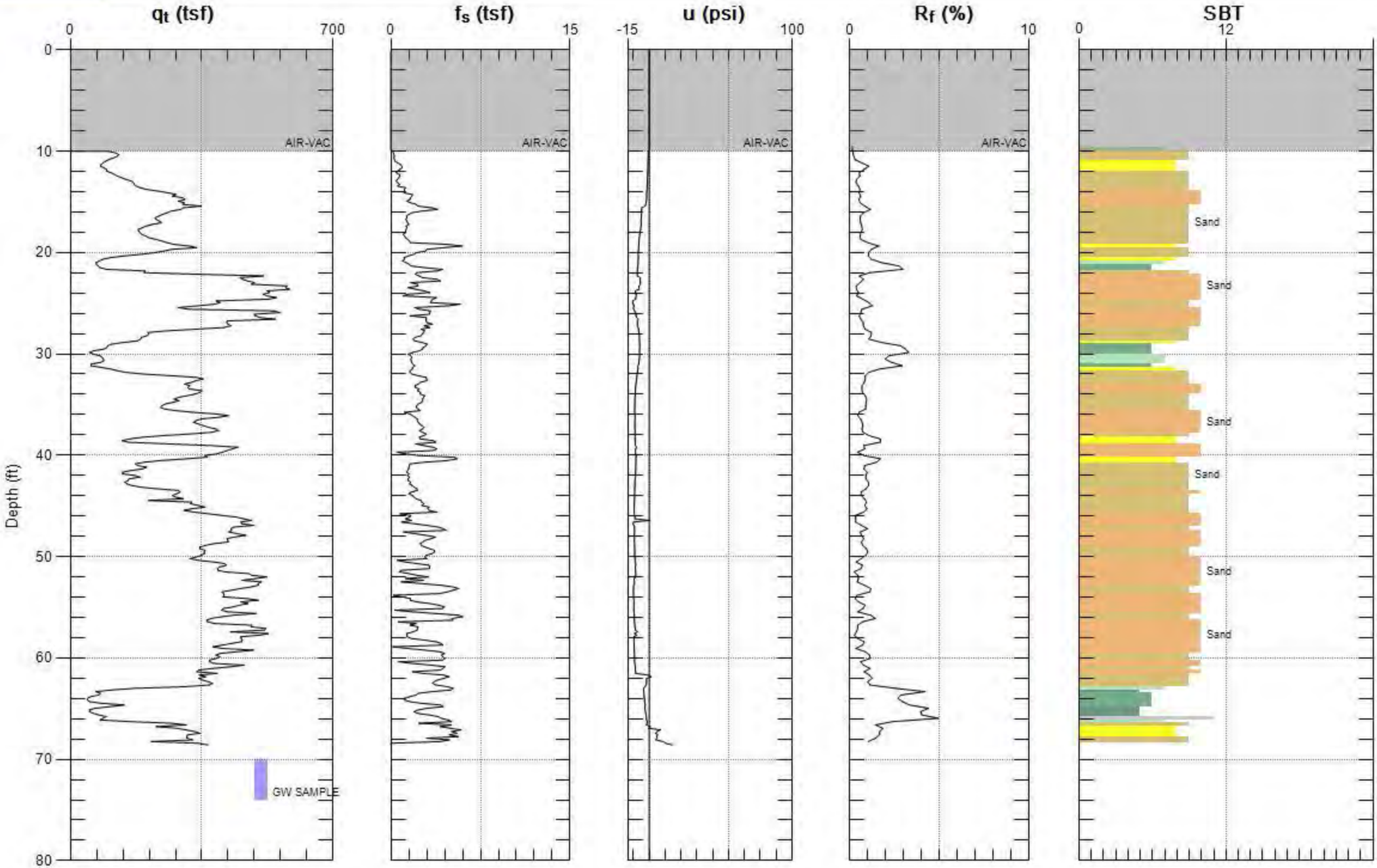
SBT: Soil Behavior Type (Robertson 1990)

GREGG

OTIE

Site: GLENDALE
Sounding: CPT-3

Engineer: J.DE LOERA
Date: 4/15/2014 07:52



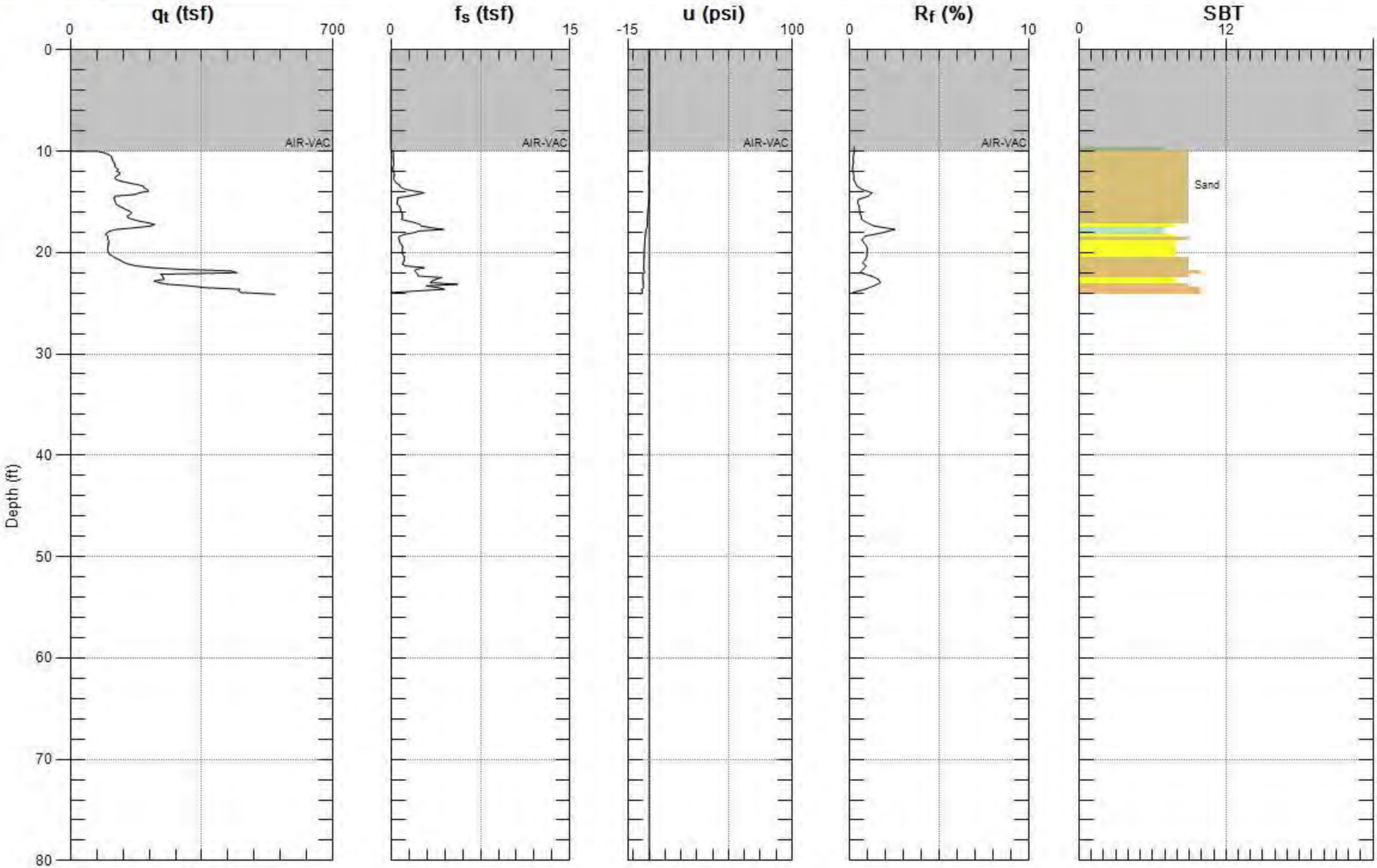
Max. Depth: 68.570 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

OTIE

Site: GLENDALE
Sounding: CPT-4

Engineer: J.DE LOERA
Date: 4/15/2014 10:55



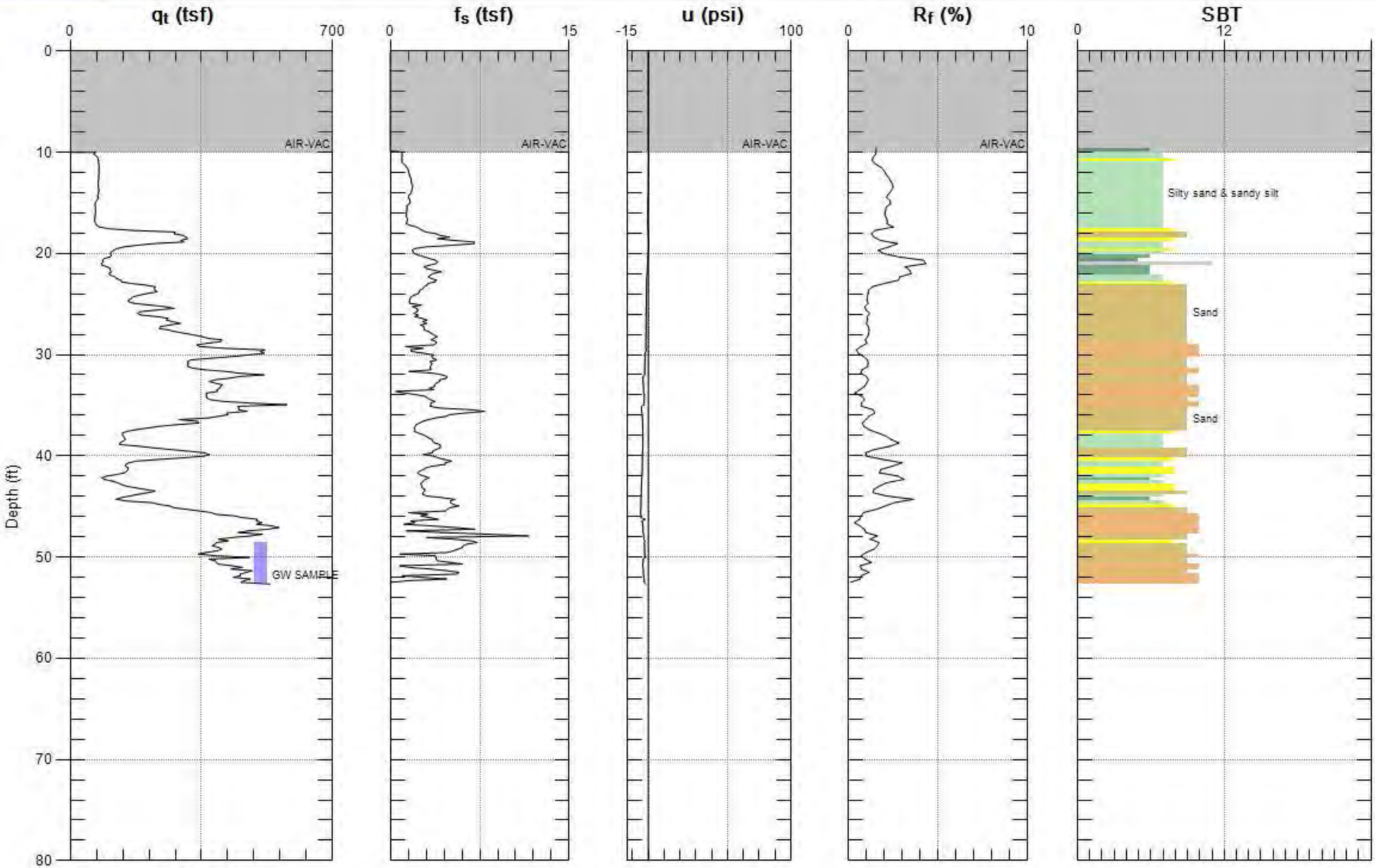
Max. Depth: 24.114 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

OTIE

Site: GLENDALE
Sounding: CPT-5

Engineer: J.DE LOERA
Date: 4/15/2014 12:25



Max. Depth: 52.657 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

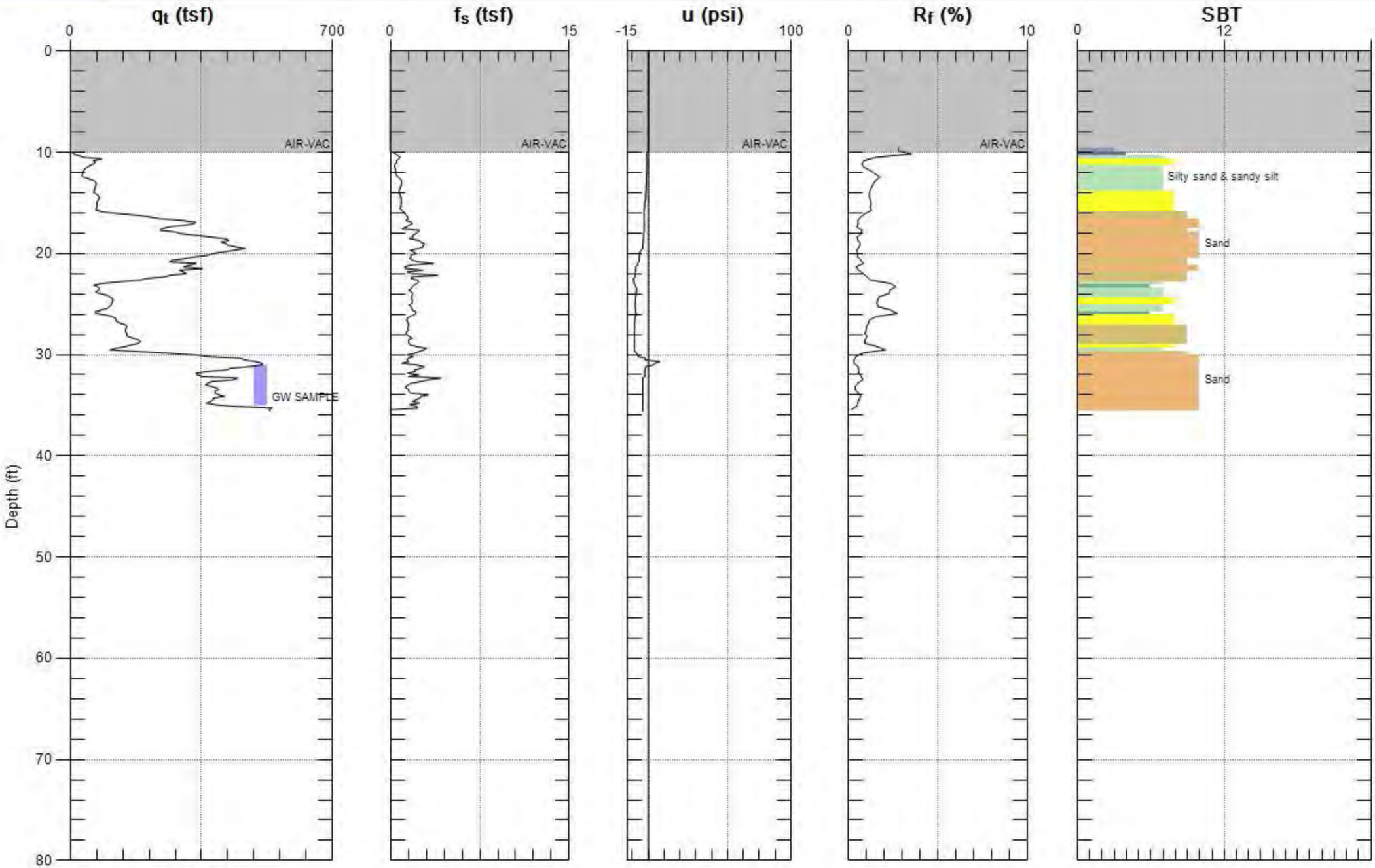
OTIE

Site: GLENDALE

Sounding: CPT-6

Engineer: J.DE LOERA

Date: 4/16/2014 07:26



Max. Depth: 35.597 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

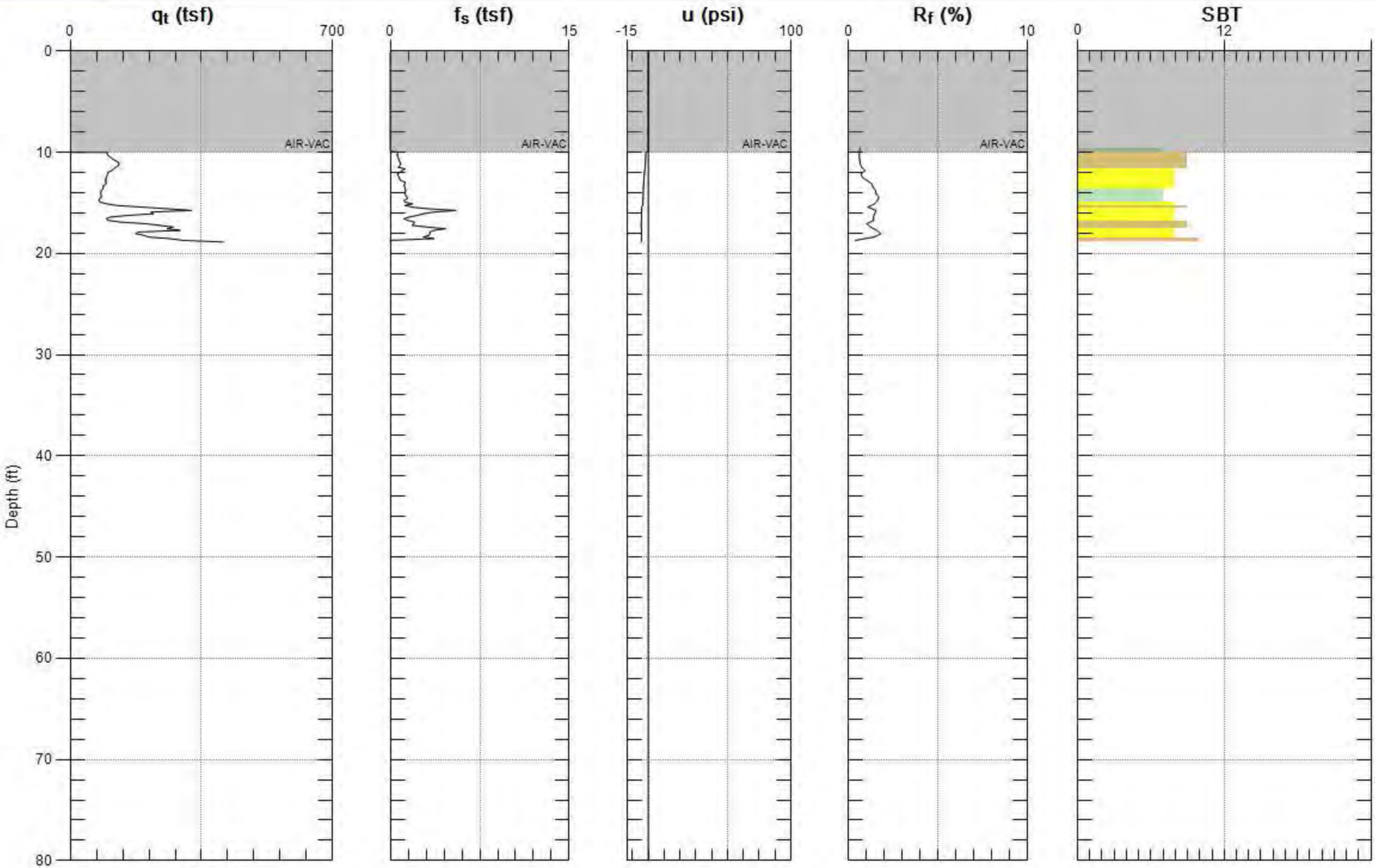
OTIE

Site: GLENDALE

Sounding: CPT-7

Engineer: J.DE LOERA

Date: 4/16/2014 09:00



Max. Depth: 18.865 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

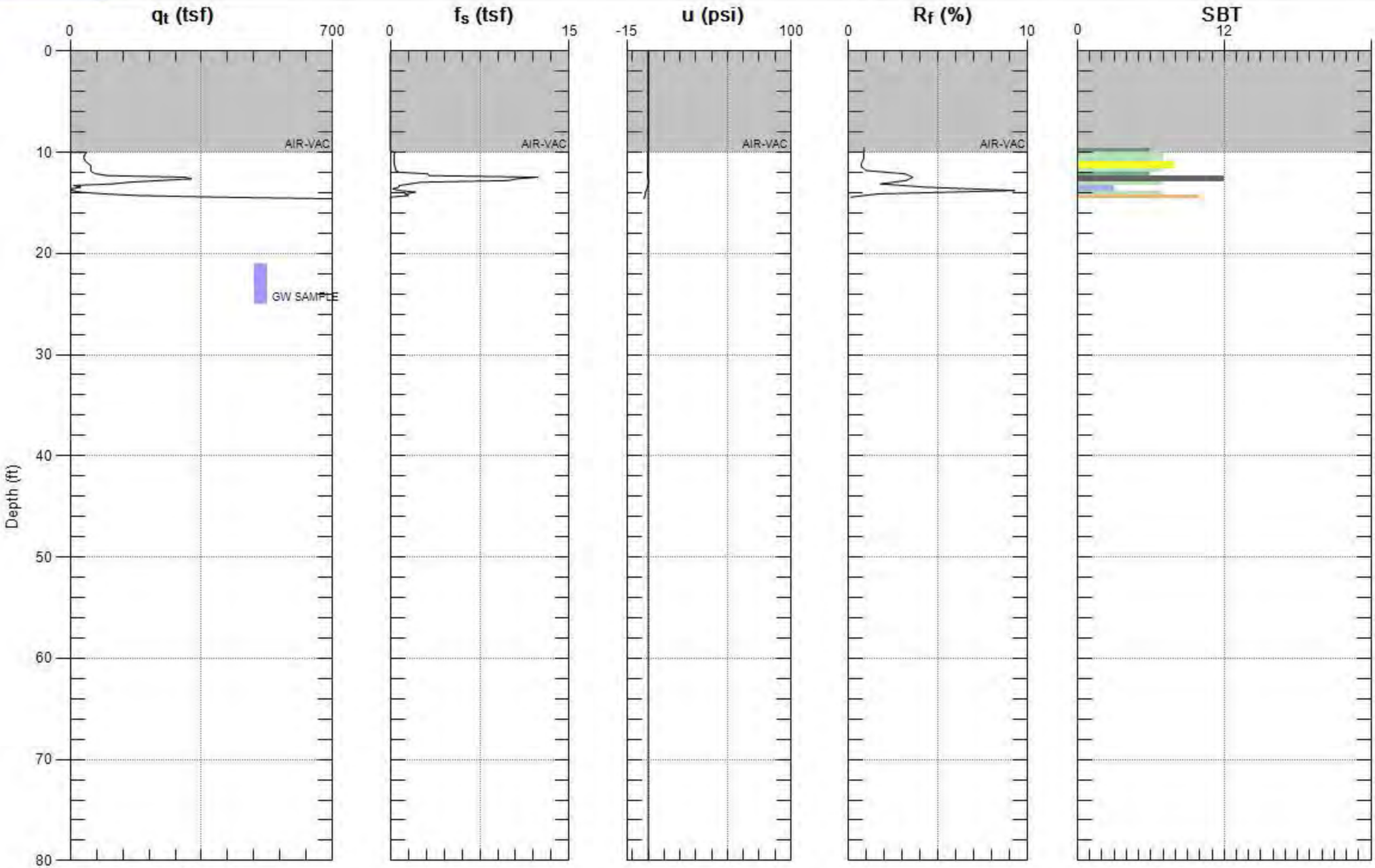
OTIE

Site: GLENDALE

Sounding: CPT-8

Engineer: J.DE LOERA

Date: 4/16/2014 10:17



Max. Depth: 14.600 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

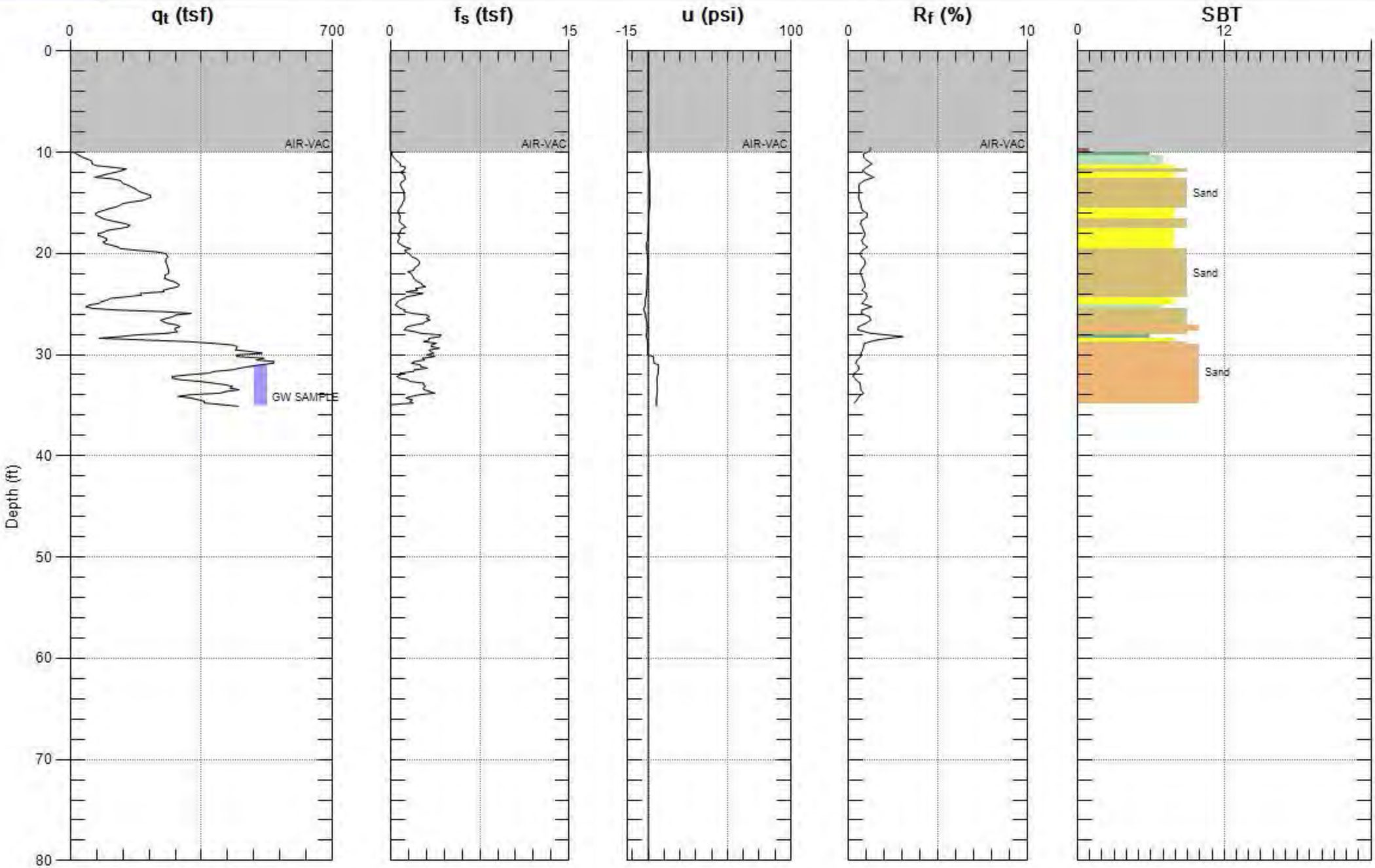
OTIE

Site: GLENDALE

Sounding: CPT-9

Engineer: J.DE LOERA

Date: 4/16/2014 12:50



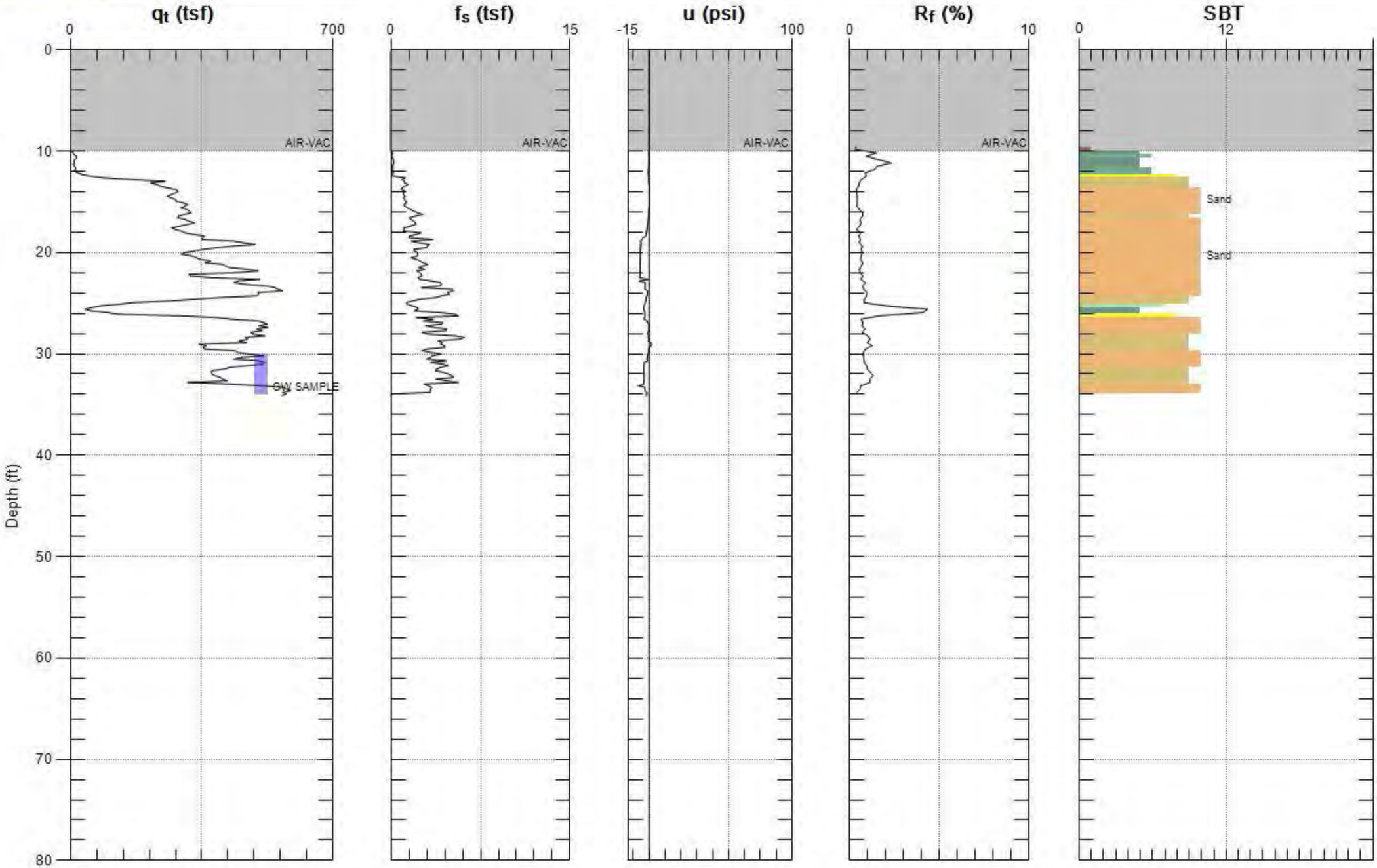
Max. Depth: 35.105 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

OTIE

Site: GLENDALE
Sounding: CPT-10

Engineer: J.DE LOERA
Date: 4/17/2014 07:41



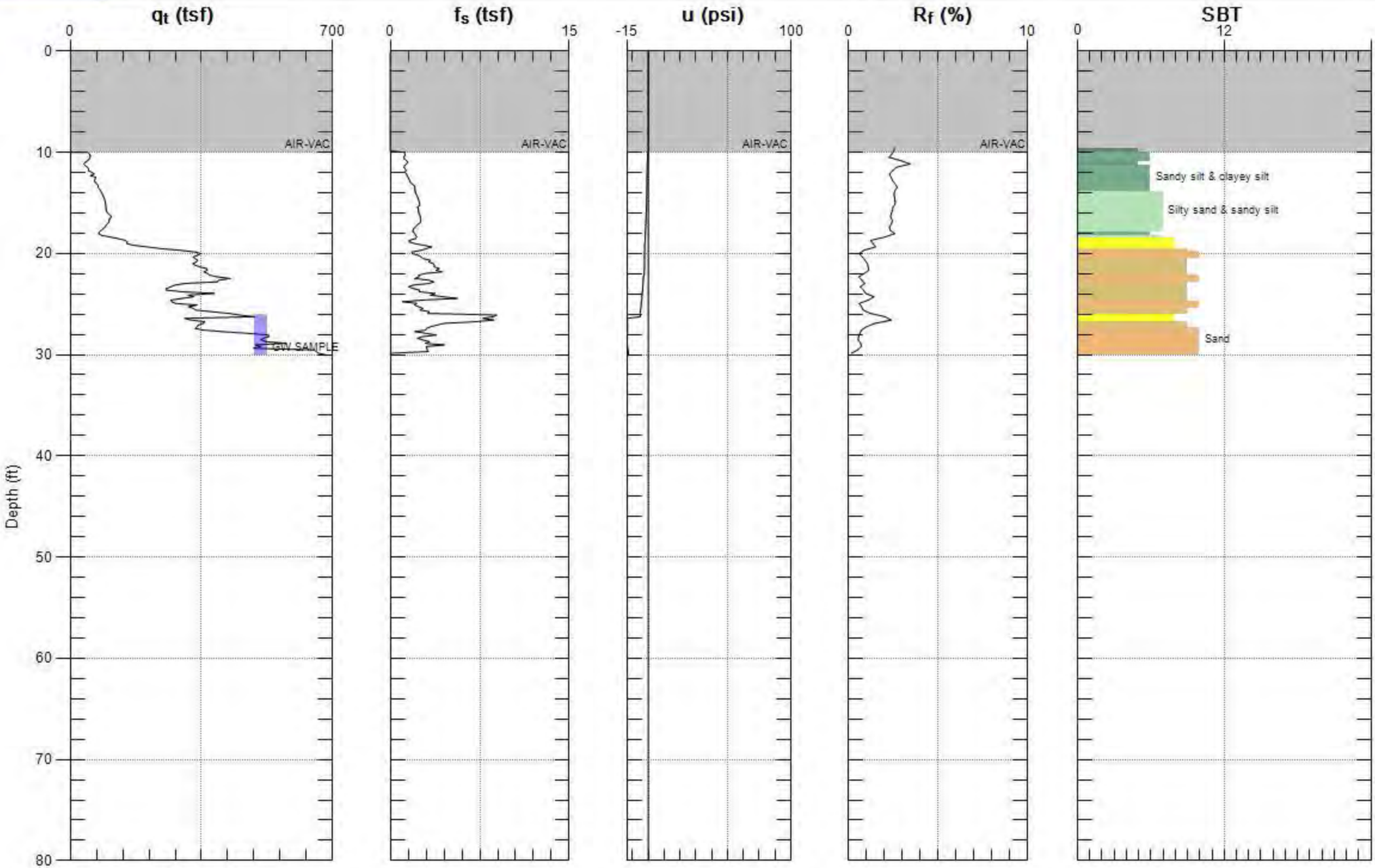
Max. Depth: 34.121 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

OTIE

Site: GLENDALE
Sounding: CPT-11

Engineer: J.DE LOERA
Date: 4/17/2014 08:36



Max. Depth: 30.020 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

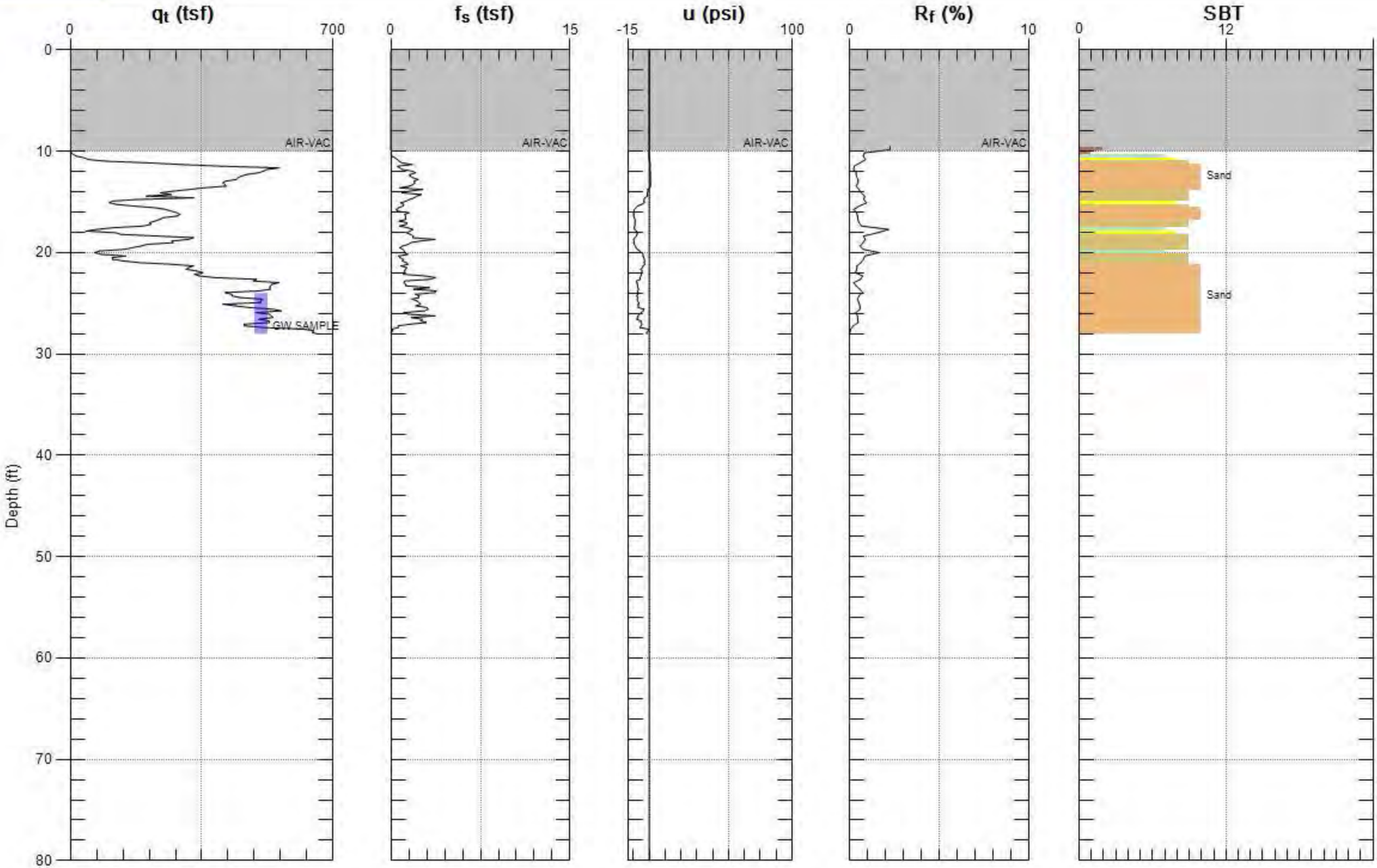
OTIE

Site: GLENDALE

Sounding: CPT-12

Engineer: J.DE LOERA

Date: 4/17/2014 09:57



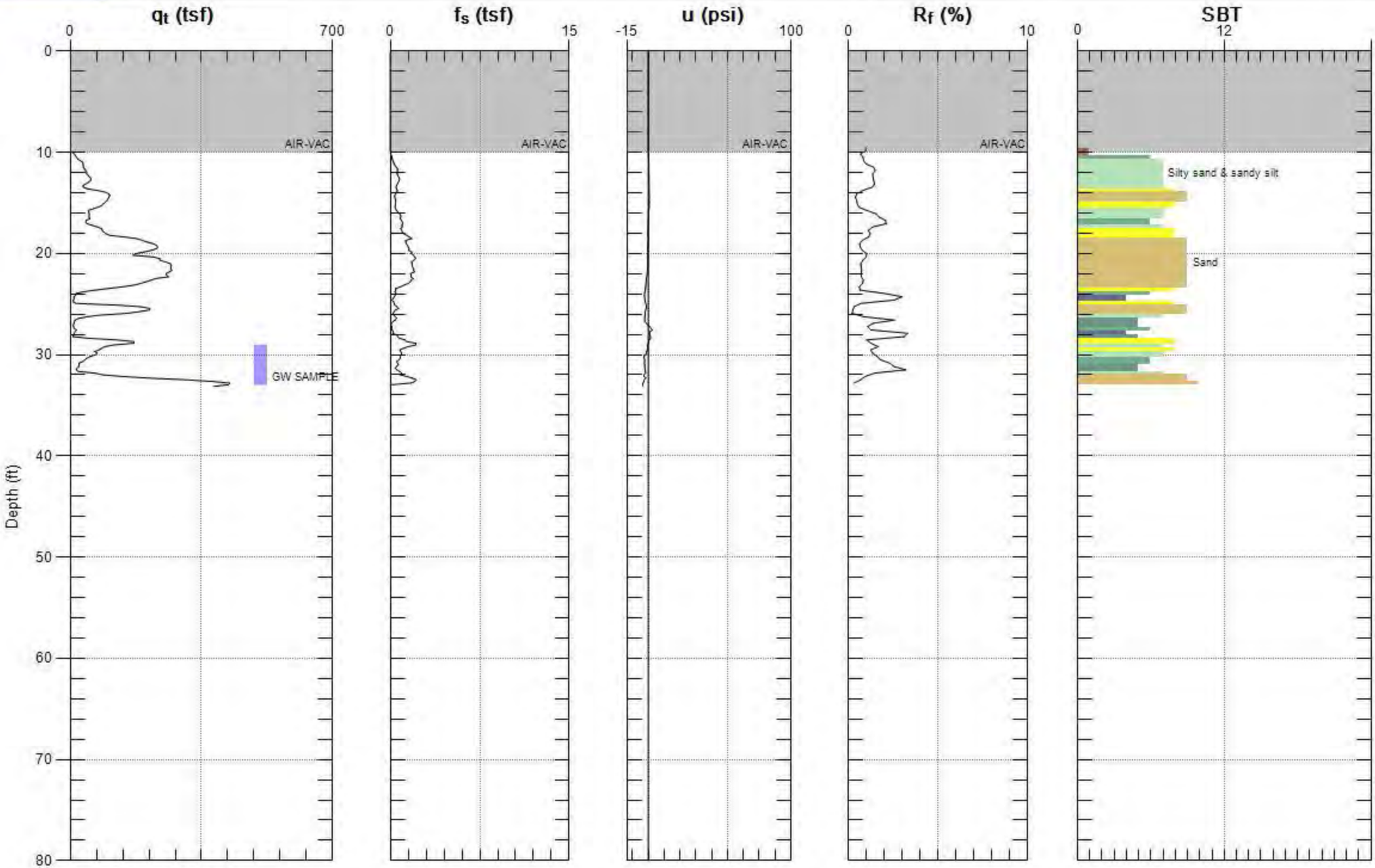
Max. Depth: 28.051 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

OTIE

Site: GLENDALE
Sounding: CPT-13

Engineer: J.DE LOERA
Date: 4/17/2014 11:57



Max. Depth: 33.136 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

EPA Well Development Logs

CH2MHILL

PROJECT NUMBER

WELL ID: CD-C30-120

Sheet 1 of __

WELL DEVELOPMENT LOG

PROJECT: Glendale Chromium · Area - 2 LOCATION: Whitnall Hwy

DEVELOPMENT CONTRACTOR: Gregg Drilling

DEVELOPMENT METHOD AND EQUIPMENT USED: Bail, Swab, pump, — Bernix Aguiler

START WATER LEVELS: START: 95.49 END: 98.21 LOGGER: mike Palm

MAXIMUM DRAWDOWN DURING PUMPING: 9.96

RANGE AND AVERAGE DISCHARGE RATE: 8 g.p.m

TOTAL QUANTITY OF WATER DISCHARGED: 450 gal

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Horiba U-10, water level meter

Date/ Time	Flowrate (gpm)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
8-16-12 0746		95.49						Began bailing well
0800								Finished bailing well
0802								Started swabbing well
0827								Finished swabbing well
0828								Began bailing well for a second time
0927		95.67						Finished bailing well purge total 75gal.
0954	4	96.40	20.9	7.25	1.29	487		
0957	13	103.45	19.8	7.39	1.37	787		
1000	↓	103.67	19.7	7.54	1.36	799		
1005	15	105.45	19.6	7.67	1.35	466		
1010	8	101.00	20.0	7.77	1.34	410		
1015		100.37	20.0	7.81	1.35	113		
1020		99.30	19.9	7.78	1.36	7		
1025		98.26	19.9	7.78	1.36	3		
1030	↓	98.21	19.9	7.78	1.36	2		TD 122.51

CH2MHILL

PROJECT NUMBER: 427727.51.11

WELL ID: CD-C30-200

WELL DEVELOPMENT LOG

PROJECT: EPA GCOU

LOCATION: Whitsall Hwy, Burbank

DEVELOPMENT CONTRACTOR: Gregg

DEVELOPMENT METHOD AND EQUIPMENT USED: Bail, Surge, Pump

DTW=91.42' BTOC TD=201.16' BTOC

START WATER LEVELS:

START: 96.12' BTOC (pumping)

END:

LOGGER: M. Mayry

MAXIMUM DRAWDOWN DURING PUMPING:

RANGE AND AVERAGE DISCHARGE RATE:

1 well casing volume = 73 gallons

TOTAL QUANTITY OF WATER DISCHARGED:

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED:

Date/ Time	Flowrate (gpm)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
1045	5	Bail						55 gallons of silt bailed
1130		Surge Screen						
1300		Bail						55 gallons of silt bailed
1350		Set Pump						Set pump at 110'
1355		( )						Pump at 120'
1356	5.4 gpm	Begin Pumping						5.4 gpm at 120' to clear casing
1405	5.5	96.12	—	—	—	—	—	Total 48 gallons. Silty, cloudy
1410	5.8	96.10	21.8	6.60	0.909	811	—	Total 79 gallons. Slightly cloudy
1412	16.4	96.70	—	—	—	—	—	Remove all dirty water from top of casing
1416	16.4	—	—	—	—	—	—	Total 168 gallons. Lower pump
1427	14.3	Resume Pumping at 200' bgs						
1430	14.4	96.75	19.9	7.28	0.552	166	—	Total 208 gallons Pump at 200'
1435	14.3	96.76	19.8	7.35	0.550	102	—	Total 260 gallons
1437	14.2	96.76	19.7	7.37	0.550	5	—	Total 325 gallons
1440	13.1	96.72	19.8	7.34	0.551	5	—	Total 352 gallons
1443	13.1	96.73	19.7	7.38	0.547	2	—	Total 395 gallons
1446	5.5	96.15	19.9	7.38	0.547	3	—	421 gal
1450	5.6	96.14	20.4	7.38	0.551	2	—	444 gal
1453	5.6	96.13	20.4	7.41	0.550	2	—	460 gal
1455	5.1	96.12	20.4	7.43	0.549	2	—	475 gal
1458	5.5	96.10	20.4	7.44	0.549	3	—	485 gal
1500	5.1	96.10	20.4	7.45	0.549	3	—	495 gal

CH2MHILL

PROJECT NUMBER

WELL ID CD-C30-200

WELL DEVELOPMENT LOG

PROJECT :

LOCATION : Whitrall Hwy

DEVELOPMENT CONTRACTOR :

DEVELOPMENT METHOD AND EQUIPMENT USED :

START WATER LEVELS : START : END : LOGGER : M. Mayry

MAXIMUM DRAWDOWN DURING PUMPING:

RANGE AND AVERAGE DISCHARGE RATE:

TOTAL QUANTITY OF WATER DISCHARGED:

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED:

Date/ Time	Flowrate (gpm)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
1503	5.1	96.10	20.4	7.47	0.548	2	—	Total 509 gallons
1505	—	95.70	—	—	—	—	—	Shutoff pump. Monitor Recovery
1510	—	95.66	—	—	—	—	—	
1515	—	95.62	—	—	—	—	—	
1520	—	—	—	—	—	—	—	
1545	—	95.57	—	—	—	—	—	
1555	—	95.55	—	—	—	—	—	

CH2MHILL

PROJECT NUMBER: 427727.F1.01

WELL ID: CD-C31-102

Sheet __ of __

WELL DEVELOPMENT LOG

PROJECT: EPA GCOU1

LOCATION: Florence St, Burbank, CA

DEVELOPMENT CONTRACTOR: Gregg Drilling and Testing

DEVELOPMENT METHOD AND EQUIPMENT USED: surge, bail, pump

START WATER LEVELS: START: 80.64 END:

LOGGER: M. Mayny

MAXIMUM DRAWDOWN DURING PUMPING:

TD pre = 101.15' BTOC

RANGE AND AVERAGE DISCHARGE RATE:

TD post = 101.97' BTOC (chord)

TOTAL QUANTITY OF WATER DISCHARGED:

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Horiba U-22 with turbidity

Date/ Time	Flowrate (gpm)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
0800	Bail Sediment						—	TD = 101.15'
0830	Bailed 153~~5~~ gallons						—	Fine sand and silt
0835	Surge screen						—	
0855	Bail 21 gallons						—	Fine sand and silt
0910	Prepare to pump from the screen							TD = 101.97'
0930	Start Pump		DTW = 80.79'					Pump set at 90 ft bgs
0935		83.11	22.5	5.26	1.38	285	—	
0945	5 gpm	83.16	22.0	6.01	1.35	45	—	80 gal clear
0955	5 gpm	83.20	21.9	6.26	1.38	28	—	142 gal clear
1005	5 gpm	83.23	21.9	6.25	1.37	19	—	200 gal clear
1015	5 gpm	83.15	21.6	6.24	1.37	58	—	232 gal shutoff pump momentarily
1025	2 gpm	81.75	22.6	6.24	1.36	18	—	272 gal clear
1035	2 gpm	81.75	22.9	6.29	1.36	8	—	290 gal clear
1035	—	—	Shutoff pump				—	290 gal

CH2MHILL

PROJECT NUMBER	WELL ID	
427727.F1.01	CS-C32-120	Sheet 1 of 1

WELL DEVELOPMENT LOG

PROJECT : Glendale Chromium LOCATION : 12

DEVELOPMENT CONTRACTOR : Gregg

DEVELOPMENT METHOD AND EQUIPMENT USED : Bail, Swab, pump

START WATER LEVELS : START : 100.00 END : 111.00 LOGGER : Mike Palm

MAXIMUM DRAWDOWN DURING PUMPING: 11.00

RANGE AND AVERAGE DISCHARGE RATE: 2.5 g.p.m. to 3 g.p.m.

TOTAL QUANTITY OF WATER DISCHARGED: 337.5 + 55 = 392.5 gallons

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Horiba U-10

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
12-17-12 0946	40	106.45	20.1	5.11	1.28	>1000		
0951	51.5	107.30	20.4	5.67	1.21	>1000		
0956	63	106.60	20.4	5.90	1.20	>1000		
1001	74.5	107.10	20.4	6.00	1.19	>1000		
1006	86	107.65	20.4	6.07	1.18	>1000		
1011	97.5	107.85	20.4	6.11	1.17	>1000		
1016	112.5	109.09	20.1	6.13	1.17	>1000		3 g.p.m
1021	127.5	110.74	20.0	6.23	1.13	>1000		
1026	142.5	111.00	20.3	6.21	1.11	786		
1031	157.5	111.08	20.3	6.18	1.12	646		
1036	172.5	111.13	20.3	6.19	1.10	344		
1041	187.5	111.13	20.3	6.19	1.10	171		
1046	202.5	111.00	20.3	6.18	1.11	137		
1051	217.5	110.95	20.2	6.19	1.09	59		
1056	232.5	111.00	19.9	6.22	1.09	33		
1101	247.5	111.03	20.2	6.24	1.08	23		
1106	262.5	111.06	19.5	6.22	1.09	12		
1111	277.5	111.03	20.1	6.21	1.09	11		
1119	292.5	111.03	20.1	6.21	1.08	7		
1124	307.5	111.05	20.0	6.23	1.08	5		
1129	322.5	111.11	20.0	6.24	1.08	5		
1134	337.5	111.13	19.9	6.26	1.08	4		Sampled CS-C32-120 @ 1135 for Cr6

WellDevLog.xls

CH2MHILL

PROJECT NUMBER: 427727.F1.01

WELL ID: CS-C33-59

Sheet 1 of 1

WELL DEVELOPMENT LOG

PROJECT: Glendale Chromium LOCATION: 9

DEVELOPMENT CONTRACTOR: Gregg

DEVELOPMENT METHOD AND EQUIPMENT USED: Bail, swab, pump

START WATER LEVELS: START: 36.90 END: 35.65 LOGGER: mike Palm

MAXIMUM DRAWDOWN DURING PUMPING: 0.75

RANGE AND AVERAGE DISCHARGE RATE: 3 g.p.m

TOTAL QUANTITY OF WATER DISCHARGED: 106 + 55 = 161 gallons

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Horiba U-10

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
12-18-12 1020	1	36.90	20.5	4.53	1.19	>1000		
1030	31	37.65	20.9	5.22	1.11	160		
1035	46	37.65	21.1	5.50	1.09	49		
1040	61	37.65	20.9	5.59	1.07	14		
1045	76	37.65	21.1	5.64	1.08	6		
1050	91	35.65	21.1	5.67	1.07	1		
1055	106	35.65	21.1	5.68	1.07	1		
1100								Sampled CS-C33-59 for Cr6

WellDevLog.xls

CH2MHILL

PROJECT NUMBER: 427727 FI 01

WELL ID: CS-C34-065

WELL DEVELOPMENT LOG

PROJECT: GCOU

LOCATION: Glendale, CA 4165 Bemis St

DEVELOPMENT CONTRACTOR: National

DEVELOPMENT METHOD AND EQUIPMENT USED: bailer, swab, pump

START WATER LEVELS: START: 43.30 END: 44.05 LOGGER: Mike Palm

MAXIMUM DRAWDOWN DURING PUMPING: 0.75

RANGE AND AVERAGE DISCHARGE RATE: 2.5 g.p.m

TOTAL QUANTITY OF WATER DISCHARGED: 260 gallons

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Hanna turbidity meter (HI93703) Hanna pH/ec/TDS meter (HI9811-3m)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
6 10 13								
0815	40							Began bailing well / finished @ 0835
0841								Began swabbing well / finished @ 0900
0900	40							Began bailing well / finished @ 0932
1030	5	44.00	25.8	6.90	1058	194		Began purging well @ 2.5 g.p.m
1035	17.5	44.10	24.0	6.86	1060	162		
1040	30	44.05	23.9	6.97	1032	119		
1045	42.5	44.05	24.1	6.96	1034	272		
1050	55	44.05	23.7	7.00	1041	73		
1055	67.5	44.05	24.0	7.02	1025	69		
1100	80	44.05	24.0	7.03	1027	33.7		
1105	92.5	44.05	23.6	7.05	1019	14.3		
1110	105	44.05	23.7	7.07	1020	31		
1115	117.5	44.05	23.6	7.06	1017	40.1		
1120	130	44.05	24.0	7.10	1023	10.84		
1125	142.5	44.05	24.0	7.10	1015	6.21		
1130	155	44.05	24.0	7.11	1015	3.69		
1135	167.5	44.05	24.1	7.10	1015	3.18		
1140	180	44.05	23.8	7.13	1015	3.26		
								Cleaned up and offsite @ 1215

CH2MHILL

PROJECT NUMBER: 427727.F1.01

WELL ID: CS-C35-041

Sheet 1 of 1

WELL DEVELOPMENT LOG

PROJECT: GCOU

LOCATION: Glendale, CA 4278 Brunswick Ave

DEVELOPMENT CONTRACTOR: National

DEVELOPMENT METHOD AND EQUIPMENT USED: Bailer, Swab, pump

START WATER LEVELS: ___ START: 17.90 END: 19.25 LOGGER: mike Palm

MAXIMUM DRAWDOWN DURING PUMPING: 1.35

RANGE AND AVERAGE DISCHARGE RATE: 5 g.p.m

TOTAL QUANTITY OF WATER DISCHARGED: 355 gallons

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Hanna turbidity meter (HI93703) Hanna pH/EC/TDS (HI991300)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
6-10-13 1238	25							Began bailing well / finished @ 1246
1248								Began swabbing well / finished @ 1309
1312	50							Began bailing well / finished @ 1333
1400	5	18.00	25.3	7.37	931	574		Began purging @ 5 g.p.m
1405	30	19.25	22.6	7.37	919	116		
1410	55	19.25	22.0	7.33	917	106		
1415	80	19.25	22.1	7.24	920	6.59		
1420	105	19.25	21.7	7.36	926	36.58		
1425	130	19.25	21.8	7.29	908	38.81		
1430	155	19.25	21.9	7.26	920	19.4		
1435	180	19.25	22.1	7.23	917	17.0		
1440	205	19.25	21.9	7.22	919	22.3		
1445	230	19.25	21.8	7.23	916	7.32		
1450	255	19.25	21.8	7.22	915	4.44		
1455	280	19.25	21.9	7.19	915	4.21		
								Cleaned up and offsite 1525

CH2MHILL

PROJECT NUMBER: 427727 FT 01

WELL ID: CS-C36-055

WELL DEVELOPMENT LOG

PROJECT: GCOU

LOCATION: Glendale, CA 4323 Perlita Ave

DEVELOPMENT CONTRACTOR: National

DEVELOPMENT METHOD AND EQUIPMENT USED: bail, swab, pump

START WATER LEVELS: START: 34.00 END: 35.60 LOGGER: mike Palm

MAXIMUM DRAWDOWN DURING PUMPING: 1.6

RANGE AND AVERAGE DISCHARGE RATE: 12 g.p.m

TOTAL QUANTITY OF WATER DISCHARGED:

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Hanna turbidity meter (HI93703) Hanna pH/EC/TDS meter (HI991300)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
6.12.13								
1227	20							Begin bailing well / finished @ 1234
1235								Begin swabbing well / finished @ 1250
1252	35							Begin bailing well / finished @ 1301
1333	12	35.60	23.0	7.53	960	>1000		Begin purging well @ ~~18~~ 12 g.p.m
1338	72	35.60	21.8	7.23	980	221		
1343	132	35.60	22.5	7.16	970	208		
1348	192	35.60	22.1	7.17	990	72		
1353	252	35.60	21.9	7.16	963	54		
1358	312	35.60	22.0	7.15	973	12.2		
1403	372	35.60	21.9	7.15	960	10.1		
1408	432	35.60	21.4	7.10	962	5.16		
1413	492	35.60	21.8	7.19	959	2.48		
								Cleaned up and offsite @ 1500

CH2MHILL

PROJECT NUMBER: 427727.F1.01

WELL ID: CS-C37-035

WELL DEVELOPMENT LOG

PROJECT: GCOU

LOCATION: Glendale, CA 4016 Brunswick AVE

DEVELOPMENT CONTRACTOR: National

DEVELOPMENT METHOD AND EQUIPMENT USED: bailer, swab, pump

START WATER LEVELS: START: 15.20 END: 16.00 LOGGER: Mike Palm

MAXIMUM DRAWDOWN DURING PUMPING: 0.8

RANGE AND AVERAGE DISCHARGE RATE: 10 g.p.m

TOTAL QUANTITY OF WATER DISCHARGED: 605 gallons

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Hanna turbidity meter (HI93703) Hanna pH Ec/TDS (HI991300)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
6.11.13 1238	20							Began bailing well / finished @ 1245
1248								Began swabbing well / finished @ 1303
1303	35							Began bailing well / finished @ 1325
1337	50	15.30	20.5	7.38	866	635		Began purging @ 10 g.p.m.
1342	100	16.00	23.4	7.36	870	>1000		
1347	150	16.00	22.7	7.34	952	74		
1352	200	16.00	22.3	7.28	961	22.71		
1357	250	16.00	22.4	7.27	913	123		
1402	300	16.00	22.4	7.30	947	51		
1407	350	16.00	22.4	7.24	944	15.9		
1412	400	16.00	22.1	7.20	943	10.3		
1417	450	16.00	22.0	7.26	940	6.93		
1422	500	16.00	21.8	7.22	938	4.59		
1427	550	16.00	21.8	7.23	935	3.21		
								Cleaned up and off site @ 1500

CH2MHILL

PROJECT NUMBER: 427727.F1.01

WELL ID: CS-C3A-051

WELL DEVELOPMENT LOG

PROJECT: GCOU

LOCATION: Ferraro Fields, Glendale, CA

DEVELOPMENT CONTRACTOR: National

DEVELOPMENT METHOD AND EQUIPMENT USED: Bail, Swab, pump

START WATER LEVELS: START: 29.60 END: 30.60 LOGGER: Mike Palm

MAXIMUM DRAWDOWN DURING PUMPING: 1.00

RANGE AND AVERAGE DISCHARGE RATE: 11 gpm

TOTAL QUANTITY OF WATER DISCHARGED: 561 gallons

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Hanna turbidity meter (HI93703) Hanna pH/EC/TDS (HI9811300)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
6.12.13 0739	25							Began bailing well / finished @ 0746
0748								Began swabbing well / finished @ 0803
0805	30							Began bailing well / finished @ 0814
0847	11	30.80	21.1	6.87	1602	183		Began purging well @ 11 gpm
0852	66	31.05	20.9	6.84	1525	74		
0857	121	30.60	20.8	6.92	1440	52		
0902	176	30.60	20.7	6.92	1382	26.2		
0907	231	30.60	20.7	6.96	1348	27.9		
0912	286	30.60	20.6	6.93	1081	79		
0917	341	30.60	20.6	6.94	1243	45.9		
0922	396	30.60	20.7	6.95	1307	8.76		
0927	451	30.60	20.7	6.96	1311	4.01		
0932	506	30.60	20.6	6.95	1308	2.76		
								Cleaned up and offsite @ 1005

CH2MHILL

PROJECT NUMBER: 427727.F1.01

WELL ID: CS-C39-73

Sheet 1 of 1

WELL DEVELOPMENT LOG

PROJECT: GCOU

LOCATION: Glendale, CA 4947 W. San Fernando Rd

DEVELOPMENT CONTRACTOR: National

DEVELOPMENT METHOD AND EQUIPMENT USED: Bail, Swab, Pump

START WATER LEVELS: START: 52 30 END: 1156 31 LOGGER: mike Palm

MAXIMUM DRAWDOWN DURING PUMPING: 4.01

RANGE AND AVERAGE DISCHARGE RATE: 5 gpm

TOTAL QUANTITY OF WATER DISCHARGED: 500 gallons

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Hanna Turbidity meter (HI93703) Hanna pH/EC/TDS meter (HI991300)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
6 11 13								
0847	20							Began bailing well / finished @ 0900
0903								Started swabbing well / finished @ 0919
0920	35							Began bailing well / finished @ 0940
1000	25	56.15	23.1	7.12	1085	>1000		Begin purging well @ 5 g.p.m
1005	55	56.15	22.7	7.19	1082	>1000		
1010	85	56.19	22.4	7.13	1072	501		
1015	115	56.20	22.4	7.15	1055	331		
1020	145	56.22	22.2	7.15	1049	206		
1025	175	56.22	22.0	7.20	1042	77		
1030	205	56.22	22.1	7.19	1042	63		
1035	235	56.22	22.3	7.20	1037	38.6		
1040	265	56.22	22.3	7.19	1041	70		
1045	295	56.22	22.4	7.23	1036	52		
1050	325	56.24	22.2	7.22	1037	26.1		
1055	355	56.30	22.5	7.23	1036	12.1		
1100	385	56.31	22.5	7.21	1035	8.2		
1105	415	56.31	22.4	7.22	1034	6.7		
1110	445	56.31	22.3	7.21	1036	4.2		
								Cleaned up and offsite @ 1140

CH2MHILL

PROJECT NUMBER 427727.FI.01

WELL DEVELOPMENT LOG

PROJECT: GCOU

LOCATION: Location 18 (CS-C40-079)

DEVELOPMENT CONTRACTOR: National

PURGE METHOD AND EQUIPMENT USED: Pulstar development rig, bailer, surge block, submersible pump

START WATER LEVELS: START: 58.2' BTOC END: 71.8' BTOC LOGGER: Andre' Ritchie

MAXIMUM DRAWDOWN DURING PUMPING: 13.6 feet

RANGE AND AVERAGE DISCHARGE RATE: 2.4 to 4.4 gpm; avg. = 3.59 gpm

TOTAL QUANTITY OF WATER DISCHARGED: 365.5 gallons

DISPOSITION OF DISCHARGE WATER: Trailer tank into rolloff tank

MONITORING EQUIPMENT USED: Horiba U-5000 (P3V8WNYX)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Remarks (color, odor, sheen, sediment, etc.)
1440	~20								Bail
1450									Swab/surge
1510									Bail
1525	~50								Finish bail
1555		58.2							
1600			Start		pump				Totalizer initial reading = 2800
1605									Adjusting flow rate
1610	2841	67.8	24.26	7.41	0.939	9.58	217	556	
1615	2859	69.2	23.46	7.45	0.950	9.62	256	400	
1620	2877	69.8	23.08	7.40	0.944	9.54	264	109	
1625	2894	70.1	22.92	7.39	0.945	9.36	271	47.6	
1630	2912	70.8	22.83	7.43	0.948	9.24	272	26.3	
1635	2930	71.4	22.82	7.40	0.945	9.15	278	21.5	
1640	2947	71.8	22.62	7.41	0.948	9.15	280	20.2	
1645	2965	71.8	22.70	7.43	0.947	9.08	277	20.0	
1646	2971								Turn pump off
1648	~~297~~ AR	67.3							Monitor recovery
1649		64.5							
1651		61.9							
1653		59.8							
1655		59.2							
1656			Start		pump				Totalizer reading = 2971

CH2MHILL

PROJECT NUMBER 427727.FI.01

WELL DEVELOPMENT LOG

PROJECT: GCOU

LOCATION: Location 18 (CS-C40-079)

DEVELOPMENT CONTRACTOR: National

PURGE METHOD AND EQUIPMENT USED: Pulstar development rig, bailer, surge block, submersible pump

START WATER LEVELS: START: 58.2' BTOC END: 71.8' BTOC LOGGER: Andre' Ritchie

MAXIMUM DRAWDOWN DURING PUMPING: 13.6 feet

RANGE AND AVERAGE DISCHARGE RATE: 2.4 to 4.4 gpm ; avg = 3.59 gpm

TOTAL QUANTITY OF WATER DISCHARGED: 365.5 gallons

DISPOSITION OF DISCHARGE WATER: Trailer tank to rolloff tank

MONITORING EQUIPMENT USED: Horiba U-5000 (P3V8WNYX)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Remarks (color, odor, sheen, sediment, etc.)
1701	2987	67.0	23.22	7.39	0.966	8.93	277	390	
1706	2999	70.5	22.95	7.42	0.964	8.95	277	182	
1711	3021	71.7	22.71	7.40	0.951	8.99	280	36.6	
1716	3040	71.7	22.67	7.37	0.945	9.00	283	15.0	
1721	3056	71.8	22.80	7.36	0.944	8.86	283	17.6	
1726	3077	71.8	22.86	7.40	0.942	5.02	280	17.9	
1731	3094	71.8	22.77	7.39	0.936	4.44	280	19.8	
1736	3111	71.8	22.80	7.37	0.922	8.67	280	16.6	
1738	3115.5								Turn pump off. Trailer tank full.

CH2MHILL

PROJECT NUMBER: 427727.F1.01

WELL ID: CS-C41-038

Sheet 1 of 1

WELL DEVELOPMENT LOG

PROJECT: GCON

LOCATION: Glendale, CA 600 Paula Ave

DEVELOPMENT CONTRACTOR: National

DEVELOPMENT METHOD AND EQUIPMENT USED: Bail, swab, purge

START WATER LEVELS: START: 36.90 END: 48.30 LOGGER: Mike Palm

MAXIMUM DRAWDOWN DURING PUMPING: 11.4

RANGE AND AVERAGE DISCHARGE RATE: 10 g.p.m

TOTAL QUANTITY OF WATER DISCHARGED: 615 gallons

DISPOSITION OF DISCHARGE WATER:

MONITORING EQUIPMENT USED: Hanna Turbidity meter (HI93703) Hanna pH/EC/TDS (HI98130)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (µmhos/cm)	Turbidity (NTU)	Sand (ml/L)	Remarks (color, odor, sheen, sediment, etc.)
6.14.13								
0750	15							Began bailing well / finished @ 0753
0756								Began swabbing well / finished @ 0804
0806	25							Began bailing well / finished @ 0810
0811								Began swabbing well / finished @ 0826
0828	15							Began bailing well / finished @ 0836
0903	10	48.30	21.2	7.42	1438	>1000		Began purging well @ 10 g.p.m
0908	60	48.30	21.2	7.26	1239	203		
0913	110	48.30	21.0	7.26	1213	232		
0917	160	48.30	19.9	7.42	1207	118		
0923	210	48.30	21.3	7.19	1206	83		
0928	260	48.30	21.7	7.23	1196	51		
0933	310	48.30	21.3	7.23	1205	45.5		
0938	360	48.30	21.6	7.22	1209	42.4		
0943	410	48.30	21.5	7.20	1209	56		
0948	460	48.30	21.9	7.16	1128	28.2		
0953	510	48.30	22.0	7.15	1158	16.9		
0958	560	48.30	21.9	7.19	1163	8.63		
1001	610	48.30	21.7	7.22	1170	6.21		
								cleaned up workareas offsite @ 1040

WellDevLog.xls

CH2MHILL

PROJECT NUMBER 427727.FI.01

WELL DEVELOPMENT LOG

PROJECT: GCOU

LOCATION: Location 3 (CS-C42-059)

DEVELOPMENT CONTRACTOR: National

PURGE METHOD AND EQUIPMENT USED: Pulstar development rig, bailer, surge block, submersible pump

START WATER LEVELS: START: 36.8' BTOC END: 52.9' BTOC LOGGER: André Ritchie

MAXIMUM DRAWDOWN DURING PUMPING: 16.1 feet

RANGE AND AVERAGE DISCHARGE RATE: 2 to 2.8 gpm; avg. = ~~2.15 gpm~~ AR 2.43 gpm

TOTAL QUANTITY OF WATER DISCHARGED: ~~239.5 gallons~~ AR 239.5 gallons

DISPOSITION OF DISCHARGE WATER: Trailer tank into rolloff tank

MONITORING EQUIPMENT USED: Horiba U-5000 (P3V8WNYX)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Remarks (color, odor, sheen, sediment, etc.)
0835	~20								Bail
0850									Swab/surge
0905									Bail
0920	~50	51.2							Finish bail
1140			Start	pump					Totalizer initial reading = 2610
1145	Totalizer = 2620	43.3	25.79	7.19	1.19	9.03	256	157	~~Start pump~~ AR
1150	2630	47.2	25.48	7.57	1.18	6.08	247	574	
1155	2641	49.3	25.30	6.65	0.863	8.76	252	554	
1200	2655	51.1	25.03	7.39	0.982	8.65	262	96.6	
1205	2667	52.0	24.96	7.40	0.986	8.59	267	25.2	
1210	2679	52.6	25.03	7.38	0.984	8.52	273	13.3	
1215	2691	52.9	24.97	7.37	0.982	8.49	272	14.7	
1220	2703	52.9	24.94	7.45	0.978	8.47	274	7.7	
1225	2716	52.9	25.11	7.41	0.976	8.36	278	3.3	
1227	2721								Turn pump off
1228		50.2							Monitor recovery
1229		47.3							
1230		45.2							
1232		42.2							
1234		38.9							
1236		37.3							
1237				Start	pump				Totalizer reading = 2721

CH2MHILL

PROJECT NUMBER 427727.FI.01

WELL DEVELOPMENT LOG

PROJECT: GCOU

LOCATION: Location 3 (CS-C42-059)

DEVELOPMENT CONTRACTOR: National

PURGE METHOD AND EQUIPMENT USED: Pulstar development rig, bailer, surge block, submersible pump

START WATER LEVELS: START: 36.8' BTOC END: 52.9' BTOC LOGGER: André Ritchie

MAXIMUM DRAWDOWN DURING PUMPING: 16.1 feet

RANGE AND AVERAGE DISCHARGE RATE: 2 to 2.8 gpm; avg. = ~~2.15 gpm~~ AR 2.43 gpm

TOTAL QUANTITY OF WATER DISCHARGED: ~~189.5 gallons~~ AR 239.5 gallons

DISPOSITION OF DISCHARGE WATER: Trailer tank into rolloff tank

MONITORING EQUIPMENT USED: Horiba U-5000 (P3V8WNYX)

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Remarks (color, odor, sheen, sediment, etc.)
1242	2732	NA	25.04	7.43	0.968	8.47	280	88.4	Water level meter tangled w/ downhole equip
1247	2746	NA	24.99	7.38	0.969	8.43	283	47.2	
1252	2760	NA	24.82	7.37	0.969	8.45	282	12.8	
1257	2772	NA	24.88	7.37	0.966	8.40	284	2.6	
1302	2784	NA	24.76	7.37	0.962	8.35	282	2.1	
1307	2797	NA	24.79	7.44	0.958	8.33	277	0.3	
1308	2799.5								Turn pump off

CH2MHILL

PROJECT NUMBER 427727.F1.01

CS-C43-083

Sheet 1 of 1

WELL DEVELOPMENT LOG

PROJECT: EPA / GERNDALE AREA 2 Superfund site. LOCATION: LOCATION 161 641 W. HARVARD GLENDALE CA

DEVELOPMENT CONTRACTOR: NATIONAL

PURGE METHOD AND EQUIPMENT USED: Bail, surge, bail, pump — (not completed due to slow recharge)

START WATER LEVELS: START: 61.10 END: 78.5 LOGGER: ESC

MAXIMUM DRAWDOWN DURING PUMPING: N/A

RANGE AND AVERAGE DISCHARGE RATE: N/A

TOTAL QUANTITY OF WATER DISCHARGED: 26 gal

DISPOSITION OF DISCHARGE WATER: BROWN & SILTY

MONITORING EQUIPMENT USED: HORIBA U-52 / NATIONAL PULSTAR DEVELOPMENT RIG

6/20/13

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	* pH	Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Remarks (color, odor, sheen, sediment, etc.)
08:47	≈ 20 gal	82	21.68	6.92	1.82	9.82	239	71000	From drum after first bail
10:00	20 gal	70	21.14	7.54	1.26	9.16	208	>1000	from bailer at start of 2nd bail
10:25	26 gal	83.5	21.2	7.71	1.20	8.98	214	>1000	bailed clean
10:55	"	78.5							decided to move on to next boring due to slow recharge, will have to return to well for further development.
									* Checked pH to see if perhaps bentonite from well construction got into screen. pH was not high indicating this did not happen.

4" PVC = .66 gal/ft

Well depth 83.5'

CASING VOLUME: (83.5' - 61.10') × 0.66 gal/ft =

22.4' × 0.66 = 14.8 gal

10 Casing volumes = 148 gal

Well depth = 83.5'

Water column = 22.4'

WellDevelopmentLog

6-24-13

CH2MHILL

PROJECT NUMBER 427727.F1.01

LOC16/ CS-C43-083

Sheet 1 of 1

WELL DEVELOPMENT LOG

PROJECT: GCOU PHASE 2B

LOCATION: 647 W HARVARD ST, GLENDALE CA

DEVELOPMENT CONTRACTOR: NATIONAL EWP

PURGE METHOD AND EQUIPMENT USED: BAIL-SURGE-BAIL-PUMP / NATIONAL PULSTAR RIG

START WATER LEVELS: START: 61.1' (6-24-13 1210) END: 78.7' (6-24-13 1638) LOGGER: NICOLE ALKOV

MAXIMUM DRAWDOWN DURING PUMPING: 82.0'

RANGE AND AVERAGE DISCHARGE RATE: N/A

TOTAL QUANTITY OF WATER DISCHARGED: ~41 GAL

DISPOSITION OF DISCHARGE WATER: BROWN, SILTY

MONITORING EQUIPMENT USED: HORIBA U-52; ~~3" GRUNDFOS PUMP~~ BAILER

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity ~~(µS/cm)~~ (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Remarks (color, odor, sheen, sediment, etc.)
12:15	–	61.1	–	–	–	–	–	–	STARTED BAILING; BROWN, SILTY
12:30	18	81.8	–	–	–	–	–	–	WELL IS ALMOST DRY, LET RECHARGE
13:02	–	76	–	–	–	–	–	–	RECHARGE (SLOW)
13:23	–	73	–	–	–	–	–	–	↓
13:38	–	70	–	–	–	–	–	–	
13:40	18	70	–	–	–	–	–	–	BEGIN SURGING
13:55	"	"	–	–	–	–	–	–	FINISH SURGING, BEGIN BAILING #2
14:10	30	81.7	–	–	–	–	–	–	FINISH BAILING #2
14:15	"	–	–	–	–	–	–	–	LET WELL RECHARGE
14:45	"	–	–	–	–	–	–	–	BEGIN BAILING #3
15:30	38	–	–	–	–	–	–	–	CONTINUE BAILING
15:55	39	81.1	25.78	7.85	0.941	11.23	208	475	CONTINUE TO BAIL; CLOUDY, GREYISH BROWN
16:05	40	82.0	23.02	7.94	0.818	5.57	260	404	" "
16:15*	41	81.7	22.70	7.88	0.828	7.20	256	200	" "
									*DEVELOPMENT TO CONTINUE NEXT DAY, ON 6-25-13

TOTAL DEPTH OF WELL = 83.5'

4" PVC 1 CASING VOL = 83.5 - 61.1' × 0.66 GAL/FT

≈ 14.8 GAL;

10 CASING VOLS = 148 GAL = ~3 DRUMS

6/25/13

CH2MHILL

PROJECT NUMBER 427727.F1.01

Sheet 1 of 1

WELL DEVELOPMENT LOG

PROJECT: GCOU Phase 2B

LOCATION: 647 W. Harvard ST. Glendale CA.

DEVELOPMENT CONTRACTOR: NATIONAL EWP

PURGE METHOD AND EQUIPMENT USED: National PulSTAR Rig

START WATER LEVELS: START: 62.00 END:

LOGGER: G. Early / SCD

MAXIMUM DRAWDOWN DURING ~~PUMPING~~: Bailing = < 1' water in Well

RANGE AND AVERAGE DISCHARGE RATE: N/A

TOTAL QUANTITY OF WATER DISCHARGED:

DISPOSITION OF DISCHARGE WATER: Stored in Mobil Tank Until Transfered to Tank at Staging Area (Today) / National PulSTAR Development Rig

MONITORING EQUIPMENT USED: Horiba - U-52

Date/ Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Temp. (°C)	pH	Conductivity ~~(µS/cm)~~ mS/cm	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Remarks (color, odor, sheen, sediment, etc.)
11:45		62.00							Well Surging
12:10	~15		21.2	7.85	1.12	4.91	274	>1000	Cloudy, LT. Brn, No ODOR, No sheen, Sediment Silty
1:30	~15		21.3	7.81	1.02	5.20	270	>1000	Clearing Slightly
2:18	~15		21.5	7.84	.992	5.15	275	830	
3:07	~7+	~67.70	21.4	7.80	.812	5.40	276	590	Clearing / LT. Brn
4:04	~15	~65.80	21.7	7.83	.824	6.39	268	442	Still Cloudy / LT Brn / Solids Settle-out in Cup <5min

67-70 gallons Bailed today

6/25/13

WellDevelopmentLog.xls

OTIE
Oneida Total Integrated Enterprises

Groundwater Well Development/~~Purge Log~~

Project Name	Project ID/Phase/Task:	Field Activity: Development
Site Name/ID Flaver St	Location ID (Well ID): CS-C44-120	Target Purge Volume (gal):
Purging Method/Equipment	Sampling Equipment:	Air Monitoring Equipment:
A. Well Casing Diameter (inches): 4" (SCH 80)	**B.** Unit Casing Volume: →	6" Diameter = ~1.5 gal/ft 4" Diameter = ~0.67 gal/ft 3" Diameter = ~0.37 gal/ft 2" Diameter = ~0.17 gal/ft
C. Depth to Well Bottom from TOC: 113.8 ft (0928)	**D. Static** Depth to Water from TOC: 88.76 ft (0925)	
E. Length of Static Water Column in Casing **(C – D)** 31.09 ft	**F.** Casing Water Volume **(B x E)** 19.9 gal	**G.** Casing Volumes ~~(3 x F)~~ Development Volume (x10) 200 gal

Date	Time 24hr	Recovery Time (min)	Purge Rate (gal/min)	Dynamic H2O Level (ft)	Volume Purged (gl)	Temp (C°)	pH	Specific Conductivity (us/cm)	Dissolved oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Water Description
6/05/14	10 05			92.40								After bailing
	10 :22	swabbing started (30 min)										
	10 :55	bailing										
	12 :22		3.5			23.4	7.02	1520			+999	Initial reading
	12 :27		2.2	118.04	20	24.2	7.15	1510	9.31		+999	
	12 :38		1.6	117.95	40	26.3	7.24	1500	8.54		+999	
	12 :49		1.6	117.95	60	26.0	7.20	1440	8.61		+999	cloudy
	13 :00		1.7	117.93	80	26.0	7.15	1410	8.58		760	
	13 :11		1.7	117.95	100	25.7	7.14	1380	8.70		510	
	13 :23		1.5	117.95	120	25.8	7.12	1380	8.63		274	
	14 :00		—	—	140	22.2	7.32	1350	10.09		+999	Started Bailing
	14 20		—	—	160	21.7	7.39	1360	10.47		+999	
	14 :50				180	21.9	7.43	1360	10.36		+999	
6/06/14	09 :00			88.73								static DTW. DTB = 119.85

Recovery Depth* (ft from TOC) : _____ Final **Recovery Time*** (min) : _____ * Taken As Final Water Level Reading and Time after sampling is complete and well has recovered.

Prepared By: _____ Checked By: _____

OTIE
Oneida Total Integrated Enterprises

Groundwater Well Development/Purge Log

Project Name: _____

LOCATION ID:(Well Number) CS-C44-120

Date	Time 24hr	Recovery Time (min)	Purge Rate (gal/min)	Dynamic H2O Level (ft)	Volume Purged (gl)	Temp (C°)	pH	Specific Conductivity (us/cm)	Dissolved oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Water Description
6/06	9:10											Begin swabbing
	9:40											Finish swabbing
	10:05			97.65	200	21.5	6.71	1440	9.05		+999	
	10:15			—	220	21.4	7.46	1390	9.09		+999	Lots of silt
	10:24			114.66	240	21.3	7.62	1390	9.14		+999	
	10:39			114.71	260	21.1	7.69	1380	9.22		+999	
	11:24			—	280	21.6	7.91	1350	9.00		+999	
	11:32			117.22	300	21.4	7.89	1270	9.10		+999	
	11:40			117.60								Final DTW DTB = 119.9
	:											
	:											
	:											

Recovery Depth* (ft from TOC) : _____ Final **Recovery Time*** (min) : _____ * Taken As Final Water Level Reading and Time after sampling is complete and well has recovered.

Prepared By: _____ Checked By: _____

OTIE
Omaha Total Integrated Enterprises

Groundwater Well Development/Purge Log

Project Name	Project ID/Phase/Task:	Field Activity: Development
Site Name/ID Brownsville	Location ID (Well ID): CS-C45 ~~45~~ 54 RS	Target Purge Volume (gal):
Purging Method/Equipment	Sampling Equipment:	Air Monitoring Equipment:
A. Well Casing Diameter (inches):	B. Unit Casing Volume: 0.65 (SCH 80) →	6" Diameter = ~1.5 gal/ft 4" Diameter = ~0.67 gal/ft 3" Diameter = ~0.37 gal/ft 2" Diameter = ~0.17 gal/ft
C. Depth to Well Bottom from TOC: 50.75	D. Static Depth to Water from TOC: 27.83	
E. Length of Static Water Column in Casing (C – D) 22.92	F. Casing Water Volume (B x E) 14.9	G. Casing Volumes (3 x F)

Date	Time 24hr	Recovery Time (min)	Purge Rate (gal/min)	Dynamic H2O Level (ft)	Volume Purged (gl)	Temp (C°)	pH	Specific Conductivity (us/cm)	Dissolved oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Water Description
6/06	13 05											Rig setup
6/06	13 :25				30	22.1	5.70	1180	8.78		+999	Bailing
6/06	13 :36			27.90	55	21.3	6.96	1150	9.12		+999	DTB: 53.8
6/06	13 46				65							Started swabbing
6/06	14 16											Resumed bailing
6/06	14 :30				85	21.6	7.21	1170	8.98		+999	
6/06	14 :36			27.93	105	21.4	7.23	1150	9.09		+999	
6/06	14 :40											Finished bailing
6/09	09 :05			27.90								DTB: 53.8 ft
	09 :50				110	21.4	7.08	1100	7.84	+194	+999	
	10 :02				130	21.4	6.83	1100	7.95	+187	+999	
	10 10				150	21.5	6.78	1100	7.82	+185	+999	
	10 :18				170	21.6	6.71	1100	7.68	+181	+999	
	10 :30				190	21.6	6.70	1100	7.57	+178	+999	

Recovery Depth* (ft from TOC) : _____ Final **Recovery Time*** (min) : _____ * Taken As Final Water Level Reading and Time after sampling is complete and well has recovered.

Prepared By: R. Carmona Checked By: _____

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Groundwater Well Development/Purge Log

Project Name: _____

Page ___ of ____

LOCATION ID:(Well Number) CS - C4S - 54

Date	Time 24hr	Recovery Time (min)	Purge Rate (gal/min)	Dynamic H2O Level (ft)	Volume Purged (gl)	Temp (C°)	pH	Specific Conductivity (us/cm)	Dissolved oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Water Description
6/09	10 :40			27.90	200	21.6	6.70	1090	7.41	+176	+999	Development finished
	:											
	:											
	:											
	:											
	:											
	:											
	:											
	:											
	:											
	:											
	:											
	:											

Recovery Depth* (ft from TOC) : _____ Final **Recovery Time*** (min) : _____

* Taken As Final Water Level Reading and Time after sampling is complete and well has recovered.

Prepared By: R. Carmona

Checked By: _____

OTIE
Oneida Total Integrated Enterprises

Groundwater Well Development/Purge Log

Project Name GCOU	Project ID/Phase/Task:	Field Activity:
Site Name/ID Dover Place	Location ID (Well ID): CS-CA6-45	Target Purge Volume (gal):
Purging Method/Equipment	Sampling Equipment:	Air Monitoring Equipment:
A. Well Casing Diameter (inches): 4" (SCH 80)	**B.** Unit Casing Volume: 0.65	6" Diameter = ~1.5 gal/ft 4" Diameter = ~0.67 gal/ft 3" Diameter = ~0.37 gal/ft 2" Diameter = ~0.17 gal/ft
C. Depth to Well Bottom from TOC: 42.75 ft	**D. Static** Depth to Water from TOC: 22.23 ft	
E. Length of Static Water Column in Casing **(C – D)** 20.52 ft	**F.** Casing Water Volume **(B x E)** 13.34	**G.** Casing Volumes **(3 x F)**

Date	Time 24hr	Recovery Time (min)	Purge Rate (gal/min)	Dynamic H2O Level (ft)	Volume Purged (gl)	Temp (C°)	pH	Specific Conductivity (us/cm)	Dissolved oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Water Description
	12:25				25							Started bailing
	12:30											Started swabbing
	13:00				~~20~~							Resumed bailing
	13:10				~~25~~ 30							Done bailing (1 drum)
	13:23		3.4	22.6	0 ↓							Started pumping
	13:25		3.4	27.60								- Fast drawdown
	13:27		2.8	30.78								
	13:31		2.8	31.01	25	22.5	7.02	1090	11.30	+137	+999	
	13:37		2.8	31.45	40	22.1	6.91	1060	11.42	+135	220	
	13:41		2.8	31.53	50	22.0	6.84	1040	11.20	+131	57.6	
	13:44		2.8	31.55	60	22.0	6.80	1030	11.50	+130	2.6	
	13:47		2.8	31.57	70	22.0	6.78	1030	12.04	+128	0.0	
	13:51		2.8	31.60	80	22.0	6.75	1020	11.40	+126	0.0	
	13:54		2.8	31.63	90	22.0	6.73	1020	11.57	+126	0.0	Finished pumping

Recovery Depth* (ft from TOC) : _____ Final **Recovery Time*** (min) : _____ * Taken As Final Water Level Reading and Time after sampling is complete and well has recovered.

Prepared By: R. Carmona Checked By: _____

OTIE
Oneida Total Integrated Enterprises

Groundwater Well Development/Purge Log

Project Name	Project ID/Phase/Task:	Field Activity: WELL DEVELOPMENT
Site Name/ID Boyce	Location ID (Well ID): CS-C47-53	Target Purge Volume (gal):
Purging Method/Equipment	Sampling Equipment:	Air Monitoring Equipment:
A. Well Casing Diameter (inches): 4" (SCH 80)	**B.** Unit Casing Volume:	→ 6" Diameter = ~1.5 gal/ft 4" Diameter = ~0.67 gal/ft 3" Diameter = ~0.37 gal/ft 2" Diameter = ~0.17 gal/ft
C. Depth to Well Bottom from TOC: 53.21	**D. Static** Depth to Water from TOC: 27.8	
E. Length of Static Water Column in Casing **(C – D)** 25.4	**F.** Casing Water Volume **(B x E)** 16.5	**G.** Casing Volumes **(3 x F)**

Date	Time 24hr	Recovery Time (min)	Purge Rate (gal/min)	Dynamic H2O Level (ft)	Volume Purged (gl)	Temp (C°)	pH	Specific Conductivity (us/cm)	Dissolved oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Water Description
6/10	08:44			27.8								Static DTW
	08:52				20							Bailing
	08:55											Started swabbing
	09:10											Bailing
	09:17				20							
	09:20											Resumed swabbing
	09:35											Finished swabbing
	09:50											Calibrated meter
	10:06			27.93	20		(DTB = 53.35)					Bailed 20 gal
	10:18		3.3									Started pump
	10:25		3.3	28.02	20	22.8	6.16	1150	13.72	+173	+999	Screen bottom
	10:31		3.3	28.02	20	22.8	6.33	1220	16.37	+168	415	Screen top
	10:37		3.3	28.01	20	22.8	6.37	1130	15.96	+165	261	
	10:44		3.3	28.01	20	22.8	6.36	1120	14.95	+161	100	

Recovery Depth* (ft from TOC) : _____ Final **Recovery Time*** (min) : _____ * Taken As Final Water Level Reading and Time after sampling is complete and well has recovered.

Prepared By: R. Camona Checked By: _____

OTIE
Oneida Total Integrated Enterprises

Groundwater Well Development/Purge Log

Project Name: _____

LOCATION ID:(Well Number)_____

Date	Time 24hr	Recovery Time (min)	Purge Rate (gal/min)	Dynamic H2O Level (ft)	Volume Purged (gl)	Temp (C°)	pH	Specific Conductivity (us/cm)	Dissolved oxygen (mg/L)	Redox (mV)	Turbidity (NTU)	Water Description
6/10/14	10:50		3.3	28.01	20	22.7	6.41	1110	12.09	+159	16.3	
	10:56		3.3	28.01	20	22.8	6.37	1110	11.56	+157	0.0	
	11:02		3.3	28.01	20	22.7	6.36	1110	11.14	+155	0.0	Finished pumping
	:											
	:		Total Volume= 200 gal									
	:											
	:											
	:											
	:											
	:											
	:											
	:											

Recovery Depth* (ft from TOC) : _____ Final **Recovery Time*** (min) : _____ * Taken As Final Water Level Reading and Time after sampling is complete and well has recovered.

Prepared By: R. Carmona Checked By: _____

OTIE
Oneida Total Integrated Enterprises

317 E. Main Street
Ventura, CA 93001
Tel: (805) 585-2110
Fax: (805) 585-2111

TECHNICAL MEMORANDUM

Date: 6/24/15

Prepared By: Jose DeLoera
Nova Clite, PG

Re: Additional Information Regarding Development of EPA RI Wells CS-C44-120 and CS-C45-54.

This technical memorandum has been prepared to present additional information regarding the well development activities at wells CS-C44-120 and CS-C45-54. These wells were developed in June 2014 after being installed in May 2014 during Phase 3 of the Remedial Investigation (RI) for the Glendale Chromium Operable Unit (GCOU) of the San Fernando Valley Area 2 Superfund Site.

Well development activities during the RI were performed in accordance with OTIE Standard Operating Practice (SOP) OTIE008D - Monitoring and Extraction Well Installation and Development. During development, monitored field parameters included pH, temperature, specific conductance, dissolved oxygen, and turbidity.

After 300 gallons (approximately 12 casing volumes) had been purged during development from monitoring well CS-C44-120, only turbidity had not stabilized. OTIE's SOP OTIE008D states that if "the duration of well development has been at least four hours, even if stabilization of parameters has not been met" development can be discontinued. Development of well CS-C44-120 was stopped after seven hours.

Similarly for monitoring well CS-C45-54, only turbidity had not stabilized after four hours of well development and purging of a total of 200 gallons purged (roughly 22 casing volumes). Per SOP OTIE008D, well development was terminated.

There were significant changes in total depth measurements in these two wells at the start and finish of development. In well CS-C44-120, total depth started at 113.8 ft below top of casing (TOC) and ended at 119.9 ft, a change of 6.1 ft, and in well CS-C45-54, total depth started at 50.75 ft below TOC and ended at 53.8 ft, a change of 3.05 ft, indicating a thickness of silt in the wells prior to development.

During subsequent groundwater monitoring events, total depths were measured at depths near to constructed depths and turbidity values were low. In July 2014, total depth in well CS-C44-120 was 119.9 ft below TOC and turbidity was 18.4 NTUs and measurements in well CS-C45-54 were 53.5 ft below TOC and 1.7 NTUs. In the October 2014 event, measurements in well CS-C44-120 were 120.8 ft below TOC and 8.17 NTUs and 54.2 ft below TOC and 9.62 NTUs in well CS-C45-54. These measured total depths and low turbidity values do not indicate the presence of significant silt in the wells and confirm that wells were properly and sufficiently developed.

If you have any questions, please call me at 808-585-6396.

Oneida Total Integrated Enterprises

PROFESSIONAL GEOLOGIST
NOVA CLITE
No. 8482
EXP. 11/15
STATE OF CALIFORNIA

Nova Clite, PG
Senior Hyrdogeologist

EPA Survey Reports

CH2M HILL
GLENDALE CHROMIUM OPERABLE UNIT
CITY OF GLENDALE/BURBANK, CA

WELL	ELEV	DESC	NORTH	EAST
CS-C30-120	563.93	4" PVC (N)	1882052.0	6457705.3
CS-C30-120	564.36	RIM		
CS-C30-120	564.38	ASPHALT		
CS-C30-200	563.96	4" PVC (N)	1882066.5	6457688.6
CS-C30-200	564.51	RIM		
CS-C30-200	564.50	ASPHALT		
CS-C31-102	538.86	4" PVC (N)	1880562.4	6461145.3
CS-C31-102	539.33	RIM		
CS-C31-102	539.30	ASPHALT		
CS-C32-120	567.31	4" PVC (E) HIGH POINT	1882933.7	6458859.2
CS-C32-120	567.80	RIM		
CS-C32-120	567.78	ASPHALT		
CS-C33-059	435.91	4" PVC (N)	1871305.7	6480270.9
CS-C33-059	436.22	RIM		
CS-C33-059	436.24	ASPHALT		

BENCHMARK:

VERTICAL DATUM NAVD88

CITY OF BURBANK BM #1404-1, 2-1/2" BRASS CAP STMP CITY OF BURBANK BM 1404-1, AT 3400 CLARK AVE, SW QUADRANT OF THE CL OF THE INT OF CLARK AVE AND LIMA ST, ABOUT 22' S OF THE CL OF CLARK AVE AND ABOUT 66' W OF THE CL OF LIMA ST, SET IN THE TOP SW CORNER A 7'x3.5' CATCH BASIN, ABOUT 19' W'LY OF THE S'LY BCR OF CLARK AVE AND LIMA ST

ELEV= 563.967 FEET NAVD88

HORIZONTAL DATUM NAD83, ZONE 5

NGS PID STATIONS AJ1878 AND AJ1907 EPOCH DATE 2000.35

Prepared by:
DULIN and BOYNTON

Date of Survey:
21 FEB 13

CH2M HILL
GLENDALE CHROMIUM

WELL	ELEV	DESC	NORTH	EAST
CS-C34-065	442.30	4" PVC (N)	1871368.7	6480953.3
CS-C34-065	442.63	RIM		
CS-C34-065	442.68	CONCRETE		
CS-C35-041	414.38	4" PVC (N)	1870174.2	6480242.3
CS-C35-041	414.84	RIM		
CS-C35-041	414.81	ASPHALT		
CS-C36-055	431.01	4" PVC (N)	1870440.7	6480612.2
CS-C36-055	431.57	RIM		
CS-C36-055	431.55	CONCRETE		
CS-C37-035	406.79	4" PVC (N)	1868151.9	6481139.5
CS-C37-035	407.04	RIM		
CS-C37-035	407.00	ASPHALT		
CS-C38-051	456.15	4" PVC (N)	1878304.7	6476829.2
CS-C38-051	456.43	RIM		
CS-C38-051	456.4	GROUND		
CS-C39-073	459.20	4" PVC (N)	1873705.4	6480189.4
CS-C39-073	459.60	RIM		
CS-C39-073	459.58	ASPHALT		
CS-C40-079	501.67	4" PVC (N)	1882860.7	6469742.2
CS-C40-079	502.02	RIM		
CS-C40-079	501.97	ASPHALT		
CS-C42-059	469.47	4" PVC (N)	1881735.1	6475163.9
CS-C42-059	469.88	RIM		
CS-C42-059	469.85	ASPHALT		

BENCHMARK:

VERTICAL DATUM NAVD88

CITY OF LOS ANGELES BM #09-01530, WIRE SPK IN N CURB OF CHEVY CHASE DR 116' NE OF NE CURB LINE PROD OF ALGER ST FROM SE, SW END CB

1985 ELEV= 447.613 FEET NAVD88

HORIZONTAL DATUM NAD83, ZONE 5

NGS PID STATIONS AB5036 AND AB5056 EPOCH DATE 1995.50

CH2M HILL
GLENDALE CHROMIUM

WELL	ELEV	DESC	NORTH	EAST
CS-C41-058	470.93	4" PVC (N)	1880777.6	6474132.2
CS-C41-058	471.21	RIM		
CS-C41-058	471.18	ASPHALT		

BENCHMARK:

VERTICAL DATUM NAVD88

CITY OF LOS ANGELES BM #09-02948, SPK IN S CURB SONORA AVE 10.5' E/O BCR E/O FLOWER ST

1985 ELEV= 476.918 FEET NAVD88

HORIZONTAL DATUM NAD83, ZONE 5

NGS PID STATIONS AB5036 AND AB5056 EPOCH DATE 1995.50

WELL	ELEV	DESC	NORTH	EAST
CS-C43-083	474.87	4" PVC (N)	1875040.1	6480236.6
CS-C43-083	475.10	RIM		
CS-C43-083	475.05	ASPHALT		
V13DRMW1	477.90	4" PVC (S)	1876144.8	6479738.4
V13DRMW1	478.45	RIM		
V13DRMW1	478.51	CONCRETE		
V13DRMW2	479.43	4" PVC (N)	1876096.6	6479912.1
V13DRMW2	479.77	RIM		
V13DRMW2	479.78	ASPHALT		
V13DRMW3	477.96	4" PVC (N)	1875992.5	6479897.1
V13DRMW3	478.70	RIM		
V13DRMW3	478.70	CONCRETE		
V13DRMW4	478.61	4" PVC (N)	1876303.0	6479769.4
V13DRMW4	478.87	RIM		
V13DRMW4	478.92	CONCRETE		
V13DRMW5	476.21	4" PVC (S)	1875944.7	6479775.0
V13DRMW5	476.68	RIM		
V13DRMW5	476.68	CONCRETE		

CH2M HILL
GLENDALE CHROMIUM

WELL	ELEV	DESC	NORTH	EAST
V13DRMW6	473.61	4" PVC (N)	1875992.9	6479620.6
V13DRMW6	473.84	RIM		
V13DRMW6	473.85	ASPHALT		
V13DRMW7	472.95	4" PVC (N)	1875573.4	6479743.6
V13DRMW7	473.29	RIM		
V13DRMW7	473.29	ASPHALT		
V13DRMW8	475.64	4" PVC (N)	1875572.8	6479922.5
V13DRMW8	475.97	RIM		
V13DRMW8	475.97	ASPHALT		
V13DRMW9	473.90	4" PVC (N)	1875243.2	6479882.3
V13DRMW9	474.16	RIM		
V13DRMW9	474.15	ASPHALT		
V13DWBW1	476.84	4" PVC (N)	1876181.2	6479689.4
V13DWBW1	477.16	RIM		
V13DWBW1	477.16	CONCRETE		
V13DWBW3	476.47	4" PVC (SW)	1876148.5	6479667.8
V13DWBW3	476.62	RIM		
V13DWBW3	476.62	CONCRETE		

BENCHMARK:

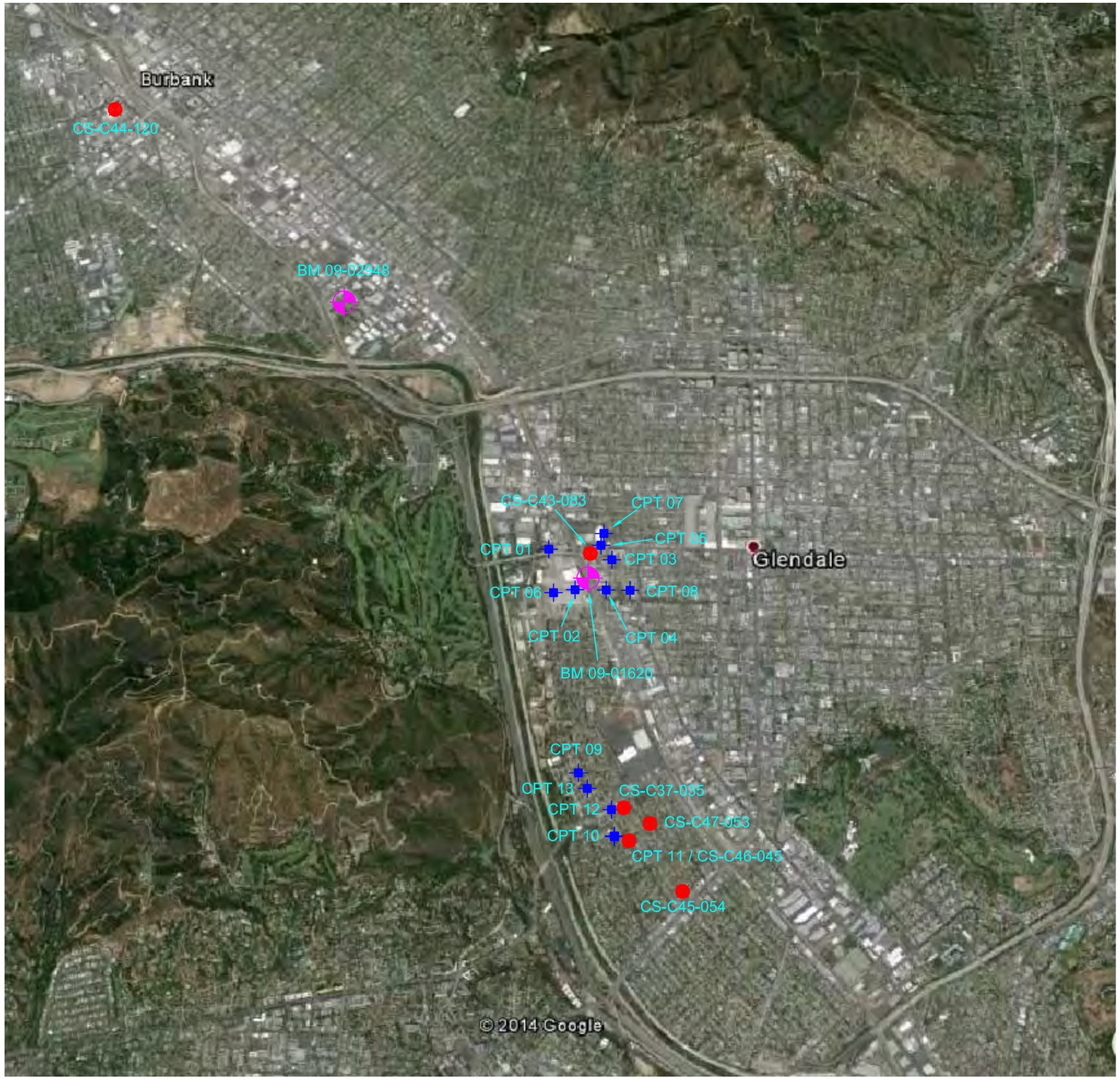
VERTICAL DATUM NAVD88

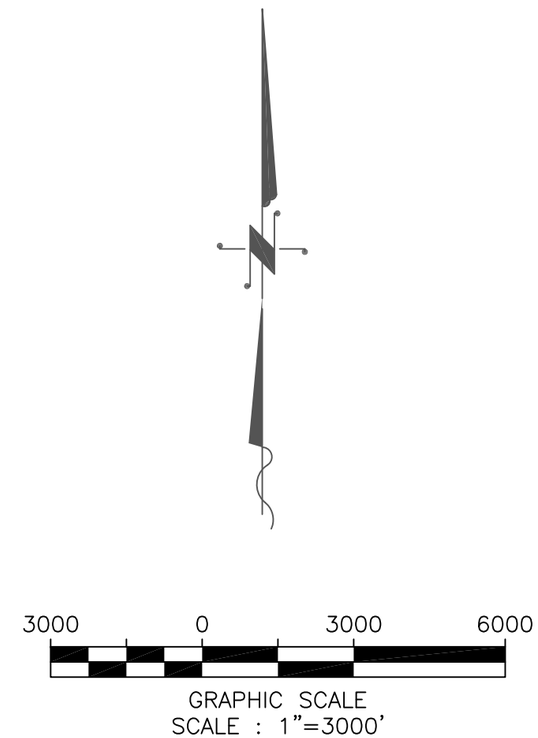
CITY OF LOS ANGELES BM #09-01620, PLUG AND WASHER IN N CURB COLORADO ST 5' E OF BC CURB RET E OF SAN FERNANDO RD, 1.6' E OF W END CB

1985 ELEV= 467.561 FEET NAVD88

HORIZONTAL DATUM NAD83, ZONE 5

NGS PID STATIONS AB5036 AND AB5056 EPOCH DATE 1995.50





Otie Burbank Exhibit.

City of Burbank

Survey Date: June 23, 2014

Prepared by:
AZIMUTH GROUP
5201 Clemson Street
Ventura, CA 93003
(805) 289-9407

LICENSED LAND SURVEYOR
LESTER G. EVERARD
NO. 6774
Exp. 9-30-14
STATE OF CALIFORNIA

LEGEND

- MONITORING WELL
- CPT SURVEY CONTROL POINT
- BENCHMARK

SURVEYED BY AZIMUTH GROUP June 23, 2014

WELL DESCRIPTION	NORTHING	EASTING	CASE	RIM	LID CTR	AC
CS–C37–035	1868151.9	6481139.5	406.79	407.04		407.00
CS–C43–083	1875040.1	6480236.9	475.00	475.22		475.17
CS–C44–120	1887060.8	6467366.5	555.47	555.80		555.75
CS–C45–054	1865886.3	6482732.3	414.06		412.53	412.48
CS–C46–045	1867258.9	6481281.0	411.49		412.02	411.95
CS–C47–053	1867723.7	6481847.0	417.99		418.39	418.34

BORING DESCRIPTION	NORTHING	EASTING	ELEVATION	DESCRITION
CPT 01	1875153.1	6479109.9	440.52	AC AT BORING
CPT 02	1874055.4	6479820.8	458.34	AC AT BORING
CPT 03	1874866.4	6480819.1	480.61	AC AT BORING
CPT 04	1874048.0	6480662.0	470.07	AC AT BORING
CPT 05	1875258.3	6480524.3	479.20	AC AT BORING
CPT 06	1873977.0	6479237.1	429.13	AC AT BORING
CPT 07	1875579.6	6480603.4	411.48	AC AT BORING
CPT 08	1874042.3	6481311.1	479.64	AC AT BORING
CPT 09	1869096.4	6479910.1	412.90	AC AT BORING
CPT 10	1867378.1	6480886.5	492.41	AC AT BORING
CPT 11	1867258.9	6481281.0	411.95	AC AT WELL VAULT
CPT 12	1868100.8	6480807.2	405.99	AC AT BORING
CPT 13	1868676.9	6480151.3	416.61	AC AT BORING

BENCHMARK	NORTHING	EASTING	ELEVATION	DESCRITION
09–02948	1881844.19	6473570.81	476.92	BM SONORA/FLOWER
09–01620	1874371.99	6480170.63	467.48	BM SAN FERNANDO/COLORADO

Otie Burbank Exhibit.

City of Burbank

Survey Date: June 23, 2014

Prepared by:
AZIMUTH GROUP
5201 Clemson Street
Ventura, CA 93003
(805) 289-9407

GCOU Respondents

Boring and Well Construction Logs, Well Development Logs, and Geophysical Logs

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF BOREHOLE: GC-1

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 264 Spazier Ave., Burbank, CA
Contractor: Cascade Drilling
Drilling Method: HSA CME-95
Sampling Method: Cal-Mod Split Spoon
Logged By: B. Eddington
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 10/15/2012
Date Completed: 10/17/2012
Total Depth: 76.5 feet
Borehole Diameter: 6"
Initial Water Level: 64 feet bgs
Northing: 1883167.28
Easting: 6468994.57
TOC/Surface Elevation:
Notes: Air Knifed to approximately 9 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
						Asphalt Surface 6" thick
				SM		Silty SAND, olive brown (2.5Y 4/3), dry, loose, very fine grained, with little mica, trace medium to coarse grained sand
5			0.0			
10		15 24 30 64	0.0	SP		SAND, olive gray (5Y 5/2), fine grained, dry, dense, trace medium grained sand
15			0.0			
				ML		Sandy SILT, light olive brown (2.5Y 5/4), fine grained, dry, no plasticity
20		19 21 27 64	0.0			Becomes hard
25						
				SM		Silty SAND, light olive brown (2.5Y 5/3), dry, fine grained, trace fine to coarse grained gravel
		29				

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:09 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-1.GPJ

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Irvine, CA 92606
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LOG OF BOREHOLE: GC-1

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Notes: Air Knifed to approximately 9 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
		50 64	0.0	SM		Becomes dense
35				SP		SAND with Gravel, light olive brown (2.5Y 5/3), dry, fine to medium grained sand, fine to coarse grained gravel, trace silt
40		50 64	0.0			Becomes dense
45				ML		SILT, dark yellowish brown (10YR 4/4), dry to moist, no plasticity, with mica, trace fine grained sand
50		15 23 27 64	0.0			Becomes hard
55		50 64	0.0	SP		SAND, yellowish brown (10YR 5/4), dry to moist, fine grained, trace silt, trace fine to coarse grained gravel
		50 64	0.0			
		50 64	0.0	SP		SAND with Gravel, yellowish brown (10YR 5/6), dry to moist, fine to medium grained sand, fine to coarse grained gravel
		50				COBBLES, subrounded to rounded

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:09 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-1.GPJ

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LOG OF BOREHOLE: GC-1

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Northing: 1883167.28
Easting: 6468994.57
TOC/Surface Elevation:
Notes: Air Knifed to approximately 9 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
		64	0.0			COBBLES, subrounded to rounded
			0.0	SP		Gravelly SAND, dark yellowish brown (10YR 4/4), moist to wet, medium grained sand, fine to coarse grained gravel, trace fine and coarse grained sand
	X	50 64				
		50 64	0.0			
▽						Becomes wet
65	X	50 64	0.0			
		18 24 30 64 50 64		SP		SAND, dark yellowish brown (10YR 4/4), wet, fine grained, dense, with mica, trace medium grained sand
						Becomes olive brown (2.5Y 4/4), fine to medium grained
70		50 64	0.0			Becomes fine to coarse grained, trace fine to coarse grained gravel
		22 50 64	0.0			
		30 50 64	0.0	SW		SAND, grayish brown (2.5Y 5/2), wet, dense, fine to coarse grained, trace fine to coarse grained gravel
75		50 64	0.0			
						Total Depth - 76.5 feet bgs
80						
85						

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:09 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-1.GPJ

ERM
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Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF BOREHOLE: GC-2

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Western Ave
Contractor: Cascade Drilling
Drilling Method: Sonic
Sampling Method: Cal-Mod Split Spoon
Logged By: J. Summers
Reviewed By: M. Makerov

Date Started: 8/13/2012
Date Completed: 8/15/2012
Total Depth: 135 feet
Borehole Diameter: 6"
Initial Water Level: 75.5 feet bgs
Northing: 1884443.39
Easting: 6473713.18
TOC/Surface Elevation:
Notes: Air Knifed to approximately 10 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
						Not Logged
5						
10						Silty SAND, dark brown (7.5YR 3/4), dry, trace angluar to subangular coarse gravel
			2.9			
			7.3			Silty SAND, dark brown (7.5YR 4/4), dry, with angular to subangular coarse gravel
15						
			7.6	SM		Silty SAND, dark brown (7.5YR 4/4), dry, with angluar to subangular coarse gravel, trace rounded cobbles
						Silty SAND, dark brown (7.5YR 3/4), dry, with angular to subangular fine gravel
20						
						Silty SAND, dark brown, 7.5YR 3/4), moist, with subangular to subrounded coarse gravel
				CL		CLAY with Silt, dark brown (7.5YR 3/2), moist
25			8.3			
				SM		Silty SAND, dark brown (7.5YR 4/4), dry, trace subangular fine gravel

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:11 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-2.GPJ

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Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF BOREHOLE: GC-2

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Western Ave
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Sampling Method: Cal-Mod Split Spoon
Logged By: J. Summers
Reviewed By: M. Makerov

Date Started: 8/13/2012
Date Completed: 8/15/2012
Total Depth: 135 feet
Borehole Diameter: 6"
Initial Water Level: 75.5 feet bgs
Northing: 1884443.39
Easting: 6473713.18
TOC/Surface Elevation:
Notes: Air Knifed to approximately 10 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			22.1	SM		Silty SAND, dark brown (7.5YR 4/4), dry, trace subangular fine gravel
						Silty SAND, dark brown (7.5YR 3/2), moist, trace angular to subangular fine gravel
35			9.4	CL		CLAY with Silt, dark brown (7.5YR 3/2), moist, trace angular to subangular fine gravel
40			1.5	SM		Silty SAND, dark brown (7.5YR 3/4), moist, trace angular to subangular fine gravel
45			4.1	CL		CLAY with Silt, dark brown (7.5YR 4/3), moist, trace angular to subangular fine gravel, trace cobble
50			13.5			No Recovery
				CL		CLAY with Silt, olive (5Y 4/3), moist
55			9.6	SM		Silty SAND, dark brown (7.5 YR 3/4), dry, with subangular coarse gravel

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:11 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-2.GPJ

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LOG OF BOREHOLE: GC-2

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Western Ave
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Sampling Method: Cal-Mod Split Spoon
Logged By: J. Summers
Reviewed By: M. Makerov

Date Started: 8/13/2012
Date Completed: 8/15/2012
Total Depth: 135 feet
Borehole Diameter: 6"
Initial Water Level: 75.5 feet bgs
Northing: 1884443.39
Easting: 6473713.18
TOC/Surface Elevation:
Notes: Air Knifed to approximately 10 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			11.8	CL		CLAY with Silt, light olive gray (5Y 6/2), dry, trace angular fine gravel
				SM		Silty SAND, dark yellowish brown (10YR 4/4), trace angular to subangular fine gravel
65	X	75.5	11.1	CL		CLAY with Silt, gray (5Y 6/1), dry, trace angular to subangular fine gravel
				SM		Silty SAND, dark brown (7.5YR 4/4), moist, trace angular to subangluar fine gravel
70	X	75.5	1.3			Silty SAND, dark yellowish brown (10YR 4/4), moist, trace subangular gravel
						Silty SAND, dark yellowish brown (10YR 4/4), dry, trace angular fine gravel
						Silty SAND, dark yellowish brown (10YR 4/6), moist, trace angluar to subangular coarse gravel
75 ▽	X	75.5	12.1			Silty SAND, light olive brown (2.5YR 5/4), wet, medium to coarse sand
80	X	75.5	11.7			Silty SAND, dark yellowish brown (10YR 4/4), fine to medium sand
						Silty SAND, dark yellowish brown (10YR 4/4), moist, with angular to subangular fine gravel
85			10.2			
						No Recovery
				SM		Silty SAND, olive (5Y 4/4), wet
			2.5			

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:11 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GOOU\GC-2.GPJ

ERM
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Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF BOREHOLE: GC-2

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Western Ave
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Sampling Method: Cal-Mod Split Spoon
Logged By: J. Summers
Reviewed By: M. Makerov

Date Started: 8/13/2012
Date Completed: 8/15/2012
Total Depth: 135 feet
Borehole Diameter: 6"
Initial Water Level: 75.5 feet bgs
Northing: 1884443.39
Easting: 6473713.18
TOC/Surface Elevation:
Notes: Air Knifed to approximately 10 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
						No Recovery
				SM		Silty SAND, dark yellowish brown (10YR 4/4), moist
95			1.7			Silty SAND, dark yellowish brown (10YR 4/4), wet
				CL		CLAY with Silt, olive (5Y 4/4), dry, trace angular fine gravel
100			2.0			CLAY with Silt, dark yellowish brown (10YR 3/4), moist, trace medium sand
105			1.8			
110			1.1			CLAY with Silt, olive brown (2.5Y 4/4), moist
				SM		Silty SAND, olive brown (2.5Y 4/4), moist, fine sand
115						

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:11 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-2.GPJ

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LOG OF BOREHOLE: GC-2

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Western Ave
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Sampling Method: Cal-Mod Split Spoon
Logged By: J. Summers
Reviewed By: M. Makerov

Date Started: 8/13/2012
Date Completed: 8/15/2012
Total Depth: 135 feet
Borehole Diameter: 6"
Initial Water Level: 75.5 feet bgs
Northing: 1884443.39
Easting: 6473713.18
TOC/Surface Elevation:
Notes: Air Knifed to approximately 10 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
						Silty SAND, olive brown (2.5Y 4/4), moist, fine sand
						Silty SAND, olive (5Y 4/3), wet, medium sand
125						
				SM		Silty SAND, light gray (5Y 6/1), dry, with angular to subangular fine gravel
						Silty SAND, dark brown (10YR 4/3), moist, trace angular fine gravel
130			2.9			
			3.1			Silty SAND, olive (5Y 4/3), dry, with angular fine gravel
135						Total Depth - 135 feet bgs
140						
145						

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:11 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-2.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF BOREHOLE: GC-3

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 1539 Flower Street, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Sonic
Sampling Method: Cal-Mod Split Spoon
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 5/17/2012
Date Completed: 5/18/2012
Total Depth: 120 feet
Borehole Diameter: 6"
Initial Water Level: 48 feet bgs
Northing: 1882181.31
Easting: 6473177.6
TOC/Surface Elevation:
Notes: Air Knifed to approximately 9.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
						Asphalt Surface 5" thick
				SM		Silty SAND, dark yellowish brown (10YR 4/6), dry, dense, fine grained, with some mica
5						
10						
				SP		SAND, grayish brown (10YR 5/2), dry, loose, fine grained, with some mica Becomes dark yellowish brown (10YR 4/6)
15				SM		Silty SAND, very dark brown (10YR 2/2), dry, very dense, fine grained, trace clay, trace fine grained subangular gravel, with trace caliche
				SP		SAND, dark yellowish brown (10YR 4/6), dry, medium dense, fine to medium grained, trace silt SAND, grayish brown (10YR 5/2), dry, loose, fine grained, some mica, trace fine grained gravel Becomes dark yellowish brown (10YR 4/6) Becomes grayish brown (10YR 5/2)
20						
25				SW		SAND, dark yellowish brown (10YR 4/4), dry, loose, fine to coarse grained, some mica, trace fine grained subrounded gravel, trace silt
				SM		Silty SAND, dark yellowish brown (10YR 3/6), moist, medium dense, fine to medium grained, some mica

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:12 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-3.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF BOREHOLE: GC-3

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 1539 Flower Street, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Sonic
Sampling Method: Cal-Mod Split Spoon
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 5/17/2012
Date Completed: 5/18/2012
Total Depth: 120 feet
Borehole Diameter: 6"
Initial Water Level: 48 feet bgs
Northing: 1882181.31
Easting: 6473177.6
TOC/Surface Elevation:
Notes: Air Knifed to approximately 9.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
				SM		Silty SAND, dark yellowish brown (10YR 3/6), moist, medium dense, fine to medium grained, some mica
				SW		SAND, grayish brown (10YR 5/2), dry, loose, fine to coarse grained, some mica, trace fine to medium grained subrounded gravel
				SM		Silty SAND, dark yellowish brown (10YR 3/4), dry, medium dense, fine to coarse grained, with some mica SILT with Sand, dark yellowish brown (10YR 3/6), moist, stiff, low plasticity, some mica, iron staining, fine to medium grained sand, trace coarse grained sand
35						
				SW		SAND, dark yellowish brown (10YR 3/6), dry, loose, fine to medium grained, some mica, iron staining, trace fine grained subrounded gravel Becomes fine to coarse grained sand, with fine to medium grained subrounded gravel
40		48				
45						
▽						Becomes wet
		48		SW		SAND with Gravel, grayish brown (10YR 5/2), wet, loose, fine to coarse grained, some fine grained aubangular gravel, with trace mica
50		48				
				SP		SAND, grayish brown (10YR 5/2), wet, loose, fine grained, some mica, trace fine grained subangular gravel
55				SW		SAND with Gravel, grayish brown (10YR 5/2), wet, loose, fine to coarse grained, some fine grained subangular gravel, with trace mica

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:12 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-3.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF BOREHOLE: GC-3

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 1539 Flower Street, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Sonic
Sampling Method: Cal-Mod Split Spoon
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 5/17/2012
Date Completed: 5/18/2012
Total Depth: 120 feet
Borehole Diameter: 6"
Initial Water Level: 48 feet bgs
Northing: 1882181.31
Easting: 6473177.6
TOC/Surface Elevation:
Notes: Air Knifed to approximately 9.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
				SW		SAND with Gravel, grayish brown (10YR 5/2), wet, loose, fine to coarse grained, some fine grained subangular gravel, with trace mica
65						
				SP		SAND, olive brown (2.5Y 4/4), wet, loose, fine grained, with some mica
70				SW		SAND with Gravel, olive brown (2.5Y 4/4), wet, loose, fine to coarse grained, fine to coarse grained subrounded gravel, some mica, trace cobbles (rig bouncing)
75						SAND with Silt and Gravel, dark yellowish brown (10YR 3/6), wet, medium dense, fine to coarse grained, some fine grained rounded to subrounded gravel
80				SC-SM		CLAY with Silt, dark yellowish brown (10YR 3/4), wet, stiff, some mica, trace coarse grained sand, trace fine grained subangular to subrounded gravel
				CL		CLAY, dark brown (10YR 3/3), wet, very stiff, some mica, trace fine sand and fine subrounded gravel
85						

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:12 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-3.GPJ

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TOC/Surface Elevation:
Notes: Air Knifed to approximately 9.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
				CL		CLAY, dark brown (10YR 3/3), wet, very stiff, some mica, trace fine sand and fine subrounded gravel
95						
100				SW		SAND with Gravel, dark grayish brown (10YR 4/2), wet, fine to coarse grained, some fine grained rounded to subrounded gravel
105				SM		Silty SAND, olive brown (2.5Y 4/4), wet, medium dense, fine grained, with abundant mica
110				SW		SAND with Gravel, dark yellowish brown (10YR 4/4), wet, loose, fine to coarse grained, fine grained rounded to subrounded gravel
115						Increased fine grained rounded to subrounded gravel

Total Depth - 120 feet bgs

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:12 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-3.GPJ

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Phone: (949) 623-4700
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LOG OF BOREHOLE: GC-4

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Crystal Springs Parking Lot, Griffith Park, Los Angeles
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Sampling Method: Cal-Mod Split Spoon
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 3/9/2012
Date Completed: 3/14/2012
Total Depth: 80 feet
Borehole Diameter: 6"
Initial Water Level: 12 feet bgs
Northing: 1871304.73
Easting: 6478161.54
TOC/Surface Elevation: NA/413.07
Notes: Air knifed to approximately 8.0 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
						Asphalt Surface 4" thick
			0.0	SW		SAND, mottled brown (10YR 5/3) to brownish yellow (10YR 6/8), dry, fine to coarse grained
5			0.0			
		4 4 5	4.0	SP		SAND, dark yellowish brown (10YR 4/4), moist, loose, fine to medium grained, poorly graded, with some mica
		3 4 4	3.7	SW		SAND, dark grayish brown (10YR 4/2), moist, loose, fine to coarse grained, well graded, with some mica
10		8 20 22	3.6	SP		SAND, very dark grayish brown (10YR 3/2), wet, loose, fine to medium grained, trace clay, poorly graded, with trace mica
		10 15 22	4.2			
		12 14 17 21	4.7	SW		SAND, dark grayish brown (2.5Y 4/2), wet, loose, medium to coarse grained, well graded, subrounded
			4.6			
15		16 19 20				Trace medium subrounded gravel
		12 19 20	4.2			
		8 12	6.1	SP		SAND, olive brown (2.5Y 4/3), wet, loose, fine to medium grained, poorly graded, with some mica

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:18 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-4.GPJ

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LOG OF BOREHOLE: GC-4

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
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Contractor: Cascade Drilling
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Notes: Air knifed to approximately 8.0 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
		16 19				CLAYEY SAND, very dark grayish brown (2.5Y 3/2), wet, medium stiff, fine to medium grained, medium plasticity, with abundant mica
20		11 12 14	3.6	SC		
		12 14 22	7.5			
		12 13 17 23	7.5	SM		SILTY SAND, very dark grayish brown (2.5Y 3/2), wet, loose, fine to coarse grained, trace fine gravel, fining downward
25		13 17 21	7.7	CL		CLAY with Silt, very dark grayish brown (10YR 3/2), wet, medium plasticity, trace coarse sand to fine subangular gravel, with abundant mica
		14 23 31	7.0	SP		SAND with Gravel, lens from 26-26.25' bgs SAND, very dark grayish brown (10YR 3/2), wet, loose, fine grained, trace fines
		16 18 19 22	6.5	SW		SAND, very dark grayish brown (10YR 3/2), wet, loose, fine to coarse grained, well graded, trace fines, trace fine to medium subrounded gravel
30		11 14 18	6.1			SAND, brown (10YR 4/3), wet, very loose, fine to coarse grained, some fine to medium subangular gravel, well graded, with trace mica
		7 7 11	6.3			
		5 8 12 14	4.9	SP		SAND, very dark grayish brown (10YR 3/2), wet, loose, medium grained, poorly graded, with trace mica
				SW		SAND, very dark grayish brown (10YR 3/2), wet, very loose, fine to medium grained, well graded, trace coarse gravel, with some mica
35		12 16 19	5.0			Becomes dark brown (10YR 3/3)

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:18 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-4.GPJ

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Northing: 1871304.73
Easting: 6478161.54
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Notes: Air knifed to approximately 8.0 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
		17 23 22		CL		CLAY with Silt, dark olive brown (2.5Y 3/3), wet, low plasticity, iron oxide staining, 1" clay lense at 36.25', with abundant mica
			5.0	SM		SAND with Silt, dark brown (10YR 3/3), wet, very loose, fine to coarse grained
		17 19 26 29				
			6.2	SW		SAND, grayish brown (10YR 5/2), wet, loose, medium grained (38-39') grading to coarse grained sand with subrounded medium gravel, well graded
40		11 16 19	6.3	SP		SAND, dark yellowish brown (10YR 4/4), wet, loose, fine to medium grained, poorly graded, with abundant mica
		11 16 19	6.5	CL		CLAY with Silt, olive brown (2.5Y 4/3), moist, stiff, low plasticity, with abundant mica
				SP		SAND, dark grayish brown (2.5Y 4/2), wet, very loose, fine grained, with abundant mica
		9 7 17 23	5.0	SW		SAND, dark grayish brown (2.5Y 4/2), wet, very loose, fine to coarse grained, some fine subrounded gravel, well graded, with abundant mica
45		15 20 21	4.6			
		12 18 21	3.8			
		17 19 23 26	3.4			SAND, dark yellowish brown (10YR 4/4), wet, very loose, fine to coarse grained, trace fine gravel, well graded, with trace mica
50		15 19 26	4.0			Coarsening downwards, trace fine subandular gravel
		19 20 24	3.8			
		15 19 29 21				2" sand stringer, gray (2.5Y 5/1) SAND, light yellowish brown (10YR 6/4), wet, fine to coarse grained, trace coarse gravel

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:18 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-4.GPJ

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Notes: Air knifed to approximately 8.0 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			2.4	SW		SAND, dark grayish brown (2.5Y 4/2), wet, very loose, fine to coarse grained, some fine subrounded gravel, well graded, with abundant mica
55		18 19 23				
		19 22 28	3.6			SAND, dark grayish brown (10YR 4/2), wet, very loose, fine to medium grained, coarsening downward, trace fine gravel, with trace mica
		15 19 29 26	1.7			
60		12 9 16				No recovery from 60-63'
		17 17 19				
		11 12 15 19	5.2	SP		SAND, dark grayish brown (10YR 4/2), wet, very loose, fine to medium grained, poorly graded, with trace mica
			4.6			
65		12 14 19	3.4			
		16 19 23		SM		SAND with Silt, very dark grayish brown (10YR 3/2), wet, fine to medium grained, with trace mica
		11 12 16 21	2.8	SP		SAND, dark grayish brown (10YR 4/2), wet, very loose, fine to medium grained, trace fines from 66.5-67', poorly graded, with trace mica
70		14 14 18	3.8	CL		CLAY with Silt, very dark gray (10YR 3/1), wet, medium stiff, medium plasticity, with abundant mica
				SP		SAND, dark grayish brown (10YR 4/2), wet, very loose, fine to medium grained, poorly graded, with trace mica
		11 9 11		CL		CLAY with Silt, dark greenish gray (5G 4/1), wet, medium stiff, medium plasticity, with abundant mica

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:18 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-4.GPJ

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LOG OF BOREHOLE: GC-4

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Northing: 1871304.73
Easting: 6478161.54
TOC/Surface Elevation: NA/413.07
Notes: Air knifed to approximately 8.0 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			4.1			SAND, dark greenish brown (10YR 4/2), wet, very loose, fine to medum grained, with trace fines
		10 12 16 19	3.6	SP		Becomes very dark gray, (10YR 3/1), coarser grained
			5.3			
75		12 14 12		SW		SAND, very dark gray, (10YR 3/1), wet, very loose, fine to coarse grained, with medium gravel, well graded, with trace mica
		13 11 19	2.8			
		10 12 15 18		CL		CLAY with Silt, very dark gray (10YR 3/1), wet, stiff, low plasticity, organic odor, with abundant mica
			5.1	SW		SAND, very dark grayish brown (10YR 4/2), wet, very loose, fine to medium grained, with trace fines
			3.9			
80						Total Depth - 80 feet bgs
85						

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:18 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-4.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF BOREHOLE: GC-5

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 4658 Brunswick Ave., Los Angeles, California
Contractor: Cascade Drilling
Drilling Method: Sonic
Sampling Method: Cal-Mod Split Spoon
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 4/13/2012
Date Completed: 4/19/2012
Total Depth: 130 feet
Borehole Diameter: 6"
Initial Water Level: 44 feet bgs
Northing: 1872296.68
Easting: 6480271.92
TOC/Surface Elevation: NA/447.46
Notes: Air Knifed to approximately 7.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
						Asphalt Surface 4" thick
5				SW		SAND, brown (7.5YR 5/2), dry, loose, fine to coarse grained, subangular, well graded
10			2.5	SM		Silty SAND, dark grayish brown (2.5Y 4/2), dry, loose, fine to medium grained, subangular, trace mica
15			0.8	SP		SAND, dark yellowish brown (10YR 4/6), dry, loose, fine grained, subrounded, poorly graded, trace mica

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-5.GPJ

ERM
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LOG OF BOREHOLE: GC-5

Project Number: 0130384
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Northing: 1872296.68
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TOC/Surface Elevation: NA/447.46
Notes: Air Knifed to approximately 7.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
						SAND, dark yellowish brown (10YR 4/6), dry, loose, fine grained, subrounded, poorly graded, trace mica
20			0.9			
						Rig bouncing, possible cobbles at 22-24' bgs
				SP		
25			1.1			SAND, grayish brown (10YR 5/2), dry, loose, fine grained, subrounded, trace mica
30			1.4			Silty SAND with Clay, light gray (10YR 7/1), dry, loose, fine grained, trace subangular medium gravel, trace angular gravel (possible cobbles)
				SM		
35			1.0	SW		SAND with Gravel, dark yellowish brown (10YR 4/4), dry, loose, fine to coarse grained sand, fine to medium grained gravel, subrounded to subangular, some mica, trace silt, trace angular grains (possible cobbles at 34-40' bgs)

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-5.GPJ

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Notes: Air Knifed to approximately 7.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
				SW		SAND with Gravel, dark yellowish brown (10YR 4/4), dry, loose, fine to coarse grained sand, fine to medium grained gravel, subrounded to subangular, some mica, trace silt, trace angular grains (possible cobbles at 34-40' bgs)
40			0.5			
				SW		SAND, dark grayish brown (10YR 4/2), dry, loose, fine grained, little coarse grained, trace subangular gravel, trace angular gravel (possible cobbles)
			0.5	SC		Clayey SAND, dark yellowish brown (10YR 3/4), moist, hard, fine to medium grained, some coarse grained, clay nodules, trace fine grained subangular gravel
			0.5			SAND, dark yellowish brown (10YR 4/4), wet, dense, fine to coarse grained, trace fine grained gravel, subrounded to subangular
45		44				
				SW		
50			0.5			Increasing fine grained gravel
				SW		SAND with Gravel, dark brown (10YR 3/3), wet, fine to coarse grained sand, fine to medium grained gravel, subangular, trace silt, caliche at 52-52.2' bgs

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-5.GPJ

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LOG OF BOREHOLE: GC-5

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Notes: Air Knifed to approximately 7.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
				SW		SAND with Gravel, dark brown (10YR 3/3), wet, fine to coarse grained sand, fine to medium grained gravel, subangular, trace silt, caliche at 52-52.2' bgs
55			1.6	SP		SAND, brown (10YR 4/3), wet, medium grained, subangular, trace clay
				CL		CLAY, brown (10YR 5/3), moist, stiff, low plasticity, iron staining, trace sand at 57.5' bgs
				SP		SAND, grayish brown (10YR 5/2), wet, medium grained, trace fine grained gravel, subrounded
				CL		CLAY, brown (10YR 5/3), moist, stiff, low plasticity, iron staining
60				SW		SAND with Gravel, dark yellowish brown (10YR 3/4), wet, loose, fine to coarse grained sand, fine to coarse grained gravel, subrounded to subangular, trace angluar grains (possible cobbles), trace silt
65			1.5			
				SP		SAND, dark yellowish brown (10YR 4/4), wet, loose, medium grained, trace coarse grained sand and fine grained gravel, increasing gravel from 69-69.5' bgs
70			1.7			

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-5.GPJ

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LOG OF BOREHOLE: GC-5

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Easting: 6480271.92
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Notes: Air Knifed to approximately 7.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
						SAND, dark yellowish brown (10YR 4/4), wet, loose, medium grained, trace coarse grained sand and fine grained gravel, increasing gravel from 69-69.5' bgs
75			0.8	SP		SAND, dark yellowish brown (10YR 4/4), wet, loose, medium grained, trace coarse grained sand, trace fine grained gravel, subrounded
						Increasing coarse grained sand and fine subrounded gravel
80			0.5	SW		SAND with Gravel, dark grayish brown (10YR 4/2), wet, loose, medium to coarse grained sand, fine to coarse grained gravel, subrounded
				SW		SAND, dark yellowish brown (10YR 4/4), wet, loose, medium grained, trace coarse grained sand and fine grained gravel, subrounded to subangular
						SAND, dark gray (10YR 4/1), wet, loose, medium grained, some mica
85			0.5	SP		SAND, dark yellowish brown (10YR 4/4), wet, loose, medium grained, trace fine to medium grained gravel, subrounded
						Increasing gravel
						SAND, dark gray (10YR 4/1), wet, loose, medium grained, subangular, some mica

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-5.GPJ

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LOG OF BOREHOLE: GC-5

Project Number: 0130384
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Easting: 6480271.92
TOC/Surface Elevation: NA/447.46
Notes: Air Knifed to approximately 7.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			0.4	SP		SAND, dark gray (10YR 4/1), wet, loose, medium grained, some mica
95			1.9	SW		SAND, dark yellowish brown (10YR 4/4), wet, fine to coarse grained, subangular to subrounded, trace fine grained gravel
100			2.1			Decreasing gravel
105			2.6			SAND, dark yellowish brown (10YR 4/4), wet, fine to coarse grained sand, subangular to subrounded, trace gravel

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-5.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF BOREHOLE: GC-5

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 4658 Brunswick Ave., Los Angeles, California
Contractor: Cascade Drilling
Drilling Method: Sonic
Sampling Method: Cal-Mod Split Spoon
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 4/13/2012
Date Completed: 4/19/2012
Total Depth: 130 feet
Borehole Diameter: 6"
Initial Water Level: 44 feet bgs
Northing: 1872296.68
Easting: 6480271.92
TOC/Surface Elevation: NA/447.46
Notes: Air Knifed to approximately 7.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
				SW		SAND, dark yellowish brown (10YR 4/4), wet, fine to coarse grained, subangular to subrounded, trace fine grained gravel
110			1.9	SW		SAND with Gravel, yellowish red (5YR 4/6), wet, fine to coarse grained sand, subrounded to subangular
115			3.4			
120			3.2			Same as above
125			2.8			Becomes dark yellowish brown (10YR 4/4)

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-5.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF BOREHOLE: GC-5

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 4658 Brunswick Ave., Los Angeles, California
Contractor: Cascade Drilling
Drilling Method: Sonic
Sampling Method: Cal-Mod Split Spoon
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 4/13/2012
Date Completed: 4/19/2012
Total Depth: 130 feet
Borehole Diameter: 6"
Initial Water Level: 44 feet bgs
Northing: 1872296.68
Easting: 6480271.92
TOC/Surface Elevation: NA/447.46
Notes: Air Knifed to approximately 7.5 feet bgs

Depth (ft)	Sample Interval	Blow Count	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			2.9	SW		SAND with Gravel, yellowish red (5YR 4/6), wet, fine to coarse grained sand, subrounded to subangular
130						Total Depth - 130 feet bgs
135						
140						

BOREHOLE-IRV 30 FT BLOW COUNT - - 1/18/13 15:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\GC-5.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

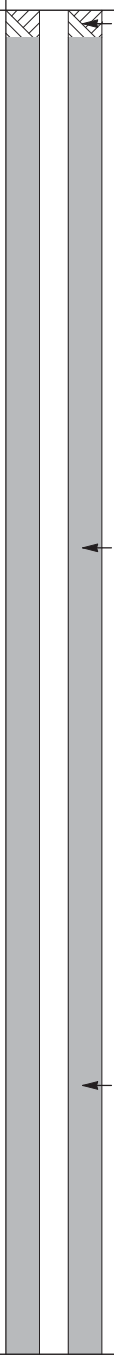
LOG OF MONITORING WELL: PWA-1

Project Number: 0130384
Project Name: Glendale Chormium Operable Unit
Location: Near Victory Blvd. and Chandler Blvd., Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 9/25/2012
Date Completed: 9/27/2012
Total Depth: 160 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1888206.37
Easting: 6464601.81
TOC/Surface Elevation: 576.51/576.87

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Asphalt Surface 4.0" thick
					SAND with Gravel, brownish gray (10YR 5/2), dry, loose, fine to coarse grained sand, fine grained gravel, subangular
5		0.2	SW		
10					SAND, dark grayish brown (10YR 4/2), fine grained, with mica
15			SP		
20					SAND, dark grayish brown (10YR 4/2), fine to coarse grained, with mica
25					
30					
35			SW		SAND, brown, (10YR 4/3), fine to medium grained, subangular, with little mica
40					SAND, brown (10YR 4/3), fine to coarse grained, subangular, with come mica
45					SAND, brown (10YR 4/3), fine grained, with mica, trace medium grained sand

WELL DIAGRAM



MW TO 50FT IRVINE - - 5/30/13 15:44 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-1.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-1

Project Number: 0130384
Project Name: Glendale Chormium Operable Unit
Location: Near Victory Blvd. and Chandler Blvd., Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 9/25/2012
Date Completed: 9/27/2012
Total Depth: 160 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1888206.37
Easting: 6464601.81
TOC/Surface Elevation: 576.51/576.87

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations	WELL DIAGRAM
					SAND, dark grayish brown (10YR 4/2), fine to coarse grained, with mica	Cement/Bentonite Grout
55					Same as above (rig bouncing from 55-75' bgs)	
60						
65						
70					SAND, brown (10YR 4/3), fine to medium grained, subrounded, with little mica	
75			SW			
80					SAND, brown (10YR 4/3), fine to medium grained, subrounded, with little mica, trace coarse grained sand	
85						4.0" Dia. Sch. 40 PVC Blank Well Casing
90						
95						

MW TO 50FT IRVINE - - 5/30/13 15:44 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-1.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-1

Project Number: 0130384
Project Name: Glendale Chormium Operable Unit
Location: Near Victory Blvd. and Chandler Blvd., Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
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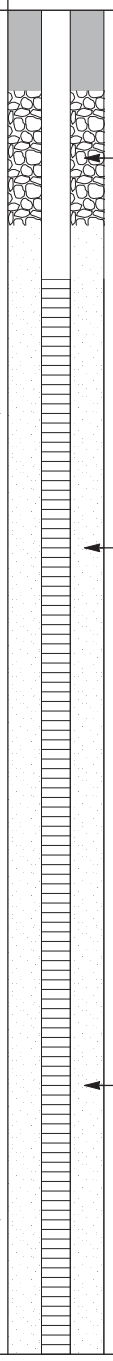
Date Started: 9/25/2012
Date Completed: 9/27/2012
Total Depth: 160 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1888206.37
Easting: 6464601.81
TOC/Surface Elevation: 576.51/576.87

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			SW		SAND, dark grayish brown (10YR 4/2), fine to coarse grained, with mica
105					SAND, brown (10YR 5/3), fine to medium grained, trace coarse grained sand, with trace mica
110					
115			SP		SAND, brown (10YR 5/3), fine grained sand, with mica
120					
125					
130					
135					
140					
145			SW		SAND, brown (10YR 5/3), fine to medium grained, subangular, with little mica

WELL DIAGRAM



MW TO 50FT IRVINE - - 5/30/13 15:44 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-1.GPJ

ERM
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Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-1

Project Number: 0130384
Project Name: Glendale Chormium Operable Unit
Location: Near Victory Blvd. and Chandler Blvd., Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 9/25/2012
Date Completed: 9/27/2012
Total Depth: 160 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1888206.37
Easting: 6464601.81
TOC/Surface Elevation: 576.51/576.87

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations	WELL DIAGRAM
			SW		SAND, brown (10YR 5/3), fine to medium grained, subangular, with little mica	6.0" PVC Bottom Cap
155					SAND, brown (10YR 5/3), fine to medium grained, subangular, with little mica, trace coarse grained sand	#3 Monterey Sand
160					Total Depth - 160 feet bgs	
165						
170						
175						
180						
185						
190						
195						

MW TO 50FT IRVINE - - 5/30/13 15:44 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-1.GPJ

PACIFIC SURVEYS

CALIPER
BOREHOLE VOLUMES

Job No.
16795

File No.

Company	ERM
Well	PWA-1
Field	BURBANK
County	LOS ANGELES
State	CA

Location:

NEAR INTERSECTION OF VICTORY & WEST CHANDLER
GPS: N34o 10.819' W118o 19.256'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG
SONIC/VDL

Permanent Datum	G.L.		Elevation above perm. datum	Elevation
Log Measured From	G.L.	0'		K.B.
Drilling Measured From	G.L.			D.F.
				G.L.

Date	09-25-2012		
Run Number	ONE		
Depth Driller	160'		
Depth Logger	158'		
Bottom Logged Interval	158'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.09 @ 77F		
Rmf @ Meas. Temp	7.09 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	13:50		
Time Logger on Bottom	14:15		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	RIDDER	WATKINS	
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File 16795.db
Dataset Pathname cal.1
Dataset Creation Tue Sep 25 15:53:40 2012

Temperature Calibration Report

Serial Number:	GRPH_SHORT
Tool Model:	GRPH_CAL
Performed:	Mon Sep 24 15:04:51 2012

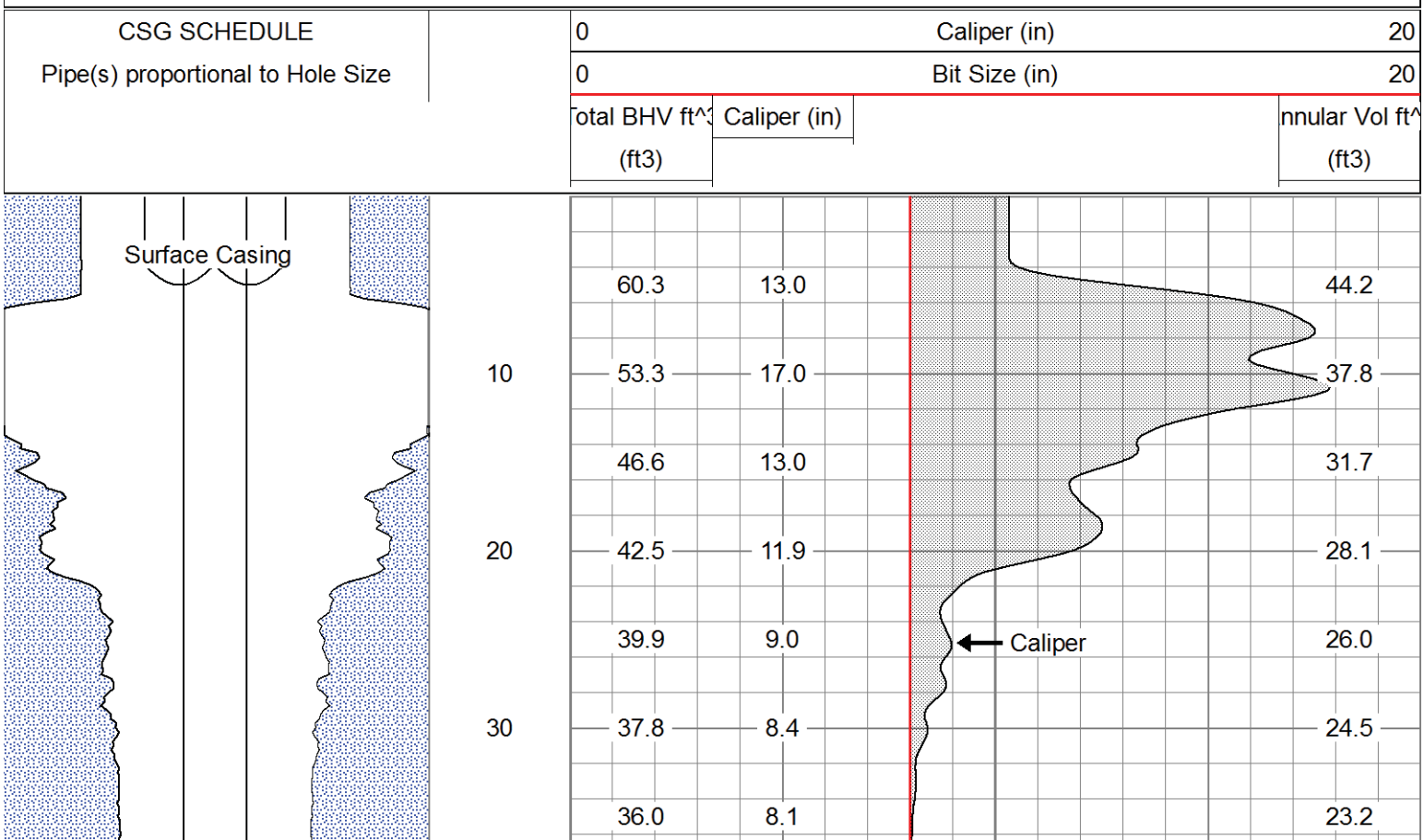
Point #	Reading		Reference	
1	387.23	cps	2.00	degF
2	1015.80	cps	14.00	degF
3		cps		degF
4		cps		degF
5		cps		degF
6		cps		degF
7		cps		degF
8		cps		degF
9		cps		degF
10		cps		degF

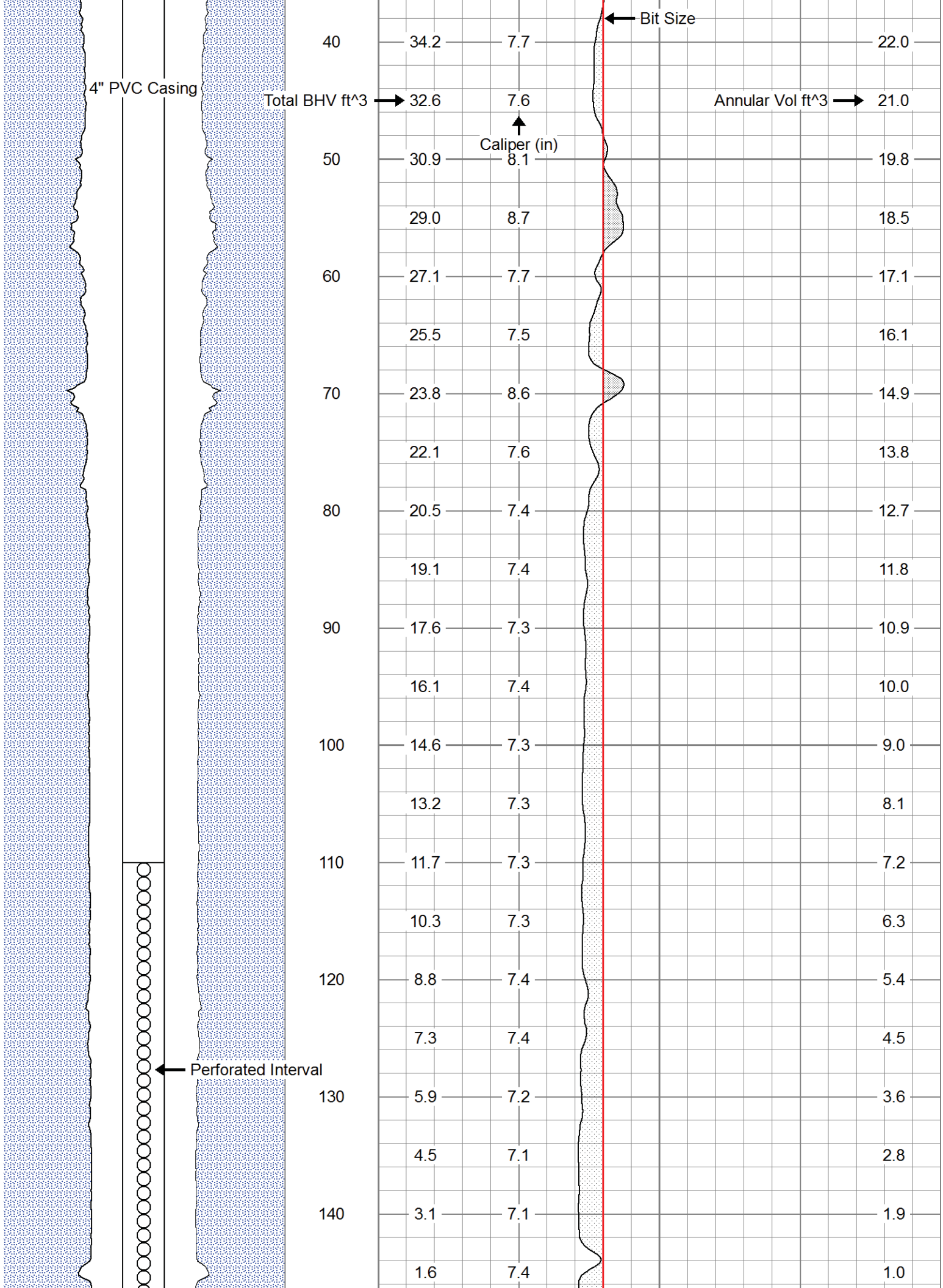
XY Caliper Calibration Report

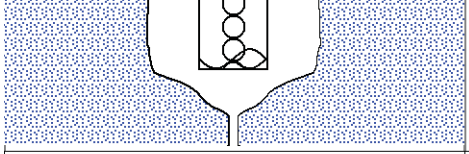
Serial Number/Model:	PS-1_Short-Comprobe
Performed:	Mon Sep 24 15:01:26 2012

	Ring		X Caliper		Y Caliper	
1:	4	in	387.228	cps	387.22	cps
2:	6	in	501.837	cps	501.837	cps
3:	8	in	634.598	cps	634.598	cps
4:	14	in	1015.8	cps	1015.8	cps
5:	20	in	1402.99	cps	1402.99	cps
6:		in		cps		cps

Database File	16795.db
Dataset Pathname	cal.1
Presentation Format	xyc_gph
Dataset Creation	Tue Sep 25 15:53:40 2012
Charted by	Depth in Feet scaled 1:120




Bit Size
4" PVC Casing
Total BHV ft^3
Caliper (in)
Annular Vol ft^3
Perforated Interval
40
50
60
70
80
90
100
110
120
130
140
34.2
32.6
30.9
29.0
27.1
25.5
23.8
22.1
20.5
19.1
17.6
16.1
14.6
13.2
11.7
10.3
8.8
7.3
5.9
4.5
3.1
1.6
7.7
7.6
8.1
8.7
7.7
7.5
8.6
7.6
7.4
7.4
7.3
7.4
7.3
7.3
7.4
7.3
7.4
7.2
7.1
7.1
7.4
22.0
21.0
19.8
18.5
17.1
16.1
14.9
13.8
12.7
11.8
10.9
10.0
9.0
8.1
7.2
6.3
5.4
4.5
3.6
2.8
1.9
1.0



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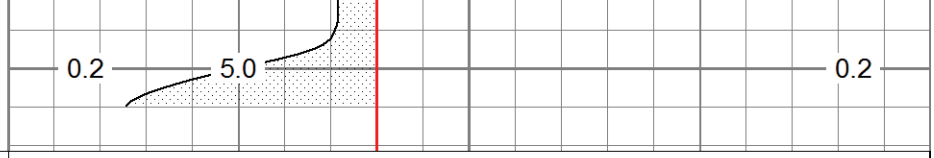

CSG SCHEDULE

Pipe(s) proportional to Hole Size

0	Caliper (in)	20
0	Bit Size (in)	20

Total BHV ft^3 (ft3)	Caliper (in)	Annular Vol ft^ (ft3)

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No.
16795

File No.

Company ERM
Well PWA-1
Field BURBANK
County LOS ANGELES State CA

Location:

NEAR INTERSECTION OF VICTORY & WEST CHANDLER
GPS: N34o 10.819' W118o 19.256'

Sec. Twp. Rge.

Other Services:

GR/LL3
CALIPER
SONIC/VDL

Permanent Datum	G.L.		Elevation above perm. datum	Elevation
Log Measured From	G.L.	0'		K.B.
Drilling Measured From	G.L.			D.F.
				G.L.

Date	09-25-2012		
Run Number	ONE		
Depth Driller	160'		
Depth Logger	158'		
Bottom Logged Interval	158'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.09 @ 77F		
Rmf @ Meas. Temp	7.09 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	13:50		
Time Logger on Bottom	14:15		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	RIDDER	WATKINS	
Witnessed By	A. BEACH		

<<< Fold Here >>>

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Comments

Calibration Report

Database File 16795.db
Dataset Pathname elog
Dataset Creation Tue Sep 25 14:26:21 2012

ELOG Calibration Report

Serial:	D1
Model:	DTQ
Shop Calibration Performed:	Fri Aug 31 10:06:38 2012
Before Survey Verification Performed:	Fri Aug 31 10:09:27 2012
After Survey Verification Performed:	Fri Aug 31 10:11:46 2012

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	9.667	101.482		10.200	102.200	Ohm-m	1.002	0.514
Long	9.618	98.756		10.200	102.200	Ohm-m	1.032	-17.600
IEE	241.820	7561.640	counts	0.265	8.275	A		
VSN	94.920	8607.040	counts	1.810	164.169	V		
VLN	92.720	2183.960	counts	1.769	41.656	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	28.684	101.321		34.937	101.312	Ohm-m	0.914	8.726
Long	153.931	102.826		102.828	102.828	Ohm-m	0.659	35.059
IEE	245.260	7584.340	counts	0.268	8.300	A		
VSN	79.040	8633.620	counts	1.508	164.676	V		
VLN	106.040	2190.460	counts	2.023	41.780	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	28.273	101.325		28.684	101.321	Ohm-m	0.994	0.572
Long	152.477	102.843		102.826	102.826	Ohm-m	1.030	-3.065
IEE	249.140	7584.080	counts	0.273	8.300	A		
VSN	79.140	8633.680	counts	1.509	164.677	V		
VLN	106.700	2190.760	counts	2.035	41.786	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	34.937	28.684	Ohm-m	101.312	101.321	Ohm-m
Long	136.510	153.931	Ohm-m	102.828	102.826	Ohm-m

Gamma Ray Calibration Report

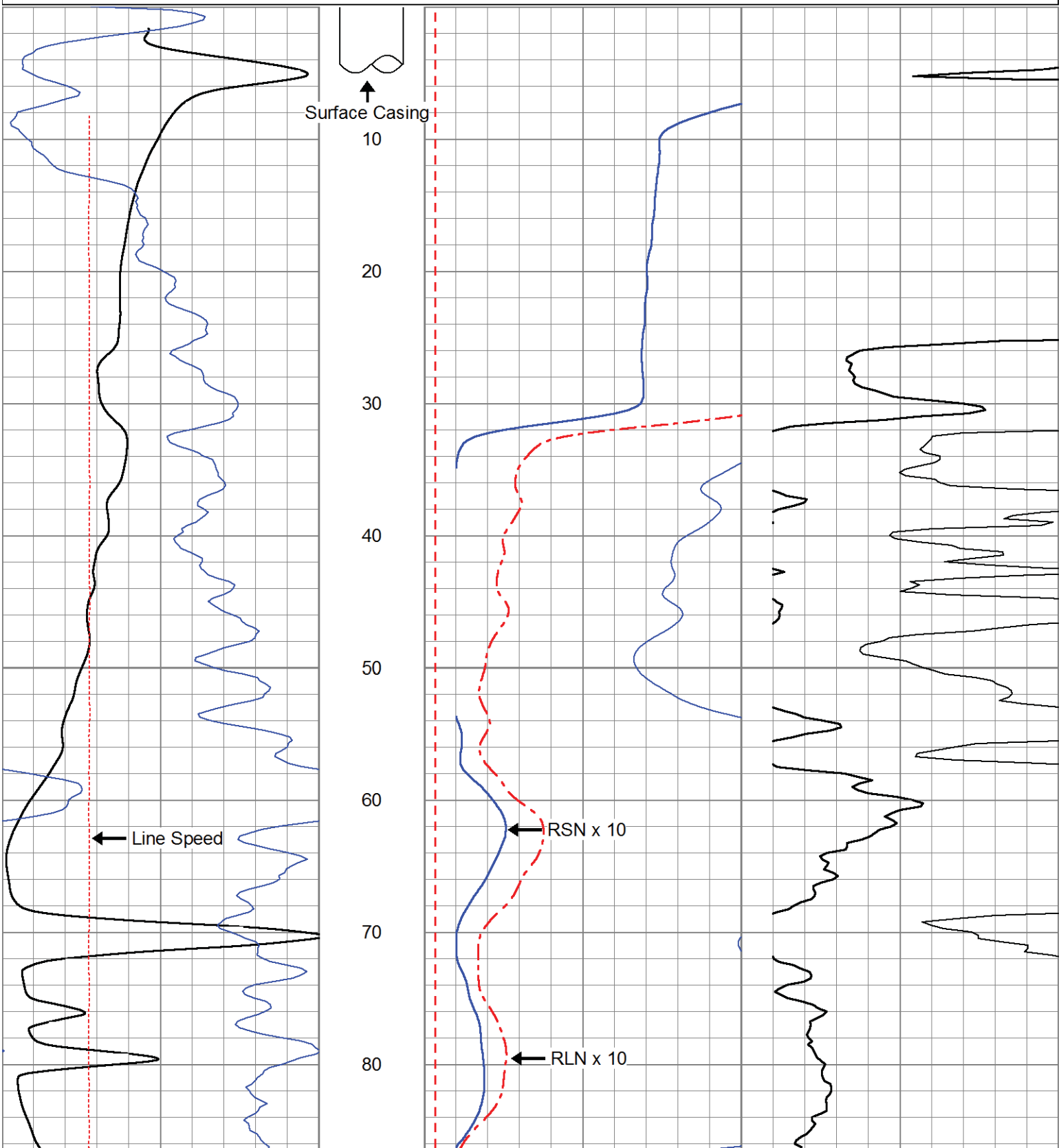
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Sat Apr 09 12:21:07 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	212.4	cps
Calibrator Reading:	707.5	cps
Sensitivity:	0.3272	GAPI/cps

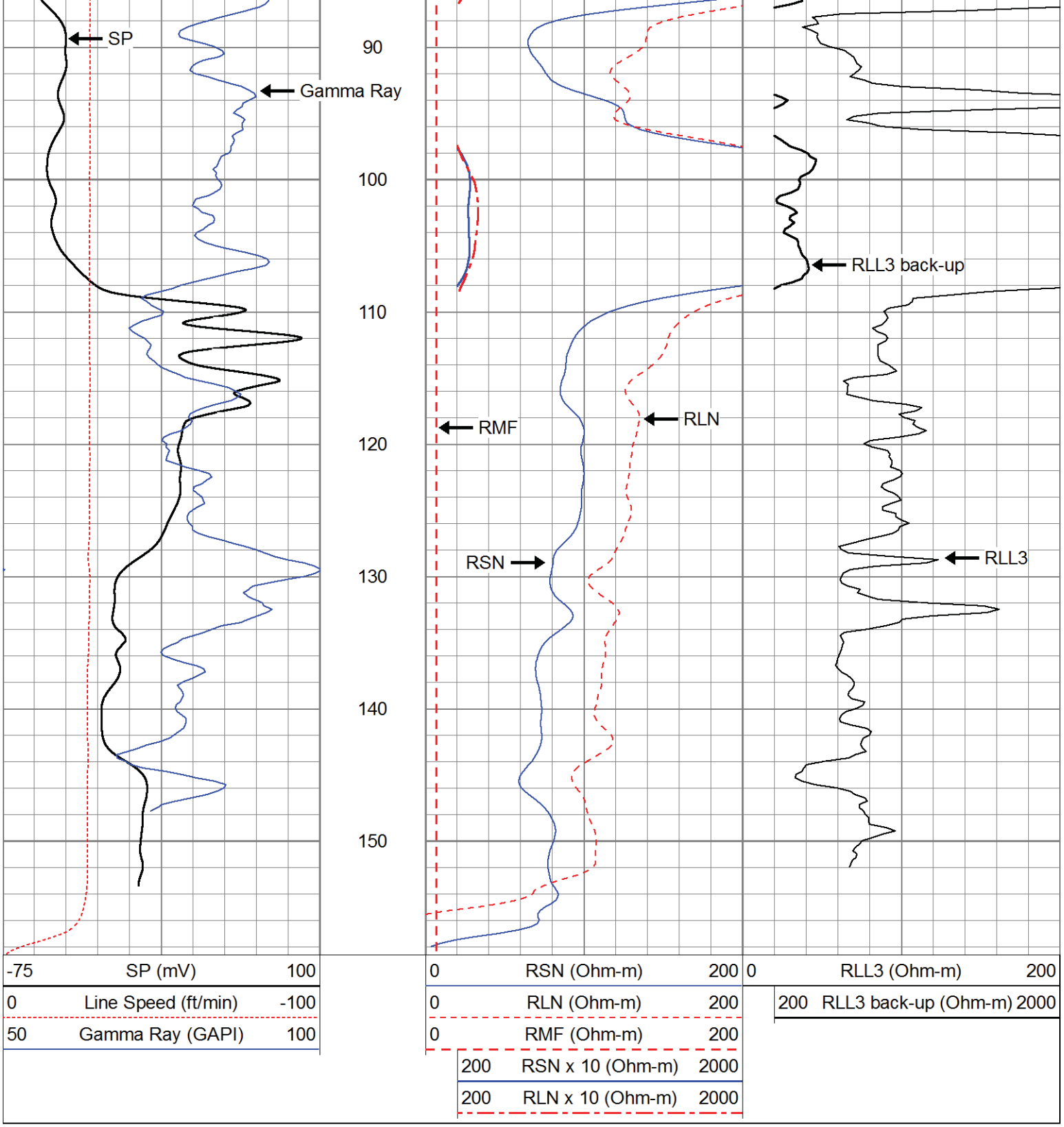
Database File	16795.db
Dataset Pathname	elog
Presentation Format	elog
Dataset Creation	Tue Sep 25 14:26:21 2012
Charted by	Depth in Feet scaled 1:120

-75	SP (mV)	100
0	Line Speed (ft/min)	-100
50	Gamma Ray (GAPI)	100

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 back-up (Ohm-m)	2000




SP
Gamma Ray
90
100
110
120
130
140
150
RLL3 back-up
RMF
RLN
RSN
RLL3
-75 SP (mV) 100
0 Line Speed (ft/min) -100
50 Gamma Ray (GAPI) 100
0 RSN (Ohm-m) 200
0 RLN (Ohm-m) 200
0 RMF (Ohm-m) 200
200 RSN x 10 (Ohm-m) 2000
200 RLN x 10 (Ohm-m) 2000
0 RLL3 (Ohm-m) 200
200 RLL3 back-up (Ohm-m) 2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
16795

File No.

Company	ERM
Well	PWA-1
Field	BURBANK
County	LOS ANGELES
State	CA

Location:

NEAR INTERSECTION OF VICTORY & WEST CHANDLER
GPS: N34o 10.819' W118o 19.256'

Sec. Twp. Rge.

Other Services:

GR/ELOG
CALIPER
SONIC/VDL

Permanent Datum	G.L.		Elevation above perm. datum	Elevation
Log Measured From	G.L.	0'		K.B.
Drilling Measured From	G.L.			D.F.
				G.L.

Date	09-25-2012		
Run Number	ONE		
Depth Driller	160'		
Depth Logger	158'		
Bottom Logged Interval	158'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.09 @ 77F		
Rmf @ Meas. Temp	7.09 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	13:50		
Time Logger on Bottom	14:15		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	RIDDER	WATKINS	
Witnessed By	A. BEACH		

<<< Fold Here >>>

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Comments

Calibration Report

Database File 16795.db
Dataset Pathname ll4
Dataset Creation Tue Sep 25 14:41:51 2012

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Fri Apr 15 07:10:16 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	43.7	
Calibrator Reading:	168.2	
Sensitivity:	1.3020	GAPI/

RLL3 (Resistivity Laterolog 3) Calibration Report:

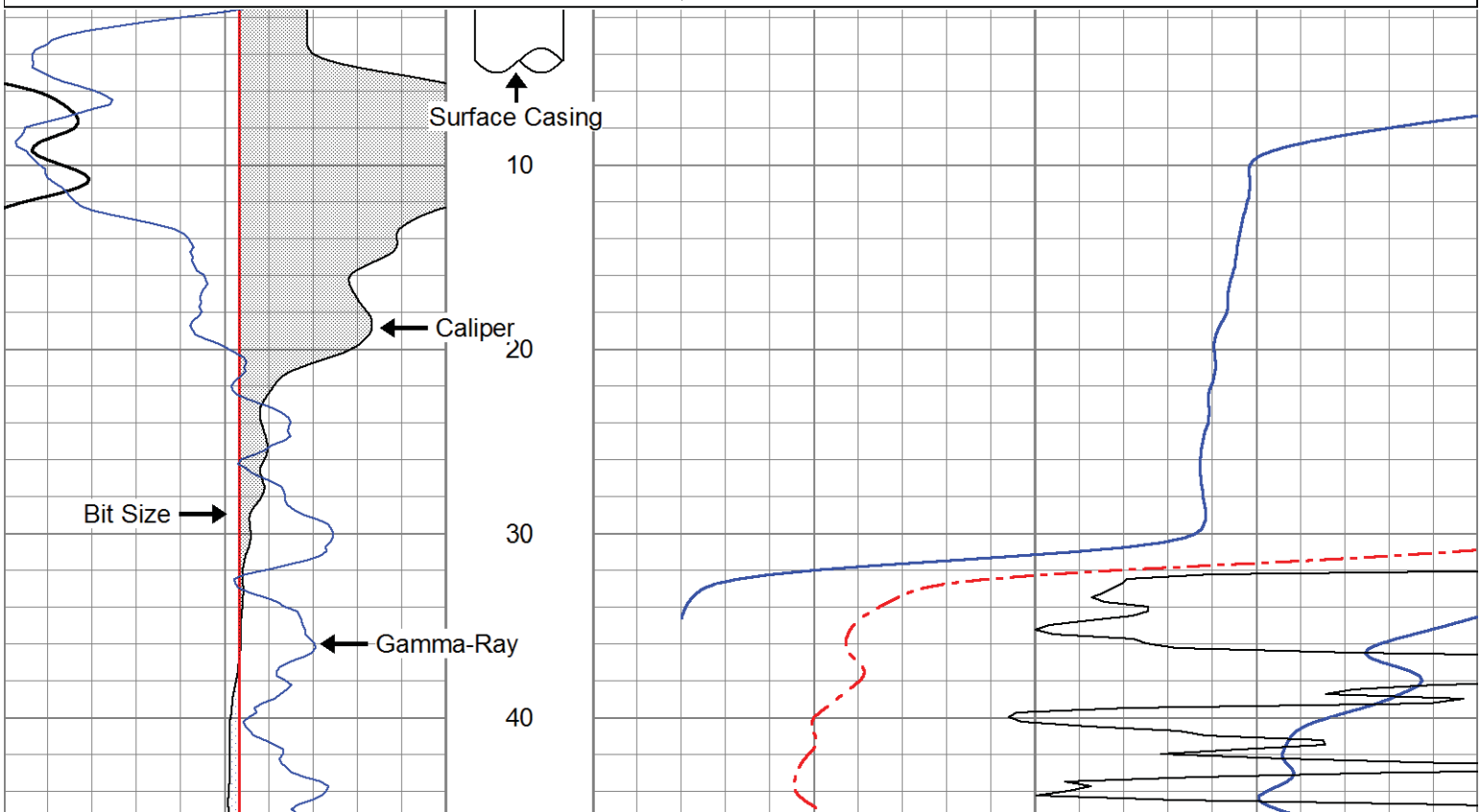
Serial Number:	130
Tool Model:	M&W
Performed:	Fri Aug 31 10:37:34 2012

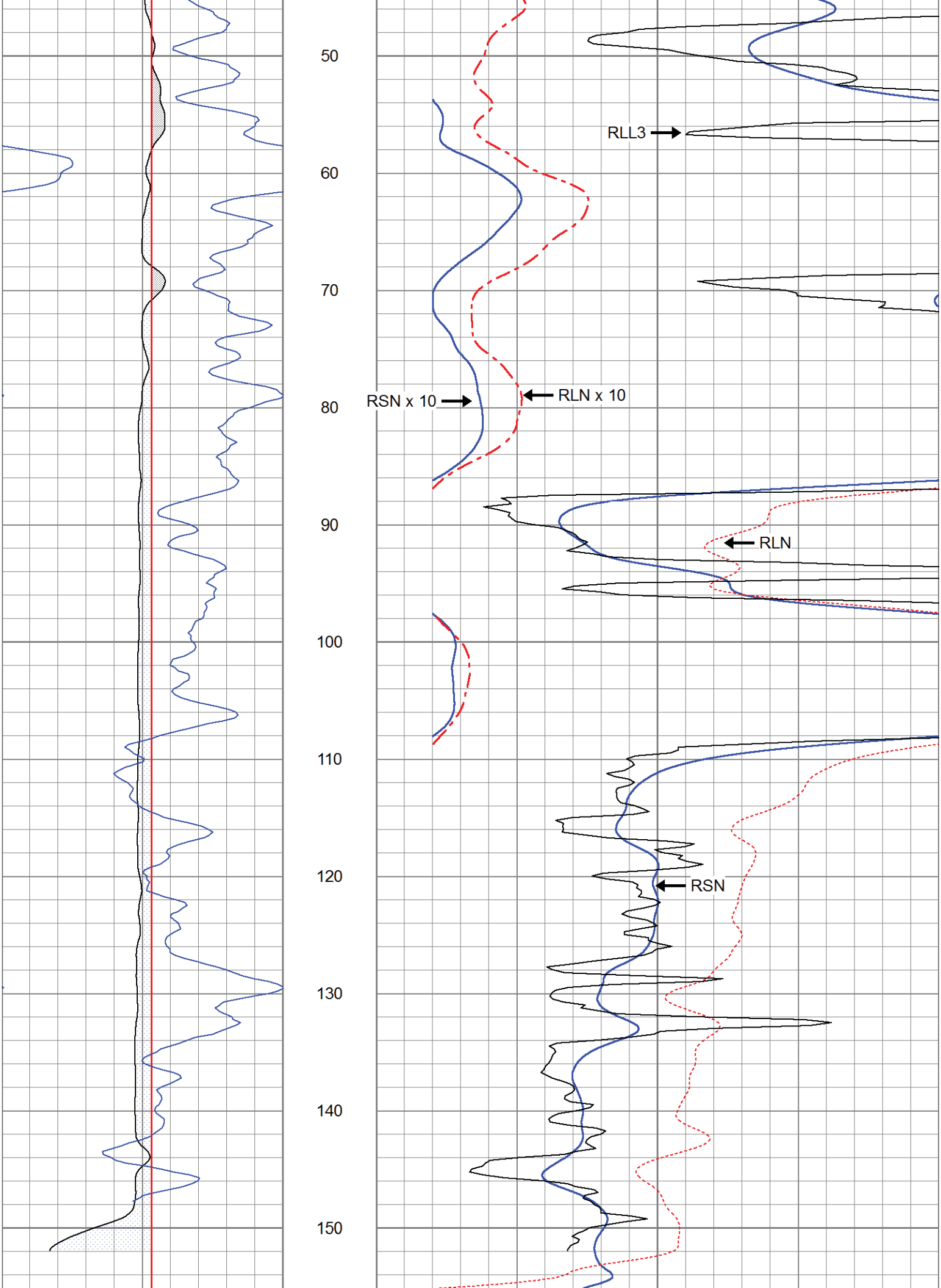
System Reading	Calibration Reference	
0.003	2.500	Ohm-m
0.007	5.000	
0.068	50.000	
0.356	250.000	
0.703	500.000	

Database File	16795.db
Dataset Pathname	ll4
Presentation Format	guard
Dataset Creation	Tue Sep 25 14:41:51 2012
Charted by	Depth in Feet scaled 1:120

0	Caliper (in)	15
0	Bit Size (in)	15
15	Caliper backup (in)	30
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000




50
60
70
80
90
100
110
120
130
140
150
RLL3
RSN x 10
RLN x 10
RLN
RSN

0	Caliper (in)	15
0	Bit Size (in)	15
15	Caliper backup (in)	30
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No. 16795

File No.

Company ERM

Well PWA-1

Field BURBANK

County LOS ANGELES State CA

Location:

NEAR INTERSECTION OF VICTORY & WEST CHANDLER
GPS: N34o 10.819' W118o 19.256'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG
CALIPER

Permanent Datum	G.L.		Elevation above perm. datum	Elevation
Log Measured From	G.L.	0'		K.B.
Drilling Measured From	G.L.			D.F.
				G.L.

Date	09-25-2012		
Run Number	ONE		
Depth Driller	160'		
Depth Logger	158'		
Bottom Logged Interval	158'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.09 @ 77F		
Rmf @ Meas. Temp	7.09 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	13:50		
Time Logger on Bottom	14:15		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	RIDDER	WATKINS	
Witnessed By	A. BEACH		

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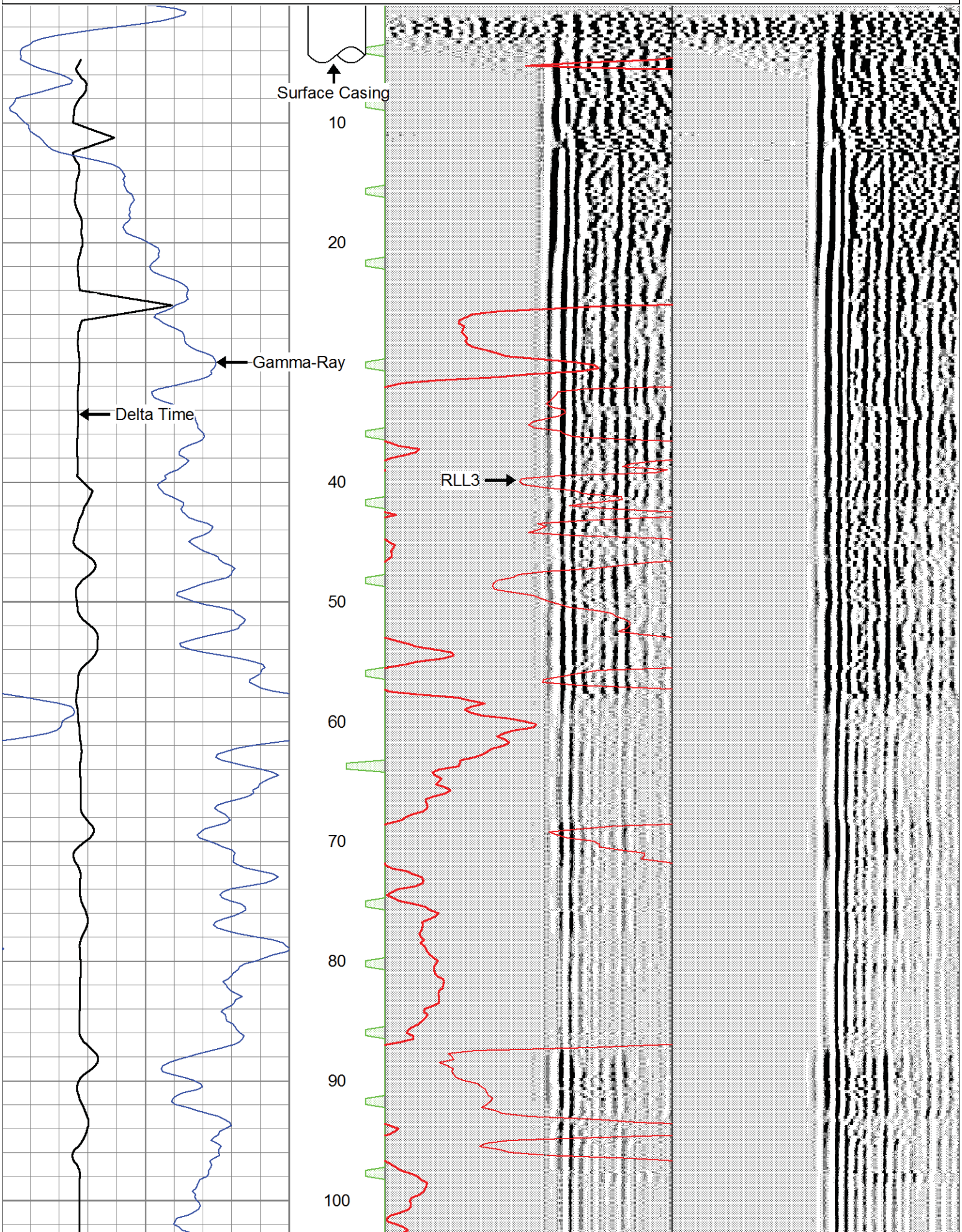
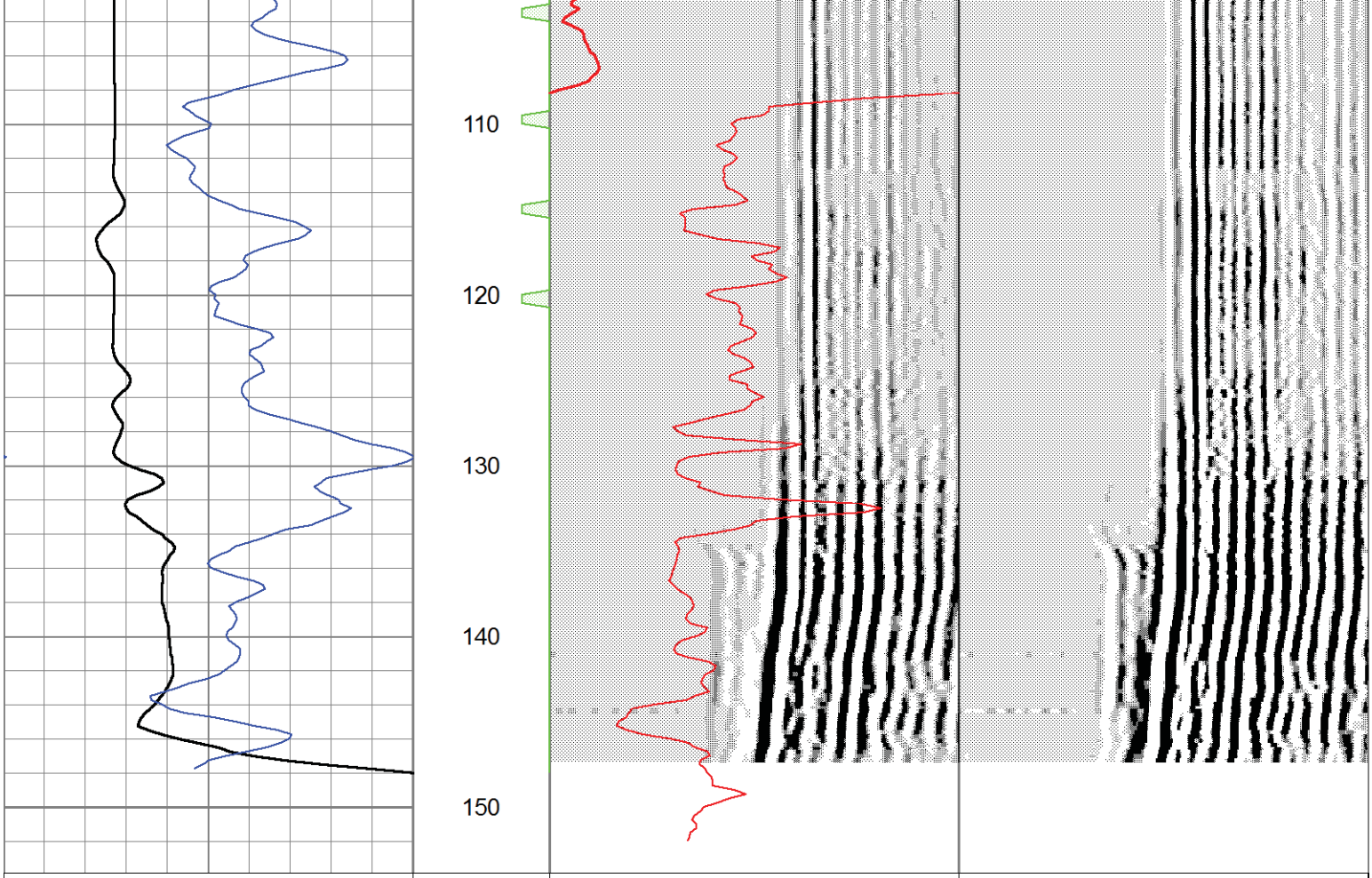
Comments

Database File	16795.db
Dataset Pathname	snc2
Presentation Format	slt
Dataset Creation	Tue Sep 25 15:09:14 2012
Charted by	Depth in Feet scaled 1:120

350	Delta Time (usec/ft)	50	ITT	600	Variable Density 5 ft	1600	600	Variable Density 5 ft	1699
50	Gamma-Ray (GAPI)	100	5 (msec) 0	0	RLL3 (Ohm-m)	200			
				200	RLL3 back-up (Ohm-m)	2000			





350	Delta Time (usec/ft)	50	ITT	600	Variable Density 5 ft	1600	600	Variable Density 5 ft	1699
50	Gamma-Ray (GAPI)	100	5 (msec) 0	0	RLL3 (Ohm-m)	200			
				200	RLL3 back-up (Ohm-m)	2000			

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

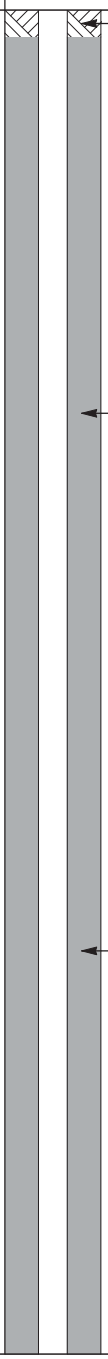
LOG OF MONITORING WELL: PWA-2

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 777 N. Old Front Street, Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 9/13/2012
Date Completed: 9/18/2012
Total Depth: 163 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 8.5 feet bgs
Northing: 1889748.69
Easting: 6465655.96
TOC/Surface Elevation: 592.60/593.03

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Asphalt Surface 4.0" thick
			SM		Silty SAND, very dark grayish brown (10YR 3/2), dry, loose, fine grained, subrounded, trace fine grained gravel
5					
10			SP		SAND, dark brown (10YR 3/3), fine grained, subrounded, with mica
15			SW		SAND with Gravel, dark yellowish brown (10YR 4/4), fine to coarse grained, fine grained gravel, subrounded to angular, with some mica
20			SW		SAND, dark yellowish brown (10YR 4/4), fine to coarse grained, subrounded to angular, with mica, little fine grained gravel
25					Same as above with abundant mica
30					Same as above with mica
35			SP		SAND, brown (10YR 4/3), fine grained, subrounded, with mica
40					
45					Same as above with trace coarse subangular sand

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-2.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-2

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 777 N. Old Front Street, Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
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Initial Water Level: feet bgs
Notes: Air Knifed to approximately 8.5 feet bgs
Northing: 1889748.69
Easting: 6465655.96
TOC/Surface Elevation: 592.60/593.03

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations	WELL DIAGRAM
			SP		SAND, brown (10YR 4/3), fine grained, subrounded, with mica	Cement/Bentonite Grout
55						
60						
65			SW		SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with some mica, little coarse grained sand	
70						
75			SP		SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with mica, little coarse grained sand	
80						
85						4.0" Dia. Sch. 40 PVC Blank Well Casing
90						
95					SAND, brown (10YR 4/3), medium grained, subrounded to subangular, some coarse grained sand	

GCOU MW TO 50FT IRVINE - - 5/30/13 16:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-2.GPJ

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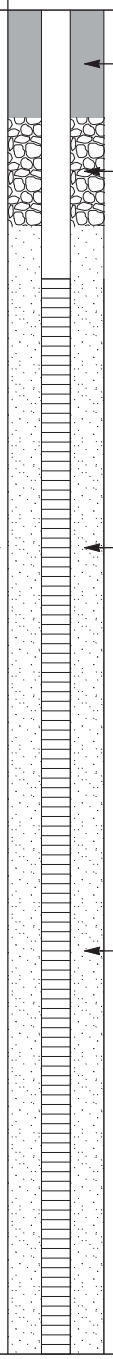
LOG OF MONITORING WELL: PWA-2

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 777 N. Old Front Street, Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 9/13/2012
Date Completed: 9/18/2012
Total Depth: 163 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 8.5 feet bgs
Northing: 1889748.69
Easting: 6465655.96
TOC/Surface Elevation: 592.60/593.03

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			SP		SAND, brown (10YR 4/3), fine grained, subrounded, with abundant mica
105					
110					
115					
120			SW		SAND, brown (10YR 4/3), fine grained, subrounded, little medium to coarse grained sand
125					SAND, brown (10YR 4/3), medium to coarse grained, subrounded to subangular
130					SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, some coarse grained sand
135					SAND, brown (10YR 4/3), fine to medium grained, subrounded
140					
145					SAND, brown (10YR 4/3), fine to coarse grained, subrounded to subangular

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-2.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-2

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 777 N. Old Front Street, Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 9/13/2012
Date Completed: 9/18/2012
Total Depth: 163 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 8.5 feet bgs
Northing: 1889748.69
Easting: 6465655.96
TOC/Surface Elevation: 592.60/593.03

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations	WELL DIAGRAM
					SAND, brown (10YR 4/3), fine grained, subrounded, little medium to coarse grained sand	6.0" PVC Bottom Cap
155			SW		SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, little coarse grained sand	
160						Bentonite Chips
					Total Depth - 163 feet bgs	
165						
170						
175						
180						
185						
190						
195						

GCOU MW TO 50FT IRVINE - - 5/30/13 16:21 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-2.GPJ

PACIFIC SURVEYS

CALIPER
BOREHOLE VOLUMES

Job No.
16771

File No.

Company ERM
Well PWA-2
Field BURBANK
County LOS ANGELES State CA

Location:

OFF FRONT RD. WEST OF I-5, NEAR BURBANK BLVD.
GPS: N 34o 11.064' W 118o 19.022'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG
SONIC/VDL

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	09-14-2012		
Run Number	ONE		
Depth Driller	162'		
Depth Logger	163'		
Bottom Logged Interval	161'		
Top Log Interval	0'		
Casing Driller	9.5" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	3.4 @ 77F		
Rmf @ Meas. Temp	4.4 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	1330		
Time Logger on Bottom	1500		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File: 16771.db
Dataset Pathname: CAL/CAL.1
Dataset Creation: Fri Sep 14 17:50:34 2012 by Calc SOC 111108

Temperature Calibration Report

Serial Number:	GRPH_SHORT		
Tool Model:	GRPH_CAL		
Performed:	Thu Aug 16 13:30:05 2012		
	Reference		Reading
Low Reference:	4.00	degF	634.60 cps
High Reference:	10.00	degF	1402.99cps
Gain:	0.01		
Offset:	-0.96		
Delta Spacing	1		

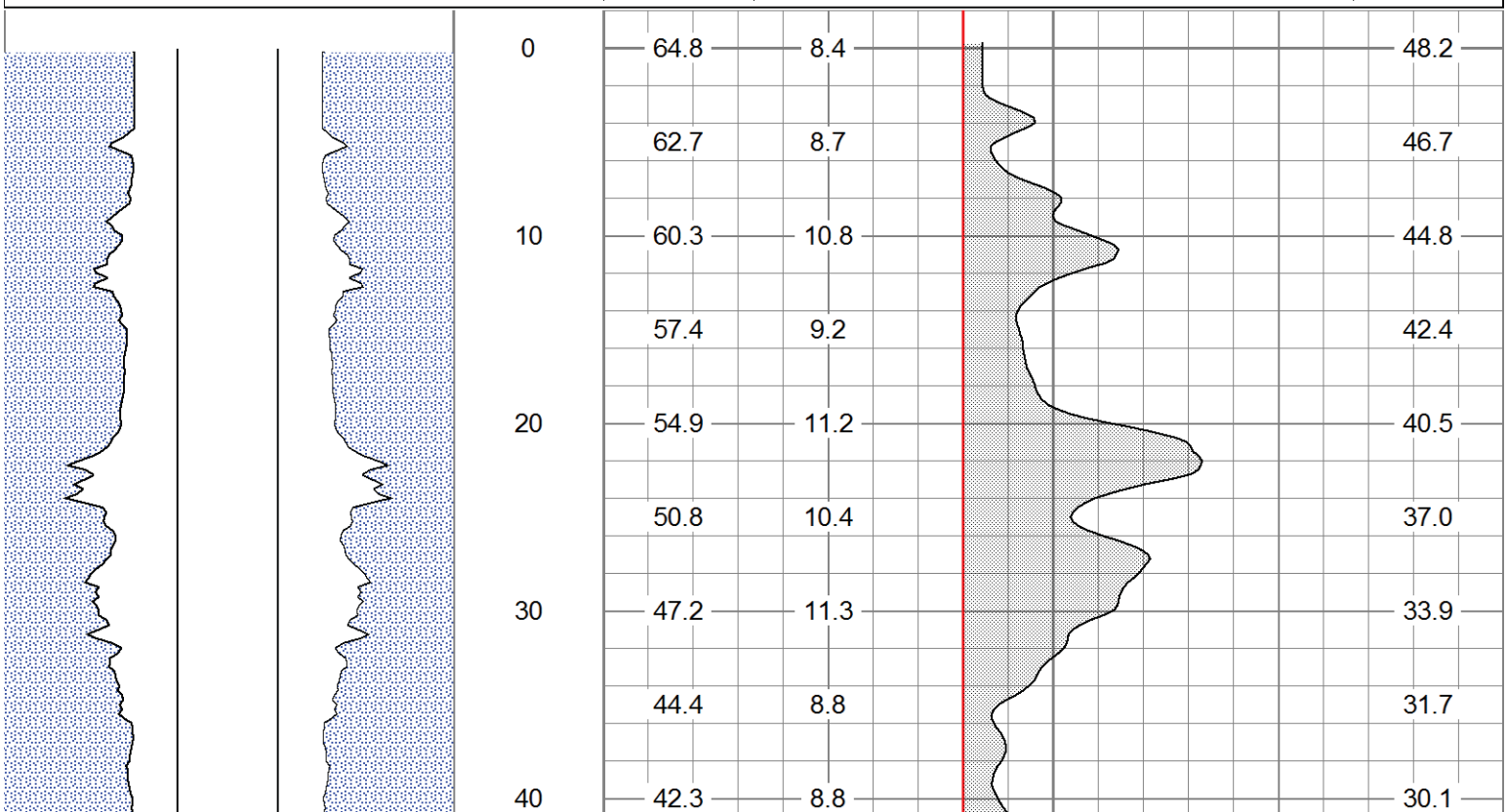
XY Caliper Calibration Report

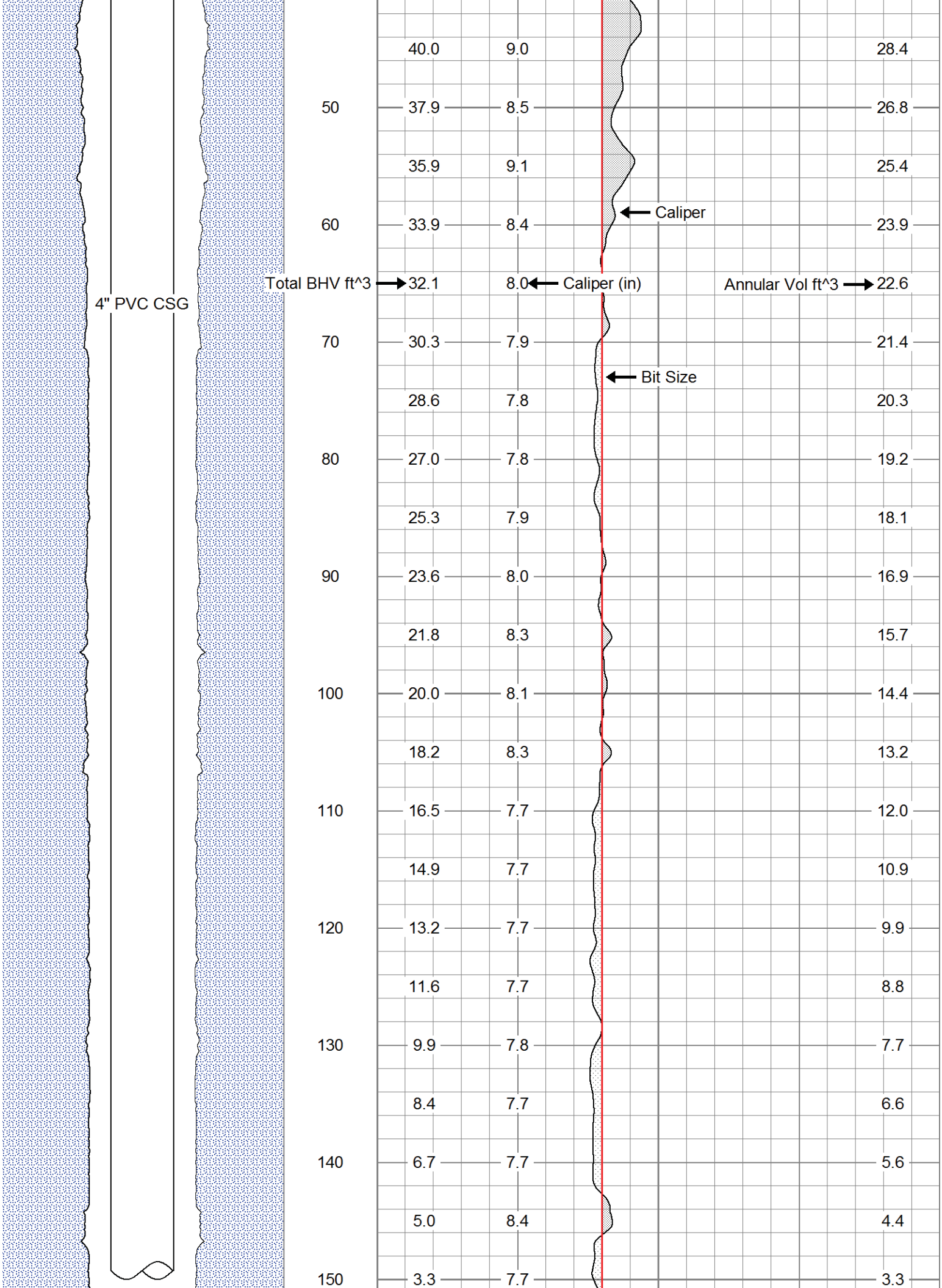
Serial Number/Model: Short-Comprobe
Performed: Thu Aug 16 13:29:09 2012

	Ring		X Caliper		Y Caliper	
1:	4	in	387.228	cps	387.228	cps
2:	6	in	501.837	cps	501.837	cps
3:	8	in	634.598	cps	634.598	cps
4:	14	in	1015.8	cps	1015.8	cps
5:	20	in	1402.99	cps	1402.99	cps
6:		in		cps		cps

Database File:	16771.db
Dataset Pathname:	CAL/CAL.1
Presentation Format:	xyc_gph
Dataset Creation:	Fri Sep 14 17:50:34 2012 by Calc SOC 111108
Charted by:	Depth in Feet scaled 1:120

CSG SCHEDULE
Pipe(s) proportional to Hole Size




4" PVC CSG
Total BHV ft^3
Caliper (in)
Annular Vol ft^3
Caliper
Bit Size
50
60
70
80
90
100
110
120
130
140
150
40.0
37.9
35.9
33.9
32.1
30.3
28.6
27.0
25.3
23.6
21.8
20.0
18.2
16.5
14.9
13.2
11.6
9.9
8.4
6.7
5.0
3.3
9.0
8.5
9.1
8.4
8.0
7.9
7.8
7.8
7.9
8.0
8.3
8.1
8.3
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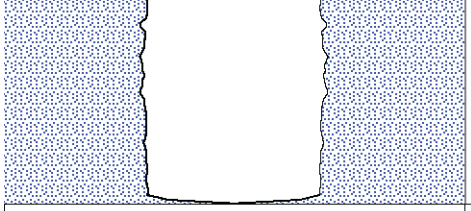
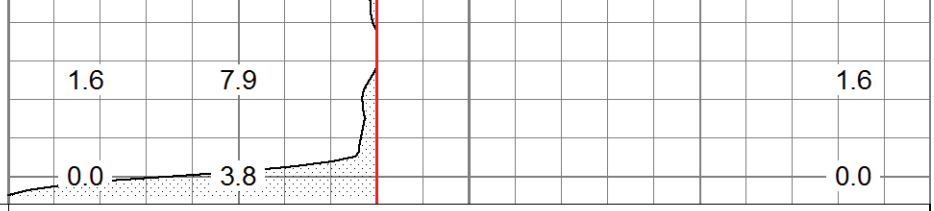
7.7
7.8
7.7
7.7
8.4
7.7
28.4
26.8
25.4
23.9
22.6
21.4
20.3
19.2
18.1
16.9
15.7
14.4
13.2
12.0
10.9
9.9
8.8
7.7
6.6
5.6
4.4
3.3





160

CSG SCHEDULE

Pipe(s) proportional to Hole Size

0	Caliper (in)	20
0	Bit Size (in)	20

Total BHV ft^3 (ft3)	Caliper (in)	Annular Vol ft^ (ft3)

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No.
16771

File No.

Company ERM
Well PWA-2
Field BURBANK
County LOS ANGELES State CA

Location:

OFF FRONT RD. WEST OF I-5, NEAR BURBANK BLVD.
GPS: N 34o 11.064' W 118o 19.022'

Sec. Twp. Rge.

Other Services:

GR/LL3
SONIC/VDL
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	09-14-2012		
Run Number	ONE		
Depth Driller	162'		
Depth Logger	163'		
Bottom Logged Interval	163'		
Top Log Interval	0'		
Casing Driller	9.5" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	3.4 @ 77F		
Rmf @ Meas. Temp	4.4 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	1330		
Time Logger on Bottom	1500		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File: 16771.db
Dataset Pathname: ELOG
Dataset Creation: Fri Sep 14 15:19:56 2012 by Log SOC 111108

ELOG Calibration Report

Serial:	D1
Model:	DTQ
Shop Calibration Performed:	Mon Apr 16 08:59:06 2012
Before Survey Verification Performed:	Mon Apr 16 08:59:12 2012
After Survey Verification Performed:	Mon Apr 16 08:59:23 2012

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	10.541	102.359		10.200	102.200	Ohm-m	1.002	-0.362
Long	12.899	101.908		10.200	102.200	Ohm-m	1.034	-21.000
IEE	220.700	7403.940	counts	0.242	8.103	A		
VSN	109.100	8420.260	counts	2.081	160.606	V		
VLN	71.300	2136.020	counts	1.360	40.742	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	23.831	101.318		43.999	101.225	Ohm-m	0.739	26.400
Long	114.753	102.199		102.713	102.713	Ohm-m	0.980	2.529
IEE	218.420	7514.180	counts	0.239	8.224	A		
VSN	58.480	8553.520	counts	1.115	163.148	V		
VLN	70.400	2156.980	counts	1.343	41.142	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	0.000	99.861		0.000	99.853	Ohm-m	1.000	0.000
Long	0.000	102.069		102.055	102.055	Ohm-m	1.000	0.000
IEE	129.370	6528.851	counts	0.142	7.145	A		
VSN	142.833	7325.000	counts	2.724	139.715	V		
VLN	114.778	1871.738	counts	2.189	35.701	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	43.999	0.000	Ohm-m	101.225	99.853	Ohm-m
Long	115.019	0.000	Ohm-m	102.713	102.055	Ohm-m

Gamma Ray Calibration Report

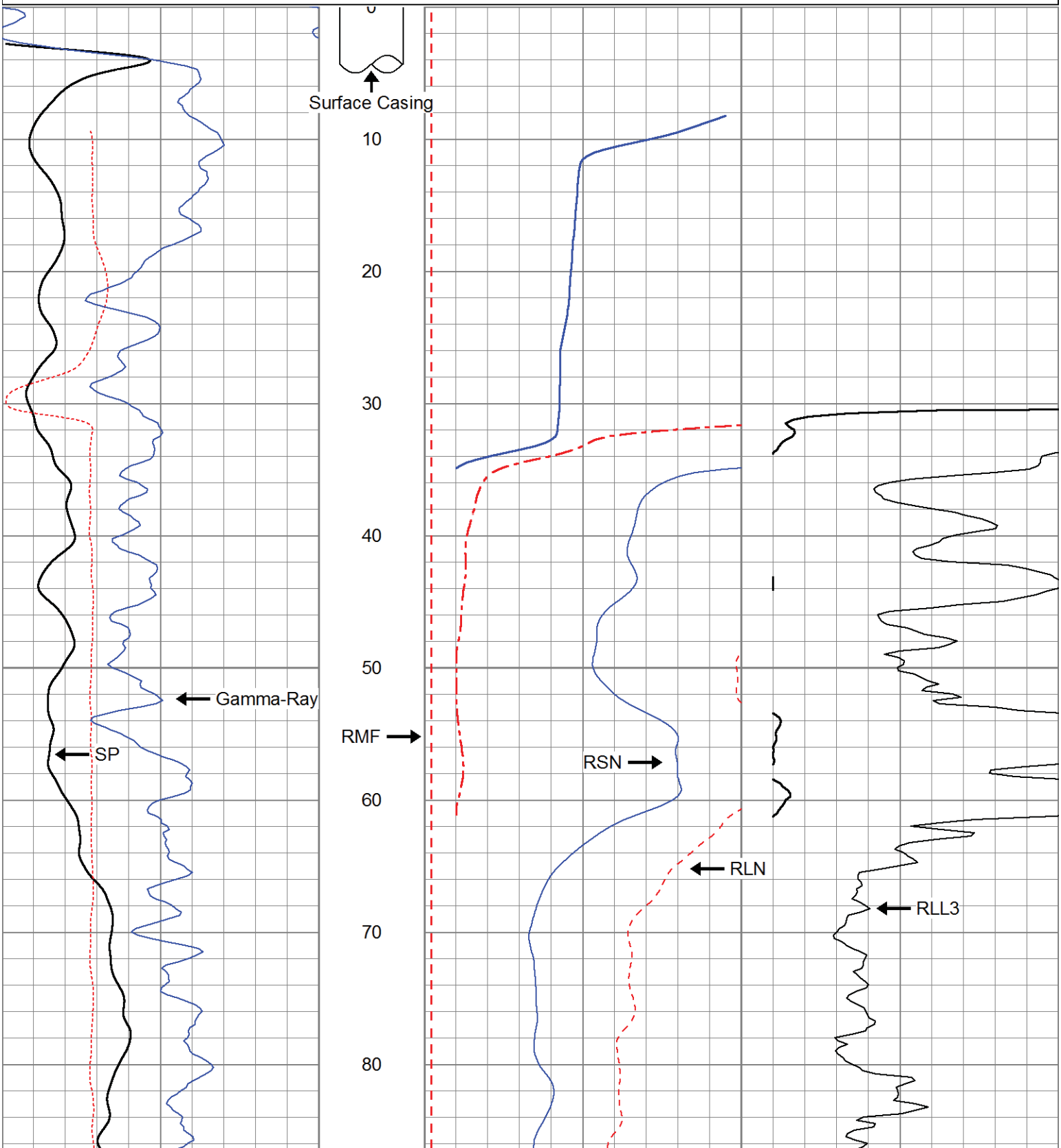
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Mon Apr 16 08:59:33 2012	
Calibrator Value:	162.0	GAPI
Background Reading:	198.3	cps
Calibrator Reading:	742.0	cps
Sensitivity:	0.2980	GAPI/cps

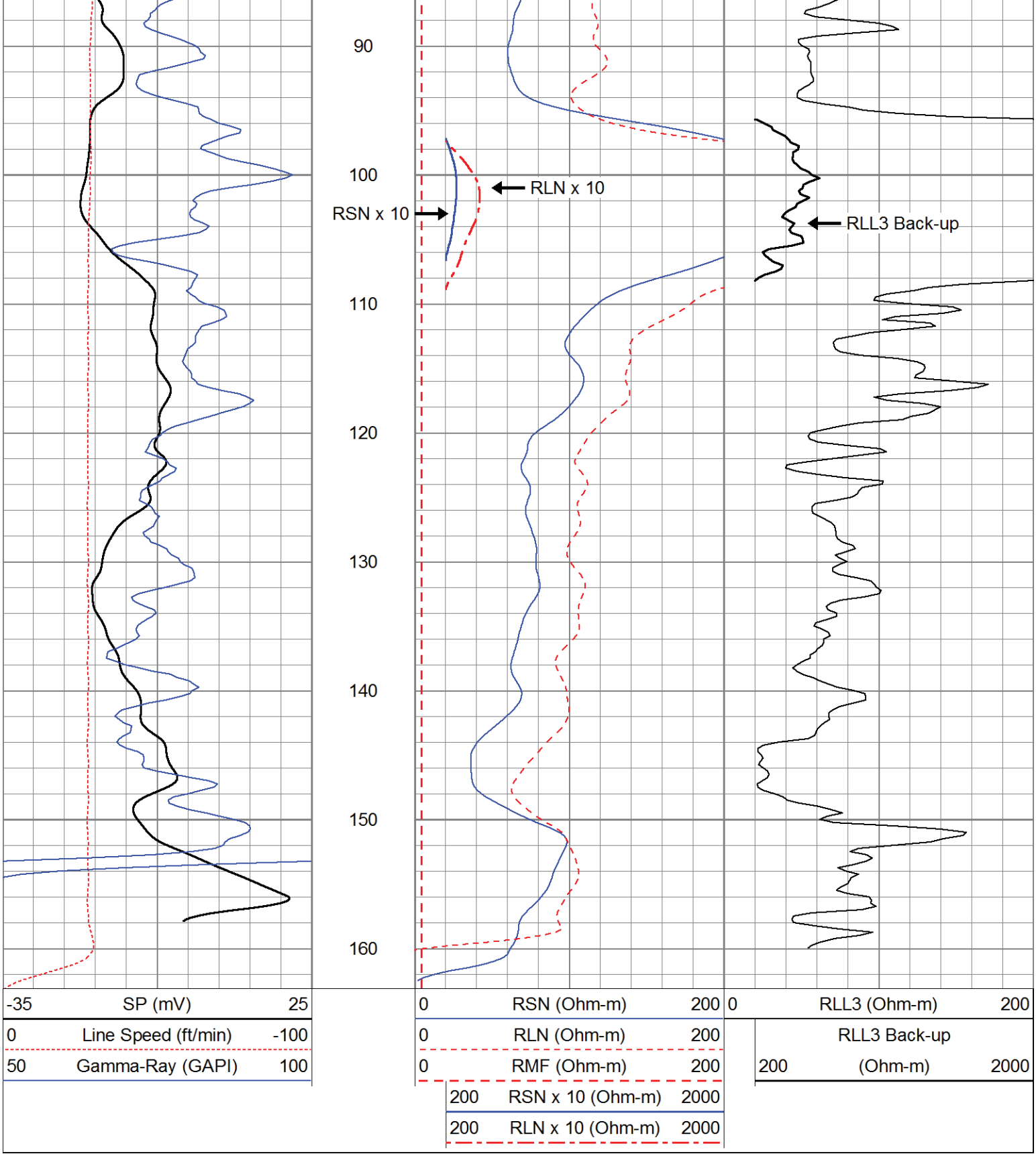
Database File:	16771.db
Dataset Pathname:	ELOG
Presentation Format:	elog
Dataset Creation:	Fri Sep 14 15:19:56 2012 by Log SOC 111108
Charted by:	Depth in Feet scaled 1:120

-35	SP (mV)	25
0	Line Speed (ft/min)	-100
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 Back-up (Ohm-m)	2000




90
100
110
120
130
140
150
160
RLN x 10
RSN x 10
RLL3 Back-up
-35 SP (mV) 25
0 Line Speed (ft/min) -100
50 Gamma-Ray (GAPI) 100
0 RSN (Ohm-m) 200
0 RLN (Ohm-m) 200
0 RMF (Ohm-m) 200
200 RSN x 10 (Ohm-m) 2000
200 RLN x 10 (Ohm-m) 2000
0 RLL3 (Ohm-m) 200
RLL3 Back-up
200 (Ohm-m) 2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
16771

File No.

Company	ERM
Well	PWA-2
Field	BURBANK
County	LOS ANGELES
State	CA

Location:

OFF FRONT RD. WEST OF I-5, NEAR BURBANK BLVD.
GPS: N 34o 11.064' W 118o 19.022'

Sec. Twp. Rge.

Other Services:

GR/ELOG
SONIC/VDL
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	09-14-2012		
Run Number	ONE		
Depth Driller	162'		
Depth Logger	163'		
Bottom Logged Interval	163'		
Top Log Interval	0'		
Casing Driller	9.5" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	3.4 @ 77F		
Rmf @ Meas. Temp	4.4 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	1330		
Time Logger on Bottom	1500		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File: 16771.db
Dataset Pathname: LL3
Dataset Creation: Fri Sep 14 15:38:08 2012 by Log SOC 111108

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Thu Jan 06 11:06:13 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	43.7	
Calibrator Reading:	168.2	
Sensitivity:	1.3020	GAPI/

RLL3 (Resistivity Laterolog 3) Calibration Report:

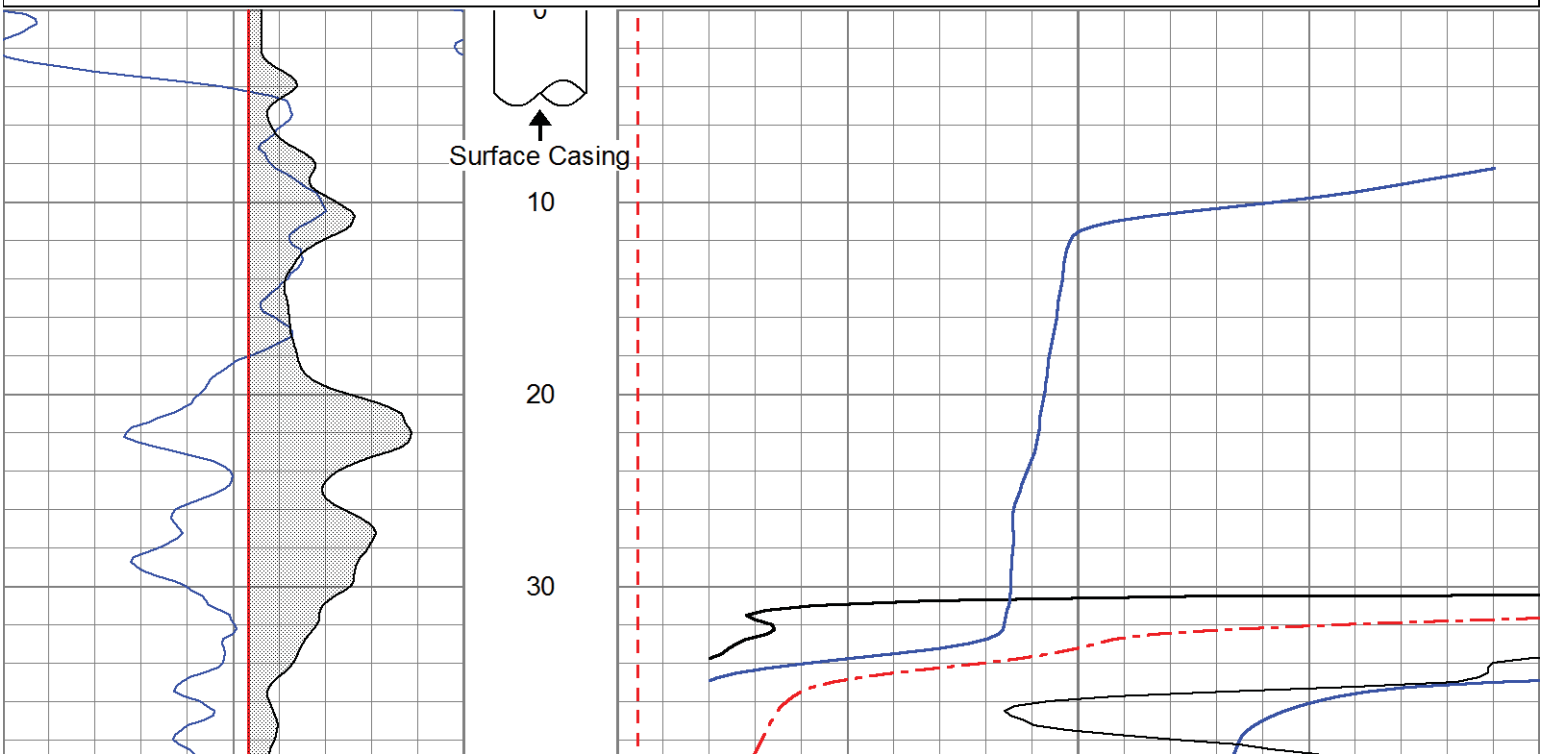
Serial Number:	81
Tool Model:	M&W
Performed:	Wed Jan 05 09:55:20 2011

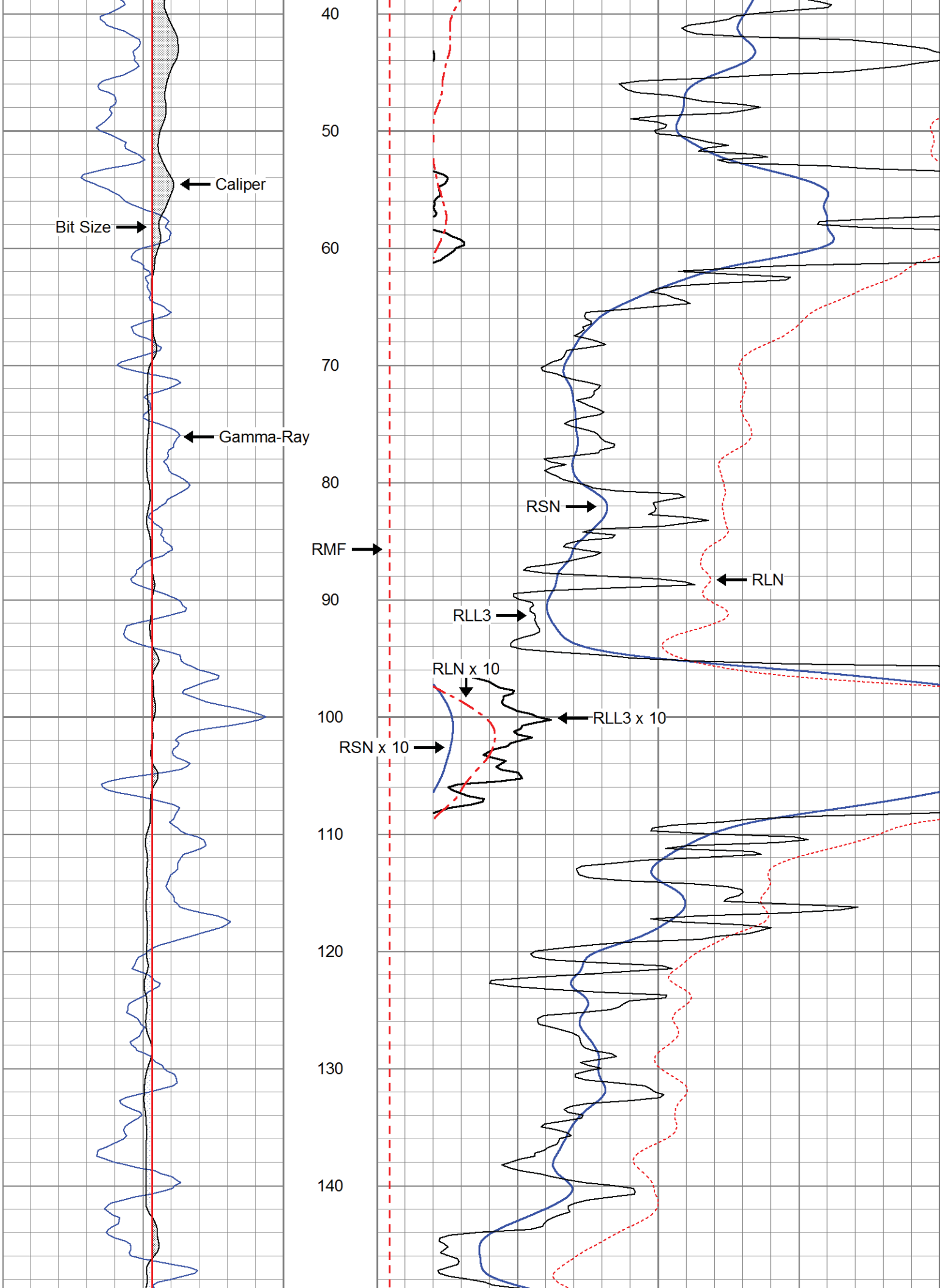
System Reading	Calibration Reference	
0.019	2.500	Ohm-m
0.038	5.000	
0.375	50.000	
1.824	250.000	
3.504	500.000	

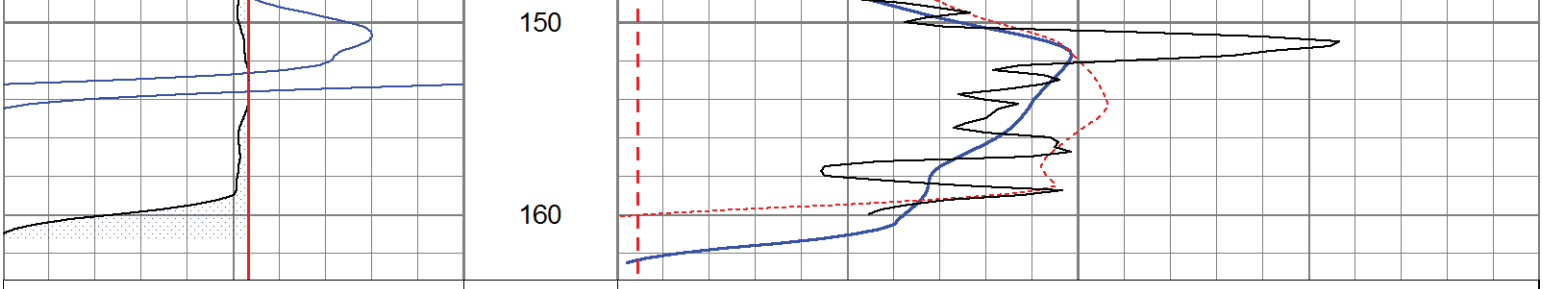
Database File:	16771.db
Dataset Pathname:	LL3
Presentation Format:	guard
Dataset Creation:	Fri Sep 14 15:38:08 2012 by Log SOC 111108
Charted by:	Depth in Feet scaled 1:120

50	Gamma-Ray (GAPI)	100
0	Caliper (in)	15
0	Bit Size (in)	15

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000




40
50
60
70
80
90
100
110
120
130
140
Caliper
Bit Size
Gamma-Ray
RMF
RSN
RLN
RLL3
RLN x 10
RLL3 x 10
RSN x 10



50	Gamma-Ray (GAPI)	100
0	Caliper (in)	15
0	Bit Size (in)	15

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No.
16771

File No.

Company ERM
Well PWA-2
Field BURBANK
County LOS ANGELES State CA

Location:

OFF FRONT RD. WEST OF I-5, NEAR BURBANK BLVD.
GPS: N 34o 11.064' W 118o 19.022'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	09-14-2012		
Run Number	ONE		
Depth Driller	162'		
Depth Logger	163'		
Bottom Logged Interval	163'		
Top Log Interval	0'		
Casing Driller	9.5" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	3.4 @ 77F		
Rmf @ Meas. Temp	4.4 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	1330		
Time Logger on Bottom	1500		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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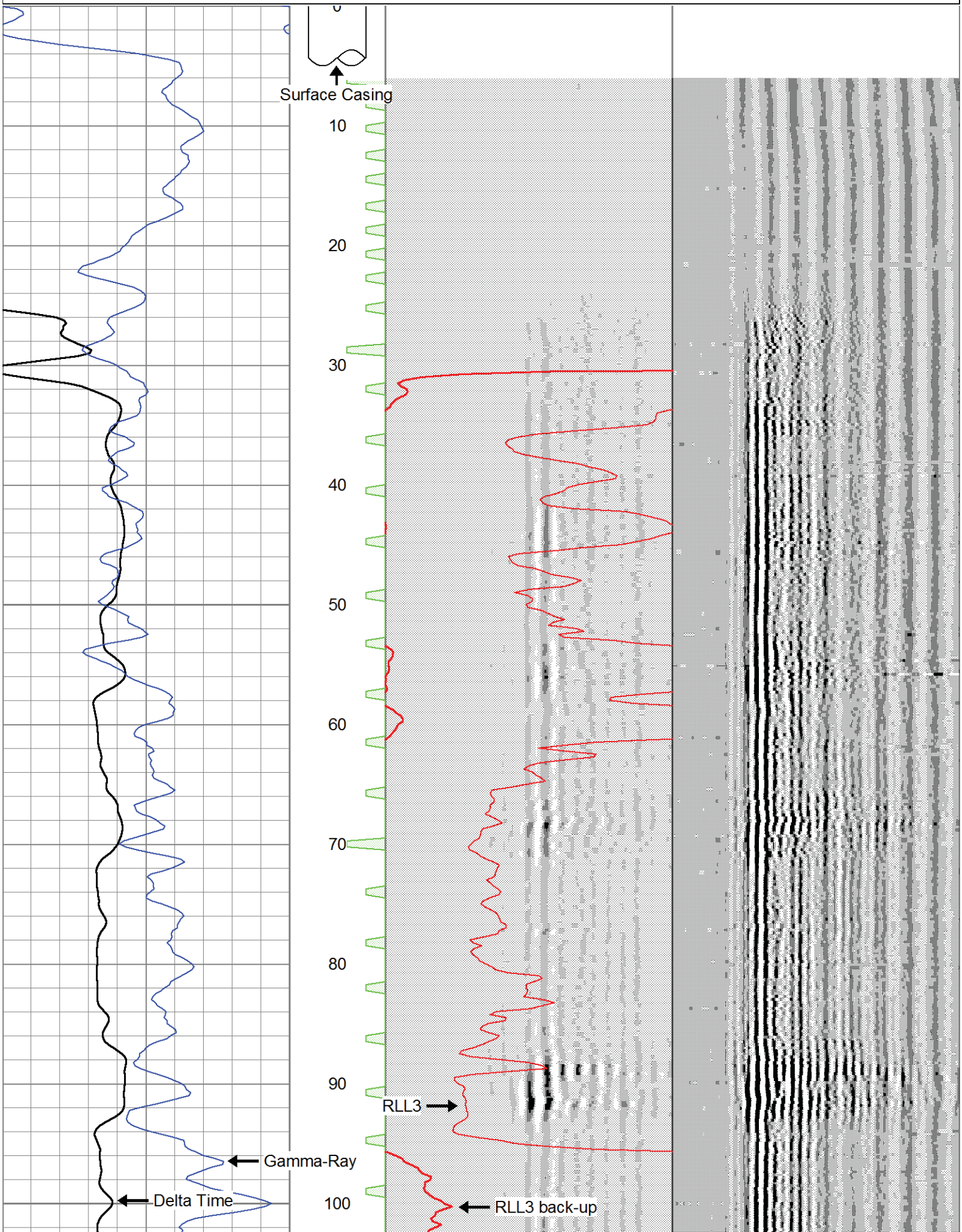
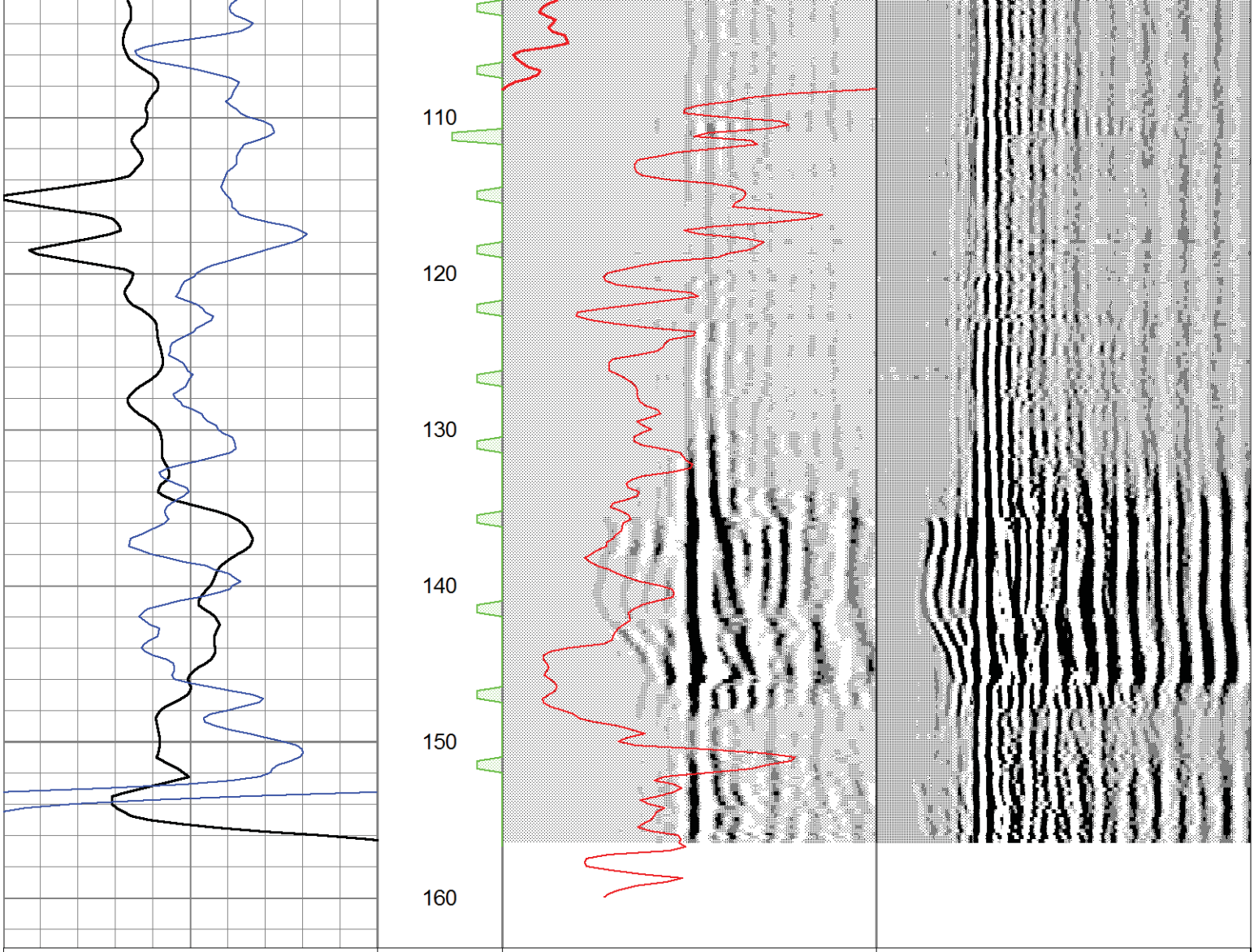
Comments

Database File: 16771.db
Dataset Pathname: SNC2
Presentation Format: slt
Dataset Creation: Fri Sep 14 16:45:49 2012 by Log SOC 111108
Charted by: Depth in Feet scaled 1:120

350	Delta Time (usec/ft)	50	ITT	600	Variable Density 5 ft	1600	600	Variable Density 5 ft	2400
50	Gamma-Ray (GAPI)	100	5 (msec) 0	0	RLL3 (Ohm-m)	200			
				200	RLL3 back-up (Ohm-m)	2000			





350	Delta Time (usec/ft)	50	ITT	600	Variable Density 5 ft	1600	600	Variable Density 5 ft	2400
50	Gamma-Ray (GAPI)	100	5 (msec) 0	0	RLL3 (Ohm-m)	200			
				200	RLL3 back-up (Ohm-m)	2000			

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

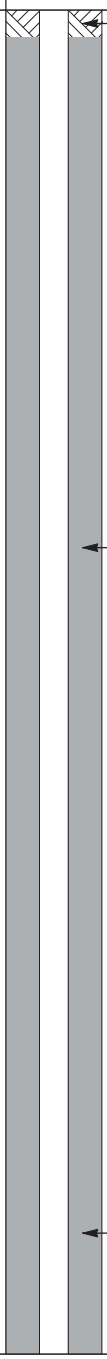
LOG OF MONITORING WELL: PWA-3

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 100 N. Old Front Street, Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 9/19/2012
Date Completed: 9/21/2012
Total Depth: 148 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1888447.79
Easting: 6466527.38
TOC/Surface Elevation: 573.92/574.28

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Asphalt Surface 4.0" thick
			SP		SAND, dark brown (10YR 3/3), dry, loose, fine grained, subrounded, with mica, trace fine grained gravel and fines
5					
10					SAND, dark brown (10YR 3/3), fine to coarse grained, subrounded, with mica
15					
20					SAND, brown (10YR 4/3), fine to coarse grained, subrounded, trace fine grained angular gravel
25			SW		
30					
35					SAND, brown (10YR 4/3), medium to coarse grained, subrounded, some fine grained angular gravel
40					SAND with Gravel, brown (10YR 4/3), medium to coarse grained, subangular, fine grained subrounded gravel
45			SW		

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 15:53 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-3.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-3

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 100 N. Old Front Street, Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
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Date Started: 9/19/2012
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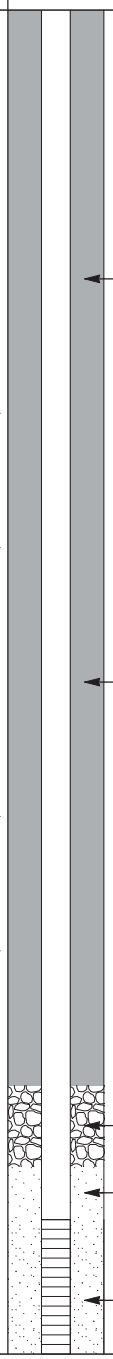
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1888447.79
Easting: 6466527.38
TOC/Surface Elevation: 573.92/574.28

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
55, 60			SW		SAND, brown (10YR 4/3), fine to coarse grained, subrounded
65			SP		SAND, brown (10YR 4/3), fine grained, subrounded, with mica, little medium grained sand
70, 75			SW		SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular
80			SP		SAND, brown (10YR 4/3), fine grained, with mica, trace medium subrounded sand
85, 90, 95			SW		SAND, brown (10YR 4/3), fine to coarse grained, subrounded to subangular

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 15:53 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-3.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

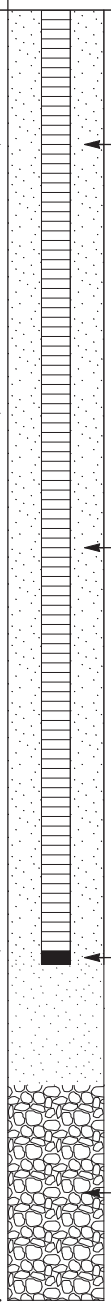
LOG OF MONITORING WELL: PWA-3

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 100 N. Old Front Street, Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 9/19/2012
Date Completed: 9/21/2012
Total Depth: 148 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1888447.79
Easting: 6466527.38
TOC/Surface Elevation: 573.92/574.28

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			SP		SAND, brown (10YR 4/3), fine grained, with mica
105			SW		SAND, brown (10YR 4/3), fine to medium grained, subrounded, with some mica, trace coarse grained sand
110					
115			SP		SAND, brown (10YR 4/3), fine grained, with mica, trace medium to coarse grained sand
120					
125					
130					
135			SW		SAND, brown (10YR 4/3), fine to medium grained, subrounded, with come mica, trace coarse grained sand
140					
145					
					Total Depth - 148 feet bgs

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 15:53 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-3.GPJ

PACIFIC SURVEYS

CALIPER
BOREHOLE VOLUMES

Job No.
16734

File No.

Company	ERM
Well	PWA-3
Field	GLENDALE
County	LOS ANGELES
State	CA

Location:

.EAST OF BURBANK BLVD ON NORTH SIDE OF FRONT ROAD
GPS N34o10.883' W118o18.886'

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
SONIC/VDL

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	09/20/2012		
Run Number	ONE		
Depth Driller	150'		
Depth Logger	150'		
Bottom Logged Interval	150'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.12 @ 77F		
Rmf @ Meas. Temp	6.58 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	11:30 AM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	ABREAU		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File 16734.db
Dataset Pathname run2/CAL.2
Dataset Creation Thu Sep 20 12:58:32 2012

Temperature Calibration Report

Serial Number:	PS-4_Short			
Tool Model:	Short_GPH			
Performed:	Tue Oct 18 12:20:14 2011			
	Reference		Reading	
Low Reference:	4.00	degF	292.42	cps
High Reference:	7.00	degF	898.75	cps
Gain:	0.00			
Offset:	2.55			
Delta Spacing	1			

XY Caliper Calibration Report

Serial Number/Model:	Short-Comprobe
Performed:	Tue Oct 18 12:18:41 2011

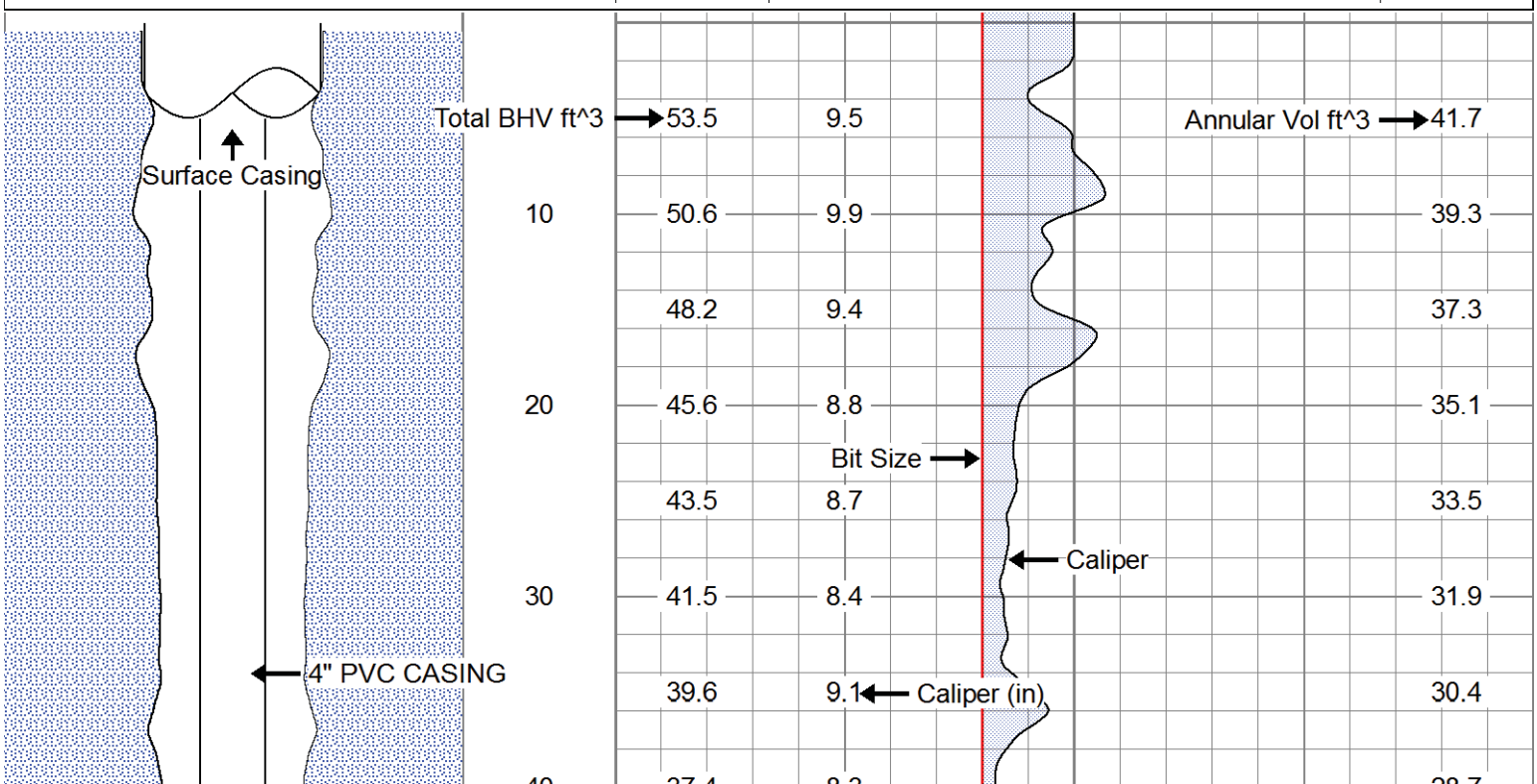
	Ring		X Caliper		Y Caliper	
1:	6	in	80.1582	cps	80.1582	cps
2:	8	in	292.415	cps	292.415	cps
3:	10	in	506.311	cps	506.311	cps
4:	14	in	898.75	cps	898.75	cps
5:	18	in	1299.97	cps	1299.97	cps
6:	22	in	1699.56	cps	1699.56	cps

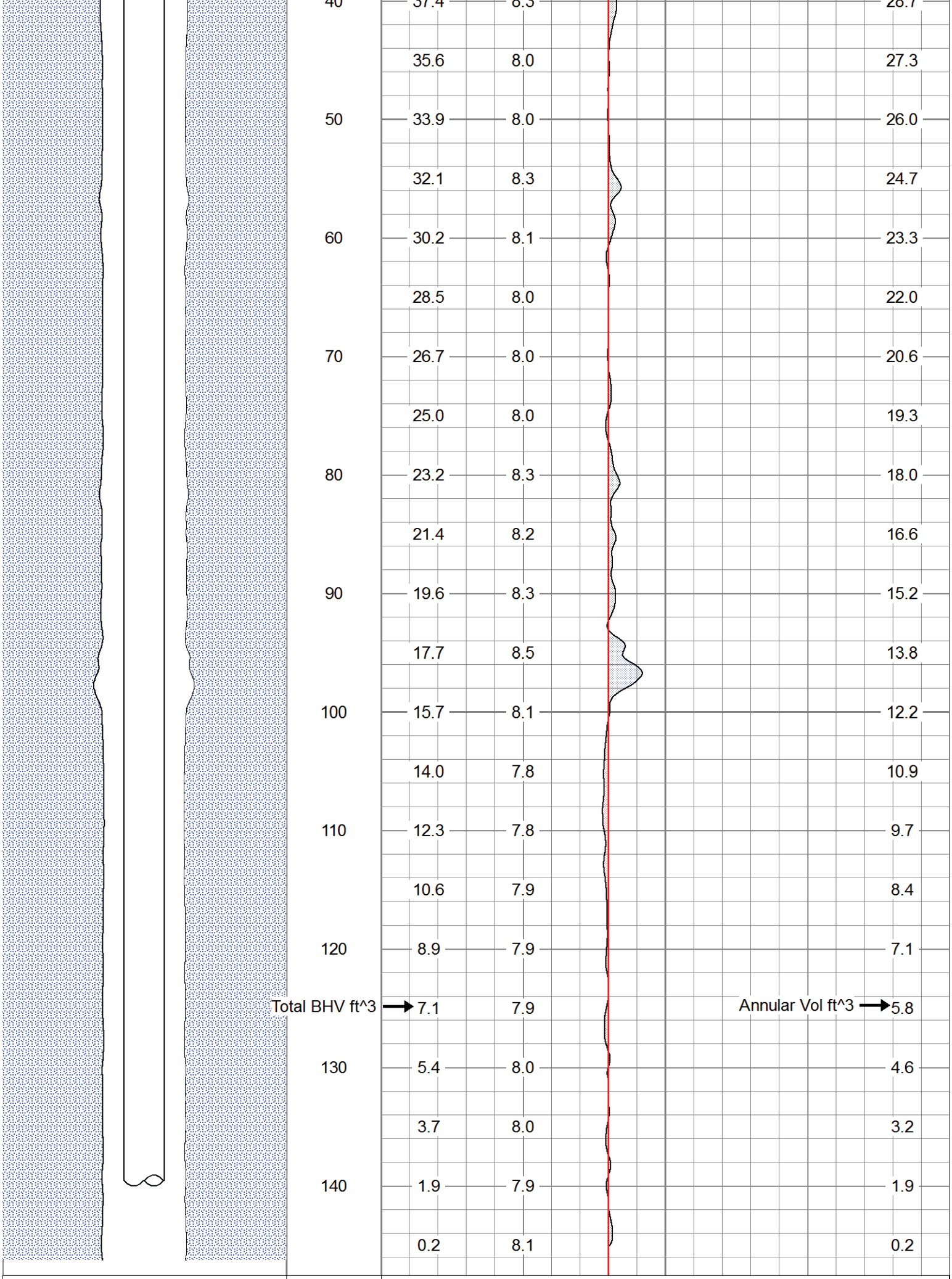
Database File	16734.db
Dataset Pathname	run2/CAL.2
Presentation Format	xyc_gph
Dataset Creation	Thu Sep 20 12:58:32 2012
Charted by	Depth in Feet scaled 1:120

CSG SCHEDULE

Pipe(s) proportional to Hole Size

0	Caliper (in)	20
0	Bit Size (in)	20
20	Caliper back-up (in)	40




40
37.4
8.3
26.7
35.6
8.0
27.3
50
33.9
8.0
26.0
32.1
8.3
24.7
60
30.2
8.1
23.3
28.5
8.0
22.0
70
26.7
8.0
20.6
25.0
8.0
19.3
80
23.2
8.3
18.0
21.4
8.2
16.6
90
19.6
8.3
15.2
17.7
8.5
13.8
100
15.7
8.1
12.2
14.0
7.8
10.9
110
12.3
7.8
9.7
10.6
7.9
8.4
120
8.9
7.9
7.1
Total BHV ft^3
7.1
7.9
Annular Vol ft^3
5.8
130
5.4
8.0
4.6
3.7
8.0
3.2
140
1.9
7.9
1.9
0.2
8.1
0.2
CSG SCHEDULE
0
Caliper (in)
20

Pipe(s) proportional to Hole Size	0	Bit Size (in)		20
	20	Caliper back-up (in)		40
	Total BHV ft^3 (ft3)	Caliper (in)		Annular Vol ft^ (ft3)

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No.
16734

File No.

Company ERM
Well PWA-3
Field GLENDALE
County LOS ANGELES State CA

Location:

. EAST OF BURBANK BLVD ON NORTH SIDE OF FRONT ROAD
GPS N34o10.883' W118o18.886'

Sec. Twp. Rge.

Other Services:

GR/LL3
CALIPER
SONIC/VDL

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	09/20/2012		
Run Number	ONE		
Depth Driller	150'		
Depth Logger	150'		
Bottom Logged Interval	150'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.12 @ 77F		
Rmf @ Meas. Temp	6.58 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	11:30 AM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	ABREAU		
Witnessed By	A. BEACH		

<<< Fold Here >>>

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Comments

Calibration Report

Database File 16734.db
Dataset Pathname elog2
Dataset Creation Thu Sep 20 11:38:38 2012

ELOG Calibration Report

Serial:	D4
Model:	DTQ
Shop Calibration Performed:	Fri Aug 31 13:10:24 2012
Before Survey Verification Performed:	Sun Sep 09 13:17:43 2007
After Survey Verification Performed:	Sun Sep 09 13:17:48 2007

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	10.092	101.745		10.200	102.200	Ohm-m	1.004	0.070
Long	11.371	101.099		10.200	102.200	Ohm-m	1.025	-17.000
IEE	23988.000	23988.000	counts	26.252	26.252	A		
VSN	1724.000	1724.000	counts	32.883	32.883	V		
VLN	6816.000	6816.000	counts	130.007	130.007	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.249	101.201		40.505	101.206	Ohm-m	0.996	0.422
Long	142.638	102.842		102.858	102.858	Ohm-m	1.024	-2.408
IEE	212.960	7070.960	counts	0.233	7.738	A		
VSN	96.300	8039.720	counts	1.837	153.348	V		
VLN	85.320	2042.520	counts	1.627	38.959	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.270	101.200		40.249	101.201	Ohm-m	1.000	-0.035
Long	142.491	102.843		102.842	102.842	Ohm-m	1.004	-0.383
IEE	213.380	7077.580	counts	0.234	7.746	A		
VSN	96.540	8047.160	counts	1.841	153.490	V		
VLN	85.400	2044.440	counts	1.629	38.995	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	40.505	40.249	Ohm-m	101.206	101.201	Ohm-m
Long	143.592	142.638	Ohm-m	102.858	102.842	Ohm-m

Gamma Ray Calibration Report

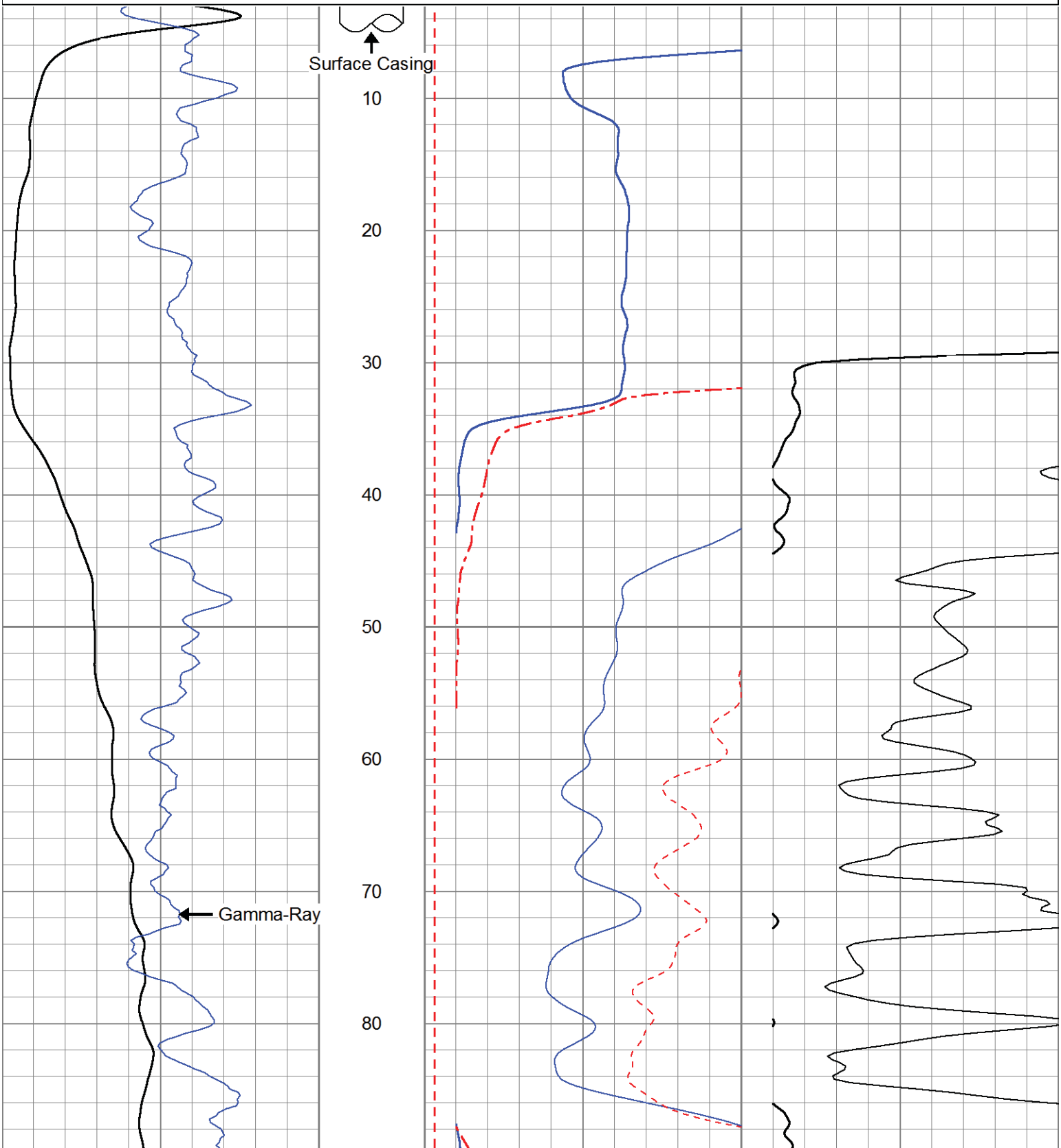
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Thu Jan 20 08:42:38 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	173.2	cps
Calibrator Reading:	678.3	cps
Sensitivity:	0.3207	GAPI/cps

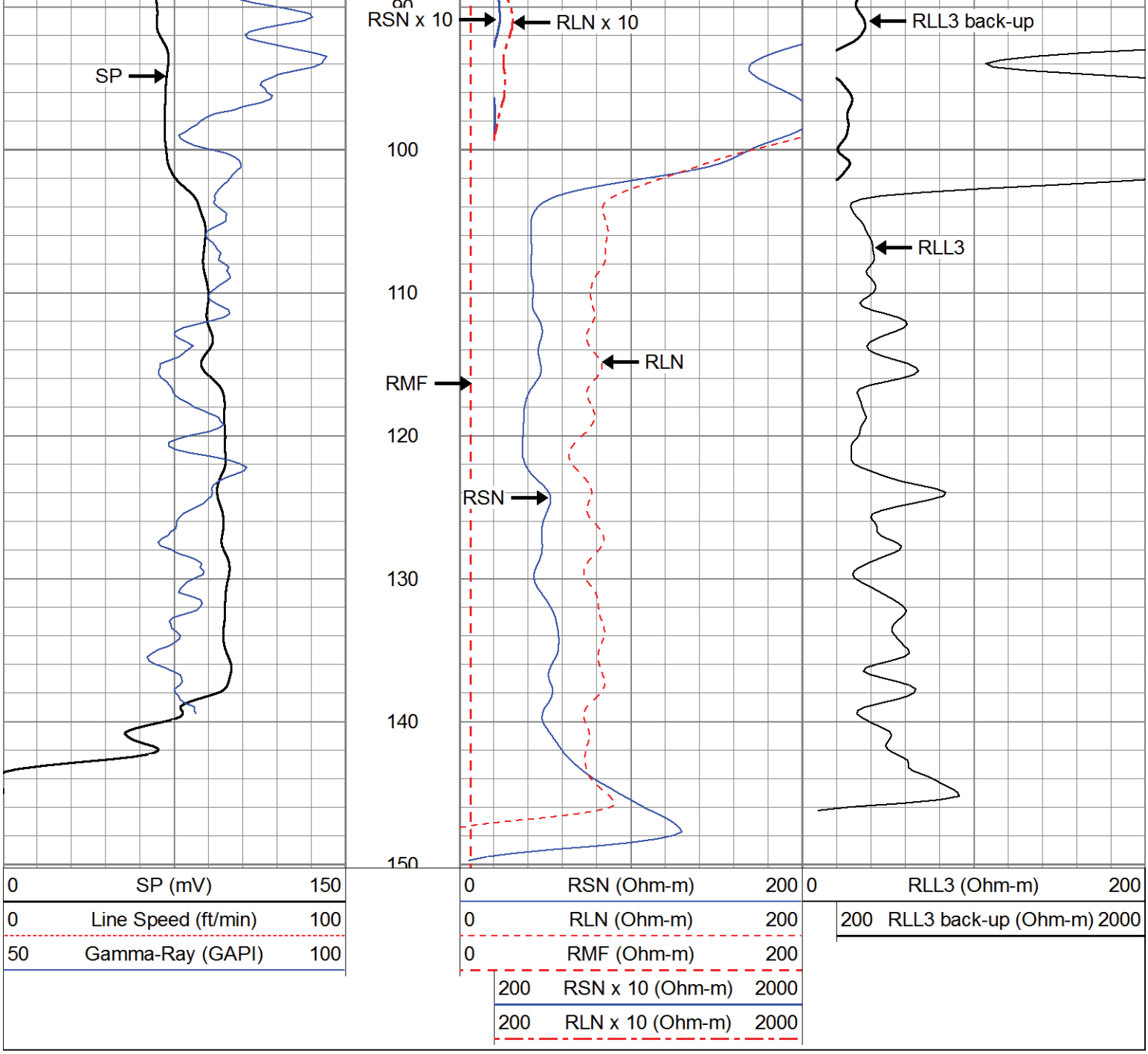
Database File	16734.db
Dataset Pathname	elog2
Presentation Format	elog
Dataset Creation	Thu Sep 20 11:38:38 2012
Charted by	Depth in Feet scaled 1:120

0	SP (mV)	150
0	Line Speed (ft/min)	100
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 back-up (Ohm-m)	2000




SP
RSN x 10
RLN x 10
RLL3 back-up
RLL3
RLN
RMF
RSN
90
100
110
120
130
140
150
0 SP (mV) 150
0 Line Speed (ft/min) 100
50 Gamma-Ray (GAPI) 100
0 RSN (Ohm-m) 200
0 RLN (Ohm-m) 200
0 RMF (Ohm-m) 200
200 RSN x 10 (Ohm-m) 2000
200 RLN x 10 (Ohm-m) 2000
0 RLL3 (Ohm-m) 200
200 RLL3 back-up (Ohm-m) 2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
16734

File No.

Company ERM
Well PWA-3
Field GLENDALE
County LOS ANGELES State CA

Location:

EAST OF BURBANK BLVD ON NORTH SIDE OF FRONT ROAD
GPS N34o10.883' W118o18.886'

Sec. Twp. Rge.

Other Services:

ELOG
CALIPER
SONIC/VDL

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	09/20/2012		
Run Number	ONE		
Depth Driller	150'		
Depth Logger	150'		
Bottom Logged Interval	150'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.12 @ 77F		
Rmf @ Meas. Temp	6.58 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	11:30 AM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	ABREAU		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File 16734.db
Dataset Pathname LL3
Dataset Creation Thu Sep 20 11:53:03 2012

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Thu Jan 20 09:04:17 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	30.6	
Calibrator Reading:	128.2	
Sensitivity:	1.6595	GAPI/

RLL3 (Resistivity Laterolog 3) Calibration Report:

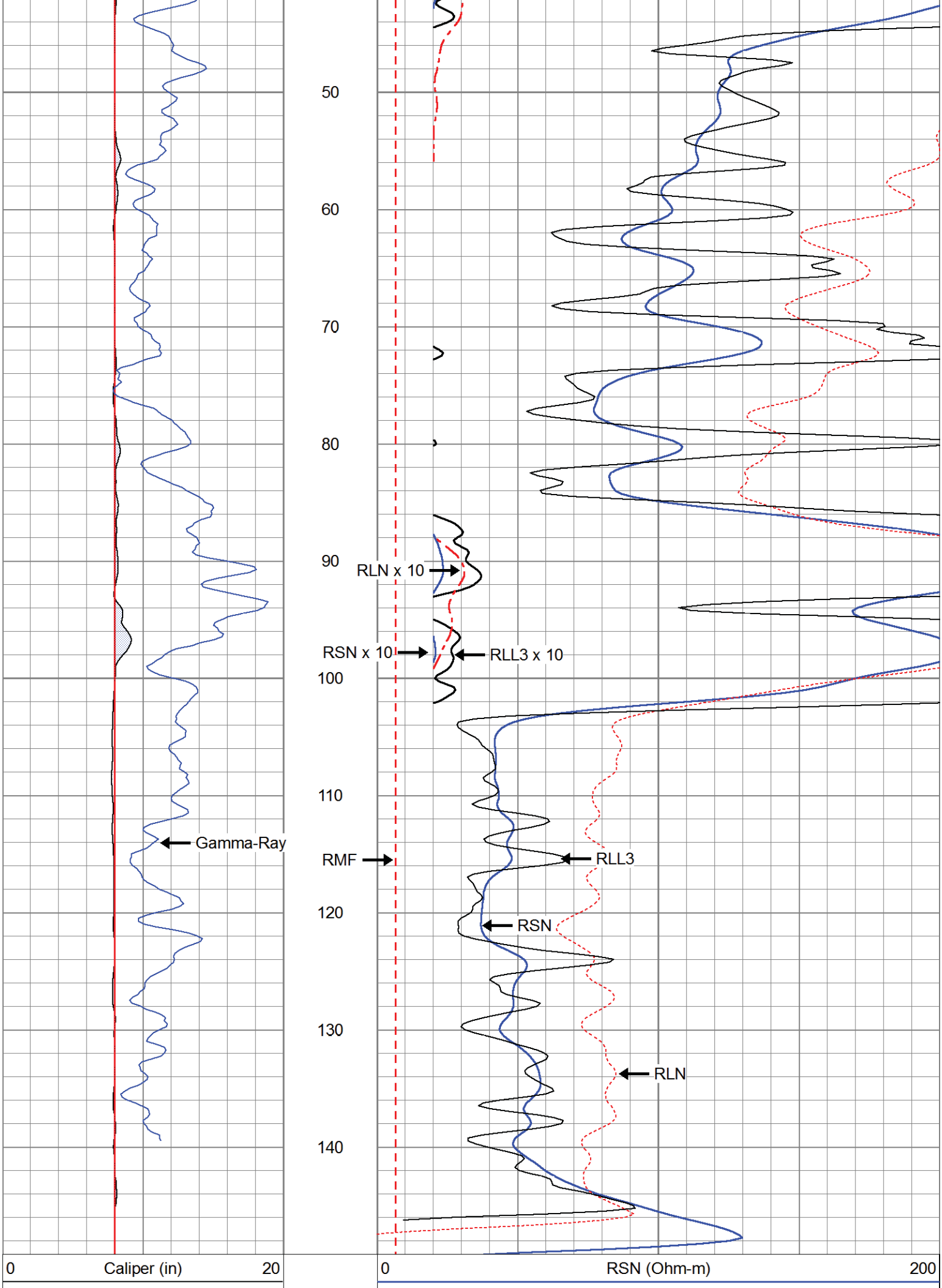
Serial Number:	883
Tool Model:	M&W
Performed:	Fri Aug 31 13:19:27 2012

System Reading	Calibration Reference	
0.014	2.500	Ohm-m
0.027	5.000	
0.254	50.000	
1.169	250.000	
2.121	500.000	

Database File	16734.db
Dataset Pathname	LL3
Presentation Format	guard
Dataset Creation	Thu Sep 20 11:53:03 2012
Charted by	Depth in Feet scaled 1:120

0	Caliper (in)	20
0	BOREID (in)	20
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000


50
60
70
80
90
100
110
120
130
140
RLN x 10
RSN x 10
RLL3 x 10
Gamma-Ray
RMF
RLL3
RSN
RLN
0
Caliper (in)
20
0
RSN (Ohm-m)
200

0	BOREID (in)	20
50	Gamma-Ray (GAPI)	100

0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No. 16734

File No.

Company ERM

Well PWA-3

Field GLENDALE

County LOS ANGELES State CA

Location:

EAST OF BURBANK BLVD ON NORTH SIDE OF FRONT ROAD
GPS N34o10.883' W118o18.886'

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
CALIPER

				Elevation
Permanent Datum	G.L.		Elevation above perm. datum	K.B.
Log Measured From	G.L.	0'		D.F.
Drilling Measured From	G.L.			G.L.

Date	09/20/2012		
Run Number	ONE		
Depth Driller	150'		
Depth Logger	150'		
Bottom Logged Interval	150'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.12 @ 77F		
Rmf @ Meas. Temp	6.58 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	11:30 AM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	ABREAU		
Witnessed By	A. BEACH		

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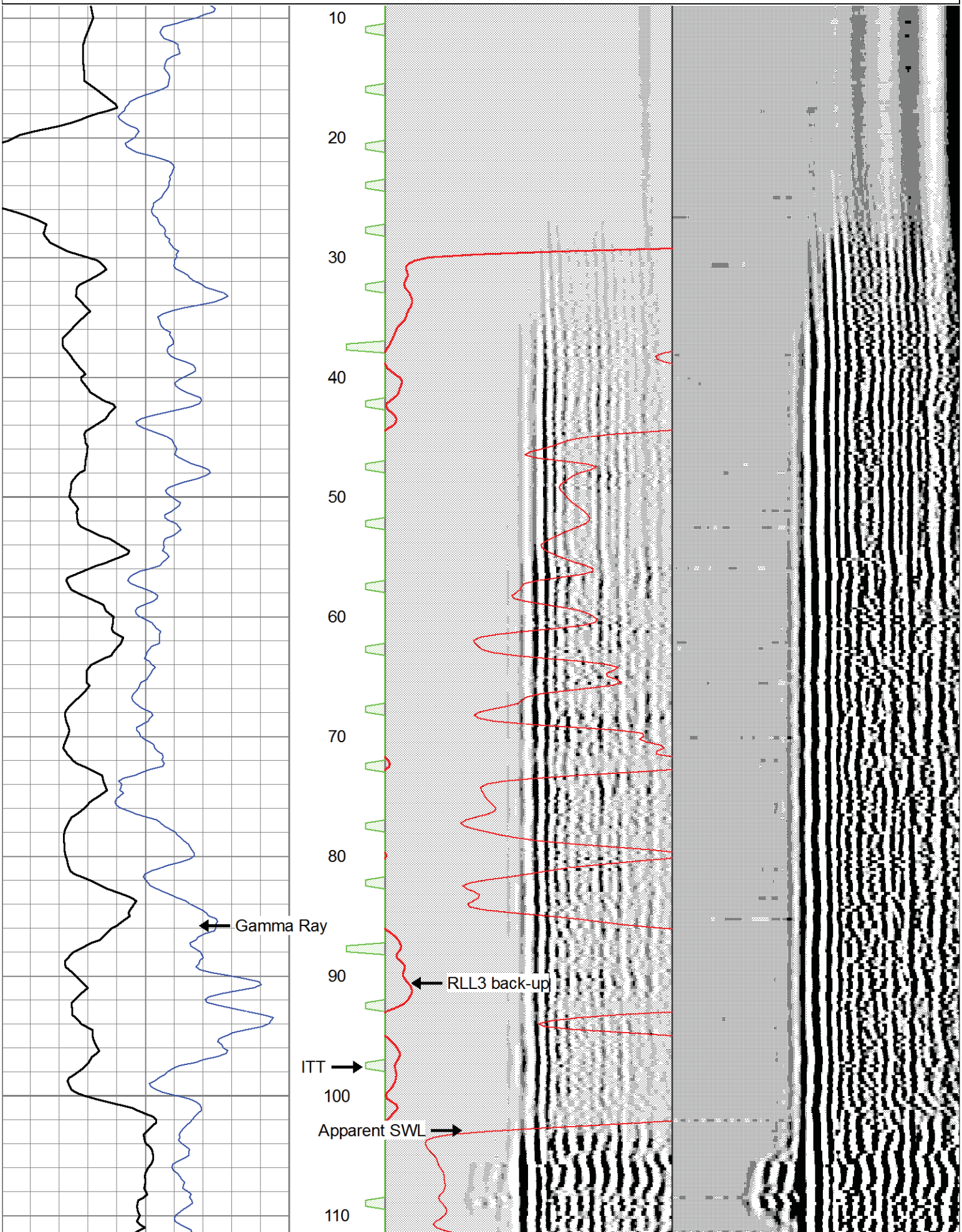
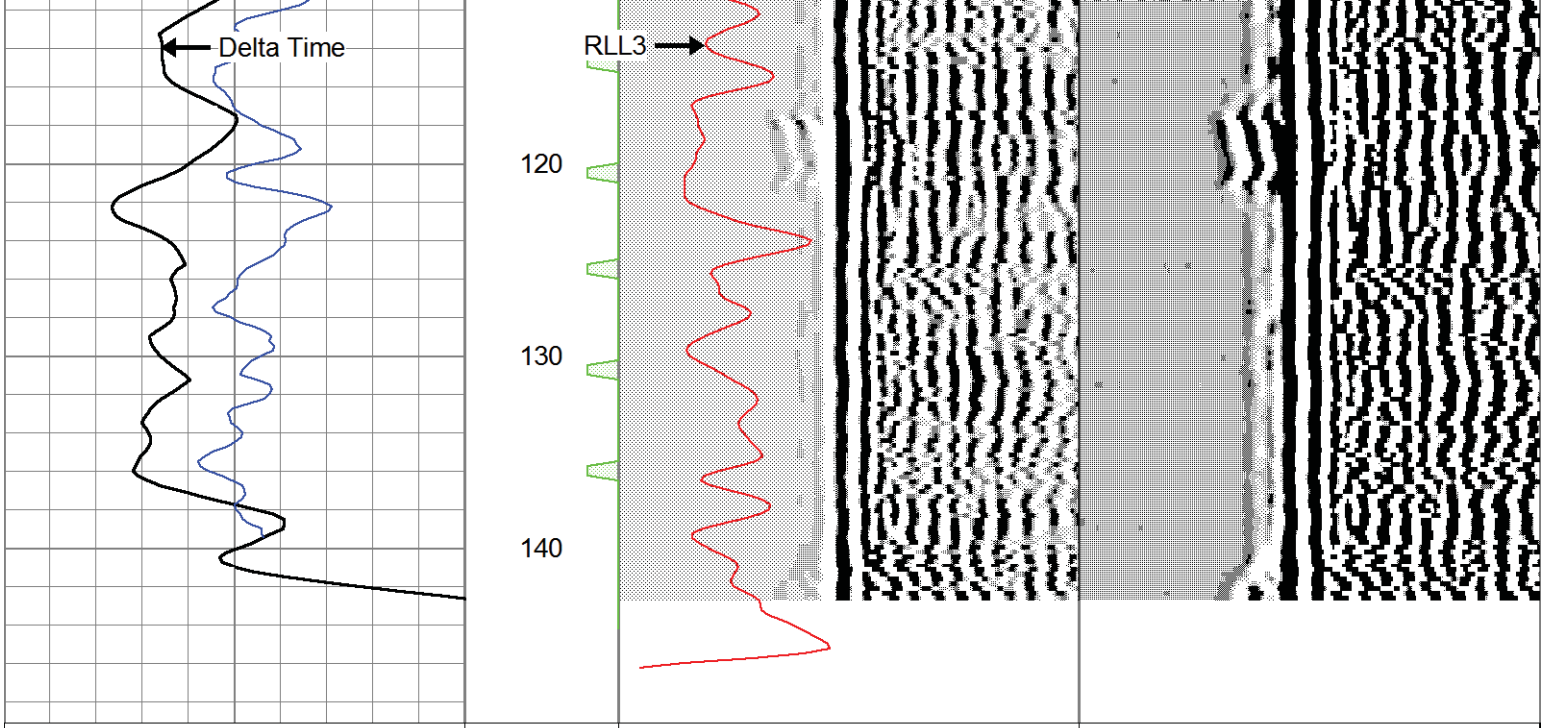
Comments

Database File	16734.db
Dataset Pathname	SNC
Presentation Format	slt
Dataset Creation	Thu Sep 20 12:12:32 2012
Charted by	Depth in Feet scaled 1:120

260	Delta Time (usec/ft)	60	ITT	600	Variable Density 5 ft	1600	600	Variable Density 5 ft	1600
50	Gamma-Ray (GAPI)	100	5 (msec) 0	0	RLL3 (Ohm-m)	200			
				200	RLL3 back-up (Ohm-m)	2000			





260	Delta Time (usec/ft)	60	ITT	600	Variable Density 5 ft	1600	600	Variable Density 5 ft	1600
50	Gamma-Ray (GAPI)	100	5 (msec) 0	0	RLL3 (Ohm-m)	200			
				200	RLL3 back-up (Ohm-m)	2000			

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

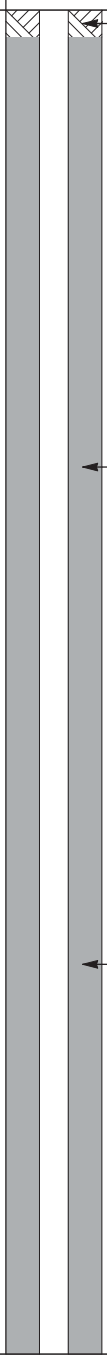
LOG OF MONITORING WELL: PWA-4

Project Number: 0130384
Project Name: Glendale Chormium Operable Unit
Location: Near 231 W. Orange Grove Ave, Burbank
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 9/28/2012
Date Completed: 10/2/2012
Total Depth: 127 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 10 feet bgs
Northing: 1886408.6
Easting: 6466075.85
TOC/Surface Elevation: 555.85/556.28

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Asphalt Surface 4.0" thick
					Silty SAND, dark grayish brown (10YR 5/2), fine grained, with mica, some fines
5		0.4	SM		
10					SAND, grayish brown (10YR 5/2), fine grained, with abundant mica, trace coarse grained sand
15					
20					SAND, grayish brown (10YR 5/2), fine grained, with abundant mica, some fines
25					SAND, grayish brown (10YR 5/2), fine grained, with abundant mica, some fines
30			SP		
35					SAND, brown (10YR 5/3), fine grained, with abundant mica, some fines
40					
45					

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 15:55 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-4.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-4

Project Number: 0130384
Project Name: Glendale Chormium Operable Unit
Location: Near 231 W. Orange Grove Ave, Burbank
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
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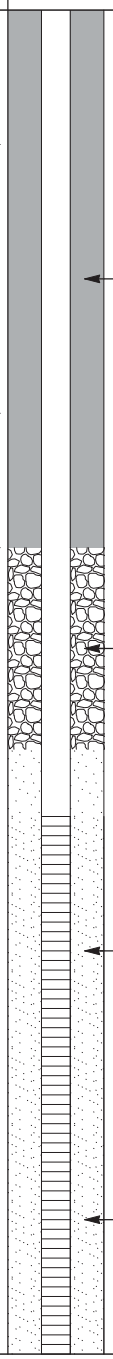
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 10 feet bgs
Northing: 1886408.6
Easting: 6466075.85
TOC/Surface Elevation: 555.85/556.28

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			SP		SAND, gray (10YR 5/1), fine grained, with abundant mica, some fines
55			SW		SAND, brown (10YR 5/3), fine grained, with abundant mmica, some medium grained sand and fines
60					SAND, brown (10YR 5/3), fine to medium grained, with abuandant mica, subangular (rig bouncing)
65			SP		SAND, brown (10YR 5/3), fine grained, with abundant mica, subangular, some fines, trace medium grained sand
70			SW		SAND, brown (10YR 5/3), fine to medium grained, subrounded, some fines, trace subangular coarse grained sand
75					SAND, grayish brown (10YR 5/2), fine to medium grained, with mica, subrounded, little subangular fine grained gravel (rig bouncing)
80					SAND, brown (10YR 5/3), fine grained, with mica, some medium grained sand and fines
85					SAND, brown (10YR 5/3), fine to medium grained, with mica, subrounded
90					
95					

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 15:55 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-4.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

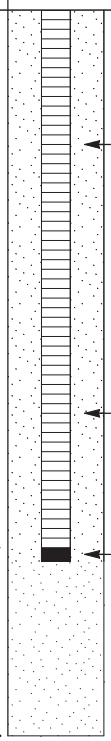
LOG OF MONITORING WELL: PWA-4

Project Number: 0130384
Project Name: Glendale Chormium Operable Unit
Location: Near 231 W. Orange Grove Ave, Burbank
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 9/28/2012
Date Completed: 10/2/2012
Total Depth: 127 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 10 feet bgs
Northing: 1886408.6
Easting: 6466075.85
TOC/Surface Elevation: 555.85/556.28

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			SW		SAND, brown (10YR 5/3), fine grained, with mica, some medium grained sand and fines, subrounded
105					
110					SAND, brown (10YR 5/3), fine to medium grained, subangular, with mica, some fines, trace coarse grained sand
115					
120			SP		SAND, brown (10YR 5/3), fine grained, with abundant mica, trace medium grained sand
125					
					Total Depth - 127 feet bgs
130					
135					
140					
145					

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 15:55 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-4.GPJ

PACIFIC SURVEYS

CALIPER
BOREHOLE VOLUMES

Job No.
16778

File No.

Company	ERM
Well	PWA-4
Field	BURBANK
County	LOS ANGELES
State	CA

Location:

VICTORY AND ORANGE GROVE
GPS: N 34o 10.512' W 118o 18.979'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG
SONIC/VDL

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10-01-2012		
Run Number	ONE		
Depth Driller	115'		
Depth Logger	115'		
Bottom Logged Interval	115'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	8.66 @ 77F		
Rmf @ Meas. Temp	9.66 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	0845		
Time Logger on Bottom	0945		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	LA		
Recorded By	SCHUMACHER	KOSTER	
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File	16778.db
Dataset Pathname	CAL/CAL
Dataset Creation	Mon Oct 01 10:27:34 2012

Temperature Calibration Report

Serial Number:	PS-3_Short			
Tool Model:	Short_GPH			
Performed:	Thu Jun 07 15:23:13 2012			
	Reference		Reading	
Low Reference:	4.00	degF	446.36	cps
High Reference:	8.00	degF	703.01	cps
Gain:	0.02			
Offset:	-2.96			
Delta Spacing	1			

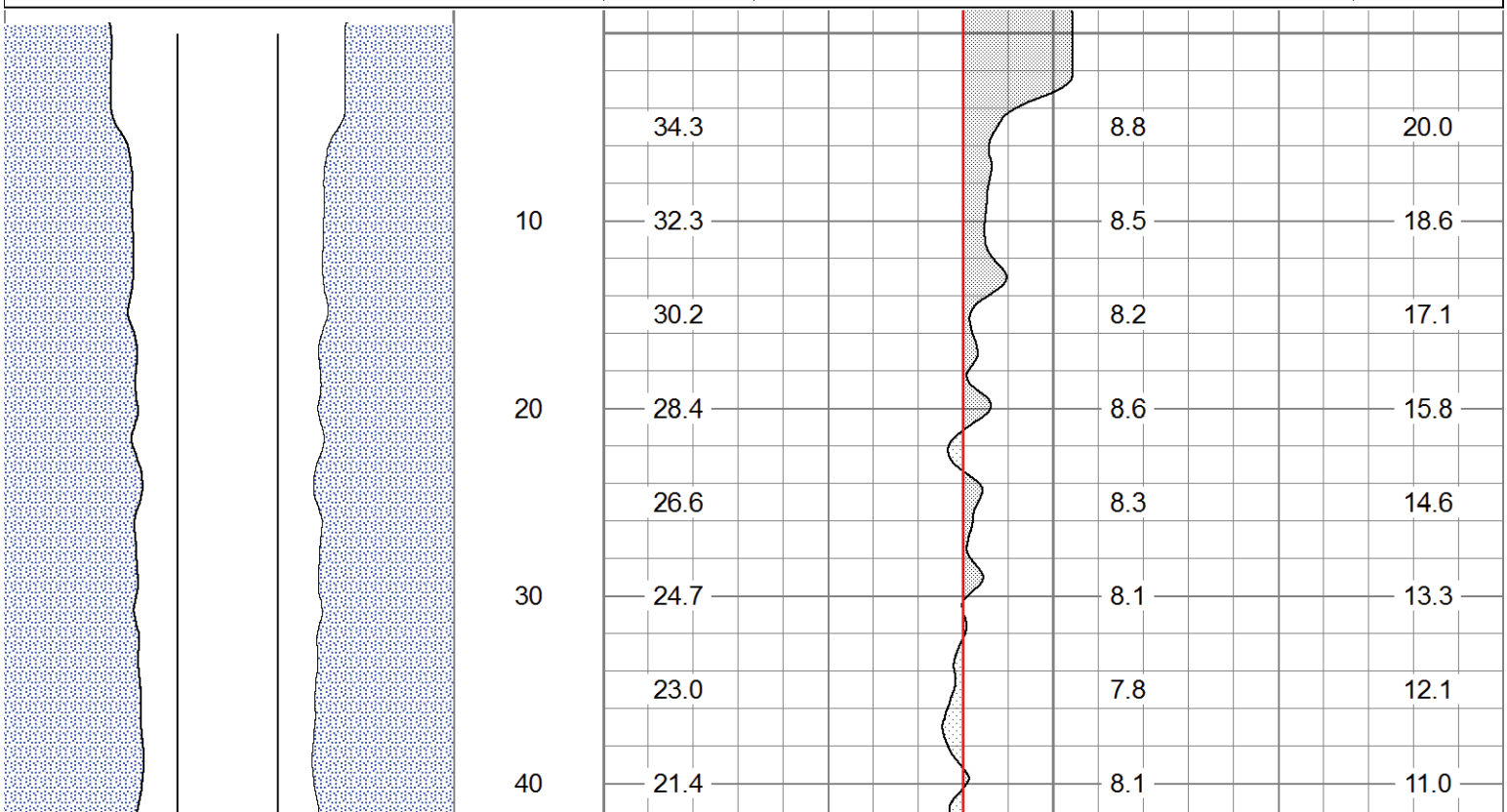
XY Caliper Calibration Report

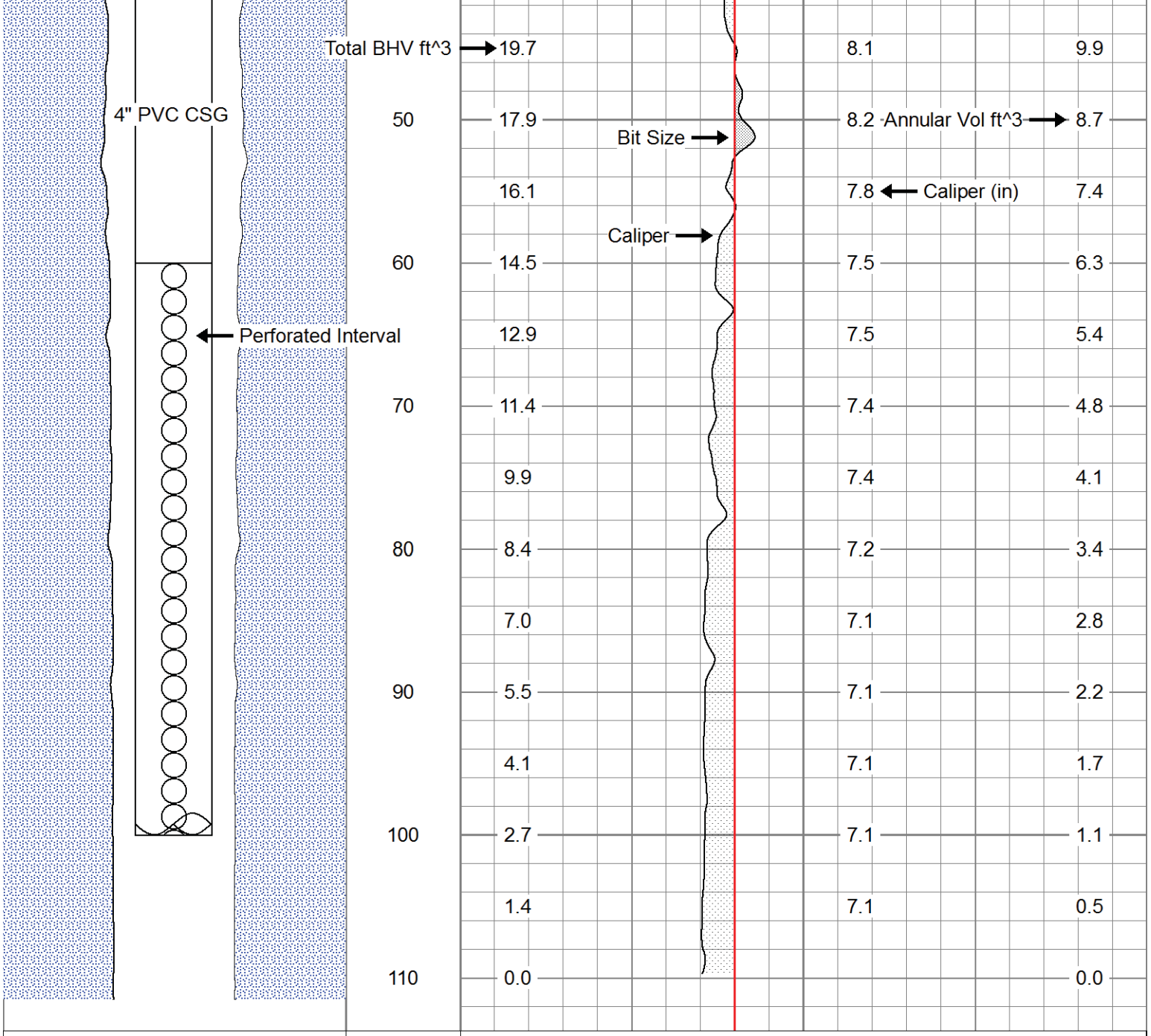
Serial Number/Model: Short-Comprobe
Performed: Thu Jun 07 15:17:39 2012

	Ring		X Caliper		Y Caliper	
1:	4	in	323.326	cps	323.326	cps
2:	8	in	446.363	cps	446.363	cps
3:	12	in	575.851	cps	575.851	cps
4:	16	in	703.014	cps	703.014	cps
5:	20	in	834.164	cps	834.164	cps
6:		in		cps		cps

Database File	16778.db
Dataset Pathname	CAL/CAL
Presentation Format	xyc_gph
Dataset Creation	Mon Oct 01 10:27:34 2012
Charted by	Depth in Feet scaled 1:120

CSG SCHEDULE
Pipe(s) proportional to Hole Size





CSG SCHEDULE

Pipe(s) proportional to Hole Size

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No.
16778

File No.

Company ERM
Well PWA-4
Field BURBANK
County LOS ANGELES State CA

Location:

VICTORY AND ORANGE GROVE
GPS: N 34o 10.512' W 118o 18.979'

Sec. Twp. Rge.

Other Services:

GR/LL3
SONIC/VDL
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10-01-2012		
Run Number	ONE		
Depth Driller	115'		
Depth Logger	115'		
Bottom Logged Interval	115'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	8.66 @ 77F		
Rmf @ Meas. Temp	9.66 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	0845		
Time Logger on Bottom	0945		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	LA		
Recorded By	SCHUMACHER	KOSTER	
Witnessed By	A. BEACH		

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Comments

NOTE: BASED ON INFORMATION GATHERED FROM RESISTIVITIES CURVES AND USING THE 3' WAVE FORM FROM THE SONIC LOG, IT IS ESTIMATED THAT GROUNDWATER CAN BE FOUND BETWEEN 90' AND 95' BGS.

Calibration Report

Database File 16778.db
Dataset Pathname elog2.1
Dataset Creation Mon Oct 01 10:08:34 2012

ELOG Calibration Report

Serial:	D4
Model:	DTQ
Shop Calibration Performed:	Fri Sep 02 15:34:18 2011
Before Survey Verification Performed:	Sun Sep 09 13:17:43 2007
After Survey Verification Performed:	Sun Sep 09 13:17:48 2007

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	9.321	100.380		10.200	102.200	Ohm-m	1.010	0.782
Long	8.948	97.855		10.200	102.200	Ohm-m	1.035	-17.100
IEE	88.740	5882.980	counts	0.097	6.438	A		
VSN	104.920	6618.800	counts	2.001	126.246	V		
VLN	77.120	1684.980	counts	1.471	32.139	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.249	101.201		40.505	101.206	Ohm-m	0.996	0.422
Long	142.638	102.842		102.858	102.858	Ohm-m	1.024	-2.408
IEE	212.960	7070.960	counts	0.233	7.738	A		
VSN	96.300	8039.720	counts	1.837	153.348	V		
VLN	85.320	2042.520	counts	1.627	38.959	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.270	101.200		40.249	101.201	Ohm-m	1.000	-0.035
Long	142.491	102.843		102.842	102.842	Ohm-m	1.004	-0.383
IEE	213.380	7077.580	counts	0.234	7.746	A		
VSN	96.540	8047.160	counts	1.841	153.490	V		
VLN	85.400	2044.440	counts	1.629	38.995	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	40.505	40.249	Ohm-m	101.206	101.201	Ohm-m
Long	143.592	142.638	Ohm-m	102.858	102.842	Ohm-m

Gamma Ray Calibration Report

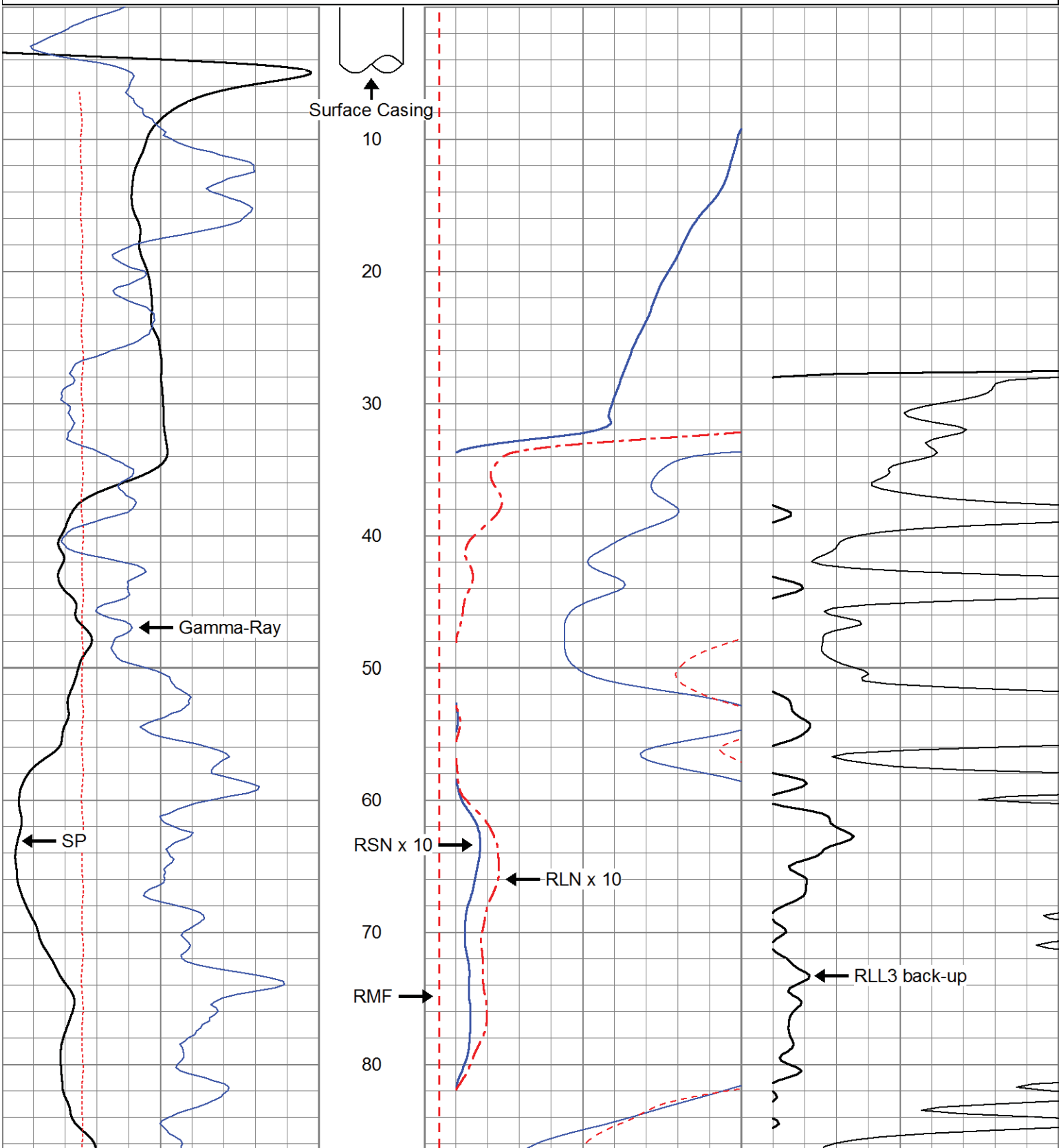
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Tue Jul 15 15:58:21 2008	
Calibrator Value:	162.0	GAPI
Background Reading:	198.6	cps
Calibrator Reading:	742.0	cps
Sensitivity:	0.2982	GAPI/cps

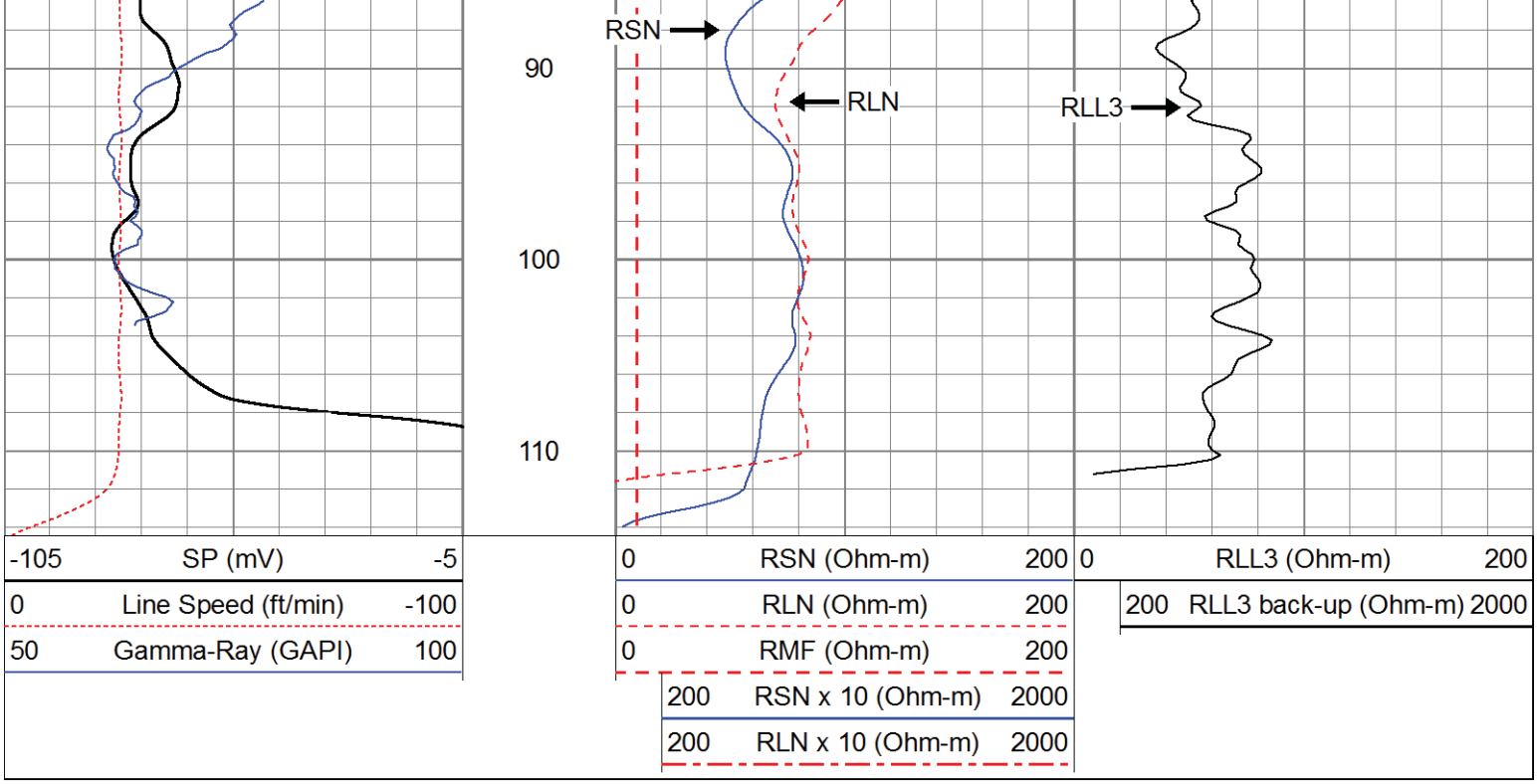
Database File	16778.db
Dataset Pathname	elog2.1
Presentation Format	elog
Dataset Creation	Mon Oct 01 10:08:34 2012
Charted by	Depth in Feet scaled 1:120

-105	SP (mV)	-5
0	Line Speed (ft/min)	-100
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 back-up (Ohm-m)	2000




RSN
RLN
RLL3
90
100
110
-105 SP (mV) -5
0 Line Speed (ft/min) -100
50 Gamma-Ray (GAPI) 100
0 RSN (Ohm-m) 200
0 RLN (Ohm-m) 200
0 RMF (Ohm-m) 200
200 RSN x 10 (Ohm-m) 2000
200 RLN x 10 (Ohm-m) 2000
0 RLL3 (Ohm-m) 200
200 RLL3 back-up (Ohm-m) 2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
16778

File No.

Company	ERM
Well	PWA-4
Field	BURBANK
County	LOS ANGELES
State	CA

Location:

VICTORY AND ORANGE GROVE
GPS: N 34o 10.512' W 118o 18.979'

Sec. Twp. Rge.

Other Services:

GR/ELOG
CALIPER
SONIC/VDL

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10-01-2012		
Run Number	ONE		
Depth Driller	115'		
Depth Logger	115'		
Bottom Logged Interval	115'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	8.66 @ 77F		
Rmf @ Meas. Temp	9.66 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	0845		
Time Logger on Bottom	0945		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	LA		
Recorded By	SCHUMACHER	KOSTER	
Witnessed By	A. BEACH		

<<< Fold Here >>>

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Comments

Calibration Report

Database File	16778.db
Dataset Pathname	LL3
Dataset Creation	Mon Oct 01 10:07:19 2012

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Wed Aug 31 18:41:03 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	41.2	
Calibrator Reading:	182.5	
Sensitivity:	1.1460	GAPI/

RLL3 (Resistivity Laterolog 3) Calibration Report:

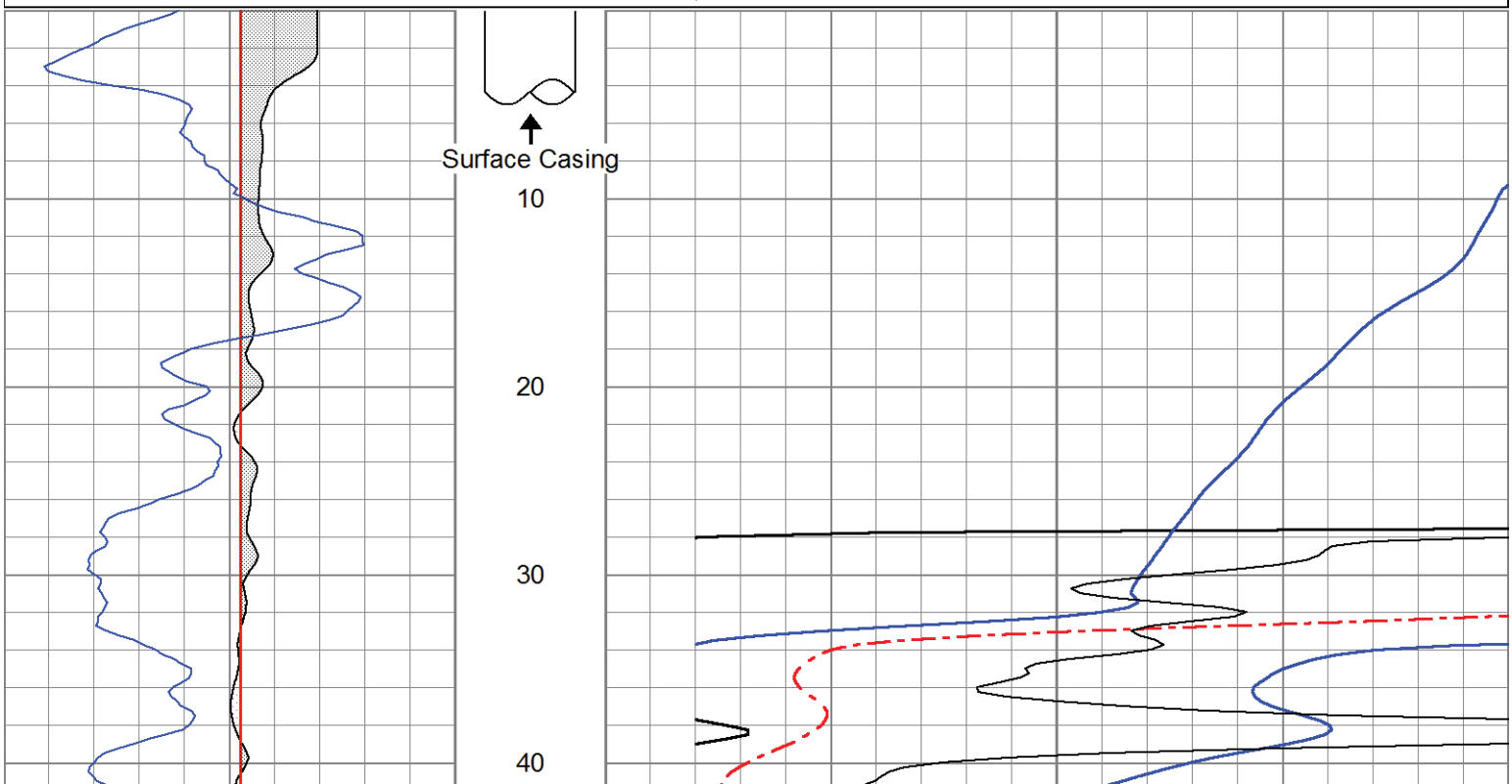
Serial Number:	231
Tool Model:	M&W
Performed:	Wed Aug 31 18:40:12 2011

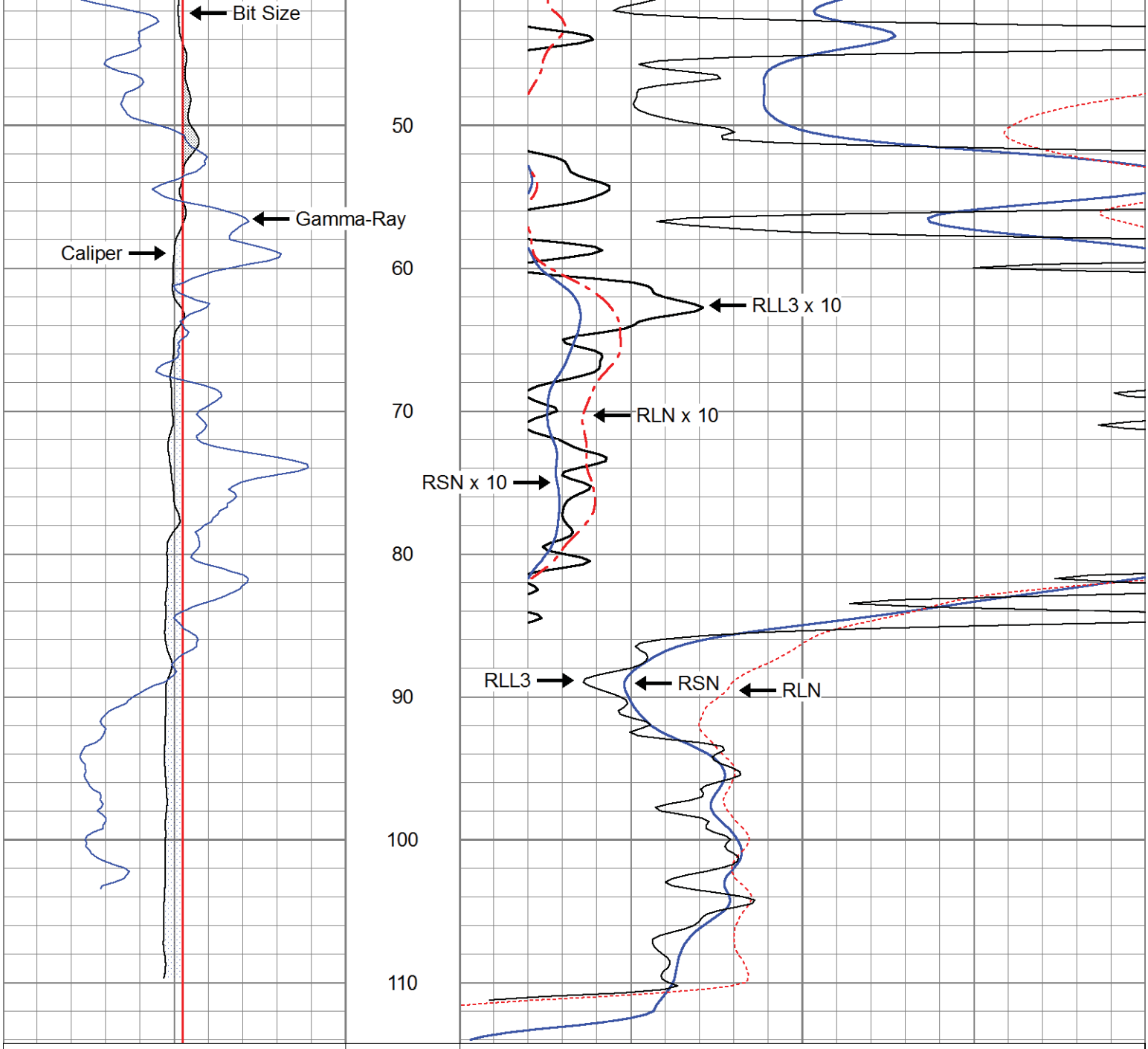
System Reading	Calibration Reference	
0.005	2.500	Ohm-m
0.009	5.000	
0.101	50.000	
0.535	250.000	
0.942	500.000	

Database File	16778.db
Dataset Pathname	LL3
Presentation Format	guard
Dataset Creation	Mon Oct 01 10:07:19 2012
Charted by	Depth in Feet scaled 1:120

0	Caliper (in)	15
0	Bit Size (in)	15
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000





0	Caliper (in)	15
0	Bit Size (in)	15
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No. 16778

File No.

Company	ERM
Well	PWA-4
Field	BURBANK
County	LOS ANGELES State CA

Location:

VICTORY AND ORANGE GROVE
GPS: N 34o 10.512' W 118o 18.979'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10-01-2012		
Run Number	ONE		
Depth Driller	115'		
Depth Logger	115'		
Bottom Logged Interval	115'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	8.66 @ 77F		
Rmf @ Meas. Temp	9.66 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	0845		
Time Logger on Bottom	0945		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	LA		
Recorded By	SCHUMACHER	KOSTER	
Witnessed By	A. BEACH		

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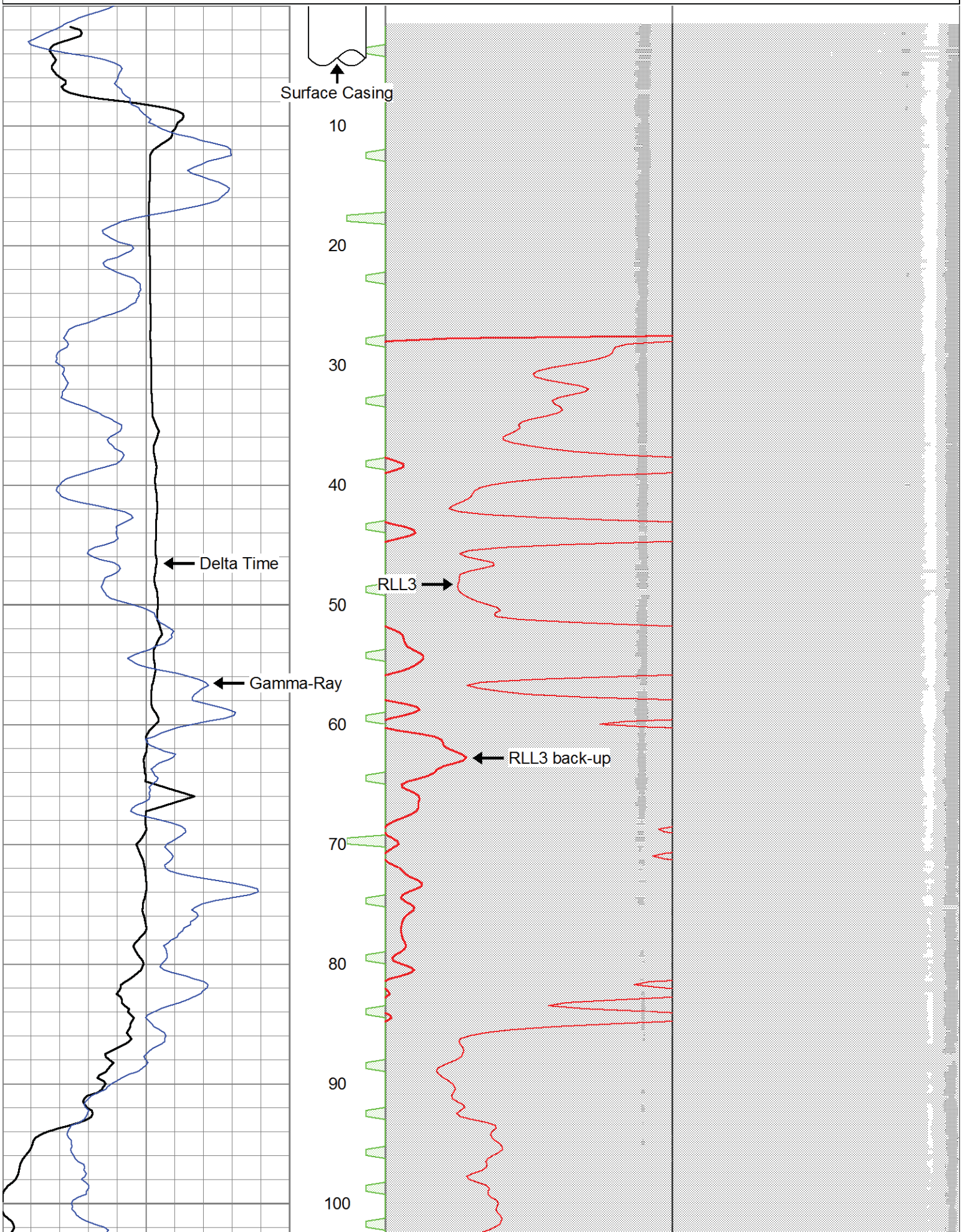
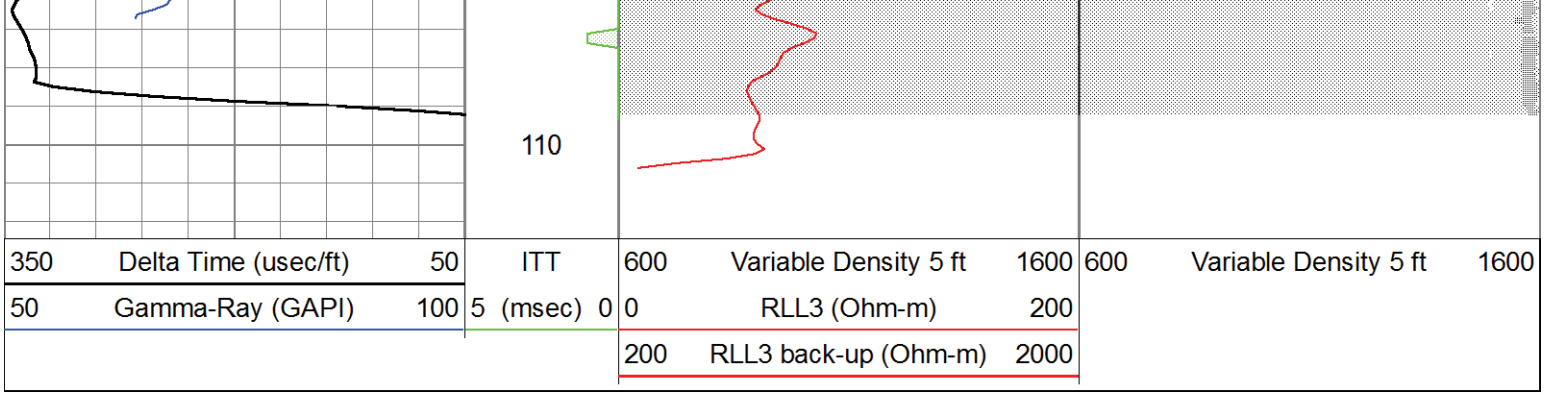
Comments

NOTE: BASED ON INFORMATION GATHERED FROM RESISTIVITIES CURVES AND USING THE 3' WAVE FORM FROM THE SONIC LOG, IT IS ESTIMATED THAT GROUNDWATER CAN BE FOUND BETWEEN 90' AND 95' BGS.

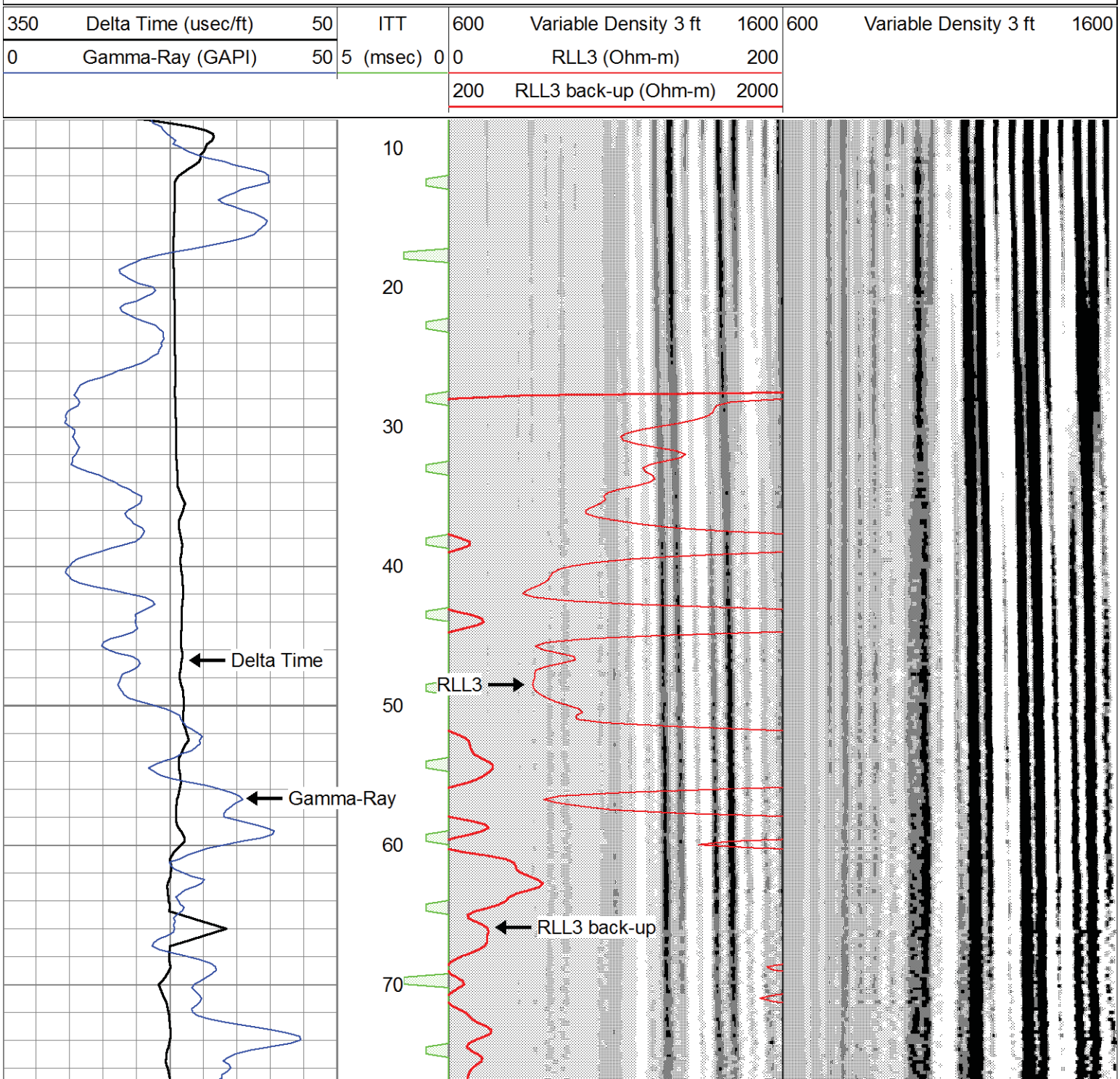
Database File	16778.db
Dataset Pathname	SNC2
Presentation Format	sonic_ba
Dataset Creation	Mon Oct 01 10:52:55 2012
Charted by	Depth in Feet scaled 1:120

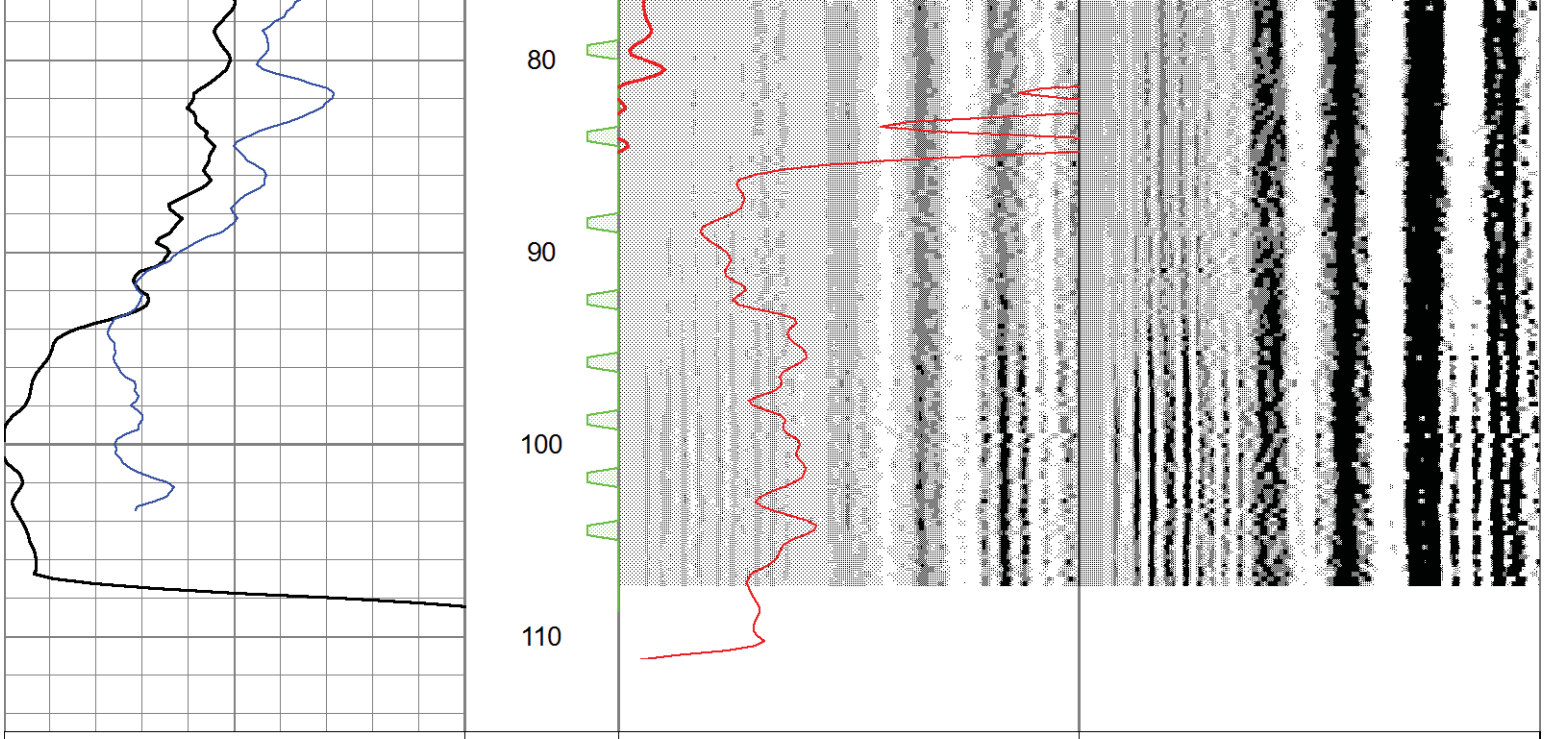
350	Delta Time (usec/ft)	50	ITT	600	Variable Density 5 ft	1600	600	Variable Density 5 ft	1600
50	Gamma-Ray (GAPI)	100	5 (msec) 0	0	RLL3 (Ohm-m)	200			
				200	RLL3 back-up (Ohm-m)	2000			





Database File	16778.db
Dataset Pathname	SNC2.1
Presentation Format	sonic_ba
Dataset Creation	Mon Oct 01 11:45:15 2012
Charted by	Depth in Feet scaled 1:120





350	Delta Time (usec/ft)	50	ITT	600	Variable Density 3 ft	1600	600	Variable Density 3 ft	1600
0	Gamma-Ray (GAPI)	50	5 (msec) 0	0	RLL3 (Ohm-m)	200			
				200	RLL3 back-up (Ohm-m)	2000			

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-5

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near W. Chandler Blvd. and N. Orchard Dr., Burbank, CA
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 10/3/2012
Date Completed: 10/5/2012
Total Depth: 168 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9 feet bgs.
Northing: 1887118.7
Easting: 6462154.74
TOC/Surface Elevation: 578.06/578.56

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations	WELL DIAGRAM
					Asphalt Surface 4.0" thick	Cement Apron with Flush-Mounted Traffic-Rated Well Box and Locking Cap
			SM		Silty SAND, dark grayish brown (10YR 4/2), dry, loose, fine grained, some fines	
5						
10			SP		SAND, brown (10YR 4/3), fine grained, subrounded, some coarse grained sand and fines, with mica	
15					SAND, brown (10YR 4/3), fine to medium grained, subrounded, with mica, some fines	
20						
25					SAND, brown (10YR 4/3), fine to medium grained, subrounded, with mica, some fines, trace fine grained gravel	4.0" Dia. Sch. 40 PVC Blank Well Casing
30			SW		SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with mica	
35						
40					SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, little coarse grained sand, with mica	
45						Cement/Bentonite Grout

GCOU MW TO 50FT IRVINE - - 5/30/13 15:58 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-5.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-5

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near W. Chandler Blvd. and N. Orchard Dr., Burbank, CA
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 10/3/2012
Date Completed: 10/5/2012
Total Depth: 168 feet
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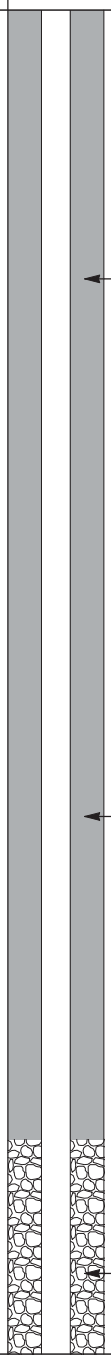
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9 feet bgs.
Northing: 1887118.7
Easting: 6462154.74
TOC/Surface Elevation: 578.06/578.56

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with mica
55					
60					SAND, brown (10YR 5/3), fine to medium grained, subrounded, trace coarse grained sand (rig bouncing), with some mica
65					SAND, brown (10YR 4/3), fine to medium grained, subrounded, with mica, some fines
70					
75			SW		SAND, brown (10YR 5/3), medium to coarse grained, subrounded to angular (rig bouncing), with little mica
80					SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with mica, some fines
85					SAND, brown (10YR 4/3), fine to medium grained, subrounded to angular, with mica
90					SAND, grayish brown (10YR 5/2), fine to coarse grained, subrounded to angular (rig bouncing)
95					SAND, brown (10YR 4/3), fine to medium grained, subrounded to angular (rig bouncing), with mica

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 15:58 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-5.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

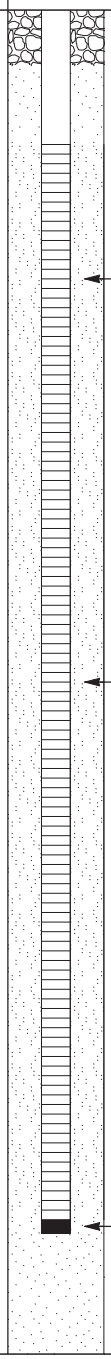
LOG OF MONITORING WELL: PWA-5

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near W. Chandler Blvd. and N. Orchard Dr., Burbank, CA
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 10/3/2012
Date Completed: 10/5/2012
Total Depth: 168 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9 feet bgs.
Northing: 1887118.7
Easting: 6462154.74
TOC/Surface Elevation: 578.06/578.56

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with mica
105					SAND, grayish brown (10YR 5/2), fine to coarse grained, subrounded to subangular, some angular fine grained gravel, with little mica
110					SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with mica
115					
120					SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, some coarse grained, with mica
125			SW		SAND, grayish brown (10YR 5/2), medium coarse grained, subrounded to subangular, trace angular sand (rig bouncing)
130					SAND, brown (10YR 4/3), fine to medium grained, subrounded, with mica, trace coarse grained sand
135					
140					SAND, brown (10YR 4/3), fine to medium grained, subrounded, with mica, trace coarse grained sand (rig bouncing)
145					

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 15:58 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-5.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-5

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near W. Chandler Blvd. and N. Orchard Dr., Burbank, CA
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 10/3/2012
Date Completed: 10/5/2012
Total Depth: 168 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9 feet bgs.
Northing: 1887118.7
Easting: 6462154.74
TOC/Surface Elevation: 578.06/578.56

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations	WELL DIAGRAM
			SW		SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with mica	
155					SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with mica	
160					SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with mica, trace angular coarse grained sand (rig bouncing)	Hydrated Bentonite Pellets
165					SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with mica (rig bouncing)	
					Total Depth - 168 feet bgs	
170						
175						
180						
185						
190						
195						

GCOU MW TO 50FT IRVINE - - 5/30/13 15:58 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-5.GPJ

PACIFIC SURVEYS

CALIPER
BOREHOLE VOLUMES

Job No.
16810

File No.

Company	ERM
Well	PWA-5
Field	BURBANK
County	LOS ANGELES
State	CA

Location:

CHANDLER AND ORCHARD
GPS: 34o 10.639' W 118o 19.736'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG
SONIC/VDL

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10-04-2012		
Run Number	ONE		
Depth Driller	170'		
Depth Logger	168'		
Bottom Logged Interval	168'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.2 @ 76.7F		
Rmf @ Meas. Temp	7.1 @ 76.7F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	0945		
Time Logger on Bottom	1015		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

<<< Fold Here >>>

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Comments

Calibration Report

Database File 16810.db
Dataset Pathname CAL/CAL
Dataset Creation Thu Oct 04 12:06:48 2012

Temperature Calibration Report

Serial Number:	GRPH_SHORT
Tool Model:	GRPH_CAL
Performed:	Wed Oct 03 14:43:44 2012

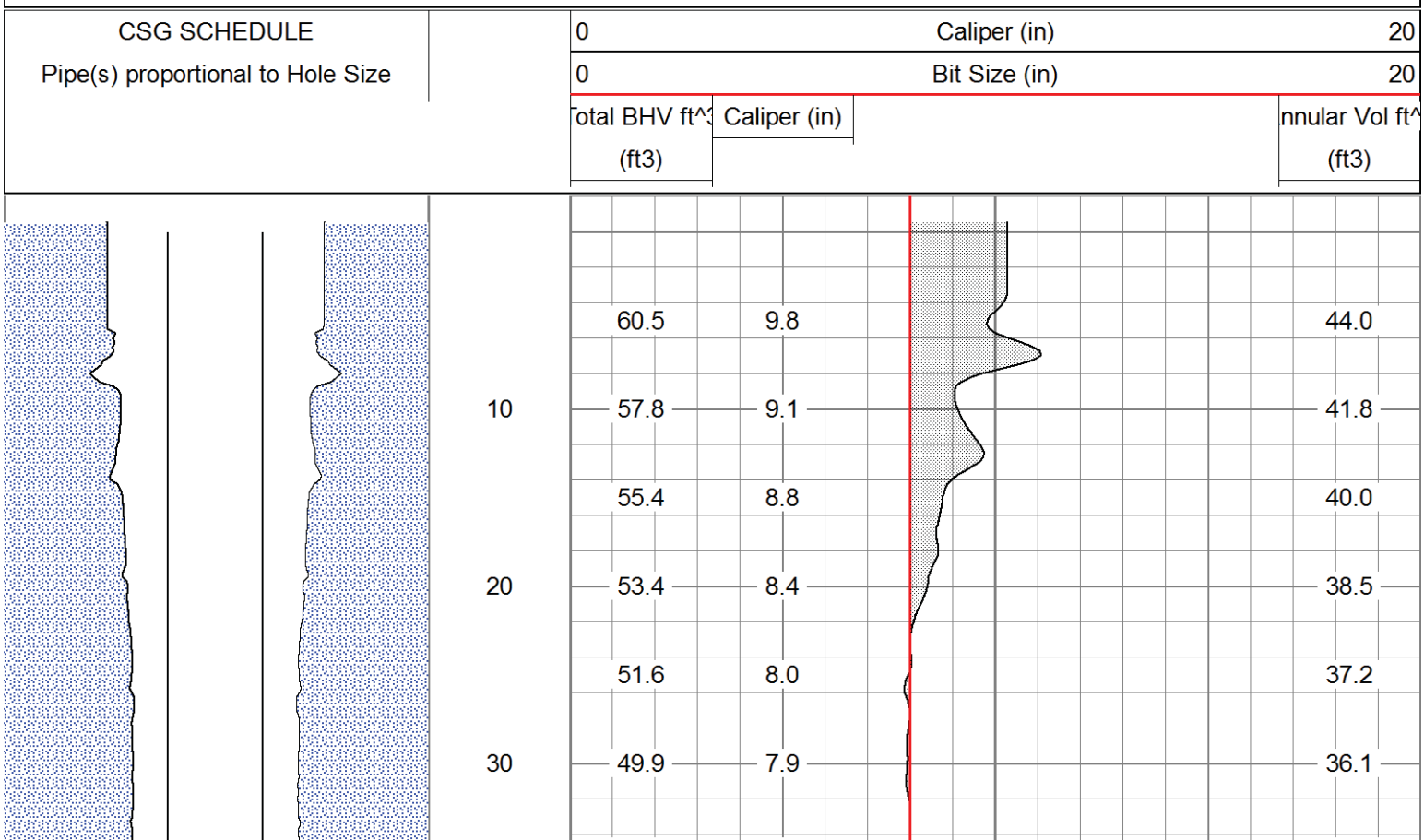
Point #	Reading		Reference	
1	387.23	cps	2.00	degF
2	1015.80	cps	7.00	degF
3		cps		degF
4		cps		degF
5		cps		degF
6		cps		degF
7		cps		degF
8		cps		degF
9		cps		degF
10		cps		degF

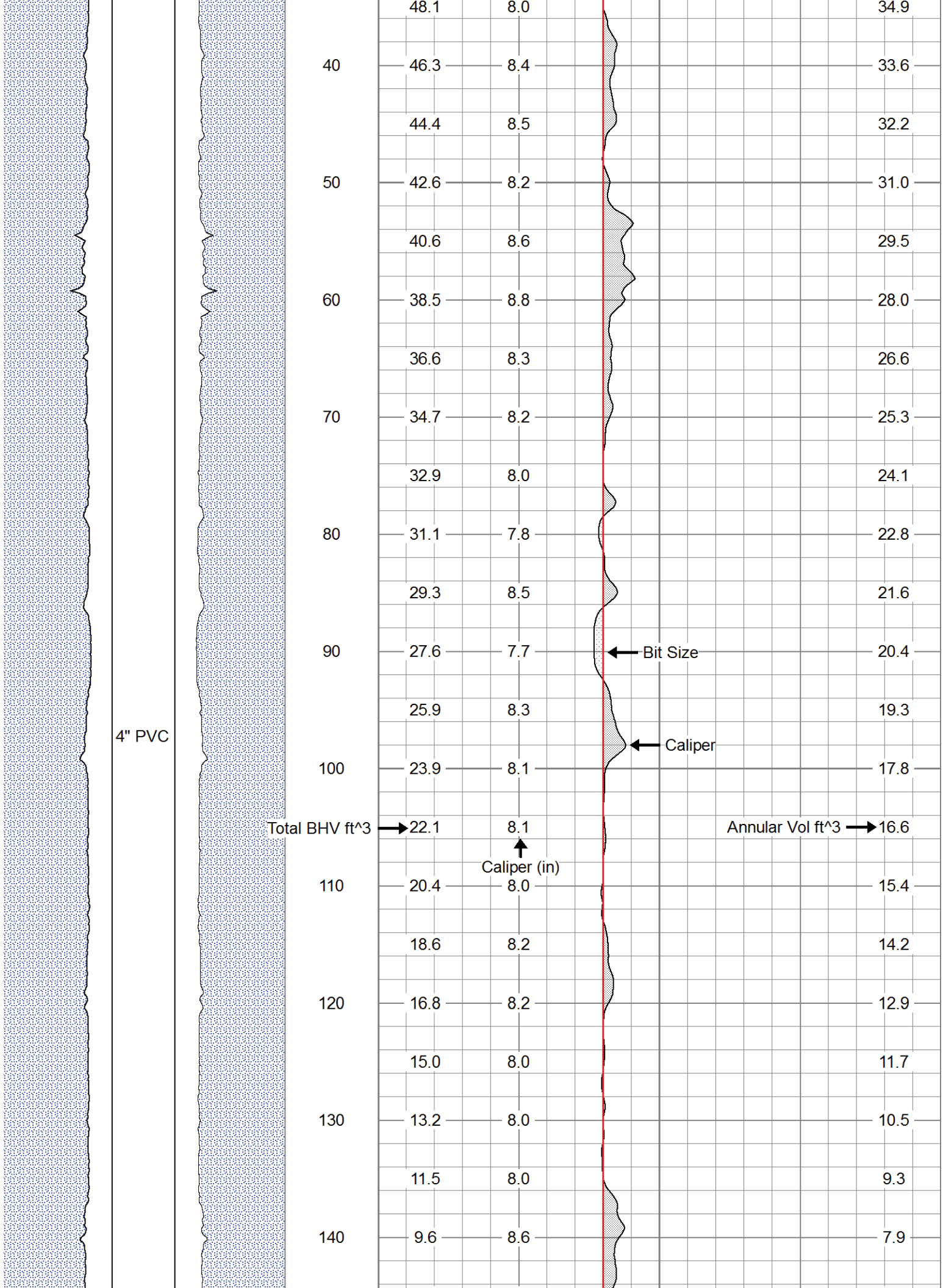
XY Caliper Calibration Report

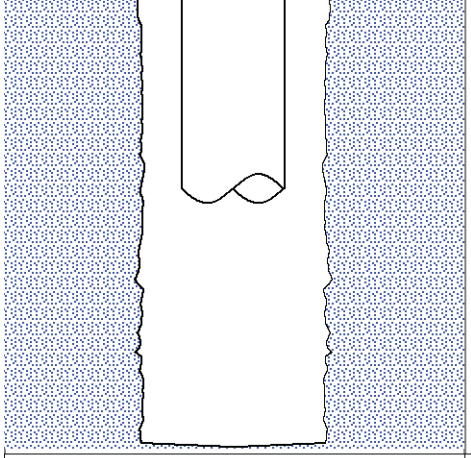
Serial Number/Model:	PS-1_Short-Comprobe
Performed:	Mon Sep 24 15:01:26 2012

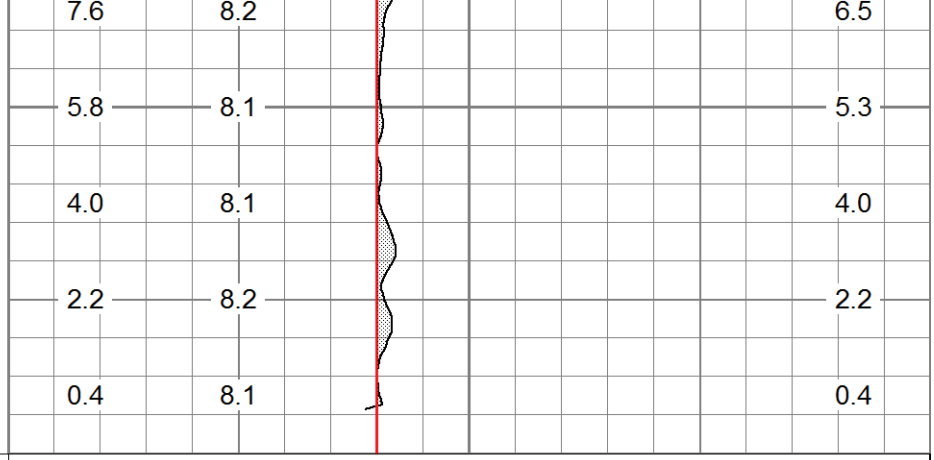
	Ring		X Caliper		Y Caliper	
1:	4	in	387.228	cps	387.22	cps
2:	6	in	501.837	cps	501.837	cps
3:	8	in	634.598	cps	634.598	cps
4:	14	in	1015.8	cps	1015.8	cps
5:	20	in	1402.99	cps	1402.99	cps
6:		in		cps		cps

Database File	16810.db
Dataset Pathname	CAL/CAL
Presentation Format	xyc_gph
Dataset Creation	Thu Oct 04 12:06:48 2012
Charted by	Depth in Feet scaled 1:120




4" PVC
Total BHV ft^3
Caliper (in)
Bit Size
Caliper
Annular Vol ft^3
40
50
60
70
80
90
100
110
120
130
140
48.1
46.3
44.4
42.6
40.6
38.5
36.6
34.7
32.9
31.1
29.3
27.6
25.9
23.9
22.1
20.4
18.6
16.8
15.0
13.2
11.5
9.6
8.0
8.4
8.5
8.2
8.6
8.8
8.3
8.2
8.0
7.8
8.5
7.7
8.3
8.1
8.1
8.0
8.2
8.2
8.0
8.0
8.0
8.6
34.9
33.6
32.2
31.0
29.5
28.0
26.6
25.3
24.1
22.8
21.6
20.4
19.3
17.8
16.6
15.4
14.2
12.9
11.7
10.5
9.3
7.9





CSG SCHEDULE

Pipe(s) proportional to Hole Size

0	Caliper (in)	20
0	Bit Size (in)	20

Total BHV ft^3 (ft3)	Caliper (in)	Annular Vol ft^ (ft3)

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No.
16810

File No.

Company ERM
Well PWA-5
Field BURBANK
County LOS ANGELES State CA

Location:

CHANDLER AND ORCHARD
GPS: 34o 10.639' W 118o 19.736'

Sec. Twp. Rge.

Other Services:

GR/LL3
SONIC/VDL
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10-04-2012		
Run Number	ONE		
Depth Driller	170'		
Depth Logger	168'		
Bottom Logged Interval	168'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.2 @ 76.7F		
Rmf @ Meas. Temp	7.1 @ 76.7F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	0945		
Time Logger on Bottom	1015		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File 16810.db
Dataset Pathname ELOG2
Dataset Creation Thu Oct 04 10:39:22 2012

ELOG Calibration Report

Serial:	D1
Model:	DTQ
Shop Calibration Performed:	Fri Aug 31 10:06:38 2012
Before Survey Verification Performed:	Fri Aug 31 10:09:27 2012
After Survey Verification Performed:	Fri Aug 31 10:11:46 2012

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	9.667	101.482		10.200	102.200	Ohm-m	1.002	0.514
Long	9.618	98.756		10.200	102.200	Ohm-m	1.032	-17.600
IEE	241.820	7561.640	counts	0.265	8.275	A		
VSN	94.920	8607.040	counts	1.810	164.169	V		
VLN	92.720	2183.960	counts	1.769	41.656	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	28.684	101.321		34.937	101.312	Ohm-m	0.914	8.726
Long	153.931	102.826		102.828	102.828	Ohm-m	0.659	35.059
IEE	245.260	7584.340	counts	0.268	8.300	A		
VSN	79.040	8633.620	counts	1.508	164.676	V		
VLN	106.040	2190.460	counts	2.023	41.780	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	28.273	101.325		28.684	101.321	Ohm-m	0.994	0.572
Long	152.477	102.843		102.826	102.826	Ohm-m	1.030	-3.065
IEE	249.140	7584.080	counts	0.273	8.300	A		
VSN	79.140	8633.680	counts	1.509	164.677	V		
VLN	106.700	2190.760	counts	2.035	41.786	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	34.937	28.684	Ohm-m	101.312	101.321	Ohm-m
Long	136.510	153.931	Ohm-m	102.828	102.826	Ohm-m

Gamma Ray Calibration Report

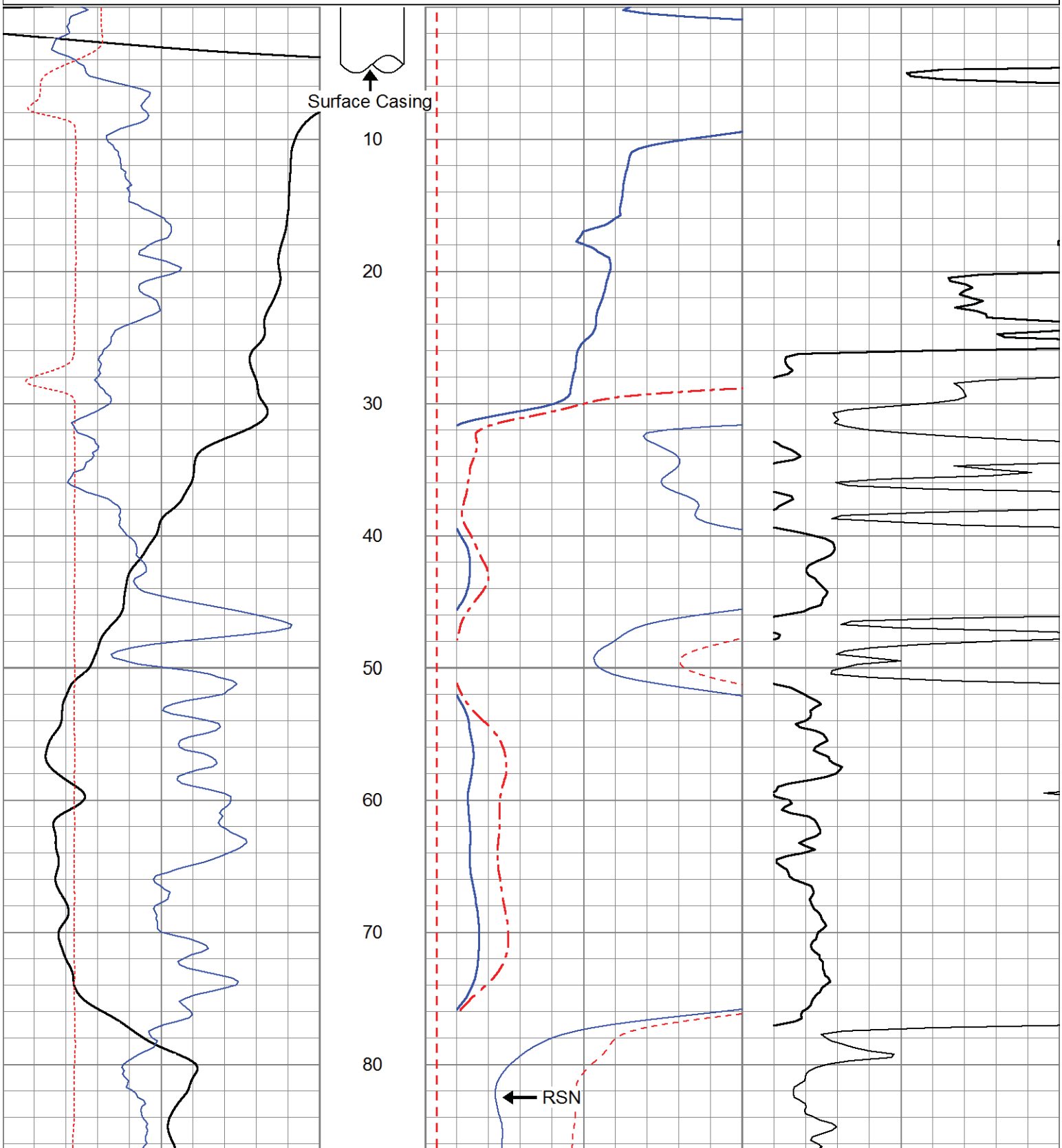
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Sat Apr 09 12:21:07 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	212.4	cps
Calibrator Reading:	707.5	cps
Sensitivity:	0.3272	GAPI/cps

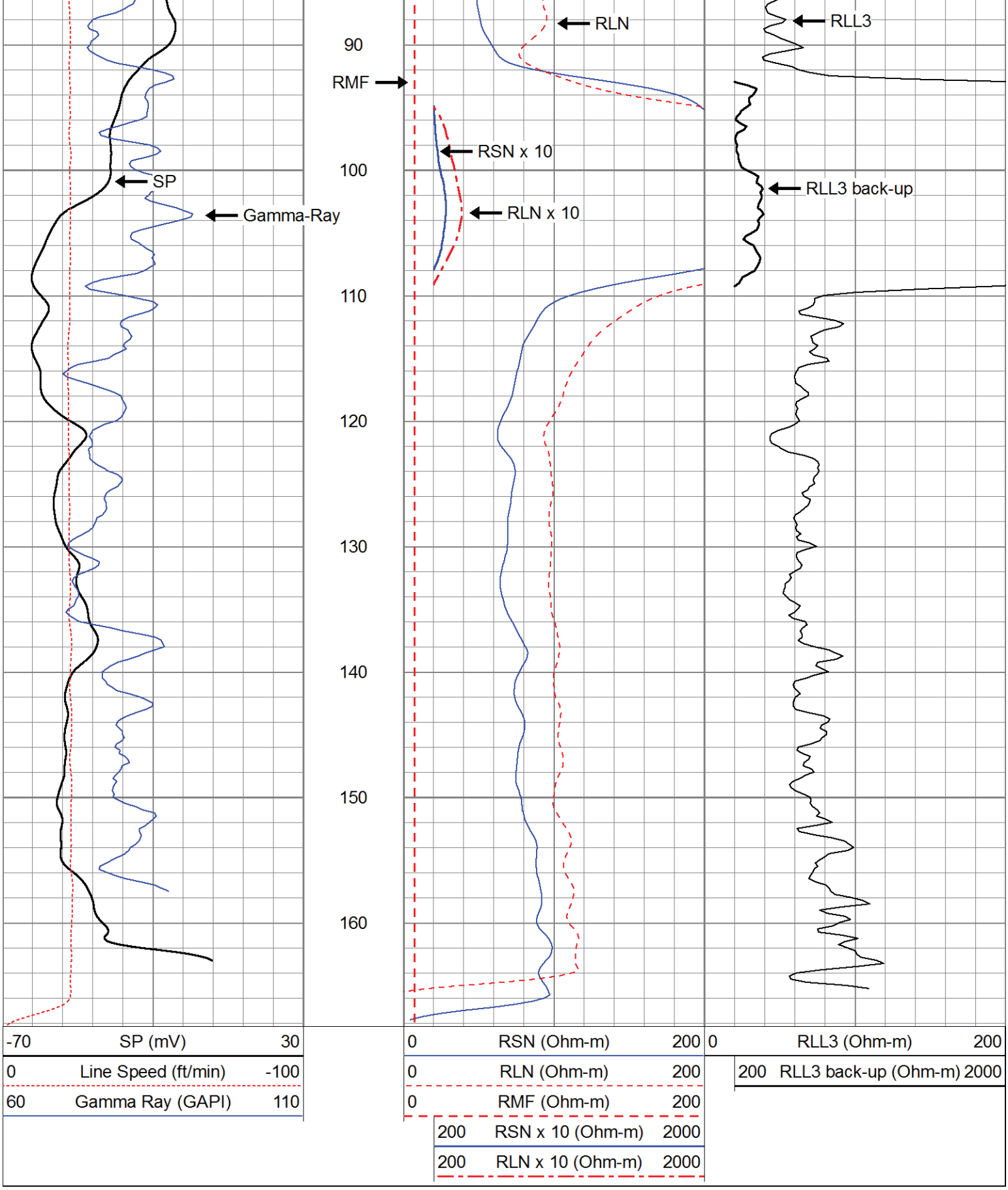
Database File	16810.db
Dataset Pathname	ELOG2
Presentation Format	elog
Dataset Creation	Thu Oct 04 10:39:22 2012
Charted by	Depth in Feet scaled 1:120

-70	SP (mV)	30
0	Line Speed (ft/min)	-100
60	Gamma Ray (GAPI)	110

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 back-up (Ohm-m)	2000




90
100
110
120
130
140
150
160
SP
Gamma-Ray
RMF
RLN
RSN x 10
RLN x 10
RLL3
RLL3 back-up
-70 SP (mV) 30
0 Line Speed (ft/min) -100
60 Gamma Ray (GAPI) 110
0 RSN (Ohm-m) 200
0 RLN (Ohm-m) 200
0 RMF (Ohm-m) 200
200 RSN x 10 (Ohm-m) 2000
200 RLN x 10 (Ohm-m) 2000
0 RLL3 (Ohm-m) 200
200 RLL3 back-up (Ohm-m) 2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
16810

File No.

Company	ERM
Well	PWA-5
Field	BURBANK
County	LOS ANGELES
State	CA

Location:

CHANDLER AND ORCHARD
GPS: 34o 10.639' W 118o 19.736'

Sec. Twp. Rge.

Other Services:

GR/ELOG
SONIC/VDL
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10-04-2012		
Run Number	ONE		
Depth Driller	170'		
Depth Logger	168'		
Bottom Logged Interval	168'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.2 @ 76.7F		
Rmf @ Meas. Temp	7.1 @ 76.7F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	0945		
Time Logger on Bottom	1015		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File 16810.db
Dataset Pathname LL3
Dataset Creation Thu Oct 04 10:59:10 2012

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Fri Apr 15 07:10:16 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	43.7	
Calibrator Reading:	168.2	
Sensitivity:	1.3020	GAPI/

RLL3 (Resistivity Laterolog 3) Calibration Report:

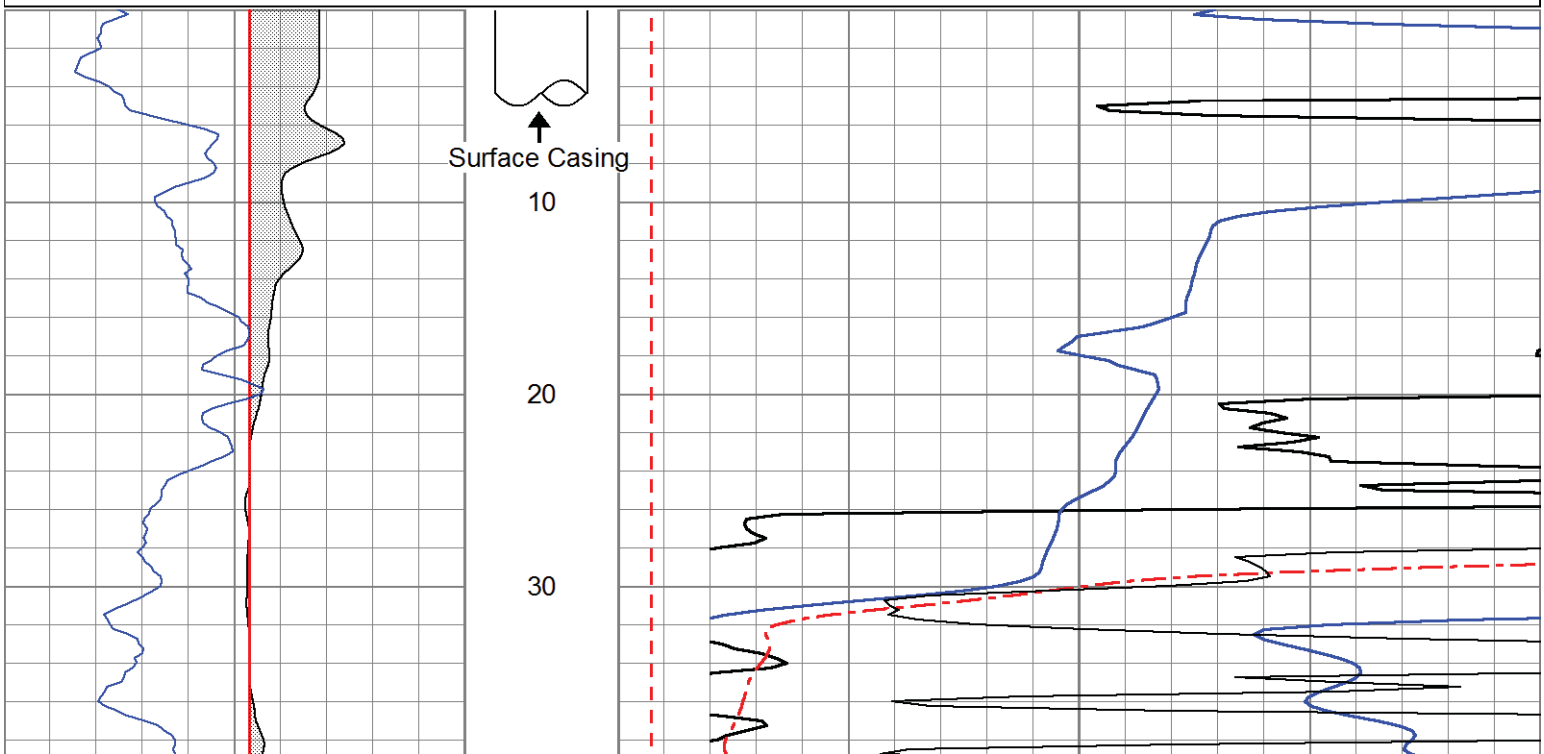
Serial Number:	130
Tool Model:	M&W
Performed:	Fri Aug 31 10:37:34 2012

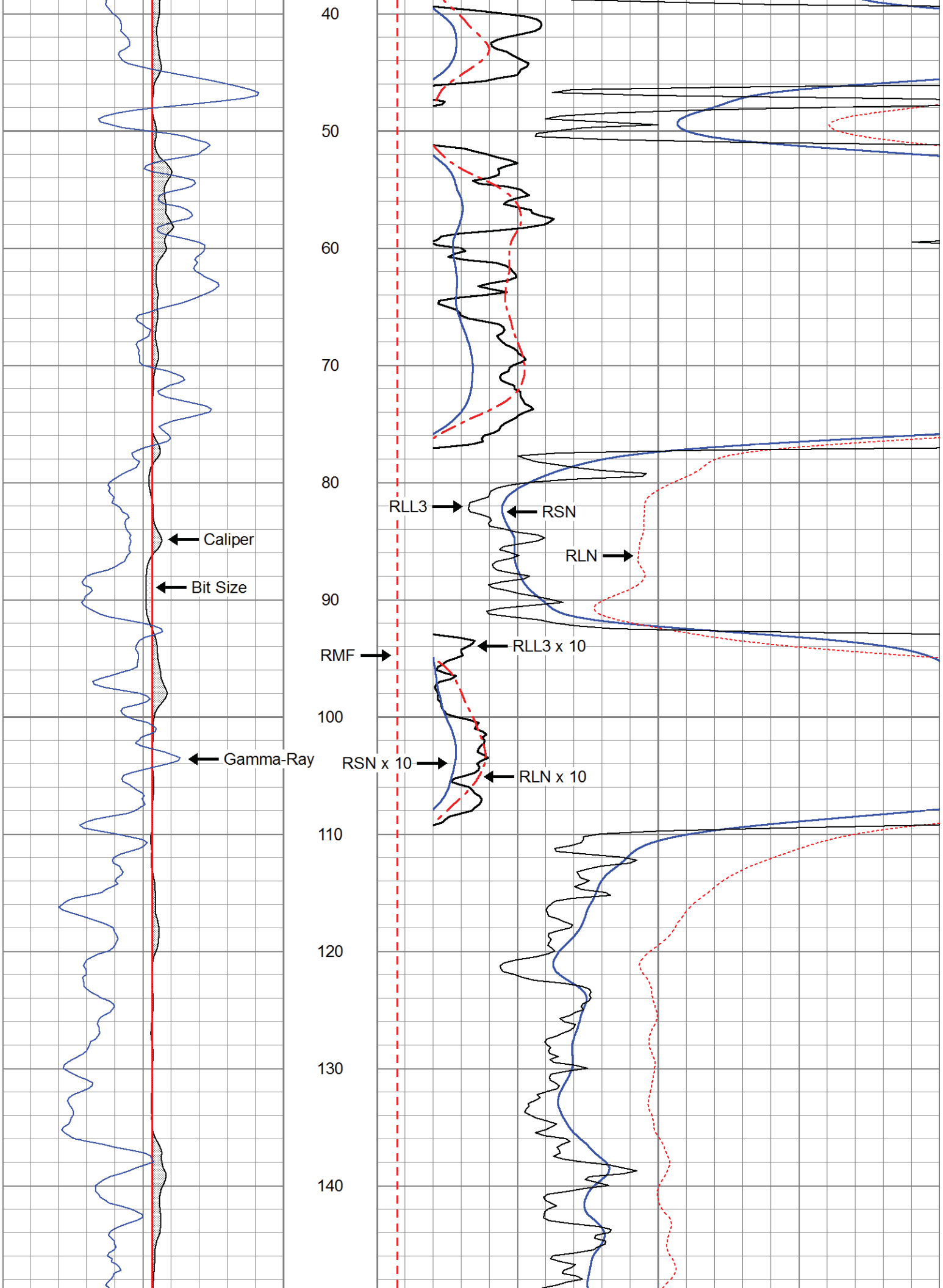
System Reading	Calibration Reference	
0.003	2.500	Ohm-m
0.007	5.000	
0.068	50.000	
0.356	250.000	
0.703	500.000	

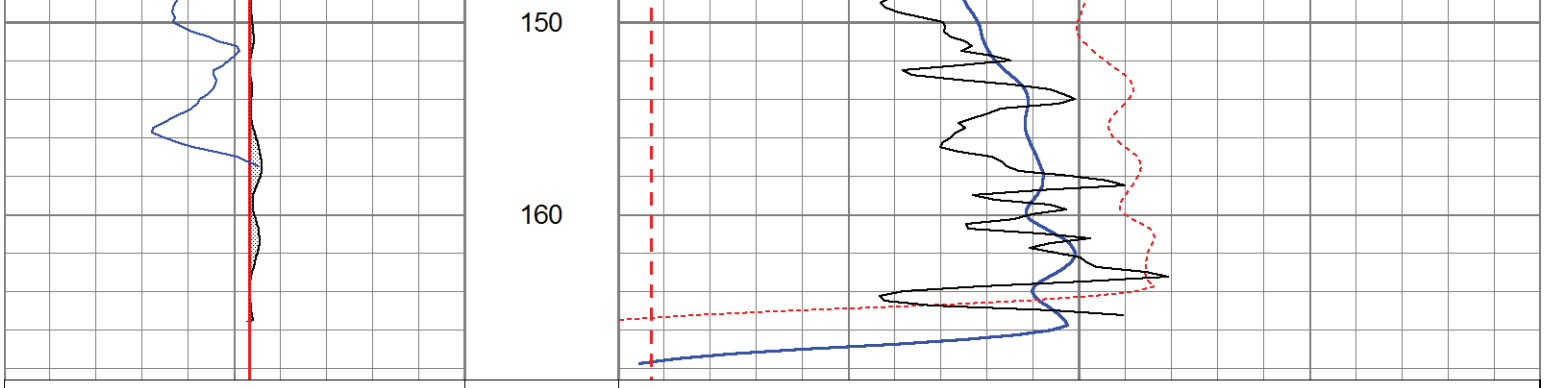
Database File	16810.db
Dataset Pathname	LL3
Presentation Format	guard
Dataset Creation	Thu Oct 04 10:59:10 2012
Charted by	Depth in Feet scaled 1:120

0	Caliper (in)	15
0	Bit Size (in)	15
60	Gamma-Ray (GAPI)	110

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000




40
50
60
70
80
90
100
110
120
130
140
Caliper
Bit Size
Gamma-Ray
RLL3
RSN
RLN
RMF
RLL3 x 10
RSN x 10
RLN x 10



0	Caliper (in)	15
0	Bit Size (in)	15
60	Gamma-Ray (GAPI)	110

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No.
16810

File No.

Company ERM
Well PWA-5
Field BURBANK
County LOS ANGELES State CA

Location:

CHANDLER AND ORCHARD
GPS: 34o 10.639' W 118o 19.736'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10-04-2012		
Run Number	ONE		
Depth Driller	170'		
Depth Logger	168'		
Bottom Logged Interval	168'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.2 @ 76.7F		
Rmf @ Meas. Temp	7.1 @ 76.7F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	0945		
Time Logger on Bottom	1015		
Max. Recorded Temperature	N/A		
Equipment Number	PS-5		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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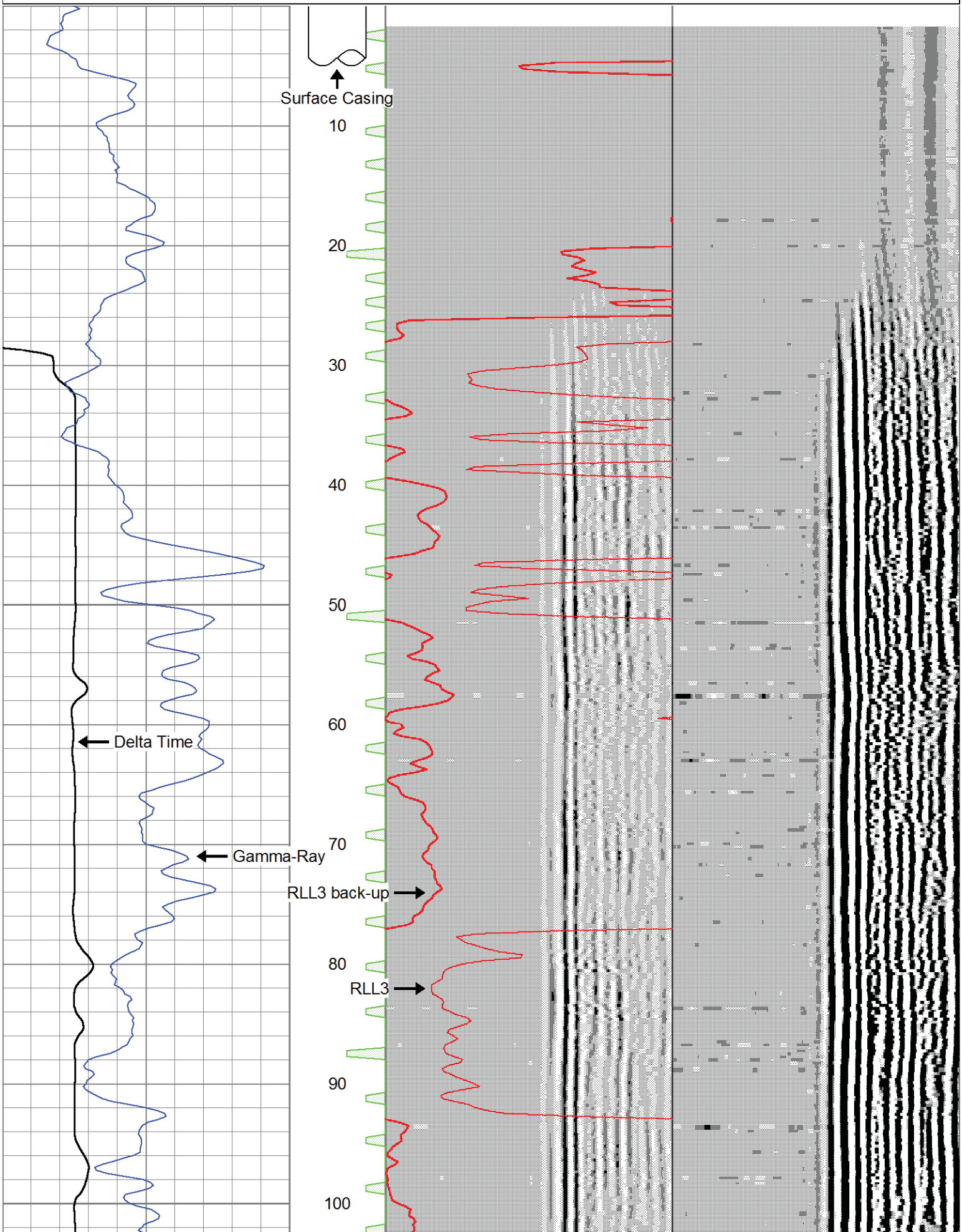
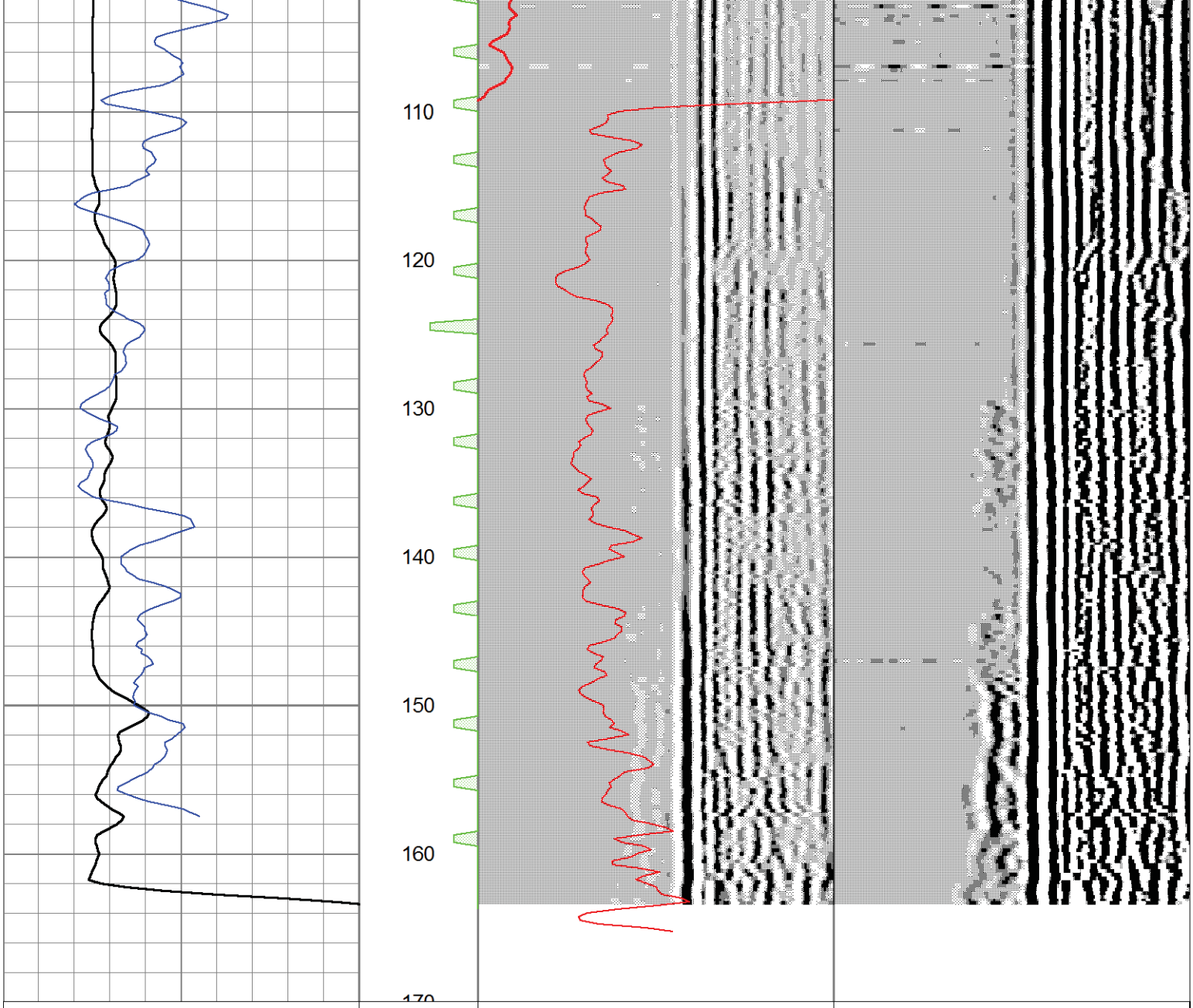
Comments

Database File 16810.db
Dataset Pathname SNC
Presentation Format slt
Dataset Creation Thu Oct 04 11:22:05 2012
Charted by Depth in Feet scaled 1:120

350	Delta Time (usec/ft)	50	ITT	600	Variable Density 5 ft	1600	600	Variable Density 5 ft	1600
60	Gamma-Ray (GAPI)	110	5 (msec) 0	0	RLL3 (Ohm-m)	200			
				200	RLL3 back-up (Ohm-m)	2000			




110
120
130
140
150
160
350 Delta Time (usec/ft) 50
60 Gamma-Ray (GAPI) 110
ITT
5 (msec) 0
600 Variable Density 5 ft 1600
0 RLL3 (Ohm-m) 200
200 RLL3 back-up (Ohm-m) 2000
600 Variable Density 5 ft 1600

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

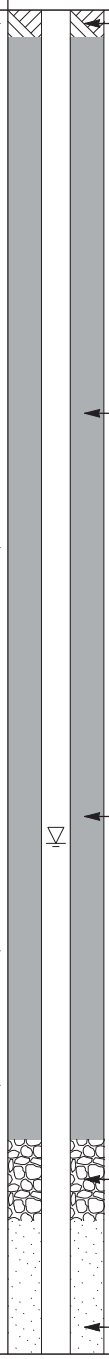
LOG OF MONITORING WELL: PWA-6

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 703 Hawthorne Street, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 4/20/2012
Date Completed: 4/24/2012
Total Depth: 115 feet
Borehole Diameter: 8"
Initial Water Level: 31 feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1875237.98
Easting: 6480118.65
TOC/Surface Elevation: 476.18/476.52

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Asphalt Surface 4.0" thick
			SW		SAND, yellowish brown (10YR 5/4), dry, fine to coarse grained, subangular, with trace mica
5					
					Becomes moist
10					
15					
20			SP		SAND, dark yellowish brown (10YR 4/4), fine to medium grained, subrounded, with some mica
25					
30					Becomes medium to coarse grained, subrounded to rounded Groundwater encountered at approximately 31' bgs
35			SW		SAND, brown (10YR 4/3), fine to medium grained, some coarse grained sand, subrounded to rounded
40			SP		SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with some fines
45					

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:00 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-6.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

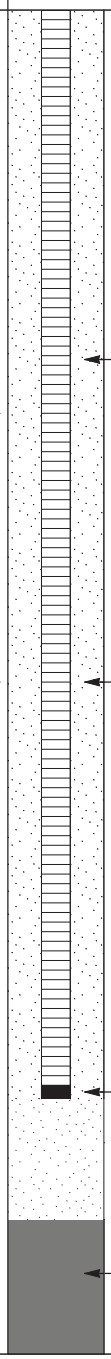
LOG OF MONITORING WELL: PWA-6

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 703 Hawthorne Street, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 4/20/2012
Date Completed: 4/24/2012
Total Depth: 115 feet
Borehole Diameter: 8"
Initial Water Level: 31 feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1875237.98
Easting: 6480118.65
TOC/Surface Elevation: 476.18/476.52

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			SP		SAND, brown (10YR 4/3), fine to medium grained, subrounded to subangular, with some fines
55					Becomes subrounded to rounded
60					SAND, yellowish brown (10YR 4/4), fine grained, trace medium grained, with some fines
65			SW		SAND, yellowish brown (10YR 4/4), fine to medium grained, some coarse grained sand, subrounded to subangular
70					Increased coarse grained sand, subrounded to subangular
75			SP		SAND, yellowish brown (10YR 4/4), fine to medium grained, some fines, with some mica
80					
85					Decreasing sand, possible gravel or cobbles (rig bouncing at 87'bgs)
90					SAND (low return), yellowish brown (10YR 4/4), fine grained, with abundant mica, some medium grained sand
95					

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:00 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-6.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-6

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 703 Hawthorne Street, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 4/20/2012
Date Completed: 4/24/2012
Total Depth: 115 feet
Borehole Diameter: 8"
Initial Water Level: 31 feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1875237.98
Easting: 6480118.65
TOC/Surface Elevation: 476.18/476.52

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations	WELL DIAGRAM
					SAND, yellowish brown (10YR 4/4), fine grained, with some mica	
105			SP			Bentonite Chips
110					SAND, yellowish brown (10YR 4/4), medium to coarse grained, subangular	
			SP			
					SAND, yellowish brown (10YR 4/4), fine to medium grained, with trace mica	
115					Total Depth - 115 feet bgs	
120						
125						
130						
135						
140						
145						

GCOU MW TO 50FT IRVINE - - 5/30/13 16:00 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-6.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

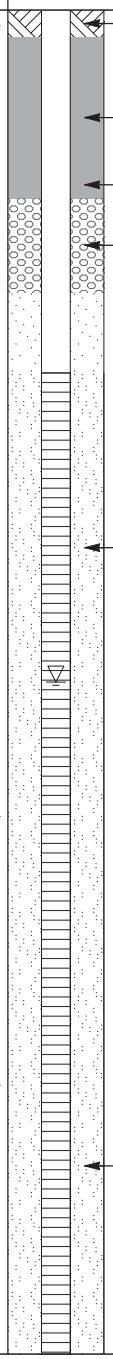
LOG OF MONITORING WELL: PWA-7

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 4560 Doran Street, Los Angeles, California
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Sampling Method: Cal-Mod Split Spoon
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 3/9/2012
Date Completed: 3/12/2012
Total Depth: 60 feet
Borehole Diameter: 8"
Initial Water Level: 25 feet bgs
Notes: Air knifed to approximately 8.5 feet bgs
Northing: 1878185.19
Easting: 6477606.15
TOC/Surface Elevation: 449.62/450.11

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Asphalt Surface 7.0" thick
			SW		SAND, yellowish brown (10YR 5/4), dry, fine to coarse grained, very loose, well graded, subrounded to subangular
5					
10	X	4.5			SAND, very dark grayish brown (10YR 3/2), moist, fine to medium grained, very loose, well graded, subrounded, trace coarse grained sand, with trace mica,
15					
20	X	4.5			SAND, as above, becomes olive brown (2.5Y 4/4), subrounded to subangular
25					Groundwater encountered at ~25' bgs
30	X	6.8	SP		SAND, dark grayish brown (2.5Y 4/2), wet, loose, medium to coarse grained, poorly graded, subrounded to subangular, with trace mica
35					
40	X	8.3	SW		SAND, dark grayish brown (2.5Y 4/2), wet, loose, fine to coarse grained, well graded, some mica, with trace fines
45					
	X				

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:01 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-7.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

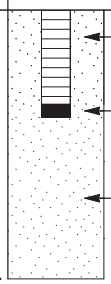
LOG OF MONITORING WELL: PWA-7

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 4560 Doran Street, Los Angeles, California
Contractor: Cascade Drilling
Drilling Method: Hollow Stem Auger
Sampling Method: Cal-Mod Split Spoon
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 3/9/2012
Date Completed: 3/12/2012
Total Depth: 60 feet
Borehole Diameter: 8"
Initial Water Level: 25 feet bgs
Notes: Air knifed to approximately 8.5 feet bgs
Northing: 1878185.19
Easting: 6477606.15
TOC/Surface Elevation: 449.62/450.11

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
		8.8			SAND, dark grayish brown (2.5Y 4/2), wet, loose, fine to coarse grained, fine gravel at 50.5' bgs, well graded, subrounded to subangular, some fines throughout, with abundant mica
55			SW		
					Becomes olive brown (2.5Y 4/3), fining upwards
60		7.9			Total Depth - 60 feet bgs
65					
70					
75					
80					
85					
90					
95					

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:01 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-7.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

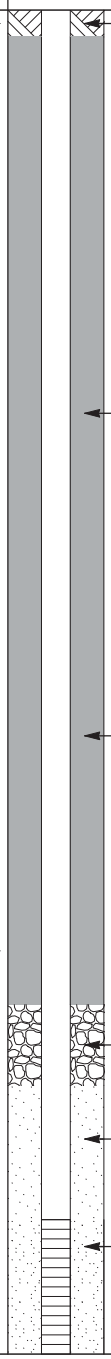
LOG OF MONITORING WELL: PWA-8

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 1851 Victory Blvd., Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 5/14/2012
Date Completed: 5/15/2012
Total Depth: 95 feet
Borehole Diameter: 8"
Initial Water Level: 52 feet bgs
Notes: Air Knifed to approximately 10 feet bgs.
Northing: 188223.71
Easting: 6469928.59
TOC/Surface Elevation: 498.70/499.09

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Asphalt Surface 4.0" thick
			SP		SAND, very dark grayish brown (2.5Y 3/2), moist, fine grained, with abundant mica
5					
10					
15					SAND, brown (10YR 4/3), fine grained, with some mica
20					
25					
30					SAND, very dark grayish brown (2.5Y 3/2), fine grained, with abundant mica
35			SW		SAND, brown (10YR 4/3), fine to medium grained, trace mica
40					
45					SAND, brown (10YR 4/3), fine to coarse grained, trace angular granitic gravel (possibly cobbles)

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:03 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-8.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

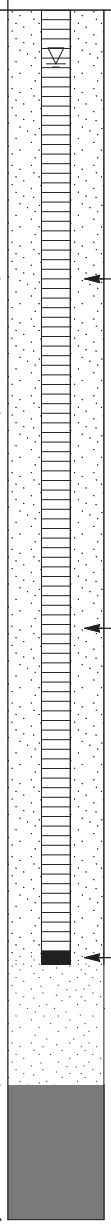
LOG OF MONITORING WELL: PWA-8

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 1851 Victory Blvd., Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 5/14/2012
Date Completed: 5/15/2012
Total Depth: 95 feet
Borehole Diameter: 8"
Initial Water Level: 52 feet bgs
Notes: Air Knifed to approximately 10 feet bgs.
Northing: 188223.71
Easting: 6469928.59
TOC/Surface Elevation: 498.70/499.09

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
55			SW		SAND, brown (10YR 4/3), fine to coarse grained, trace mica
60			SW		Gravelly SAND, brown (10YR 4/3), fine to coarse grained, some fine grained subrounded gravel, trace angular fine grained gravel (possibly cobbles)
65			SW		SAND, brown (10YR 4/3), fine to coarse grained, trace mica
70			SW		SAND, brown (10YR 4/3), fine to coarse grained, trace fine grained subrounded gravel
75			SW		
80			SW		
85			SW		SAND, brown (10YR 4/3), fine to medium grained, trace mica
90			SW		SAND with Gravel, brown (10YR 4/3), fine to coarse grained, trace subangular fine grained gravel
95					Total Depth - 95 feet bgs

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:03 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-8.GPJ

PACIFIC SURVEYS

CALIPER
BOREHOLE VOLUMES

Job No.
16530

File No.

Company	ERM
Well	PWA-8
Field	GLENDALE
County	LOS ANGELES
State	CA

Location:

1851 VICTORY BLVD.
GPS: N 34o 09.816' W 118o 18.214'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG

Permanent Datum	G.L.		Elevation above perm. datum	Elevation
Log Measured From	G.L.	0'		K.B.
Drilling Measured From	G.L.			D.F.
				G.L.

Date	05-15-2012		
Run Number	ONE		
Depth Driller	95'		
Depth Logger	95.5'		
Bottom Logged Interval	95.5'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.4 @ 77F		
Rmf @ Meas. Temp	8.1 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1/2 HR		
Time Logger on Bottom	1030		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

Calibration Report

Database File 16530.db
Dataset Pathname CAL/CAL.1
Dataset Creation Tue May 15 20:41:09 2012

Temperature Calibration Report

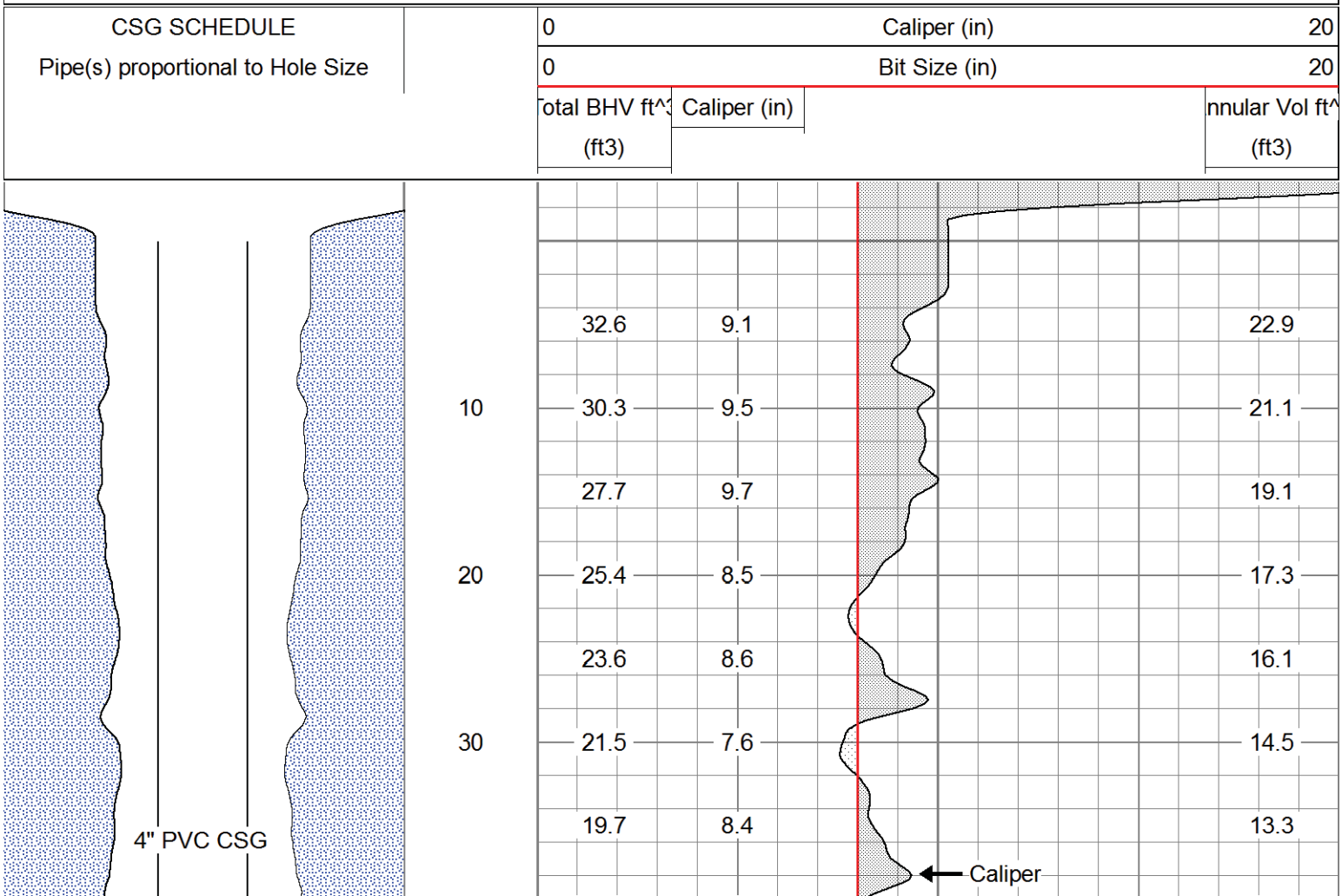
Serial Number:	PS-1_Short		
Tool Model:	Short_GPH		
Performed:	Mon Jan 23 15:20:46 2012		
	Reference		Reading
Low Reference:	1.88	degF	422.31 cps
High Reference:	7.00	degF	1405.64cps
Gain:	0.01		
Offset:	-0.33		
Delta Spacing	1		

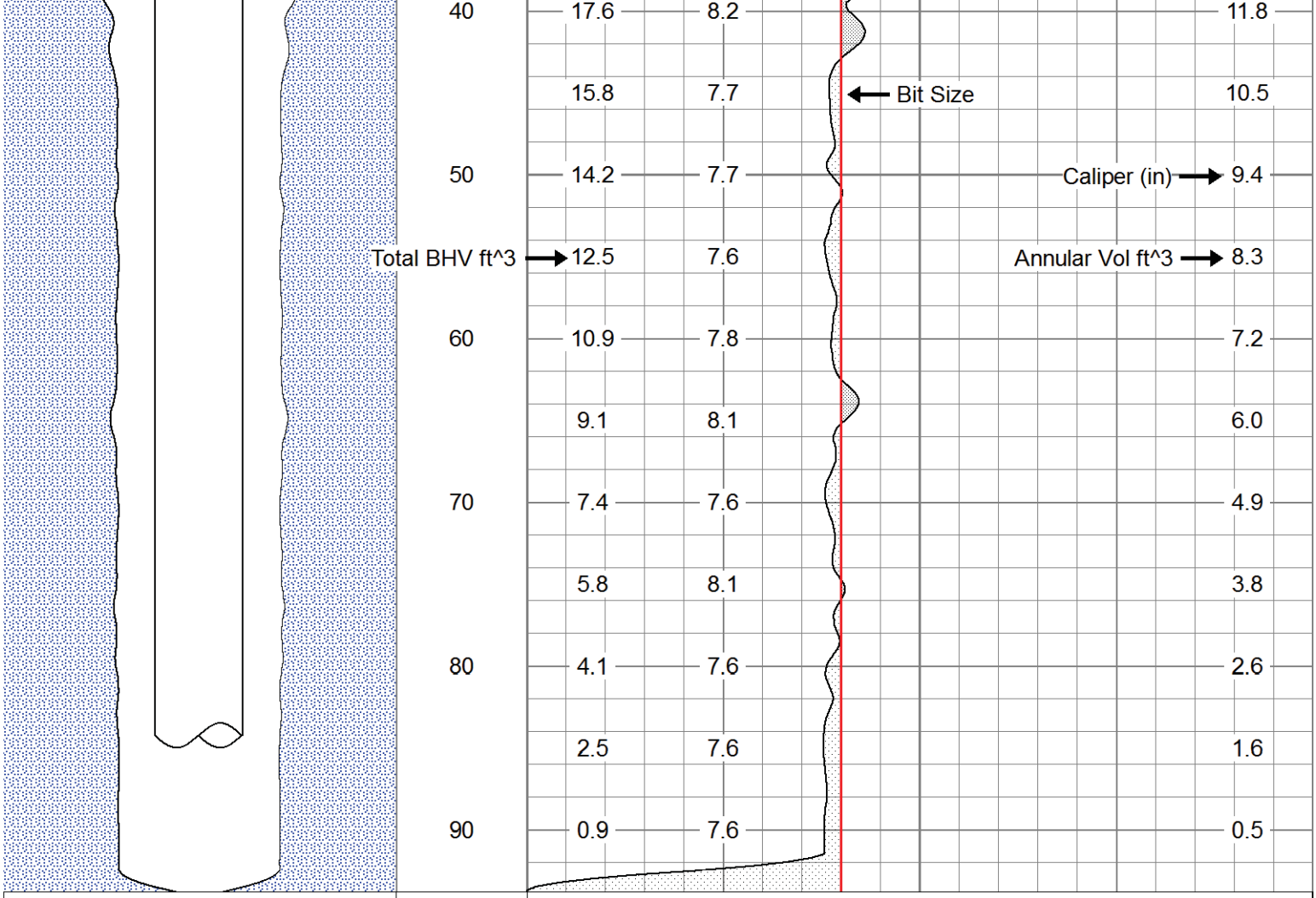
XY Caliper Calibration Report

Serial Number/Model:	PS-1_Short-Comprobe
Performed:	Mon Jan 23 15:20:51 2012

	Ring		X Caliper		Y Caliper	
1:	3.75	in	422.314	cps	422.314	cps
2:	5.75	in	629.242	cps	629.242	cps
3:	8	in	855.977	cps	855.977	cps
4:	14	in	1405.64	cps	1405.64	cps
5:	20	in	1982.8	cps	1982.8	cps
6:		in		cps		cps

Database File	16530.db
Dataset Pathname	CAL/CAL.1
Presentation Format	xyc_gph
Dataset Creation	Tue May 15 20:41:09 2012
Charted by	Depth in Feet scaled 1:120





CSG SCHEDULE

Pipe(s) proportional to Hole Size

0	Caliper (in)	20
0	Bit Size (in)	20

Total BHV ft^3 (ft3) | Caliper (in) | Annular Vol ft^ (ft3)

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No.
16530

File No.

Company ERM
Well PWA-8
Field GLENDALE
County LOS ANGELES State CA

Location:

1851 VICTORY BLVD.
GPS: N 34o 09.816' W 118o 18.214'

Sec. Twp. Rge.

Other Services:

GR/LL3
CALIPER

Permanent Datum	G.L.		Elevation above perm. datum	Elevation
Log Measured From	G.L.	0'		K.B.
Drilling Measured From	G.L.			D.F.
				G.L.

Date	05-15-2012		
Run Number	ONE		
Depth Driller	95'		
Depth Logger	95.5'		
Bottom Logged Interval	95.5'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.4 @ 77F		
Rmf @ Meas. Temp	8.1 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1/2 HR		
Time Logger on Bottom	1030		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File 16530.db
Dataset Pathname elog.1
Dataset Creation Tue May 15 17:58:30 2012

ELOG Calibration Report

Serial:	D4
Model:	DTQ
Shop Calibration Performed:	Tue Mar 27 11:06:58 2012
Before Survey Verification Performed:	Sun Sep 09 13:17:43 2007
After Survey Verification Performed:	Sun Sep 09 13:17:48 2007

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	9.071	100.688		10.200	102.200	Ohm-m	1.004	1.091
Long	7.302	96.917		10.200	102.200	Ohm-m	1.027	-17.000
IEE			counts			A		
VSN			counts			V		
VLN			counts			V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.249	101.201		40.505	101.206	Ohm-m	0.996	0.422
Long	142.638	102.842		102.858	102.858	Ohm-m	1.024	-2.408
IEE			counts			A		
VSN			counts			V		
VLN			counts			V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.270	101.200		40.249	101.201	Ohm-m	1.000	-0.035
Long	142.491	102.843		102.842	102.842	Ohm-m	1.004	-0.383
IEE			counts			A		
VSN			counts			V		
VLN			counts			V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	40.505	40.249	Ohm-m	101.206	101.201	Ohm-m
Long	143.592	142.638	Ohm-m	102.858	102.842	Ohm-m

Gamma Ray Calibration Report

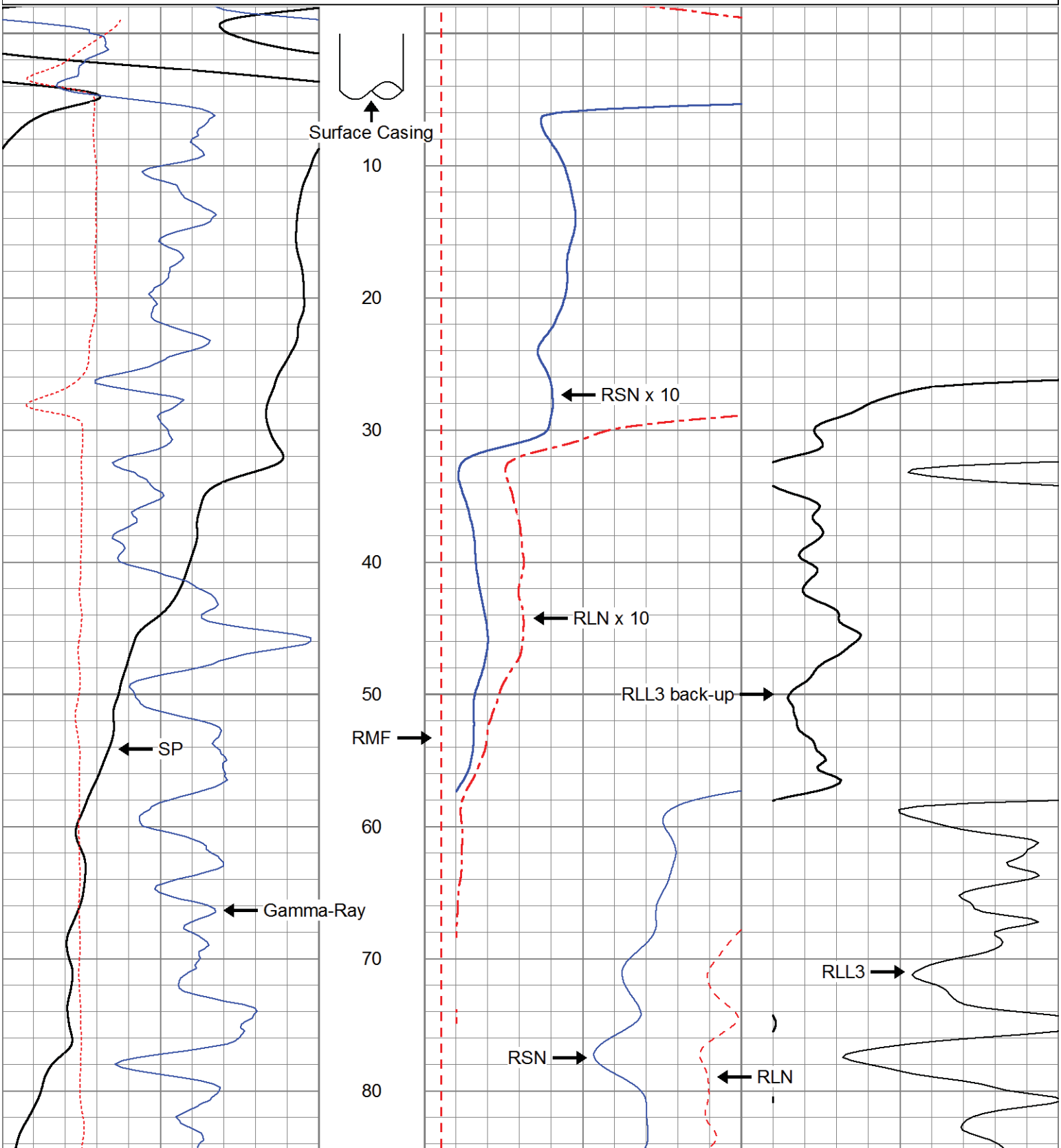
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Thu Jan 20 08:42:38 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	173.2	cps
Calibrator Reading:	678.3	cps
Sensitivity:	0.3207	GAPI/cps

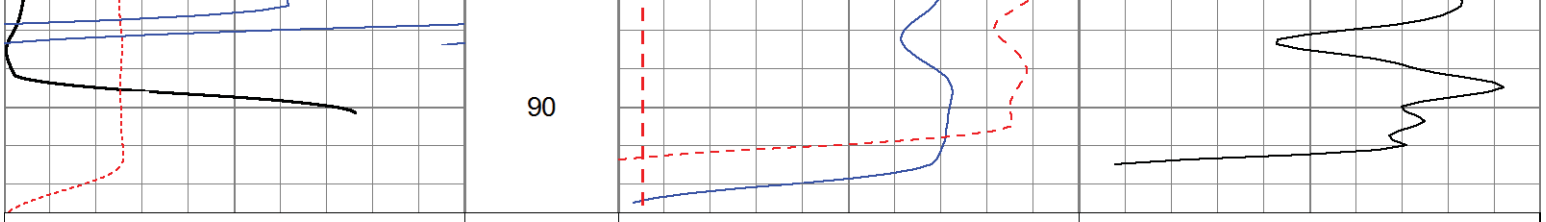
Database File	16530.db
Dataset Pathname	elog.1
Presentation Format	elog
Dataset Creation	Tue May 15 17:58:30 2012
Charted by	Depth in Feet scaled 1:120

-115	SP (mV)	35
0	Line Speed (ft/min)	-100
55	Gamma-Ray (GAPI)	105

0	RSN (Ohm-m)	150
0	RLN (Ohm-m)	150
0	RMF (Ohm-m)	150
150	RSN x 10 (Ohm-m)	1500
150	RLN x 10 (Ohm-m)	1500

0	RLL3 (Ohm-m)	150
150	RLL3 back-up (Ohm-m)	1500




90
-115 SP (mV) 35
0 Line Speed (ft/min) -100
55 Gamma-Ray (GAPI) 105
0 RSN (Ohm-m) 150
0 RLN (Ohm-m) 150
0 RMF (Ohm-m) 150
150 RSN x 10 (Ohm-m) 1500
150 RLN x 10 (Ohm-m) 1500
0 RLL3 (Ohm-m) 150
150 RLL3 back-up (Ohm-m) 1500

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
16530

File No.

Company	ERM
Well	PWA-8
Field	GLENDALE
County	LOS ANGELES
State	CA

Location:

1851 VICTORY BLVD.
GPS: N 34o 09.816' W 118o 18.214'

Sec. Twp. Rge.

Other Services:

GR/ELOG
CALIPER

Permanent Datum	G.L.		Elevation above perm. datum	Elevation
Log Measured From	G.L.	0'		K.B.
Drilling Measured From	G.L.			D.F.
				G.L.

Date	05-15-2012		
Run Number	ONE		
Depth Driller	95'		
Depth Logger	95.5'		
Bottom Logged Interval	95.5'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.4 @ 77F		
Rmf @ Meas. Temp	8.1 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1/2 HR		
Time Logger on Bottom	1030		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File	16530.db
Dataset Pathname	LL3
Dataset Creation	Tue May 15 18:18:15 2012

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Thu Jan 20 09:04:17 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	30.6	
Calibrator Reading:	128.2	
Sensitivity:	1.6595	GAPI/

RLL3 (Resistivity Laterolog 3) Calibration Report:

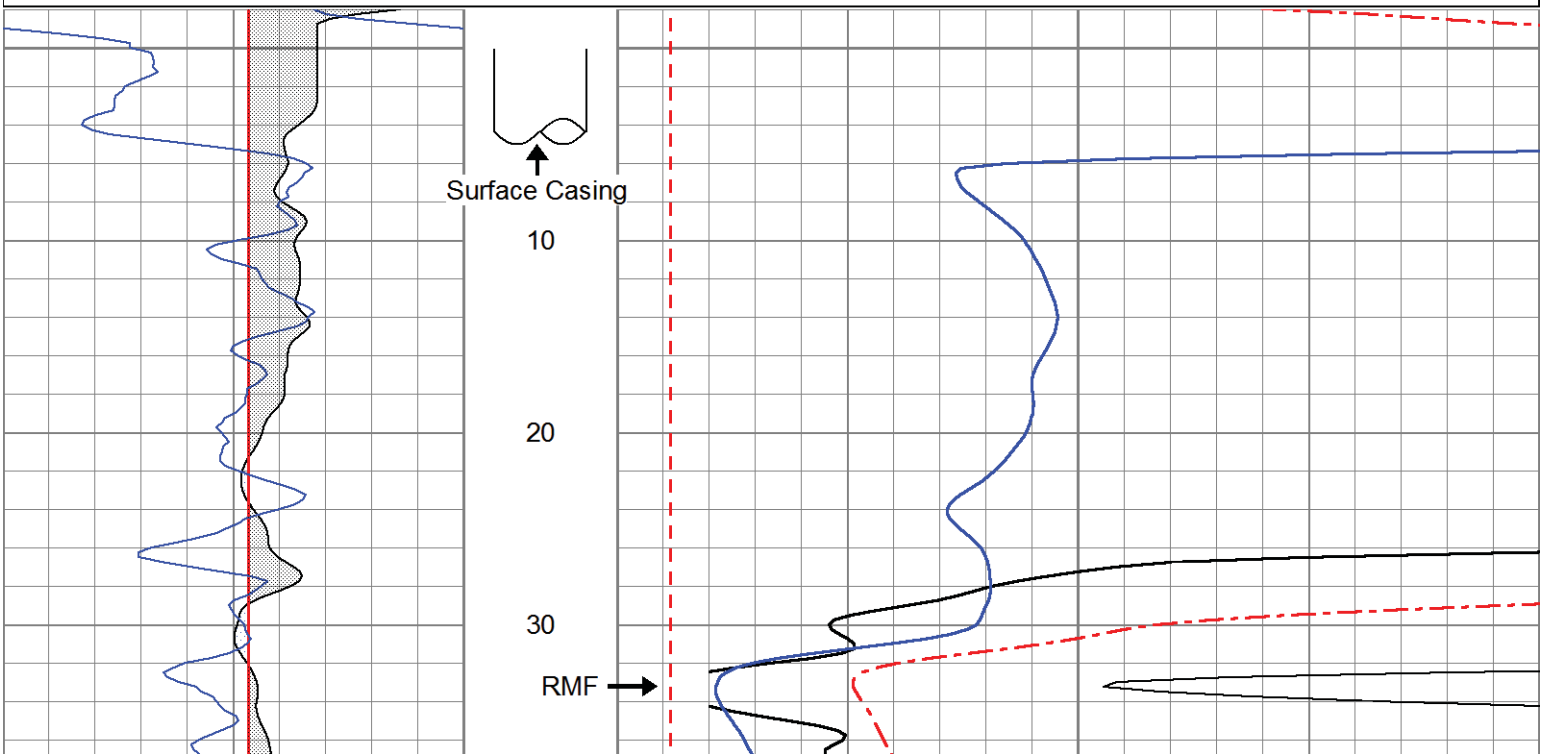
Serial Number:	883
Tool Model:	M&W
Performed:	Sat May 05 12:09:11 2012

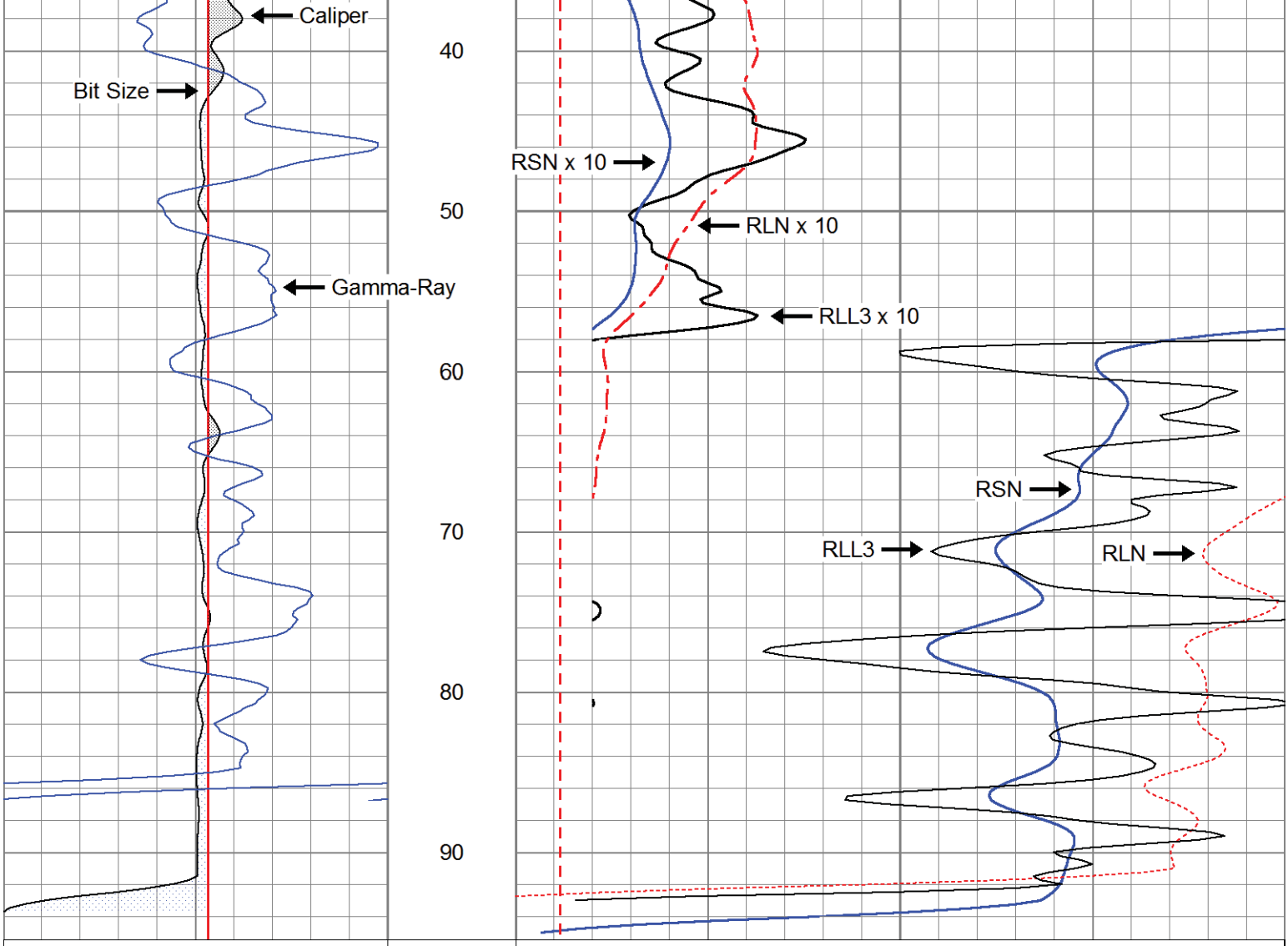
System Reading	Calibration Reference	
0.015	2.500	Ohm-m
0.028	5.000	
0.262	50.000	
1.178	250.000	
2.076	500.000	

Database File	16530.db
Dataset Pathname	LL3
Presentation Format	guard
Dataset Creation	Tue May 15 18:18:15 2012
Charted by	Depth in Feet scaled 1:120

0	Caliper (in)	15
0	Bit Size (in)	15
55	Gamma-Ray (GAPI)	105

0	RSN (Ohm-m)	150
0	RLN (Ohm-m)	150
0	RMF (Ohm-m)	150
0	RLL3 (Ohm-m)	150
150	RLL3 x 10 (Ohm-m)	1500
150	RSN x 10 (Ohm-m)	1500
150	RLN x 10 (Ohm-m)	1500





0	Caliper (in)	15
0	Bit Size (in)	15
55	Gamma-Ray (GAPI)	105

0	RSN (Ohm-m)	150
0	RLN (Ohm-m)	150
0	RMF (Ohm-m)	150
0	RLL3 (Ohm-m)	150
150	RLL3 x 10 (Ohm-m)	1500
150	RSN x 10 (Ohm-m)	1500
150	RLN x 10 (Ohm-m)	1500

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

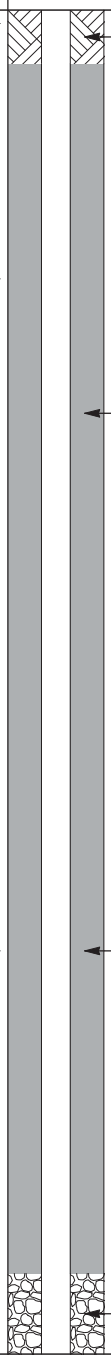
LOG OF MONITORING WELL: PWA-9

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 6501 San Fernando Road, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 6/11/2012
Date Completed: 6/14/2012
Total Depth: 110 feet
Borehole Diameter: 8"
Initial Water Level: 54 feet bgs
Notes: Air Knifed to approximately 10 feet bgs
Northing: 1883532.94
Easting: 6473710.3
TOC/Surface Elevation: 507.94/508.32

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Aspalt Surace 4.0" thick
			ML-SM		Sandy SILT, dark brown (7.5 YR 3/2), dry, loose, fine grained sand, trace fine grained subrounded gravel, with some mica
5					
10			SP		SAND, dark grayish brown (10YR 4/2), dry, loose, fine to medium grained, trace fine grained subangular gravel
15					SAND, dark grayish brown (10YR 4/2), medium to coarse grained, subangular
20					SAND, dark grayish brown (10YR 4/2), fine to medium grained
25					
30					SAND, dark grayish brown (10YR 4/2), fine to medium grained, trace fine grained subangular gravel
35			SW		SAND, dark grayish brown (10YR 4/2), fine to coarse grained, subangular
40					SAND, dark grayish brown (10YR 4/2), fine to coarse grained, subangular, possible cobbles (rig bouncing 41-45' bgs)
45					

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:05 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-9.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

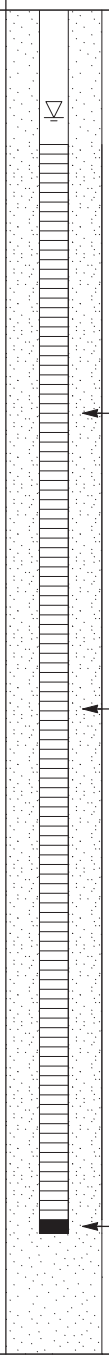
LOG OF MONITORING WELL: PWA-9

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 6501 San Fernando Road, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 6/11/2012
Date Completed: 6/14/2012
Total Depth: 110 feet
Borehole Diameter: 8"
Initial Water Level: 54 feet bgs
Notes: Air Knifed to approximately 10 feet bgs
Northing: 1883532.94
Easting: 6473710.3
TOC/Surface Elevation: 507.94/508.32

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					SAND, dark grayish brown (10YR 4/2), fine to coarse grained, subangular
55					Becomes fine to medium grained
60					
65					
70			SW		
75					
80					SAND, dark grayish brown (10YR 4/2), fine to coarse grained, subangular
85					Possible cobbles (rig bouncing 85-90' bgs)
90					SAND, dark grayish brown (10YR 4/2), fine to coarse grained, subangular
95			SM		

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:05 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-9.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-9

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 6501 San Fernando Road, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 6/11/2012
Date Completed: 6/14/2012
Total Depth: 110 feet
Borehole Diameter: 8"
Initial Water Level: 54 feet bgs
Notes: Air Knifed to approximately 10 feet bgs
Northing: 1883532.94
Easting: 6473710.3
TOC/Surface Elevation: 507.94/508.32

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations	WELL DIAGRAM
105			SM		SAND, dark grayish brown (10YR 4/2), fine to coarse grained, subangular	Bentonite Chips
110					Total Depth - 110 feet bgs	
115						
120						
125						
130						
135						
140						
145						

GCOU MW TO 50FT IRVINE - - 5/30/13 16:05 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-9.GPJ

PACIFIC SURVEYS

CALIPER
BOREHOLE VOLUMES

Job No.
16621

File No.

Company	ERM
Well	PWA-9
Field	GLENDALE
County	LOS ANGELES
State	CA

Location:

6501 SAN FERNANDO ROAD.
GPS: N 34o 10.062' W 118o 17.458'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG

				Elevation
Permanent Datum	G.L.		Elevation above perm. datum	K.B.
Log Measured From	G.L.	0'		D.F.
Drilling Measured From	G.L.			G.L.

Date	06-13-2012		
Run Number	ONE		
Depth Driller	110'		
Depth Logger	110'		
Bottom Logged Interval	110'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.1 @ 77F		
Rmf @ Meas. Temp	8.0 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	0845		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

Calibration Report

Database File 16621.db
Dataset Pathname CAL/CAL.2
Dataset Creation Wed Jun 13 10:49:28 2012

Temperature Calibration Report

Serial Number:	PS-1_Short			
Tool Model:	Short_GPH			
Performed:	Mon Jan 23 15:20:46 2012			
	Reference		Reading	
Low Reference:	2.00	degF	323.33	cps
High Reference:	10.00	degF	834.16	cps
Gain:	0.02			
Offset:	-3.06			
Delta Spacing	1			

XY Caliper Calibration Report

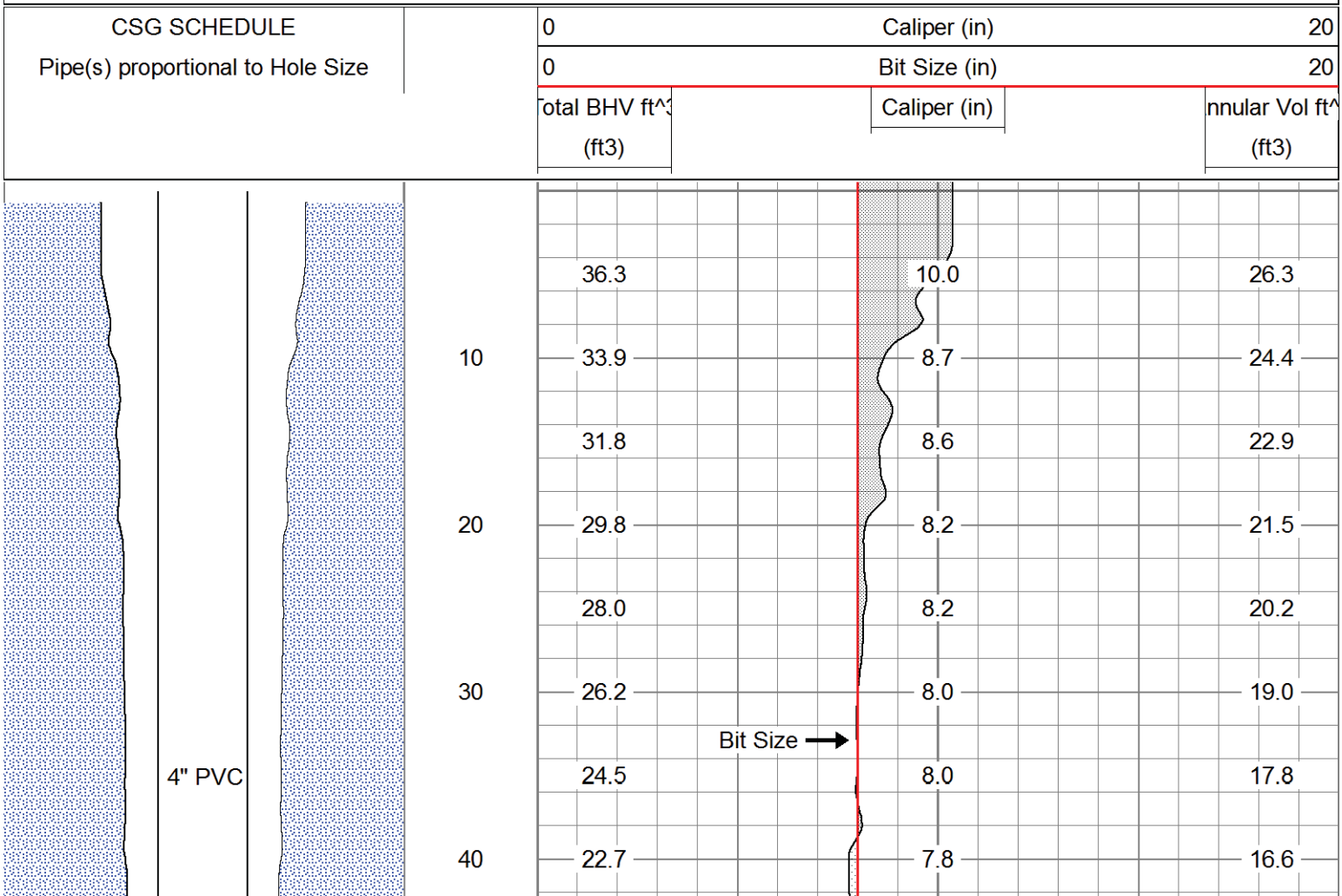
Serial Number/Model:	PS-1_Short-Comprobe
Performed:	Mon Jan 23 15:20:51 2012

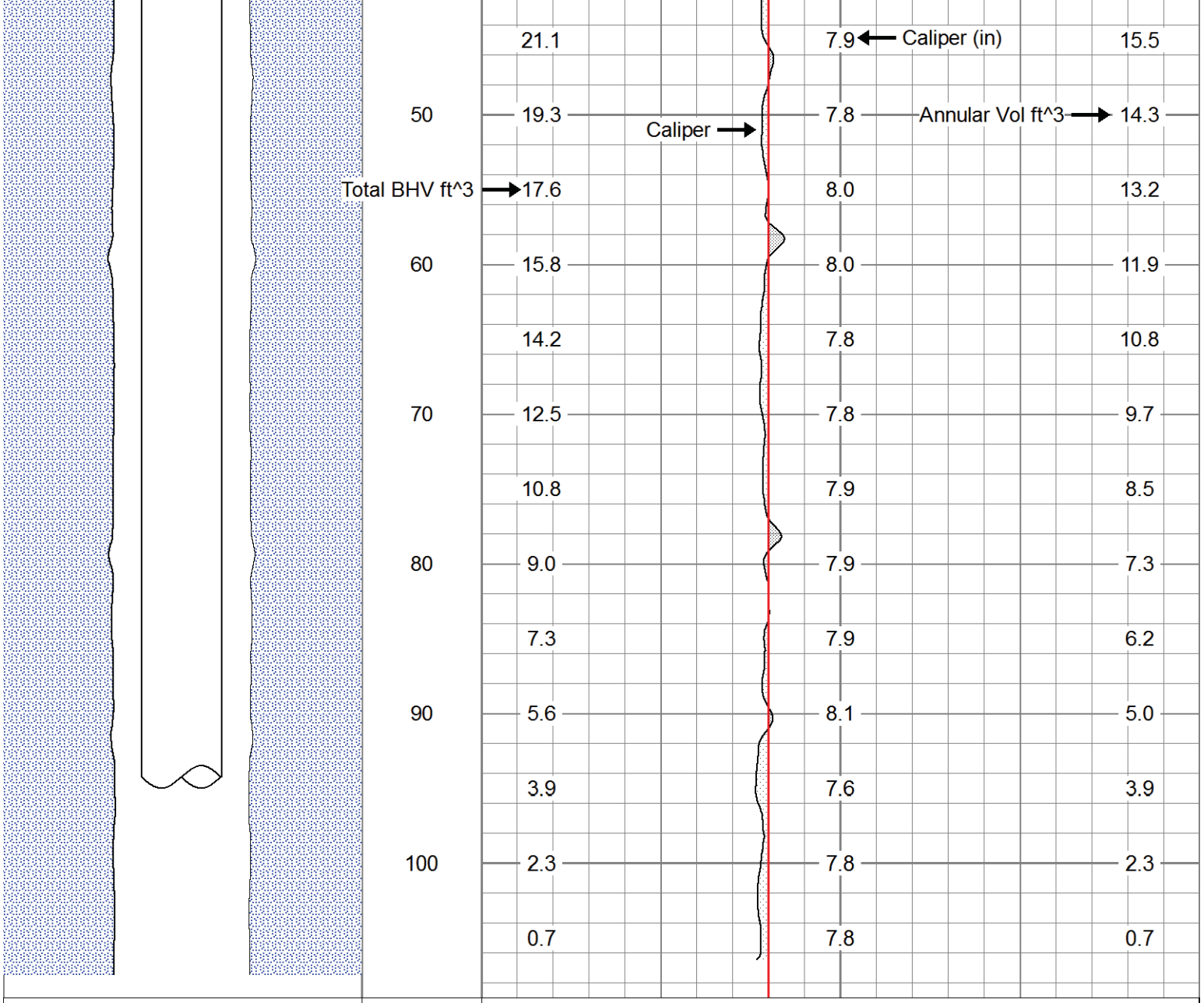
	Ring		X Caliper		Y Caliper	
1:	4	in	323.326	cps	323.326	cps
2:	8	in	446.363	cps	446.363	cps
3:	12	in	575.851	cps	575.851	cps
4:	16	in	703.014	cps	703.014	cps
5:	20	in	834.164	cps	834.164	cps
6:		in		cps		cps

Database File	16621.db
Dataset Pathname	CAL/CAL.2
Presentation Format	xyc_gph
Dataset Creation	Wed Jun 13 10:49:28 2012
Charted by	Depth in Feet scaled 1:120

CSG SCHEDULE

Pipe(s) proportional to Hole Size





CSG SCHEDULE

Pipe(s) proportional to Hole Size

0	Caliper (in)	20
0	Bit Size (in)	20
Total BHV ft^3 (ft3)	Caliper (in)	Annular Vol ft^3 (ft3)

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No.
16621

File No.

Company ERM
Well PWA-9
Field GLENDALE
County LOS ANGELES State CA

Location:

6501 SAN FERNANDO ROAD.
GPS: N 34o 10.062' W 118o 17.458'

Sec. Twp. Rge.

Other Services:

GR/LL3
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	06-13-2012		
Run Number	ONE		
Depth Driller	110'		
Depth Logger	110'		
Bottom Logged Interval	110'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.1 @ 77F		
Rmf @ Meas. Temp	8.0 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	0845		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

<<< Fold Here >>>

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Comments

Calibration Report

Database File 16621.db
Dataset Pathname ELOG2.1
Dataset Creation Wed Jun 13 09:00:04 2012

ELOG Calibration Report

Serial:	D4
Model:	DTQ
Shop Calibration Performed:	Tue Mar 27 11:06:58 2012
Before Survey Verification Performed:	Sun Sep 09 13:17:43 2007
After Survey Verification Performed:	Sun Sep 09 13:17:48 2007

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	9.071	100.688		10.200	102.200	Ohm-m	1.004	1.091
Long	7.302	96.917		10.200	102.200	Ohm-m	1.027	-17.000
IEE	22.700	5501.220	counts	0.025	6.021	A		
VSN	175.940	6234.840	counts	3.356	118.922	V		
VLN	70.000	1565.500	counts	1.335	29.860	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.249	101.201		40.505	101.206	Ohm-m	0.996	0.422
Long	142.638	102.842		102.858	102.858	Ohm-m	1.024	-2.408
IEE	212.960	7070.960	counts	0.233	7.738	A		
VSN	96.300	8039.720	counts	1.837	153.348	V		
VLN	85.320	2042.520	counts	1.627	38.959	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.270	101.200		40.249	101.201	Ohm-m	1.000	-0.035
Long	142.491	102.843		102.842	102.842	Ohm-m	1.004	-0.383
IEE	213.380	7077.580	counts	0.234	7.746	A		
VSN	96.540	8047.160	counts	1.841	153.490	V		
VLN	85.400	2044.440	counts	1.629	38.995	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	40.505	40.249	Ohm-m	101.206	101.201	Ohm-m
Long	143.592	142.638	Ohm-m	102.858	102.842	Ohm-m

Gamma Ray Calibration Report

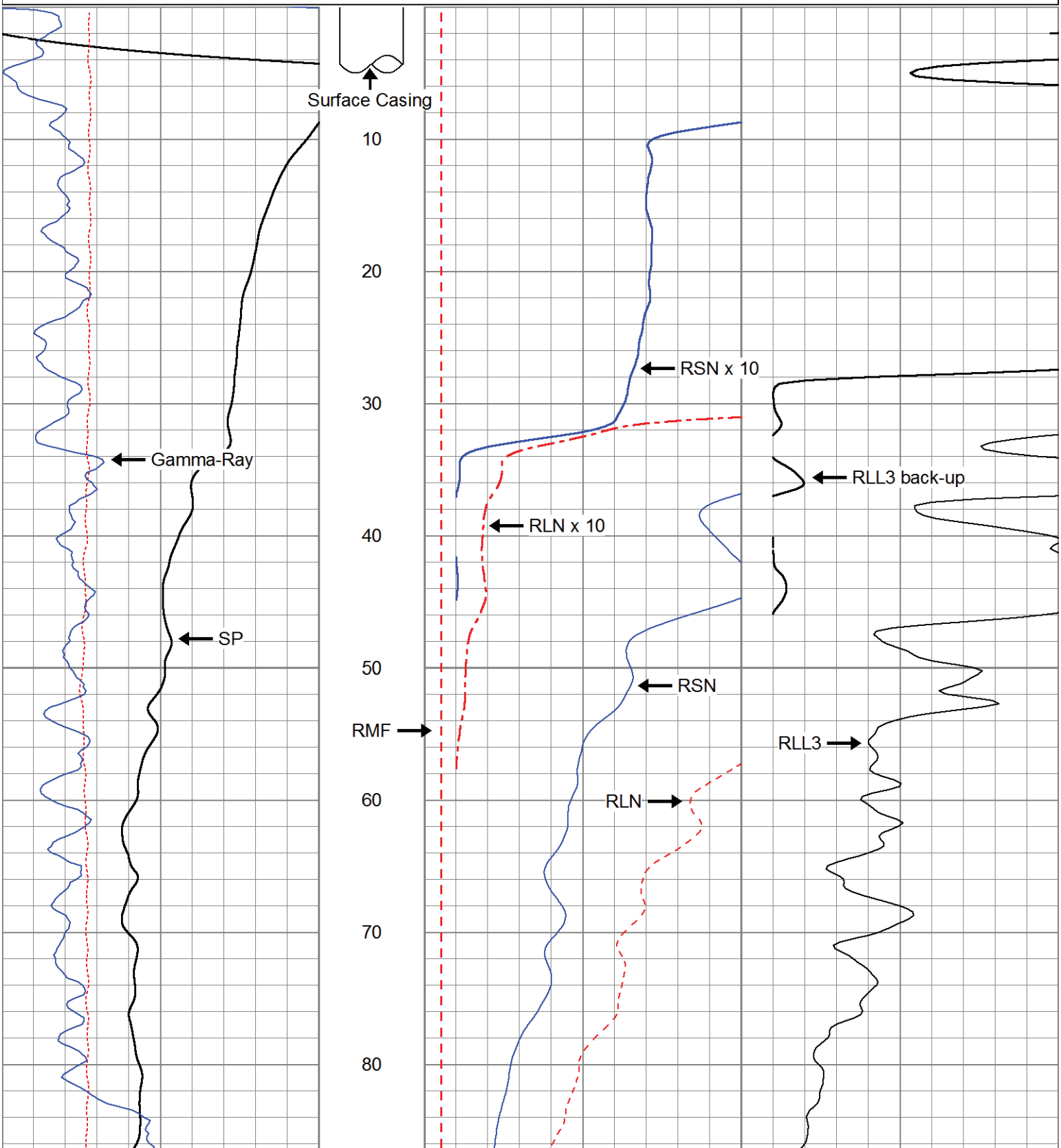
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Thu Jan 20 08:42:38 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	173.2	cps
Calibrator Reading:	678.3	cps
Sensitivity:	0.3207	GAPI/cps

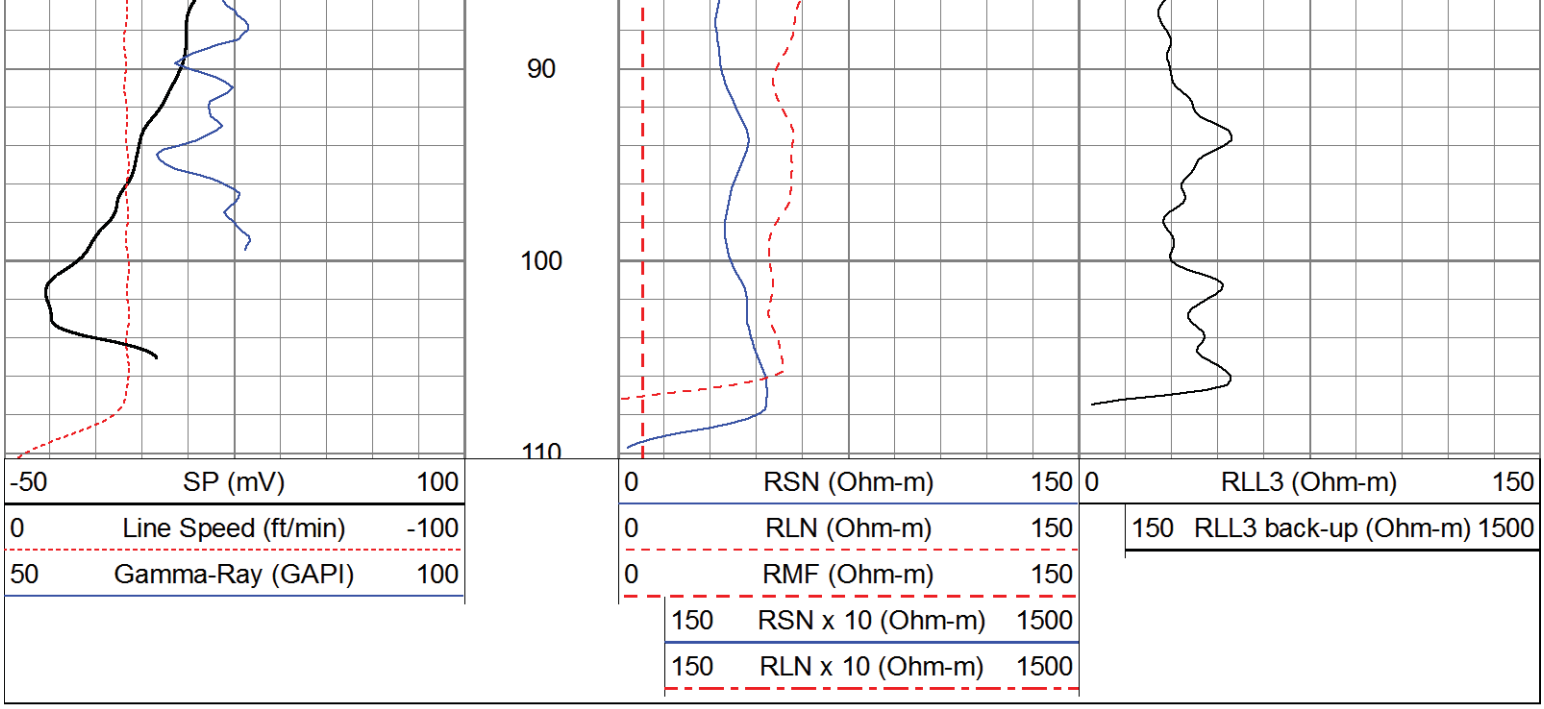
Database File	16621.db
Dataset Pathname	ELOG2.1
Presentation Format	elog
Dataset Creation	Wed Jun 13 09:00:04 2012
Charted by	Depth in Feet scaled 1:120

-50	SP (mV)	100
0	Line Speed (ft/min)	-100
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	150
0	RLN (Ohm-m)	150
0	RMF (Ohm-m)	150
150	RSN x 10 (Ohm-m)	1500
150	RLN x 10 (Ohm-m)	1500

0	RLL3 (Ohm-m)	150
150	RLL3 back-up (Ohm-m)	1500




90
100
110
-50 SP (mV) 100
0 Line Speed (ft/min) -100
50 Gamma-Ray (GAPI) 100
0 RSN (Ohm-m) 150
0 RLN (Ohm-m) 150
0 RMF (Ohm-m) 150
150 RSN x 10 (Ohm-m) 1500
150 RLN x 10 (Ohm-m) 1500
0 RLL3 (Ohm-m) 150
150 RLL3 back-up (Ohm-m) 1500

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
16621

File No.

Company	ERM
Well	PWA-9
Field	GLENDALE
County	LOS ANGELES
State	CA

Location:

6501 SAN FERNANDO ROAD.
GPS: N 34o 10.062' W 118o 17.458'

Sec. Twp. Rge.

Other Services:

GR/ELOG
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	06-13-2012		
Run Number	ONE		
Depth Driller	110'		
Depth Logger	110'		
Bottom Logged Interval	110'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.1 @ 77F		
Rmf @ Meas. Temp	8.0 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	0845		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File	16621.db
Dataset Pathname	LL3
Dataset Creation	Wed Jun 13 09:09:27 2012

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Thu Jan 20 09:04:17 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	30.6	
Calibrator Reading:	128.2	
Sensitivity:	1.6595	GAPI/

RLL3 (Resistivity Laterolog 3) Calibration Report:

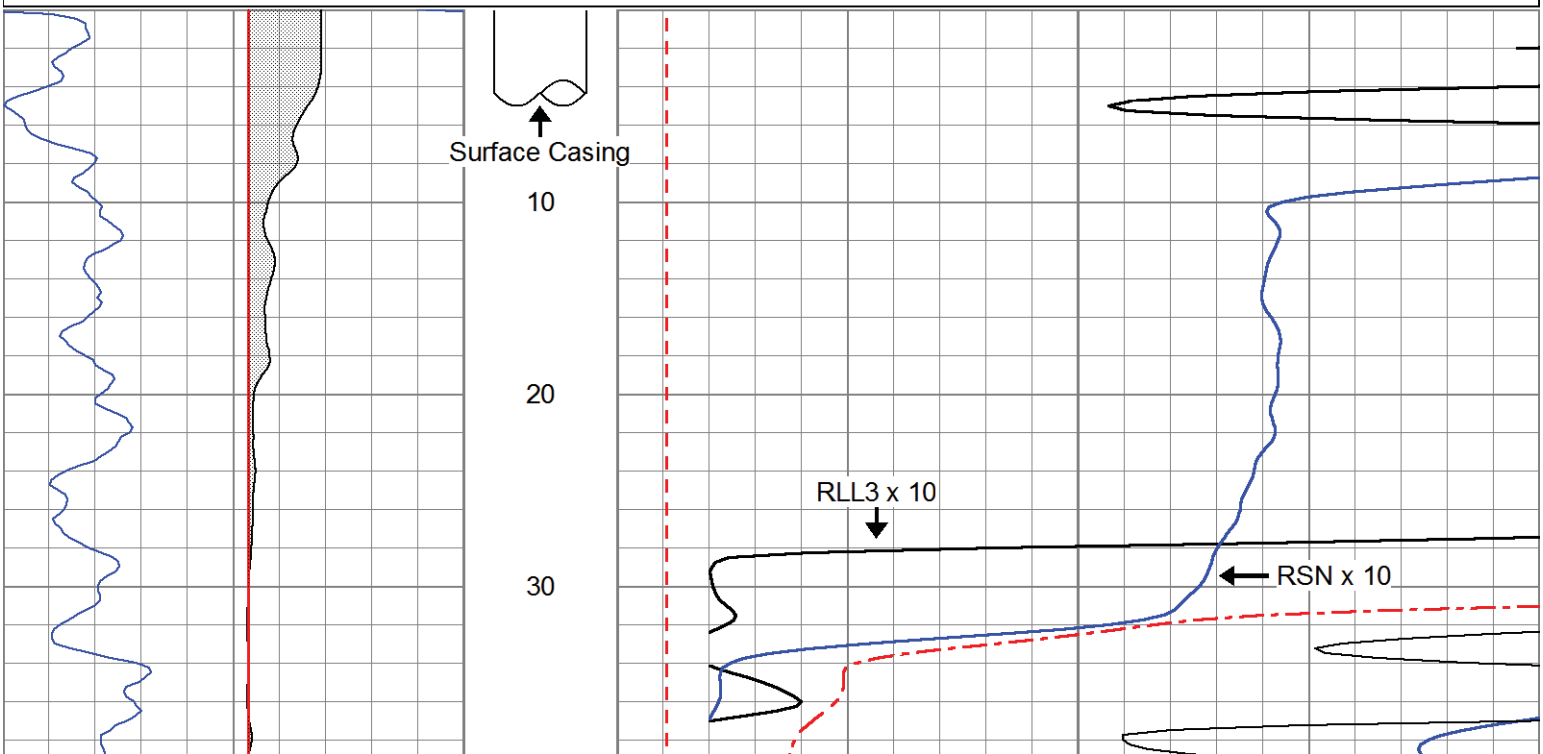
Serial Number:	883
Tool Model:	M&W
Performed:	Sat May 05 12:09:11 2012

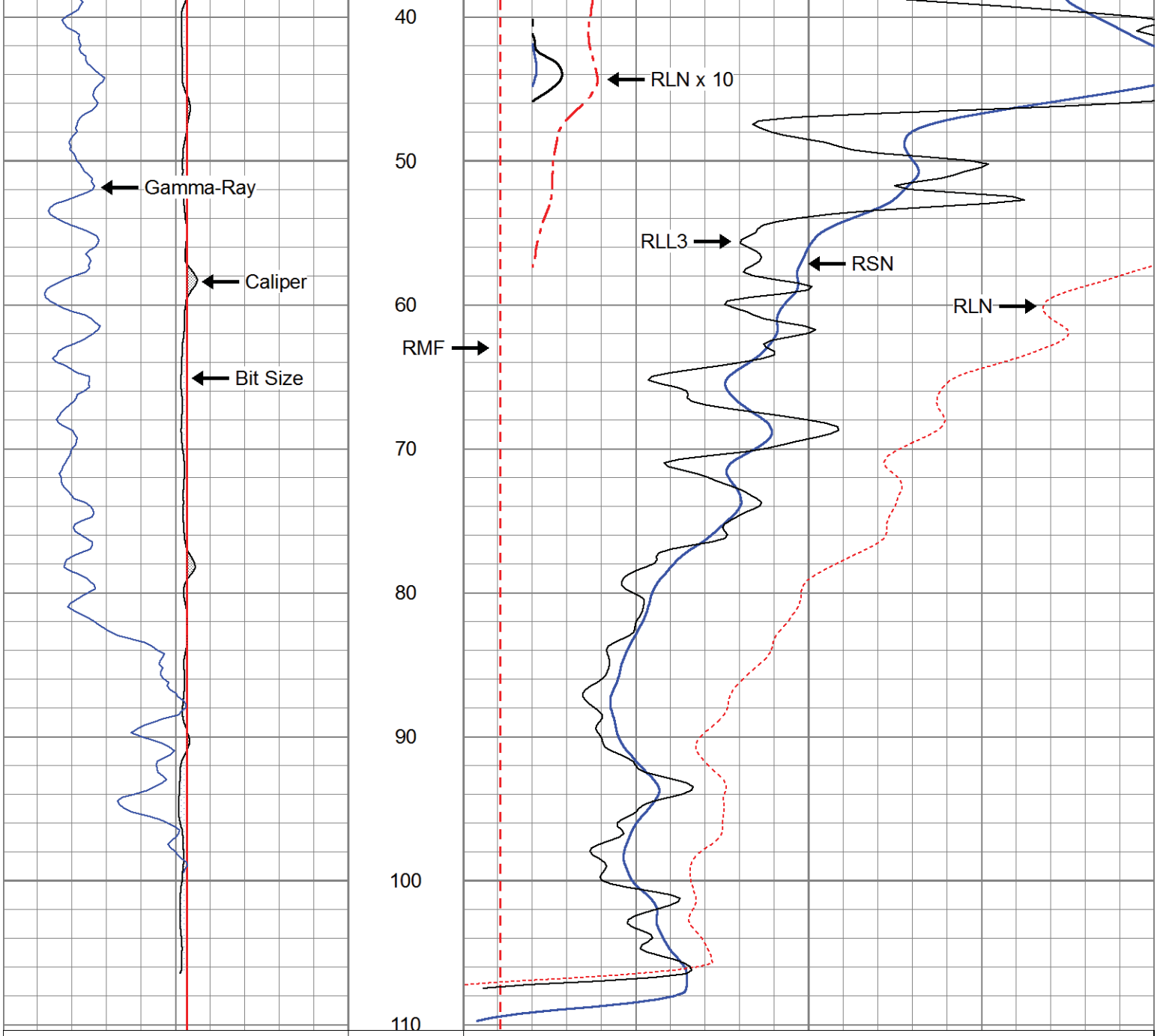
System Reading	Calibration Reference	
0.015	2.500	Ohm-m
0.028	5.000	
0.262	50.000	
1.178	250.000	
2.076	500.000	

Database File	16621.db
Dataset Pathname	LL3
Presentation Format	guard
Dataset Creation	Wed Jun 13 09:09:27 2012
Charted by	Depth in Feet scaled 1:120

0	Caliper (in)	15
0	Bit Size (in)	15
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	150
0	RLN (Ohm-m)	150
0	RMF (Ohm-m)	150
0	RLL3 (Ohm-m)	150
150	RLL3 x 10 (Ohm-m)	1500
150	RSN x 10 (Ohm-m)	1500
150	RLN x 10 (Ohm-m)	1500





0	Caliper (in)	15
0	Bit Size (in)	15
50	Gamma-Ray (GAPI)	100

0	RSN (Ohm-m)	150
0	RLN (Ohm-m)	150
0	RMF (Ohm-m)	150
0	RLL3 (Ohm-m)	150
150	RLL3 x 10 (Ohm-m)	1500
150	RSN x 10 (Ohm-m)	1500
150	RLN x 10 (Ohm-m)	1500

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

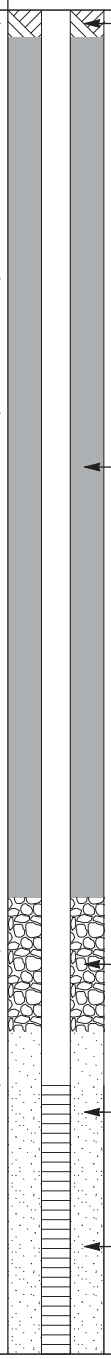
LOG OF MONITORING WELL: PWA-10

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 1500 Emens Way, Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 10/12/2012
Date Completed: 10/15/2012
Total Depth: 100 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 11 feet bgs
Northing: 1881625.15
Easting: 6472544.56
TOC/Surface Elevation: 482.47/483.07

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Asphalt Surface 4.0" thick
					Silty SAND, brown (10YR 4/3), dry, loose, fine grained, with little mica, some fines
5		0.0	SM		
10					SAND, brown (10YR 4/3), fine grained, subrounded, with mica
			SP		
15					SAND, brown (10YR 4/3), fine to medium grained, subrounded, with mica
20					
25			SW		
30					SAND, brown (10YR 4/3), fine to coarse grained, subrounded to subangular, with mica, some fines
35					SAND, brown (10YR 4/3), fine grained, with mica
			SP		
40					SAND, brown (10YR 4/3), fine to coarse grained, subrounded to subangular, with mica, some fines
45			SW		SAND, brown (10YR 4/3), fine to medium grained, subrounded, with mica, some fines

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:06 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-10.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

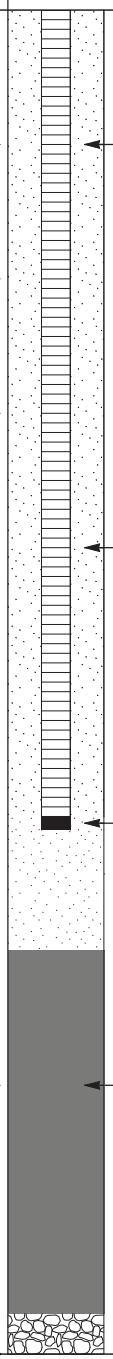
LOG OF MONITORING WELL: PWA-10

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 1500 Emens Way, Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 10/12/2012
Date Completed: 10/15/2012
Total Depth: 100 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 11 feet bgs
Northing: 1881625.15
Easting: 6472544.56
TOC/Surface Elevation: 482.47/483.07

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			SP		SAND, dark grayish brown (10YR 4/2), medium grained, subrounded to subangular, with mica
55			SW		SAND, dark grayish brown (10YR 4/2), fine to medium grained, little coarse grained, subrounded to subangluar, with mica
60			SP		SAND, dark grayish brown (10YR 4/2), medium grained, trace coarse grained, subrounded to subangular, with mica
65			SW		SAND, grayish brown (10YR 5/2), fine to coarse grained, subrounded to angular (rig bouncing), with mica
70					
75					SAND, dark grayish (10YR 4/2), fine to coarse grained, subrounded to angular (rig bouncing), trace fine grained angular gravel, with some mica
80					
85					
90			SP		SAND, brown (10YR 4/3), fine grained, subrounded, trace medium grained, with mica
95					

WELL DIAGRAM



Total Depth - 100 feet bgs

GCOU MW TO 50FT IRVINE - - 5/30/13 16:06 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-10.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

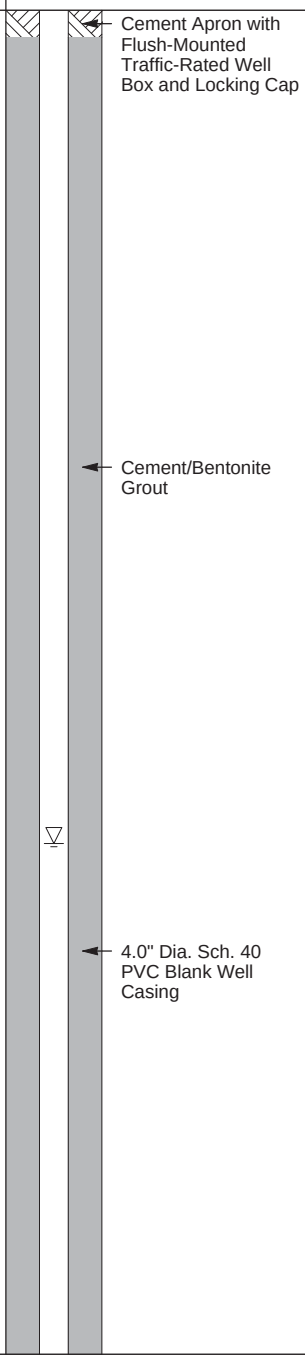
LOG OF MONITORING WELL: PWA-12

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 703 Hawthorne Street, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 4/17/2012
Date Completed: 4/19/2012
Total Depth: 200 feet
Borehole Diameter: 8" inches
Initial Water Level: 31 feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs.
Northing: 1875238.26
Easting: 6480145.18
TOC/Surface Elevation: 476.39/476.82

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Asphalt Surface 4.0" thick
5			SW		SAND with Gravel, yellowish brown (10YR 5/4), dry, fine to mediumg grained sand, fine grained gravel, subrounded to subangular
10			SP		SAND, grayish brown (10YR 5/2), fine, some mica, trace fines
15					SAND, grayish brown (10YR 5/2), fine grained, some mica, trace fines
20			SW		SAND, brown (10YR 4/3), fine to coarse grained, subrounded, some mica
25					Becomes fine to medium grained sand, subrounded
30					SAND, brown (10YR 4/3), medium to coarse grained, some fine grained gravel, subrounded
35					
40					Angular gravel (possible cobbles, rig bouncing from 43-45' bgs)
45					

WELL DIAGRAM



MW IRVINE - - 7/18/13 15:04 - Z:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-12.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-12

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 703 Hawthorne Street, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 4/17/2012
Date Completed: 4/19/2012
Total Depth: 200 feet
Borehole Diameter: 8" inches
Initial Water Level: 31 feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs.
Northing: 1875238.26
Easting: 6480145.18
TOC/Surface Elevation: 476.39/476.82

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations	WELL DIAGRAM
55			SW		Increasing gravel, subrounded	
60						
65					SAND, dark yellowish brown (10YR 3/4), fine grained, some fines	Cement/Bentonite Grout
70						
75					SAND, dark yellowish brown (10YR 3/4), fine to medium grained, some fines	
80			SP			4.0" Dia. Sch. 40 PVC Blank Well Casing
85						
90					SAND, dark yellowish brown (10YR 3/4), fine to medium grained	
95			SW		SAND, dark yellowish brown (10YR 3/4), fine to coarse grained sand, subangular	

MW IRVINE - - 7/18/13 15:04 - Z:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-12.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

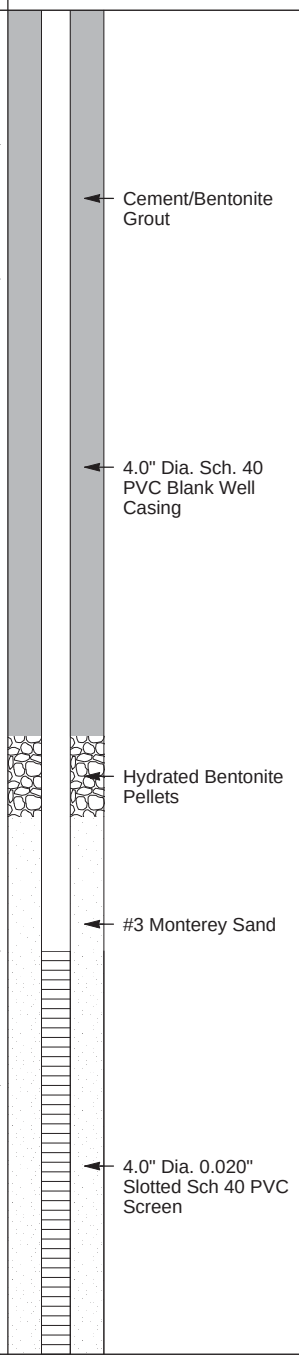
LOG OF MONITORING WELL: PWA-12

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 703 Hawthorne Street, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 4/17/2012
Date Completed: 4/19/2012
Total Depth: 200 feet
Borehole Diameter: 8" inches
Initial Water Level: 31 feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs.
Northing: 1875238.26
Easting: 6480145.18
TOC/Surface Elevation: 476.39/476.82

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			SW		
105			SP		SAND, brown (10YR 5/3), fine to medium grained, subrounded, trace fines
110			SW		SAND, dark yellowish brown (10YR 3/4), medium to coarse grained sand, some fine grained gravel, subrounded to subangular
115					
120					SAND, dark yellowish brown (10YR 3/4), fine to medium grained
125					
130					
135			SP		SAND, dark yellowish brown (10YR 3/4), fine grained
140			SW		SAND, dark yellowish brown (10YR 3.4), fine to medium grained
145					SAND, dark yellowish brown (10YR 3/4), fine to coarse grained, subrounded to subangluar

WELL DIAGRAM



MW IRVINE - - 7/18/13 15:04 - Z:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-12.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

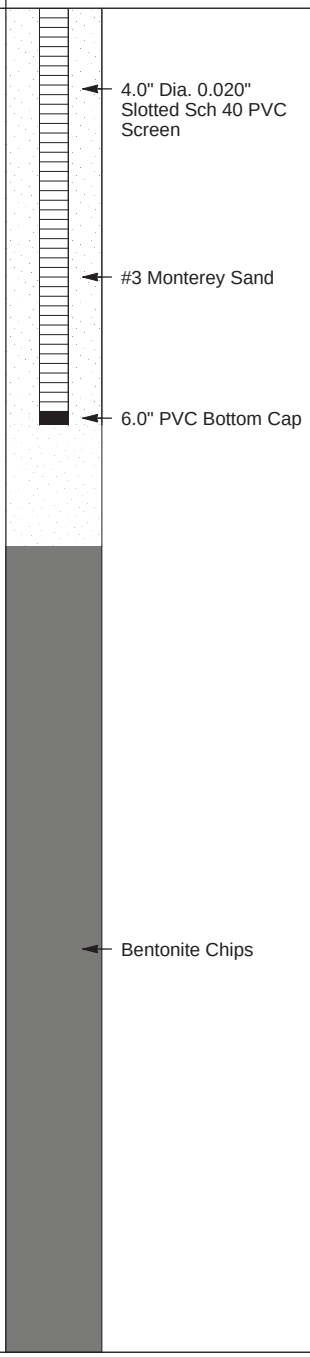
LOG OF MONITORING WELL: PWA-12

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 703 Hawthorne Street, Glendale, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grab Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: M. Makerov

Date Started: 4/17/2012
Date Completed: 4/19/2012
Total Depth: 200 feet
Borehole Diameter: 8" inches
Initial Water Level: 31 feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs.
Northing: 1875238.26
Easting: 6480145.18
TOC/Surface Elevation: 476.39/476.82

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
			SP		SAND, dark yellowish brown (10YR 3/4), fine to medium grained
155					
160			SW		SAND, brown (10YR 4/3), fine to coarse grained, subrounded to subangular
165					
170					
175					
180					
185			SP		SAND, brown (10YR 4/3), fine grained sand
190					
195					

WELL DIAGRAM



Total Depth - 200 feet bgs

MW IRVINE - - 7/18/13 15:04 - Z:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-12.GPJ

PACIFIC SURVEYS

CALIPER
BOREHOLE VOLUMES

Job No.
16494

File No.

Company ERM
Well PWA-12
Field GLENDALE
County LOS ANGELES State CA

Location:

700 HAWTHORNE ST
GPS: N34o08.698' W118o16.178'

Sec. Twp. Rge.

Other Services:

GR/LL3
ELOG

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	04-18-2012		
Run Number	ONE		
Depth Driller	200'		
Depth Logger	199'		
Bottom Logged Interval	197.5'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	8.0 @ 77F		
Rmf @ Meas. Temp	8.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1315		
Time Logger on Bottom	1415		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File: 16494.db
Dataset Pathname: CAL/CAL
Dataset Creation: Wed Apr 18 15:24:11 2012 by Log Open-Cased 090629

Temperature Calibration Report

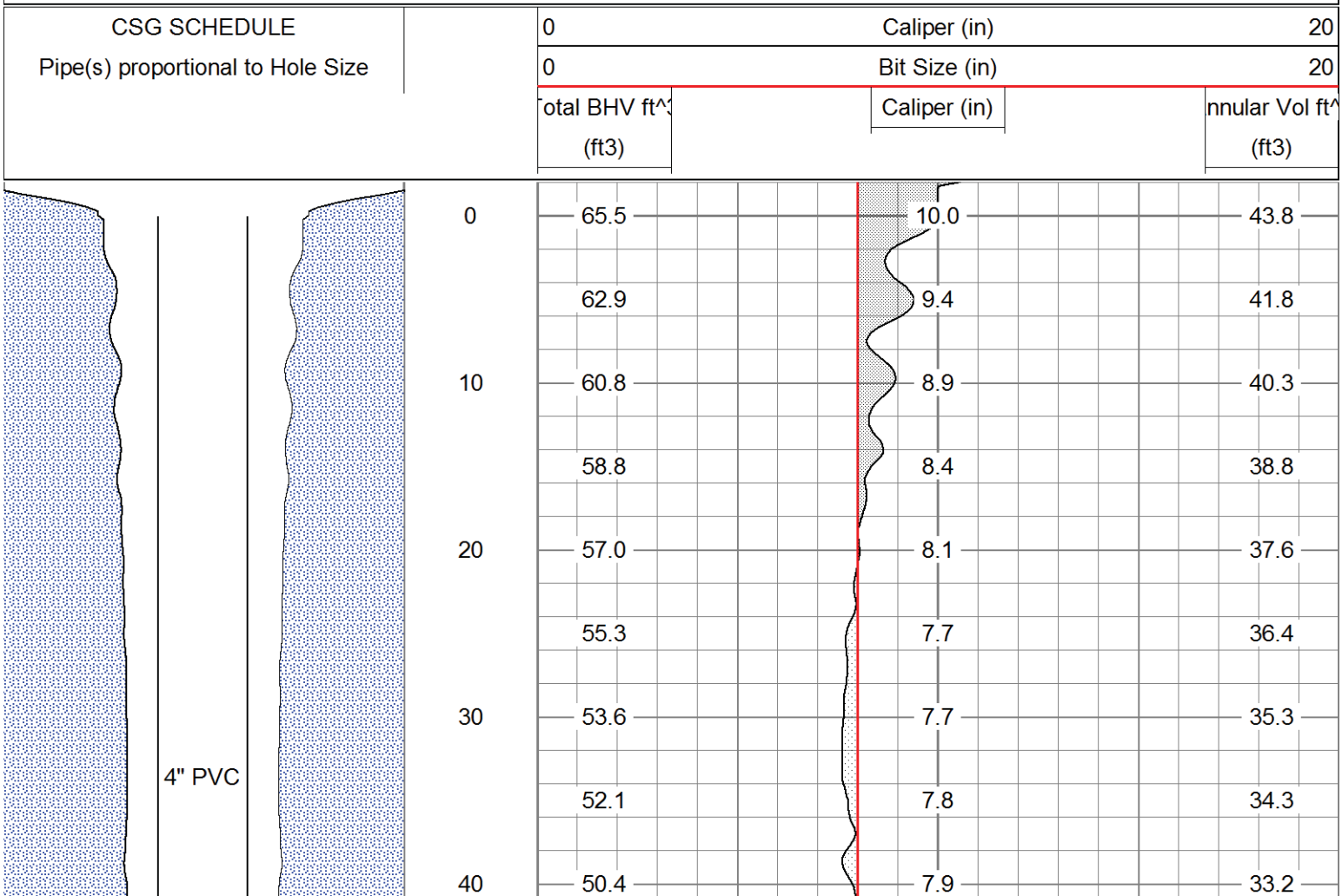
Serial Number:	PS-3_Short			
Tool Model:	Short_GPH			
Performed:	Fri Nov 04 15:09:55 2011			
	Reference		Reading	
Low Reference:	4.00	degF	446.36	cps
High Reference:	8.00	degF	703.01	cps
Gain:	0.02			
Offset:	-2.96			
Delta Spacing	1			

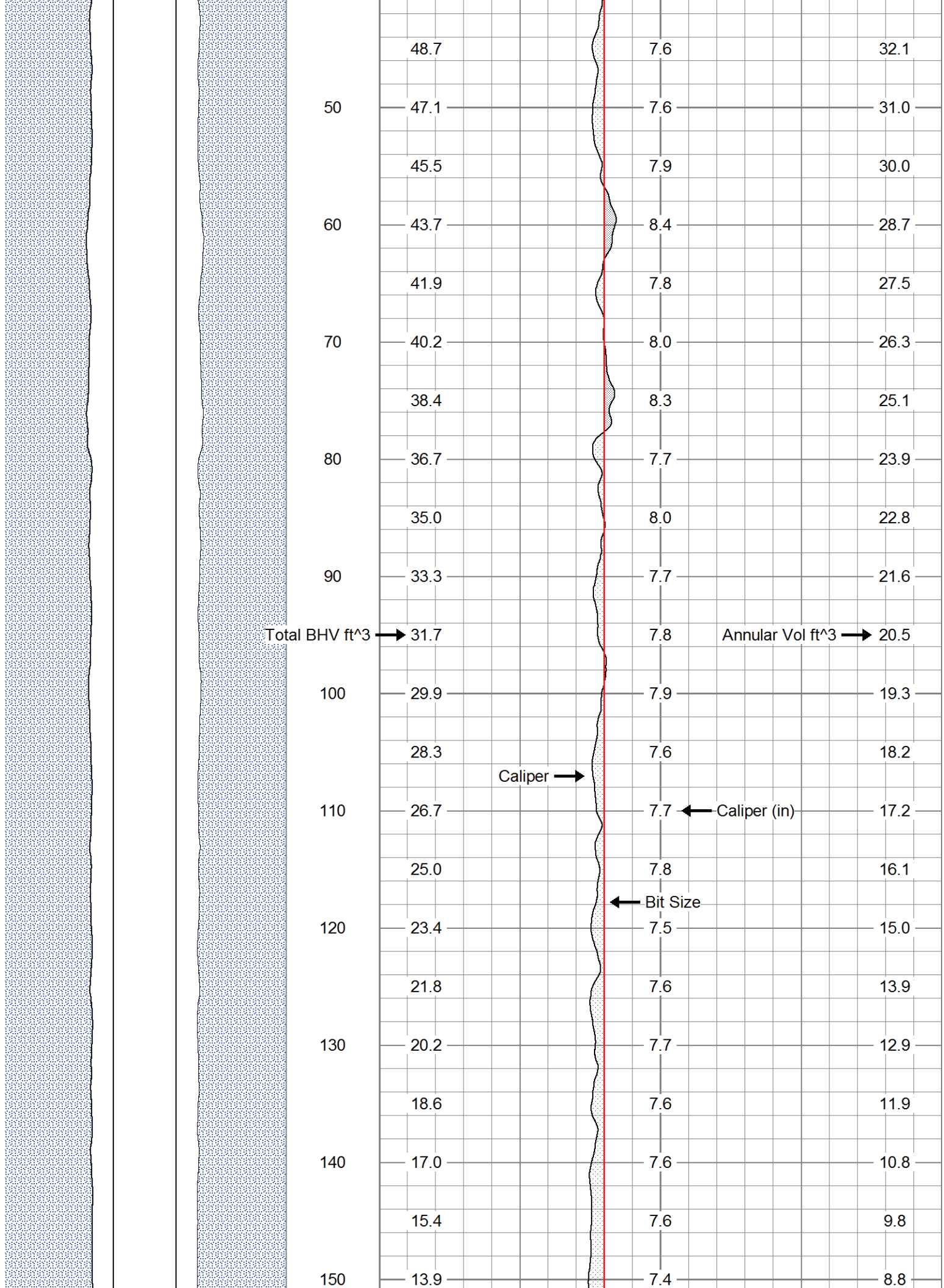
XY Caliper Calibration Report

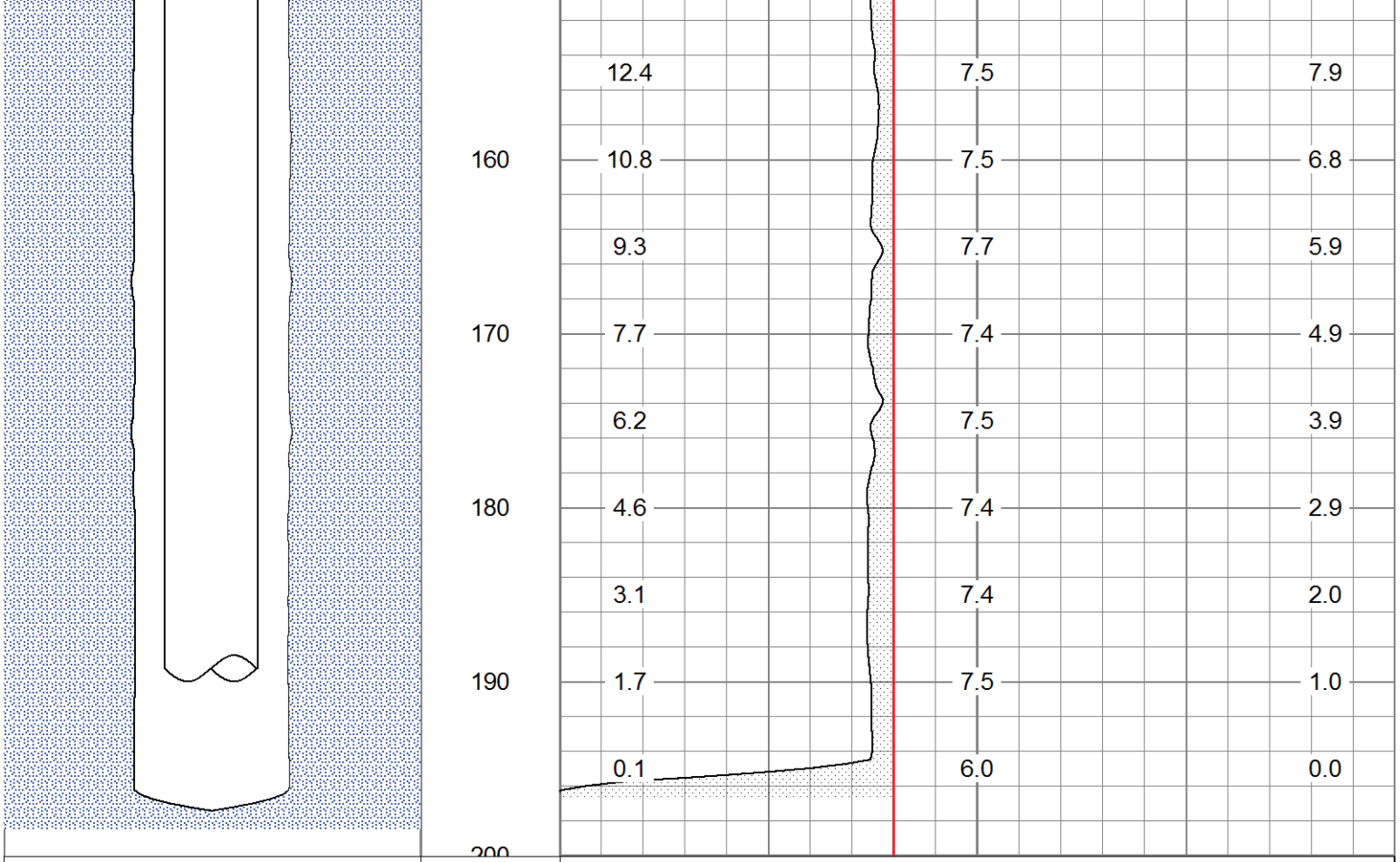
Serial Number/Model: Short-Comprobe
Performed: Wed Jul 06 14:17:30 2011

	Ring		X Caliper		Y Caliper	
1:	4	in	323.326	cps	323.326	cps
2:	8	in	446.363	cps	446.363	cps
3:	12	in	575.851	cps	575.851	cps
4:	16	in	703.014	cps	703.014	cps
5:	20	in	834.164	cps	834.164	cps
6:		in		cps		cps

Database File:	16494.db
Dataset Pathname:	CAL/CAL
Presentation Format:	xyc_gph
Dataset Creation:	Wed Apr 18 15:24:11 2012 by Log Open-Cased 090629
Charted by:	Depth in Feet scaled 1:120




48.7
7.6
32.1
50
47.1
7.6
31.0
45.5
7.9
30.0
60
43.7
8.4
28.7
41.9
7.8
27.5
70
40.2
8.0
26.3
38.4
8.3
25.1
80
36.7
7.7
23.9
35.0
8.0
22.8
90
33.3
7.7
21.6
Total BHV ft^3
31.7
7.8
Annular Vol ft^3
20.5
100
29.9
7.9
19.3
28.3
7.6
18.2
Caliper
110
26.7
7.7
Caliper (in)
17.2
25.0
7.8
16.1
Bit Size
120
23.4
7.5
15.0
21.8
7.6
13.9
130
20.2
7.7
12.9
18.6
7.6
11.9
140
17.0
7.6
10.8
15.4
7.6
9.8
150
13.9
7.4
8.8



CSG SCHEDULE

Pipe(s) proportional to Hole Size

0	Caliper (in)	20
0	Bit Size (in)	20
otal BHV ft^3 (ft3)	Caliper (in)	nnular Vol ft^ (ft3)

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No.
16494

File No.

Company ERM
Well PWA-12
Field GLENDALE
County LOS ANGELES State CA

Location:

700 HAWTHORNE ST
GPS: N34o08.698' W118o16.178'

Sec. Twp. Rge.

Other Services:

GR/LL3
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	04-18-2012		
Run Number	ONE		
Depth Driller	200'		
Depth Logger	199'		
Bottom Logged Interval	199'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	8.0 @ 77F		
Rmf @ Meas. Temp	8.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1315		
Time Logger on Bottom	1415		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

<<< Fold Here >>>

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Comments

Calibration Report

Database File: 16494.db
Dataset Pathname: elog2
Dataset Creation: Wed Apr 18 14:34:17 2012 by Log Open-Cased 090629

ELOG Calibration Report

Serial:	D4
Model:	DTQ
Shop Calibration Performed:	Fri Sep 02 15:34:18 2011
Before Survey Verification Performed:	Sun Sep 09 13:17:43 2007
After Survey Verification Performed:	Sun Sep 09 13:17:48 2007

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	9.321	100.380		10.200	102.200	Ohm-m	1.010	0.782
Long	8.948	97.855		10.200	102.200	Ohm-m	1.035	-17.100
IEE	88.740	5882.980	counts	0.097	6.438	A		
VSN	104.920	6618.800	counts	2.001	126.246	V		
VLN	77.120	1684.980	counts	1.471	32.139	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.249	101.201		40.505	101.206	Ohm-m	0.996	0.422
Long	142.638	102.842		102.858	102.858	Ohm-m	1.024	-2.408
IEE	212.960	7070.960	counts	0.233	7.738	A		
VSN	96.300	8039.720	counts	1.837	153.348	V		
VLN	85.320	2042.520	counts	1.627	38.959	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.270	101.200		40.249	101.201	Ohm-m	1.000	-0.035
Long	142.491	102.843		102.842	102.842	Ohm-m	1.004	-0.383
IEE	213.380	7077.580	counts	0.234	7.746	A		
VSN	96.540	8047.160	counts	1.841	153.490	V		
VLN	85.400	2044.440	counts	1.629	38.995	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	40.505	40.249	Ohm-m	101.206	101.201	Ohm-m
Long	143.592	142.638	Ohm-m	102.858	102.842	Ohm-m

Gamma Ray Calibration Report

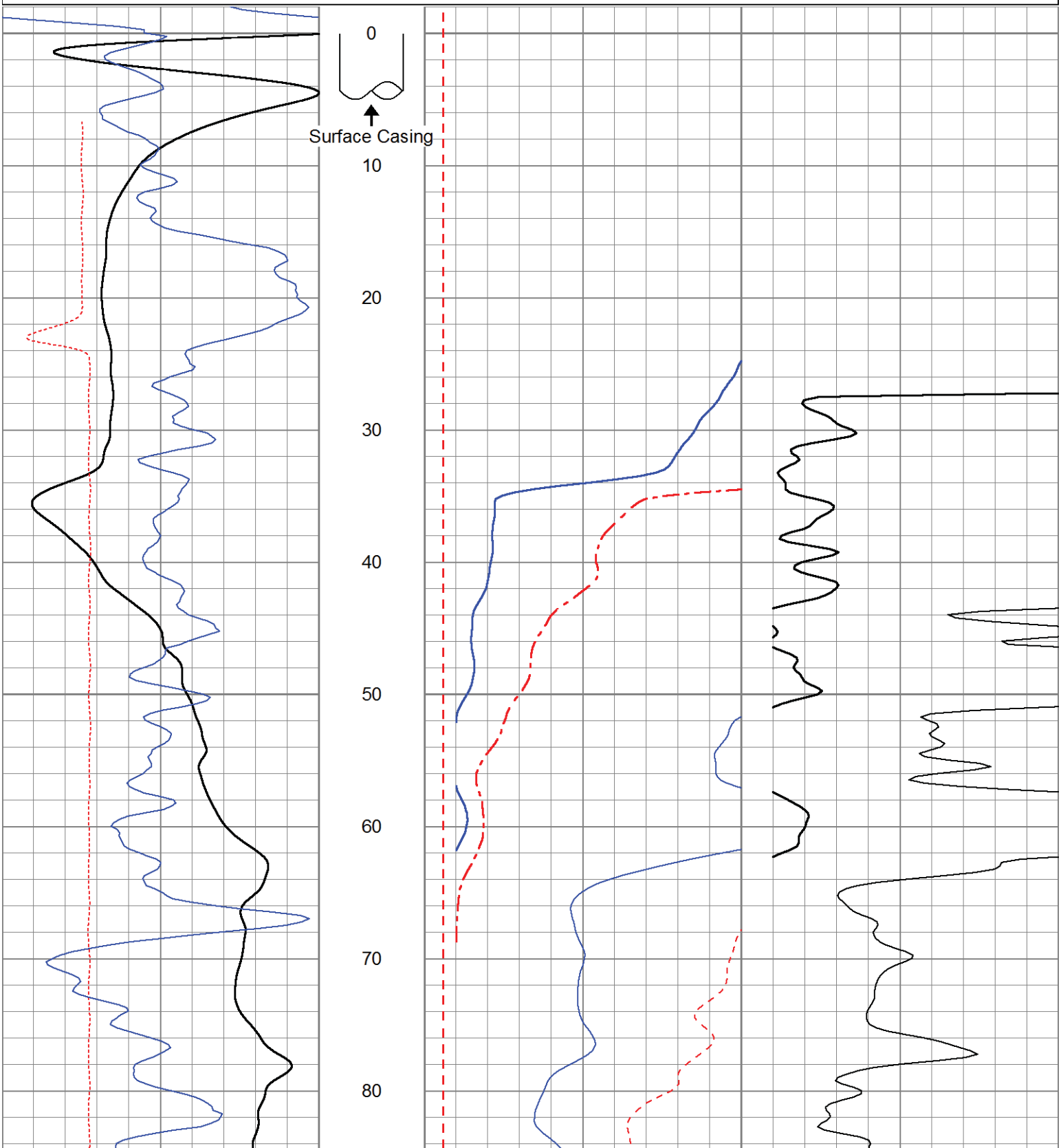
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Tue Jul 15 15:58:21 2008	
Calibrator Value:	162.0	GAPI
Background Reading:	198.6	cps
Calibrator Reading:	742.0	cps
Sensitivity:	0.2982	GAPI/cps

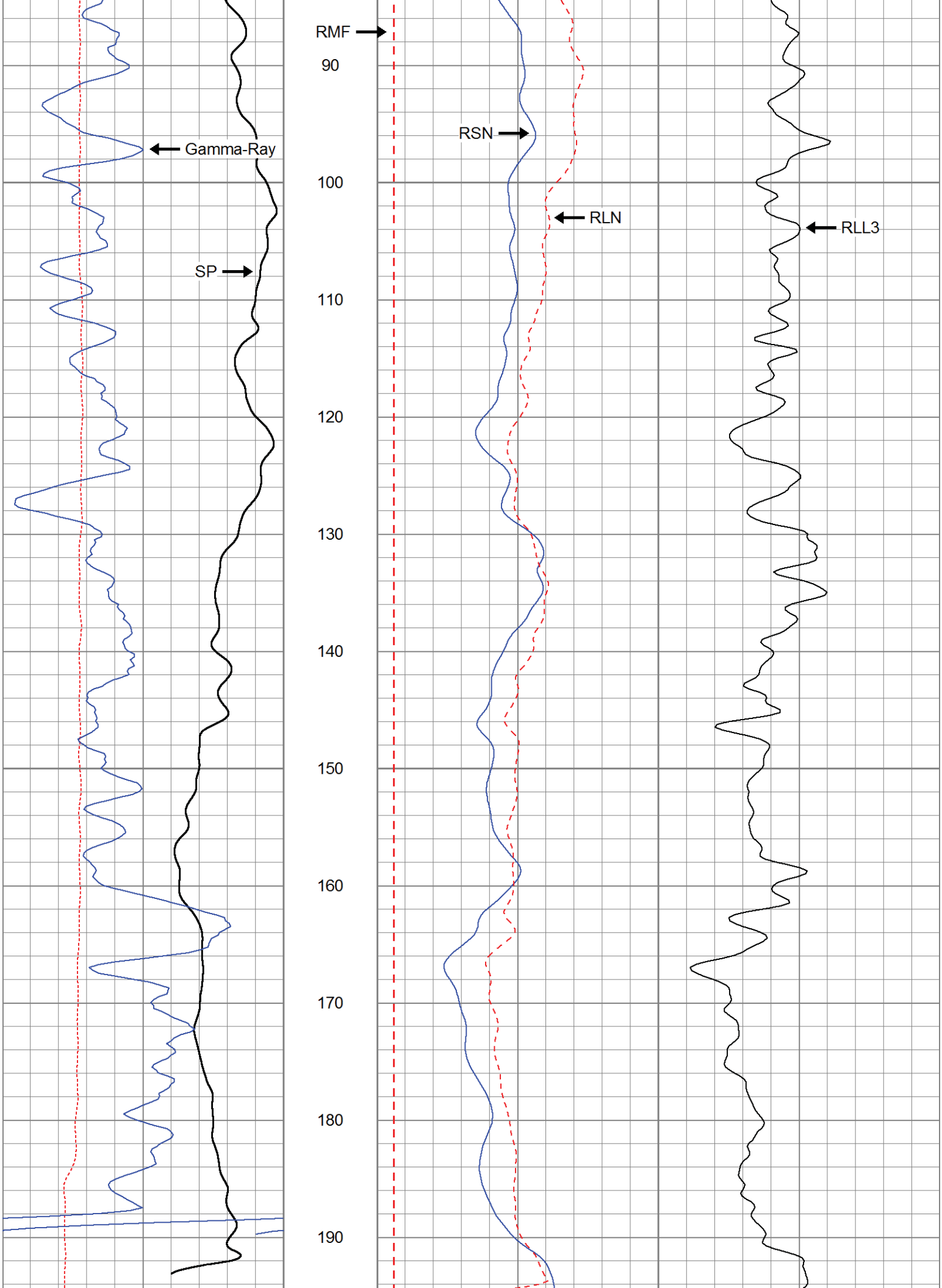
Database File:	16494.db
Dataset Pathname:	elog2
Presentation Format:	elog
Dataset Creation:	Wed Apr 18 14:34:17 2012 by Log Open-Cased 090629
Charted by:	Depth in Feet scaled 1:120

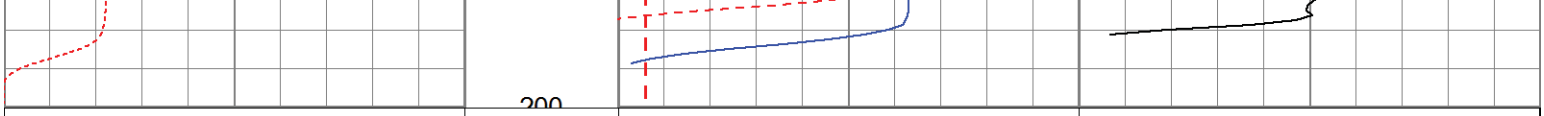
-90	SP (mV)	60
0	Line Speed (ft/min)	-100
55	Gamma-Ray (GAPI)	105

0	RSN (Ohm-m)	150
0	RLN (Ohm-m)	150
0	RMF (Ohm-m)	150
150	RSN x 10 (Ohm-m)	1500
150	RLN x 10 (Ohm-m)	1500

0	RLL3 (Ohm-m)	150
150	RLL3 back-up (Ohm-m)	1500




RMF
90
RSN
Gamma-Ray
100
RLN
RLL3
SP
110
120
130
140
150
160
170
180
190



-90	SP (mV)	60	0	RSN (Ohm-m)	150	0	RLL3 (Ohm-m)	150
0	Line Speed (ft/min)	-100	0	RLN (Ohm-m)	150	150	RLL3 back-up (Ohm-m)	1500
55	Gamma-Ray (GAPI)	105	0	RMF (Ohm-m)	150			
			150	RSN x 10 (Ohm-m)	1500			
			150	RLN x 10 (Ohm-m)	1500			

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
16494

File No.

Company ERM
Well PWA-12
Field GLENDALE
County LOS ANGELES State CA

Location:

700 HAWTHORNE ST
GPS: N34o08.698' W118o16.178'

Sec. Twp. Rge.

Other Services:

GR/ELOG
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	04-18-2012		
Run Number	ONE		
Depth Driller	200'		
Depth Logger	199'		
Bottom Logged Interval	199'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	8.0 @ 77F		
Rmf @ Meas. Temp	8.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1315		
Time Logger on Bottom	1415		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	LA		
Recorded By	SCHUMACHER		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File: 16494.db
Dataset Pathname: II3
Dataset Creation: Wed Apr 18 15:00:16 2012 by Log Open-Cased 090629

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Wed Aug 31 18:41:03 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	41.2	
Calibrator Reading:	182.5	
Sensitivity:	1.1460	GAPI/

RLL3 (Resistivity Laterolog 3) Calibration Report:

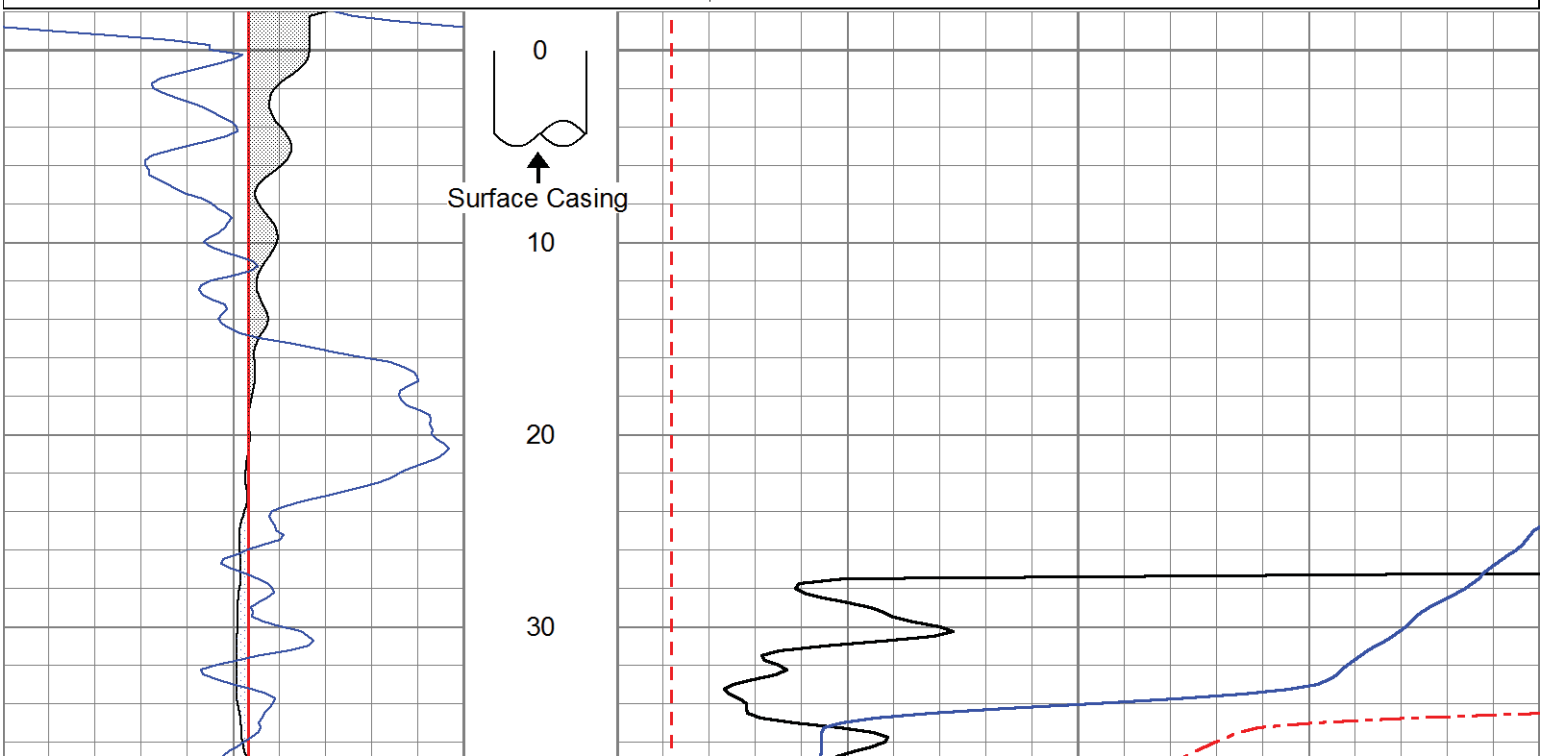
Serial Number:	231
Tool Model:	M&W
Performed:	Wed Aug 31 18:40:12 2011

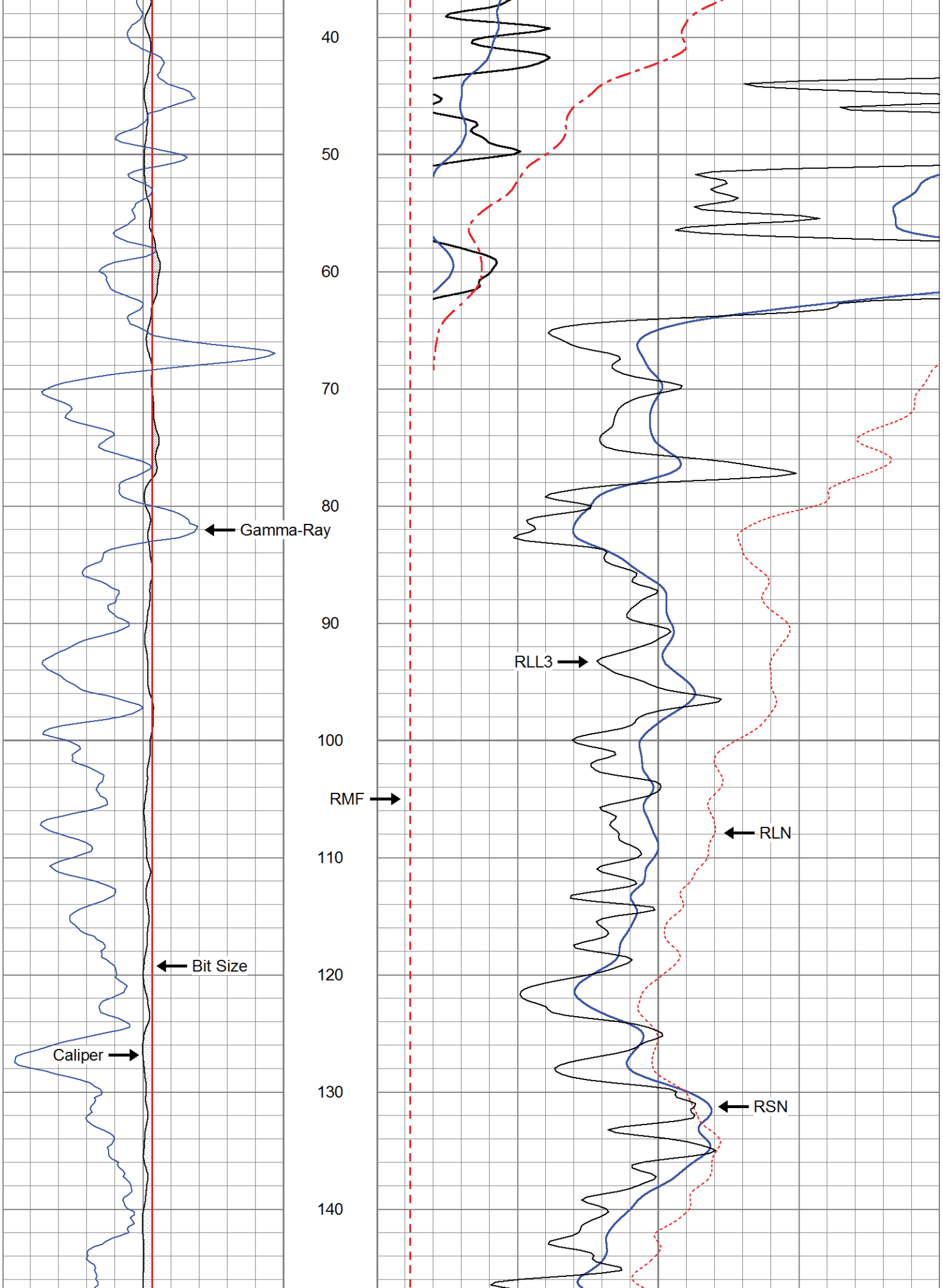
System Reading	Calibration Reference	
0.005	2.500	Ohm-m
0.009	5.000	
0.101	50.000	
0.535	250.000	
0.942	500.000	

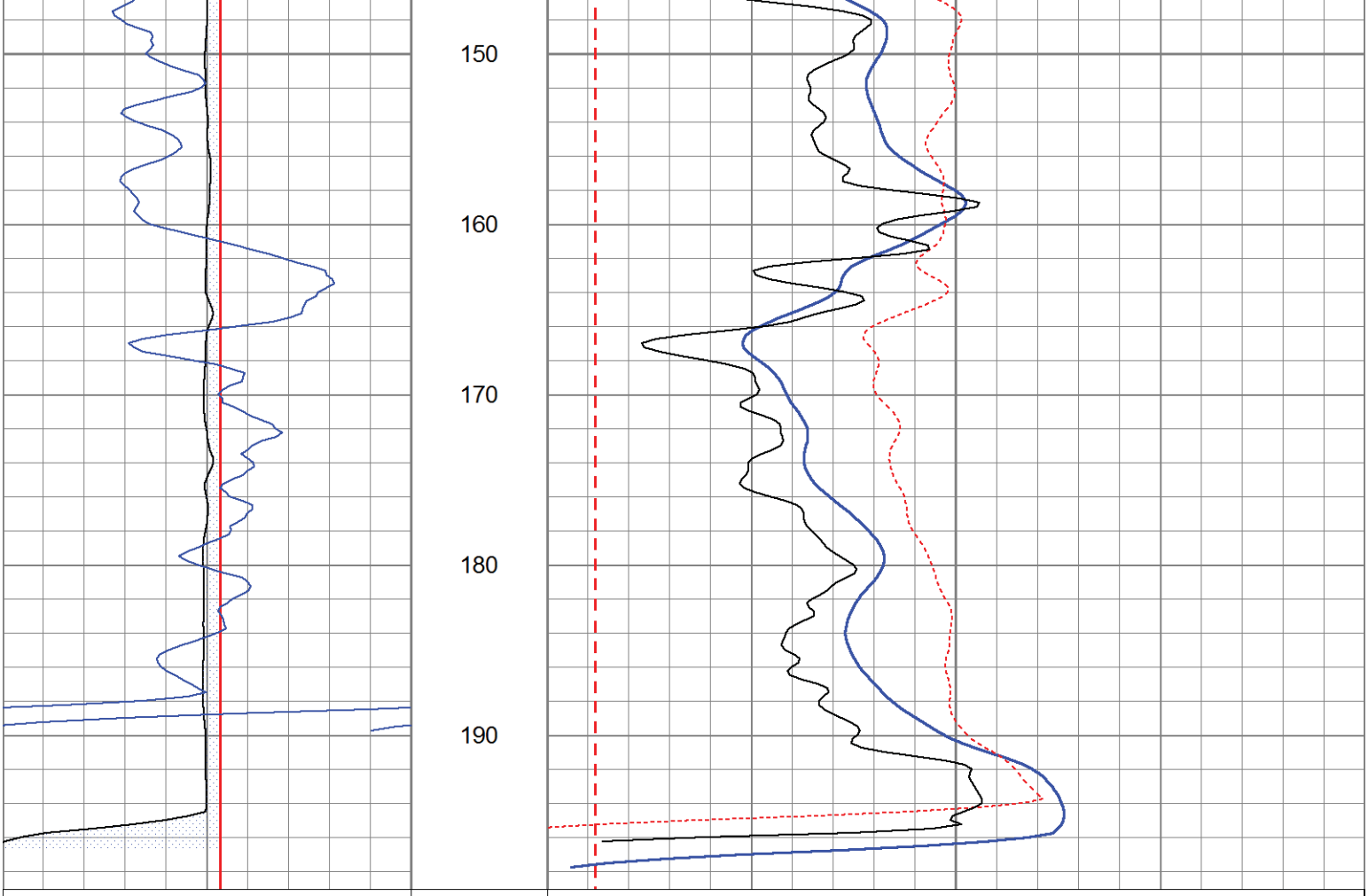
Database File:	16494.db
Dataset Pathname:	ll3
Presentation Format:	200
Dataset Creation:	Wed Apr 18 15:00:16 2012 by Log Open-Cased 090629
Charted by:	Depth in Feet scaled 1:120

0	Caliper (in)	15
0	BOREID (in)	15
55	Gamma-Ray (GAPI)	105

0	RSN (Ohm-m)	150
0	RLN (Ohm-m)	150
0	RMF (Ohm-m)	150
0	RLL3 (Ohm-m)	150
150	RLL3 x 10 (Ohm-m)	1500
150	RSN x 10 (Ohm-m)	1500
150	RLN x 10 (Ohm-m)	1500




40
50
60
70
80
90
100
110
120
130
140
Gamma-Ray
Bit Size
Caliper
RMF
RLL3
RLN
RSN



0	Caliper (in)	15
0	BOREID (in)	15
55	Gamma-Ray (GAPI)	105

0	RSN (Ohm-m)	150
0	RLN (Ohm-m)	150
0	RMF (Ohm-m)	150
0	RLL3 (Ohm-m)	150
150	RLL3 x 10 (Ohm-m)	1500
150	RSN x 10 (Ohm-m)	1500
150	RLN x 10 (Ohm-m)	1500

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

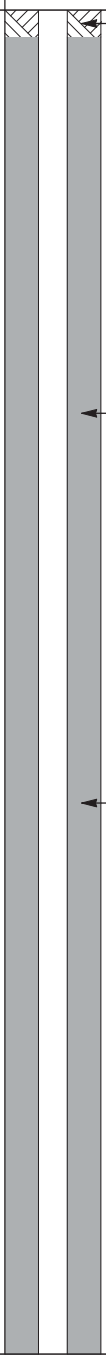
LOG OF MONITORING WELL: PWA-13

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 262 West Tujunga Ave., Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grabe Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 10/9/2012
Date Completed: 10/10/2012
Total Depth: 117 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1885263.42
Easting: 6466654.5
TOC/Surface Elevation: 538.40/538.79

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					Asphalt Surface 4.0" thick
			SM		Silty SAND, olive brown (2.5 Y 4/3), dry, loose, fine grained, some fines, trace medium to coase grained sand, with little mica
5					
10			SP		SAND, brown (10YR 4/3), fine grained sand, with abundant mica, little medium grained sand, some fines
15			SW		SAND, brown (10YR 4/3), fine to medium grained, subangular, with mica, some fines
20					SAND, brown (10YR 4/3), fine to medium grained, subangular, trace coarse grained sand, with mica, some fines
25					SAND, dark grayish brown (10YR 4/2), fine to coarse grained, subrounded to subangular, with mica
30					SAND, dark grayish brown (10YR 4/2), fine to coarse grained, subrounded to subangular, with mica, some angular coarse grained sand and fine grained gravel
35			SP		SAND, brown (10YR 4/3), fine grained, with abundant mica
40					Becomes very dark grayish brown (10YR 3/2)
45			SW		SAND, dark grayish brown (10YR 4/2), fine to coarse grained, subrounded to subangular, with some mica

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:09 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-13.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

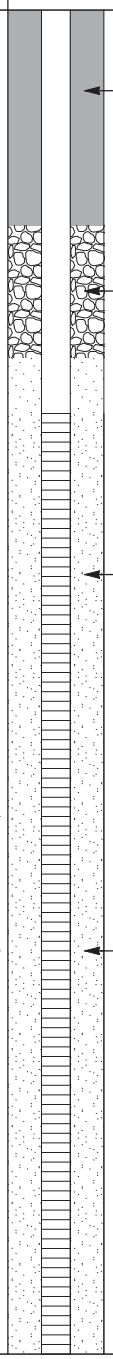
LOG OF MONITORING WELL: PWA-13

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 262 West Tujunga Ave., Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grabe Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 10/9/2012
Date Completed: 10/10/2012
Total Depth: 117 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1885263.42
Easting: 6466654.5
TOC/Surface Elevation: 538.40/538.79

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations
					SAND, brown (10YR 4/3), fine grained, subrounded, with mica, some fines
55					
60					
65			SW		SAND, brown (10YR 4/3), fine to coarse grained, subrounded, with mica
70					
75					SAND, dark grayish brown (10YR4/2), fine to coarse grained, subrounded, with little mica
80			SP		SAND, brown (10YR 4/2), fine grained, with mica
85			SW		SAND, dark grayish brown (10YR 4/2), medium to coarse grained, subangular, some fine grained gravel
90					SAND, brown (10YR 4/3), fine grained, subrounded, with mica, some medium grained sand
95					

WELL DIAGRAM



GCOU MW TO 50FT IRVINE - - 5/30/13 16:09 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-13.GPJ

ERM
2875 Michelle Drive, Suite 200
Irvine, CA 92606
Phone: (949) 623-4700
Fax: (949) 623-4711

LOG OF MONITORING WELL: PWA-13

Project Number: 0130384
Project Name: Glendale Chromium Operable Unit
Location: Near 262 West Tujunga Ave., Burbank, California
Contractor: Cascade Drilling
Drilling Method: Mud Rotary
Sampling Method: Grabe Samples Taken From Shaker Table
Logged By: A. Beach
Reviewed By: S. Perkins (CA PG #7705)

Date Started: 10/9/2012
Date Completed: 10/10/2012
Total Depth: 117 feet
Borehole Diameter: 8"
Initial Water Level: feet bgs
Notes: Air Knifed to approximately 9.5 feet bgs
Northing: 1885263.42
Easting: 6466654.5
TOC/Surface Elevation: 538.40/538.79

Depth (ft)	Sample Interval	PID (ppm)	USCS Code	GRAPHIC LOG	Soil Descriptions and Observations	WELL DIAGRAM
			SW		SAND, dark grayish brown (10YR 4/2), fine to coarse grained, subangular, with some mica (rig bouncing)	4.0" Dia. 0.020" Slotted Sch 40 PVC Screen
105					SAND, brown (10YR 4/3), fine to coarse grained, subrounded to angular, with little mica	
110						#3 Monterey Sand
115			SP		SAND, brown (10YR 4/3), fine grained, with mica, little subangular medium grained sand	
					Total Depth - 117 feet bgs	
120						
125						
130						
135						
140						
145						

GCOU MW TO 50FT IRVINE - - 5/30/13 16:09 - F:\ERM FILES\GINT BORING LOGS\PROJECTS\GCOU\PWA-13.GPJ

PACIFIC SURVEYS

CALIPER
BOREHOLE VOLUMES

Job No.
16826

File No.

Company	ERM
Well	PWA-13
Field	GLENDALE
County	LOS ANGELES
State	CA

Location:

TUJUNGA AVE BETWEEN VICTORY AND LAKE
GPS N34o10.359' W118o18.827'

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
SONIC/VDL

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10/09/2012		
Run Number	ONE		
Depth Driller	115'		
Depth Logger	115'		
Bottom Logged Interval	115'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.4 @ 77F		
Rmf @ Meas. Temp	6.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	1:30 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	ABREAU		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File 16826.db
Dataset Pathname run2/cal
Dataset Creation Tue Oct 09 14:36:56 2012

Temperature Calibration Report

Serial Number:	PS-4_Short			
Tool Model:	Short_GPH			
Performed:	Tue Oct 18 12:20:14 2011			
	Reference		Reading	
Low Reference:	4.00	degF	292.42	cps
High Reference:	7.00	degF	898.75	cps
Gain:	0.00			
Offset:	2.55			
Delta Spacing	1			

XY Caliper Calibration Report

Serial Number/Model:	Short-Comprobe
Performed:	Tue Oct 18 12:18:41 2011

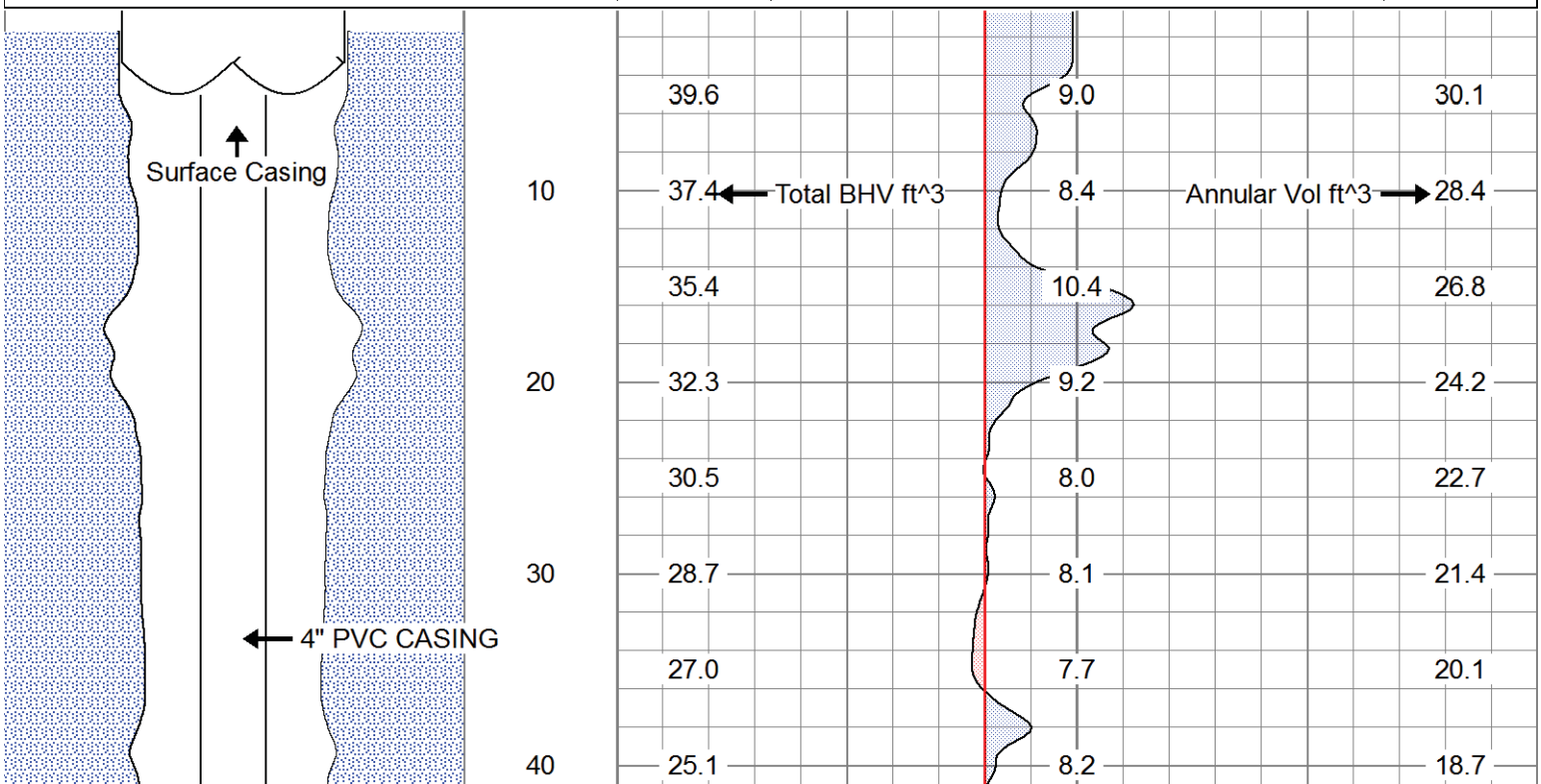
	Ring		X Caliper		Y Caliper	
1:	6	in	80.1582	cps	80.1582	cps
2:	8	in	292.415	cps	292.415	cps
3:	10	in	506.311	cps	506.311	cps
4:	14	in	898.75	cps	898.75	cps
5:	18	in	1299.97	cps	1299.97	cps
6:	22	in	1699.56	cps	1699.56	cps

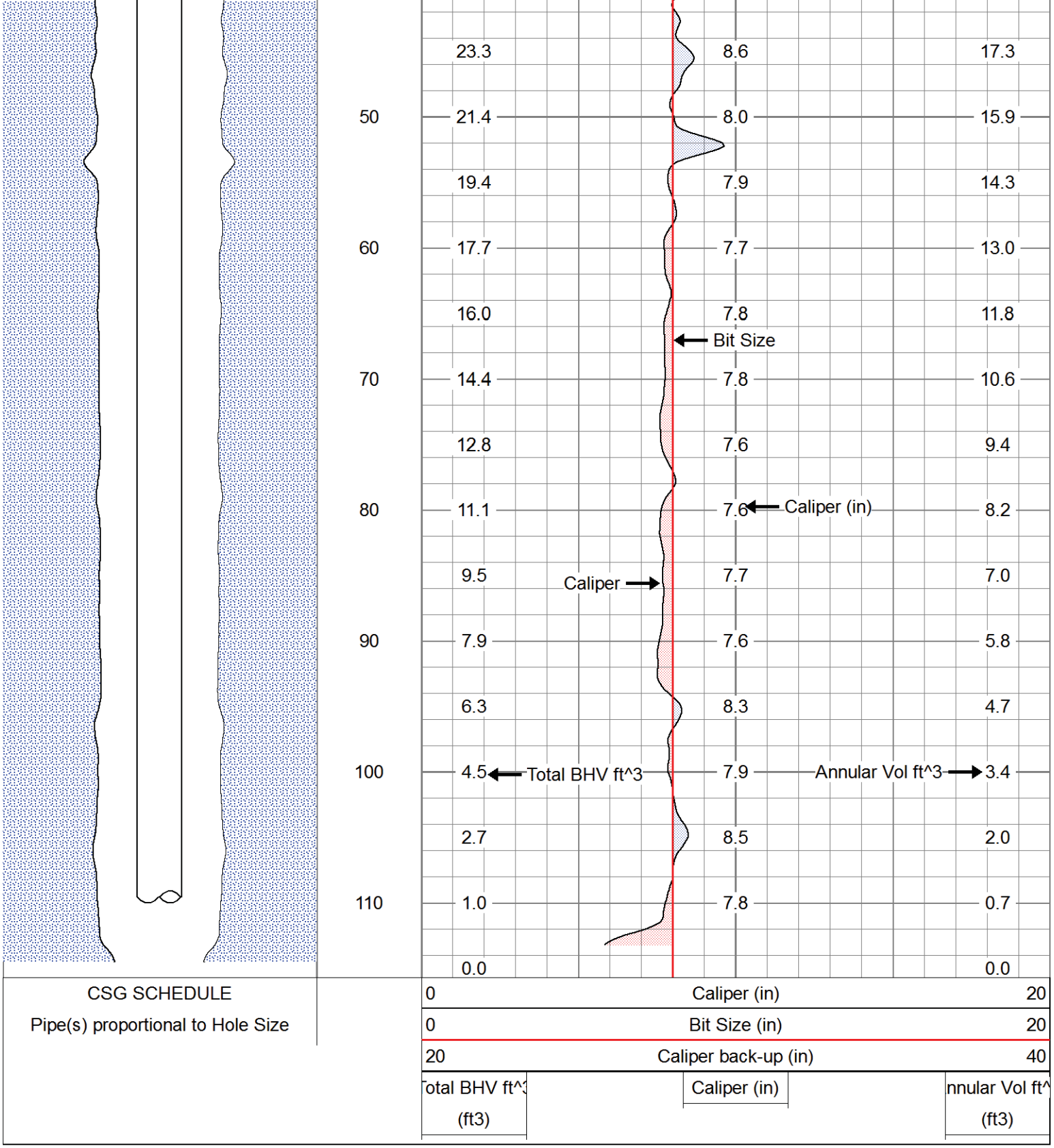
Database File	16826.db
Dataset Pathname	run2/cal
Presentation Format	xyc_gph
Dataset Creation	Tue Oct 09 14:36:56 2012
Charted by	Depth in Feet scaled 1:120

CSG SCHEDULE

Pipe(s) proportional to Hole Size

0	Caliper (in)	20
0	Bit Size (in)	20
20	Caliper back-up (in)	40




23.3
8.6
17.3
50
21.4
8.0
15.9
19.4
7.9
14.3
60
17.7
7.7
13.0
16.0
7.8
11.8
Bit Size
70
14.4
7.8
10.6
12.8
7.6
9.4
80
11.1
7.6
Caliper (in)
8.2
9.5
Caliper
7.7
7.0
90
7.9
7.6
5.8
6.3
8.3
4.7
100
4.5
Total BHV ft^3
7.9
Annular Vol ft^3
3.4
2.7
8.5
2.0
110
1.0
7.8
0.7
0.0
0.0
CSG SCHEDULE
Pipe(s) proportional to Hole Size
0
Caliper (in)
20
0
Bit Size (in)
20
20
Caliper back-up (in)
40
Total BHV ft^3
(ft3)
Caliper (in)
Annular Vol ft^
(ft3)

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No.
16826

File No.

Company ERM
Well PWA-13
Field GLENDALE
County LOS ANGELES State CA

Location:

TUJUNGA AVE BETWEEN VICTORY AND LAKE
GPS N34o10.359' W118o18.827'

Sec. Twp. Rge.

Other Services:

GR/LL3
CALIPER
SONIC/VDL

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10/09/2012		
Run Number	ONE		
Depth Driller	115'		
Depth Logger	115'		
Bottom Logged Interval	115'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.4 @ 77F		
Rmf @ Meas. Temp	6.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	1:30 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	ABREAU		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File 16826.db
Dataset Pathname elog
Dataset Creation Tue Oct 09 13:33:20 2012

ELOG Calibration Report

Serial:	D4
Model:	DTQ
Shop Calibration Performed:	Fri Aug 31 13:10:24 2012
Before Survey Verification Performed:	Sun Sep 09 13:17:43 2007
After Survey Verification Performed:	Sun Sep 09 13:17:48 2007

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	10.092	101.745		10.200	102.200	Ohm-m	1.004	0.070
Long	11.371	101.099		10.200	102.200	Ohm-m	1.025	-17.000
IEE	23988.000	23988.000	counts	26.252	26.252	A		
VSN	1724.000	1724.000	counts	32.883	32.883	V		
VLN	6816.000	6816.000	counts	130.007	130.007	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.249	101.201		40.505	101.206	Ohm-m	0.996	0.422
Long	142.638	102.842		102.858	102.858	Ohm-m	1.024	-2.408
IEE	212.960	7070.960	counts	0.233	7.738	A		
VSN	96.300	8039.720	counts	1.837	153.348	V		
VLN	85.320	2042.520	counts	1.627	38.959	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.270	101.200		40.249	101.201	Ohm-m	1.000	-0.035
Long	142.491	102.843		102.842	102.842	Ohm-m	1.004	-0.383
IEE	213.380	7077.580	counts	0.234	7.746	A		
VSN	96.540	8047.160	counts	1.841	153.490	V		
VLN	85.400	2044.440	counts	1.629	38.995	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	40.505	40.249	Ohm-m	101.206	101.201	Ohm-m
Long	143.592	142.638	Ohm-m	102.858	102.842	Ohm-m

Gamma Ray Calibration Report

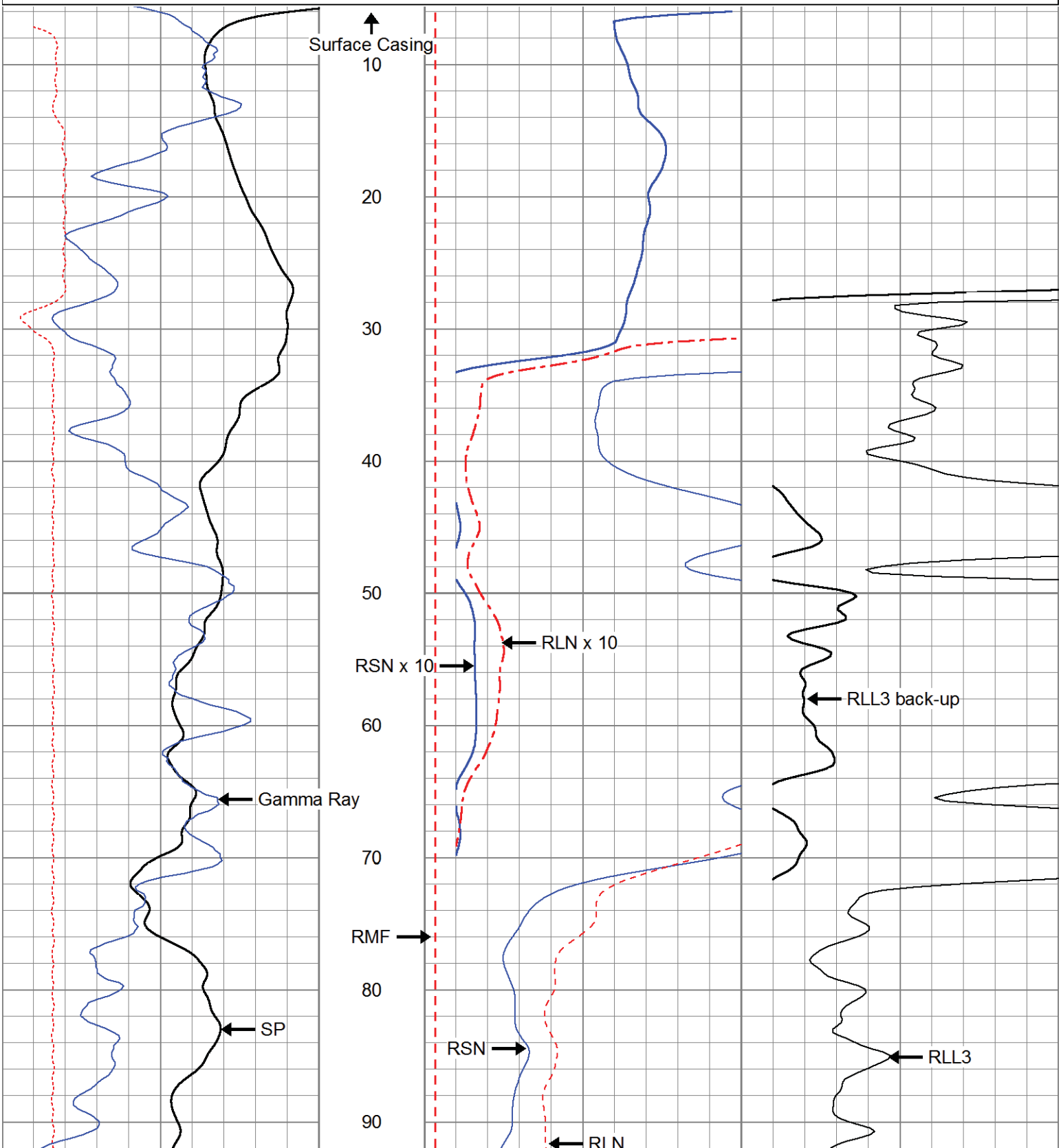
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Thu Jan 20 08:42:38 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	173.2	cps
Calibrator Reading:	678.3	cps
Sensitivity:	0.3207	GAPI/cps

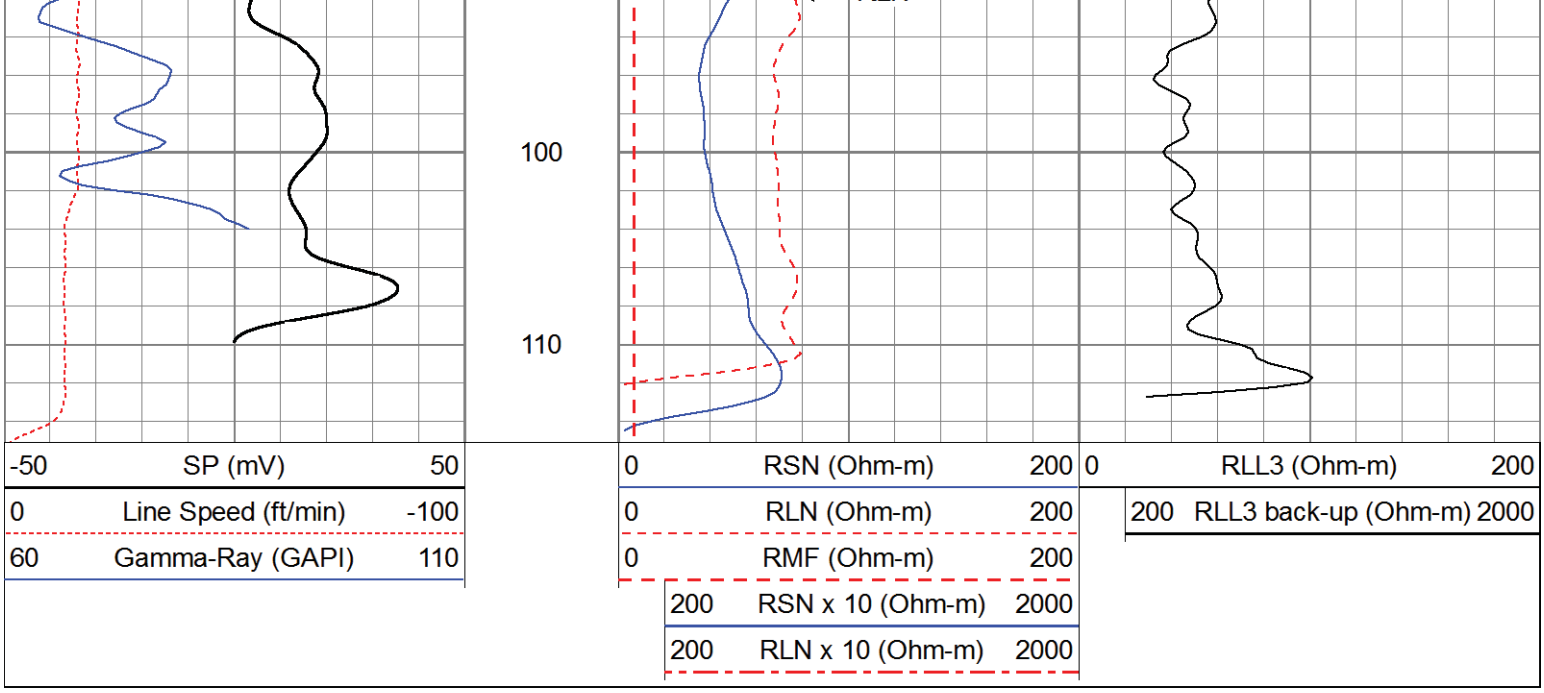
Database File	16826.db
Dataset Pathname	elog
Presentation Format	elog
Dataset Creation	Tue Oct 09 13:33:20 2012
Charted by	Depth in Feet scaled 1:120

-50	SP (mV)	50
0	Line Speed (ft/min)	-100
60	Gamma-Ray (GAPI)	110

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 back-up (Ohm-m)	2000




100
110
-50 SP (mV) 50
0 Line Speed (ft/min) -100
60 Gamma-Ray (GAPI) 110
0 RSN (Ohm-m) 200
0 RLN (Ohm-m) 200
0 RMF (Ohm-m) 200
200 RSN x 10 (Ohm-m) 2000
200 RLN x 10 (Ohm-m) 2000
0 RLL3 (Ohm-m) 200
200 RLL3 back-up (Ohm-m) 2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
16826

File No.

Company ERM
Well PWA-13
Field GLENDALE
County LOS ANGELES State CA

Location:

TUJUNGA AVE BETWEEN VICTORY AND LAKE
GPS N34o10.359' W118o18.827'

Sec. Twp. Rge.

Other Services:

ELOG
CALIPER
SONIC/VDL

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10/09/2012		
Run Number	ONE		
Depth Driller	115'		
Depth Logger	115'		
Bottom Logged Interval	115'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.4 @ 77F		
Rmf @ Meas. Temp	6.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	1:30 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	ABREAU		
Witnessed By	A. BEACH		

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Comments

Calibration Report

Database File 16826.db
Dataset Pathname LL3
Dataset Creation Tue Oct 09 13:50:53 2012

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Thu Jan 20 09:04:17 2011	
Calibrator Value:	162.0	GAPI
Background Reading:	30.6	
Calibrator Reading:	128.2	
Sensitivity:	1.6595	GAPI/

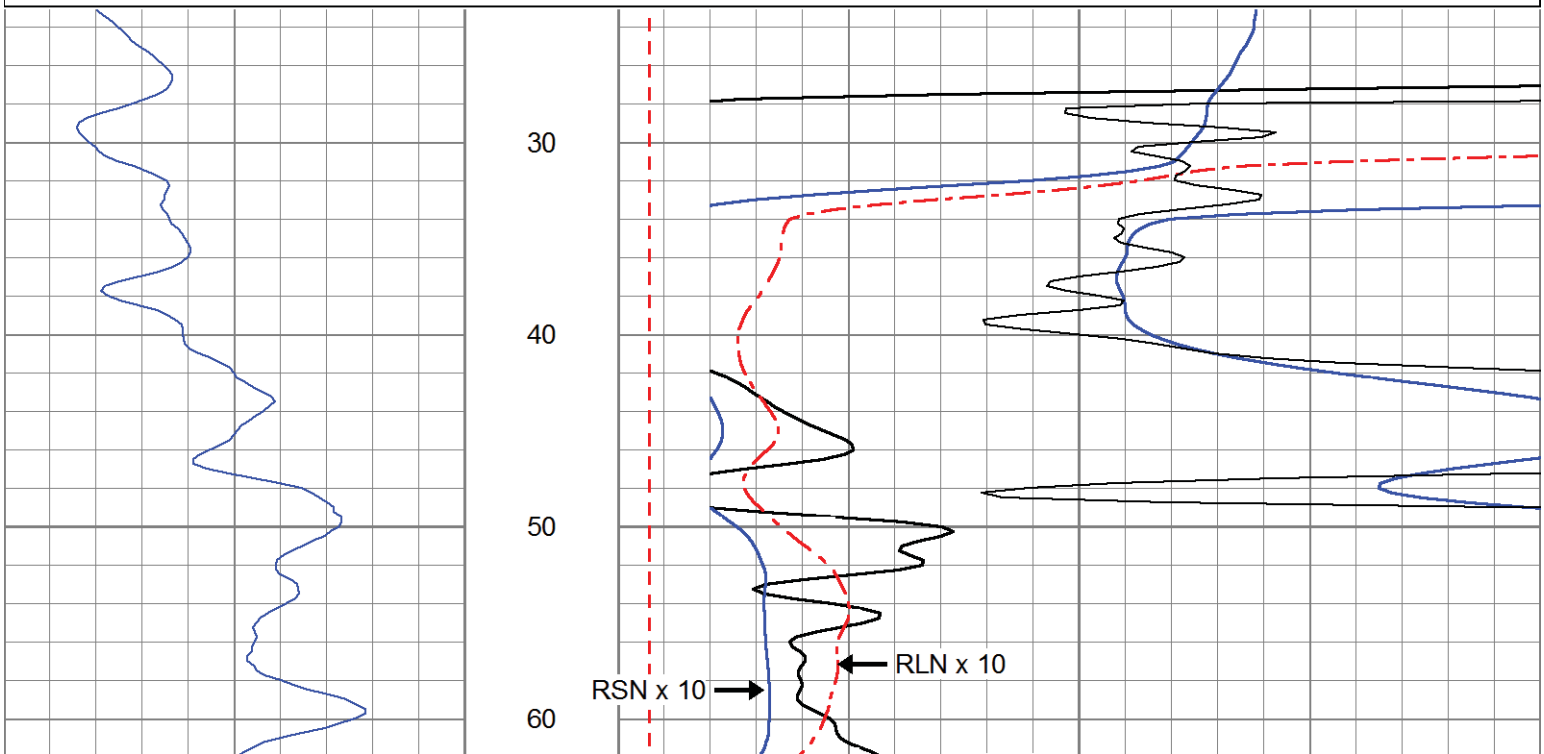
RLL3 (Resistivity Laterolog 3) Calibration Report:

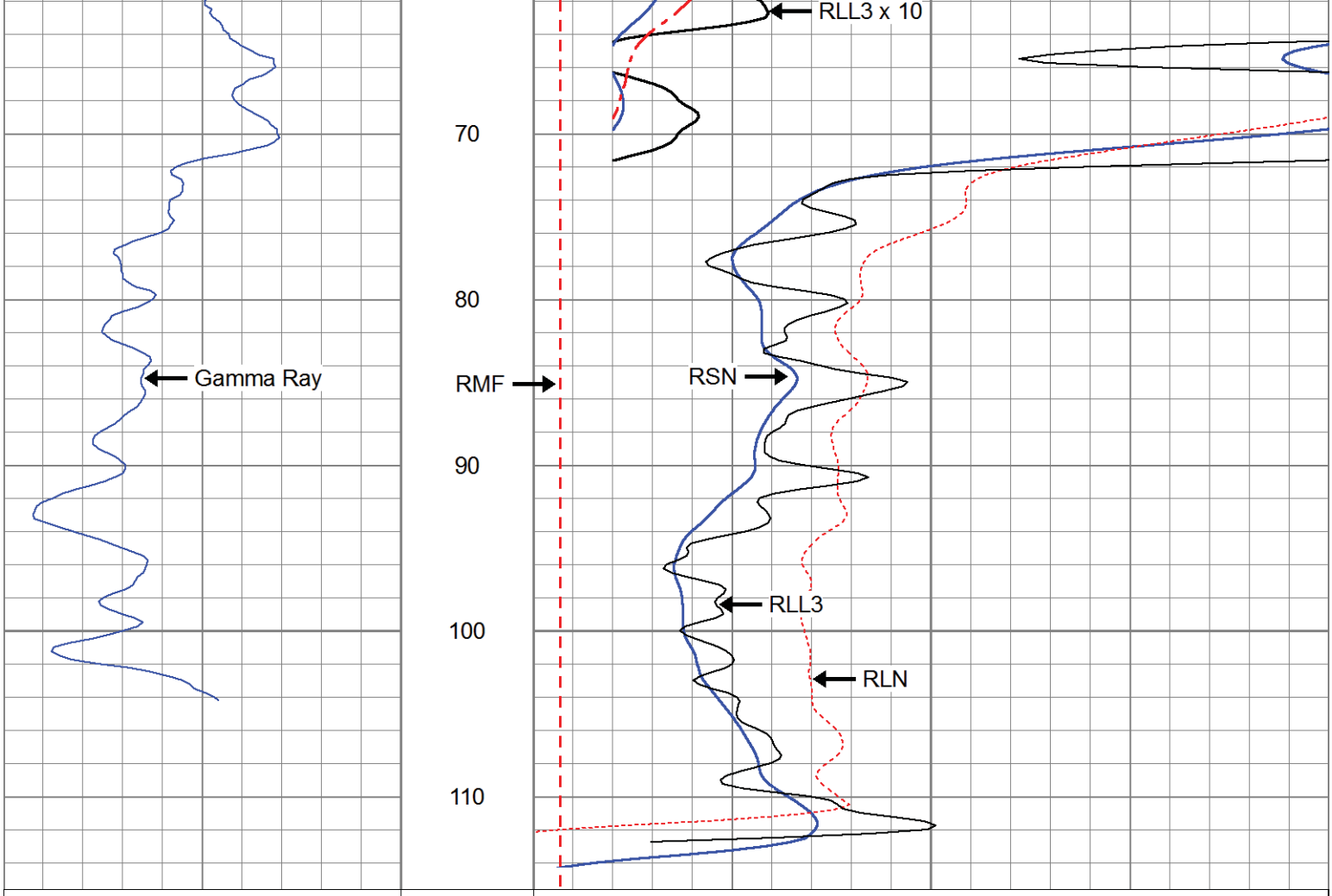
Serial Number:	883
Tool Model:	M&W
Performed:	Fri Aug 31 13:19:27 2012

System Reading	Calibration Reference	
0.014	2.500	Ohm-m
0.027	5.000	
0.254	50.000	
1.169	250.000	
2.121	500.000	

Database File	16826.db
Dataset Pathname	LL3
Presentation Format	guard
Dataset Creation	Tue Oct 09 13:50:53 2012
Charted by	Depth in Feet scaled 1:120

60	Gamma-Ray (GAPI)	110		
			0	RSN (Ohm-m) 200
			0	RLN (Ohm-m) 200
			0	RMF (Ohm-m) 200
			0	RLL3 (Ohm-m) 200
			200	RLL3 x 10 (Ohm-m) 2000
			200	RSN x 10 (Ohm-m) 2000
			200	RLN x 10 (Ohm-m) 2000





60	Gamma-Ray (GAPI)	110	0	RSN (Ohm-m) 200
			0	RLN (Ohm-m) 200
			0	RMF (Ohm-m) 200
			0	RLL3 (Ohm-m) 200
			200	RLL3 x 10 (Ohm-m) 2000
			200	RSN x 10 (Ohm-m) 2000
			200	RLN x 10 (Ohm-m) 2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No.
16826

File No.

Company ERM
Well PWA-13
Field GLENDALE
County LOS ANGELES State CA

Location:

TUJUNGA AVE BETWEEN VICTORY AND LAKE
GPS N34o10.359' W118o18.827'

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10/09/2012		
Run Number	ONE		
Depth Driller	115'		
Depth Logger	115'		
Bottom Logged Interval	115'		
Top Log Interval	0'		
Casing Driller	10" @ 5'		
Casing Logger	5'		
Bit Size	8"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	6.4 @ 77F		
Rmf @ Meas. Temp	6.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	1 HR		
Time Logger on Bottom	1:30 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-4		
Location	LA		
Recorded By	ABREAU		
Witnessed By	A. BEACH		

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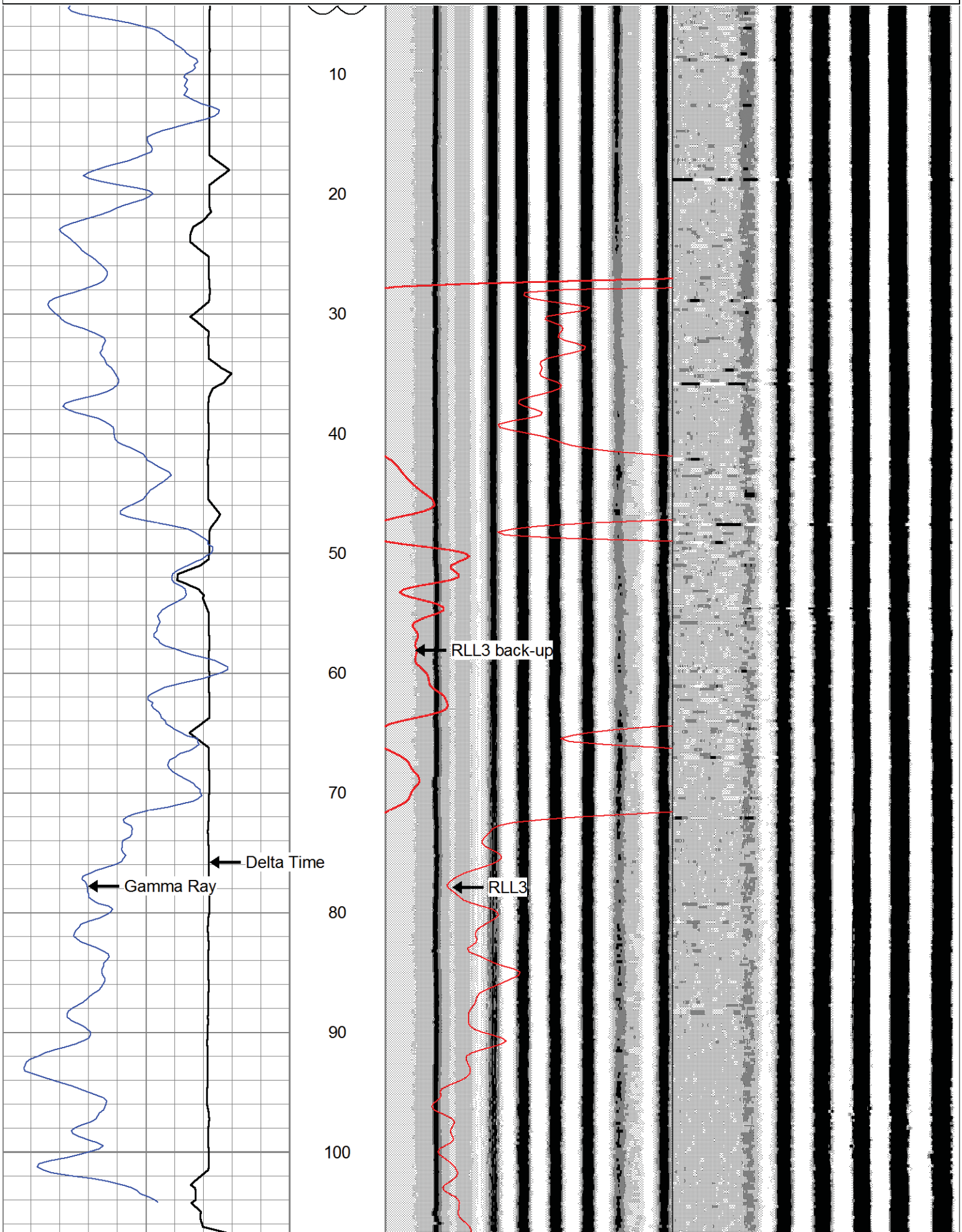
Comments

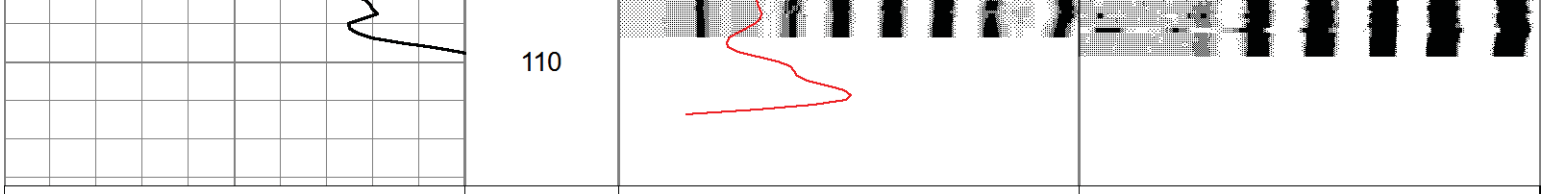
Database File 16826.db
Dataset Pathname SNC
Presentation Format slt
Dataset Creation Tue Oct 09 14:08:22 2012
Charted by Depth in Feet scaled 1:120

325	Delta Time (usec/ft)	25
60	Gamma-Ray (GAPI)	110

200	variable Density 3 ft	1600
0	RLL3 (Ohm-m)	200
200	RLL3 back-up (Ohm-m)	2000

400	Variable Density 5 ft	1600





325	Delta Time (usec/ft)	25		200	variable Density 3 ft	1600	400	Variable Density 5 ft 1600
60	Gamma-Ray (GAPI)	110		0	RLL3 (Ohm-m)	200		
				200	RLL3 back-up (Ohm-m)	2000		

J. B. Koenig & Associates, Inc.

3150 E. La Palma Ave., Suite E
Anaheim, California 92806
(714) 237-0931
(714) 237-0987 Fax

November 9, 2012

ERM
Ms. Veronica Shannon
2875 Michelle Dr., Suite 200
Irvine, CA 92606

Re: **Glendale Chromium Operable Unit**
San Fernando Valley Superfund Site
Vicinity of 3900 Chevy Chase Dr.
Los Angeles, CA

Dear Ms. Shannon:

Locations and elevations of Monitoring Wells **GC-1 thru GC-5, PWA-1 thru PWA-10, PWA-12, PWA-13, and V13EEMW1** at the subject location have been determined by field survey on October 22 -29, 2012.

Elevations are based on: Per record documents, NGS BM# BE102 (PID EW2045); located 2.05 miles southeasterly along the Southern Pacific railroad from the railroad station in Burbank, on top of and 1' east of the west end of the northwest concrete wingwall of a culvert under the railroad, 88.9' southeast of the centerline of the north-eastbound lanes of Grandview Ave., 11.2' southwest of the near rail, and 1' below the level of the track, elevation being 470.94'(NAVD88, Adj. 1994).

Horizontal Coordinates are based on the following: Per record documents, all coordinates were set relative to Zone 5 of the California coordinate system (NAD-83, NGS PID Stations AB5036 and AB5056 EPOCH date 2000.35).

Monitoring Well	Northing	Easting	NAD83 Latitude	NAD83 Longitude	Elevation Top of Casing	Elevation Top of Rim
GC-1	1883167.28	6468994.57	34.1666456	-118.3063612	N.A.	*504.56
GC-2	1884443.39	6473713.18	34.1701907	-118.2907747	N.A.	*533.79
GC-3	1882181.31	6473177.60	34.1639706	-118.2925235	N.A.	*481.66
GC-4	1871304.73	6478161.54	34.1341220	-118.2759494	N.A.	*413.07
GC-5	1872296.68	6480271.92	34.1368635	-118.2689844	N.A.	*447.46
PWA-1	1888206.37	6464601.81	34.1804546	-118.3209358	576.51	576.87
PWA-2	1889748.69	6465655.96	34.1847019	-118.3174665	592.60	593.03
PWA-3	1888447.79	6466527.38	34.1811347	-118.3145717	573.92	574.28
PWA-4	1886408.60	6466075.85	34.1755275	-118.3160435	555.85	556.28
PWA-5	1887118.70	6462154.74	34.1774442	-118.3290148	578.06	578.56
PWA-6	1875237.98	6480118.65	34.1449447	-118.2695170	476.18	476.52
PWA-7	1878185.19	6477606.15	34.1530243	-118.2778476	449.62	450.11
PWA-8	1882223.71	6469928.59	34.1640606	-118.3032641	498.70	499.09
PWA-9	1883532.94	6473710.30	34.1676889	-118.2907755	507.94	508.32
PWA-10	1881625.15	6472544.56	34.1624372	-118.2946107	482.47	483.07

PWA-12	1875238.26	6480145.18	34.1449456	-118.2694293	476.39	476.82
PWA-13	1885263.42	6466654.50	34.1723857	-118.3141185	538.40	538.79
V13EEMW1	1875500.99	6478317.60	34.1456539	-118.2754721	435.84	436.62

* Elevation indicated was surveyed at the finished surface location of the boring.

Elevations shown for Top of Casings are on notches on the north edge of casing walls, and elevations for Top of Rims are on the north edge of well rims. Please call if you have any questions.

Very truly yours,

William A. Teipe, P.E.

File: 1221F

REGISTERED PROFESSIONAL ENGINEER
WILLIAM A. TEIPE
No. 21838
Exp. 3/31/14
CIVIL
STATE OF CALIFORNIA

11/16/12

APPENDIX B

Groundwater Monitoring Field Records

CH2M HILL GW Purge Sheets

9/6/12 EPA GCOU M. LADEAU

0650 ARRIVE AT CLUSTER 30. ANDRE RITCHIE/CH2M HILL ONSITE.

0655 CAL BARRICADE ONSITE SETTING UP TRAFFIC CONTROL.

0700 HORIBA C102388 METER BEING USED. NO CAL SOLUTIONS IN CASE. WILL DO POST CALIBRATIONS

0715 CS-C30-200 DTW = 95.79
CS-C30-120 DTW = 95.41

0745 PUMP ON CS-C30-200.

	TEMP	EC	PH	ORP	DO
0748	20.20	1.73	7.61	307	9.26
0750	20.17	1.72	7.55	298	8.89
0754	20.46	1.71	7.50	286	9.93
0756	20.76	1.70	7.48	274	9.76
0758	20.87	1.70	7.46	272	10.15
0800	20.94	1.71	7.46	267	9.90
0802	20.98	1.71	7.46	267	9.39
0804	21.08	1.71	7.46	269	9.13
0806	21.27	1.71	7.45	270	9.49
0808	21.18	1.71	7.45	269	9.93
0810	21.06	1.72	7.45	268	8.70
0812	20.85	1.71	7.45	265	9.51
0814	20.87	1.71	7.44	256	10.02

	TEMP (°C)	EC (mS/cm)	PH	ORP (mV)	DO (mg/L)
0816	21.08	1.71	7.44	252	9.99
0818	21.15	1.71	7.44	251	9.47

- Purged ~ 9 gallons.

0820 Mike offsite to get 40 mL preserved sample bottles.

0850 Mike back onsite.

0852 Pump on CS-C30-200.

	TEMP	EC	PH	ORP	DO
0854	20.54	1.74	7.62	257	11.30
0856	20.74	1.72	7.58	248	10.13
0858	20.79	1.71	7.53	228	9.84
0900	21.01	1.72	7.51	219	9.78
0902	21.15	1.71	7.50	214	9.61
0904	21.20	1.71	7.49	211	9.45
0906	21.23	1.70	7.49	208	9.23

- Purged ~ 4 gallons.

0950 Pump off. Total ~25 gallons discharged.

1000 Checked pH calibration using 7.00 @ 25°C and 10.01 @ 25°C buffers.
- 7.00 buffer = 7.18 @ 24°C
- 10.01 buffer = 10.07 @ 24°C

1015 Pump on CS-C30-120.

	(°C) TEMP	(mS/cm) EC	PH	(mV) ORP	(mg/L) DO
1019	21.37	3.03	7.21	185	8.83
1021	21.55	3.01	7.21	173	8.55
1023	22.45	2.98	7.20	168	8.58
1025	22.78	2.96	7.19	168	8.50
1027	22.92	2.94	7.18	168	8.53
1029	22.98	2.92	7.18	168	8.50
1031	23.06	2.91	7.18	166	8.61
1033	23.08	2.90	7.18	166	8.63
1035	23.22	2.89	7.18	165	8.50
1037	23.20	2.89	7.18	165	8.43
1039	23.25	2.89	7.18	164	8.54
1041	23.31	2.88	7.19	164	8.47
1043	23.35	2.88	7.19	165	8.47

- Purged ~ 10 gallons.

1045 Collect sample @ CS-C30-120

1105 Pump off. Total ~ 15 gallons discharged.

1125 Offsite @ CS-C30

1130 Onsite @ CS-C31-102

1140 CS-C31-102 DTW = 80.92'

1145 Pump on CS-C31-102

	TEMP (°C)	EC (mS/cm)	PH	ORP (mV)	DO (mg/L)
1149	21.65	3.25	7.30	160	7.54
1151	22.39	3.26	7.27	138	7.24
1153	22.74	3.25	7.24	132	7.14
1155	22.93	3.25	7.22	127	7.10
1157	22.98	3.24	7.21	122	7.10
1159	23.02	3.24	7.21	115	7.12
1201	23.06	3.23	7.16	112	7.10
1203	23.06	3.23	7.16	111	7.08

- Purged ~ 8 gallons

1205 Collect primary sample @ CS-C31-102

1220 Collect ~~primary~~ duplicate sample @ CS-C31-102

1240 Pump off. Total ~ 14 gallons discharged.

1245 Offsite!

1300 Stop at park to package samples and fill COC

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: AMP - MW11
Date of Field Visit: 10.16.12
Field Staff: Mike Palm, Hun Tung

Sample ID:

Well Casing Dia. 4in
Static WL: 61.97
Total Depth 74.00
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1145	63.07	22.29	1.299	85.6	6.65	137.6	169	
1149	63.25	22.69	1.299	39.7	6.78	111.5	21.2	
1203	63.30	22.85	1.307	36.2	6.92	97.8	5.81	
1206	63.21	23.08	1.309	34.7	6.94	94.4	4.17	
1210	63.11	23.06	1.310	35.3	6.97	91.6	2.59	
1214	63.13	23.49	1.313	36.9	6.98	90.2	2.60	
1218	62.95	23.50	1.314	37.2	6.99	90.1	2.31	
1222	62.96	23.62	1.311	37.4	6.99	89.8	1.85	

Final SWL: 62.15
Total Vol.: 13

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: Amp-MW3
Date of Field Visit: 10·16·12
Field Staff: Mike palan, Hun Jung

Sample ID:

Well Casing Dia. 4in
Static WL: 62.55
Total Depth 75.20
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1022	62.61	22.03	1.848	52.9	7.09	219.7	123	
1026	62.65	22.63	1.843	51.8	6.95	176.0	27.2	
1029	62.65	22.71	1.832	51.1	7.02	149.0	21.3	
1032	62.66	22.77	1.795	50.6	7.06	129.9	7.76	
1035	62.65	22.78	1.767	49.8	7.07	119.6	4.40	
1038	62.65	22.83	1.740	48.7	7.08	113.5	2.56	
1041	62.65	22.86	1.717	48.7	7.08	110.0	1.97	
1044	62.65	22.86	1.685	48.6	7.08	108.3	1.33	
1047	62.65	22.94	1.651	47.7	7.08	106.6	1.00	

Final SWL: 62.65
Total Vol.: 15 (gal)

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: DRC-MW1
Date of Field Visit: 10.17.12
Field Staff: Hun Jung, Mike Palm
Sample ID:

Well Casing Dia. 4in
Static WL: 61.20
Total Depth 71.30
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1316	61.34	23.07	1.309	43.6	6.58	63.8	23.8	
1319	61.30	23.59	1.311	43.6	6.75	51.7	20.9	
1322	61.32	23.58	1.311	43.3	6.81	46.5	15.7	
1325	61.30	23.56	1.311	42.3	6.83	44.8	18.5	
1328	61.28	23.68	1.310	42.2	6.87	43.9	14.0	
1331	61.27	23.67	1.309	41.2	6.91	43.7	13.1	
1334	61.28	23.80	1.309	40.9	6.93	43.3	12.5	
1337	61.28	23.63	1.310	42.9	6.94	44.8	12.2	
1340	61.28	22.88	1.309	42.9	6.94	44.1	10.96	

Final SWL: 61.10
Total Vol.: 8(gal)

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: DRC-MW2
Date of Field Visit: 10.17.12
Field Staff: Mike palm, Hun Tung
Sample ID:

Well Casing Dia. 4 in
Static WL: 62.85
Total Depth 71.85
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1040	63.40	21.46	1.258	381.1	6.71	139.0	26.8	
1043	63.61	23.32	1.256	22.5	6.50	112.7	35.7	
1047	63.90	22.94	1.211	21.0	6.72	88.1	10.29	
1050	63.91	23.11	1.210	20.2	6.73	85.4	14.0	
1053	63.80	23.35	1.207	20.1	6.74	85.2	16.9	
1057	63.79	24.13	1.200	20.5	6.76	85.3	6.98	
1100	63.71	24.10	1.189	21.6	6.77	86.9	4.33	
1104	63.72	24.31	1.184	21.4	6.77	89.4	3.19	
1107	63.74	24.14	1.138	22.8	6.77	90.5	4.21	

Final SWL: 62.98
Total Vol.: 6 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: DRC-MW3
Date of Field Visit: 10.17.12
Field Staff: Mike Palan, Hun Tung
Sample ID:

Well Casing Dia. 4(in)
Static WL: 62.17 (ft)
Total Depth 73.60 (ft)
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
951	62.35	21.01	2.194	12.0	6.94	134.6	120	
955	62.36	22.62	1.780	21.6	6.95	119.1	55.4	
959	62.35	23.04	1.507	29.0	6.91	116.2	38.1	
1003	62.34	23.11	1.334	34.2	6.89	113.8	20.5	
1006	62.34	23.11	1.249	36.3	6.88	111.8	13.5	
1009	62.34	23.11	1.213	37.2	6.88	110.2	11.7	
1013	62.35	23.26	1.184	37.5	6.88	109.2	7.8	

Final SWL: 62.20
Total Vol.: 6 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: DRC-MW4
Date of Field Visit: 10.17.12
Field Staff: mike pabon, Hun Jung
Sample ID:

Well Casing Dia. 4in
Static WL: 61.50 (ft)
Total Depth 71.25 (ft)
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
855	61.80	21.30	1.205	82.0	6.65	100.3	62.0	
858	61.80	21.82	1.206	63.6	6.78	95.3	22.9	
902	61.81	22.20	1.207	56.1	6.86	91.0	13.7	
905	61.82	22.28	1.207	54.5	6.86	82.6	16.6	
908	61.82	22.34	1.207	49.9	6.87	81.1	15.2	
911	61.82	22.32	1.207	48.2	6.87	82.1	12.2	

Final SWL: 61.38
Total Vol.: 7 (gal)

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: DWB-W1
Date of Field Visit: 10.17.12
Field Staff: mike palm, Hun Jung
Sample ID:

Well Casing Dia. 4in
Static WL: 59.95
Total Depth 75.60
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1216	60.00	21.73	1.219	67.6	6.94	126.7	124	
1219	60.00	22.22	1.225	57.0	6.61	112.3	127	
1222	60.05	22.77	1.233	51.3	6.65	76.8	69.2	
1225	60.00	22.90	1.229	47.2	6.76	64.6	36.3	
1228	60.00	22.96	1.231	45.5	6.81	58.6	25.3	
1231	60.00	22.95	1.234	44.2	6.82	56.4	19.7	
1234	60.00	22.98	1.240	44.5	6.83	54.9	14.8	
1237	60.00	22.97	1.242	44.4	6.83	53.9	12.7	

Final SWL: 60.00
Total Vol.: 8 gal

00.29

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: GP10
Date of Field Visit: 10.18.12
Field Staff:

Sample ID:

Well Casing Dia. 4in
Static WL: 39.54
Total Depth 98.20
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0803	39.60	21.73	1.170	58.7	6.89	229.5	61.2	
0806	39.60	21.91	1.145	52.7	6.93	156.6	31.1	
0812	39.60	22.18	1.146	50.7	7.02	126.5	14.5	
0815	39.60	22.39	1.144	46.8	7.12	100.3	10.52	
0820	39.60	22.44	1.149	44.9	7.14	92.9	9.53	
0823	39.60	22.50	1.153	42.1	7.16	88.9	8.03	
0826	39.60	22.53	1.153	41.1	7.17	87.2	7.19	
0830	39.61	22.47	1.158	41.1	7.16	85.0	6.84	
0833	39.61	22.69	1.155	39.9	7.16	82.5	5.11	
0837	39.61	22.51	1.155	39.6	7.17	84.1	3.93	
0840	39.51	22.51	1.156	39.7	7.17	82.2	3.85	

Final SWL: 39.58
Total Vol.: 7.6

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: GN-P11
Date of Field Visit: 10.18.12
Field Staff: mike pol
Sample ID:

Well Casing Dia. 4in
Static WL: 28.80
Total Depth 44.30
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
955	28.80	20.39	1.458	101.2	6.53	106.2	294	
958	28.80	21.36	1.420	52.1	6.60	102.7	82.2	
1004	28.80	21.40	1.418	46.9	6.63	101.6	55.8	
1007	28.80	21.48	1.404	44.7	6.65	101.6	54.8	
1010	28.80	21.62	1.394	42.1	6.66	101.1	39.4	
1014	28.80	21.72	1.376	40.3	6.68	100.7	43.9	
1017	28.80	21.72	1.369	39.5	6.69	100.5	40.6	
1020	28.80	21.73	1.366	39.8	6.69	100.5	38.2	
1023	28.80	21.77	1.359	39.1	6.70	99.8	32.8	
1026	28.80	21.80	1.355	38.6	6.70	99.2	42.8	

Final SWL: 28.80
Total Vol.: 8 (gal)

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-CS0-120
Date of Field Visit: 10.19.12
Field Staff: Mike palan, Hun Jung

Sample ID:

Well Casing Dia. 4in
Static WL: 95.20
Total Depth 122.30
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1155	95.25	20.48	1.332	74.8	7.46	57.5	215	
1158	95.26	20.78	1.313	62.4	7.16	59.2	187	
1201	95.25	21.64	1.311	54.5	7.26	50.5	149	
1204	95.25	22.06	1.312	52.0	7.37	46.8	112	
1207	95.25	22.15	1.312	50.5	7.39	47.5	90.7	
1210	95.25	22.18	1.308	48.3	7.39	49.2	87.8	
1213	95.25	22.23	1.307	48.0	7.38	50.3	67.4	
1216	95.25	22.23	1.298	49.2	7.38	51.1	42.5	

Final SWL: 95.24
Total Vol.: 11 (gal)

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-CSØ-2ØØ
Date of Field Visit: 10.19.12
Field Staff: Mike palon, Hun Jung
Sample ID:

Well Casing Dia. 4in
Static WL: 94.50
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1108	94.55	19.97	0.716	48.4	7.17	83.9	4.76	
1111	94.53	20.12	0.714	46.8	7.07	84.7	2.04	
1114	94.53	20.77	0.715	44.6	7.34	65.2	0.93	
1118	94.51	21.02	0.716	44.8	7.45	55.8	0.80	
1121	94.50	21.08	0.716	45.3	7.50	49.3	0.93	
1124	94.50	21.09	0.716	44.2	7.50	48.1	0.50	
1127	94.50	21.12	0.716	44.5	7.56	49.1	0.74	
1130	94.51	21.13	0.716	45.8	7.56	51.1	0.84	

Final SWL: 94.52
Total Vol.: 9 (gal)

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C31-102
Date of Field Visit: 10.19.13
Field Staff: Mike palm, Hun Jung
Sample ID:

Well Casing Dia. 4in
Static WL: 79.48
Total Depth 103.60
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0800	79.55	20.86	1.321	68.6	6.55	157.2	70.5	
0804	79.54	20.86	1.320	63.8	6.69	120.2	33.1	
0808	79.55	22.25	1.331	56.9	6.99	85.6	20.6	
0813	79.56	22.38	1.331	54.7	7.03	88.7	15.0	
0816	79.55	22.40	1.331	55.1	7.06	80.2	13.1	
0819	79.56	22.65	1.328	53.5	7.09	78.1	9.5	
0822	79.55	22.98	1.320	53.0	7.13	67.1	7.7	
0826	79.55	22.61	1.332	52.8	7.16	63.1	5.4	
0829	79.55	22.35	1.330	51.3	7.16	63.9	3.8	
0833	79.56	22.33	1.330	50.2	7.17	64.5	2.0	
0836	79.56	22.40	1.327	49.9	7.12	64.7	1.8	

Final SWL: 79.43
Total Vol.: 11 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: V13DRMW5
Date of Field Visit: 10.17.12
Field Staff: Mike palm, Hun Tung

Sample ID:

Well Casing Dia. 4in
Static WL: 60.19
Total Depth 68.60
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
759	60.25	21.27	1.269	71.5	6.34	233.2	16.1	
802	60.25	21.93	1.226	67.2	6.66	180.2	3.43	
807	60.27	23.00	1.268	65.0	6.82	147.5	1.56	
810	60.26	23.10	1.268	62.8	6.84	136.6	1.38	
814	60.25	23.22	1.267	58.5	6.86	130.7	1.60	
817	60.23	23.27	1.266	55.7	6.87	126.0	1.53	
820	60.23	23.34	1.266	54.1	6.87	123.9	0.98	
823	60.23	22.96	1.266	50.6	6.87	122.2	0.54	

Final SWL: 60.20
Total Vol.: 8 (gal)

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: GS-A3
Date of Field Visit: 10/19/12
Field Staff: Mike palm, Hun Jung
Sample ID:

Well Casing Dia. 4in
Static WL: 33.33
Total Depth 49.10
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0930	34.15	21.85	1.112	36.2	7.18	49.0	76.3	
0935	34.25	22.78	1.113	18.3	7.18	49.9	47.9	
0938	34.27	23.22	1.115	11.3	7.19	46.1	56.8	
0941	34.25	23.45	1.115	10.3	7.20	46.7	60.3	
0944	34.25	23.45	1.118	10.7	7.19	48.1	58.7	
0949	34.53	23.78	1.116	9.7	7.19	44.1	56.5	
0952	34.50	23.44	1.115	9.4	7.19	45.2	75.4	
0958	34.45	23.81	1.115	8.9	7.20	46.6	67.1	

Final SWL: 33.25
Total Vol.: 4.5 gal

GROUNDWATER SAMPLING
FIELD DATA SHEET

PROJECT NAME SAN FERNANDO VALLEY JOB NUMBER 386135.FI.04/05

FIELD TEAM Mike Palm, Hun Jung

WELL NUMBER CS-VPB-09 FIELD CONDITIONS Cloudy, Cool

SAMPLE ID	SAMPLE TIME	SAMPLE TYPE		
MY8L10 MY8L11	0845	☒ PRIMARY ☐ FIELD DUPLICATE	☐ EQUIPMENT BLANK ☐ LAB BLANK	☐ MS ☐ MSD
MY8L12 MY8L13	0900	☐ PRIMARY ☐ FIELD DUPLICATE	☐ EQUIPMENT BLANK ☒ LAB BLANK	☐ MS ☐ MSD
		☐ PRIMARY ☐ FIELD DUPLICATE	☐ EQUIPMENT BLANK ☐ LAB BLANK	☐ MS ☐ MSD

OUTCOME ☒ SAMPLED ☐ NO WATER TO SURFACE ☐ INOPERABLE ☐ BLOCKED

COMMENTS

DECONTAMINATION ☒ PIPE AND SOUNDER

PURGE INFORMATION

DATE 10-22-12 START TIME 0831 END TIME 0905

TOTAL WELL DEPTH 76 (ft bgs) PUMP DEPTH 71 (ft bgs)

DEPTH TO WATER 51.70 (ft bgs)

WATER COLUMN 24.3 (ft) x 0.653 = 15.8 GAL/CASING VOL.

DISCHARGE RATE 6 (gpm) TOTAL VOL. PURGED 55 (gal)

METHOD ☒ DEDICATED PUMP ☐ PORTABLE PUMP ☐

HORSEPOWER ☐ 1/3 ☐ 1 ☐ 1/2 ☒ 1 1/2 ☐ 3/4

VOLUME OF WATER IN CASING	
DIAMETER	VOLUME
2 inches	0.163 gal/ft
4 inches	0.653 gal/ft
6 inches	1.469 gal/ft
8 inches	2.611 gal/ft

TIME	VOLUME PURGED (gal)	TEMP (°C)	pH (pH units)	CONDUCT (µMHOS)	DO (mg/L)	ORP (mV)	TURBIDITY (NTU)	APPEARANCE
0831	0	19.9	6.90	2.167	78.5	211.4	17.2	
0834	16	19.9	6.85	2.175	79.3	188.0	172	
0837	32	20.1	6.95	2.168	75.6	151.7	81.6	
0840	48	20.2	6.97	2.160	61.9	131.6	27.1	

PURGE WATER DISPOSAL

☐ STORM DRAIN

☒ ~~TANKER~~ Drums

HEALTH AND SAFETY http://www.int.ch2m.com/SBO

DATE OF MOST RECENT SAFE BEHAVIOR OBSERVATION

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: WCW-4
Date of Field Visit: 11 1 12
Field Staff: mike palan
Hum Tung

Sample ID:

Well Casing Dia. 4
Static WL: 41.39
Total Depth 103.40
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1029	41.40	19.98	0.995	7.62	6.62	132.8	0.58	
1033	41.40	20.30	0.994	6.87	6.77	125.7	1.62	
1036	41.40	20.90	0.989	6.07	6.89	118.6	1.61	
1039	41.40	21.01	0.990	5.93	6.95	114.7	1.28	
1043	41.40	21.11	0.986	5.63	6.99	112.2	0.76	
1047	41.40	21.14	0.983	5.84	6.92	116.1	0.28	
1051	41.40	21.18	0.978	5.84	6.83	120.8	0	
1054	41.40	21.14	0.978	5.85	6.94	115.0	0	
1057	41.40	21.20	0.992	6.24	6.88	118.0	0	
1100	41.40	21.17	0.997	6.12	6.91	114.5	0	
1103	41.40	21.19	0.995	6.02	6.90	115.4	0	
1106	41.40	21.18	0.994	6.15	6.91	120.3	0	

Final SWL: 41.39
Total Vol.: 13

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: WCW-1
Date of Field Visit: 11.1.12
Field Staff:

Sample ID:

Well Casing Dia. 2
Static WL: 46.21
Total Depth 53.50
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1147	46.30	21.63	1.060	5.91	6.93	121.8	1423	
1150	46.37	21.83	1.067	5.60	6.87	115.0	1117	
1152	46.81	22.01	1.069	5.32	6.90	113.4	889	
1154	46.81	22.19	1.074	5.17	6.91	111.2	694	

Final SWL: 46.21
Total Vol.: 0.5 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: OW-2
Date of Field Visit: 11/1/12
Field Staff: Mike Dolan
Hun Jung

Sample ID:

Well Casing Dia. 4 in
Static WL: 39.16
Total Depth 54.15
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0921	39.21	21.24	1.133	6.86	7.00	117.0	37.3	
0925	39.21	21.65	1.140	6.45	7.12	109.0	27.2	
0928	39.21	21.82	1.139	6.00	7.15	104.3	15.4	
0932	39.21	21.85	1.134	5.94	7.14	103.3	10.0	
0936	39.21	21.75	1.123	5.87	7.10	104.5	5.78	
0940	39.21	21.78	1.120	5.84	7.09	105.0	4.61	
0943	39.21	21.83	1.117	5.84	7.07	105.6	3.59	
0946	39.21	21.88	1.115	5.82	7.06	106.5	3.20	
0949	39.21	21.91	1.114	5.80	7.06	107.4	2.53	

Final SWL: 39.18
Total Vol.: 11.5

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: OW-3
Date of Field Visit: 11-1-12
Field Staff: mike Palm
Hun Jung

Sample ID:

Well Casing Dia. 4 in
Static WL: 39.45
Total Depth 57.00
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0816	39.48	20.77	1.102	7.49	6.69	118.0	5.66	
0820	39.48	21.41	1.115	6.79	7.05	100.8	2.67	
0824	39.49	22.03	1.122	6.60	7.13	98.2	1.70	
0827	39.48	22.05	1.117	6.40	7.15	98.9	1.02	
0830	39.45	22.99	1.110	6.42	7.12	101.5	1.23	
0834	39.46	22.18	1.115	6.64	7.13	101.7	0.99	
0837	39.45	22.08	1.111	6.65	7.12	104.5	0.89	

Final SWL: 39.45
Total Vol.: 8 (gal)

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: PWA-7
Date of Field Visit: 1.21.13
Field Staff: Mike Palm
Mike Ladrow

Well Casing Dia. 4in
Static WL: 25.96
Total Depth 53.00
Sampling Equipment

Field Parameters

Sample @ 1035 MY8MX0, MY8MX1

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1013	26.02	20.65	1.560	4.37	6.96	91.7	44.0	
1016	26.05	21.03	1.596	3.26	7.03	54.0	42.9	
1019	26.05	21.66	1.594	3.36	7.05	38.6	55.3	
1022	26.05	21.57	1.600	2.48	7.21	22.4	60.5	
1025	26.05	21.82	1.581	3.12	7.18	19.4	42.4	
1028	26.05	21.86	1.575	3.15	7.16	18.9	47.1	
1031	26.05	21.81	1.565	3.04	7.19	15.1	36.0	

Final SWL: 26.05
Total Vol.: 7 gal.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: PWA-6
Date of Field Visit: 1-21-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 62.70
Total Depth 90.00
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1119	62.74	19.60	1.234	6.92	7.16	45.9	36.3	* Having problems with
1122	62.74	20.51	1.251	6.91	7.18	38.9	37.3	the pump
1125	62.77	21.00	1.261	6.90	7.19	35.1	35.1	
1128	62.78	20.31	1.243	8.07	7.10	54.9	38.2	
1132	62.79	20.19	1.241	8.49	7.19	41.7	58.0	
1135	62.78	20.55	1.249	8.24	7.18	38.8	34.8	
1138	62.78	20.63	1.251	8.57	7.18	37.8	26.8	
1141	62.78	20.59	1.251	8.43	7.19	35.7	24.1	
								MYBMX2 @ 1145
								MY8MX3 @ 1145

Final SWL: 62.78
Total Vol.: 8 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: FWA-12
Date of Field Visit: 1-21-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4 in
Static WL: 62.76
Total Depth 164.00
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1201	62.80	19.38	1.200	6.06	7.66	28.6	1.02	
1203	62.81	19.31	1.181	7.33	7.14	33.7	92.7	
1206	62.84	19.58	1.186	7.29	7.14	33.7	70.3	
1209	62.84	19.77	1.191	7.30	7.17	32.8	60.1	
1212	62.84	19.92	1.196	7.33	7.18	30.1	49.9	
1215	62.84	19.87	1.199	7.25	7.19	30.1	31.5	
								M48MX4 @ 1220 LAB QC
								M48MX5 @ 1220 LAB QC

Final SWL: 62.84
Total Vol.: 6 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-032-120
Date of Field Visit: 1.22.13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4 in
Static WL: 99.88
Total Depth 120.00
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0834	99.92	19.29	1.476	7.21	7.16	143.2	36.6	
0837	99.94	19.71	1.470	7.25	7.50	93.0	27.6	
0840	99.94	21.19	1.458	6.88	7.55	64.4	36.9	
0843	99.98	21.68	1.461	6.65	7.59	47.7	31.1	
0846	99.98	21.66	1.456	6.55	7.57	43.2	30.2	
0849	99.98	21.74	1.455	6.55	7.57	39.9	36.0	
0852	99.98	21.86	1.451	6.43	7.55	37.7	32.1	
								MYBMXA @ 0855 LAB QC
								MYBMX9 @ 0855 LAB QC

Final SWL: 99.98
Total Vol.: 7 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C33-059
Date of Field Visit: 1-22-13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 37.01
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1149	37.08	21.76	1.117	6.78	7.36	52.0	120	
1152	37.08	21.68	1.111	5.36	6.83	44.7	103.2	
1155	37.10	22.24	1.112	5.29	6.87	37.2	90	
1158	37.10	22.40	1.113	5.24	7.04	26.4	74.9	
1201	37.10	22.48	1.113	5.43	7.13	21.1	80.0	
1204	37.10	22.56	1.113	5.10	7.17	18.4	72.6	
1207	37.10	22.42	1.112	5.37	7.18	17.8	58.8	
								MY8MY2 @ 1210
								MY8MY3 @ 1210
								MY8MY4 @ 1230 DUP
								MY8MY5 @ 1230 DUP

Final SWL: 37.10
Total Vol.: 7 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C31-102
Date of Field Visit: 1.23.13
Field Staff: mike
James

Well Casing Dia. 4in
Static WL: 78.27
Total Depth 102.00
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0801	78.35	18.91	1.386	7.24	6.61	92.4	~~78.35~~ 9.63	Initial
0804	78.32	19.27	1.393	6.78	7.26	35.4	12.5	
0807	78.32	19.96	1.395	6.74	7.30	26.5	9.46	
0810	78.32	21.32	1.399	6.83	7.35	20.3	8.67	
0813	78.32	21.89	1.400	6.65	7.37	16.7	8.40	
0816	78.32	22.15	1.400	6.61	7.37	15.0	7.17	
0819	78.32	22.26	1.400	6.48	7.36	14.6	7.28	
0821	78.32	22.32	1.400	6.49	7.35	14.6	5.59	
0824	78.32	22.35	1.399	6.57	7.35	15.2	4.81	
0827	78.32	22.40	1.398	6.55	7.34	15.6	4.09	
0830	78.32	22.44	1.397	6.58	7.34	16.1	3.12	
0833	78.32	22.42	1.397	6.56	7.33	16.9	2.78	
0836	78.32	22.46	1.396	6.45	7.31	17.5	2.11	
0839	78.32	22.49	1.396	6.42	7.31	17.9	2.01	
0842	78.33	22.53	1.396	6.38	7.31	18.4	2.19	Final MY8MY6 @ 0845
0845								MY8MY7 @ 0845

Final SWL: 78.33
Total Vol.: 11 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C30-200
Date of Field Visit: 1-23-13
Field Staff: Mike
James

Well Casing Dia. 4in
Static WL: 93.43
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0910	93.48	19.36	0.734	8.04	7.27	47.1	1.79	Initial
0913	93.48	20.78	0.732	6.86	7.00	43.2	2.97	
0916	93.47	21.20	0.732	6.69	7.25	29.2	0.73	
0919	93.47	21.31	0.728	6.66	7.29	23.7	1.59	
0922	93.47	21.31	0.726	6.73	7.29	22.8	0.71	
0925	93.48	21.32	0.723	6.87	7.29	23.6	0.39	
0928	93.48	21.34	0.722	6.77	7.25	24.6	0.60	
0931	93.48	21.37	0.720	6.69	7.26	24.2	1.80	
0934	93.48	21.33	0.717	6.73	7.30	2.29		
0937								
0940								Sampled MY8MY8 @ 0940
								MY8MY9 @ 0940

Final SWL: 93.48
Total Vol.: 8 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C30-120
Date of Field Visit: 1-23-13
Field Staff: Mike P.
James

Well Casing Dia. 4in
Static WL: 94.55
Total Depth 120
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1003	94.59	20.77	1.299	7.31	7.54	13.1	7.68	
1006	94.60	20.15	1.363	4.01	6.49	59.8	18.0	
1009	94.60	20.24	1.332	4.12	6.46	53.3	20.2	
1012	94.60	21.07	1.302	4.06	6.54	46.4	60.3	
1015	94.60	21.93	1.273	4.02	6.81	30.5	76.7	
1018	94.60	22.26	1.248	3.99	7.04	19.1	78.0	
1021	94.60	22.42	1.240	3.99	7.17	13.5	76.7	
1024	94.60	22.55	1.238	4.07	7.19	11.0	99.9	
1027	94.60	22.64	1.241	4.15	7.25	9.0	93.9	
1030	94.60	22.71	1.245	4.21	7.30	7.9	62.5	
1033	94.61	22.72	1.249	4.27	7.30	7.4	54.9	
1036								
1039								
1040								sample MY8MZ0 @ 1045
								MY8MZ1 @ 1045

Final SWL: 94.61
Total Vol.: 7 gal.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: PWA-8
Date of Field Visit: 1.23.13
Field Staff: Mike P
James

Well Casing Dia. 4 in
Static WL: 57.63
Total Depth 85.00
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1130	57.65	21.28	1.172	9.72	6.92	44.3	105.7	Initial
1133	57.65	21.11	1.159	7.07	6.54	54.9	97.4	
1136	57.65	22.10	1.156	6.33	6.50	47.8	62.9	
1139	57.65	22.17	1.154	6.08	6.65	36.0	38.9	
1142	57.66	22.26	1.153	5.89	6.68	32.1	41.4	
1145	57.66	22.41	1.152	5.81	6.74	27.1	27.8	
1148	57.65	22.50	1.152	5.91	6.77	24.2	21.9	
1151	57.65	22.58	1.150	5.70	6.77	25.1	17.9	
1154	57.65	22.63	1.152	5.49	6.82	20.7	22.3	
1157	57.65	22.63	1.150	5.41	6.79	21.7	14.6	
1200	57.63	22.63	1.150	5.05	6.80	20.8	12.9	
								MYBMZ2 @ 1205
								MYBMZ3 @ 1205

Final SWL: 57.63
Total Vol.: 10 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-9
Date of Field Visit: 1-28-13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 53.28
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0800	53.32	19.70	1.160	3.70	6.05	16.2	234	
0803	53.35	21.14	1.230	1.01	7.22	-62.8	184	
0806	53.35	21.83	1.232	1.08	7.24	-70.3	104.8	
0809	53.39	22.38	1.236	1.01	7.24	-76.6	47.2	
0812	53.38	22.59	1.238	0.86	7.23	-76.5	23.6	
0815	53.38	22.71	1.239	0.78	7.22	-75.2	18.4	
0818	53.38	22.72	1.238	0.76	7.22	-76.0	15.5	
0821	53.38	22.85	1.240	0.71	7.22	-79.3	13.5	
								MYBMZ6 @ 0825
								MYBMZ7 @ 0825

Final SWL:
Total Vol.:

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: PWA-4
Date of Field Visit: 1-28-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 89.06
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0857	89.11	16.50	0.798	9.64	6.26	87.0	93.2	
0900	89.18	18.76	0.774	7.94	6.65	51.5	126.0	
0903	89.23	19.90	0.772	6.91	7.27	17.2	133	
0906	89.23	20.95	0.773	6.26	7.61	1.5	136	
0909	89.23	21.11	0.773	6.09	7.68	-0.7	135	
0912	89.25	21.16	0.774	5.96	7.69	-1.1	115	
0915	89.27	21.14	0.773	5.91	7.68	-0.6	86.9	
0918	89.25	21.18	0.773	6.21	7.67	1.5	88.3	
0921	89.25	21.22	0.773	6.37	7.66	2.2	84.0	
								MYBMZ8 @ 0925
								MYBMZ9 @ 0925

Final SWL: 89.25
Total Vol.: 7 gal.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: PWA-13
Date of Field Visit: 1-28-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 72.58
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0955	72.63	19.20	1.443	6.06	6.78	71.4	24.3	
0958	72.65	19.71	1.502	5.55	7.06	36.8	79.7	
1001	72.65	19.99	1.509	5.29	7.20	23.5	71.5	
1004	72.69	20.65	1.509	5.00	7.28	16.0	72.8	
1007	72.69	21.37	1.512	4.79	7.39	8.5	59.7	
1010	72.69	21.70	1.512	4.53	7.47	3.9	61.5	
1013	72.69	21.85	1.511	4.45	7.48	2.0	52.3	
1016	72.71	21.96	1.510	4.31	7.48	1.2	34.7	
1019	72.70	22.02	1.507	4.21	7.49	0.3	28.0	
								MYBN08 @1020
								MYBN01 @ 1020

Final SWL: 72.70
Total Vol.: 7 Gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PU1A-10
Date of Field Visit: 1-28-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 46.71
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1046	46.73	19.43	1.197	6.71	7.11	38.5	1324	
1049	46.78	20.20	1.190	5.28	6.80	42.0	226	
1052	46.81	20.69	1.191	5.03	6.91	30.8	166	
1055	46.81	20.82	1.190	5.25	7.01	24.8	135	
1058	46.82	20.87	1.192	5.39	7.11	19.2	82.5	
1101	46.82	20.79	1.193	5.33	7.11	19.7	32.3	
1104	46.82	20.85	1.194	4.77	7.16	17.1	26.7	
1107	46.82	20.88	1.194	4.75	7.17	16.8	27.3	
1110	46.82	20.86	1.193	5.13	7.19	15.8	21.3	
								MY8N02 @ 1115
								MY8N03 @ 1115
								MY8N04 @ 1130 DUP
								MY8N05 @ 1130 DUP

Final SWL: 46.82
Total Vol.: 9 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-1
Date of Field Visit: 1-28-13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 109.10
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1145	109.15	21.24	0.974	8.68	7.73	23.5	42.4	
1148	109.18	20.82	0.964	8.21	7.00	37.0	11.8	
1151	109.21	21.70	0.959	7.86	6.94	35.1	63.6	
1154	109.21	22.68	0.963	7.66	7.36	13.0	55.4	
1157	109.21	22.78	0.962	7.61	7.50	7.2	46.2	
1200	109.20	22.87	0.962	7.74	7.57	4.9	39.3	
1203	109.20	22.87	0.962	7.74	7.60	4.1	38.3	
								MY8N06 @ 1205
								MY8N07 @ 1205

Final SWL: 109.20
Total Vol.: 6 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-5
Date of Field Visit: 1.28.13
Field Staff: mike Palm
mike Ladew

Well Casing Dia. 4in
Static WL: 109.83
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1233	109.87	19.80	1.068	9.27	7.06	44.0	428	
1236	109.86	19.67	1.077	8.22	6.80	49.3	292	
1239	109.91	21.24	1.064	8.72	6.91	40.1	127	
1242	109.91	21.46	1.067	8.29	7.20	25.2	37.4	
1245	109.94	21.55	1.061	7.93	7.31	21.2	30.1	
1248	109.96	21.58	1.056	7.77	7.38	18.5	17.9	
1251	109.94	21.56	1.059	7.78	7.43	17.1	15.6	
1254	109.94	21.57	1.061	7.89	7.44	16.4	12.9	
								MYBN08 @ 1255
								MYBN09 @ 1255

Final SWL: 109.94
Total Vol.: 7 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: HLA-1R
Date of Field Visit: 1.29.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 42.75
Total Depth
Sampling Equipment

Field Parameters

Y8N12, M48N12, M48N13 @ 0800

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0735	42.79	17.49	1.036	8.73	6.82	78.7	46.2	
0738	42.79	21.46	1.013	7.39	7.45	23.4	54.8	
0741	42.79	21.99	1.015	7.16	7.49	16.9	56.5	
0744	42.79	22:09	1.014	7.00	7.49	15.9	58.2	
0747	42.79	22.14	1.014	6.86	7.48	16.3	59.9	
0750	42.81	22.18	1.013	7.20	7.46	17.5	46.8	
0753	42.83	22.12	1.012	7.33	7.45	19.1	62.8	
0756	42.83	22.15	1.012	7.21	7.44	20.5	51.6	
								[illegible], [illegible], [illegible]

Final SWL: 42.83
Total Vol.: 8 gal.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: HMW-1R
Date of Field Visit: 1.29.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 45.96
Total Depth
Sampling Equipment

Field Parameters

Y8N14, MY8N14, MY8N15 @ 0905 LAB QC

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0845	45.99	19.80	1.026	6.72	7.41	23.4	252	
0848	46.02	21.86	1.036	5.70	7.35	14.7	840	
0851	46.04	22.25	1.036	5.70	7.37	13.4	4.64	
0854	46.05	22.90	1.043	5.64	7.42	9.4	5.88	
0857	46.05	23.23	1.043	5.60	7.43	8.6	6.97	
0900	46.05	23.32	1.045	5.61	7.43	8.1	7.27	
0903	46.05	23.45	1.044	5.59	7.41	8.8	6.63	

Final SWL: 46.05
Total Vol.: 10 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: OW-3
Date of Field Visit: 1.29.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4 in
Static WL: 38.11
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0945	38.19	20.01	1.015	8.75	7.24	61.4	4.76	
0948	38.22	20.82	1.017	8.16	7.29	34.7	1.81	
0951	38.22	21.46	1.018	7.85	7.36	25.4	1.63	
0954	38.22	21.69	1.018	7.66	7.41	21.0	1.88	
0957	38.22	21.76	1.017	7.56	7.40	20.7	1.28	
1000	38.25	21.76	1.018	7.56	7.39	22.3	1.75	
1003	38.25	21.77	1.017	7.84	7.38	22.8	1.12	
								MYBN16 @ 1005
								MYBN17 @ 1005

Final SWL: 38.25
Total Vol.: 7 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: OW-2
Date of Field Visit: 1-29-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 38.79
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1024	38.84	20.28	1.034	8.22	7.41	35.1	2.36	
1027	38.84	20.75	1.031	7.47	7.37	25.4	2.47	
1030	38.87	21.58	1.031	7.01	7.41	19.8	3.97	
1033	38.87	21.69	1.030	6.91	7.43	19.0	3.49	
1036	38.87	21.73	1.029	7.28	7.42	19.7	3.70	
1039	38.87	21.75	1.029	7.05	7.39	21.2	3.05	
1042	38.87	21.88	1.026	6.41	7.41	17.3	—	Well Dewatered
								MY8N18 @ 1050
								MY8N19 @ 1050

Final SWL: 38.87
Total Vol.: 6 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: WCW-4
Date of Field Visit: 1-29-13
Field Staff: Mike Palm
Mike Lodeau

Well Casing Dia. 4in
Static WL: 41.00
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1112	41.10	19.88	0.849	7.53	7.37	27.6	1.55	
1115	41.15	20.38	0.868	7.16	7.34	25.9	1.52	
1118	41.15	20.76	0.902	7.13	7.41	21.0	1.01	
1121	41.15	20.72	0.914	6.95	7.51	15.8	1.29	
1124	41.15	20.56	0.915	6.54	7.41	17.9	1.70	
1127	41.15	20.68	0.915	6.47	7.48	16.3	1.75	
1130	41.15	20.69	0.916	6.32	7.44	16.6	1.68	
								MY8N20 @ 1135
								MY8N21 @ 1135

Final SWL: 41.15
Total Vol.: 8 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: WCW-1
Date of Field Visit: 1.29.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 2 in
Static WL: ~~[illegible]~~ 45.88
Total Depth 53.00
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
								Took a grab sample
								MYBN22 @ 1200
								MYBN23 @ 1200

Final SWL:
Total Vol.:

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: MW-13
Date of Field Visit: 1.30.13
Field Staff: Mike Palm
Mike Ladrow

Well Casing Dia. 4in
Static WL: 33.59
Total Depth 40.30
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0835	33.67	17.76	1.606	4.33	6.28	99.2	169	
0838	33.69	21.60	1.746	2.75	7.07	26.6	216	
0841	37.71	22.04	1.754	2.76	7.08	24.4	247	
0844	37.75	22.13	1.755	2.76	7.09	23.0	205	
0847	37.75	22.23	1.763	2.71	7.08	22.4	208	
0850	37.75	22.30	1.751	2.71	7.07	22.6	137	
0853	37.75	22.33	1.745	2.69	7.07	23.0	140	
0856	37.75	22.40	1.748	2.70	7.07	23.2	112	
								MY8N26 @ 0900
								MY8N27 @ 0900
								MY8N28 @ 0915 Dup
								MY8N29 @ 0915 Dup

Final SWL: 37.75
Total Vol.: 9 gal.

Ph	Ph	Ph	Ec	Turb
4.22	7.33	10.06	9.983	1.07 / 9.89
4.00	7.00	10.00	10.00	1.00 / 10.00
4.00	7.00	10.00	10.00	1.00 / 10.00

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: MW-8
Date of Field Visit: 1-30-13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4 in
Static WL: 37.35
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0930	37.42	20.60	1.466	5.44	7.15	16.0	86.0	
0933	37.45	22.50	1.509	3.08	6.91	28.3	149	
0936	37.45	23.05	1.513	2.78	7.03	20.4	69.1	
0939	37.45	23.24	1.509	2.63	7.06	19.0	44.0	
0942	37.45	23.26	1.508	2.56	7.04	19.6	45.3	
0945	37.55	23.24	1.507	2.55	7.06	18.8	44.5	
								MYBN30 @ 0950
								MYBN31 @ 0950

Final SWL: 37.51
Total Vol.: 7 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: MW-2
Date of Field Visit: 1.30.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 40.46
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1010	40.49	21.40	1.261	3.61	7.16	29.2	23.3	
1013	40.52	22.25	1.267	2.69	6.87	38.2	9.15	
1016	40.52	23.14	1.270	2.56	6.92	33.1	8.00	
1019	40.55	23.51	1.274	2.50	7.04	25.5	8.56	
1022	40.55	23.55	1.275	2.42	7.11	22.2	8.25	
1025	40.55	23.63	1.275	2.33	7.10	21.9	7.23	
1028	40.55	23.61	1.276	2.31	7.12	20.3	6.66	
								MY8N32 @ 1030
								MY8N33 @ 1030

Final SWL: 40.55
Total Vol.: 8 gal.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: MW-12
Date of Field Visit: 1.30.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 43.59
Total Depth 53.60
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1052	43.62	21.70	2.282	2.36	7.06	28.7	18.7	
1055	43.62	22.02	2.300	1.67	6.65	39.9	13.1	
1058	43.62	22.80	2.310	1.82	6.57	36.3	10.59	
1101	43.65	23.61	2.332	2.11	6.72	25.6	8.66	
1104	43.65	23.32	2.344	2.27	6.76	24.2	7.07	
1107	43.65	23.42	2.350	2.39	6.83	19.5	6.85	
1110	43.65	23.44	2.357	2.48	6.84	19.0	6.24	
								MYBN34 @ 1115
								MYBN35 @ 1115

Final SWL: 43.65
Total Vol.: 9Gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: MW-4
Date of Field Visit: 1.30.13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 38.19
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1205	38.23	20.70	1.098	2.11	7.10	24.8	54.5	
1208	38.29	20.90	1.087	1.27	6.13	60.8	38.8	
1211	38.29	21.21	1.086	0.98	6.10	49.7	33.3	
1215	38.30	21.27	1.086	0.96	6.22	39.6	21.4	
1218	38.30	21.27	1.085	1.18	6.27	36.0	14.5	
1221	38.30	21.28	1.084	1.44	6.31	33.0	11.1	
1224	38.30	21.30	1.082	1.53	6.39	31.8	9.6	
								MY8N36 @ 1225
								MY8N37 @ 1225

Final SWL: 38.30
Total Vol.: 6 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: MW-7
Date of Field Visit: 1.30.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 36.93
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1242	36.99	20.79	1.235	5.04	6.68	40.7	107.9	
1245	37.03	20.85	1.238	1.70	6.77	20.0	133	
1248	37.05	21.50	1.238	1.48	6.90	8.6	78.9	
1251	37.05	21.56	1.234	1.47	6.98	5.5	43.6	
1254	37.05	21.61	1.236	1.40	6.97	4.2	38.4	
1257	37.08	21.64	1.240	1.36	7.00	3.2	29.0	
1300	37.10	21.68	1.243	1.31	7.00	-0.1	31.1	
								MYBN38 @ 1305
								MYBN39 @ 1305

Final SWL: 37.10
Total Vol.: 7gal

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: OW-4R
Date of Field Visit: 1.31.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4 in
Static WL: 34.48
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0726	34.52	21.25	1.051	6.79	6.92	62.4	162	
0729	34.55	22.29	1.061	6.76	7.04	36.1	74.6	
0732	34.54	22.51	1.061	6.63	7.03	31.0	41.2	
0735	34.55	22.68	1.061	6.46	6.99	30.2	39.0	
0738	34.55	22.79	1.061	6.37	6.99	29.7	37.2	
0741	34.56	22.83	1.061	6.28	6.98	29.7	34.1	
								M48N42 @ 0745
								M48N43 @ 0745

Final SWL: 34.56
Total Vol.: 8 gal.

Ph	Ph	Ph	Ec	Turb
4.09	6.93	10.07	9.731	0.59 / 14.10
4.00	7.00	10.00	10.00	1.00 / 10.00
4.00	7.00	10.00	10.00	1.00 / 10.00

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: WCW-2R
Date of Field Visit: 1.31.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4 in
Static WL: 45.02
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0806	45.06	17.34	1.242	8.13	6.31	145.5	131.0	
0809	45.06	19.59	1.268	5.98	6.58	89.5	113	
0812	45.09	19.45	1.265	5.55	6.69	64.1	91.0	
0815	45.11	19.37	1.263	5.53	6.70	56.9	81.4	
0818	45.13	18.85	1.262	5.34	6.67	52.8	61.9	
0821	45.13	18.23	1.255	5.22	6.60	53.7	57.4	
0824	45.13	17.96	1.248	5.30	6.55	55.2	55.9	
0827	45.13	17.87	1.237	5.40	6.50	55.1	51.2	
								MYBN44 @ 0830
								MYBN45 @ 0830

Final SWL: 45.13
Total Vol.: 7 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: MW-5
Date of Field Visit: 1-31-13
Field Staff: Mike Ladeau
Mike Palm

Well Casing Dia. 4in
Static WL: 67.99
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0910	68.04	17.91	1.437	9.16	6.77	57.3	111	
0913	68.04	19.96	1.414	7.45	6.90	40.4	339	
0916	68.07	20.67	1.391	7.54	7.14	30.5	203	
0919	68.10	20.82	1.390	7.81	7.22	28.4	151	
0922	68.10	20.90	1.390	7.61	7.19	30.4	114	
0925	68.10	20.88	1.391	7.13	7.17	32.0	78.0	
0928	68.10	20.73	1.398	7.04	7.15	34.6	67.1	
								MYBN46 @ 0930
								MYBN47 @ 0930

Final SWL: 68.10
Total Vol.: 9 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA - 3
Date of Field Visit: 1-31-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 105.84
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1016	105.89	21.96	0.782	5.92	7.46	34.3	36.5	
1019	105.90	22.50	0.987	1.34	7.43	23.2	55.5	
1022	105.90	23.10	0.989	0.84	7.52	10.3	65.8	
1025	105.92	24.17	0.988	0.69	7.75	-6.3	63.6	
1028	105.92	24.31	0.986	0.67	7.80	-10.0	70.0	
1031	105.90	24.57	0.978	0.66	7.80	-11.4	79.6	
1034	105.90	24.58	0.973	0.69	7.80	-12.2	82.6	
								MYBN48 @ 1035
								MYBN49 @ 1035

Final SWL: 105.90
Total Vol.: 7 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-2
Date of Field Visit: 1-31-13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 8in
Static WL: 123.34
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1103	123.38	22.50	0.945	9.77	7.52	39.7	40	
1106	123.38	21.58	0.976	7.40	7.44	33.0	28.3	
1109	123.40	21.60	0.977	6.97 7.37	7.37	30.2	18.3	
1112	123.40	22.24	0.966	6.81	7.40	25.0	14.9	
1115	123.40	23.06	0.958	6.70	7.49	18.7	10.24	
1118	123.40	23.73	0.966	6.56	7.53	13.3	11.94	
1121	123.40	24.17	0.964	6.65	7.59	10.3	9.16	
								MW8NS0 @ 1125
								MW8NS1 @ 1125

Final SWL: 123.40
Total Vol.: 8gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C33-059
Date of Field Visit: 4.30.13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 36.11
Total Depth N/A
Sampling Equipment Sounder
YSI 556
Lamotte 2020 use

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1153	38.20	21.18	1.044	6.03	6.62	86.9	19.5	
1156	38.20	21.81	1.043	5.66	6.55	87.0	23.7	
1159	38.20	22.26	1.045	5.44	6.73	76.1	25.2	
1202	38.20	22.51	1.045	5.44	6.83	70.2	32.5	
1205	38.20	22.60	1.045	5.38	6.85	68.1	32.1	
1208	38.20	22.72	1.044	5.31	6.85	66.9	29.8	
1211	38.20	22.76	1.043	5.35	6.87	66.7	33.3	
								MY8SN3 - filtered @ 1215
								MY8SN4 - Unfiltered @ 1215

Final SWL: 38.20
Total Vol.: 5gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C31-102
Date of Field Visit: 4.30.13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 77.29
Total Depth N/A
Sampling Equipment Sounder
YSI 556
Lamotte 2020e

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1050	77.45	19.87	1.298	7.61	7.00	61.7	16.8	
1053	77.45	20.12	1.290	7.19	6.73	72.4	22.6	
1056	77.45	21.10	1.288	6.92	6.93	60.6	21.4	
1059	77.45	21.47	1.284	6.79	7.07	51.9	17.1	
1102	77.45	21.63	1.280	6.62	7.10	51.4	14.2	
1105	77.45	21.69	1.289	6.89	7.10	52.2	11.3	
1108	77.45	21.76	1.286	6.99	7.11	52.8	7.93	
								MY8SN1 @ 1110 Filtered
								MY8SN2 @ 1110 Unfiltered

Final SWL: 77.45
Total Vol.: 7gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C30-120
Date of Field Visit: 4-30-13
Field Staff: mike Palm
mike Ledeau

Well Casing Dia. 4 in
Static WL: 93.65
Total Depth N/A
Sampling Equipment Sounder
YSI 556
Lamotte 2020we

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0940	93.72	19.87	1.149	5.50	7.22	65.7	5.18	
0943	93.72	19.52	1.160	3.43	7.02	74.6	155	
0946	93.72	20.79	1.114	5.52	7.18	53.7	73.3	
0949	93.72	21.15	1.112	5.15	7.27	45.4	58.3	
0952	93.72	21.44	1.121	5.30	7.30	40.9	49.5	
0955	93.72	21.52	1.124	5.36	7.30	41.6	45.1	
0958	93.72	21.59	1.129	5.24	7.33	42.9	38.5	
								MY8SM9 - Filtered @ 1000 LAB QC
								MY8SN0 - Unfiltered @ 1000 LAB QC

Final SWL: 93.72
Total Vol.: 6.5 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C32-120
Date of Field Visit: 4.30.13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4 in
Static WL: 98.86
Total Depth N/A
Sampling Equipment Bounder
YSI 556
Lamotte 2020 we

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0805	99.10	19.48	1.382	7.79	6.72	101.0	10.14	
0808	99.10	19.54	1.331	7.77	7.11	84.5	9.69	
0811	99.10	20.86	1.322	7.07	7.17	81.5	7.99	
0814	99.10	20.97	1.320	6.71	7.19	82.1	8.02	
0817	99.10	21.03	1.321	6.46	7.18	83.2	7.51	
0820	99.10	21.05	1.324	6.40	7.18	84.2	7.26	
0823	99.10	21.15	1.328	6.68	7.14	82.8	7.11	
								M483M5 - Filtered @ 0825
								M483M6 - Unfiltered @ 0825

Final SWL: 99.10
Total Vol.: 4 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C30-200
Date of Field Visit: 4-30-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4 in
Static WL: 92.42
Total Depth N/A
Sampling Equipment Sounder
451556
Lamotte 2020 we.

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0859	92.45	19.10	0.694	7.19	7.51	75.3	7.59	
0903	92.45	19.34	0.684	6.41	7.33	85.0	1.48	
0906	92.45	19.52	0.682	6.36	7.38	82.6	0.87	
0909	92.45	19.65	0.680	6.22	7.35	81.3	0.55	
0912	92.45	19.96	0.676	5.89	7.39	76.8	0.62	
0915	92.45	20.13	0.679	5.69	7.42	72.9	0.45	
0918	92.45	20.31	0.678	5.51	7.49	70.4	0.40	
								MY8SM7-Filtered @ 0920
								MY8SM8-Unfiltered @ 0920

Final SWL: 92.45
Total Vol.: 4 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-2
Date of Field Visit: 5-1-13
Field Staff: Mike Palm
Mike Lodeau

Well Casing Dia. 4 in
Static WL: 122.40
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1045	125.10	21.89	0.912	7.76	7.49	57.3	4.03	
1048	125.10	21.15	0.956	7.15	6.94	86.9	8.11	
1051	125.10	21.46	0.956	6.99	7.01	80.2	6.36	
1054	125.10	22.47	0.956	6.79	7.27	68.7	4.57	
1057	125.10	23.39	0.955	6.73	7.43	48.4	3.51	
1100	125.10	23.69	0.950	6.66	7.45	45.8	2.97	
1103	125.10	23.76	0.947	6.61	7.46	44.0		
								MY85P5 - filtered @ 1105
								MY85P6 - unfiltered @ 1105

Final SWL: 125.10
Total Vol.: 6 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-3
Date of Field Visit: 5-1-13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 105.29
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020 WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1004	106.65	22.10	0.897	2.56	7.57	72.0	7.66	
1007	106.65	21.78	0.909	1.63	7.55	60.3	6.17	
1010	106.65	22.19	0.910	1.45	7.56	50.4	3.92	
1013	106.65	23.60	0.897	2.12	7.63	31.7	3.32	
1016	106.65	23.84	0.888	2.24	7.65	27.4	3.71	
1019	106.65	23.91	0.876	2.30	7.64	23.8	3.21	
1022	106.65	24.02	0.867	2.37	7.60	22.0	3.29	
								MYBSP3 - Filtered @ 1025
								MYBSP4 - unfiltered @ 1025

Final SWL: 106.65
Total Vol.: 6 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-7
Date of Field Visit: 5-1-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 24.58
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020we

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0900	24.62	20.44	1.219	2.15	6.88	101.5	8.81	
0903	24.62	21.24	1.218	1.71	7.04	78.5	11.5	
0906	24.62	21.63	1.216	1.68	7.06	68.2	8.23	
0909	24.62	21.67	1.214	1.68	7.04	64.3	12.2	
0912	24.62	21.71	1.213	1.61	7.05	61.7	8.51	
0915	24.62	21.73	1.211	1.59	7.04	60.4	12.5	
0918	24.62	21.74	1.210	1.58	7.03	58.7	8.79	
								MY8SP1 - Filtered @ 0920
								MY8SP2 - unfiltered @ 0920

Final SWL: 24.62
Total Vol.: 7 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-6
Date of Field Visit: 5-1-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 61.77
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020 we

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0725	62.03	19.61	1.081	8.43	6.56	191.2	14.5	
0728	62.03	19.59	1.078	8.27	6.98	141.3	19.6	
0731	62.03	20.25	1.077	7.73	6.99	113.6	26.8	
0734	62.03	20.93	1.075	7.42	7.05	94.5	16.1	
0737	62.03	21.13	1.073	7.23	7.05	86.6	8.27	
0740	62.03	21.21	1.071	7.21	7.06	81.4	5.54	
0743	62.03	21.25	1.071	7.21	7.05	79.5	4.36	
								MY8SN7 - Filtered @ 0745
								MY8SN8 - unfiltered @ 0745

Final SWL: 62.03
Total Vol.: 5 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-12
Date of Field Visit: 5-1-13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4 in
Static WL: 61.90
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020 we

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0803	61.94	19.48	1.051	6.56	7.05	82.4	3.42	
0806	61.94	19.48	1.043	7.01	6.80	88.3	11.8	
0809	61.94	19.66	1.040	7.82	6.86	81.5	14.3	
0812	61.94	19.89	1.039	7.17	6.91	75.7	21.3	
0815	61.94	19.99	1.041	7.30	6.82	78.3	19.5	
0818	61.94	20.02	1.041	7.31	6.86	74.9	27.7	
0821	61.94	20.06	1.041	7.26	6.88	73.7		
								MY85N9 - Filtered @ 0825
								MY85P0 - Unfiltered @ 0825

Final SWL: 61.94
Total Vol.: 1 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-X1
Date of Field Visit: 5/2/13
Field Staff: Mike Palm
Chris Izan

Well Casing Dia. 4 in
Static WL: 108.6
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020 WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
7:59	108.65	20.08	0.930	7.06	7.46	146.3	7.70	
8:02	108.62	20.17	0.927	6.77	7.56	133.2	6.60	
8:05	108.62	20.40	0.925	6.56	7.58	120.5	6.06	
8:08	108.63	20.69	0.926	6.43	7.59	109.8	6.00	
8:11	108.62	21.01	0.927	6.35	7.59	101.2	6.04	
8:14	108.62	21.30	0.927	6.21	7.59	92.1	6.29	
8:17	108.62	21.70	0.928	6.14	7.60	83.5	6.06	
8:20	108.62	22.10	0.929	6.07	7.60	75.6	5.25	
8:23	108.64	22.31	0.927	6.03	7.60	69.4	3.71	
								MYBSP9 - Filtered @ 0825
								MYBSQ0 - unfiltered @ 0825
								MYBSQ1 - Filtered @ 0825 - DUP
								MYBSQ2 - unfiltered @ 0835 - DUP

Final SWL: 108.64
Total Vol.: 6 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-8
Date of Field Visit: 5/2/13
Field Staff: MIKE PALM
CHRIS JOAN

Well Casing Dia. 4 in
Static WL: ~~56.36~~ 56.33'
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
11:30	56.38	23.26	1.074	5.23	7.34	-18.4	66.1	
11:33	56.37	21.31	1.069	4.60	6.32	56.0	59.9	
11:36	56.37	21.97	1.068	4.43	6.48	53.1	41.5	
11:39	56.37	22.35	1.070	4.35	6.82	34.4	28.2	
11:42	56.37	22.46	1.072	4.30	7.06	20.7	24.9	
11:47	56.37	22.47	1.079	4.59	7.22	9.8	22.3	
11:50	56.37	22.30	1.079	4.67	7.20	12.1	16.0	
								M48SQ7 - Filtered @ 1155
								M48SQ8 - unfiltered @ 1155

Final SWL: 56.37
Total Vol.: 7 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-10
Date of Field Visit: 5/2/13
Field Staff: Mike Palm
CHRIS IWAN

Well Casing Dia. 4 in
Static WL: 43.09
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
10:32	43.09	21.73	1.163	4.76	7.36	43.7	80.4	
10:35	43.09	20.88	1.157	4.26	6.82	61.7	95.4	
10:38	43.09	21.34	1.156	4.18	6.93	51.2	38.3	
10:41	43.09	21.52	1.156	4.15	7.08	40.0	27.3	
10:44	43.09	21.70	1.157	4.15	7.22	30.5		
10:47	43.09	21.74	1.161	4.16	7.25	28.1	28.0	
10:50	43.09	21.80	1.162	4.04	7.25	25.7	30.8	
10:53	43.09	21.87	1.162	4.00	7.29	22.6	34.0	
								MYBSQ5 - Filtered @ 1055
								MYBSQ6 - unfiltered @ 1055

Final SWL: 43.09
Total Vol.: 6 gal

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: ~~PW-A~~ PWA-5
Date of Field Visit: 5/2/13
Field Staff: Mike Palm
CHRIS TOAN

Well Casing Dia. 4 in
Static WL: 109.24'
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020 WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
9:12	109.25	19.87	1.091	8.30	7.32	71.1	19.0	
9:15	109.26	19.72	1.128	8.15	7.18	74.1	36.1	
9:18	109.27	20.01	1.139	7.91	7.24	72.7	26.1	
9:21	109.26	20.83	1.140	7.53	7.36	61.3	15.7	
9:24	109.26	21.36	1.141	7.43	7.47	52.1	16.2	
9:27	109.27	21.53	1.145	7.60	7.48	50.9	16.7	
9:30	109.26	21.62	1.144	7.42	7.48	49.4	9.62	
9:33	109.27	21.71	1.141	7.36	7.48	47.6	13.3	
								HYASQ3 - Filtered @ 0935
								HYASQ4 - unfiltered @ 0935

Final SWL: 109.27
Total Vol.: 5 Gal.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: PWA-4
Date of Field Visit: 5/2/13
Field Staff: MIKE PALM
CHRIS FOAN

Well Casing Dia. 4 in
Static WL: 88.25'
Total Depth N/A
Sampling Equipment Sounder
431 55lb ents
Lamotte 2020 WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
~~10:42~~								
10:42	88.38	21.86	0.753	10.05	6.56	41.9	76.7	
10:45	88.39	22.40	0.749	6.05	6.52	46.0	55.9	
10:48	88.43	23.71	0.748	5.36	6.79	34.8	23.3	
10:51	88.39	21.57	0.747	5.81	6.95	29.3	20.5	
10:54	88.43	22.34	0.747	5.47	7.27	7.1	11.1	
10:57	88.47	23.29	0.751	5.52	7.33	2.0	7.90	
11:00	88.43	21.92	0.750	6.36	7.22	10.5	7.61	
								MYBSR5 - Filtered @ 1105
								MYBSR6 - Unfiltered 1105

Final SWL: 88.43
Total Vol.: 6 gal.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: PWA-9
Date of Field Visit: 5/3/13
Field Staff: MIKE LADEAU
CHRIS JOAN

Well Casing Dia. 4in
Static WL: 53.25
Total Depth n/a
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
8:22	53.65	22.44	1.167	1.03	6.92	-209.1	621	
8:25	53.64	23.32	1.221	0.30	6.98	-234.4	-23	
8:28	53.65	22.49	1.224	0.39	7.02	-250.8	-23	
8:31	53.67	23.11	1.221	0.40	7.08	-256.4	11.19	
8:34	53.68	23.52	1.217	0.34	7.10	-256.7	9.28	
8:37	53.68	23.63	1.216	0.32	7.11	-258.3	10.04	
8:40	53.68	23.76	1.214	0.31	7.11	-254.7	5.26	
8:43	53.69	23.81	1.219	0.28	7.11	-259.0	5.47	
								MY8SB1 - Filtered @ 0845 Lab QC
								MY8SB2 - Unfiltered @ 0845 Lab QC

Final SWL: 53.69
Total Vol.: 5gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: PWA-43
Date of Field Visit: 5/3/13
Field Staff: MIKE PAUL
CHRIS TOAD

Well Casing Dia. 4in
Static WL: 71.85
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020 WQ

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
9:43	72.00	21.74	1.489	3.79	6.86	-19.1	10.20	
9:46	72.00	20.90	1.500	3.56	6.74	-7.5	10.60	
9:49	72.00	21.73	1.498	3.38	6.85	-4.6	15.5	
9:52	72.00	22.28	1.501	3.30	7.18	-18.6	17.8	
9:55	72.00	22.46	1.500	3.24	7.29	-20.5	20.6	
9:58	72.00	22.60	1.500	3.14	7.32	-22.4	28.3	
10:01	72.00	22.66	1.498	3.08	7.33	-19.8	26.2	
10:05	72.00	22.79	1.497	3.08	7.37	-20.4	24.4	
								MY8SR3 - Filtered @ 1010
								MY8SR4 - Unfiltered @ 1010

Final SWL: 72.00
Total Vol.: 6 gal.

CH2M HILL

Groundwater Monitoring
Field Activity Sheet

Well ID: Amp-W1
Date of Field Visit: 5.7.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4 in
Static WL: 59.87
Total Depth N/A
Sampling Equipment Bounder
YSI 556 MPS
Lamotte 2020 WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0811	60.40	20.35	1.334	4.43	6.79	160.1	>1000	
0814	60.40	20.79	1.313	3.85	7.10	122.5	180	
0817	60.40	21.94	1.316	3.79	7.12	105.8	73.7	
0820	60.40	22.63	1.315	3.97	7.13	84.5	52.4	
0823	60.40	22.81	1.315	3.92	7.13	79.5	50.0	
0826	60.40	22.88	1.319	3.86	7.10	72.0	51.8	
								MY85R9-Filtered @ 0830
								MY85S0 - unfiltered 0830

Final SWL: 60.40
Total Vol.: 5 gal.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: AMP-63
Date of Field Visit: 5-7-13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 60.46
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020 WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0853	60.55	21.42	2.515	6.62	7.27	17.9	18.0	
0856	60.55	21.95	2.526	6.24	7.07	33.5	10.77	
0859	60.55	22.78	2.529	6.15	7.23	25.4	15.2	
0902	60.55	22.89	2.521	6.10	7.28	22.2	17.0	
0905	60.55	22.93	2.512	5.99	7.28	21.3	16.5	
0908	60.55	23.00	2.497	5.87	7.32	19.4	11.7	
0911	60.55	23.03	2.481	5.82	7.31	21.3	11.5	
								MYBSS1 - Filtered @ 0915
								MYBSS2 - Unfiltered @ 0915

Final SWL: 60.55
Total Vol.: 7 gal.

CH2M HILL

Groundwater Monitoring
Field Activity Sheet

Well ID: DWB-W1
Date of Field Visit: 5-7-13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 58.89
Total Depth N/A
Sampling Equipment Sander
YSI 556 MPS
Lamotte 2020WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1058	58.98	21.14	1.196	6.55	6.59	221.0	13.8	
1101	58.98	21.57	1.210	6.23	6.30	225.1	15.5	
1104	58.98	22.14	1.212	6.15	6.49	205.7	13.3	
1107	58.98	22.28	1.215	6.10	6.70	185.8	11.5	
1110	58.98	22.28	1.222	6.07	6.68	181.0	8.59	
1113	58.98	22.26	1.223	6.07	6.68	176.6	9.18	
								MY8SS7 - VOC's @ 1115
								MY8SS7 - Filtered @ 1115
								MY8SS8 - unfiltered @ 1115

Final SWL: 58.98
Total Vol.: 5 gal.

CH2M HILL

Groundwater Monitoring
Field Activity Sheet

Well ID: DWB-W3
Date of Field Visit: 3-7-13
Field Staff: Mike Pahn
Mike Ladeau

Well Casing Dia. 4 in
Static WL: 58.60
Total Depth 61.09
Sampling Equipment Sounder
Bailer

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
								Hand bailed Sample
								MY8555 - Filtered @ 1045
								MY8556 - Unfiltered @ 1045

Final SWL: N/A
Total Vol.: N/A

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: DRC-MW5
Date of Field Visit: 5.7.13
Field Staff: Mike Palm
Mike Ledeau

Well Casing Dia. 4in
Static WL: 59.18
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0947	59.20	20.70	1.294	8.16	6.76	27.8	8.68	
0950	59.20	20.76	1.286	6.75	6.52	41.6	3.50	
0953	59.20	22.40	1.283	6.07	6.69	50.6	2.92	
0956	59.20	22.62	1.287	5.63	6.86	46.2	2.03	
0959	59.20	23.94	1.287	5.56	6.86	52.5	1.70	
1002	59.20	23.96	1.293	5.43	6.93	42.3	2.24	
1005	59.20	23.94	1.289	5.39	6.93	45.5	1.25	
								YBSS3-VOC's @ 1010
								MYBSS3-Filtered @ 1010
								MYBSS4-unfiltered @ 1010

Final SWL: 59.20
Total Vol.: 5gal.

Groundwater Monitoring
Field Activity Sheet

Well ID: DRC-MW1
Date of Field Visit: 3-8-13
Field Staff: mike Palm
mike Ladeau

Well Casing Dia. 4in
Static WL: 60.19
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1238	60.30	23.26	1.333	7.19	7.04	16.2	25.4	
1241	60.30	21.73	1.330	6.00	6.22	90.7	22.1	
1244	60.30	22.30	1.331	5.75	6.33	93.5	16.3	
1247	60.30	22.47	1.330	5.70	6.59	84.2	9.55	
1250	60.30	22.49	1.330	5.63	6.68	81.7	6.42	
1253	60.30	22.48	1.329	5.61	6.72	80.7	5.46	
1256	60.30	22.47	1.328	5.57	6.76	80.2	4.33	
								MY8SW1 - Filtered @ 1300
								MY8SW2 - Unfiltered @ 1300
								MY8SW3 - DUP - Filtered @ 1315
								MY8SW4 - DUP - Unfiltered @ 1315

Final SWL: 60.30
Total Vol.: 5 gal.

Groundwater Monitoring
Field Activity Sheet

Well ID: DRC-MW2
Date of Field Visit: 5.8.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 61.78
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020 WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0920	61.83	20.49	1.303	2.73	6.64	83.2	20.1	
0923	61.83	21.21	1.342	2.77	6.41	106.7	7.00	
0926	61.83	22.57	1.323	2.85	6.66	95.4	3.72	
0929	61.83	22.85	1.270	3.36	6.77	93.0	2.48	
0932	61.83	22.57	1.246	3.45	6.76	101.2	2.10	
0935	61.83	22.86	1.239	3.56	6.80	90.7	2.07	
0938	61.83	22.98	1.230	3.62	6.84	87.3	1.39	
								MY8ST7 - Filtered @ 0940
								MY8ST8 - Unfiltered @ 0940

Final SWL: 61.83
Total Vol.: 6 gal.

CH2M HILL

Groundwater Monitoring
Field Activity Sheet

Well ID: DRC-MW3
Date of Field Visit: 5.8.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 61.17
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020 WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0844	61.50	19.87	1.162	6.05	6.89	92.7	23.2	
0847	61.50	21.36	1.146	5.79	6.92	106.2	10.57	
0850	61.50	21.68	1.145	5.78	6.99	105.5	7.30	
0853	61.50	21.81	1.148	5.78	6.99	108.2	4.56	
0856	61.50	21.82	1.555	5.76	6.99	109.2	3.27	
0859	61.50	21.84	1.563	5.77	6.99	109.6	2.33	
								MY85T5 - Filtered @ 0900
								MY85T6 - Unfiltered @ 0900

Final SWL: 61.50
Total Vol.: 5 gal

Groundwater Monitoring
Field Activity Sheet

Well ID: DRC - MW4
Date of Field Visit: 5.8.13
Field Staff: Mike Palm
Mike Ladeau

Well Casing Dia. 4in
Static WL: 60.50
Total Depth N/A
Sampling Equipment Sounder
YSI 556 MPS
Lamotte 2020 WE

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0748	60.75	19.37	1.197	6.60	6.57	216.7	8.23	
0751	60.75	19.81	1.199	6.09	6.99	180.4	5.26	
0754	60.75	20.14	1.201	6.02	7.03	164.2	3.47	
0757	60.75	21.86	1.207	5.78	7.10	126.6	3.35	
0800	60.75	22.07	1.208	5.68	7.10	119.1	3.45	
0803	60.75	22.21	1.207	5.65	7.09	112.5	2.54	
0806	60.75	22.23	1.207	5.59	7.09	110.7		
								MY8ST1 - Filtered @ 0810
								MY8ST2 - Unfiltered @ 0810
								MY8ST3 - Filtered - Dup @ 0830
								MY8ST4 - Unfiltered - Dup @ 0830

Final SWL: 60.75
Total Vol.: 5gal.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: V13EEMW1
Date of Field Visit: 6 17.13
Field Staff: Mike Palm
Andre Ritchie

Well Casing Dia. 4 in
Static WL: 18.80
Total Depth 33.97
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0908	19.06	21.46	1.214	0.48	6.98	-118.7	38.4	
0911	19.07	21.54	1.202	0.44	6.95	-172.5	14.34	~3.25 gal. discharged
0914	19.02	21.57	1.187	1.10	6.95	-207.0	12.24	~4 gal. discharged
0917	18.98	21.70	1.178	2.50	6.97	-219.4	11.07	~4.75 gal. dis.
0920	18.95	21.88	1.168	0.78	6.99	-218.5	10.20	~6 gal. dis.
0923	18.94	21.98	1.160	0.24	7.00	-206.2	8.42	~6.75 gal. dis.
0926	18.94	22.02	1.156	0.18	7.00	-204.7	7.22	~7.5 gal. dis
0929	18.94	22.08	1.153	0.16	7.01	-205.5	6.75	~8 gal. dis.
0930								Sampled Y8WM5 (TVOAs and Hex chrom.) MY8WM5 (Total chrom, unfiltered), MY8WM6 (Total chrom, filtered).

Final SWL: 18.94
Total Vol.: ~8 gallons

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: V13EEMW3
Date of Field Visit: 6.17.13
Field Staff: Mike Palm
Andre Birchie

Well Casing Dia. 4
Static WL: 20.10
Total Depth 34.90
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1006	20.21	21.10	1.250	5.36	6.93	-24.7	161	Light brown water color
1009	20.21	21.32	1.250	5.23	6.90	-0.3	87.4	~3 gal. discharged
1012	20.22	21.13	1.255	5.15	6.86	26.6	47.6	~5 gal. discharged
1015	20.22	21.15	1.253	5.05	6.87	43.3	20.0	~7.5 gal. dis.
1018	20.23	21.15	1.251	5.02	6.86	53.6	11.69	~9 gal. dis.
1021	20.23	21.17	1.249	5.01	6.85	59.8	8.30	~11.25 gal. dis.
1024	20.23	21.17	1.248	4.98	6.87	63.9	7.86	~12.5 gal. dis.
1027	20.23	21.17	1.246	4.94	6.86	69.8	6.16	~14 gal. dis.
1030								Sampled Y8WM7 (TVOAs and hex chrom.), MY8WM7 (Total chrom, unfiltered) and MY8WM8 (Total chrom., filtered).

Final SWL: 20.23
Total Vol.: ~20 gallons

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: V13EEMW4
Date of Field Visit: 6.17.13
Field Staff:

Well Casing Dia. 4in
Static WL: 18.04
Total Depth 22.61
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1103	18.15	21.76	1.204	3.82	6.88	67.4	66.9	~2.25 gallons discharged
1106	18.15	21.89	1.196	4.21	6.90	67.2	31.3	~3.75 gallons discharged
1109	18.15	21.82	1.189	4.41	6.84	70.2	17.92	~5.25 gal. dis
1112	18.17	21.72	1.179	4.47	6.87	72.3	8.69	~6.5 gal. dis
1115	18.18	21.65	1.178	4.32	6.87	73.1	7.32	~7.75 gal. dis.
1118	18.18	21.60	1.173	4.38	6.90	72.2	5.67	~9 gal. dis
1120								Sampled

Final SWL:
Total Vol.:

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: CS-C34-065
Date of Field Visit: 6 19 13
Field Staff: M. Palm
K. Remmen

Well Casing Dia. 4 in
Static WL: 43.62 ft bgs
Total Depth 104.50 ft bgs
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0815	43.71	21.83	1.126	5.67	6.82	198.4	961	cloudy water
0818	43.71	22.39	1.126	5.57	6.82	169.9	941	" "
0821	43.71	22.90	1.126	5.72	6.83	133.6	346	" "
0824	43.71	22.88	1.124	5.63	6.84	123.4	142	" "
0827	43.71	22.88	1.122	5.58	6.84	119.5	96.9	" "
0830	43.71	22.89	1.119	5.56	6.84	116.2	72.9	
0833	43.71	22.89	1.117	5.60	6.84	115.0	67.9	

Final SWL: 43.66
Total Vol.: 20 gal.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: CS-C37-035
Date of Field Visit: 6.19.13
Field Staff: M. Palm
K. Remmen

Well Casing Dia. 4 in.
Static WL: 15.25 ft bgs
Total Depth 34.75 ft bgs
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0935	15.23	21.10	0.927	7.85	6.94	161.9	479	cloudy water
0938	15.23	21.62	0.925	7.41	6.92	156.1	433	" "
0941	15.23	21.76	0.922	7.27	6.93	154.5	306	" "
0943	15.23	21.81	0.919	7.24	6.93	152.8	211	" "
0946	15.23	21.86	0.919	7.23	6.93	150.2	153	" "
0949	15.23	21.95	0.918	7.15	6.93	146.9	118	" "
0951	15.23	21.98	0.916	7.15	6.93	144.0	81.9	
0954	15.23	21.86	0.912	7.27	6.92	139.6	65.2	
0957	15.23	21.76	0.911	7.33	6.92	137.1	36.6	
1000	15.23	21.79	0.908	7.32	6.92	135.0	32.1	

Final SWL: 15.21 ft bgs
Total Vol.: 14 gal

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: CS-C35-041
Date of Field Visit: 6.19.13
Field Staff: M. Palm
K. Remmert

Well Casing Dia. 4 in.
Static WL: 18.04 ft msl
Total Depth 40.90 ft msl
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1045	18.06	21.33	0.982	5.15	6.97	158.0	216	cloudy water
1048	18.06	21.38	0.977	4.68	6.90	155.8	519	" "
1051	18.07	21.49	0.973	4.50	6.87	154.2	464	" "
1054	18.08	21.53	0.974	4.44	6.87	150.7	325	" "
1057	18.08	21.55	0.971	4.42	6.87	145.5	182	" "
1100	18.08	21.58	0.972	4.43	6.85	142.1	150	" "
1103	18.08	21.58	0.973	4.45	6.85	138.9	84.5	" "
1106	18.08	21.57	0.973	4.45	6.82	134.3	44.1	
1109	18.08	21.61	0.972	4.44	6.87	131.7	29.6	
1112	18.08	21.65	0.976	4.44	6.87	130.4	26.5	

Final SWL: 18.05
Total Vol.: 16 gal

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: CS-C36-055
Date of Field Visit: 6-20-13
Field Staff: Mike Palm
André Ritchie

Well Casing Dia. 4 in.
Static WL: 34.15 ft BTOC
Total Depth 54.90 ft BTOC
Sampling Equipment Grundfos pump

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs) BTOC	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0801	34.16	21.09	1.047	8.85	6.92	310.5	401	~1 gallon discharged
0804	34.17	21.30	1.047	8.82	6.91	295.3	250	~2.5 gal. dis.
0807	34.17	21.34	1.045	8.82	6.91	283.0	205	~3.75 gal. dis.
M ~~0810~~ 0810	34.17	21.40	1.044	8.80	6.90	259.2	35.4	~4.5 gal. dis.
0813	34.17	21.33	1.043	8.78	6.90	242.2	18.51	~5.75 gal. dis.
0816	34.17	21.34	1.042	8.74	6.90	226.9	16.07	~7 gal. dis.
0819	34.17	21.38	1.041	8.73	6.90	213.3	12.79	~8 gal. dis.
0822	34.17	21.39	1.040	8.71	6.90	208.2	9.29	~9.25 gal. dis.
0825	34.17	21.41	1.040	8.68	6.90	204.1	8.17	~10.25 gal. dis.
0828	34.17	21.38	1.040	8.66	6.90	199.7	6.73	~11.5 gal. dis.
								AR
0830								Collect Y8WP1 (inorganics)
								MY8WP1 (inorganics, unfiltered)
								MY8WP2 (inorganics, filtered)

Final SWL: 34.15 ft BTOC
Total Vol.: ~16 gal. dis.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: CS-C41-058
Date of Field Visit: 6-20-13
Field Staff: Mike Palm
Andre' Ritzhie

Well Casing Dia. 4 in.
Static WL: 36.94 ft BTOC
Total Depth 58.40 ft BTOC
Sampling Equipment Grundfos pump

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs) BTOC	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0936	37.00	21.24	1.488	2.49	6.89	180.2	514	~1.25 gallons discharged
0939	37.00	21.75	1.487	2.27	6.90	168.2	182	~2.25 gallons discharged
0942	37.00	21.86	1.488	2.19	6.92	149.0	76.8	~3 gal. dis.
0945	37.00	21.84	1.487	2.15	6.90	142.0	42.2	~3.75 gal. dis.
0948	37.00	21.92	1.483	2.12	6.89	136.9	35.0	~4.5 gal. dis.
0951	37.00	22.10	1.476	2.10	6.89	130.0	30.9	~5.25 gal. dis.
0954	37.00	22.14	1.468	2.04	6.90	125.6	20.8	~6 gal. dis.
0957	37.00	21.82	1.456	2.04	6.91	124.7	17.76	~6.5 gal. dis.
1000	37.00	21.68	1.451	2.06	6.90	123.0	15.56	~7 gal. dis.
1003	37.00	21.65	1.444	2.08	6.91	126.2	9.30	~7.75 gal. dis.
1006	37.00	21.69	1.438	2.10	6.91	122.4	9.08	~8.25 gal. dis.
1009	37.01	21.47	1.426	2.11	6.90	126.3	8.58	~9 gal. dis.
1010								Collect Y8WP3 (organics),
								MY8WP4 (inorg., unfil.)
								MY8WP8 (inorg., fil.)

Final SWL: 36.94 ft BTOC
Total Vol.: ~14 gal. dis.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C40-079
Date of Field Visit: 6-20-13
Field Staff: Mike Palm
Andre' Ritchie

Well Casing Dia. 4 in.
Static WL: 58.35 ft BTOC
Total Depth 78.95 ft BTOC
Sampling Equipment Grundfos pump

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs) BTOC	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1058	58.87	22.06	1.195	3.82	7.00	137.8	32.1	~ 1.25 gallons discharged
1101	58.61	22.10	1.197	3.77	7.00	137.0	25.6	~ 1.75 gal. dis. Decrease purge rate.
1104	58.61	22.49	1.193	3.77	6.99	125.2	26.7	~ 2.25 gal. dis.
1107	58.74	23.38	1.200	3.72	7.00	121.3	25.8	~ 2.75 gal. dis. Increase purge rate.
1110	58.80	22.97	1.205	3.74	7.00	121.0	24.5	~ 3.5 gal. dis.
1113	58.81	22.74	1.206	3.75	6.99	121.5	23.6	~ 4 gal. dis.
1116	58.81	22.70	1.207	3.71	6.98	119.3	25.4	~ 4.5 gal. dis.
1119	58.81	22.76	1.211	3.70	6.99	118.4	27.4	~ 5.25 gal. dis.
1120								Collect Y8WP5 (organics),
								MY8WP65 (inorg., unfil.)
								MY8WP75 (inorg., fil.)
1140								Collect Y8WP7 (organics)
								MY8WP84 (inorg., unfil.)
								MY8WP94 (inorg., fil.)

Final SWL: 58.35 ft BTOC
Total Vol.: ~10 gal. dis.

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C39-073
Date of Field Visit: 6-21-13
Field Staff: Mike Palm
André Ritchie

Well Casing Dia. 4 in.
Static WL: 52.49 ft BTOC
Total Depth 72.91 ft BTOC
Sampling Equipment Grundfos pump

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs) BTOC	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
0758	52.59	21.18	1.062	8.35	6.90	185.3	136	~1.25 gallons discharged
0801	52.59	21.46	1.061	8.35	6.92	171.4	150	~3 gal. dis.
0804	52.60	21.59	1.061	8.36	6.91	159.3	120	~4 gal. dis.
0807	52.60	21.58	1.060	8.34	6.91	154.7	85.7	~5.5 gal. dis.
0810	52.60	21.54	1.059	8.35	6.92	149.4	47.0	~7.25 gal. dis.
0813	52.60	21.53	1.058	8.37	6.92	144.2	52.7	~9 gal. dis
0816	52.60	21.57	1.058	8.37	6.91	141.4	29.6	~10.25 gal. dis.
0819	52.60	21.59	1.057	8.37	6.91	139.8	28.7	~12 gal. dis.
0822	52.61	21.56	1.057	8.36	6.94	138.4	30.3	~14 gal. dis.
0825	52.62	21.60	1.056	8.36	6.94	139.1	20.1	~15.5 gal. dis.
0828	52.61	21.60	1.056	8.36	6.94	138.9	19.75	~17 gal. dis.
0831	52.60	21.61	1.056	8.35	6.94	138.5	12.85	~18.25 gal. dis.
0834	52.60	21.61	1.056	8.36	6.93	139.2	12.24	~19.25 gal. dis.
0837	52.60	21.60	1.055	8.36	6.93	140.4	12.82	~20 gal. dis.
0840								Collect Y8WQ1 (organics), MY8WQ1
								(inorg., unfilt.), MY8WQ2 (inorg., filt.)

Final SWL: 52.49 ft BTOC
Total Vol.: ~26 gal. dis.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: CS-C42-059
Date of Field Visit: 6-21-13
Field Staff: Mike Palm
André Ritchie

Well Casing Dia. 4 in.
Static WL: 36.57 ft BTOC
Total Depth 58.38 ft BTOC
Sampling Equipment Grundfos pump

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs) BTOC	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
1048	36.64	23.87	1.392	5.93	7.12	102.6	65.0	~0.5 gallons discharged
1051	36.65	24.36	1.380	5.88	7.10	90.5	27.7	~1 gal. dis.
1054	36.65	24.92	1.383	5.69	7.11	86.5	24.1	~1.5 gal. dis.
1057	36.65	25.07	1.384	5.60	7.11	86.2	17.13	~2 gal. dis.
1100	36.65	25.22	1.384	5.69	7.10	86.7	17.16	~2.5 gal. dis.
1103	36.65	25.30	1.384	5.63	7.11	87.0	17.22	~3 gal. dis.
1106	36.65	25.38	1.382	5.55	7.10	86.6	16.92	~3.75 gal. dis.
1109	36.65	25.43	1.382	5.57	7.10	86.8	16.92	~4.25 gal. dis.
1110								Collect Y8WQ5 (organics),
								MY8WQ5 (inorg., unfilt.),
								MY8WQ6 (inorg., filt.)

Final SWL: 36.57 ft BTOC
Total Vol.: ~8 gal. dis.

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: V13DRMW7
Date of Field Visit: 6/24/13
Field Staff:

Well Casing Dia. 4 in
Static WL: 57.20 ft to BTOC
Total Depth
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
~~[illegible]~~								
7:45 am		21.95	1.172	5.70	7.28	178.9	67.0	
7:48 am	57.50	21.82	1.158	3.96	7.02	160.2	52.9	
7:51 am	57.50	23.30	1.158	3.80	7.03	119.5	105	
7:54 am	57.52	23.65	1.160	3.63	7.04	109.8	240	
7:57 am	57.50	23.62	1.162	3.55	7.05	94.4	116	
8:00 am	57.53	23.62	1.159	3.45	7.06	92.2	58.5	
8:03 am	57.52	23.66	1.158	3.47	7.07	88.5	44.0	
8:06 am	57.53	23.72	1.158	3.65	7.07	86.6	54.0	
8:09 am	57.53	23.75	1.157	3.78	7.07	86.1	36.2	

Final SWL:
Total Vol.:

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: V13MW8
Date of Field Visit: 6/24/13
Field Staff:

Well Casing Dia. 4 in
Static WL: 61.01 ft to BTOC
Total Depth 76.50 ft to BTOC
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs) 61.01	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
8:51 am	61.01	21.59	0.051	10.55	7.05	187.3	49.5	
8:54 am	61.02	21.16	0.051	10.50	6.96	143.2	41.3	
8:57 am	61.15	22.65	0.051	9.24	6.96	125.3	29.2	
9:00 am	61.20	22.94	0.052	9.02	6.97	113.3	28.3	
9:03 am	61.21	23.11	0.059	10.42	6.90	115.4	26.0	
9:06 am	61.22	23.20	0.040	8.78	6.98	125.5	30.6	
9:09 am	61.60	23.28	0.169	7.45	7.05	115.7	23.1	
9:12 am	61.87	22.50	1.169	6.95	7.04	113.5	23.2	
9:15 am	62.00	22.49	1.167	6.93	7.03	113.3	24.1	

Final SWL:
Total Vol.:

CH2MHILL

Groundwater Monitoring Field Activity Sheet

V13DRC-MW6

Well ID: V13DRC-MW6
Date of Field Visit: 7/24/13
Field Staff:

Well Casing Dia. 4 in
Static WL: 56.15 ft to TOC
Total Depth 71.75 ft to TOC
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
10:24 am	56.15							
10:27 am	56.17	22.59	1.086	5.89	7.15	128	845	
10:30 am	56.19	22.98	1.082	5.82	7.15	120.9	762	
10:33 am	56.21	23.07	1.079	5.78	7.14	115.8	831	
10:36 am	56.21	23.14	1.087	5.61	7.13	111.9	687	
10:39 am	56.16	23.35	1.088	5.53	7.12	110.2	718	
10:41 am	56.17	23.60	1.088	5.41	7.13	107.8	614	
10:44 am	56.18	23.72	1.088	5.45	7.13	106.0	666	

10:30
10:33

Final SWL:
Total Vol.:

CH2MHILL

Groundwater Monitoring
Field Activity Sheet

Well ID: CS-C38-031
Date of Field Visit:
Field Staff:

Well Casing Dia. ~~cm~~ 4 in
Static WL: 29.60 ft to BTOC
Total Depth 51.27 ft to BTOC
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
8:20 am	29.66	20.83	2.020	4.71	6.54	171.2		
8:23 am	29.64	20.31	2.012	1.72	6.14	170.0	519	
8:26 am	29.65	21.06	2.007	2.55	6.18	163.9	363	
8:29 am	29.66	21.40	2.007	0.82	6.19	161.7	343	
8:32 am	29.67	21.46	2.008	0.75	6.17	157.8	271	
8:35 am	29.67	21.54	2.007	0.81	6.19	159.1	213	
8:38 am	29.66	21.64	2.008	0.76	6.19	157.2	168	
8:41 am	29.66	21.81	2.007	0.61	6.20	155.3	116	
8:44 am	29.66	21.91	2.008	0.52	6.20	153.01	66	
8:47 am	29.67	21.97	2.008	0.48	6.20	150.9	85.3	

Final SWL:
Total Vol.:

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: ~~6/25/13~~ V13 DRA-MW7
Date of Field Visit: 6/25/13
Field Staff:

Well Casing Dia. 4 in
Static WL: 59.60 ft to BTOC
Total Depth 72.03 ft to BTOC
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
9:45 am	59.60							
9:48 am	60.40	22.08	0.577	9.03	6.80	116.7	59.0	
9:51 am	60.41	22.47	0.591	8.94	6.78	114.7	58.5	
9:54 am	60.41	22.53	0.614	8.83	6.79	114.7	46.3	
9:57 am	60.42	22.57	0.648	8.72	6.79	115.4	48.7	
10:00 am	60.43	22.58	0.673	8.62	6.80	115.8	45.8	
10:03 am	60.45	22.56	0.700	8.56	6.81	116.1	45.7	

Final SWL:
Total Vol.:

CH2MHILL

Groundwater Monitoring Field Activity Sheet

Well ID: CS-043-083
Date of Field Visit: 6/25/13
Field Staff:

Well Casing Dia. 4in
Static WL: 61.81
Total Depth 83.27
Sampling Equipment

Field Parameters

Clock Time (24 HR)	Water Level (ft bgs)	Temp. °C	Specific Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments
8:20 am	61.81	--	--	--	--	--	--	
8:23 am	62.28	21.42	1.102	8.93	7.19	129.7	993	
8:26 am	62.26	21.76	1.094	8.03	7.16	134.2	438	
8:29 am	62.26	22.24	1.095	7.97	7.18	133.1	247	
8:32 am	62.26	22.46	1.096	7.78	7.17	134.3	314	
8:35 am	62.27	22.57	1.095	7.88	7.17	133.5	458	
8:38 am	62.28	22.59	1.095	7.87	7.16	132.9	534	
8:41 am	62.285	22.60	1.092	7.87	7.15	130.6	480	
8:44 am	62.28	22.64	1.093	7.80	7.13	128.5	420	
8:47 am	62.27	22.67	1.092	7.73	7.12	127.1	410	

Final SWL:
Total Vol.:

MIKE PALM, CHRIS JOAN 6/26/13

7:20 am - Calibrate YSI 556 MPS
C2 ~~C0030~~ ~~C0B~~ CF
CI ~~C0B~~ C03D0899AL) and
Oakton CT-100 (642863)

	~~pH~~ pH	pH	pH
Reading	4.53	6.77	9.82
Standard	4.00	7.00	10.00
Calibrate	4.00	7.00	10.00

	Conductivity mS
Reading	9.85
Standard	10
Calibrate	10

8:17 am - CS-043-083 arrived.
DTW = 61.81 ft to BTOC
Total Depth = 83.27 ft to BTOC
8:20 am → Begin purging CS-043-083
8:50 am → Collect Y8WS5 (organics)
MY8WS5 (inorganics, unfiltered)
MY8WS6 (inorganics, filtered)

M. LADEZAN 7/16/13

0700 SET UP TRAFFIC CONTROL
0710 AT CSC43083 DTW = 61.79
0735 PUMP ON.

TIME	TEMP	EC	PH	DO	TURB	GALS
0740	20.63	1.005	5.24	4.47	66.4	1
0745	21.61	1.028	6.04	3.87	46.5	2.5
0752	21.80	1.031	6.37	4.29	97.3	5.0
DTW =	62.09					
0806	21.87	1.031	6.29	5.61	50.9	10.0
0816	21.92	1.030	6.20	5.67	42.3	14.0
0826	21.89	1.030	6.24	5.89	39.0	18.0
DTW =	62.13					22.0
0836	21.89	1.029	6.33	6.06	27.2	22.0
0848	21.92	1.028	6.40	6.24	20.5	27.0
0856	22.01	1.029	6.42	6.08	20.7	30.0
	DTW = 62.13					

0900 COLLECT CS-043-083-071613 FOR CRL ONLY
1030 TRANSFER PURGE WATER TO TANK AT STAGING AREA.
1115 UNLOAD EQUIPMENT AT BOU/EPA STORAGE CONTAINER.
1150 GO TO AETL LABS

7/22/13 GCOU M. LADEAU H. JUNG

0700 AT BOU. LOAD UP EQUIPMENT.
0745 AT ALL METALS. CALIBRATE EQUIPMENT

METER	STANDARD	READING
LA MOTTE	1.00	1.10 NTU
"	10.0	10.04 NTU
YSI 556	4.00	4.01 PH
"	7.00	7.00 PH
"	10.00	10.00 us/cm

0810 AMP-W1 DTW= 59.41
PUMP ON

TIME	TEMP	EC	PH	TURB	GALS
0823	21.66	1.395	7.17	268	0.5
0826	22.20	1.402	7.16	279	1.75
0829	22.57	1.399	7.13	272	2.5
0832	22.96	1.400	7.16	182	3
0835	23.24	1.401	7.17	153	3.75
0838	23.71	1.403	7.18	118	4 V
0841	23.91	1.402	7.18	109.8	4.5
0844	23.88	1.404	7.18	98.1	5
0849	24.11	1.404	7.18	97.4	5.75
0854	24.16	1.402	7.19	125	6.75
0857	24.21	1.403	7.19	122	7.25

Total 8 gal

7/22/13 GCOU M. LADEAU H. JUNG

0900 COLLECT Y8MX5 + MY8MX5 UNFILTERED SAMPLES AND MY8MX6 FILTERED SAMPLES
0915 AT AMP-W3 DTW= 59.93'
PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS
0923	23.20	2.313	7.46	60.2	~~[illegible]~~ 1.5
0927	22.77	2.305	7.38	47.5	1.75
0930	23.40	2.300	7.34	11.4	2.75
0933	23.37	2.303	7.37	11.2	3.25
0937	23.47	2.301	7.38	8.18	4 V
0940	23.50	2.298	7.37	8.18	4.75
0943	23.51	2.292	7.38	6.95	5.75
0946	23.59	2.286	7.37	5.11	6.75
0950	23.60	2.281	7.37	4.46	7.75
0954	23.51	2.275	7.37	3.90	8.5

1000 COLLECT Y8MX7/MY8MX7 UNFILTERED SAMPLES AND MY8MX8 FILTERED.
TOTAL PURGE 11.5 gallons
1020 AT PWA-3 - 105.50' DTW
PUMP ON

SAMPLE IDs WERE TRANSPOSED. "MY8MX7" HERE SHOULD BE "MY8XM7"

7/22/13 GCOU M. LADEAU H. JUNG

PWA-3

TIME	TEMP	EC	PH	TURB	GALS
1035	24.52	0.966	7.91	10.16	0.75
1038	23.00	0.962	7.81	40.8	1.75
1042	23.84	0.958	7.76	19.6	3
1047	24.15	0.942	7.78	24.9	3.5
1050	24.48	0.931	7.80	13.7	4 ✓
1053	24.45	0.924	7.82	9.85	4.75
1056	24.45	0.921	7.80	7.61	5.5
1100	24.55	0.912	7.80	4.69	6.5
1103	24.49	0.911	7.80	3.59	7.25
1106	24.50	0.906	7.79	3.04	8 ✓
1109	24.57	0.901	7.81	2.64	8.75

1110 COLLECT MY8XM9/MY8XN0

1125 AT PWA-2 121.95 DTW

PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS
1136	24.54	1.030	7.73	2086	1
1141	22.92	1.018	7.63	232	1.5
1145	23.11	1.008	7.61	148	2.25
1148	23.94	0.993	7.67	20.5	3.5
1152	24.30	0.994	7.68	14.2	4.25
1155	24.40	0.998	7.69	13.4	5

7/22/13 GCOU M. LADEAU H. JUNG

continued (PWA-2)

Time	Temp	EC	PH	TURB	Gals
1158	24.45	1.002	7.67	15.4	6
1202	24.50	1.004	7.67	15.7	6.5
1205	24.58	1.006	7.67	13.9	7.5

1210 COLLECT SAMPLES MY8XN1/MY8XN2

1220 FILL BLANKS MY8XN3/MY8XN4

1245 GO TO AETL TO DROP OFF SAMPLES.

1330 DONE FOR DAY.

7/23/13 GCOU M. LADEAU H. JUNG.

0615 DROP OFF PURGE WATER (50 gallons) AT BOU.

0645 GET ICE FROM STORE.

0650 MEET HUN JUNG AND GO TO WELL PWA-5.

0705 CALIBRATE EQUIPMENT

METER	STANDARD	READING
YSI 556	10.00 EC	9.999 EC
	4.00 PH	4.00
	7.00 PH	7.00
MOTTE	1.00	1.25 NTU
	10.00	10.39 NTU

0715 PWA-5 DTW= 109.55

PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS
0722	20.23	1.308	7.18	12.1	0.5
0725	19.82	1.318	7.10	124	1.5
0728	20.35	1.316	7.12	37.1	2.25
0731	21.05	1.317	7.31	21.4	3.5
0734	21.24	1.318	7.37	16.1	4 ✓
0737	21.34	1.317	7.38	10.29	5
0740	21.33	1.316	7.38	8.46	6
0743	21.42	1.313	7.37	6.82	7.75

8.5 gals

7/23/13 GCOU M. LADEAU H. JUNG

0750 COLLECT SAMPLES MY8XN5/MY8XN6 LAB QC.

0810 AT PWA-1 DTW = 108.60

Time	Temp	EC	PH	Turb	Gals
0818	21.32	0.976	7.55	17.4	0.75
0821	21.71	0.972	7.47	11.2	1.5
0824	21.92	0.969	7.38	8.40	2
0828	22.06	0.967	7.47	5.14	2.5
0831	21.94	0.966	7.46	6.10	3.5
0834	21.86	0.957	7.45	7.66	4 ✓
0837	21.95	0.964	7.57	18.0	5
0840	22.15	0.970	7.82	16.5	6
0845	22.28	0.967	7.94	9.6	7
0849	22.36	0.965	7.95	6.74	8 ✓
0853	22.44	0.961	7.92	9.66	9.5
0856	22.47	0.963	7.90	8.2	10.5

0900 COLLECT SAMPLES MY8XN7/MY8XN8

0955 AT PWA-13. DTW = 71.86

PUMP ON

7/23/13 GCOU M. LADEAU H. JUNG

PWA-13

TIME	TEMP	EC	PH	TURB	GALS
1002	21.70	1.540	7.36	6.63	0.75
1006	21.16	1.531	7.30	10.22	1.5
1010	22.05	1.530	7.29	7.49	2.5
1014	22.17	1.528	7.31	9.09	4 V
1017	22.19	1.526	7.30	14.6	5
1021	22.20	1.523	7.30	17.2	6.5
1024	22.21	1.524	7.30	15.7	7.5
1028	22.19	1.525	7.30	11.9	8 V
1032	22.07	1.527	7.30	10.37	9.5

1035 COLLECT SAMPLES MY8XN9/MY8XPØ

1050 FILL BLANK MY8XP1/MY8XP2

1115. DO COC AND PACKAGE SAMPLES FOR FEDEX.

1300 GO TO AETL. DONE FOR DAY.

7/24/13 GCOU H. JUNG M. LADEAU

0700 AT PWA-4 DTW = 88.41

0720 Calibrate Equipment

Meter	Standard	Reading
YSI556	10.00 EC	10.06
	4.00 PH	4.19
	7.00 PH	6.99
	10.00 PH	10.06
LaMotte	1.00	1.04
	10.00	9.96

0740 PWA-4 PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS
0745	20.45	0.880	7.27	22.7	1
0748	20.96	0.880	7.26	14.6	2
0752	21.51	0.874	7.29	12.0	3
0755	21.54	0.869	7.33	8.07	4 V
0759	21.58	0.856	7.34	7.19	5
0803	21.61	0.846	7.32	8.19	6
0807	21.65	0.841	7.31	5.86	7.25
0810	21.69	0.833	7.34	5.06	8 V
0813	21.72	0.830	7.32	4.10	8.75

0815 COLLECT SAMPLES MY8XP3/MY8XP4

7/24/13 GCOU M. LADEAU H. SUNG

0850 AT PWA-6 DTW = 61.91

PUMP ON. WILL PURGE EXTRA VOLUMES ~~DUE~~ DUE TO HIGH CRL RESULTS.

TIME	TEMP	EC	PH	TURB	GALS	
0902	20.70	1.414	7.08	17.0	1.25	
0907	21.57	1.414	7.01	27.8	3	✓
0914	21.45	1.143	7.01	9.84	6	✓
0921	21.48	1.414	7.01	4.33	9	✓
0928	21.46	1.143	7.00	1.77	12	✓
0935	21.45	1.141	6.99	0.91	15	✓
0942	21.53	1.141	6.99	0.15	18	✓
0951	21.57	1.141	6.98	0.39	21	✓
0957	21.63	1.141	7.00	0.60	24	✓
1004	21.61	1.140	6.98	0.51	~~27~~ 27	✓
1010	21.66	1.141	6.99	0.91	30	✓

1000 COLLECT SAMPLES MY8XP5/~~MY8XP6~~ MY8XP6

1010 COLLECT SAMPLES MY8XP7/MY8XP8

DECON PUMP.

SET UP ON PWA-12.

7/24/13 GCOU M. LADEAU H. SUNG.

1028 PWA-12-61.92 DTW

1031 Pump on. PWA-12

TIME	TEMP	EC	PH	Turb	GALS	
1034	21.56	1.097	7.12	2.98	0.75	
1037	20.73	1.092	6.97	14.6	1.5	
1040	20.77	1.083	6.98	5.70	2.25	
1043	20.84	1.082	6.99	2.51	3.0	
1047	21.01	1.082	7.00	1.62	3.5	
1050	20.76	1.080	7.00	1.59	4	✓
1054	20.74	1.089	7.11	3.19	5.5	
1057	21.09	1.092	7.21	2.82	6.25	
1100	21.02	1.093	7.30	4.30	7	
1104	21.06	1.088	7.23	7.97	7.75	✓
1107	21.06	1.086	7.13	7.10	8.5	
1111	21.11	1.083	7.09	4.61	9.25	
1115	21.18	1.082	7.06	3.02	10.0	
1118	21.25	1.083	7.06	3.04	10.5	
1121	21.30	1.084	7.06	2.68	11	

1125 COLLECT SAMPLES MY8XP9/MY8XQØ

1135 COLLECT BLANK MY8XQ1/MY8XQ2

1300 DONE FOR DAY.

7/25/13 GCOU M.LADEPU H.JUNG

0700 AT CS-C30 CLUSTER.
0705 CAL. BARRICADE ONSITE FOR TRAFFIC CONTROL.
0710 CALIBRATE EQUIPMENT.

Meter	standard	reading
YSI556	10.00 EC	9.996
	4.0 PH	3.97
	7.0 PH	7.08
	10.0 PH	10.10
Lamotte	1.0	0.76
	10.0	10.2

CS-C30-120 DTW= 93.57'

TIME	TEMP	EC	PH	TURB	GALS
0733	19.80	1.198	7.10	132	0.75
0737	19.92	1.211	7.16	72.4	1.75
0741	21.17	1.242	7.28	46.5	3.25
0745	21.36	1.237	7.25	42.3	4 ✓
0749	21.46	1.225	7.24	34.2	5.25
0753	21.55	1.206	7.25	26.3	6.75
0756	21.57	1.189	7.28	14.1	7.75
0759	21.64	1.179	7.27	9.15	8 ✓
0803	21.68	1.175	7.27	7.02	9.5

7/25/13 GCOU M.LADEPU H.JUNG

0805 COLLECT SAMPLES MX8XQ3/Q4
0817 CS-C30-200 DTW= 93.97
PUMP ON

TIME	TEMP	EC	PH	TURB	GALS
0823	20.01	0.674	7.55	5.71	0.75
0826	19.96	0.664	7.24	1.34	1.5
0830	21.30	0.683	7.48	1.89	2.75
0834	21.64	0.688	7.49	0	3.75
0838	21.78	0.689	7.47	0.81	4.75
✓ 0842	21.63	0.692	7.47	0.51	6.25
0852	22.25	0.698	7.49	0.38	7.25
0855	22.64	0.703	7.49	0.21	8
0859	22.15	0.699	7.47	0.32	8.75

0905 COLLECT SAMPLES MY8X85/Q6

0915 GO TO CS-C32-120
0920 AT CS-C32-120 DTW= 99.58
PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS

7/25/13 GCOU M. LADERAU H. JUNG

TIME	TEMP	EC	PH	TURB	GALS
0941	20.51	1.211	7.25	25.2	0.75
0945	20.71	1.210	7.05	20.8	2
0949	21.76	1.239	7.19	19.3	3
0953	22.03	1.249	7.21	17.2	4
0957	22.05	1.251	7.21	15.0	5.75
1000	22.12	1.253	7.21	12.2	6.75
1003	22.14	1.253	7.20	13.9	7.75
1007	22.22	1.256	7.20	9.22	9.25
1010	22.21	1.256	7.20	10.56	10.0

1010 COLLECT SAMPLES MY8XQ7/~~8~~Q8

1030 AT CS-C31-102 78.65
PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS
1040	20.92	1.332	7.22	11.7	1
1043	21.29	1.333	7.16	25.6	2
1047	21.75	1.345	7.16	46.8	3
1051	21.85	1.347	7.16	25.8	4.5 ✓
1055	21.92	1.350	7.16	11.1	6
1059	22.03	1.354	7.17	8.53	7.75
~~10~~1103	22.04	1.357	7.16	7.89	9
1105	22.02	1.357	7.16	7.50	10

7/25/13 GCOU H. JUNG M. LADERAU

1105 COLLECT SAMPLES MY8XQ9/RØ

1125 FILL BLANK MY8XR1/R2

1140 PACKAGE SAMPLES FOR SHIPMENT.
GO TO FEDEX AND AETL.

7/26/13 GCOU H. JUNG M. LADEAU

0630 WELL ON PERLITA / LOS FELIZ
DTW = 28.43 TD 53.60'
0650 AT OW4R DTW = 35.12
CALIBRATE EQUIPMENT

Meter	Standard	reading
YSI 556	10.00	10.00
	4.0 PH	4.02
	7.0 PH	7.05
	10.0 PH	10.06
LaMotte	1.0 NTU	1.06
	10.0 NTU	10.1

0815 PUMP ON.

TIME	Tem	EC	Ph	Turb	Gals
0823	23.05	1.033	6.96	16.6	1
0828	24.06	1.037	6.98	26.0	1.5
0832	24.46	1.038	6.99	19.9	2
0836	24.70	1.038	6.99	19.2	2.5
0840	24.87	1.037	7.0	22.9	3
0844	24.96	1.037	6.99	24.9	3.75
0848	24.26	1.040	6.98	17.1	4.75
0852	24.13	1.035	6.96	11.3	5.5
0856	24.26	1.035	6.97	11.6	6

0900 COLLECT SAMPLES MY8XR3 / R4

7/26/13 GCOU H. JUNG M. LADEAU

0910 AT HMW-1R DTW = 46.46
PUMP ON

TIME	TEMP	EC	PH	TURB	GALS
0930	22.10	1.039	6.93	6.26	.75
0934	23.32	1.035	6.94	5.02	1.75
0939	23.79	1.039	6.94	5.05	2.5
0944	24.0	1.039	6.95	6.83	3.5
0949	24.09	1.041	6.95	5.55	4.5
0954	24.09	1.041	6.95	4.90	5.25
0958	24.16	1.041	6.95	4.58	6
1002	24.38	1.041	6.94	4.40	7
1006	24.26	1.042	6.96	3.63	7.5

1010 COLLECT SAMPLES MY8XR5 / R6

1025 AT HLA 2R DTW 42.24.
PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS
1032	22.23	1.012	6.97	15.4	1.25
1036	22.67	1.012	6.99	6.34	2.25
1040	22.72	1.010	7.0	1.84	3.5
1044	22.70	1.011	6.99	0.9	4.75
1048	22.69	1.009	6.99	0.4	6
1052	22.68	1.008	6.99	0.4	7.5

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7/26/13 M. LADEAU

Continued from previous page (HLA-1R)

Time	temp	EC	PH	Turb	GALs
1055	22.68	1.007	7.0	0.36	8.25
1059	22.65	1.006	6.99	0.44	9.5

1105 COLLECT SAMPLES MY8XR7/R8

1115 FILL EQUIP BLANK MY8XR9/SO

1200 UNLOAD EQUIPMENT AT BOU.

1220 GO TO AETL.

1245 DONE FOR DAY.

7/29/13 GCOU H. SUNG M. LADEAU

0700 AT BOU. LOAD UP EQUIPMENT.

0710 GO TO PWA-8

0720 AT PWA-8 DTW = 56.03'

CALIBRATE EQUIPMENT.

Meter	~~Test~~standard	Reading
YSI 556	10.0 EC	10.0
	4.0 PH	3.99
	7.0 PH	7.01
	10.0 PH	10.02
Lamotte	1 NTU	1.01
	10 NTU	9.99

0743 pump on @ PWA-8

Time	temp	EC	PH	Turb	Gals
0748	20.35	1.081	7.17	144	1.25
0752	21.09	1.078	7.25	59.1	2.5
0756	21.39	1.078	7.27	44.4	3.5
0800	21.55	1.076	7.27	18.4	4.5
0804	21.62	1.077	7.27	18.6	5.25
0808	21.66	1.079	7.27	12.3	6
0812	21.76	1.078	7.27	9.25	7
0816	21.79	1.085	7.27	8.96	7.75

7/29/13 GCOU M. LADEAU M. JUNG

0820 COLLECT SAMPLES MY8XS1/S2

0905 AT PWA-10 DTW=44.62
PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS
0911	20.72	1.180	7.37	38.7	1
0915	21.34	1.174	7.16	39.5	1.75
0919	21.93	1.175	7.29	24.0	2.75
0922	22.09	1.177	7.29	21.7	3.75
0926	22.75	1.179	7.29	24.2	4
0930	22.24	1.177	7.28	23.9	5
0934	22.24	1.179	7.27	24.1	6
0938	22.31	1.180	7.27	19.0	7
0942	22.38	1.179	7.27	17.5	8
0946	22.35	1.178	7.27	16.3	9

0950 COLLECT SAMPLES MY8XS3/S4
1000 COLLECT DUP MY8XS5/S6
1040 AT CS-C33-059 DTW=37.02
PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS

7/29/13 GCOU M. JUNG M. LADEAU

(CS-C33-059 CONT'D)

TIME	TEMP	EC	PH	TURB	GALS
1047	21.41	1.078	7.26	10.79	0.5
1050	21.85	1.069	7.10	16.9	1.5
1054	22.49	1.069	7.08	14.9	2.5
1058	22.59	1.070	7.08	16.4	3.25
1102	22.67	1.068	7.08	24.0	4.5
1106	22.78	1.067	7.08	31.3	5
1110	22.94	1.067	7.09	25.0	6
1114	23.08	1.066	7.08	25.0	6.5
1118	23.20	1.066	7.08	22.0	7.25
1122	23.37	1.066	7.09	20.9	8
1126	23.32	1.066	7.08	19.3	9

1130 Collect Samples MY8XS7/S8
1140 FILL BLANK MY8XS9/TØ

1215 GO TO LAB AND FEDEX.

7/30/13 GCOU M. JUNG M. LADERAM

0615 AT BOU. DUMP PURGE WATER AND GET SUPPLIES.

0650 AT WCW2R DTW= 46.02

CALIBRATE EQUIPMENT

Meter	Standard	reading
YSI556	10 Ec	10.01
	4 Ph	3.99
	7 Ph	7.0
	10 Ph	10.03
LaMotte	1	1.03
	10	9.97

0710 Pump on

Time	temp	EC	ph	Turb	Gals
0714	21.12	1.138	6.59	8.68	1.5
0717	21.72	1.135	6.63	8.29	2.5
0720	21.95	1.131	6.64	8.63	3.25
0723	21.97	1.127	6.64	9.27	3.75
0726	22.03	1.119	6.64	12.9	4
0729	22.25	1.110	6.64	21.8	4.75
0732	23.22	1.106	6.65	39.0	5.25
0735	23.35	1.108	6.65	41.5	5.75

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7/30/13 GCOU M. LADERAM H JUNG

WCW-2R CONTD

Time	temp	EC	ph	Turb	Gals
0738	22.99	1.109	6.65	44.8	6
0742	23.75	1.110	6.65	43.7	7
0745	24.31	1.120	6.66	32.9	7.5
0748	23.25	1.125	6.66	30.1	8.25
0753	24.77	1.131	6.67	30.1	9

0755 COLLECT SAMPLES MY8XT1/T2

0820 AT PWA-7 DTW= 24.49

Pump on.

TIME	TEMP	EC	PH	TURB	GAS
0831	21.12	1.235	6.91	9.14	0.5
0834	21.41	1.243	6.86	15.6	1.5
0837	21.67	1.242	6.86	12.6	2.5
0840	21.72	1.240	6.85	11.9	3.5 ✓
0843	21.72	1.240	6.84	11.7	5
0846	21.73	1.240	6.84	11.1	6
0849	21.75	1.240	6.84	10.5	7 ✓
0853	21.77	1.241	6.85	10.4	8.5

0855 COLLECT SAMPLES MY8XT3/T4.

0915 GOTO PWA9

0940 AT PWA-9 DTW=53.57'

7/30/13 GCOU M. JUNG M. LADEAU

PWA-9

TIME	TEMP	EC	PH	TURB	GALS
0951	23.33	1.241	6.91	7.90	0.75
0954	23.31	1.243	6.83	11.2	1.75
0957	23.85	1.245	6.86	9.34	2.75
1000	24.06	1.246	6.86	9.36	4.75
1004	24.12	1.246	6.86	8.05	6
1008	24.19	1.246	6.86	7.13	7.25
1011	24.24	1.246	6.85	5.54	8

1015 COLLECT SAMPLES MY8XT5/T6

1100 AT CS-C40-079 DTW=58.65'

PUMP ON

TIME	TEMP	EC	PH	TURB	GALS
1119	21.42	1.218	7.01	1.77	0.5
1123	21.90	1.216	7.01	2.48	0.75
1130	22.64	1.196	7.07	2.39	1.5
1136	22.35	1.184	7.03	1.02	3
1140	21.82	1.165	7.00	2.88	3.75
1144	22.64	1.168	6.98	2.15	4.75
1148	22.85	1.177	7.01	2.15	5.75
1152	22.73	1.191	7.02	1.98	7
1155	22.73	1.194	7.01	1.38	7.75

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7/30/13 GCOU M. JUNG M. LADEAU

Time	temp	EC	PH	Turb	Gals
1158	22.69	1.194	7.01	1.11	8.75
1202	22.69	1.194	7.01	1.08	9.75
1206	22.69	1.195	7.01	1.01	11

1210 COLLECT SAMPLES MY8XT7/T8

1220 FILL BLANK MY8XT9/MY8XWD

1245 GO TO AETL TO DROP OFF SAMPLES.

7/31/13 GCOU H. JUNG M. LADEMA

0605 AT BOU TO DUMP PURGE WATER AND PICK UP SUPPLIES.

0640 AT CS-C42-059 DTW = 36.75

0700 CALIBRATE EQUIPMENT

Meter	reading	Standard
YSI 556	10.0	10 mS/cm
	3.99	4 ph
	7.01	7 ph
	10.02	10 ph
Lamotte	1.01	1 NTU
	10.04	10 NTU

0717 pump on at CS-C42-059

Time	temp	EC	Ph	Turb	Gals
0720	22.87	1.341	6.51	22.0	1.5
0724	23.36	1.350	6.51	16.2	2.75
0728	23.49	1.353	6.52	27.7	3.75
0732	23.59	1.354	6.52	23.6	5
0736	23.64	1.354	6.52	21.2	6.5
0740	23.67	1.354	6.52	19.6	7.75
0744	23.70	1.353	6.52	19.4	9

0750 COLLECT SAMPLES MY8XW1/W2

7/31/13 GCOU H. JUNG M. LADEMA

0805 AT CS-C41-058 DTW = 37.35'
PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS
0815	20.28	1.907	6.08	9.75	0.5
0819	21.01	1.935	5.99	23.9	1
0824	21.63	1.935	6.01	19.2	2
0828	21.65	1.925	6.02	10.07	3
0832	21.60	1.917	6.01	9.91	4
0836	21.66	1.909	6.02	9.41	5.5
0840	21.69	1.903	6.02	6.45	6.25
0844	21.75	1.890	6.03	5.61	7.25
0848	21.78	1.870	6.06	4.49	8
0852	21.76	1.826	6.05	4.85	9.25
0855	21.37	1.767	6.08	4.26	10.75
0859	21.36	1.732	6.09	4.46	11.75

0900 COLLECT SAMPLES MY8XW3/W4

0930 AT CS-C38-051 DTW = 29.97
PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS

7/31/13 GCOU M. LADERON H. JUNG

CS-C38-051 CONT'D

TIME	TEMP	EC	PH	TURB	GALS
0940	20.46	1.970	5.65	154	0.75
0943	21.22	1.973	5.62	142	1.5
0947	21.53	1.975	5.63	117	3
0951	21.57	1.975	5.63	133	4
0955	21.56	1.975	5.62	105	5.5
0959	21.59	1.975	5.62	93.6	6.75
1003	21.62	1.974	5.62	50.3	7.75
1007	21.60	1.973	5.61	23.2	9
1011	21.62	1.973	5.62	15.5	10.25
1014	21.62	1.973	5.61	11.6	11.5

1015 COLLECT SAMPLES MY8XW5/W6

1030 PLACE NO PARKING SIGNS FOR FRIDAY'S WELLS.

1125 FILL BLANK MY8XW7/W8.

1130 PACK COOLER FOR SHIPMENT

1300 DONE FOR DAY.

8/1/13 GCOU M. LADERON H. JUNG

0615 AT BOU. DUMP PURGE WATER AND P/U SUPPLIES.

0710 AT GPP. CHECK IN WITH OPERATIONS.

0735 CALIBRATE EQUIPMENT

Meter	Standard	Cal to	reading
YSI 556	10.0 mS/cm	10.0	10.0
	4.0 PH	4.0	4.0
	7.0 PH	7.0	7.04
	10.0 PH	10.0	10.21
Lamotte	1 NTU	1	1.02
	10 NTU	10	10.1

0755 MW13 AT GPP, DTW = 37.25 PUMP ON

TIME	TEMP	EC	PH	TURB	GALS
0802	21.57	1.728	6.86	61.9	0.75
0806	22.06	1.742	6.92	21.1	2
0810	22.36	1.740	6.92	15.9	3.25
1813	22.19	1.720	6.92	13.6	5
0816	22.31	1.700	6.93	15.8	6.25
0820	22.41	1.690	6.94	6.79	7.25
0823	22.43	1.676	6.93	6.81	8

8/1/13 GCOU M. LADEAU H. JUNG

MW-13 CONTD

Time	temp	EC	pH	Turb	Gals
0826	22.46	1.660	6.93	4.88	9
0829	22.57	1.649	6.93	2.78	10.25
0833	22.57	1.640	6.93	2.72	11.25

0835 COLLECT SAMPLES MY8XW9/X0

0850 AT MW-8 DTW= 35.54

PUMP ON

TIME	TEMP	EC (mS/cm)	PH	TURB	GALS
0855	22.07	1.418	6.88	4.68	0.5
0858	22.97	1.428	6.88	3.59	2
0902	23.06	1.436	6.90	2.63	3
0905	23.08	1.441	6.90	1.92	4
0908	23.08	1.441	6.90	2.28	5.75
0912	23.11	1.441	6.90	2.03	7

0915 COLLECT SAMPLES MY8XX1/X2

0925 AT MW-2 DTW= 38.79

PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS

8/1/13 GCOU M. LADEAU H. JUNG

MW-2 CONTD

TIME	TEMP	EC	PH	TURB	GALS
0933	21.98	1.321	7.07	3.42	1
0937	22.90	1.322	7.07	2.22	2.5
0942	23.00	1.321	7.06	1.17	3.75
0946	23.01	1.316	7.07	0.65	5
0950	22.99	1.314	7.07	0.24	6.75
0953	23.02	1.313	7.06	0.52	7.75
0957	23.04	1.311	7.06	0.32	9.25
1000	23.04	1.311	7.06	0.37	10

1005 COLLECT LAB QC MY8XX3/X4

1010 GOTO MW-12.

1025 AT MW-12 DTW= 42.10'

PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS
1025	21.88	2.491	6.98	7.36	0.5
1029	22.70	2.487	6.93	3.11	1.5
1033	23.33	2.492	6.95	2.43	2.25
1039	24.12	2.496	6.95	3.97	3.25
1043	24.02	2.497	6.95	6.21	4
1047	24.32	2.496	7.00	6.66	4.5
1051	24.69	2.503	6.96	8.52	4.75

8/1/13 GCOU M. LADEAU H. JUNG

Contd from MW-12

Time	temp	EC	pH	Turb	Gals
1055	23.65	2.520	6.96	9.33	6.25
1059	23.62	2.507	6.95	7.45	7.25
1103	24.10	2.501	6.95	6.06	8.25
1107	24.49	2.480	6.95	5.89	9
1111	24.60	2.455	6.96	5.07	10

1115 COLLECT SAMPLES MY8XX5/X6
1125 FILL BLANKS MY8XX7/X8.
1145 GO TO AETL TO DROP OFF CR6 SAMPLES.
1230 DONE FOR DAY.

8/2/13 GCOU M. LADEAU H. JUNG

0615 AT BOU. DUMP PURGE WATER.
0715 AT CS-C34-065. DTW=43.67
CALIBRATE EQUIPMENT

Meter	Standard	Calto	reading
YSI 556	10.0 mS/cm	10.0	10.0
	4 Ph	4	3.98
	7 Ph	7	7.01
	10 Ph	10	10.09
Helamotte	1 NTU	1	1.00
	10 NTU	10	9.97

0739 pump on

Time	temp	EC	Ph	Turb	Gals
0741	22.01	1.147	6.99	58.0	1.75
0745	22.38	1.147	6.99	163	3.5
0749	22.57	1.148	7.00	136	4.75
0753	22.80	1.147	7.00	81.4	6.5
0757	22.92	1.147	7.00	74.6	7.5
0801	22.97	1.145	7.00	113	8
0806	22.99	1.144	7.00	93.8	9.25
0810	23.03	1.143	7.00	70.1	10.5

0815 COLLECT SAMPLES MY8XX9/Y0
0825 COLLECT DUPS MY8XY1/Y2

8/2/13 GCOU M. LADEAU H. SUNG

0830 AT CS-C36-055 DTW = 34.18
PUMP ON

TIME	TEMP	EC	PH	TURB	GALS
0838	20.70	1.067	7.17	43.3	0.5
0842	21.32	1.066	7.11	50.4	2
0846	21.70	1.067	7.12	83.4	3.25
0850	21.75	1.0607	7.11	62.2	4
0854	21.73	1.067	7.10	18.2	5.25
0858	21.76	1.067	7.09	11.5	6.5
0902	21.76	1.067	7.09	6.5	7.75
0906	21.78	1.066	7.10	3.46	8.75

0910 COLLECT SAMPLES MY8XY3/Y4
0920 AT CS-C37-035 DTW = 15.45'
PUMP ON

TIME	TEMP	EC	PH	TURB	GALS
0930	21.08	0.949	7.31	133	0.75
0934	21.36	0.943	7.16	122	1.5
0938	21.65	0.944	7.17	57.9	3
0942	21.70	0.943	7.16	35.5	4
0946	21.70	0.943	7.15	22.1	5.25
0950	21.75	0.944	7.14	14.4	7.25
0954	21.7	0.944	7.15	13.4	8

8/2/13 GCOU M. LADEAU H. SUNG

1000 COLLECT SAMPLES MY8XY5/Y6
1010 COLLECT DUP MY8XY7/Y8

1015 AT CS-C35-041 DTW = 18.09
PUMP ON.

TIME	TEMP	EC	PH	TURB	GALS
1018	21.40	1.017	7.39	10.87	0.5
1022	21.43	1.003	7.12	100.8	1.25
1026	21.76	1.003	7.11	149	2.25
1030	21.61	1.002	7.12	125	3.25
1034	21.64	1.003	7.13	90.1	4.75
1038	21.60	1.005	7.14	64.1	6.25
1042	21.56	1.005	7.13	39.5	7.75
1046	21.56	1.006	7.12	26.1	9
1050	21.53	1.006	7.12	15.7	10.5

1055 COLLECT MY8XY9/Z0
1110 FILL BLANK MY8XZ1/Z2
PACKAGE SAMPLES FOR FEDEX
1300 DONE FOR DAY.

8/5/13 GCOU M. LADEAU H. JUNG

0615 AT BOU. LOAD EQUIPMENT
0735 Calibrate equipment

meter	standard	Calto	Readings
YSI556	10.0 mS/cm	10.0	10.0
	4 PH	4	3.98
	7 PH	7	7.01
	10 PH	10	10.04
LaMotte	1 NTU	1.0	0.83
	10 NTU	10.0	9.89

0752 at DRC-MW6 DTW= 56.23
PUMP ON

TIME	TEMP	EC	PH	TURB	GALS
0800	20.98	1.177	7.23	73.1	0.75
0804	21.86	1.180	7.23	60.6	1.75
0808	21.21	1.181	7.22	96.5	3
0812	22.35	1.182	7.22	127	4
0816	22.45	1.182	7.22	126	5.25
0820	22.49	1.182	7.21	97.8	6.25
0824	22.59	1.181	7.21	92.6	7.25
0828	22.63	1.181	7.21	92.6	8.25
0832	22.65	1.181	7.20	63.3	9.5
0836	22.72	1.180	7.20	43.0	10.75
0840	22.77	1.180	7.20	48.1	11.75

8/5/13 GCOU M. LADEAU H. JUNG

0845 COLLECT LAB QC MY8X23/24
0900 AT DRC-MW5 DTW= 59.22
PUMP ON

TIME	TEMP	EC	PH	TURB	GALS
0914	21.91	1.305	7.02	6.14	1.75
0918	22.18	1.307	7.01	2.72	3.25
0922	22.54	1.304	7.00	2.06	4
0926	22.80	1.306	7.01	1.35	5
0930	22.94	1.305	7.00	1.77	6.5
0934	22.88	1.304	7.00	1.02	7.5
0938	22.82	1.304	7.00	1.38	8

0940 COLLECT SAMPLES MY8X25/26
0950 COLLECT DUP MY8X27/28
1005 AT DRC-MW3 DTW= 61.24
PUMP ON

TIME	TEMP	EC	PH	TURB	GALS
1016	20.28	2.309	7.11	9.05	0.75
1020	22.08	1.580	7.06	16.7	2.5
1024	22.22	1.332	6.99	9.40	3.5
1028	22.72	1.264	6.99	4.23	4
1032	22.85	1.240	6.98	2.54	5.25
1036	22.88	1.232	6.98	1.67	6.25
1040	22.94	1.220	6.98	1.36	7

Continued on next page

8/5/13 GCOU M. LADERA M. SUNG

Time	Temp	EC	pH	Turb	Gals
1044	23.00	1.209	6.97	1.36	8
1048	23.07	1.206	6.97	0.99	9
1052	23.00	1.222	6.96	1.35	10.25
1056	22.16	1.177	6.93	1.20	11

1100 COLLECT MY8XZ9/MY8Y00.

1110 AT DRC-MW2 DTW=61.83

1120 pump on

Time	temp	EC	PH	Turb	Gals
1123	21.34	1.223	6.57	7.27	0.5
1127	22.15	1.215	6.55	4.56	1.5
1131	22.77	1.173	6.64	2.57	2.5
1135	22.75	1.162	6.66	2.11	3.5
1139	22.66	1.155	6.65	1.71	4.25
1143	22.66	1.152	6.66	1.50	6
1147	22.65	1.144	6.67	1.09	7.5
1151	22.68	1.138	6.70	0.94	8

1155 collect samples ~~for~~ MY8Y01/02

1215 FILL BLANK MY8YD3/04

1300 GO TO AETC

8/6/13 GCOU M. LADERA M. SUNG

0800 AT DRC-MW4 DTW=60.52

CALIBRATE EQUIPMENT

meter	standard	Cal to	readings
YSI 556	10.0 mS/cm	10.0	10
	4 PH	4	4.1
	7 PH	7	6.99
	10 PH	10	10.02
LaMotte	1 NTU	1	1.03
	10 NTU	10	9.98

0840 pump on

Time	temp	EC	PH	Turb	Gals
0848	21.37	1.234	7.04	17.2	1.5
0852	22.04	1.237	7.15	12.3	2.5
0856	22.24	1.236	7.15	12.1	3.75
0900	22.36	1.236	7.15	10.17	5.25
~~0946~~ 0904	22.38	1.235	7.15	8.68	6.5
0908	22.43	1.234	7.16	7.63	7.25
0912	22.52	1.234	7.15	6.13	8.5
0916	22.54	1.232	7.16	5.77	9.5

0920 COLLECT SAMPLES MY8YØ5/06

CONTENTS

PAGE	REFERENCE	DATE

Location GCOU Date 8/6/13

Project / Client Mike Ladeau
Hun Jung

0930 at DWB-MW1, DTW = 58.95
0940 pump on

Time	temp	EC	pH	Turb	Gals
0941	21.56	1.215	7.12	90.5	0.75
0945	22.24	1.219	7.03	103.4	2
0949	22.74	1.222	7.08	67.6	3.5
0954	23.11	1.222	7.10	35.9	4.5
0958	23.15	1.226	7.07	31.4	5.5
1002	23.16	1.229	7.08	20.6	6.5
1006	23.19	1.232	7.07	15.7	7.5
1010	23.21	1.235	7.10	12.7	8.5
1014	23.27	1.236	7.08	10.9	9.75

1020 Collect Samples MY8Y07/08
1030 DWB-W3 DTW = 58.65'
TD = 61.10'
1040 Collect Samples MY8Y09/10
W/ Blank
1410 at ~~DRG~~ WB-MW1 DTW = 60.23
1420 pump on

Location GCOU Date 8/6/13

Project / Client Mike Ladeau
Hun Jung

Time	temp	Ec	PH	Turb	Gals
1424	21.87	1.334	7.29	21.6	0.75
1428	22.46	1.314	6.97	6.37	2.75
1432	22.52	1.313	7.03	5.64	3.75
1436	22.59	1.312	7.10	5.08	4.75
1440	22.60	1.310	7.07	4.45	6.75
1444	22.63	1.309	7.07	4.57	7.25
1448	22.68	1.309	7.06	3.96	8.25

1450 collect Samples MY8Y11 / 12
1505 Fill Blank MY8Y13 / 14

1530 GO TO LAB AND FEDEX

Location GCOU Date 8/7/13

Project / Client Mike Ladeau
Hun Jung

0600 At BOU, Dump Purge water
0700 at CS-C43-038
set up Traffic control
0715 calibrate Equipments

Meter	Standard	cal to	readings
YSI 556	10.0 mS/cm	10	10
	4 PH	4	3.98
	7 PH	7	7.01
	10 PH	10	10.06
Lamotte	1 NTU	1	1.01
(2020E)	10 NTU	10	9.98

0714 CSC43083 DTW = 61.90
0730 pump on

Time	temp	PH	EC	Turb	Gals
0734	20.41	7.27	1.124	30.7	0.75
0738	20.95	7.24	1.123	54.2	1.75
0742	21.68	7.24	1.125	83.9	3
0746	21.85	7.23	1.125	62.1	4
0750	21.93	7.22	1.125	33.1	5.75
0758	22.01	7.22	1.125	25.1	8.75
0803	22.02	7.22	1.124	24.5	9.75

continued on next page

Location GCOU Date 8/7/13

Project / Client Mike Ladeau
Hun Jung

Time	temp	PH	EC	Turb	Gals
0807	22.06	7.22	1.125	23.0	10.75
0811	22.07	7.21	1.124	28.5	11.75
0815	22.06	7.21	1.125	24.4	13

0820 Collect Sample MY8Y15 / 16
0840 At DRC-MW8 DTW = 60.28
0842 pump on

Time	Temp	EC	PH	Turb	Gals
0846	20.65	1.201	7.35	12.9	1
0850	21.74	1.198	7.31	14.0	2.5
0856	21.80	1.200	7.33	14.6	4
0900	22.20	1.196	7.30	10.01	5.5
0904	22.24	1.194	7.30	10.96	6.5
0908	22.23	1.192	7.29	13.0	8
0912	22.36	1.196	7.29	11.0	9
0916	22.31	1.198	7.30	11.1	10.5

0920 Collect samples MY8Y17/18
0930 Collect Dup MY8Y19/20

Location GCOU Date 8/7/13

Project / Client Mike Ladeau
Hun Jung

0940 at DRC-MW7 DTW = 57.33

Time	temp	EC	PH	Turb	Gals
0951	21.94	1.199	7.51	6.25	0.5
0956	21.13	1.196	7.36	3.04	1.25
1000	23.51	1.199	7.37	6.25	2.5
1004	23.71	1.200	7.38	8.13	3.25
1008	23.76	1.200	7.37	7.89	4
1012	23.77	1.199	7.36	8.65	5
1016	23.83	1.198	7.36	8.78	6
1020	23.92	1.198	7.36	7.15	7

1025 Collect Samples MY8Y21/22

1050 at CSC39-073 DTW = 52.43
1054 pump on

Time	temp	EC	PH	Turb	Gals
1056	22.01	1.120	7.58	0.52	0
1100	21.23	1.105	7.12	112	1.5
1104	21.85	1.105	7.17	158	3.5
1108	22.11	1.105	7.17	165	4
1112	22.18	1.106	7.18	58.6	5.5
1116	22.22	1.105	7.18	12.3	6.5
1120	22.25	1.105	7.18	6.38	7.5

Location GCOU Date 8/7/13

Project / Client Mike Ladeau
Hun Jung

1125 Collect Samples MY8Y23/24
1135 Fill Blank MY8Y25/26

Location GCOU Date 8/8/13

Project / Client Mike Ladeau
Hun Jung

0600 At Bou, Dump Purge Water
0714 DRC-MW-9 DTW = 59.75
0717 Calibrate Equipments

Meter	Standard	Cal to	readings
YSI556	10 mS/cm	10	9.99
	4 PH	4	3.96
	7 PH	7	7.04
	10 PH	10	10.01
Lamotte (2020E)	1 NTU	1	0.98
	10 NTU	10	9.97

0735 pump on

Time	Temp	EC	pH	Turb	Gals
0737	20.71	0.625	6.41	14.1	0.75
0741	20.67	0.625	6.25	8.10	2.25
0746	22.48	0.655	6.28	17.0	3.5
0754	22.71	0.702	6.30	14.6	5.5
0759	22.74	0.738	6.31	13.3	7
0803	22.74	0.763	6.31	11.2	8
0807	22.83	0.789	6.32	10.74	9
0811	22.84	0.804	6.33	8.29	10

0815 Collect samples MY8Y27/28

Location GCOU Date 8/8/13

Project / Client Mike Ladeau
Hun Jung

0855 at POUPB01 DTW = 26.35
0901 pump on

Time	temp	EC	PH	Turb	Gals
0906	23.29	1.023	6.6	337	1
0910	21.65	1.026	6.76	91.3	43
0914	21.45	1.022	6.57	24.7	86
0918	21.45	1.018	6.54	9.14	129

0920 Collect Samples MY8 Y29/30

1030 AT GPP-MW4 DTW = 38.27
1104 Pump ON

TIME	TEMP	EC	PH	TURB	GALS
1106	21.01	1.143	6.68	6.95	1
1110	21.75	1.143	6.72	6.71	3
1114	22.30	1.144	6.74	2.13	4
1118	22.41	1.144	6.77	1.19	5
1122	22.42	1.143	6.80	0.96	6.5
1126	22.49	1.143	6.74	0.43	7.5

1130 Collect samples MY8 Y31/32

Location GCOU Date 8/8/13

Project / Client M. LADEAU
H. JUNG

1140 AT GPP-MW7 DTW = 37.61
PUMP ON

TIME	TEMP	EC	PH	TURB	GAS
1149	22.35	1.325	6.48	13.1	0.5
1153	22.37	1.319	6.38	6.61	2
1159	22.50	1.321	6.37	3.32	4
1203	22.51	1.321	6.37	3.14	5
1207	22.52	1.318	6.38	2.67	7
1211	22.55	1.318	6.39	2.06	8
1215	22.53	1.317	6.40	1.82	9
1218	22.51	1.318	6.40	1.91	9.75

~~1230~~
1220 ~~Sam~~ Collect Samples

OTIE Daily Field Record

DAILY FIELD RECORD

OTIE

Project and Task Number: 2013152	Date: 11/11/13
Project Name: Glendale Chromium	Field Activity: Groundwater Sampling
Location: Burbank	Weather: AM → 50's, Sunny

PERSONNEL: Name	Company	Time In	Time Out
Geoff Brink	OTIE	0630	1530
Manny Vasquez	OTIE	0630	1530
Mike LaDue	CH2M Hill	0630	1500

PERSONAL SAFETY CHECKLIST

X	Steel-toed Boots	–	Hard Hat	–	Tyvek Coveralls
X	Rubber Gloves	X	Safety Goggles	–	1/2-Face Respirator

DRUM I.D.	DESCRIPTION OF CONTENTS AND QUANTITY	LOCATION

TIME	DESCRIPTION OF WORK PERFORMED
0630	Geoff Brink, and Manny Vasquez (OTIE) meet Mike LaDue at the Burbank OU Treatment Plant, sign in at office, then head to storage container.
0700	Conduct H&S tailgate and initial site info. Collect purge water drum and delineators from storage container.
0730	Stop at Ralph's to get ice and DI water.
0860	Arrive at PWA-2, located on north end of "Dead End" street off of Front Street.
0836	Pump stops working, pull all equipment from downhole to test all equipment. Pump was burned up, so replaced with the additional motor that was sent. Called Field Eng. Inc. and spoke with Gary Yamron to discuss the issues. Said to run it off the car battery, not a deep cell marine battery. Will look into getting a backup pump on-site.
0920	Resume purging at PWA-2
0955	Complete activities at PWA-2, mobe to PWA-3

DAILY FIELD RECORD (continued)

OTIE

Project and Task Number: 2013152

Date: 11/11/13

TIME	DESCRIPTION OF WORK PERFORMED
1015	Begin purging at PWA-3, south side, off of Front Street
1100	End sampling activities at PWA-3
1120	Arrive at PWA-1, located in the parking lane of
	Chandler St., next to Toys "R" Us.
1135	Begin Purging at PWA-1
1210	End Sampling activities at PWA-1 move to PWA-5.
1220	Arrive at PWA-5, on the corner of Chandler Blvd.
	and Orchard Drive. Address is 742.
1230	Begin purging PWA-5
1300	End sampling activities at PWA-5
1330	Arrive at PWA-8, after indentifying PWA-4 and PWA-13
	were parked on. PWA-8 is located in an alley of
	of Allen Ave and Victory Blvd.
1340	Begin purging PWA-8.
1415	End sampling activities at PWA-8
1440	Arrive back at BOU Treatment Plant to off-load purge water
	Access to System sump to dump purge water was
	denied, due to lack of "advanced notice". Move to
	storage container to store purge water and equipment
	until tomorrow. Mike Ladue contacted David Towell (CH2M Hill)
	about advanced notice, and it has never been required
	for the quarterly events. Will contact the Plant Manager
	tomorrow for further details.
1500	Collect equipment blank.
1530	Depart BOU Treatment Plant

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form

Rev. 1.062613

Date/Time: 11/11/13 -> 0700 **Project Number:** 2013152

Project Name: San Fernando Valley Superfund Sites **Contract No:** EP-S9-13-01

Project Location:

Client: U.S. EPA **Client Phone:**

Type of Work: Groundwater sampling

OPERATIONS and QUALITY	Yes	No	N/A
Tasks to be performed (include the definable features of work)	X		
Critical path items (schedule, client interaction, project coordination)	X		
Subcontractors on site today			X
Other visitors expected on site	X		
Material/Equipment deliveries expected and storage areas	X		
Applicable information from Base Operations or client (as needed)			X
Review of As Builts/Layout Plans, if applicable	X		
Operational / Quality Deficiencies to discuss (refer to Daily Quality Control Report from day before and other inspection reports)	X		
Other:			

SAFETY	Yes	No	N/A
Protective Clothing/Equipment Level: (D) C B A (circle appropriate) As applicable, head, eye, ear, respiratory, other protection	X		
Contaminants and hazardous materials anticipated	X		
Chemical exposure issues anticipated	X		
Work zones and methods of security	X		
Decontamination procedures (equipment and personnel)	X		
General safe work practices	X		
GOOD CATCHES and any safety deficiencies or Near Misses (if yes, provide explanation below)			
Other:			
Other:			
Emergency Procedures:			
Hospital Name: Glendale Memorial **Hospital Phone:**			

ENVIRONMENTAL COMPLIANCE	Yes	No	N/A
Environmental Protection Plan	X		
• Preservation of existing conditions in surrounding water and land			
• Dust quality monitoring			
• Spill prevention and response			
• Promote recycling, waste prevention, minimization and energy conservation	X		
Waste Management Plan			
• Storage, shipping, disposal of general waste			
• Storage, shipping, disposal of hazardous waste			
• Recordkeeping			
• NO Waste should be kept on site for more than 90 Days			X
Stormwater Pollution Prevention Plan			
• Periodic BMP Inspection Checklist			
• Post-Rain Inspection			
• Other			

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form
Rev. 1.062613

EXPLANATIONS/NOTES

ATTENDEES

The following personnel were present for discussion of the topics listed above and have read and understand the contents of the Site Accident Prevention Plan/AHAs/Site Safety and Health Plan.

NAME	COMPANY	SIGNATURE
Geoffrey Brink	OTIE	
Emmanuel Rosario	OTIE	
MIKE LADEAU	CH2M HILL	

Meeting Conducted By:

DAILY FIELD RECORD

OTIE

Project and Task Number: 2013152	Date: 11/12/13
Project Name: Glendale Chromium	Field Activity: Groundwater Sampling
Location:	Weather: AM→ 50's, sunny

PERSONNEL: Name	Company	Time In	Time Out
Geoff Brink	OTIE	0615	1430
Manny Vasquez	OTIE	0615	1430
Mike LaDue	CH2M Hill	0630	1400

PERSONAL SAFETY CHECKLIST

X	Steel-toed Boots	—	Hard Hat	—	Tyvek Coveralls
X	Rubber Gloves	X	Safety Goggles	—	1/2-Face Respirator

DRUM I.D.	DESCRIPTION OF CONTENTS AND QUANTITY	LOCATION

TIME	DESCRIPTION OF WORK PERFORMED
0615	Geoff Brink + Manny Vasquez arrive at the BOU Treatment Plant.
0630	Mike LaDue arrives, everyone signs in to the BOU treatment plant, and makes to the storage container
0640	Conduct daily H+S meeting, then load equipment from container into sampling vehicle.
0650	Make to PWA-4, and set-up for the first well.
0715	Begin purging at PWA-4
0740	End sampling activities at PWA-4, make to CS-C40-079
0805	Begin purging at CS-C40-079
0840	Complete sampling activities at CS-C40-079, make to PWA-10.
0845	Nova Clite (OTIE PM) calls, provide her with the status update of activities from yesterday and this morning.
0900	Begin purging at PWA-10
0955	Complete sampling activities at PWA-10. Make to V13DRMW7
1000	Recieved call from FEI courier, he is en-route with a replacement motor for the sampling pump.

DAILY FIELD RECORD (continued)

OTIE

Project and Task Number: 2013152

Date: 11/12/13

TIME	DESCRIPTION OF WORK PERFORMED
1020	Begin purging at V13DRMW7.
1050	Complete sampling activities at V13DRMW7 make to V13DRMW8, about 100 yds. up the street.
1105	Begin sampling at V13DRMW8.
1110	Spoke with Tania Mahmoudpour with Quixote Studios, and we are all set for access on Wednesday (11/13/13) after 6:00 am.
1145	Complete sampling activities at V13DRMW8, make to V13DRMW6
1220	Begin purging at V13DRMW6.
1235	Mike LaDue takes me on a ~~we~~ Site Walk for the ~~Dryclube~~ Drilube facility Vapor and Groundwater wells.
1305	Complete sampling activities at V13DRMW6. Make back to the BOU treatment compound.
1330	Arrive at the BOU treatment compound, and have been cleared to off-load all purge water. For future events, they requested a one week notice to both Albert and Charles (CADT Managers). Will also list the sampled wells on the water off-load sign-in sheet.
1410	Collect Equipment Blank, and stage all equipment at the storage container.
1430	Depart BOU Treatment Compound.

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form

Rev. 1.062613

Date/Time: 11/12/13 **Project Number:** 2013152

Project Name: San Fernando Valley Superfund Sites **Contract No:** EP-S9-13-01

Project Location: Glendale and Burbank

Client: U.S. EPA **Client Phone:**

Type of Work: Groundwater Sampling

OPERATIONS and QUALITY	Yes	No	N/A
Tasks to be performed (include the definable features of work)	X		
Critical path items (schedule, client interaction, project coordination)	X		
Subcontractors on site today			—
Other visitors expected on site	X		
Material/Equipment deliveries expected and storage areas			—
Applicable information from Base Operations or client (as needed)			—
Review of As Builts/Layout Plans, if applicable			—
Operational / Quality Deficiencies to discuss (refer to Daily Quality Control Report from day before and other inspection reports)	X		
Other:			

SAFETY	Yes	No	N/A
Protective Clothing/Equipment Level: (D) C B A (circle appropriate) As applicable, head, eye, ear, respiratory, other protection	X		
Contaminants and hazardous materials anticipated	X		
Chemical exposure issues anticipated	X		
Work zones and methods of security	X		
Decontamination procedures (equipment and personnel)	X		
General safe work practices	X		
GOOD CATCHES and any safety deficiencies or Near Misses (if yes, provide explanation below)			
Other:			
Other:			
Emergency Procedures:			
Hospital Name: Glendale Memorial **Hospital Phone:**			

ENVIRONMENTAL COMPLIANCE	Yes	No	N/A
Environmental Protection Plan	X		
• Preservation of existing conditions in surrounding water and land			
• Dust quality monitoring			
• Spill prevention and response			
• Promote recycling, waste prevention, minimization and energy conservation			
Waste Management Plan	X		
• Storage, shipping, disposal of general waste			
• Storage, shipping, disposal of hazardous waste			
• Recordkeeping			
• NO Waste should be kept on site for more than 90 Days			
Stormwater Pollution Prevention Plan			—
• Periodic BMP Inspection Checklist			
• Post-Rain Inspection			
• Other			

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form
Rev. 1.062613

EXPLANATIONS/NOTES

ATTENDEES

The following personnel were present for discussion of the topics listed above and have read and understand the contents of the Site Accident Prevention Plan/AHAs/Site Safety and Health Plan.

NAME	COMPANY	SIGNATURE
Geoff Brink	OTIE	
Emmanuel Vasquez	OTIE	
MIKE LADEAU	CH2M HILL	

Meeting Conducted By:

DAILY FIELD RECORD

OTIE

Project and Task Number: 2013152	Date: 11/13/13
Project Name: Glendale Chromium	Field Activity: Groundwater Sampling
Location: Glendale / Burbank	Weather: AM->Sunny 60's

PERSONNEL: Name	Company	Time In	Time Out
Geoff Brink	OTIE	0615	1500
Manny Vasquez	OTIE	0800	1500
Mike LaDue	CH2M Hill	0630	1400

PERSONAL SAFETY CHECKLIST

X	Steel-toed Boots	—	Hard Hat	–	Tyvek Coveralls
X	Rubber Gloves	X	Safety Goggles	–	1/2-Face Respirator

DRUM I.D.	DESCRIPTION OF CONTENTS AND QUANTITY	LOCATION

TIME	DESCRIPTION OF WORK PERFORMED
0615	Geoff Brink arrives at the BOU Treatment Plant.
0625	Call with Manny, he informs me he's running about 1-Hr late.
0635	Mike LaDue arrives, as we head into the storage unit, we are informed of a carbon change-out in progress, and access is blocked. We are told to enter through the Gate associated with the Glendale Water Department (off of Hollywood Way)
0650	Arrive at Storage container, begin packing samples for shipment today, as well as loading up all sampling equipment.
0740	Make back to the front of the BOU treatment plant to meet with Manny.
0800	Manny arrives at the BOU Treatment Plant. Make to first well of the day.
0820	Arrive at PWA-13, calibrate Horiba U-52 and set-up to collect samples.

DAILY FIELD RECORD (continued)

OTIE

Project and Task Number: 2013152 | Date: 11/13/13

TIME	DESCRIPTION OF WORK PERFORMED
0850	Geoff Brink leaves well site to pick up plumbing supplies for the purge water tank. Leave Manny and Mike to complete well sampling.
0930	Contact John Escudero (City of Glendale) at the Grayson Power Plant to discuss access. He was in a meeting, so left a message.
1000	Make to Quiete Studios, set-up on V13EEMW1.
1010	Geoff Brink and Mike Cadue make to Home Depot, to complete plumbing on the purge water tank.
	~~Complete~~
1040	Notified of sampling protocol change for Hex Chrome samples. Samples will now be carried to CalScience on a daily basis. All Hex Chrome samples ~~will have~~ from monday and tuesday (11/11 + 11/12) will need to be re-collected, since they have exceeded the 24-hr hold time. Will go forward today, collecting Hex Chrome samples in "rinsed out" preserved polys. CalScience will deliver new bottles at their next pick-up.
~~1000~~ 1055	Complete sampling activities at V13MEE1, make to V13MEE3.
1055	Complete sampling activities at V13MEE3 make to V13MEE4
1235	Complete sampling activities at V13MEE4, make to CS-C34-065
1315	Complete sampling activities at CS-C34-065, remob to PWIA-13 to collect an un-preserved Hex Chrome sample
1350	Complete re-sampling at PWIA-13, make to BOU treatment plant
1415	Arrive at BOU treatment plant, drop off purge water, then proceed to the storage container, to off-load all equipment.
1430	Collect equipment blank
1500	Meet CalScience for exchange of Hex Chrome samples. Manny proceeds to drop all CLP samples at FedEx for shipment.
1520	Geoff Brink departs site.

OTIE
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Safety and Operations Tailgate Meeting Form

Rev. 1.062613

Date/Time: 11/13/13 **Project Number:** 2013152

Project Name: San Fernando Valley Superfund Sites **Contract No:** EP-S9-13-01

Project Location: Glendale / Burbank

Client: U.S. EPA **Client Phone:**

Type of Work: Groundwater Sampling

OPERATIONS and QUALITY	Yes	No	N/A
Tasks to be performed (include the definable features of work)	X		
Critical path items (schedule, client interaction, project coordination)	X		
Subcontractors on site today			—
Other visitors expected on site	X		
Material/Equipment deliveries expected and storage areas	X		
Applicable information from Base Operations or client (as needed)			
Review of As Builts/Layout Plans, if applicable			—
Operational / Quality Deficiencies to discuss (refer to Daily Quality Control Report from day before and other inspection reports)	X		
Other:			

SAFETY	Yes	No	N/A
Protective Clothing/Equipment Level: (D) C B A (circle appropriate) As applicable, head, eye, ear, respiratory, other protection	X		
Contaminants and hazardous materials anticipated	X		
Chemical exposure issues anticipated	X		
Work zones and methods of security	X		
Decontamination procedures (equipment and personnel)	X		
General safe work practices	X		
GOOD CATCHES and any safety deficiencies or Near Misses (if yes, provide explanation below)			
Other:			
Other:			
Emergency Procedures:			
Hospital Name: Glendale Memorial **Hospital Phone:**			

ENVIRONMENTAL COMPLIANCE	Yes	No	N/A
Environmental Protection Plan	X		
• Preservation of existing conditions in surrounding water and land			
• Dust quality monitoring			
• Spill prevention and response			
• Promote recycling, waste prevention, minimization and energy conservation	X		
Waste Management Plan			
• Storage, shipping, disposal of general waste			
• Storage, shipping, disposal of hazardous waste			
• Recordkeeping			
• NO Waste should be kept on site for more than 90 Days			
Stormwater Pollution Prevention Plan			—
• Periodic BMP Inspection Checklist			
• Post-Rain Inspection			
• Other			

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form
Rev. 1.062613

EXPLANATIONS/NOTES

ATTENDEES

The following personnel were present for discussion of the topics listed above and have read and understand the contents of the Site Accident Prevention Plan/AHAs/Site Safety and Health Plan.

NAME	COMPANY	SIGNATURE
Geoff Brink	OTIE	
Emmanuel Vasquez	OTIE	

Meeting Conducted By:

DAILY FIELD RECORD

OTIE

Project and Task Number: 2013152	Date: 11/14/13
Project Name: Glendale Chromium	Field Activity: Groundwater Sampling
Location: Glendale / Burbank	Weather: AM → Sunny, 70's

PERSONNEL: Name	Company	Time In	Time Out
Geoff Brink	OTIE	0620	1440
Manny Vasquez	OTIE	0620	1440
Mike LeDuc	CH2M Hill	0620	1400

PERSONAL SAFETY CHECKLIST

X	Steel-toed Boots	—	Hard Hat	—	Tyvek Coveralls
X	Rubber Gloves	X	Safety Goggles	—	1/2-Face Respirator

DRUM I.D.	DESCRIPTION OF CONTENTS AND QUANTITY	LOCATION

TIME	DESCRIPTION OF WORK PERFORMED
0620	Arrive at BDU treatment plant, check in at office and proceed to storage container. Conduct H&S meeting.
0640	All equipment has been collected, mobe to PWA-2 and PWA-3 to re-collect Hex Chrome samples. This will allow time before the "no parking" time frame sets in at the next few wells.
0810	Arrive at V13DRMW9, and set-up to sample.
0845	Complete sampling activities at V13DRMW9, mobe to PWA-6, about 100 yds. up the street.
0940	Complete sampling activities at PWA-6, mobe to PWA-12, about 10 yds up the street.
1005	Contacted Chean Young of the New Life Vision Church and set-up a time to sample 4 wells on his property for Monday (11/18) morning around 700 AM.
1030	Attempted to contact Laura Bancroftfield to access CS-C38-051 located in Griffith Park, left a message.

DAILY FIELD RECORD (continued)

OTIE

Project and Task Number: 2013152

Date: 11/14/13

TIME	DESCRIPTION OF WORK PERFORMED
1035	Complete sampling activities at PWA-12, Mobe to CS-41-058.
1055	Attempted to contact Chris Berg (ERM) to schedule sampling activities at three of their wells, left a message.
1120	Complete sampling activities at CS-41-058, mobe to CS-C33-059, but access is blocked, will re-schedule for Wednesday.
1150	Arrive at CS-C40-079 to resample for Hex Chrome.
1210	Talk with Raul (new contact) for City of LA Parks + Rec, he is coordinating access to Griffith Park at 1300.
1215	Arrive at PWA-8 to resample for Hex Chrome.
1250	Arrive at CS-C38-051, access gate was open upon arrival.
1330	Complete sampling activities at CS-C38-051. Notify Raul that we have completed all activities, and they can close/lock the gate. Mobe back to BOU treatment plant.
1400	Arrive back at BOU treatment plant, sign-in, then begin purge water off-load.
1425	Collect equipment blank
1430	Depart BOU treatment plant to meet CalScience courier.
1440	Depart Site.

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form

Rev. 1.062613

Date/Time: 11/14/13 **Project Number:** 2013152

Project Name: San Fernando Valley Superfund Sites **Contract No:** EP-S9-13-01

Project Location: Glendale / Burbank

Client: U.S. EPA **Client Phone:**

Type of Work: Groundwater sampling

OPERATIONS and QUALITY	Yes	No	N/A
Tasks to be performed (include the definable features of work)	X		
Critical path items (schedule, client interaction, project coordination)	X		
Subcontractors on site today	X		
Other visitors expected on site			—
Material/Equipment deliveries expected and storage areas			
Applicable information from Base Operations or client (as needed)			
Review of As Builts/Layout Plans, if applicable			—
Operational / Quality Deficiencies to discuss (refer to Daily Quality Control Report from day before and other inspection reports)	X		
Other:			

SAFETY	Yes	No	N/A
Protective Clothing/Equipment Level: (D) C B A (circle appropriate) As applicable, head, eye, ear, respiratory, other protection	X		
Contaminants and hazardous materials anticipated	X		
Chemical exposure issues anticipated	X		
Work zones and methods of security	X		
Decontamination procedures (equipment and personnel)	X		
General safe work practices	X		
GOOD CATCHES and any safety deficiencies or Near Misses (if yes, provide explanation below)			
Other:			
Other:			
Emergency Procedures:			
Hospital Name: Glendale Memorial **Hospital Phone:**			

ENVIRONMENTAL COMPLIANCE	Yes	No	N/A
Environmental Protection Plan	X		
• Preservation of existing conditions in surrounding water and land			
• Dust quality monitoring			
• Spill prevention and response			
• Promote recycling, waste prevention, minimization and energy conservation	X		
Waste Management Plan			
• Storage, shipping, disposal of general waste			
• Storage, shipping, disposal of hazardous waste			
• Recordkeeping			
• NO Waste should be kept on site for more than 90 Days			—
Stormwater Pollution Prevention Plan			
• Periodic BMP Inspection Checklist			
• Post-Rain Inspection			
• Other			

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Safety and Operations Tailgate Meeting Form
Rev. 1.062613

EXPLANATIONS/NOTES

ATTENDEES

The following personnel were present for discussion of the topics listed above and have read and understand the contents of the Site Accident Prevention Plan/AHAs/Site Safety and Health Plan.

NAME	COMPANY	SIGNATURE
Geoff Brink	OTIE	
Emmanuel Vasquez	OTIE	

Meeting Conducted By:

DAILY FIELD RECORD

OTIE

Project and Task Number: 2013152	Date: 11/15/13
Project Name: Glendale Chromium	Field Activity: Groundwater Sampling
Location: Glendale / Burbank	Weather:

PERSONNEL: Name	Company	Time In	Time Out
Geoff Brink	OTIE	0605	1145
Manny Vasquez	OTIE	0615	1115
Mike LaDue	CH2M Hill	0620	1000

PERSONAL SAFETY CHECKLIST

X	Steel-toed Boots	—	Hard Hat	X	Tyvek Coveralls
X	Rubber Gloves	X	Safety Goggles	X	1/2-Face Respirator

DRUM I.D.	DESCRIPTION OF CONTENTS AND QUANTITY	LOCATION

TIME	DESCRIPTION OF WORK PERFORMED
0605	Geoff Brink arrives at the BOU treatment plant, sign in, then head to the storage container to load up all equipment.
0615	Manny Vasquez arrives at BOU treatment plant, as I am leaving.
0620	Meet Mike LaDue outside of BOU treatment plant, and make to first well, CS-C42-059.
0640	Arrive at first well, conduct H&S meeting.
0650	Begin sampling activities at CS-C42-059.
0740	Complete sampling activities at CS-C42-059, make to CS-C35-041
0755	Begin sampling activities at CS-C35-041.
0840	Complete sampling activities at CS-C35-041, make to CS-C37-035.
0920	Complete sampling activities at CS-C37-035, make to CS-C36-055.
1015	Complete sampling activities at CS-C36-055. Make back to the BOU treatment plant.

DAILY FIELD RECORD (continued)

OTIE

Project and Task Number: 2013152

Date: 11/15/13

TIME	DESCRIPTION OF WORK PERFORMED
1040	Arrive at BOU treatment plant, sign in, and proceed to off-load all purge water.
1055	Unload all equipment at the storage container, and collect equipment blank.
1115	Manny departs site with samples, will head back at Ventura to complete chains and package samples for shipment. Geoff remains behind for final site clean-up, and preparation for next Monday.
1145	Geoff Drink departs the BOU treatment plant. Chris Berg (ERM) calls to discuss three well locations for next week. He will forward maps and contact information for each this afternoon.

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form

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Date/Time: 11/15/13 **Project Number:** 2013152

Project Name: San Fernando Valley Superfund Sites **Contract No:** EP-S9-13-01

Project Location: Glendale / Burbank

Client: U.S. EPA **Client Phone:**

Type of Work: Groundwater Sampling

OPERATIONS and QUALITY	Yes	No	N/A
Tasks to be performed (include the definable features of work)	X		
Critical path items (schedule, client interaction, project coordination)	X		
Subcontractors on site today			—
Other visitors expected on site	X		
Material/Equipment deliveries expected and storage areas	X		
Applicable information from Base Operations or client (as needed)			
Review of As Builts/Layout Plans, if applicable			—
Operational / Quality Deficiencies to discuss (refer to Daily Quality Control Report from day before and other inspection reports)	X		
Other:			

SAFETY	Yes	No	N/A
Protective Clothing/Equipment Level: (D) C B A (circle appropriate) As applicable, head, eye, ear, respiratory, other protection	X		
Contaminants and hazardous materials anticipated	X		
Chemical exposure issues anticipated	X		
Work zones and methods of security	X		
Decontamination procedures (equipment and personnel)	X		
General safe work practices	X		
GOOD CATCHES and any safety deficiencies or Near Misses (if yes, provide explanation below)			
Other:			
Other:			
Emergency Procedures:			
Hospital Name: Glendale Memorial **Hospital Phone:**			

ENVIRONMENTAL COMPLIANCE	Yes	No	N/A
Environmental Protection Plan	X		
• Preservation of existing conditions in surrounding water and land			
• Dust quality monitoring			
• Spill prevention and response			
• Promote recycling, waste prevention, minimization and energy conservation			
Waste Management Plan	X		
• Storage, shipping, disposal of general waste			
• Storage, shipping, disposal of hazardous waste			
• Recordkeeping			
• NO Waste should be kept on site for more than 90 Days			—
Stormwater Pollution Prevention Plan			
• Periodic BMP Inspection Checklist			
• Post-Rain Inspection			
• Other			

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Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form
Rev. 1.062613

EXPLANATIONS/NOTES

ATTENDEES

The following personnel were present for discussion of the topics listed above and have read and understand the contents of the Site Accident Prevention Plan/AHAs/Site Safety and Health Plan.

NAME	COMPANY	SIGNATURE
Geoff Brink	OTIE	
Emmanuel Vasquez	OTIE	

Meeting Conducted By:

DAILY FIELD RECORD

OTIE

Project and Task Number: 2013152	Date: 11/18/13
Project Name: Glendale Chromium	Field Activity: Groundwater Sampling
Location: Glendale / Burbank	Weather: AM → 50's, partly cloudy

PERSONNEL: Name	Company	Time In	Time Out
Geoff Brink	OTIE	0620	
Manny Vasquez	OTIE	0620	
Mike LaDue	CH2M Hill	0620	

PERSONAL SAFETY CHECKLIST

X	Steel-toed Boots	—	Hard Hat	—	Tyvek Coveralls
X	Rubber Gloves	X	Safety Goggles	—	1/2-Face Respirator

DRUM I.D.	DESCRIPTION OF CONTENTS AND QUANTITY	LOCATION

TIME	DESCRIPTION OF WORK PERFORMED
0620	Geoff Brink and Manny Vasquez arrive at the BOU treatment plant, sign-in, and proceed to the storage container.
0630	Conduct H&S meeting, calibrate Horiba water quality meter, and load up all sampling equipment.
0645	Depart BOU treatment plant for the New Life Vision Church property to sample 4 wells.
0705	Arrive at the church property, gate is open. Meet with Executive Pastor Joseph Oh, provide him with our sampling schedule, details, and EPA contact info.
0710	Begin sampling activities at FCR-OW3, no tubing in well, use some (50') of a fresh roll.
0750	Complete sampling activities at FCR-OW3, move to FCR-OW2. There is no tubing in FCR-OW2, so use the rest of the new roll, ≈50'.
0800	Mike LaDue takes me off the church property to investigate other wells for future sampling events.

DAILY FIELD RECORD (continued)

OTIE

Project and Task Number: 2013152

Date: 11/18/13

TIME	DESCRIPTION OF WORK PERFORMED
0920	Complete sampling activities at FCR-OW2, mobe to FCR-WCW4. No tubing in well, use a full 100' roll to get to the bottom of the well.
0930	Mike LaDue investigates FCR-WCW1 for tubing, finds that there isn't any. He mobes back to the EPA storage container for an extra roll.
1000	Complete sampling activities at FCR-WCW4, mobe to FCR-WCW1, Mike LaDue arrives on-site with extra tubing.
1055	Complete sampling activities at FCR-WCW1, lock the corner gate as we leave, the close the main gate as we exit (as directed). Mobe to Grayson Power Plant.
1120	Arrive at Glendale Water and Power, check in at main gate.
1130	Arrive at Grayson Power Plant, check-in with plant personal, including John Escudero. Proceed to the first well.
1215	Complete sampling activities at V13GPPW2, mobe to V13GPP13, inside the GOU treatment plant.
1300	Complete sampling activities at V13GPP13, sign-out of the Grayson Power Plant.
1310	Mobe to locate GM-P10
1355	Complete sampling activities at GM-P10, mobe back to BOU treatment plant.
1420	Arrive at BOU treatment plant, sign-in, and begin purge water off-load.
1435	Proceed to storage container to unload all equipment. Collect equipment blank.
1500	Geoff + Meany depart site and meet lab courier.

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Safety and Operations Tailgate Meeting Form

Rev. 1.062613

Date/Time: 11/18/13 **Project Number:** 2013152

Project Name: San Fernando Valley Superfund Sites **Contract No:** EP-S9-13-01

Project Location: Glendale/Burbank

Client: U.S. EPA **Client Phone:**

Type of Work: Groundwater sampling

OPERATIONS and QUALITY	Yes	No	N/A
Tasks to be performed (include the definable features of work)	X		
Critical path items (schedule, client interaction, project coordination)	X		
Subcontractors on site today	X		
Other visitors expected on site	X		
Material/Equipment deliveries expected and storage areas			—
Applicable information from Base Operations or client (as needed)			
Review of As Builts/Layout Plans, if applicable	X		
Operational / Quality Deficiencies to discuss (refer to Daily Quality Control Report from day before and other inspection reports)	X		
Other:			

SAFETY	Yes	No	N/A
Protective Clothing/Equipment Level: (D) C B A (circle appropriate) As applicable, head, eye, ear, respiratory, other protection	X		
Contaminants and hazardous materials anticipated	X		
Chemical exposure issues anticipated	X		
Work zones and methods of security	X		
Decontamination procedures (equipment and personnel)	X		
General safe work practices	X		
GOOD CATCHES and any safety deficiencies or Near Misses (if yes, provide explanation below)			
Other:			
Other:			
Emergency Procedures:			
Hospital Name: Glendale Memorial **Hospital Phone:**			

ENVIRONMENTAL COMPLIANCE	Yes	No	N/A
Environmental Protection Plan	X		
• Preservation of existing conditions in surrounding water and land			
• Dust quality monitoring			
• Spill prevention and response			
• Promote recycling, waste prevention, minimization and energy conservation	X		
Waste Management Plan			
• Storage, shipping, disposal of general waste			
• Storage, shipping, disposal of hazardous waste			
• Recordkeeping			
• NO Waste should be kept on site for more than 90 Days			
Stormwater Pollution Prevention Plan	—		
• Periodic BMP Inspection Checklist			
• Post-Rain Inspection			
• Other			

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Safety and Operations Tailgate Meeting Form
Rev. 1.062613

EXPLANATIONS/NOTES

ATTENDEES

The following personnel were present for discussion of the topics listed above and have read and understand the contents of the Site Accident Prevention Plan/AHAs/Site Safety and Health Plan.

NAME	COMPANY	SIGNATURE
Geoffrey Brink		OTIE
Emmanuel Kasolt		OTIE

Meeting Conducted By:

DAILY FIELD RECORD

OTIE

Project and Task Number: Z013152	Date: 11/19/13
Project Name: Glendale Chromium	Field Activity: Groundwater sampling
Location: Glendale / Burbank	Weather: AM → 50's Partly Cloudy

PERSONNEL: Name	Company	Time In	Time Out
Geoff Brink	OTIE	0610	1430
Manny Vasquez	OTIE	0640	1430
Mike LaDue	CH2M Hill	0630	1200

PERSONAL SAFETY CHECKLIST

X	Steel-toed Boots	—	Hard Hat	—	Tyvek Coveralls
X	Rubber Gloves	X	Safety Goggles	—	1/2-Face Respirator

DRUM I.D.	DESCRIPTION OF CONTENTS AND QUANTITY	LOCATION

TIME	DESCRIPTION OF WORK PERFORMED
0610	Geoff Brink arrives at the BOU treatment plant, sign-in, and proceed to the storage container to load up all sampling equipment.
0635	Depart BOU treatment plant with all equipment and meet Manny and Mike just outside. Mobe to first well.
0650	Arrive at PWA-9, conduct H&S meeting, then perform callibration on the Horriba Water Quality meter. Begin sampling activities.
0755	Complete sampling activities at PWA-9, mobe to PWA-7.
0840	Complete sampling activities at PWA-7, mobe to CS-C32-120
0905	Begin sampling activities at CS-C32-120.
1000	Complete sampling activities at CS-C32-120. Mobe to CS-C31-102
1055	Complete sampling activities at CS-C31-102. Field Environmental delivery arrives with our purchased pump, takes away the rental. Mobe to CH-Pil.

#1 → Rosemary Ln. + Clark Ave (W)

#2 → W. Olive Ave. + N. Florence St.

DAILY FIELD RECORD (continued)

OTIE

Project and Task Number: 2013152

Date: 11/19/13

TIME	DESCRIPTION OF WORK PERFORMED
1125	Locate GN-P11 behind a soccer field associated with Griffith Park. Contact Raul (LA City Parks) and discuss options for access. He advises that no gates need to be opened, and hopping the curb from the parking lot will be fine, just watch for sprinklers.
1215	Complete sampling activities at GN-P11. Mobe to PWA-4, PWA-1, and PWA-5 to re-collect Hex Chrome samples.
1400	Arrive at BOV treatment plant, sign-in, off-load purge water, and off-load all sampling equipment.
1420	Collect equipment blank
1430	Geoff + Manny depart BOV to meet lab courier.

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form

Rev. 1.062613

Date/Time: 11/19/13 **Project Number:** 2013152

Project Name: San Fernando Valley Superfund Sites **Contract No:** EP-S9-13-01

Project Location: Glendale / Burbank

Client: U.S. EPA **Client Phone:**

Type of Work: Groundwater Sampling

OPERATIONS and QUALITY	Yes	No	N/A
Tasks to be performed (include the definable features of work)	X		
Critical path items (schedule, client interaction, project coordination)	X		
Subcontractors on site today	X		
Other visitors expected on site			—
Material/Equipment deliveries expected and storage areas	X		
Applicable information from Base Operations or client (as needed)			
Review of As Builts/Layout Plans, if applicable			—
Operational / Quality Deficiencies to discuss (refer to Daily Quality Control Report from day before and other inspection reports)	X		
Other:			

SAFETY	Yes	No	N/A
Protective Clothing/Equipment Level: (D) C B A (circle appropriate) As applicable, head, eye, ear, respiratory, other protection	X		
Contaminants and hazardous materials anticipated	X		
Chemical exposure issues anticipated	X		
Work zones and methods of security	X		
Decontamination procedures (equipment and personnel)	X		
General safe work practices	X		
GOOD CATCHES and any safety deficiencies or Near Misses (if yes, provide explanation below)			
Other:			
Other:			
Emergency Procedures:			
Hospital Name: Glendale Memorial **Hospital Phone:**			

ENVIRONMENTAL COMPLIANCE	Yes	No	N/A
Environmental Protection Plan	X		
• Preservation of existing conditions in surrounding water and land			
• Dust quality monitoring			
• Spill prevention and response			
• Promote recycling, waste prevention, minimization and energy conservation			
Waste Management Plan	X		
• Storage, shipping, disposal of general waste			
• Storage, shipping, disposal of hazardous waste			
• Recordkeeping			
• NO Waste should be kept on site for more than 90 Days			
Stormwater Pollution Prevention Plan			—
• Periodic BMP Inspection Checklist			
• Post-Rain Inspection			
• Other			

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form
Rev. 1.062613

EXPLANATIONS/NOTES

ATTENDEES

The following personnel were present for discussion of the topics listed above and have read and understand the contents of the Site Accident Prevention Plan/AHAs/Site Safety and Health Plan.

NAME	COMPANY	SIGNATURE
Geoff Brink	OTIE	
Emmanuel Vasquez	OTIE	

Meeting Conducted By:

DAILY FIELD RECORD

OTIE

Project and Task Number: 2013152	Date: 11/20/13
Project Name: Glendale Chromium	Field Activity: Groundwater Sampling
Location: Glendale / Burbank	Weather: AM→ Cloudy, 50's

PERSONNEL: Name	Company	Time In	Time Out
Geoff Brink	OTIE	0610	1440
Manny Vasquez	OTIE	0610	1425
Mike LeDuc	CH2M Hill	0700	1300
~~TMI~~	TMI	0710	1300

PERSONAL SAFETY CHECKLIST

X	Steel-toed Boots	–	Hard Hat	X	Tyvek Coveralls
X	Rubber Gloves	X	Safety Goggles	X	1/2-Face Respirator

DRUM I.D.	DESCRIPTION OF CONTENTS AND QUANTITY	LOCATION

TIME	DESCRIPTION OF WORK PERFORMED
0610	Manny and Geoff arrive at the BOU treatment plant, signin, load up all sampling equipment. Conduct H&S tailgate.
0630	Depart BOU treatment plant to meet Mike LeDuc and Traffic Management Inc. (TMI) for the days sampling activities
0650	Arrive at Glendale Home Depot, await Mike and TMI.
0710	Mike is located at the first well, and TMI has just arrived. Set-up traffic control at CS-C43-83
0735	Begin sampling activities at CS-C43-83.
0825	Complete sampling activities at CS-C43-83. Manny and I will make to collect a sample from CS-C33-59 while Mike escorts TMI to set-up at CS-C39-73.
0835	Begin sampling activities at CS-C33-59.
0900	Complete sampling activities at CS-C33-59, make to CS-C39-73.
0935	Complete sampling activities at CS-C39-73. Manny and I make to sample GS-P13 ~~with~~ while Mike escorts TMI to set-up near the CS-C30 wells.

DAILY FIELD RECORD (continued)

OTIE

Project and Task Number: 2013152

Date: 11/20/13

TIME	DESCRIPTION OF WORK PERFORMED
1040	Traffic control set-up, ~~begin~~ begin sampling activities at CS-C30-200.
1150	Complete sampling activities at CS-C30-200, begin sampling activities at CS-C30-120
1250	Complete sampling activities at CS-C30-120, TMI takes down all traffic control and departs site, along with Mike LaDue.
1300	Manny and Geoff make to PWA-10 to collect a Hex Chrome re-sample.
1345	Arrive at BOU treatment plant, sign-in, and off-load all purge water.
1355	Make to EPA storage container and off-load all sampling equipment. Collect Equipment Blank.
1425	Manny departs site and heads in to the office to complete/print COCs, and meet CalScience courier.
1440	Geoff departs site.

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form

Rev. 1.062613

Date/Time: 11/20/13 **Project Number:** 2013152

Project Name: San Fernando Valley Superfund Sites **Contract No:** EP-S9-13-01

Project Location: Glendale / Burbank

Client: U.S. EPA **Client Phone:**

Type of Work: Groundwater Sampling

OPERATIONS and QUALITY	Yes	No	N/A
Tasks to be performed (include the definable features of work)	X		
Critical path items (schedule, client interaction, project coordination)	X		
Subcontractors on site today	X		
Other visitors expected on site	X		
Material/Equipment deliveries expected and storage areas			—
Applicable information from Base Operations or client (as needed)			
Review of As Builts/Layout Plans, if applicable			—
Operational / Quality Deficiencies to discuss (refer to Daily Quality Control Report from day before and other inspection reports)	X		
Other:			

SAFETY	Yes	No	N/A
Protective Clothing/Equipment Level: (D) C B A (circle appropriate) As applicable, head, eye, ear, respiratory, other protection	X		
Contaminants and hazardous materials anticipated	X		
Chemical exposure issues anticipated	X		
Work zones and methods of security	X		
Decontamination procedures (equipment and personnel)	X		
General safe work practices	X		
GOOD CATCHES and any safety deficiencies or Near Misses (if yes, provide explanation below)			
Other:			
Other:			
Emergency Procedures:			
Hospital Name: Glendale Memorial **Hospital Phone:**			

ENVIRONMENTAL COMPLIANCE	Yes	No	N/A
Environmental Protection Plan	X		
• Preservation of existing conditions in surrounding water and land			
• Dust quality monitoring			
• Spill prevention and response			
• Promote recycling, waste prevention, minimization and energy conservation			
Waste Management Plan	X		
• Storage, shipping, disposal of general waste			
• Storage, shipping, disposal of hazardous waste			
• Recordkeeping			
• NO Waste should be kept on site for more than 90 Days			
Stormwater Pollution Prevention Plan			—
• Periodic BMP Inspection Checklist			
• Post-Rain Inspection			
• Other			

OTIE
Oneida Total Integrated Enterprises

Safety and Operations Tailgate Meeting Form
Rev. 1.062613

EXPLANATIONS/NOTES

ATTENDEES

The following personnel were present for discussion of the topics listed above and have read and understand the contents of the Site Accident Prevention Plan/AHAs/Site Safety and Health Plan.

NAME	COMPANY	SIGNATURE
Geoff Bank	OTIE	
Emmanuel Vasquez	OTIE	

Meeting Conducted By:

TRAFFIC MANAGEMENT INCORPORATED

CORPORATE OFFICE:
2435 Lemon Ave.
Signal Hill, CA 90755
Fax: (562) 424-0266

www.trafficmanagement.com

(800) 763-3999

SERVICE RECEIPT
& EMPLOYEE TIME RECORD

287952

ORDER #:	JOB #:
61658	33450
SERVICE DATE:	**DAY:**
11-20-13	WED

CUSTOMER NAME: ONEIDA TOTAL INTEGRATED ENT

CUSTOMER ADDRESS: CITY: STATE: ZIP:

CUSTOMER CONTACT: GEOFF BRINK CUSTOMER PHONE: 805-585-6393 CUSTOMER FAX:

JOB ADDRESS: COLORADO & SAN FERNANDO & **CITY:** GLENDALE **STATE:** CA

PROJECT INFO, BUILDING NAME, OR LOCATION DETAILS:

CUSTOMER WORK DESCRIPTION: (WATER TESTING)

SERVICE DESCRIPTION (TRAFFIC CONTROL OR OTHER WORK PERFORMED): *SPECIFY NUMBER OF LANES, STREET NAME, AND DIRECTION OF EACH STREET AFFECTED. USE SEPARATE SERVICE RECEIPTS FOR ADDITIONAL WORK AREAS.*

3 single lane closures. Different LOCATION

SERVICE DETAILS *COMPLETE ALL COLUMNS FOR EACH EMPLOYEE PERFORMING SERVICES.*

EMPLOYEE NAME	TRUCK #	TRAVEL START	ON JOB - SHIFT START	CUSTOMER WORK START	CUSTOMER WORK FINISH	SHIFT END - LEAVE JOB	TRAVEL END	TOTAL HOURS	EMPLOYEE SIGNATURE*
Carlos Arenas		530 AM PM	630 AM PM	7 AM PM	1 AM PM	AM PM	AM PM		Caa
		AM PM	AM PM	AM PM	AM PM	AM PM	AM PM		
		AM PM	AM PM	AM PM	AM PM	AM PM	AM PM		
		AM PM	AM PM	AM PM	AM PM	AM PM	AM PM		
		AM PM	AM PM	AM PM	AM PM	AM PM	AM PM		
		AM PM	AM PM	AM PM	AM PM	AM PM	AM PM		

Each employee attests that hours stated above are true and accurate, and acknowledges that he/she has been provided all required meal and rest periods pursuant to company policy as described in Company Handbook.

☐ **RENTAL RECEIPT ATTACHED (or)**

☐ **EQUIPMENT USED** Indicate equipment used in conjunction with the services performed. **NOTE: Use a Rental Receipt for equipment left on site for more than 24hrs, or for equipment being returned.**

QTY.	ITEM TYPE	DESCRIPTION
1	F.A.S.	*Unit #'s:* A217
	C.M.S.	*Unit #'s:*
2	BARRICADES	*Type-I* ☐ *w/ Light*
	BARRICADES	*Type III* ☐ *w/ Light*
20	CONES	
	DELINEATORS	
2	METAL SIGNS	
3	FABRIC SIGNS	☑ *w/ Stand*
	VERT. PANELS	☐ *w/ Light*
2	OTHER	STOP & SLOW PADDLES

STANDARD TERMS AND CONDITIONS

NO OTHER AGREEMENT: Except as otherwise mutually agreed in writing, this document is the complete agreement between Customer and TMI (Traffic Management, Inc.). AUTHORIZED REPRESENTATIVE AND ACKNOWLEDGEMENT OF WORK AND EQUIPMENT: The name and signature on this document is the duly authorized representative of the Customer (individual, company, or organization). Receipt and acknowledgement of this document is the acceptance of any or all of the following as described on the front of this Receipt: description of work performed, hours worked, equipment used, equipment picked up or dropped off, condition of equipment, or any other such specific condition or work detailed in writing. Customer will be responsible for full payment of equipment rental, lease, or services performed as described herein, and according to TMI's published billing rates, except as otherwise agreed in writing. INDEMNIFICATION: Customer agrees to indemnify and save TMI, its employees and agents harmless from all claims for death or injury to persons, including TMI's employees, and from all loss, damage, or injury to property, including the equipment, arising in any manner out of Customer's operation. Customer's duty to indemnify hereunder shall include all costs or expenses arising out of all claims specified herein, including all court and/or arbitration costs, filing fees, attorney's fees and costs of settlement. Customer shall not be required to indemnify TMI for its sole negligence, but, TMI's liability for damage caused by the sole negligence of TMI, its agents and employees, hereunder shall be limited to the amount of TMI's liability insurance. TERMS OF PAYMENT: Payment terms are net 30 days, unless otherwise specified on related invoice. A 1 1/2% per month service charge may be charged on all amounts after 30 days. In the event of any dispute relating to non-payment of any invoice, the prevailing party shall be entitled to an awarded of reasonable attorney's fees and costs. DISPUTES AND GOVERNING LAW: Disputes as to any portion of an invoice must be delivered to TMI in writing no later than 10 calendar days following the date of the disputed invoice. Failure to timely notify TMI of any such dispute shall be deemed acceptance of the same, and all charges therein. Customer's initial receipt of the Equipment and/or Services shall constitute acceptance and agreement by the Customer to all provisions, terms, and conditions herein and to this Agreement. The laws of the State of California shall apply to any rights and/or remedies provided to either party hereto.

OFFICE USE ONLY	
Reviewed by:	Date:
Entered by:	Date:
Payroll by:	Date:

(WHITE - JOB FOLDER YELLOW - PAYROLL PINK - CUSTOMER)

RECEIVED / ACKNOWLEDGED BY: *print* Geoff Brink *sign* [signature] *date* 11/20/13

I hereby agree to all terms and conditions as stated above.

© 11/1/2011

DAILY FIELD RECORD

OTIE

Project and Task Number: 2013152	Date: 11/21/13
Project Name: Glendale Chromium	Field Activity: Groundwater Sampling
Location: Glendale / Burbank	Weather:

PERSONNEL: Name	Company	Time In	Time Out
Geoff Brink	OTIE	0715	1100
Manny Vasquez	OTIE	0715	1025

PERSONAL SAFETY CHECKLIST

X	Steel-toed Boots	_	Hard Hat	–	Tyvek Coveralls
X	Rubber Gloves	X	Safety Goggles	–	1/2-Face Respirator

DRUM I.D.	DESCRIPTION OF CONTENTS AND QUANTITY	LOCATION

TIME	DESCRIPTION OF WORK PERFORMED
0715	Geoff Brink + Manny Vasquez arrive at the BOU treatment plant, sign-in, then make to the storage container to load up all sampling equipment.
0725	Depart BOU treatment plant to re-sample V13DRMW6, V13DRMW7, and V13DRMW8 for Hex Chrome.
0930	Arrive back at BOU treatment plant, sign-in, then off-load all purge water.
0945	Proceed to storage container to un-load all sampling equipment.
1010	Collect equipment blank
1025	Manny departs site to meet courier and ship all CLP lab samples. Geoff remains behind to organize sampling equipment in storage container.
1100	Geoff departs site, will drop off Horiba and Sonder at FEI on the way back to the office.
1130	Drop off Horiba and Sonder at FEI Northridge.

OTIE – GCOU Purge Logs

Product Name: Low-Flow System

Date: 2014-04-15 12:58:53

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	cs-c30-200	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	202 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	94.52 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	12:54:43	660.03	21.87	7.49	661.49	--	--	6.88	586.77
Last 5	12:55:43	720.03	21.92	7.49	657.45	--	--	6.79	592.73
Last 5	12:56:43	780.03	21.76	7.49	662.68	--	--	7.13	596.98
Last 5	12:57:43	840.03	21.73	7.49	661.21	--	--	7.06	601.50
Last 5	12:58:43	900.03	21.59	7.49	662.20	1.34	94.56	7.08	605.11
Variance 0			-0.15	0.00	5.24			0.33	4.24
Variance 1			-0.04	-0.00	-1.48			-0.07	4.52
Variance 2			-0.13	-0.00	1.00			0.02	3.61

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-16 08:49:01

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	cs-c31-102	Final Pumping Rate	0 mL/min
Well diameter	in	Total System Volume	0.09 L
Well Total Depth	ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	08:44:51	420.03	19.49	7.15	1270.82	--	--	7.79	420.64
Last 5	08:45:51	480.04	19.97	7.15	1276.87	--	--	7.64	425.37
Last 5	08:46:51	540.04	20.18	7.16	1271.45	--	--	7.43	429.35
Last 5	08:47:51	600.04	20.30	7.16	1269.15	2.99	78.92	7.28	431.93
Last 5	08:48:51	660.03	20.39	7.16	1268.64	--	--	7.17	433.99
Variance 0			0.21	0.00	-5.42			-0.21	3.98
Variance 1			0.12	0.00	-2.30			-0.15	2.59
Variance 2			0.09	0.00	-0.51			-0.10	2.06

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-16 09:29:12

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	cs-c32-120	Final Pumping Rate	0 mL/min
Well diameter	in	Total System Volume	0.09 L
Well Total Depth	ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	09:24:40	360.03	20.39	7.22	1192.88	--	0.00	7.50	465.64
Last 5	09:25:40	420.04	20.52	7.22	1205.86	--	--	7.53	470.11
Last 5	09:26:40	480.03	20.66	7.22	1184.08	--	--	7.54	473.54
Last 5	09:27:40	540.03	20.80	7.22	1179.47	--	--	7.52	476.61
Last 5	09:28:40	600.03	20.77	7.22	1183.46	15.80	101.20	7.53	479.43
Variance 0			0.13	0.00	-21.78			0.01	3.43
Variance 1			0.14	-0.00	-4.61			-0.02	3.07
Variance 2			-0.02	-0.00	3.99			0.01	2.82

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-23 10:10:32

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	49 ft

Well Information:		Pumping Information:	
Well ID	cs-c34-065	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	64.8 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	43.48 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	10:06:07	481.03	21.68	6.83	1095.04	13.70	43.50	6.20	555.00
Last 5	10:07:07	541.03	21.76	6.82	1096.17	--	--	6.21	554.02
Last 5	10:08:07	601.03	21.86	6.82	1096.19	--	--	6.21	552.75
Last 5	10:09:07	661.03	21.91	6.82	1095.71	--	--	6.21	551.21
Last 5	10:10:07	721.03	21.95	6.82	1096.25	10.40	43.50	6.21	549.01
Variance 0			0.10	0.00	0.02			-0.01	-1.28
Variance 1			0.05	-0.00	-0.48			0.00	-1.54
Variance 2			0.05	0.00	0.54			0.00	-2.20

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-23 09:33:18

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	24 ft

Well Information:		Pumping Information:	
Well ID	cs-c35-041	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	40.9 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	17.84 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	09:29:07	721.03	21.09	6.96	961.06	3.93	17.96	3.96	513.90
Last 5	09:30:09	783.03	21.05	6.96	960.69	--	--	3.96	521.45
Last 5	09:31:09	843.04	21.02	6.97	959.27	3.48	17.96	3.94	529.21
Last 5	09:32:11	905.03	21.06	6.97	960.80	4.25	17.98	3.93	536.33
Last 5	09:33:15	969.03	21.06	6.97	960.63	--	--	3.87	545.08
Variance 0			-0.04	0.00	-1.42			-0.02	7.75
Variance 1			0.04	0.00	1.53			-0.01	7.12
Variance 2			0.00	-0.00	-0.17			-0.05	8.74

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-23 12:39:29

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	36 ft

Well Information:		Pumping Information:	
Well ID	cs-c38-51	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	51 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	30.4 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	12:35:19	361.03	22.31	6.41	1543.53	--	--	1.27	590.46
Last 5	12:36:19	421.04	22.40	6.41	1544.07	--	--	1.27	595.95
Last 5	12:37:19	481.03	22.40	6.41	1541.19	--	--	1.26	601.30
Last 5	12:38:20	542.03	22.40	6.42	1541.75	61.40	30.44	1.26	606.22
Last 5	12:39:21	603.03	22.45	6.42	1541.74	--	--	1.26	610.84
Variance 0			-0.00	0.00	-2.88			-0.02	5.34
Variance 1			-0.00	0.00	0.56			0.00	4.92
Variance 2			0.06	0.00	-0.01			0.00	4.63

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-17 09:20:07

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	cs-c40-079	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	79 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	59.78 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	09:15:54	360.03	19.95	7.04	1113.72	--	--	4.30	383.63
Last 5	09:16:54	420.03	19.98	7.04	1114.15	--	--	4.30	384.17
Last 5	09:17:54	480.03	20.04	7.04	1114.33	--	0.00	4.24	384.01
Last 5	09:18:54	540.03	20.14	7.04	1114.63	--	--	4.22	383.12
Last 5	09:19:54	600.03	20.25	7.03	1114.70	10.10	59.90	4.18	381.99
Variance 0			0.06	-0.00	0.18			-0.06	-0.16
Variance 1			0.10	-0.00	0.30			-0.02	-0.89
Variance 2			0.12	-0.00	0.07			-0.04	-1.12

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-17 08:33:25

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	cs-c42-059	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	58.4 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	37.55 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	08:28:48	482.03	22.55	7.06	1276.11	--	--	5.11	346.93
Last 5	08:29:48	542.03	22.63	7.06	1277.05	--	0.00	5.11	348.84
Last 5	08:30:48	602.03	22.66	7.06	1275.78	13.70	37.64	5.10	350.29
Last 5	08:31:48	662.03	22.62	7.06	1275.33	--	--	5.11	351.73
Last 5	08:32:48	722.03	22.69	7.06	1276.93	12.70	37.64	5.11	352.46
Variance 0			0.03	0.00	-1.27			-0.01	1.45
Variance 1			-0.04	-0.00	-0.45			0.01	1.44
Variance 2			0.06	-0.00	1.60			0.00	0.73

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-15 10:35:03

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Basenwide	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	Cs-c43-083	Final Pumping Rate	0 mL/min
Well diameter	in	Total System Volume	0.09 L
Well Total Depth	ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	10:30:59	421.04	22.62	7.02	1058.22	--	--	6.09	445.32
Last 5	10:31:59	481.04	22.69	7.01	1058.72	55.40	62.40	6.10	449.11
Last 5	10:32:59	541.03	22.98	7.01	1058.50	--	--	6.09	452.48
Last 5	10:33:59	601.03	23.20	7.01	1061.11	60.00	62.40	6.09	456.02
Last 5	10:34:59	661.04	23.38	7.01	1057.89	--	--	5.98	459.35
Variance 0			0.29	-0.00	-0.22			-0.01	3.37
Variance 1			0.22	-0.00	2.61			-0.00	3.54
Variance 2			0.18	-0.00	-3.21			-0.10	3.33

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-16 10:58:19

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	pwa-1	Final Pumping Rate	0 mL/min
Well diameter	in	Total System Volume	0.09 L
Well Total Depth	ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	10:54:05	602.03	22.85	7.38	854.87	5.17	108.04	6.98	542.24
Last 5	10:55:05	662.04	22.84	7.38	852.38	--	--	6.94	547.68
Last 5	10:56:05	722.03	22.67	7.38	861.25	--	--	7.19	552.37
Last 5	10:57:05	782.03	22.62	7.37	854.17	--	--	7.48	556.60
Last 5	10:58:05	842.03	22.65	7.38	854.68	4.96	108.04	7.42	561.33
Variance 0			-0.18	0.00	8.87			0.25	4.69
Variance 1			-0.04	-0.00	-7.08			0.30	4.23
Variance 2			0.03	0.00	0.51			-0.06	4.72

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-16 13:00:51

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	pwa-3	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	135.2 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	104.9 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	12:56:41	420.03	24.42	7.53	885.88	--	--	1.56	590.94
Last 5	12:57:41	480.03	24.24	7.54	785.65	--	--	1.58	596.25
Last 5	12:58:41	540.03	24.17	7.54	905.17	--	--	1.21	600.20
Last 5	12:59:41	600.03	24.26	7.54	909.88	2.31	105.92	1.10	603.04
Last 5	13:00:41	660.04	24.53	7.54	913.34	--	--	1.30	604.07
Variance 0			-0.07	0.00	119.51			-0.37	3.95
Variance 1			0.10	0.00	4.71			-0.12	2.83
Variance 2			0.27	-0.00	3.46			0.21	1.03

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-16 11:45:06

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	pwa-4	Final Pumping Rate	0 mL/min
Well diameter	in	Total System Volume	0.09 L
Well Total Depth	ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	11:41:00	420.04	24.28	7.28	835.19	--	--	5.10	484.80
Last 5	11:42:00	480.03	24.70	7.28	836.20	--	--	5.04	489.42
Last 5	11:43:00	540.03	25.10	7.28	836.82	--	--	4.98	493.26
Last 5	11:44:00	600.03	25.51	7.28	839.96	5.31	88.35	5.00	497.01
Last 5	11:45:00	660.03	25.22	7.29	818.54	--	--	4.79	501.74
Variance 0			0.40	0.00	0.62			-0.06	3.84
Variance 1			0.41	-0.00	3.14			0.02	3.75
Variance 2			-0.29	0.02	-21.42			-0.21	4.73

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-16 10:13:19

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	pwa-5	Final Pumping Rate	0 mL/min
Well diameter	in	Total System Volume	0.09 L
Well Total Depth	ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	10:08:56	360.03	19.86	7.27	1245.94	--	--	8.87	449.90
Last 5	10:09:56	420.03	19.88	7.27	1246.05	6.16	109.05	8.82	447.10
Last 5	10:10:56	480.03	19.90	7.27	1246.17	--	--	8.73	443.76
Last 5	10:11:56	540.03	19.99	7.27	1246.29	4.85	109.05	8.66	440.59
Last 5	10:12:56	600.03	20.04	7.27	1246.54	3.95	109.05	8.60	437.13
Variance 0			0.03	-0.00	0.11			-0.09	-3.34
Variance 1			0.08	0.00	0.12			-0.07	-3.17
Variance 2			0.05	-0.00	0.25			-0.06	-3.46

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-17 11:00:58

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	pwa-6	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	90 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	62.45 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	10:56:19	481.04	22.17	7.09	1114.27	--	--	6.47	446.71
Last 5	10:57:19	541.03	22.35	7.09	1114.88	0.00	0.00	6.43	448.67
Last 5	10:58:19	601.04	22.52	7.09	1114.89	2.69	62.58	6.39	450.48
Last 5	10:59:20	662.04	22.66	7.09	1114.83	3.05	62.58	6.36	451.82
Last 5	11:00:20	722.03	22.75	7.09	1114.32	3.39	62.58	6.32	454.26
Variance 0			0.17	0.00	0.00			-0.04	1.81
Variance 1			0.14	0.00	-0.05			-0.03	1.34
Variance 2			0.09	0.00	-0.51			-0.05	2.44

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-22 11:46:09

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	30 ft

Well Information:		Pumping Information:	
Well ID	pwa-7	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	53.3 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	25 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5%	+/- 0.1%	+/- 3%	+/- 10%		+/- 0.3%	+/- 10%
Last 5	11:41:59	420.04	23.97	7.02	1211.77	--	--	1.53	492.62
Last 5	11:42:59	480.03	24.13	7.02	1213.23	4.04	25.01	1.51	499.01
Last 5	11:43:59	540.03	24.33	7.02	1213.82	--	--	1.49	504.86
Last 5	11:44:59	600.03	24.46	7.02	1213.19	3.01	25.01	1.48	510.42
Last 5	11:45:59	660.03	24.36	7.02	1213.42	3.06	25.01	1.47	516.28
Variance 0			0.20	-0.00	0.59			-0.02	5.85
Variance 1			0.14	0.00	-0.63			-0.01	5.56
Variance 2			-0.10	0.00	0.23			-0.01	5.86

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-17 13:06:13

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	pwa-8	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	85 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	57.10 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	13:02:00	360.04	23.25	7.15	1074.34	--	--	4.64	444.82
Last 5	13:03:00	420.03	23.39	7.15	1076.39	11.60	57.12	4.63	450.97
Last 5	13:04:00	480.03	23.53	7.15	1075.83	--	--	4.55	456.13
Last 5	13:05:00	540.03	23.58	7.15	1075.31	--	0.00	4.51	460.78
Last 5	13:06:00	600.03	23.61	7.15	1074.77	11.80	57.12	4.49	464.73
Variance 0			0.14	0.00	-0.56			-0.08	5.16
Variance 1			0.05	0.00	-0.52			-0.04	4.65
Variance 2			0.04	-0.00	-0.54			-0.02	3.94

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-17 07:54:09

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	pwa-9	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	95.4 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	54.5 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	07:49:40	360.03	21.64	7.10	1351.84	--	--	0.17	145.87
Last 5	07:50:40	420.03	21.68	7.10	1352.34	20.80	54.94	0.17	145.16
Last 5	07:51:40	480.03	21.73	7.10	1352.20	--	--	0.16	144.24
Last 5	07:52:40	540.03	21.82	7.10	1352.59	--	0.00	0.14	142.06
Last 5	07:53:40	600.03	21.87	7.10	1352.99	17.80	54.95	0.13	139.83
Variance 0			0.04	0.00	-0.14			-0.01	-0.92
Variance 1			0.09	0.00	0.39			-0.02	-2.18
Variance 2			0.05	0.00	0.40			-0.02	-2.23

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-17 12:28:40

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	pwa-10	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	80.1 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	45.82 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	12:24:26	360.03	24.80	7.07	1157.69	--	--	3.88	446.91
Last 5	12:25:26	420.03	24.96	7.07	1157.93	2.82	45.83	3.86	452.97
Last 5	12:26:27	481.04	25.12	7.08	1158.34	--	--	3.84	458.01
Last 5	12:27:27	541.03	25.23	7.08	1156.87	--	--	3.80	462.29
Last 5	12:28:27	601.03	25.28	7.08	1156.06	2.61	45.83	3.77	465.85
Variance 0			0.15	0.00	0.40			-0.01	5.04
Variance 1			0.11	0.00	-1.46			-0.04	4.28
Variance 2			0.05	0.00	-0.81			-0.03	3.55

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-17 11:39:25

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	pwa-12	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	164 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	62.52 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	11:35:18	600.04	21.94	7.03	1051.91	6.52	--	7.53	510.68
Last 5	11:36:18	660.03	21.95	7.04	1052.45	5.76	--	7.87	512.54
Last 5	11:37:18	720.04	22.01	7.04	1053.10	--	--	7.76	513.87
Last 5	11:38:18	780.03	22.09	7.04	1049.22	0.00	--	7.56	514.49
Last 5	11:39:18	840.03	22.08	7.04	1049.14	3.04	--	7.36	514.94
Variance 0			0.06	-0.00	0.64			-0.11	1.33
Variance 1			0.07	0.00	-3.87			-0.20	0.62
Variance 2			-0.01	0.00	-0.08			-0.20	0.44

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-16 12:21:02

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	pwa-13	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	105.6 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	71.85 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	12:16:43	360.03	22.36	7.13	1469.37	0.00	--	3.57	516.21
Last 5	12:17:44	421.03	22.46	7.13	1471.04	--	--	3.51	522.92
Last 5	12:18:44	481.03	22.62	7.14	1472.39	--	--	3.47	528.47
Last 5	12:19:44	541.03	22.76	7.14	1471.50	--	--	3.44	533.35
Last 5	12:20:44	601.03	22.92	7.14	1471.98	7.68	71.92	3.42	537.23
Variance 0			0.16	0.00	1.35			-0.04	5.54
Variance 1			0.14	0.00	-0.89			-0.02	4.88
Variance 2			0.16	0.00	0.48			-0.03	3.88

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-22 12:40:00

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	66 ft

Well Information:		Pumping Information:	
Well ID	GNP-10	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	98.4 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	36.88 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	12:35:57	481.03	26.44	7.36	1061.89	16.20	36.88	4.07	553.71
Last 5	12:36:57	541.03	26.83	7.36	1062.27	--	--	4.00	557.58
Last 5	12:37:57	601.04	27.15	7.36	1062.47	9.09	36.88	3.90	562.12
Last 5	12:38:57	661.03	27.38	7.36	1062.35	12.50	36.88	3.88	566.25
Last 5	12:39:57	721.03	27.43	7.36	1059.33	--	--	3.82	570.70
Variance 0			0.32	-0.00	0.20			-0.09	4.54
Variance 1			0.23	0.00	-0.12			-0.03	4.13
Variance 2			0.05	0.00	-3.02			-0.06	4.45

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-23 11:16:54

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	39 ft

Well Information:		Pumping Information:	
Well ID	gs-p13	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	49 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	32.82 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	11:12:44	544.03	22.53	7.07	1052.34	--	--	2.75	547.18
Last 5	11:13:44	604.03	22.62	7.08	1052.31	11.70	33.55	2.73	554.30
Last 5	11:14:44	664.03	22.67	7.08	1052.58	--	--	2.71	561.21
Last 5	11:15:44	724.03	22.72	7.08	1052.94	11.40	33.57	2.69	568.02
Last 5	11:16:49	789.04	22.80	7.08	1053.20	--	--	2.67	574.28
Variance 0			0.05	0.00	0.27			-0.02	6.91
Variance 1			0.05	0.00	0.35			-0.02	6.81
Variance 2			0.08	0.00	0.26			-0.02	6.26

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-21 10:22:50

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	98 ft

Well Information:		Pumping Information:	
Well ID	fcr-wcw4	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	100.5 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	41.05 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5%	+/- 0.1%	+/- 3%	+/- 10%		+/- 0.3%	+/- 10%
Last 5	10:18:17	660.04	21.68	7.04	888.31	--	--	6.42	594.45
Last 5	10:19:17	720.03	21.68	7.03	889.50	--	--	7.30	600.10
Last 5	10:20:17	780.03	21.73	7.03	888.97	1.76	41.06	7.59	605.39
Last 5	10:21:17	840.04	21.82	7.04	888.43	--	--	7.33	610.84
Last 5	10:22:17	900.04	21.77	7.04	877.92	1.84	41.06	7.30	616.73
Variance 0			0.05	0.00	-0.53			0.29	5.29
Variance 1			0.10	0.00	-0.54			-0.26	5.44
Variance 2			-0.05	0.00	-10.51			-0.03	5.90

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-21 08:43:33

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	45 ft

Well Information:		Pumping Information:	
Well ID	v13gppw2	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	60 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	39.2 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	08:39:22	481.03	21.68	6.95	1292.71	--	--	2.27	459.68
Last 5	08:40:22	541.04	22.02	6.95	1297.70	--	--	2.21	462.45
Last 5	08:41:22	601.03	22.17	6.95	1294.80	2.39	39.20	2.18	465.30
Last 5	08:42:22	661.03	22.24	6.95	1294.51	2.21	39.20	2.16	468.52
Last 5	08:43:22	721.03	22.35	6.95	1294.99	2.34	39.20	2.14	471.26
Variance 0			0.15	0.00	-2.91			-0.03	2.85
Variance 1			0.08	-0.00	-0.29			-0.02	3.23
Variance 2			0.11	0.00	0.48			-0.01	2.74

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-21 09:18:40

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	37 ft

Well Information:		Pumping Information:	
Well ID	v13gpp13	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	40.5 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	32.05 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	09:14:15	603.04	22.71	6.88	1804.55	584.00	32.05	2.57	527.86
Last 5	09:15:16	664.03	22.76	6.88	1802.81	--	--	2.57	530.59
Last 5	09:16:16	724.03	22.78	6.88	1802.40	--	--	2.57	533.31
Last 5	09:17:16	784.04	22.75	6.88	1800.94	--	--	2.56	535.37
Last 5	09:18:16	844.03	22.76	6.88	1800.94	286.00	32.05	2.55	536.62
Variance 0			0.03	0.00	-0.41			-0.00	2.72
Variance 1			-0.03	0.00	-1.46			-0.01	2.05
Variance 2			0.00	-0.00	-0.00			-0.01	1.25

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-17 13:44:01

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	v14ampw1	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	74 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	60.55 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	13:39:48	661.03	22.47	7.03	1324.19	--	--	3.73	460.22
Last 5	13:40:48	721.03	22.53	7.03	1326.73	--	--	3.74	462.48
Last 5	13:41:48	781.03	22.56	7.04	1329.46	--	--	3.76	463.52
Last 5	13:42:48	841.03	22.61	7.04	1330.83	26.90	61.06	3.77	464.31
Last 5	13:43:49	902.04	22.71	7.04	1331.67	26.50	61.06	3.77	465.39
Variance 0			0.03	0.00	2.73			0.02	1.05
Variance 1			0.05	0.00	1.37			0.01	0.79
Variance 2			0.10	0.00	0.84			-0.00	1.08

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-22 13:32:27

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	65 ft

Well Information:		Pumping Information:	
Well ID	v14ampw3r	Final Pumping Rate	0 mL/min
Well diameter	2 in	Total System Volume	0.09 L
Well Total Depth	77.8 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	59.62 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	13:27:42	180.03	22.42	7.04	1333.76	--	--	3.64	481.86
Last 5	13:28:42	240.03	22.27	7.04	1333.58	--	--	3.66	494.25
Last 5	13:29:42	300.03	22.35	7.04	1332.07	--	59.75	3.61	503.32
Last 5	13:30:42	360.03	22.29	7.04	1340.41	--	--	3.59	521.33
Last 5	13:31:42	420.03	22.22	7.04	1342.81	--	59.76	3.68	528.27
Variance 0			0.08	-0.00	-1.51			-0.05	9.07
Variance 1			-0.06	0.00	8.34			-0.02	18.01
Variance 2			-0.06	0.00	2.40			0.08	6.94

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-21 11:17:18

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	65 ft

Well Information:		Pumping Information:	
Well ID	v13drmw1	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	71.5 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	60.75 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5%	+/- 0.1%	+/- 3%	+/- 10%		+/- 0.3%	+/- 10%
Last 5	11:12:35	660.03	22.82	6.95	1226.45	--	--	5.28	706.72
Last 5	11:13:36	721.03	22.87	6.95	1227.26	--	--	5.24	712.07
Last 5	11:14:36	781.03	23.20	6.95	1230.20	--	--	5.21	716.07
Last 5	11:15:36	841.03	23.56	6.95	1231.39	61.40	60.80	5.18	718.55
Last 5	11:16:37	902.03	23.79	6.95	1228.89	60.90	60.80	5.15	721.66
Variance 0			0.33	0.00	2.94			-0.03	4.00
Variance 1			0.36	0.00	1.19			-0.02	2.49
Variance 2			0.23	0.00	-2.50			-0.03	3.10

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-22 10:50:41

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	67 ft

Well Information:		Pumping Information:	
Well ID	v13drmw3	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	73.8 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	61.72 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5%	+/- 0.1%	+/- 3%	+/- 10%		+/- 0.3%	+/- 10%
Last 5	10:46:36	841.03	21.37	7.00	1850.62	--	--	2.17	487.38
Last 5	10:47:36	901.03	21.38	7.00	1824.77	--	--	2.25	486.95
Last 5	10:48:36	961.03	21.39	6.99	1797.58	--	0.00	2.35	486.68
Last 5	10:49:38	1023.03	21.41	6.99	1772.80	17.60	61.80	2.45	486.44
Last 5	10:50:38	1083.03	21.41	6.99	1739.34	--	--	2.58	486.65
Variance 0			0.02	-0.00	-27.19			0.10	-0.27
Variance 1			0.02	-0.00	-24.77			0.10	-0.23
Variance 2			-0.01	-0.00	-33.47			0.13	0.21

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-22 08:50:15

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	61 ft

Well Information:		Pumping Information:	
Well ID	v13drmw4	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	71 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	56.7 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5%	+/- 0.1%	+/- 3%	+/- 10%		+/- 0.3%	+/- 10%
Last 5	08:45:40	360.04	21.46	7.15	1148.42	--	--	4.66	396.74
Last 5	08:46:41	421.03	21.57	7.15	1148.53	--	--	4.64	390.10
Last 5	08:47:41	481.03	21.66	7.15	1147.33	339.00	56.72	4.62	386.14
Last 5	08:48:42	542.03	21.68	7.14	1146.62	--	--	4.60	383.29
Last 5	08:49:42	602.03	21.72	7.14	1146.24	365.00	56.72	4.60	380.46
Variance 0			0.09	-0.00	-1.20			-0.01	-3.97
Variance 1			0.01	-0.00	-0.71			-0.02	-2.85
Variance 2			0.04	-0.00	-0.38			-0.01	-2.82

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-22 09:32:13

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	65 ft

Well Information:		Pumping Information:	
Well ID	v13drmw5	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	68.9 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	59.7 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5%	+/- 0.1%	+/- 3%	+/- 10%		+/- 0.3%	+/- 10%
Last 5	09:28:10	421.03	20.84	6.96	1230.40	--	--	5.60	429.53
Last 5	09:29:10	481.03	20.88	6.96	1230.65	--	--	5.60	429.92
Last 5	09:30:10	541.03	20.94	6.96	1230.48	--	--	5.60	429.39
Last 5	09:31:11	602.03	21.00	6.96	1230.11	16.30	59.74	5.59	428.43
Last 5	09:32:11	662.03	21.03	6.96	1230.05	--	--	5.60	427.19
Variance 0			0.06	-0.00	-0.17			0.00	-0.53
Variance 1			0.06	-0.00	-0.37			-0.01	-0.96
Variance 2			0.03	-0.00	-0.06			0.00	-1.24

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-15 08:55:38

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Basenwide	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	v13drmw7	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	72.6 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	57.78 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	08:50:44	660.03	21.89	7.07	1127.48	--	--	5.35	486.47
Last 5	08:51:44	720.03	21.99	7.07	1127.05	--	--	5.30	489.83
Last 5	08:52:44	780.04	22.06	7.07	1126.07	--	--	5.27	493.48
Last 5	08:53:47	843.04	22.09	7.07	1125.93	--	--	5.25	496.61
Last 5	08:54:47	903.04	22.13	7.07	1126.25	2.11	57.85	5.24	498.79
Variance 0			0.07	0.00	-0.98			-0.03	3.65
Variance 1			0.03	0.00	-0.14			-0.01	3.14
Variance 2			0.04	0.00	0.32			-0.02	2.17

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-15 09:42:37

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Basenwide	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	v13drmw8	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	76.5 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	60.6 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	09:38:10	720.03	21.84	7.05	1120.67	--	--	6.58	534.41
Last 5	09:39:10	780.03	21.91	7.05	1117.96	21.30	61.15	6.55	538.47
Last 5	09:40:11	841.04	21.93	7.05	1116.74	--	--	6.51	541.04
Last 5	09:41:11	901.04	21.92	7.05	1117.47	--	0.00	6.49	542.85
Last 5	09:42:11	961.03	21.95	7.05	1116.85	21.80	61.16	6.49	543.31
Variance 0			0.02	-0.00	-1.23			-0.04	2.57
Variance 1			-0.01	-0.00	0.73			-0.02	1.81
Variance 2			0.03	-0.00	-0.62			0.00	0.46

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-17 10:23:03

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	ft

Well Information:		Pumping Information:	
Well ID	v13drmw9	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	72 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	60.12 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1	+/- 3%	+/- 10		+/- 0.3	+/- 10
Last 5	10:18:44	603.03	21.86	6.72	558.71	40.00	60.30	6.69	424.89
Last 5	10:19:44	663.03	21.95	6.72	559.43	28.70	60.20	6.69	427.51
Last 5	10:20:44	723.03	22.13	6.72	560.55	--	0.00	6.65	430.76
Last 5	10:21:44	783.04	22.25	6.72	561.07	21.60	60.20	6.63	434.25
Last 5	10:22:44	843.04	22.26	6.72	561.66	--	--	6.62	437.80
Variance 0			0.17	-0.00	1.12			-0.04	3.25
Variance 1			0.12	0.00	0.52			-0.01	3.49
Variance 2			0.02	-0.00	0.60			-0.02	3.56

Notes

Grab Samples

Product Name: Low-Flow System

Date: 2014-04-21 12:05:45

Project Information:		Pump Information:	
Operator Name	Ev	Pump Model/Type	
Company Name	Otie	Tubing Type	
Project Name		Tubing Diameter	in
Site Name	Default Site	Tubing Length	ft
Latitude	0° 0' 0"		
Longitude	0° 0' 0"		
Sonde SN	340679		
Turbidity Make/Model		Pump placement from TOC	66 ft

Well Information:		Pumping Information:	
Well ID	v13dwbw1	Final Pumping Rate	0 mL/min
Well diameter	4 in	Total System Volume	0.09 L
Well Total Depth	75.5 ft	Calculated Sample Rate	60 sec
Screen Length	ft	Stabilization Drawdown	0 in
Depth to Water	59.45 ft	Total Volume Pumped	0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5%	+/- 0.1%	+/- 3%	+/- 10%		+/- 0.3%	+/- 10%
Last 5	12:01:18	480.03	23.07	6.90	1168.33	--	--	5.64	657.08
Last 5	12:02:18	540.03	23.11	6.90	1168.53	--	--	5.64	663.15
Last 5	12:03:18	600.06	23.11	6.90	1167.69	58.90	59.50	5.63	668.14
Last 5	12:04:18	660.03	23.02	6.90	1167.59	--	--	5.63	672.73
Last 5	12:05:19	721.03	23.07	6.90	1168.10	51.40	59.50	5.62	676.38
Variance 0			-0.00	0.00	-0.84			-0.01	5.00
Variance 1			-0.10	0.00	-0.10			-0.00	4.59
Variance 2			0.05	0.00	0.51			-0.00	3.65

Notes

Grab Samples

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:	Good	Bad	None
Well Identification	☐	☐	☒
Vault Cover	☒	☐	☐
Vault Seal	☒	☐	☐
Bolts	☒	☐	☐
Vault Lock	☒	☐	☒
Concrete Completion	☒	☐	☐
Well Lock/Seal	☒	☐	☐

Notes:

Well ID: V14AMPW3RN **Property Info:** **Date:** 7-16-14

Well Screen Interval (ft): 55 to 75 **Sampler(s):** Manny (MV); Kat (KK)

Measuring Point (TOM or TOC) Depth to Water (ft): 59.82 **Total Depth (ft):** ~~89~~ 79.7

Sampling Pump Type: SS hurricane **Pump Inlet Depth:** 65 ft.

Water Quality Meter Type: YSI 6920V2 **Serial #:**

Time	Volume Purged (mL)	Purge Rate (mL/min)	DTW (ft)	Temp (°C)	pH	Conductivity (mS/cm or µS/cm)	DO (mg/L)	ORP (+/- mV)	Turbidity (NTU)	Observations
10:30am			59.82							
11:09	started purge									
11:14	3,000mL	600mL/min.		23.02	7.05	1.295	4.37	171.5	278.5	
11:19	6,000mL			23.25	7.03	1.295	4.27	173.9	252	
11:24	9,000mL			23.41	7.02	1.292	4.19	176.7	192	
11:29	12,000			23.41	7.02	1.287	4.33	182.9	127	
11:34	15,000			23.56	7.02	1.288	4.33	184.8	75.2	
11:39	18,000			23.34	7.01	1.281	4.31	189.2	62.4	
11:44	21,000			23.15	7.01	1.276	4.41	193.0	53.4	
11:49	24,000			23.06	7.01	1.273	4.37	196.7	40.2	
Stabilization Criteria	--	Min. 100 mL/min	+/- 0.3 ft	+/- 1°C	+/- 0.1 units	+/- 3%	+/- 0.1 mg/L	+/- 10 mV	+/- 10%	Min. 3 readings

Sample Analyses Collected: ☒ Hex Chrome ☐ Total Chrome (filtered) ☐ Total Chrome (unfiltered) ☒ VOCs

Sample Time: 11:50 **ID:** V14AMPW3RN-0714 V14AMPW3RN-0714

QA/QC Analyses Collected: ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

QA/QC Time: **ID:**

Additional Comments: North Side on casing not marked
x turbid water
x DTW intervals not taken due to meter not fitting in 2" well.

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:	Good	Bad	None
Well Identification	☑	☐	☐
Vault Cover	☑	☐	☐
Vault Seal	☐	☑	☐
Bolts	☑	☐	☐
Vault Lock	☐	☐	☑
Concrete Completion	☑	☐	☐
Well Lock/Seal	☑	☐	☐

Notes:

Well ID: CS-C44-120 **Property Info:** **Date:** 7-17/14

Well Screen Interval (ft): 80 to 120 **Sampler(s):** MV & KK

Measuring Point (TOM or TOC) Depth to Water (ft): 88.85 **Total Depth (ft):** 120 ft

Sampling Pump Type: SS hurricane **Pump Inlet Depth:** 94 ft

Water Quality Meter Type: YSI 6920V2 **Serial #:**

Time	Volume Purged (mL)	Purge Rate (mL/min)	DTW (ft)	Temp (°C)	pH	Conductivity (mS/cm or µS/cm)	DO (mg/L)	ORP (+/- mV)	Turbidity (NTU)	Observations
8:15		started purging								
8:20	4,000	800	89.22	22.02	7.51	1.156	4.93	147.9	24.2	
8:25	8,000		89.22	22.08	7.48	1.164	4.56	147.1	19.7	
8:30	12,000		89.22	22.13	7.46	1.170	4.84	148.5	17.0	
8:35	16,000		89.24	22.17	7.44	1.176	4.69	149.7	32	
8:36	16,800		89.20	22.13	7.43	1.176	4.82	149.9	35.7	
8:38	18,400		89.20	22.09	7.43	1.175	5.07	150.3	11.5	
8:39	19,200		89.20	22.12	7.43	1.176	4.98	150.7	18.4	
Stabilization Criteria	--	Min. 100 mL/min	+/- 0.3 ft	+/- 1°C	+/- 0.1 units	+/- 3%	+/- 0.1 mg/L	+/- 10 mV	+/- 10%	Min. 3 readings

Sample Analyses Collected: ☐ Hex Chrome ☐ Total Chrome (filtered) ☐ Total Chrome (unfiltered) ☑ VOCs

Sample Time: 8:40 **ID:** CS-C44-120

QA/QC Analyses Collected: ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

QA/QC Time: **ID:**

Additional Comments:

x See COC for analysis list.

x gasget not tight

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:	Good	Bad	None
Well Identification	☑	☐	☐
Vault Cover	☑	☐	☐
Vault Seal	☑	☐	☐
Bolts	☑	☐	☐
Vault Lock	☐	☐	☑
Concrete Completion	☑	☐	☐
Well Lock/Seal	☑	☐	☐

Notes:

Well ID: CS-C45-54 **Property Info:** **Date:** 7/17/14

Well Screen Interval (ft): 24 to 54 **Sampler(s):** MV & KK

Measuring Point (TOM or TOC) Depth to Water (ft): 28.32 **Total Depth (ft):** 53.5

Sampling Pump Type: SS hurricane **Pump Inlet Depth:** 33

Water Quality Meter Type: YSI 69 20V2 **Serial #:**

Time	Volume Purged (mL)	Purge Rate (mL/min)	DTW (ft)	Temp (°C)	pH	Conductivity (mS/cm or µS/cm)	DO (mg/L)	ORP (+/- mV)	Turbidity (NTU)	Observations
10:50		start purging								
10:55	4,000	800	28.34	22.63	6.92	.930	7.56	209.8	0.8	
11:00	8,000		28.34	23.20	6.92	.943	7.34	207.2	4.9	
11:05	12,000		28.34	22.46	6.91	.929	7.59	209.8	2.6	
11:10	16,000		28.36	24.03	6.92	.957	7.42	210.2	4.8	
11:15	20,000		28.34	21.97	6.91	.917	7.16	212.9	4.0	
11:20	24,000		28.34	21.98	6.91	.917	7.51	214.3	1.6	
11:25	28,000		28.34	22.30	6.92	.923	7.63	216.7	1.5	
11:27			28.34	23.08	6.92	.933	7.57	218.0	1.7	
Stabilization Criteria	--	Min. 100 mL/min	+/- 0.3 ft	+/- 1°C	+/- 0.1 units	+/- 3%	+/- 0.1 mg/L	+/- 10 mV	+/- 10%	Min. 3 readings

Sample Analyses Collected: ☐ Hex Chrome ☐ Total Chrome (filtered) ☐ Total Chrome (unfiltered) ☒ VOCs

Sample Time: 11:30 **ID:** CS-C45-54

QA/QC Analyses Collected: ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

QA/QC Time: **ID:**

Additional Comments:

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:

	Good	Bad	None
Well Identification	☑	☐	☐
Vault Cover	☑	☐	☐
Vault Seal	☑	☐	☐
Bolts	☑	☐	☐
Vault Lock	☐	☐	☑
Concrete Completion	☑	☐	☐
Well Lock/Seal	☑	☐	☐

Notes:

Well ID: CS-C46-45 **Property Info:** **Date:** 7-16-19

Well Screen Interval (ft): 15 to 45 **Sampler(s):** Manny (MV), Kat (KK)

Measuring Point (TOM or (TOC)) Depth to Water (ft): 22.45 **Total Depth (ft):** 44.2

Sampling Pump Type: SS hurricane **Pump Inlet Depth:** 27ft.

Water Quality Meter Type: YSI 69 20V2 **Serial #:**

45 − 27 = 18

Time	Volume Purged (mL)	Purge Rate (mL/min)	DTW (ft)	Temp (°C)	pH	Conductivity (mS/cm or µS/cm)	DO (mg/L)	ORP (+/- mV)	Turbidity (NTU)	Observations
1:10		600 ml/min	22.80	started purging						
1:15	3,000mL		22.75	25.36	6.97	.9360	4.15	155.5	32.1	
1:20	6,000		22.72	25	6.95	.926	4.0	192.7	48.6	
1:25	9,000		22.72	25.19	6.97	.926	3.96	206.6	13.7	
1:30	12,000		22.72	25.03	6.97	.922	3.93	212.4	14.0	
1:35	15,000		22.72	26.17	6.98	.923	3.92	216.9	8.0	
1:40	18,000		22.72	25.08	6.98	.922	3.90	215.6	6.1	
Stabilization Criteria	--	Min. 100 mL/min	+/- 0.3 ft	+/- 1°C	+/- 0.1 units	+/- 3%	+/- 0.1 mg/L	+/- 10 mV	+/- 10%	Min. 3 readings

Sample Analyses Collected: ☐ Hex Chrome ☐ Total Chrome (filtered) ☐ Total Chrome (unfiltered) ☐ VOCs

Sample Time: 1:42 **ID:**

QA/QC Analyses Collected: ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

QA/QC Time: **ID:**

Additional Comments:

See COC for analysis collected. sample ID: CS-C46-45

OTIE

20.09

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:	Good	Bad	None
Well Identification	✓	☐	☐
Vault Cover	✓	☐	☐
Vault Seal	✓	☐	☐
Bolts	✓	☐	☐
Vault Lock	☐	☐	✓
Concrete Completion	✓	☐	☐
Well Lock/Seal	✓	☐	☐

Notes:

Well ID: CS-C47-53 **Property Info:** **Date:** 07/17/14

Well Screen Interval (ft): 23 to 53.5 **Sampler(s):** MV & KK

Measuring Point (TOM or TOC) Depth to Water (ft): 28.05 **Total Depth (ft):** 53.2

Sampling Pump Type: SS hurricane **Pump Inlet Depth:** 34 ft

Water Quality Meter Type: YSI 69 20V2 **Serial #:**

Time	Volume Purged (mL)	Purge Rate (mL/min)	DTW (ft)	Temp (°C)	pH	Conductivity (mS/cm or µS/cm)	DO (mg/L)	ORP (+/- mV)	Turbidity (NTU)	Observations
9:40am		Start purge								
9:45	4,000	800	28.05	22.52	6.95	.938	7.66	160.9	4.0	
9:50	8,000		28.07	22.84	6.95	.944	7.77	166.9	4.8	
9:55	12,000		28.05	23.14	6.94	.950	7.72	170.4	5.5	
10:00	16,000		28.08	23.02	6.92	.945	7.65	173.2	4.0	
10:05	20,000		28.07	23.08	6.93	.946	7.62	175.9	3.3	
10:07	21,600		28.07	22.90	6.92	.946	7.47	177.8	5.3	
10:08	22,400		28.07	22.97	6.92	.946	7.42	178.7	3.8	
10:09	23,200		28.07	23.03	6.93	.946	7.41	178.8	3.8	
Stabilization Criteria	--	Min. 100 mL/min	+/- 0.3 ft	+/- 1°C	+/- 0.1 units	+/- 3%	+/- 0.1 mg/L	+/- 10 mV	+/- 10%	Min. 3 readings

Sample Analyses Collected: ☐ Hex Chrome ☐ Total Chrome (filtered) ☐ Total Chrome (unfiltered) ☒ VOCs

Sample Time: 10:10 **ID:** CS-C47-53

QA/QC Analyses Collected: ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

QA/QC Time: **ID:**

Additional Comments:

x see COC list for analysis sampled.

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:	Good	Bad
Well Identification	☐	☑ No ID
Vault Cover	☑	☐
Vault Seal	☑	☐
Bolts	☑	☐
Vault Lock	☐	☐ N/A
Concrete Completion	☑	☐
Well Lock/Seal	☑	☐

Well ID: FCR-OW4R **Date:** 10-28-14 **Project No:** 2013152

A. Depth to water 35.23 feet **Location:** GCOU

B. Total depth of well 48.0 feet **Event:** 2014SA02

Sampler: ER

C. PID Ø ppm

Screened Interval NR to NR ft bgs

Purge Rate (mL/min) / Cumulative Purge Volume (mL)	DTW (ft btoc)	Time	pH	Conductivity (mS/cm, S/m or µS/cm)	Turbidity (NTU) (clear, slightly cloudy, cloudy, very cloudy)	DO (mg/L)	Temp (°C)	ORP (+/- mV)
500 / Initial	–	0857	6.72	0.940	6.25	5.82	21.38	208.2
/ 2500	35.74	0902	6.67	0.951	4.86	5.74	21.81	209.7
/ 5000	35.79	0907	6.63	0.961	5.14	5.61	22.14	209.3
/ 7500	35.82	0912	6.62	0.967	5.73	5.05	22.60	208.1
/ 10000	35.84	0917	6.62	0.971	5.69	5.10	22.71	206.8
/ 12500	35.84	0922	6.62	0.971	5.70	5.10	22.76	206.1
/								
/								
/								
/								
/								

Purging Device: Mega Monsoon **Pump inlet depth:** 40 ft

Sampling Device: Mega Monsoon **Sample depth** 40 ft

YSI 556

Water Meter Used:	
~~TROLL 9500~~	X
Lamotte turbid	X
YSI	☐
Other:	

QA/QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☑ No QA/QC Sample

QA/QC Sample ID:

Date/Time of QC Sample: **Sample ID:** Y9MW9/FCR-OW4R-009

Additional Comments:

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:	Good	Bad
Well Identification	☐	☒
Vault Cover	☒	☐
Vault Seal	☒	☐
Bolts	☒	☐
Vault Lock	☐	☐ N/A
Concrete Completion	☒	☐
Well Lock/Seal	☒	☐

Well ID: FCR - WCW 2R **Date:** 10-28-14 **Project No:** 2013152

A. Depth to water 46.0 feet **Location:** GCOU

B. Total depth of well 57.5 feet **Event:** 2014SA02

Sampler: ER

C. PID _____ ppm

Screened Interval _____ to _____ ft bgs

Purge Rate (mL/min) / Cumulative Purge Volume (mL)	DTW (ft btoc)	Time	pH	Conductivity (mS/cm, S/m or µS/cm)	Turbidity (NTU) (clear, slightly cloudy, cloudy, very cloudy)	DO (mg/L)	Temp (°C)	ORP (+/- mV)
500 / Initial	—	0807	6.78	0.963	7.71	5.82	18.47	218.0
/ 2500	46.41	0812	6.64	0.968	6.35	5.75	18.62	218.3
/ 5000	46.45	0817	6.56	0.966	6.92	5.81	18.50	219.8
/ 7500	46.48	0822	6.52	0.964	6.84	5.64	18.25	220.2
/ 10000	46.50	0827	6.51	0.962	6.80	5.70	18.29	219.7
/ 12500	46.51	0832	6.51	0.967	6.86	5.66	18.34	218.7
/								
/								
/								
/								
/								

Purging Device: Mega Monsoon **Pump inlet depth:** 51 ft

Sampling Device: " " **Sample depth** 51 ft

YSI 556

Water Meter Used:
~~TROLL 9500~~ X
Lamotte turbid X
YSI ☐
Other: _____

QA/QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☒ No QA/QC Sample

QA/QC Sample ID: _____

Date/Time of QC Sample: _____ **Sample ID:** Y9MX0 / FCR-WCW2R-010

Additional Comments: Well TD on well seal. PVC at top of well not straight.

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:	Good	Bad
Well Identification	☐	☒
Vault Cover	☒	☐
Vault Seal	☒	☐
Bolts	☒	☐
Vault Lock	☐	☐ N/A
Concrete Completion	☒	☐
Well Lock/Seal	☒	☐

Well ID: HLA-1R **Date:** 10/28/14

A. Depth to water 42.31 **feet**

B. Total depth of well 58 **feet**

C. PID 0 **ppm**

Screened Interval NP **to** NP **ft bgs**

Project No: 2013152

Location: GCOU

Event: 2014SA02

Sampler: ER

Purge Rate (mL/min) / Cumulative Purge Volume (mL)	DTW (ft btoc)	Time	pH	Conductivity (mS/cm, S/m or µS/cm)	Turbidity (NTU) (clear, slightly cloudy, cloudy, very cloudy)	DO (mg/L)	Temp (°C)	ORP (+/- mV)
500 / started @ ~~7:15~~ EL		0718	6.71	0.997	6.44	6.96	20.21	220.9
/ 2500	42.45	0723	6.83	0.996	3.98	6.78	20.26	221.2
/ 5000	42.48	0728	6.69	0.995	5.50	6.89	20.95	221.3
/ 7500	42.50	0733	6.69	0.993	4.55	6.84	20.97	221.9
/ 10000	42.50	0738	6.70	0.991	3.27	6.81	20.96	222.2
/								
/								
/								
/								
/								
/								

Purging Device: SS Hurricane Pump

Pump inlet depth: 45 **ft**

Sampling Device: ,, ,, ,,

Sample depth 45 **ft**

YSI 556

QA/QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☒ No QA/QC Sample

QA/QC Sample ID:

Date/Time of QC Sample:

Sample ID: YGMW7/ECR-HLA1R-007

Water Meter Used:	
~~TROLL 9500~~	X
Lamotte turbid	X
YSI	☐
Other:	

Additional Comments:

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:	Good	Bad
Well Identification	☐	☑
Vault Cover	☑	☐
Vault Seal	☑	☐
Bolts	☑	☐
Vault Lock	☐	☐ N/A
Concrete Completion	☑	☐
Well Lock/Seal	☑	☐

Well ID: HMW-1R **Date:** 10-28-14 **Project No:** 2013152

A. Depth to water 46.8 feet **Location:** GCOU

B. Total depth of well 58.0 feet **Event:** 2014SA02

Sampler: ER

C. PID _____ ppm

Screened Interval _____ to _____ ft bgs

Purge Rate (mL/min) / Cumulative Purge Volume (mL)	DTW (ft btoc)	Time	pH	Conductivity (mS/cm, S/m or µS/cm)	Turbidity (NTU) (clear, slightly cloudy, cloudy, very cloudy)	DO (mg/L)	Temp (°C)	ORP (+/- mV)
500 / Initial	—	0607	6.26	1.044	18.4	6.55	20.13	257.7
/ 2500	~~47.06~~ 47.06	0612	6.52	1.039	13.2	6.21	20.56	244.8
/ 5000	47.13	0617	6.56	1.038	9.51	6.17	20.72	241.5
/ 7500	47.15	0622	6.59	1.038	9.12	6.13	20.77	239.2
/ 10000	47.16	0627	6.61	1.038	9.02	6.10	20.78	237.9
/								
/								
/								
/								
/								
/								

Purging Device: SS Hurricane Pro **Pump inlet depth:** 51 ft

Sampling Device: SS Hurricane Pro **Sample depth** 51 ft

YSI 556

Water Meter Used:	
~~TROLL 9500~~	X
Lamotte turbid	X
YSI	☐
Other: _____	

QA/QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☑ No QA/QC Sample

QA/QC Sample ID: _____

Date/Time of QC Sample: _____

Sample ID: YSMW8 / FCP-HMW1R-008 (ICOLS; Hex Chrome)

Additional Comments:

OTIE Oneida Total Integrated Enterprises

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:

	Good	Bad
Well Identification	☑	☐
Vault Cover	☑	☐
Vault Seal	☑	☐
Bolts	☑	☐
Vault Lock	☐	☐ N/A
Concrete Completion	☑	☐
Well Lock/Seal	☑	☐

Well ID: CS-C44-120 **Date:** 10-29-14 **Project No:** 2013152

A. Depth to water 89.35 feet **Location:** GCOU

B. Total depth of well 120.8 feet **Event:** 2014SA02

Sampler: ER

C. PID _____ ppm

Screened Interval _____ to _____ ft bgs

Purge Rate (mL/min) / Cumulative Purge Volume (mL)	DTW (ft btoc)	Time	pH	Conductivity (mS/cm, S/m or µS/cm)	Turbidity (NTU) (clear, slightly cloudy, cloudy, very cloudy)	DO (mg/L)	Temp (°C)	ORP (+/- mV)
500 / Initial	—	1123	6.17	~~8~~ 1.200	13.0	8.45	22.69	203.1
/ 2500	89.67	1128	6.62	1.190	8.56	5.93	22.42	202.4
/ 5000	89.76	1133	6.76	1.198	7.84	5.42	22.37	201.1
/ 7500	89.79	1138	6.79	1.199	8.21	5.06	22.40	199.9
/ 10000	89.83	1143	6.81	1.208	8.27	4.95	22.27	198.6
/ 12500	89.84	1148	6.83	1.212	8.17	4.90	22.27	196.3
/								
/								
/								
/								
/								

Purging Device: Mega Monsoon **Pump inlet depth:** 95 ft

Sampling Device: " " **Sample depth** 95 ft

QA/QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☑ No QA/QC Sample

QA/QC Sample ID: _____

Date/Time of QC Sample: _____ **Sample ID:** Y9MW2 / CS-C44-120-001

Additional Comments: MS/MSD collected

Water Meter Used:
~~TROLL 9500~~ X
Lamotte turbid X
YSI ☐
Other: _____

YSI 556

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:	Good	Bad
Well Identification	☑	☐
Vault Cover	☑	☐
Vault Seal	☑	☐
Bolts	☑	☐
Vault Lock	☐	☐ N/A
Concrete Completion	☑	☐
Well Lock/Seal	☑	☐

Well ID: CS-CU5-54 **Date:** 10/29/14

A. Depth to water 28.38 feet

B. Total depth of well 54.2 feet

C. PID 0 ppm

Screened Interval N/A to N/A ft bgs

Project No: 2013152

Location: GCOU

Event: 2014SA02

Sampler: ER

Purge Rate (mL/min) / Cumulative Purge Volume (mL)	DTW (ft btoc)	Time	pH	Conductivity (mS/cm S/m or µS/cm)	Turbidity (NTU) (clear, slightly cloudy, cloudy, very cloudy)	DO (mg/L)	Temp (°C)	ORP (+/- mV)
500 / Started @ 900		[illegible]	6.00	0.915	30.8	10.96	21.87	292.7
/ 2500	28.56	0905	6.32	0.914	69.5	10.73	20.80	215.5
/ 5000	28.58	0910	6.46	0.941	92.7	6.71	22.39	206.7
/ 7500	28.59	0915	6.50	0.943	24.1	6.59	22.53	204.3
/ 10000	28.60	0920	6.54	0.950	18.7	6.34	22.93	202.3
/ 12500	28.60	0925	6.62	0.970	14.8	6.41	22.81	200.6
/ 15000	28.60	0930	6.60	0.974	9.36	6.43	22.84	198.8
/ 17500	28.61	0935	6.59	0.972	10.1	6.40	22.87	198.1
/ 20000	28.61	0940	6.60	0.969	9.62	6.41	22.86	177.3
/		[illegible]						
/								

Purging Device: Mega Monsoon

Pump inlet depth: 35 ft

Sampling Device: " "

Sample depth 35 ft

YSI 556

Water Meter Used:	
~~TROLL 9500~~	X
Lamotte turbid	X
YSI	☐
Other:	

QA/QC Sample Collected Here? ☒ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

QA/QC Sample ID: YGM14/CS-CU5-54-0003

Date/Time of QC Sample: 10/29/14

Sample ID: YGM003/CS-CU5-54-0002

Additional Comments: Silty water

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:

	Good	Bad
Well Identification	☑	☐
Vault Cover	☑	☐
Vault Seal	☑	☐
Bolts	☑	☐
Vault Lock	☐	☐ N/A
Concrete Completion	☑	☐
Well Lock/Seal	☑	☐

Well ID: CS-C46-45 **Date:** 10-29-14 **Project No:** 2013152

A. Depth to water 22.65 feet **Location:** GCOU

B. Total depth of well 45.1 feet **Event:** 2014SA02

Sampler: ER

C. PID _____ ppm

Screened Interval _____ to _____ ft bgs

Purge Rate (mL/min) / Cumulative Purge Volume (mL)	DTW (ft btoc)	Time	pH	Conductivity (mS/cm, S/m or µS/cm)	Turbidity (NTU) (clear, slightly cloudy, cloudy, very cloudy)	DO (mg/L)	Temp (°C)	ORP (+/- mV)
500 / Initial	—	1016	6.12	0.852	5.18	7.42	21.22	208.5
/ 2500	22.75	1021	5.71	0.858	5.72	5.65	21.38	201.5
/ 5000	22.80	1026	5.74	0.860	7.34	5.25	21.45	198.6
/ 7500	22.81	1031	5.75	0.861	7.02	5.14	21.44	197.5
/ 10000	22.81	1036	5.75	0.863	6.55	5.10	21.47	196.9
/ 12500	22.82	1041	5.77	0.864	6.12	5.08	21.50	196.7
/								
/								
/								
/								
/								

Purging Device: Mega-Monsoon **Pump inlet depth:** 28 ft

Sampling Device: " " **Sample depth** 28 ft

YSI 556

Water Meter Used:
~~TROLL 9500~~ X
Lamotte turbid X
YSI ☐
Other: _____

QA/QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

QA/QC Sample ID: _____

Date/Time of QC Sample: _____ **Sample ID:** Y9MW4 / CS-C46-45-004

Additional Comments: ~~MS/MSD bottles taken.~~ ER

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:

	Good	Bad
Well Identification	☑	☐
Vault Cover	☑	☐
Vault Seal	☑	☐
Bolts	☑	☐
Vault Lock	☐	☐ N/A
Concrete Completion	☑	☐
Well Lock/Seal	☑	☐

Well ID: CS-C47-53 **Date:** 10-28-14 **Project No:** 2013152

A. Depth to water 22.21 feet **Location:** GCOU

B. Total depth of well 52.9 feet **Event:** 2014SA02

Sampler: ER

C. PID Ø ppm

Screened Interval NA to NA ft bgs

Purge Rate (mL/min) / Cumulative Purge Volume (mL)	DTW (ft btoc)	Time	pH	Conductivity (mS/cm, S/m or µS/cm)	Turbidity (NTU) (clear, slightly cloudy, cloudy, very cloudy)	DO (mg/L)	Temp (°C)	ORP (+/- mV)
500 / Initial	—	1119	6.70	0.928	12.0	11.17	21.24	193.4
/ 2500	23.02	1124	6.69	0.930	6.31	10.29	21.47	192.5
/ 5000	23.13	1129	6.69	0.940	5.29	6.69	21.56	193.2
/ 7500	23.18	1134	6.69	0.944	5.95	5.31	21.62	191.2
/ 10000	23.20	1139	6.68	0.944	5.20	5.36	21.60	190.1
/ 12500	23.21	1144	6.68	0.946	5.55	5.40	21.63	189.7
/								
/								
/								
/								
/								

Purging Device: Mega Monsoon **Pump inlet depth:** 30 ft

Sampling Device: Mega Monsoon **Sample depth** 30 ft

YSI 556

Water Meter Used:
~~TROLL 9500~~ X
Lamotte turbid X
YSI ☐
Other: _____

QA/QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☒ No QA/QC Sample

QA/QC Sample ID: _____

Date/Time of QC Sample: _____ **Sample ID:** YGMW5/CS-C47-53-025

Additional Comments:

OTIE

MONITORING WELL PURGE/SAMPLE LOG

Well Inspection Checklist:	Good	Bad
Well Identification	☐	☒
Vault Cover	☒	☐
Vault Seal	☒	☐
Bolts	☒	☐
Vault Lock	☐	☐ none
Concrete Completion	☒	☐
Well Lock/Seal	☒	☐

Well ID: V14AMPW3R **Date:** 10/30/14

A. Depth to water 60.75 feet

B. Total depth of well 80 feet

C. PID Ø ppm

Screened Interval 55 to 75 ft bgs

Project No: 2013152

Location: GCOU

Event: 2014SA02

Sampler: ER

Purge Rate (mL/min) / Cumulative Purge Volume (mL)	DTW (ft btoc)	Time	pH	Conductivity (mS/cm, S/m or µS/cm)	Turbidity (NTU) (clear, slightly cloudy, cloudy, very cloudy)	DO (mg/L)	Temp (°C)	ORP (+/- mV)
1 Started	0900							
500 / 2500	–	905	6.57	1.388	2662 NTU	5.88	20.88	220
500 / 5000	–	910	6.65	1.401	1841 NTU	5.42	21.43	211.4
500 / 7500	–	915	6.69	1.414	146 NTU	5.14	21.10	208.4
500 / 10000	–	920	6.70	1.417	71	5.01	21.02	207.6
500 / 12500	–	925	6.71	1.419	66	4.81	21.09	206.3
500 / 15000	–	930	6.72	1.416	26	4.70	21.10	205.9
500 / 17500	–	935	6.74	1.417	22	4.41	21.41	205.1
1		940	6.74	1.417	25	4.39	21.40	204.7
1		945						
1								

Purging Device: SS Hollicone Pro

Pump inlet depth: 66 ft

Sampling Device: " " "

Sample depth 66 ft

QA/QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☒ No QA/QC Sample

QA/QC Sample ID:

Date/Time of QC Sample:

Sample ID: Y9MW6 / V14AMPW3R-002

Water Meter Used:	
TROLL 9500	X
Lamotte turbid	X
YSI	☐
Other:	

Additional Comments: No ID on well -2" Casing - DTW meter + Pump do not fit. No DTW intervals
-combo to gate = 4718 -very turbid water!

OTIE

APPENDIX C

IDW Disposal Records

Phase 1 to 2B
Waste Manifest

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number

2. Page 1 of 1

3. Emergency Response Phone: 909-889-5607

4. Waste Tracking Number: 70805-1

5. Generator's Name and Mailing Address
US EPA
75 HAWTHORNE STREET
SAN FRANCISCO CA 94106
Att: LISA HANUSIAK
Generator's Phone: 415 972.3181

Generator's Site Address (if different than mailing address)
US EPA
700 BLOCK OF W NC
Burbank CA 9150

6. Transporter 1 Company Name: Haz Mat Trans, Inc
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
South Yuma County Landfill
19536 S. Avenue 1E
Yuma AZ 85366
Facility's Phone: 928 341-9300
U.S. EPA ID Number: AZR000506980

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	Non-Hazardous Waste Solid	1	CM	15		
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
9B.1 IDW DRILLT #

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: MIKE LAWN
Signature
Month Day Year

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: BRUCE LONLY
Signature
Month 9 Day 21 Year
Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name
Signature
Month Day Year

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

GENERATOR'S/SHIPPER'S INITIAL COPY

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number

2. Page 1 of 1

3. Emergency Response Phone: 909-889-5607

4. Waste Tracking Number: 70807-1

5. Generator's Name and Mailing Address
US EPA
75 HAWTHORNE STREET
SAN FRANCISCO CA 94106
Generator's Phone: 415 972.3181

Att: LISA HANUSIAK

Generator's Site Address (if different than mailing address)
US EPA
700 BLOCK OF WHITNALL HWY & 100 BLOCK FLORENCE
Burbank CA 91505

6. Transporter 1 Company Name: Haz Mat Trans, Inc.
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
South Yuma County Landfill
19536 S Avenue 1E
Yuma AZ 85366
Facility's Phone: 928 341 9300
U.S. EPA ID Number: A 9

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	Non-Hazardous Waste Liquid	01	TT	1	G	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
9B.1 IDW DRILL

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: [illegible]
Signature: [illegible]
Month Day Year: [illegible]

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: [illegible]
Signature: [illegible]
Month Day Year: [illegible]
Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name
Signature
Month Day Year

GENERATOR
INT'L
TRANSPORTER
DESIGNATED FACILITY

169-BLC-O 5 11977 (Rev. 9/09)

GENERATOR'S/SHIPPER'S INITIAL COPY

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number

2. Page 1 of 1

3. Emergency Response Phone: 909-889-5607

4. Waste Tracking Number: 70806 - 1

5. Generator's Name and Mailing Address
US EPA
75 HAWTHORNE STREET
SAN FRANCISCO CA 94106
Generator's Phone: 415 972 3181

Att: LISA HANUSIAK

Generator's Site Address (if different than mailing address)
US EPA
700 BLOCK OF WHITNALL HWY & 100 BLOCK FLORENCE
Burbank CA 91505

6. Transporter 1 Company Name: Haz Mat Trans, Inc.
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
South Yuma County Landfill
19536 S. Avenue 1E
Yuma AZ 85366
Facility's Phone: 928 341-9300
U.S. EPA ID Number: AZR000506980

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	Non-Hazardous Waste Liquid	1	TT	1800	G	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
9B.1 IDW DRILLING LIQUIDS PROFILE #C1301 GLOVES & GOGGLES

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Benjamin Lechler / CH2M HILL
Signature: ON BEHALF OF US EPA
Month 7 Day 7 Year 12

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Leonard Johnson
Signature
Month Day 7 Year 12
Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name
Signature
Month Day Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

GENERATOR'S/SHIPPER'S INITIAL COPY

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number

2. Page 1 of 1

3. Emergency Response Phone: 909.889.5607

4. Waste Tracking Number: 71662-2

GENERATOR

5. Generator's Name and Mailing Address
U.S. EPA Region 9
75 Hawthorne Street
San Francisco CA 94015

Generator's Site Address (if different than mailing address)
800 Block of Rosemary Lane
Burbank CA 91505

Generator's Phone:

6. Transporter 1 Company Name: Haz Mat Trans, Inc.
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
South Yuma County Landfill
19538 S. Avenue 1E
Yuma AZ 85366
Facility's Phone: 928 341 9300
U.S. EPA ID Number: AZR000506980

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non-Hazardous Waste Liquid (Drilling Fluids)	3	DM	150	G	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
9b.1) Non-Hazardous IDW-Drilling Fluids PROFILE#C1502
Gloves & Goggles
3X55 C23 32

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Mike Jarvis / Burns & McDonnell for US EPA
Signature
Month Day Year

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Michael Cusia
Signature
Month Day Year

Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name
Signature
Month Day Year

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of 1	3. Emergency Response Phone 909.889.5607	4. Waste Tracking Number 71662-4

GENERATOR

5. Generator's Name and Mailing Address
U.S. EPA Region 9
75 Hawthorne Street
San Francisco CA 94015
Generator's Phone:

Generator's Site Address (if different than mailing address)
4500 Block of Brunswick Avenue
Los Angeles CA 90039

6. Transporter 1 Company Name: Haz Mat Trans, Inc
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
South Yuma County Landfill
19536 S Avenue 1E
Yuma AZ 85366
Facility's Phone: 928 341-9300
U.S. EPA ID Number: AZR000506980

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non-Hazardous Waste Fluids (Drilling Fluids)	7	DM	350	G	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
9b.1) Non-Hazardous IDW Drilling Fluids PROFILE#C1499
Gloves & Goggles
c33 7455

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: [illegible] Signature: [illegible] Month Day Year

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Ovalle Signature: Month Day Year
Transporter 2 Printed/Typed Name Signature Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name Signature Month Day Year

GENERATOR'S/SHIPPER'S INITIAL COPY

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number:

2. Page 1 of 1

3. Emergency Response Phone: 909.889.5607

4. Waste Tracking Number: 71662 - 1

GENERATOR

5. Generator's Name and Mailing Address
U.S. EPA Region 9
75 Hawthorne Street
San Francisco CA 94015

Generator's Phone:

Generator's Site Address (if different than mailing address)
600 Block of Rosemary Lane
Burbank CA 91505

6. Transporter 1 Company Name: Haz Mat Trans, Inc
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
South Yuma County Landfill
19536 S. Avenue 1E
Yuma AZ 85366

Facility's Phone: 928 341-9300

U.S. EPA ID Number: AZR000506980

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non-Hazardous Waste Solid (Drilling Mud)	14	DM	[illegible]	P	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
9b.1) Non-Hazardous IDW-Drilling Solids PROFILE#C1498
Gloves & Goggles

14 X 55

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: [illegible] | Signature: | Month | Day | Year

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: [illegible] | Signature: | Month | Day | Year

Transporter 2 Printed/Typed Name: | Signature: | Month | Day | Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) | Month | Day | Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: | Signature: | Month | Day | Year

3

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of 1	3. Emergency Response Phone 909.889.5607	4. Waste Tracking Number 71662-3

GENERATOR

5. Generator's Name and Mailing Address
U.S. EPA Region 9
75 Hawthorne Street
San Francisco CA 94015
Generator's Phone:

Generator's Site Address (if different than mailing address)
4500 Block of Brunswick Avenue
Los Angeles CA 90039

6. Transporter 1 Company Name: Haz Mat Trans, Inc.
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
South Yuma County Landfill
19536 S. Avenue 1E
Yuma AZ 85366
Facility's Phone: 928 341-9300
U.S. EPA ID Number: AZR000506980

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non-Hazardous Waste Solid (Drilling Mud)	6	DM	900	P	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
9b.1) Non-Hazardous IDW Drilling Solids PROFILE#C1500
Gloves & Goggles
6X55

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: [illegible] IN BEHALF OF THE [illegible] Signature: [illegible] Month Day Year

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: [illegible] Signature: Month Day Year
Transporter 2 Printed/Typed Name: Signature: Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name Signature Month Day Year

GENERATOR'S/SHIPPER'S INITIAL COPY

TKT#1066736 TRK# 07

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CAD980894901
2. Page 1 of 1
3. Emergency Response Phone: 909.889.5607
4. Waste Tracking Number: 73022-1

5. Generator's Name and Mailing Address
U.S. EPA Region 9
75 Hawthorne Street
San Francisco CA 94015
Generator's Phone: 415 972-3152

Att: Lisa Hanusalk

Generator's Site Address (if different than mailing address)
U.S. EPA Region 9 (Druhbe Co. Site)
716/718 West Wilson Avenue
Glendale CA 91203

6. Transporter 1 Company Name: Haz Mat Trans, Inc.
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
South Yuma County Landfill
19536 S. Avenue 1E
Yuma AZ 85366
Facility's Phone: 928 341-9300
U.S. EPA ID Number: AZR000506980

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non-Hazardous Waste Solid non-Hazardous Non DOT	01	CM	20	Y
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
9b.1 Non-Hazardous IDW/ Drilling Solids Profile #C1987
Gloves & Goggles

Bin PT1293

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Gary Early/CH2MHill ON Behalf of US EPA
Signature:
Month 8 Day 19 Year 13

15. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Transporter Signature (for exports only):
Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Max Nunez
Signature:
Month 8 Day 19 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Frank Nunez
Signature:
Month 8 Day 20 Year 13

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

TKT#01
TKT#1066443

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CAD980894901
2. Page 1 of 1
3. Emergency Response Phone: 909.889.5607
4. Waste Tracking Number: 73023-1

5. Generator's Name and Mailing Address
U.S. EPA Region 9
75 Hawthorne Street
San Francisco CA 94015
Generator's Phone: 415 972-3152

Att: Lisa Hanusaik

Generator's Site Address (if different than mailing address)
U.S. EPA Region 9 (Drilube Co. Site)
716/718 West Wilson Avenue
Glendale CA 91203

6. Transporter 1 Company Name: Haz Mat Trans, Inc.
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
South Yuma County Landfill
19536 S. Avenue 1E
Yuma AZ 85366
Facility's Phone: 928 341-9300
U.S. EPA ID Number: AZR000506980

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non-Hazardous Waste Solid non-Hazardous Non DOT	1	CM	18	Y	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
9b.1 Non-Hazardous IDW/ Drilling Solids Profile #C1987
Gloves & Goggles
Box PT 2728

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.
Generator's/Offeror's Printed/Typed Name: Craig Early & Hazmat ON Behalf of US EPA
Signature:
Month 8 Day 19 Year 13

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Brian Fuerrington
Signature:
Month 8 Day 19 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

ROBERT LEE COBURN, JR. 15087 STATE OF ARIZONA

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Ana Ortega
Signature: Ana Ortega
Month 8 Day 21 Year 13

GENERATOR
INT'L
TRANSPORTER
DESIGNATED FACILITY

169-BLC-O 5 11977 (Rev. 9/09)

TRANSPORTER #1

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CAD980894901

2. Page 1 of 1

3. Emergency Response Phone: 909.889.5607

4. Waste Tracking Number: 73024-1

5. Generator's Name and Mailing Address
U.S. EPA Region 9
75 Hawthorne Street
San Francisco CA 94015
Att: Lisa Hanusaik
Generator's Phone: 415 972-3152

Generator's Site Address (if different than mailing address)
U.S. EPA Region 9 (Drilube Co. Site)
716/718 West Wilson Avenue
Glendale CA 91203

6. Transporter 1 Company Name: Haz Mat Trans, Inc.
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
South Yuma County Landfill
19536 S. Avenue 1E
Yuma AZ 85366
Facility's Phone: 928 341-9300
U.S. EPA ID Number: AZR000506980

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non-Hazardous Waste Liquids Non-hazardous Non DOT	1	TT	1500	G	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
9b.1 Non Hazardous Liquids IDW/drilling liquids Profile #C1988
GLOVES & GOGGLES

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Greg Early ON Behalf of CHRIS HILL US EPA
Signature:
Month Day Year: 08 19 13

15. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Date leaving U.S.:
Transporter Signature (for exports only):

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: KENNY IBARRA
Signature:
Month Day Year: 08 19 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year:

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Kenny Guerra
Signature: Kenny Guerra
Month Day Year: 8 12 13

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

169-BLC-O 5 11977 (Rev. 9/09)

TRANSPORTER #1

Phase 3
Waste Manifest

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CAD980894901
2. Page 1 of 1
3. Emergency Response Phone: 909-889-5607
4. Waste Tracking Number: 75526-1

5. Generator's Name and Mailing Address
U.S. EPA, Region 9
75 Hawthorne Street
San Francisco CA 94105
Att: Lisa Hanusiak
Generator's Phone: 415 972-3152

Generator's Site Address (if different than mailing address)
U.S. EPA, Region 9
SFV Area 2 GCOU
Glendale CA

6. Transporter 1 Company Name: Haz Mat Trans, Inc.
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Crosby & Overton
1630 W. 17th Street
Long Beach CA 90813
Facility's Phone: 562 432-5445
U.S. EPA ID Number: CAD028409019

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non-Hazardous Waste Liquid (IDW development, sampling & decon H2o)	19	DM	950	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
9b.1) IDW Development, Sampling & Decon H2o, Profile # 92235 19x55
Gloves & Goggles 24hr Emergency # Provided by Haz Mat Trans, Inc.
D1036011

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Eric Randall of OTIE on behalf of the EPA
Signature: [signature]
Month 08 Day 12 Year 14

15. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Transporter Signature (for exports only):
Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rali Mosley
Signature: [signature]
Month 08 Day 12 Year 14

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

~~1414~~ 1135

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Gabby Navarete
Signature: [signature]
Month 08 Day 11 Year 14

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

169-BLC-O 6 10498 (Rev. 9/09)

TRANSPORTER #1

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CAD980894901
2. Page 1 of 1
3. Emergency Response Phone: 909-889-5607
4. Waste Tracking Number: 75525-1

5. Generator's Name and Mailing Address
U.S. EPA, Region 9
75 Hawthorne Street
San Francisco CA 94105
Att: Lisa Hanusiak
Generator's Phone: 415 972-3152

Generator's Site Address (if different than mailing address)
U.S. EPA, Region 9
SFV Area 2 GCOU
Glendale CA

6. Transporter 1 Company Name: Haz Mat Trans, Inc.
U.S. EPA ID Number: CAT080012800

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
South Yuma County Landfill
19536 S. Avenue 1E
Yuma AZ 85365
Facility's Phone: 928 341-9300
U.S. EPA ID Number: AZR000506980

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non-Hazardous Waste Solid (drilling of environmental wells)	1	CM	20	Y	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
9b.1) Drilling of Environmental Wells, Profile # C2720
Gloves & Goggles 24hr Emergency # Provided by Haz Mat Trans, Inc.

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Eric Randall of OTIE on behalf of the EPA
Signature:
Month 8 Day 11 Year 2014

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Max Nunez
Signature:
Month 8 Day 11 Year 14
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Penny Guerra
Signature: Penny Guerra
Month 8 Day 12 Year 14

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

169-BLC-O 6 10498 (Rev. 9/09)

TRANSPORTER #1

APPENDIX D

Data Quality and Usability Assessment Report

DATA QUALITY AND USABILITY ASSESSMENT
Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

EPA CONTRACT NO. EP-S9-13-01
GLENDALE CHROMIUM OPERABLE UNIT RI/FS
EPA TASK ORDER NO. 005-RICO-09N2
DCN: EPS91301-005-0011

Prepared for:

United States Environmental Protection Agency
Region IX
75 Hawthorne Street
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With:

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Santa Ana, California 92707

October 27, 2014

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Acronyms and Abbreviations

µg/L	micrograms per liter
CAO	Cleanup and Abatement Order
CDDW	California State Water Resources Control Board Division of Drinking Water
COC	chain of custody
COPC	chemical of potential concern
Cr6	hexavalent chromium
DQO	data quality objective
DTSC	California Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
GCOU	Glendale Chromium Operable Unit
GRG	Glendale Respondents Group
GNOU	Glendale North Operable Unit
GSOU	Glendale South Operable Unit
LARWQCB	California Regional Water Quality Control Board, Los Angeles Region
MCL	maximum contaminant level
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
OU	operable unit
PARCC	precision, accuracy, representativeness, comparability, and completeness
PE	performance evaluation
PRP	potentially responsible party
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RSL	regional screening level
SDG	sample delivery group
SFV	San Fernando Valley
VOC	volatile organic compound
WDR	Waste Discharge Requirement

SECTION 1

Introduction

This Data Quality and Usability Assessment evaluates the results of quality assurance/quality control (QA/QC) activities associated with environmental data collection for the remedial investigation (RI) being conducted for the Glendale Chromium Operable Unit (GCOU), San Fernando Valley (SFV) Superfund Sites, in Los Angeles County, California.

The objective of the Data Quality and Usability Assessment is to ensure that the conclusions and recommendations presented in the GCOU RI report are supported by data of known, acceptable, and documented quality. Determining the use of the environmental data is critical in establishing criteria for judging the adequacy of the environmental data set. This Data Quality and Usability Assessment shows that the analytical results used to evaluate the nature and extent of the regional hexavalent chromium (Cr6) ground water contamination generally meet the data quality objectives (DQOs) developed for the RI, and that primary and secondary environmental data are of sufficient quality to support the conclusions and recommendations of the RI.

1.1 Background

In 2007, the U.S. Environmental Protection Agency (EPA) placed the GCOU on the National Priorities List based on the results of a 4-year study of chromium contamination conducted by the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB), and subsequent LARWQCB investigations. EPA's overall objective for conducting an RI was to evaluate the extent and distribution of regional Cr6 contamination in ground water at the SFV Superfund Sites and potential risks to human health and the environment posed by the contamination. EPA and the GCOU Respondents (The GCOU Respondents represent a subset of the facilities identified by EPA as potential sources of Cr6 contamination) jointly performed field investigations for the RI; EPA will document the findings of the RI in the RI report.

In addition to data collected by EPA, EPA developed the data set for the RI by reviewing environmental data collected from facilities conducting investigations under the oversight of EPA and facilities conducting investigations under the oversight of the LARWQCB and California Department of Toxic Substances Control (DTSC).

The GCOU RI data set includes primary and secondary environmental data as defined below.

- ***Primary data*** consist of data collected or developed directly by EPA.
- ***Secondary data*** consist of data collected by the GCOU Respondents, by other facilities in the SFV Superfund Sites under EPA oversight, and by facilities under the jurisdiction of LARWQCB, DTSC, and California State Water Resources Control Board Division of Drinking Water (CDDW). Secondary data also include data obtained from other sources, including maps, evaluation criteria (drinking water and risk-based screening values), models, data bases, and information systems.

The general approach for this Data Quality and Usability Assessment is outlined in the *Glendale Chromium Operable Unit – Data Quality and Usability Assessment Plan* Technical Memorandum (CH2M HILL, 2014). EPA assessed the quality and usability of both primary and secondary data compiled to support RI evaluations with the primary focus of the assessment on Cr6 analytical results. The following sections provide a summary of the items listed below.

- EPA's quality system to manage environmental data collection and use
- GCOU RI data set
- Methods and results of the primary and secondary data quality and usability assessments

SECTION 2

EPA Quality System

EPA implements a quality system to manage environmental data collection, evaluation, and use. The RI makes use of the quality system described in *Overview of the EPA Quality System for Environmental Data and Technology* (EPA, 2002a). The primary goal of a quality system is to ensure that the environmental data are of sufficient quantity and quality to support the intended use of the data. Three components make up the quality system used for the RI: planning, implementation, and assessment.

2.1 Planning Process

EPA developed performance criteria for data collected to complete the RI (that is, the type, quantity, and quality of data needed to evaluate the distribution of Cr6 in ground water) during the systematic planning process documented in the RI DQOs. The Quality Assurance Project Plan (QAPP) and related addenda document the performance criteria, the level of oversight, and QC activities required to ensure the criteria are satisfied.

To support the systematic approach, EPA developed DQOs for implementation of specific RI activities. EPA used the following seven-step process to identify the RI objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors to establish the quality and quantity of data needed to support decisions.

1. Define basis of evaluation.
2. Identify potential evaluation results.
3. Define evaluation boundaries.
4. Identify areas outside the evaluation boundaries.
5. Identify data needs and uses.
6. Evaluate data usability.
7. Optimize the design.

EPA developed DQOs for the RI Task and six RI Subtasks listed below.

- **RI Task** – GCOU Remedial Investigation
  - RI Subtask 1 – Data Collection
  - RI Subtask 2 – Evaluate Nature and Extent of Contamination
  - RI Subtask 3 – Evaluate Fate and Transport of Contamination
  - RI Subtask 4 – Perform Baseline Human Health Risk Assessment
  - RI Subtask 5 – Perform Ecological Risk Assessment
  - RI Subtask 6 – Assessment of Next Steps

The DQOs and QC requirements for primary environmental data acquisition are defined in the following documents.

- *Final Remedial Investigation Work Plan, San Fernando Valley Area 2 Superfund Site Glendale Chromium Operable Unit* (Work Plan) (EPA, 2012a)
- *Final Quality Assurance Project Plan, Remedial Investigation at San Fernando Valley Area 2 Superfund Site Glendale Chromium Operable Unit* (QAPP) (EPA, 2012b)
- *Final Field Sampling Plan, Remedial Investigation at San Fernando Valley Area 2 Superfund Site Glendale Chromium Operable Unit* (FSP) (EPA, 2012c)
- *Addendum 1 to the Field Sampling Plan, Remedial Investigation at San Fernando Valley Area 2 Superfund Site Glendale Chromium Operable Unit* (FSP Addendum) (EPA, 2014)

2.2 Implementation and Oversight

The GCOU RI field program was implemented by EPA and the GCOU Respondents. Primary data for the GCOU RI were acquired by EPA according to the approved methods and procedures documented in the QAPP and procedures provided in the FSP. EPA provided oversight of the GCOU Respondents field activities, including review and approval of planning documents, oversight of well installation and sampling, and collection of split ground water samples. EPA documented the findings from oversight of the GCOU Respondents activities in the Technical Memorandum titled, *Field Oversight, Split Sample Collection, and Data Evaluation for the San Fernando Valley Area 2 Superfund Site – Glendale Chromium Operable Unit*, which is provided in Appendix A (CH2M HILL, 2013).

2.3 Data Assessment

This report satisfies the data assessment component of EPA's quality system. This Data Quality and Usability Assessment evaluates whether or not the data were obtained using approved methods and procedures, and whether the data are usable for RI evaluations and decision making and meet the DQOs developed for the RI.

SECTION 3

GCOU Remedial Investigation Data Set

The environmental data from the SFV Superfund Sites available prior to the GCOU RI was collected primarily for facility-specific Cr6 and volatile organic compound (VOC) studies or evaluation of regional VOC contamination, and did not provide adequate information about the regional extent of Cr6 contamination to evaluate the associated potential risk to human health and the environment. To investigate the regional Cr6 contamination, EPA worked with other stakeholders to identify data gap areas where additional environmental data were required.

For the GCOU RI, EPA conducted quarterly ground water sampling and installed 19 ground water monitoring wells during four phases of fieldwork (Phases 1, 2a, 2b, and 3) at 18 different locations in the cities of Burbank, Glendale, and Los Angeles, California. EPA used a phased approach for the well installations to iteratively fill data gaps and minimize redundancy during the well installation process. The GCOU Respondents provided additional support to the GCOU RI field program by installing and sampling 12 ground water monitoring wells at 11 locations.

EPA will use data collected during RI field activities as well as existing data from secondary data sources to complete the RI. EPA conducted interviews with, and reviewed documents provided by, sources of key secondary data. Tables 3-1 and 3-2 summarize the primary and secondary data types and data collection procedures, respectively, for the data evaluated for the RI. The tables also present a summary of the data uses and data assessment. The primary and secondary data sets and data assessment methods are described below.

3.1 Primary Remedial Investigation Data

EPA generated the following types of primary data as part of the GCOU RI:

- Ground water monitoring well data
  - Well locations and reference point elevations
  - Screened intervals and well depths
- Lithologic logs
- Geophysical logs
- Ground water levels from monitoring wells
- Analytical data
  - Ground water sampling results

EPA also publishes criteria for evaluating ground water data (maximum contaminant levels [MCLs]) and assessing risk to human health (MCLs and regional screening levels [RSLs]). These additional forms of primary data are peer-reviewed, formally published, and of known and usable quality.

Table 3-1 summarizes the data collection, use, and assessment for the types of primary data described above. A more detailed discussion of the data quality and usability evaluation methods for primary data EPA generated during RI field activities is provided below.

3.1.1 Evaluation of Primary Remedial Investigation Data

The RI manager reviewed all ground water monitoring well construction data, lithologic logs, and ground water levels to ensure that data were collected in accordance with the approved planning documents and reported accurately. Geophysical logs were generated by a licensed professional and are of known and usable quality. These data types are considered of sufficient quality and usable for RI evaluations with no

additional assessment. The methods for evaluating and ensuring the quality and usability of ground water sample analytical results are described below.

3.1.1.1 Ground Water Sample Collection

EPA conducted ground water sampling on an approximately quarterly basis for the GCOU RI starting in October 2012. In general, EPA sampled new GCOU RI monitoring wells as well as key existing monitoring wells following procedures outlined in the FSP and FSP Addendum (EPA, 2012c and 2014). EPA collected samples from two monitoring wells, FCR-WCW1 and V13DWBW3, using a disposable bailer because at the time of sampling, there was not an adequate water column to operate a pump. This deviation from the sampling procedures described in the FSP does not impact the usability of Cr6 data from these monitoring wells.

The extended duration of ground water monitoring provides a sufficient quantity of data to establish baseline conditions at new monitoring wells and, along with secondary data, evaluate the distribution of Cr6.

3.1.1.2 Analytical Program for GCOU RI Ground Water Monitoring

All ground water samples collected during GCOU RI monitoring were submitted for Cr6 and total chromium analyses. EPA submitted samples for additional analyses as described below:

- Dissolved metals, general chemistry parameters, and emerging compounds (1,4-dioxane, n-nitrosodimethylamine, perchlorate, and 1,2,3-trichloropropane) were analyzed during initial sampling events at new monitoring wells to establish baseline conditions for these parameters.
- VOCs were analyzed during initial sampling events at new monitoring wells and periodically at new and existing monitoring wells to provide additional information on the distribution of VOCs in SFV Area 2.

The QAPP explains the rationale for the frequency of sampling and the types of analyses (EPA, 2012b). EPA obtained laboratory analytical services through the Contract Laboratory Program, the EPA Region 9 Laboratory, and commercial laboratories. Cr6 analyses were performed by commercial laboratories (American Environmental Testing Laboratory, Inc., and Calscience Environmental Laboratories, Inc.), and by EPA's Region 9 Laboratory.

The QAPP contains the analytical parameters and the associated methods, along with the standard EPA analytical method references. Exhibit 3-1 shows the method, detection limit, and the measurement performance criteria for Cr6 as identified in the QAPP.

EXHIBIT 3-1
Methods, Detection Limits, and Measurement Performance Criteria for Ground Water Samples
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Analyte	Method	Target Detection Limit/ Reporting Limit	Precision (Relative % Deviation)	Accuracy (Percent Recovery)	Completeness (Percent)
Hexavalent chromium	EPA Method 218.6	0.2 µg/L	±25	75 – 125	90

Note:
µg/L – micrograms per liter

The analytical program also included preparation and analysis of performance evaluation (PE) samples to evaluate the accuracy of Cr6 analytical results from samples collected by EPA and the GCOU Respondents. PE sample results are discussed in Section 4.1.2.

3.1.1.3 Field Quality Control Activities

Following the QC protocols presented in the QAPP ensures that investigation records and other supporting documentation provide an accurate and representative record of field conditions. QC activities conducted to support the field sampling include the following measures.

- **Field QC Samples**—Analysis of field blanks and equipment rinsate blanks in compliance with the QAPP.
- **Records Review**—Review of sample collection records, including water level measurements, field notebooks, and chain of custody (COC) records.
- **Form Checks**—Review of the sample cross-reference lists used to document the identification of field blanks, equipment rinsate blanks, laboratory QC samples, and field duplicate samples for reference in data review.
- **Field Team Oversight**—Evaluation of the implementation of documentation procedures by field team members to confirm the accuracy and completeness of recordkeeping.

No significant deviations from the QA/QC procedures described in the FSP, FSP Addendum, or QAPP adversely affect the usability of the data for the GCOU RI.

3.1.1.4 Primary Data Review and Validation Program

The analytical data review included a combination of full data validation (Tier 3 level) and summary data review (Tier 1A level). The level of review exceeded the project goal of 10 percent Tier 3 validation.

- **Tier 1A Review**—Evaluation of data from April 2014 samples analyzed by the EPA Region 9 Laboratory consisted of a manual "Tier 1A" review of data summary forms only.
- **Tier 3 Review**—The Tier 3 validation procedure includes all elements of the Tier 1 review plus a qualitative and quantitative evaluation of 10 percent of the raw data.

All data review and validation approaches considered the QC elements listed below.

- Sample holding times
- Method blanks
- Laboratory control samples
- Continuing calibration standards
- Matrix spikes (MS)
- Sample duplicates and spike duplicates
- Internal standards

EPA performed review and validation of the primary data for the GCOU RI consistent with the guidelines described in the following reference documents.

- EPA Region 9 guidance (EPA, 2001)
- EPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA, 2004)
- QAPP (EPA, 2012b)

The overall data review and validation program attained the project objectives with no adverse effects on data quality or usability. Appendix B provides the Cr6 data validation reports. Each data validation report contains subsections that correspond to the internal QC check requirements as identified in the project QAPP and EPA data validation functional guidelines. If laboratory data deviate from the specifications, the subsection provides quantitative details for the QC data deviation and the associated affected samples, and provides flags according to defined conventions.

3.2 Secondary Remedial Investigation Data

EPA will use the following types of secondary data for the GCOU RI:

- Ground water monitoring well data
  - Well locations and reference point elevations
  - Screened intervals and well depths
- Lithologic logs
- Ground water levels from monitoring wells
- Analytical data
  - Ground water sampling results
  - Soil sampling results
- Aquifer testing data
  - Water levels from pumping and observation wells
  - Discharge rates from pumping wells
- Topographic Data
- Land use data
- Geologic data
  - Geologic maps
  - Geophysical logs
- Hydrologic data
  - Precipitation data
  - Surface water data
  - Pumping data
- Evaluation criteria
  - Drinking water standards
  - Human health risk screening levels
  - Ecological risk screening levels
  - Chemical toxicity values

The secondary data sources include the following:

- EPA SFV basinwide database
- GCOU Respondents and Glendale Respondents Group (GRG)
- Facilities under environmental oversight by LARWQCB and DTSC
- Local city governments including Burbank, Glendale, and Los Angeles
- Other federal, state, and local agencies, including:
  - Upper Los Angeles River Area Watermaster
  - Unites States Army Corps of Engineers
  - CDDW
  - Unites States Geological Survey
  - Unites States Department of Energy

Table 3-2 summarizes the data collection, use, and assessment for the types of secondary data described above. A more detailed discussion of the data quality and usability evaluation methods for secondary data is provided below.

3.2.1 Evaluation of Secondary Remedial Investigation Data

Secondary data in the form of published information or regulatory levels from federal, state, or local agencies (topographic data, land use data, MCLs, etc.) are of known and usable quality and do not require further assessment. The data assessment activities for key sources of secondary Cr6 data are summarized below.

3.2.1.1 GCOU Respondents and Glendale Respondents Group

EPA will use the following secondary data from the GCOU Respondents and the GRG to complete the RI:

- GCOU Respondents: lithologic information, well construction information, monitoring well survey data, and ground water sample results collected for the GCOU RI (ERM, 2013).
- GRG: Ground water levels and sample results from semiannual monitoring of SFV RI monitoring wells; lithologic information, well construction information, monitoring well survey data, and ground water sample results collected under the focused feasibility study scope of work (ERM, 2012).

EPA provides direct oversight of data collection activities performed by the GCOU Respondents and GRG; therefore, these parties were not interviewed. EPA used split-sample comparison and PE sample results, documented in a separate technical memorandum (CH2M HILL, 2013), to evaluate the precision and accuracy of Cr6 data collected by the GCOU Respondents.

3.2.1.2 City of Glendale and LARWQCB Facilities

EPA will use secondary water level and analytical data generated by LARWQCB cleanup sites in the GCOU area and by the City of Glendale. LARWQCB sites are required to perform routine ground water monitoring under Cleanup and Abatement Orders (CAOs) and Waste Discharge Requirement (WDR) permits. The City of Glendale routinely monitors extraction wells and piezometers as part of the interim VOC remedies for the Glendale North and Glendale South Operable Units (OUs).

EPA evaluated secondary data consistent with Chapter 3 (Projects Using Existing Data) of the *Guidance for Quality Assurance Project Plans* (EPA, 2002b). EPA interviewed the City of Glendale, generators of key secondary analytical data, and the LARWQCB, which provides oversight of facilities collecting key secondary analytical data, to evaluate the procedures followed and documentation generated during collection of secondary Cr6 data. Based on the information obtained during the interviews, EPA ranked the adequacy and suitability of the quality systems applied to the secondary data collection program according to the probable effect on the data. EPA applied a numerical rank to each quality system element as follows:

- Rank 3: The quality system is consistent with that employed during collection and analysis of primary samples.
- Rank 2: The quality system is generally consistent with that employed during collection and analysis of the primary samples, although some caveats on the confidence or significance of findings based solely on these data should be noted.
- Rank 1: The quality system does not meet EPA's requirements and the data cannot be used for critical decisions associated with EPA's RI, although it may be suitable for its original purpose and for use as information only in the RI.

The average of the rankings for each secondary data source were used to assign a data use category. Section 4.2 summarizes the interviews with LARWQCB and the City of Glendale, the quality systems evaluated, and the numerical rank for data from each facility.

SECTION 4

Data Quality and Usability Assessment

This section presents the assessment of primary and secondary Cr6 data used for GCOU RI evaluations. The assessment follows the procedures outlined in the Data Quality and Usability Assessment Plan (CH2M HILL, 2014) and QAPP (EPA, 2012b).

4.1 Primary Data Quality and Usability Assessment

Completing the data quality and usability assessment helps to ensure that the conclusions and recommendations presented in the RI report are supported by environmental data of known, acceptable, and documented quality. Table 3-1 summarizes the data collection procedures, data uses, and data assessment for the primary data types identified in the DQO tables. Table 4-1 provides a data validation summary for all GCOU RI ground water sample laboratory sample delivery groups (SDGs) between September 2012 and July 2014.

An evaluation of the quality indicators for analytical data of precision, accuracy, representativeness, comparability, and completeness (PARCC parameters) supports the qualitative and quantitative assessment of data. Exhibit 4-1 defines the data quality indicators and the criteria used to evaluate the quality of primary data. The following discussion summarizes the project QA/QC activities, in terms of the PARCC parameters.

EXHIBIT 4-1
Data Quality Indicators
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Type	PARCC Parameter	Evaluation Criteria	Quality Control Indicator
Qualitative	Comparability	Do the quality systems employed during sample collection and analyses comply with the requirements of the approved QAPP and the currently accepted standards and procedures?	Field records of sample collection and laboratory documentation of sample analysis.
	Representativeness	Was the approved sample collection and analysis strategy implemented and was the sampling design sufficient to produce results that represent site conditions?	Sampling design, including field modifications (if any), and analytical results.
Quantitative	Precision	Are the results of replicate analyses within the quantitative project acceptance criteria?	Laboratory and field duplicates.
	Accuracy	Is the recovery of Cr6 from samples containing known concentrations (analytical spikes) within project acceptance criteria?	Laboratory control samples (blank spikes), matrix spike (MS) samples, and matrix spike duplicate (MSD) samples.
	Completeness	Are sufficient usable data available to support project objectives?	Data flags applied during data review and validation.

4.1.1 Evaluation of Representativeness and Comparability

Representativeness assesses how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the sampled media. The assessment evaluates data collected from the field control samples (for example, field blanks, equipment rinsate blanks, and field duplicates) to measure representativeness.

The analysis of field blanks provides information on the possible presence of ambient contamination at the point of sample collection. Equipment rinsate blanks provide information on the effectiveness of

decontamination procedures, and field duplicates provide information on overall precision of sample collection and analytical procedures.

4.1.1.1 Field and Equipment Blanks

Field blanks demonstrate that the water used for the final decontamination rinse and for the preparation of the equipment rinsate blank is free from interfering contamination. Field blanks are prepared at a sample collection location, so they also could reveal ambient contamination that might affect field samples.

Use of equipment blanks, or aliquots of reagent water poured over reusable sampling equipment following decontamination, provides a check to confirm that the decontamination process prevents carryover contamination. The validation process qualifies sample results based on blank contamination (equipment or field) when the concentration of the analyte in the sample is less than five times the amount in the associated blank. Table 4-2 provides the field and equipment blank results and associated evaluations. For the blanks in which Cr6 was detected, three of the associated sample concentrations were lower than five times the blank concentrations and were J-flagged. These blank qualifications do not impact project decisions and do not affect the representativeness.

4.1.1.2 Field Duplicates

The FSP requires the collection of field duplicate samples to evaluate the overall sampling and analysis precision. The field duplicate sample collection frequency achieved the project goal of 10 percent of the number of field samples. EPA calculated the relative percent difference (RPD) and compared the field duplicate results. Exhibit 4-2 summarizes the criteria used to compare field duplicate results.

EXHIBIT 4-2
Criteria for Comparing and Reporting Results for Primary Field Duplicate Samples
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Analytical Results	Evaluation Criteria	Conclusion	Reporting Criteria[1]
Both results not detected	RPD cannot be calculated RLs differ by less than ± 25% RLs differ by more than ± 25%	 Agreement Disagreement	 Use reporting limit Use the lower of the two RLs
One positive result, one result not detected[2]	< 5 x difference > 5 x difference > 10 x difference	Agreement Disagreement Major Disagreement	Use positive result
One positive result above RL, one positive result between the MDL and RL[2]	< 3 x difference > 3 x difference > 5 x difference	Agreement Disagreement Major Disagreement	Use higher concentration
Both results above the RL, calculate the RPD	< 20% > 20% > 50%	Agreement Disagreement Major Disagreement	Use higher concentration

Notes:

[1] The reporting criteria for field duplicates are designed to ensure that the most conservative data set is used, in terms of protection of human health and the environment.

[2] A control limit equal to the absolute value of the RL was used if either the sample or the duplicate value was < 5x the RL.

MDL – method detection limit, the concentration of a chemical of potential concern (COPC) that could be distinguished from system background noise at the 95% confidence level.

RL – reporting limit, the concentration at which a COPC could be reliably quantitated within the method acceptance criteria.

RPD – relative percentage difference.

Table 4-3 provides the field duplicate measurements. Overall, the analytical data met project precision criteria listed in Exhibit 4-2, and there were no significant biases. Of the 26 pairs of field duplicate results, the RPDs for two pairs exceeded the evaluation criterion. RLs agreed for all analytes that were reported as not detected in pairs of field duplicate samples. Overall, 92 percent of the field duplicate results satisfied the

evaluation criteria, indicating acceptable overall sampling and analysis precision. Thus, the evaluation noted no systematic field errors or biases.

4.1.2 Evaluation of Accuracy and Precision

Accuracy measurement for Cr6 analytical data include laboratory control sample and MS recovery data. Cr6 results from some SDGs were flagged due to MS/MSD recovery data outside the specified acceptance criteria. In general, results from these SDGs (for a given monitoring well) are comparable to results from other sampling events (for the same monitoring well) and do not indicate any significant bias.

Precision measurement data include laboratory and field duplicate data expressed as RPD. As discussed in Section 4.1.1, review of the data determined that the laboratory duplicate data fall within acceptance criteria at large, as seen in the validation reports. The data do not indicate any significant bias.

4.1.2.1 Performance Evaluation Sample

Accuracy was also evaluated based on the concentration of Cr6 in PE samples. The PE sample analysis supports evaluation of the accuracy of analytical programs used by EPA and the GCOU Respondents. Blind PE samples are prepared by third parties with no relationship to the project team or the analytical laboratories. The PE sample includes a known amount of Cr6 that is added into a pure matrix (water in this case). The blind f PE samples were analyzed along with the regular monitoring samples collected during the initial ground water and split sampling event at the GCOU Respondents new monitoring wells. The PE samples were submitted blind, and were labeled and packaged using the same procedures as field samples to three separate laboratories.

- TestAmerica (GCOU Respondents commercial laboratory)
- American Environmental Testing Laboratory, Inc. (commercial laboratory used by EPA)
- EPA's Region 9 Laboratory

The PE sample scoring and evaluation reports for each of the three laboratories are included in Appendix B. The results of the PE evaluation indicate that the accuracy of the analytical programs at all three laboratories passed and are within acceptable limits.

4.1.3 Evaluation of Completeness

Tier 3 validation was completed for a minimum of 10 percent of the EPA Cr6 data as indicated in the QAPP. Appendix B contains the data validation reports. Of the data reviewed, approximately 16 percent of the Cr6 data were flagged during validation (54 of 334 results). The qualification of results was necessary, primarily because of initial calibration outliers and MS/MSD recovery outside specified acceptance criteria.

The percentage of usable results compared to unusable results quantifies completeness. No Cr6 data were deemed unusable or rejected during the data validation process. The data set achieved 100 percent completeness, which exceeds the 90 percent completeness goal for the project. Sufficient, acceptable data are available to support the decisions and conclusions of the RI.

4.1.4 Evaluation of Sensitivity and Quantitation

Analytical sensitivity refers to the ability of an analytical method to detect target analytes – Cr6 for the GCOU – at concentrations that are equal to or below evaluation criteria and are equal to or below the expected concentration range of Cr6. Method performance problems or other related issues might adversely affect quantitation of Cr6. Method limitations, high concentrations of other analytes, or difficult matrices resulting in dilutions and elevated RLs affect adequate sensitivity.

The detection limits for nearly all Cr6 analyses were below the evaluation criterion of 0.2 µg/L. Detection limits for Cr6 were elevated to 4 µg/L (or higher) for samples in four SDGs. Although the detection limits exceed the target detection limit, the only nondetect results in these SDGs were the field/equipment blanks. The elevated detection limits do not adversely affect usability of data from these SDGs.

4.2 Secondary Data Quality and Usability Assessment

Table 3-2 summarizes the data collection procedures, data uses, and data assessment for the secondary data types identified in the DQO tables. Ground water data collected from monitoring wells at four LARWQCB facilities and from the extraction wells and piezometers monitored by the City of Glendale as part of GNOU/GSOU ground water treatment plant operations comprise the secondary data set evaluated in this report.

The assessment evaluated the secondary data set based on elements of the quality systems implemented by external data collectors. EPA based the evaluation of the secondary data usability on the assumption that adherence to quality systems that are comparable to those employed by EPA would result in usable data. Table 4-4 summarizes the information EPA gathered during telephone interviews with the key secondary data providers and subsequent review of documents. The following sections provide additional details of the data collection and oversight methods, and procedures used by the secondary data providers.

EPA ranked the adequacy and suitability of the quality systems applied to the secondary data collection program according to the probable effect on the data. EPA applied a numerical rank to each QA element in Table 4-4. Exhibit 4-3 summarizes each QA element and how ranks were assigned.

EXHIBIT 4-3
Quality Assurance Elements and Ranking
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

QA Element	Rank 3[1]	Rank 2[1]	Rank 1[1]
Ground Water Sampling Method	Comparable sampling methods to those employed by EPA	NU	NU
Decontamination Procedure	Triple rinse decon procedures	Wash/ rinse decon procedures	NU
Chain of Custody (COC)	Comparable COC procedures	NU	NU
Sample Storage and Preservation	Comparable sample storage and preservation procedures	NU	NU
Shipping Procedure	Comparable shipping procedures	NU	NU
Laboratory Certification	Comparable laboratory certification	NU	NU
Cr6 Analytical Method	Comparable Cr6 method	NU	NU
Reporting Limit (RL)	Comparable to EPA RL of 0.2 µg/L	0.2 < RL ≤ 1	NU
Method Detection Limit (MDL)	Comparable to EPA RL of 0.2 µg/L	0.2 < MDL ≤ 0.5	NU
Equipment Blank	Comparable equipment blank procedure	NU	No equipment blanks collected
Duplicates	Duplicates collected	Duplicates not collected	NU
Data Review and Validation	Data validated or underwent external review	Data not validated, but laboratory QC data within acceptable limits	NU

Notes:

[1] Rankings are defined as follows:

Rank 3: The quality system is consistent with that employed during collection and analysis of primary samples.

Rank 2: The quality system is generally consistent with that employed during collection and analysis of the primary samples, although some caveats on the confidence or significance of findings based solely on these data should be noted.

Rank 1: The quality system does not meet EPA's requirements and the data cannot be used for critical decisions associated with EPA's RI, although it may be suitable for its original purpose and for use as information only in the RI.

NU – rank not used.

The average rank for all QA elements was used to assess overall usability of data from each secondary data source. Data from a given source was considered usable for GCOU RI evaluations if the average rank was greater than or equal to 2. Both secondary data sources evaluated had average ranks greater than 2 and are considered usable for RI evaluations.

4.2.1 LARWQCB Facility Data Quality Assessment

EPA evaluated the QA process implemented by LARWQCB during an interview with LARWQCB staff in August 2014 to obtain information about the elements of LARWQCB's quality systems. EPA also reviewed the most recent available monitoring reports for the key sources of Cr6 data, which are as follows:

- Former Excello Plating Company, Inc., Facility
- Former ITT Flower Site/Home Depot Development
- Former Menasco Aerospace Facility
- Former PRC-DESOTO Facility

The four facilities listed above are under LARWQCB oversight for existing CAOs and WDR permits. The participants in the interview included the following representatives from LARWQCB and EPA:

- Larry Moore, LARWQCB
- Rich Freitas, QA Office, EPA Region 9
- BJ Lechler, RI Manager, CH2M HILL

Interview checklists for the LARWQCB interview are included in Appendix C. Evaluation of the QA elements for each of the key LARWQCB Cr6 facilities, based on the interview and document review, is presented in Table 4-4. Based on the description of the LARWQCB QA process and review of facility documents, the assessment concludes that the quality of ground water data collected as part of the CAO and WDR compliance for facilities led by LARWQCB is sufficient to support all RI objectives. A summary of LARWQCB's oversight approach is provided below.

4.2.1.1 General LARWQCB Oversight Approach

LARWQCB implements a flexible QA process that is designed to accommodate the diverse scope of activities for investigating contaminant sources at facilities in the SFV. EPA prepared an example QAPP (EPA, 2008) for LARWQCB cleanup sites in the SFV and San Gabriel Valley, which is available to facilities as a reference; however, LARWQCB does not require that facilities adopt the SFV/ San Gabriel Valley QAPP for investigation or cleanup activities (EPA, 2008).

LARWQCB directs facilities suspected of having releases of Cr6 to conduct soil investigations of potential contaminant source areas**.** Each facility prepares a work plan based on the state guidance and submits the work plan to LARWQCB for review and approval. If significant contamination is detected in the soil beneath the facility, investigation of potential ground water contamination could follow.

LARWQCB oversees all phases of subsurface investigations, including installation of ground water monitoring wells and collection of ground water samples. The LARWQCB site manager typically performs field oversight at each stage in the investigation process. LARWQCB requires facilities to report all results for ground water monitoring, including laboratory certificates of analysis. The LARWQCB site manager acts as the responsible agent for reviewing and ensuring the technical quality of investigation and monitoring reports and of laboratory data.

LARWQCB requires facilities conducting subsurface investigations to use state-certified laboratories for analyzing ground water samples. State certification mandates that the laboratories maintain comprehensive quality programs that include the following basic elements.

- **Standardized Planning Documents** – Preparation of controlled QA documents for laboratory operations and analytical methods.
- **Self-Auditing** – Participation in regular onsite audits and implementation of a corrective action program to correct deficiencies.

4.2.2 City of Glendale Data Quality Assessment

EPA evaluated the QA process implemented by the City of Glendale during an interview in September 2014 to obtain information about the elements of Glendale's quality systems. EPA also reviewed recent Cr6 laboratory results from ground water monitoring related to operation of Glendale's Water Treatment Plant that supports the GNOU/GSOU interim remedies. The participants in the interview included the following representatives for the City of Glendale and EPA:

- Leo Chan, City of Glendale
- Dave Massie, City of Glendale
- Charles Cron, Glendale Water Treatment Plant Manager, CDM Smith
- BJ Lechler, RI Manager, CH2M HILL (on behalf of EPA)

The checklist for the interview with the City of Glendale is included in Appendix C. Evaluation of the QA elements for operation of Glendale's Water Treatment Plant, based on the interview and review of recent laboratory reports, is presented in Table 4-4. Based on the City of Glendale's reported QA process and review of documents generated by the City, the assessment concludes that the quality of ground water data collected as part of Glendale's Water Treatment Plant operations is sufficient to support all RI objectives.

SECTION 5

References

AMEC Environment & Infrastructure, Inc. 2014a. *2014 Annual Groundwater Monitoring Report, January 2014 through June 2014, Former Menasco Aerospace Facility, 100 East Cedar Avenue, Burbank, California*. June 12.

AMEC Environment & Infrastructure, Inc. 2014b. *Second Quarter 2014 Groundwater Monitoring Report, April through June 2014, Waste Discharge Permit, In Situ Treatment of Hexavalent Chromium and Volatile Organic Compounds in Perched Groundwater, Former Menasco Aerospace Facility, 100 East Cedar Avenue, Burbank, California*. June 14.

CCI. 2012. *Second Semi-Annual 2011 Groundwater Monitoring Report, Former Excello Plating Company, 4057 Goodwin Avenue, Los Angeles, California 90039, RWQCB File No. 113.5243*. January 31.

CH2M HILL. 2013. *Field Oversight, Split Sample Collection, and Data Evaluation for the San Fernando Valley Area 2 Superfund Site – Glendale Chromium Operable Unit*. Technical Memorandum prepared for EPA. September 6.

CH2M HILL. 2014. *Glendale Chromium Operable Unit – Data Quality and Usability Assessment Plan*. Technical Memorandum prepared for EPA. March 14.

ENVIRON International Corporation. 2014. *2013 Semi-Annual Sampling and Analysis Report (November 2013 Sampling Event) former ITT Flower Street Site, 1200 Flower Street, Burbank/Glendale, California*. January 31.

Environmental Resources Management (ERM). 2012. *Final Site Characterization Technical Memorandum, San Fernando Valley Superfund Sites, Area 2 – Crystal Springs, Glendale North and Glendale South Operable Units*. Prepared for the Glendale Respondents Group. October.

Environmental Resources Management (ERM). 2013. *Revised Final Specified Work Report, Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites, Area 2*. Prepared for the Glendale Chromium Operable Unit Respondents Group. October 21.

Geosyntec Consultants. 2014. *Treatment Status and Monitoring Report, Second Quarter 2014, Home Depot Development, 1200 Flower Street, Burbank/Glendale, California*. July 25.

Kleinfelder. 2014. *Second Quarter 2014 Monitoring Report, Revised Monitoring and Reporting Program No. CI-9837, Application of Calcium Polysulfide and Cement to Treat Soil and Groundwater, File No. 11-158, WDR Global ID No. WDR100001842, Former Excello Plating Co., Inc. Facility, 4057 and 4059 Goodwin Avenue, Los Angeles, California*. July 15.

Stantec Consulting Services, Inc. 2014a. *Fourth Quarter 2013 Groundwater Monitoring and Project Update Report, Former PRC-DESOTO Facility, 5430 San Fernando Road, Glendale, California, Geotracker Global ID # SL603799127*. January 2015.

Stantec Consulting Services, Inc. 2014b. *Annual 2013 Groundwater Monitoring and Project Update Report, Former PRC-DESOTO Facility, 5430 San Fernando Road, Glendale, California. Geotracker Global ID # WDR100000435*. January 2015.

U.S. Environmental Protection Agency (EPA). 2001. *Region 9 Superfund Data Evaluation/Validation Guidance*. R9QA/006.1.

U.S. Environmental Protection Agency (EPA). 2002a. *Overview of the EPA Quality System for Environmental Data and Technology*. EPA/240/R-02/003. November.

U.S. Environmental Protection Agency (EPA). 2002b. *Guidance for Quality Assurance Project Plans.* Chapter 3 (Projects Using Existing Data). EPA QA/G-5, EPA/600/R-02/009. December.

U.S. Environmental Protection Agency (EPA). 2004. *Functional Guidelines for Inorganic Data Review*. EPA540-R-04-004. October.

U.S. Environmental Protection Agency (EPA). 2008. *Final Quality Assurance Project Plan,* prepared for California Regional Water Quality Control Board, Los Angeles Region, Groundwater Division: Remediation Section, San Gabriel Valley/San Fernando Valley Cleanup Program. September.

U.S. Environmental Protection Agency (EPA). 2012a. *Final Remedial Investigation Work Plan, San Fernando Valley Area 2 Superfund Site Glendale Chromium Operable Unit*. April.

U.S. Environmental Protection Agency (EPA). 2012b. *Final Quality Assurance Project Plan, Remedial Investigation at San Fernando Valley Area 2 Superfund Site Glendale Chromium Operable Unit*. April.

U.S. Environmental Protection Agency (EPA). 2012c. *Final Field Sampling Plan, Remedial Investigation at San Fernando Valley Area 2 Superfund Site Glendale Chromium Operable Unit*. April.U.S. Environmental Protection Agency (EPA). 2014. *Addendum 1 to the Final Field Sampling Plan, Remedial Investigation at San Fernando Valley Area 2 Superfund Site Glendale Chromium Operable Unit*. May 5.

Tables

TABLE 3-1
Primary Environmental Data Set Analysis
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Data Type	Data Collection	Data Use	Data Assessment
Well data: • Well locations and reference point elevations • Ground water monitoring well construction information	• Well location and elevation data surveyed after well installation by a state-licensed surveyor. • Screened intervals determined after reviewing lithologic logs to evaluate coarse-grained intervals. Intervals recorded on well construction logs and in bound field notebooks.	• Develop geologic cross sections. • Calculate ground water elevations. • Develop ground water elevation contour maps. • Identify which ground water zones are influenced by pumping. • Calculate the ground water elevation of specific ground water zones.	• Data set includes locations and reference point elevations of EPA monitoring wells based on land and elevation surveys of known and usable quality. • Data set includes data for EPA monitoring well screened intervals recorded at time of construction of known and usable quality.
Lithologic logs	• Logs for EPA monitoring wells developed during the drilling process by an onsite geologist.	• Assess geologic properties. • Develop geologic cross sections. • Assess the presence of geologic controls on ground water flow (low and high hydraulic conductivity, lithology, degree of weathering, etc.).	• Lithologic logs for monitoring wells installed by EPA were reviewed by a California Professional Geologist. • Evaluations based solely on data from EPA monitoring well lithologic logs if inconsistencies between lithologic logs for monitoring wells.
Geophysical logs	• Geophysical logs generated by a licensed contractor of known and usable quality.	• Refine assessment of geologic properties. • Assess the depth of the alluvium/bedrock contact.	• Geophysical log interpretations supplemented and confirmed by lithologic information collected during drilling at EPA monitoring wells.
Ground water level at monitoring wells gauged by EPA	• Ground water level measurements collected using methods with ±0.01 foot accuracy.	• Calculate ground water elevations. • Assess ground water flow directions. • Calculate hydraulic gradients. • Calculate vertical gradients. • Estimate ground water flow velocities. • Assess the potential presence of geologic controls on ground water flow (separate hydrostratigraphic units).	• Data set includes water level data collected by EPA during routine monitoring. Depth to water measurements were compared to past measurements at wells and compared to water levels from adjacent wells screened across similar depth intervals to evaluate data quality. • Data set includes data from monitoring wells installed by EPA and other parties. Due to uncertainty in the quality of well elevation data for some wells installed by others, ground water elevation data from these wells will not be used in RI evaluations.

TABLE 3-1
Primary Environmental Data Set Analysis
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Data Type	Data Collection	Data Use	Data Assessment
Ground water laboratory analytical data	• Data collected by EPA.	• Assess the nature and general distribution of Cr6 contamination. • Calculate potential exposure point concentrations for use in the HHRA addendum.	• Laboratory analyses are performed by certified laboratories using approved methods. • Section 4.1 discusses the data validation process for the primary data.
Evaluation criteria for screening ground water environmental data: • Federal drinking water standards (EPA MCL)	• Evaluation criteria are peer-reviewed, formally published, and generally of known and usable quality.	• Identify areas with Cr6 impacts exceeding Federal drinking water standards.	• Data usable without further assessment.
• Human health risk screening levels: • EPA RSL • EPA MCL	• Screening levels used in the HHRA addendum are peer-reviewed, formally published, and generally of known and usable quality.	• Estimate potential risks associated with hypothetical domestic use of untreated ground water.	• Data usable without further assessment. The RI report will summarize uncertainties in the HHRA addendum.

Notes:
Cr6 – hexavalent chromium
HHRA – human health risk assessment
MCL – maximum contaminant level
RSL – regional screening level

TABLE 3-2
Secondary Environmental Data Set Analysis
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Data Type	Data Collection	Data Use	Data Assessment
Well data: • Facility monitoring well and production well locations and reference point elevations • Facility monitoring well and production well screened intervals	• Elevation data surveyed after well installation by a state-licensed surveyor. • Screened intervals determined after reviewing lithologic logs to determine high transmissive zone. Intervals recorded on well construction logs.	• Develop geologic cross sections. • Calculate groundwater elevations. • Develop groundwater elevation contour maps. • Calculate the groundwater elevation of specific groundwater zones.	• Data set includes locations and reference point elevations of EPA SFV RI monitoring wells and facility monitoring wells based on land and elevation surveys of variable quality. Reference elevation data are not documented for many locations. If reference elevations exhibit discrepancies with elevation data from other sources (topographic maps, other adjacent wells with elevation data of known quality), those data are not used for quantitative evaluations. • Monitoring well screened intervals recorded at time of construction are of known and usable quality.
Lithologic logs	• Logs for facility groundwater monitoring wells developed during the drilling process by an onsite geologist.	• Assess geologic properties. • Develop geologic cross sections. • Assess the presence of separate hydrostratigraphic units. • Assess the presence of geologic controls on groundwater flow (low and high hydraulic conductivity, lithology, bedrock fractures, degree of weathering, faulting, etc.).	• Geophysical logging confirmed lithologic information at some locations. • If there are inconsistencies between lithologic logs for adjacent monitoring wells, EPA uses the lithologic log based on the more comprehensive sampling method (that is, core versus grab samples).
Groundwater elevations at facility monitoring wells	• Facilities generally collected groundwater elevation measurements using methods with comparable accuracy to EPA's methods.	• Assess groundwater flow directions. • Calculate hydraulic gradients. • Calculate vertical gradients. • Estimate groundwater flow velocities. • Assess the potential presence of geologic controls on groundwater flow (separate hydrostratigraphic units).	• Reference elevation datum were reviewed for comparability to the current standard elevation datum for the SFV Superfund Site, NAVD 88. If elevations are not referenced to the NAVD 88 datum or exhibit discrepancies with elevation data from other sources (topographic maps, other adjacent wells with elevation data of known quality), ground water elevations calculated from those data are not used.

TABLE 3-2
Secondary Environmental Data Set Analysis
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Data Type	Data Collection	Data Use	Data Assessment
Groundwater laboratory analytical data from GNOU and GSOU extraction wells and piezometers	• Data obtained from the City of Glendale.	• Assess the nature and general distribution of Cr6 contamination. • Calculate potential exposure point concentrations for use in the HHRA addendum.	• Laboratory analyses are performed by certified laboratories using approved methods. • Section 4.2 discusses the data usability assessment for secondary data.
Groundwater laboratory analytical data from facility monitoring wells	• Data obtained from LARWQCB and DTSC.	• Identify potential locations of contaminant sources. • Assess the nature and general distribution of Cr6 contamination. • Calculate potential exposure point concentrations for use in the HHRA addendum.	• Laboratory analyses are performed by certified laboratories using approved methods. • Section 4.2 discusses the data usability assessment for secondary data.
Aquifer test data	• Data generated by the City of Glendale and GRG and considered to be generally of good quality.	• Assess hydraulic properties. • Estimate hydraulic conductivity. • Estimate groundwater flow velocities.	• Data usable without further assessment.
Topographic data	• Data from published USGS maps of known and usable quality.	• Assess the direction of surface water flow. • Develop a preliminary assessment of the ground water flow direction in the shallowest aquifer.	• Data usable without further assessment.
Land use data	• Published city and county data of known and usable quality.	• Evaluate land use throughout the GCOU.	• Data usable without further assessment.
Geophysical logs	• Geophysical logs generated by a licensed contractor of known and usable quality.	• Refine assessment of geologic properties.	• Geophysical log interpretations supplemented and confirmed by lithologic information collected during drilling.
Regional geologic data	• Data obtained from published sources of known and usable quality.	• Assess the potential presence of geologic controls on groundwater flow (faults, fractures, folds, etc.).	• Data usable without further assessment.

TABLE 3-2
Secondary Environmental Data Set Analysis
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Data Type	Data Collection	Data Use	Data Assessment
Precipitation data	• Published data from federal or state agencies of known and usable quality.	• Basis for discussion of groundwater recharge volume. • Assess the potential seasonality of groundwater recharge.	• Data usable without further assessment.
Surface water data: • Surface water flow data for the Los Angeles River and key tributaries in the study area	• Published data from federal or state agencies of known and usable quality.	• Basis for discussion of groundwater recharge volume.	• Data usable without further assessment.
Pumping data: • Production well pumping rates	• Published Watermaster data of known and usable quality.	• Assess well status (active/inactive) changes over time. • Identify production wells that are most likely to affect current groundwater flow directions. • Identify production wells that are most likely to have affected groundwater flow directions over time.	• Data usable without further assessment.
Evaluation criteria for screening groundwater environmental data: • California drinking water standards (MCLs)	• Evaluation criteria are peer-reviewed, formally published, and generally of known and usable quality.	• Identify areas with Cr6 impacts exceeding California drinking water standards.	• Data usable without further assessment.
Human health risk screening levels : • California PHG • California MCLs	• Screening levels used in the HHRA addendum are peer-reviewed, formally published, and generally of known and usable quality.	• Estimate potential risks associated with hypothetical domestic use of untreated ground water.	• Data usable without further assessment. The RI report will summarize uncertainties in the HHRA.

TABLE 3-2
Secondary Environmental Data Set Analysis
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Data Type	Data Collection	Data Use	Data Assessment
Ecological risk screening values for surface water: • Federal Ambient Water Quality Criteria for chronic exposure of freshwater organisms • California Toxics Rule for Aquatic Life Protection maximum for Cr6 • California MCLs and NLs • Los Angeles Region Basin Plan Water Quality Objectives • Others, such as Canadian Environmental Quality Guidelines and Ecotox Thresholds	• Screening levels and toxicity values used in the ecological risk evaluation are peer-reviewed, formally published, and generally of known and usable quality.	• Compare Cr6 concentrations to screening levels/toxicity values to identify chemicals that potentially pose a risk to lower-trophic-level ecological receptors (for example, fish and plants).	• Data usable without further assessment. The RI report will summarize uncertainties in the ecological risk evaluation.

Notes:
Cr6 – hexavalent chromium
GNOU – Glendale North Operable Unit
GRG – Glendale Respondents Group
GSOU – Glendale South Operable Unit
HHRA – human health risk assessment
MCL – maximum contaminant level
NAVD 88 – North American Vertical Datum 1988
NL – notification level
PHG – public health goal
RI – remedial investigation
SFV – San Fernando Valley
USGS – United States Geological Survey

TABLE 4-1
Data Validation Summary
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Laboratory	SDG	Well	Field Sample ID	Flag	Reason
AETL	66764	No data have been qualified with this SDG			
AETL	67153	No data have been qualified with this SDG			
AETL	67168	No data have been qualified with this SDG			
AETL	67184	No data have been qualified with this SDG			
AETL	67204	CS-C31-102	MY8KZ8	J	MS/MSD
AETL	67204	CS-C31-102	MY8L00	J	MS/MSD
AETL	67204	GSP-13	MY8L02	J	MS/MSD
AETL	67204	CS-C30-200	MY8L04	J	MS/MSD
AETL	67204	CS-C30-120	MY8L06	J	MS/MSD
AETL	67204	Equipment Blank	MY8L08	J	MS/MSD
AETL	67216	No data have been qualified with this SDG			
AETL	67303	V13EEMW1	V13EEMW1	J	MS/MSD
AETL	67303	PWA-6	PWA-6	J	MS/MSD
AETL	67303	PWA-12	PWA-12	J	MS/MSD
AETL	67303	PWA-7	PWA-7	J	MS/MSD
AETL	67314	PWA-10	PWA-10	J	MS/MSD
AETL	67314	PWA-9	PWA-9	J	MS/MSD
AETL	67314	PWA-8	PWA-8	J	MS/MSD
AETL	67314	PWA-13	PWA-13	J	MS/MSD
AETL	68212	PWA-07	Y8MX0	J	ICAL and MS/MSD
AETL	68212	PWA-06	Y8MX2	J	ICAL and MS/MSD
AETL	68212	PWA-12	Y8MX4	J	ICAL and MS/MSD
AETL	68212	Equipment Blank	Y8MX6	J	ICAL and MS/MSD
AETL	68222	CS-C32-120	Y8MX8	J	MS/MSD
AETL	68222	Equipment Blank	Y8MY0	J	MS/MSD
AETL	68222	CS-C33-059	Y8MY2	J	MS/MSD
AETL	68222	CS-C33-059	Y8MY4	J	MS/MSD
AETL	68244	CS-C31-102	Y8MY6	J	ICAL and MS/MSD
AETL	68244	CS-C30-200	Y8MY8	J	ICAL and MS/MSD
AETL	68244	CS-C30-120	Y8MZ0	J	ICAL and MS/MSD
AETL	68244	PWA-08	Y8MZ2	J	ICAL and MS/MSD
AETL	68244	Equipment Blank	Y8MZ4	J	ICAL and MS/MSD
AETL	68306	PWA-09	Y8MZ6	J	ICAL
AETL	68306	PWA-04	Y8MZ8	J	ICAL
AETL	68306	PWA-13	Y8N00	J	ICAL
AETL	68306	PWA-10	Y8N02	J	ICAL
AETL	68306	PWA-10	Y8N04	J	ICAL
AETL	68306	PWA-01	Y8N06	J	ICAL
AETL	68306	PWA-05	Y8N08	J	ICAL
AETL	68306	Equipment Blank	Y8N10	J	ICAL

TABLE 4-1
Data Validation Summary
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Laboratory	SDG	Well	Field Sample ID	Flag	Reason
AETL	68317	FCR-HLA1R	Y8N12	J	ICV and MS/MSD
AETL	68317	FCR-HMW1R	Y8N14	J	ICV and MS/MSD
AETL	68317	FCR-OW3	Y8N16	J	ICV and MS/MSD
AETL	68317	FCR-OW2	Y8N18	J	ICV and MS/MSD
AETL	68317	FCR-WCW4	Y8N20	J	ICV and MS/MSD
AETL	68317	FCR-WCW1	Y8N22	J	ICV
AETL	68317	Equipment Blank	Y8N24	J	ICV
AETL	68329	No data have been qualified with this SDG			
AETL	68345	FCR-OW4R	Y8N42	J	ICAL
AETL	68345	FCR-WCW2R	Y8N44	J	ICAL
AETL	68345	V14WDSW5	Y8N46	J	ICAL
AETL	68345	PWA-03	Y8N48	J	ICAL
AETL	68345	PWA-02	Y8N50	J	ICAL
AETL	68345	Equipment Blank	Y8N52	J	ICAL
AETL	69337	No data have been qualified with this SDG			
AETL	69351	No data have been qualified with this SDG			
AETL	69365	No data have been qualified with this SDG			
AETL	69380	No data have been qualified with this SDG			
AETL	69414	V13DWBW3	MY8SS5	J	EB
AETL	69446	No data have been qualified with this SDG			
AETL	69827	No data have been qualified with this SDG			
AETL	69851	No data have been qualified with this SDG			
AETL	69868	No data have been qualified with this SDG			
AETL	69882	No data have been qualified with this SDG			
AETL	69889	No data have been qualified with this SDG			
AETL	69914	No data have been qualified with this SDG			
AETL	70069	No data have been qualified with this SDG			
AETL	70115	No data have been qualified with this SDG			
AETL	70130	No data have been qualified with this SDG			
AETL	70141	No data have been qualified with this SDG			
AETL	70148	No data have been qualified with this SDG			
AETL	70158	No data have been qualified with this SDG			
AETL	70167	No data have been qualified with this SDG			
AETL	70173	No data have been qualified with this SDG			
AETL	70191	No data have been qualified with this SDG			
AETL	70207	No data have been qualified with this SDG			
AETL	70221	No data have been qualified with this SDG			
AETL	70234	No data have been qualified with this SDG			
AETL	70245	No data have been qualified with this SDG			
AETL	70254	No data have been qualified with this SDG			
AETL	70263	No data have been qualified with this SDG			

TABLE 4-1

Data Validation Summary

Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Laboratory	SDG	Well	Field Sample ID	Flag	Reason
CEL	13-11-1039	No data have been qualified with this SDG			
CEL	13-11-1186	No data have been qualified with this SDG			
CEL	13-11-1308	No data have been qualified with this SDG			
CEL	13-11-1416	No data have been qualified with this SDG			
CEL	13-11-1518	CS-C31-102	MY95C3	J	MS/MSD
CEL	13-11-1639	No data have been qualified with this SDG			
CEL	13-11-1763	No data have been qualified with this SDG			
EPA R9	14106A	No data have been qualified with this SDG			
EPA R9	14108A	No data have been qualified with this SDG			
EPA R9	14113A	No data have been qualified with this SDG			
EPA R9	14155A	No data have been qualified with this SDG			
EPA R9	14198A	CS-C44-120	CS-C44-120	J	Holding Time
EPA R9	14198A	CS-C45-054	CS-C45-54	J	Holding Time
EPA R9	14198A	CS-C47-053	CS-C47-53	J	Holding Time
EPA R9	14198A	V14AMPW3R	V14AMPW3RN-0714	J	Holding Time

Notes:

AETL - American Environmental Testing Laboratory, Inc.

CEL - Calscience Environmental Laboratories, Inc.

EB - equipment blank

EPA R9 - EPA Region 9 Laboratory

ICAL - initial calibration

ICV - initial calibration verification

MS/MSD - matrix spike/matrix spike duplicate

Data Qualifiers:

J - the reported concentration should be considered an estimated value

TABLE 4-2
Field and Equipment Blank Evaluation
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Well	Field Sample ID	QA/QC Type	Sample Date	Result	Laboratory Qualifier	Units	MDL	RL	Dilution	Final Result	Final Qualifier	Comment
Equipment Blank	MY8KY2	EB	10/16/2012	0.082		µg/L	0.02	0.05	1	0.082		No action
V14AMPW3	MY8KY0	N	10/16/2012	1,230		µg/L	1	5	50	1230		No action
V14AMPW1	MY8KY1	N	10/16/2012	544		µg/L	1	5	10	544		No action
Equipment Blank	Y8MZ4	EB	1/23/2013	0.06		µg/L	0.02	0.05	1	0.06		No action
CS-C31-102	Y8MY6	N	1/23/2013	0.97		µg/L	0.02	0.05	1	0.97		No action
CS-C30-200	Y8MY8	N	1/23/2013	2.79		µg/L	0.02	0.05	1	2.79		No action
CS-C30-120	Y8MZ0	N	1/23/2013	0.95		µg/L	0.02	0.05	1	0.95		No action
PWA-08	Y8MZ2	N	1/23/2013	1.96		µg/L	0.02	0.05	1	1.96		No action
Equipment Blank	MY8SS9	EB	5/7/2013	1.2		µg/L	0.02	0.05	1	1.2		No action
V14AMPW1	MY8SR9	N	5/7/2013	173		µg/L	2	10	2	173		No action
V14AMPW3	MY8SS1	N	5/7/2013	1,030		µg/L	20	100	20	1030		No action
V13DRMW5	MY8SS3	N	5/7/2013	782		µg/L	10	50	10	782		No action
V13DWBW3	MY8SS5	N	5/7/2013	4.49		µg/L	0.02	0.05	1	4.49	J	Lower than five times the blank result (6.0 µg/L)
V13DWBW1	MY8SS7	N	5/7/2013	6,710		µg/L	100	500	100	6710		No action
Equipment Blank	MY8ST9	EB	5/8/2013	0.532		µg/L	0.02	0.05	1	0.532		No action
V13DRMW4	MY8ST1	N	5/8/2013	4.45		µg/L	1	4	1	4.45		No action
V13DRMW4	MY8ST3	FD	5/8/2013	4.43		µg/L	1	4	1	4.43		No action
V13DRMW3	MY8ST5	N	5/8/2013	2,360		µg/L	50	200	50	2360		No action
V13DRMW2	MY8ST7	N	5/8/2013	952		µg/L	10	40	10	952		No action
V13DRMW1	MY8SW1	N	5/8/2013	555		µg/L	10	40	10	555		No action
V13DRMW1	MY8SW3	FD	5/8/2013	552		µg/L	10	40	10	552		No action
Equipment Blank	EB-0414Q-01	EB	4/15/2014	0.03	A3, J	µg/L	0.01	0.01	1	0.03	J	No action
V13DRMW7	V13DRMW7N-0414	N	4/15/2014	4.5	A3, J	µg/L	0.01	0.01	1	4.5	J	No action
V13DRMW8	V13DRMW8N-0414	N	4/15/2014	7.7	A3, J	µg/L	0.01	0.01	1	7.7	J	No action
CS-C43-083	CS-C43-083N-0414	N	4/15/2014	510	A3, J	µg/L	0.5	0.5	50	510	J	No action
CS-C30-120	CS-C30-120N-0414	N	4/15/2014	2.1	A3, J	µg/L	0.01	0.01	1	2.1	J	No action
CS-C30-200	CS-C30-200N-0414	N	4/15/2014	4.7		µg/L	0.01	0.01	1	4.7		No action
Equipment Blank	EB-0414Q-02	EB	4/16/2014	0.03		µg/L	0.01	0.01	1	0.03		No action
CS-C31-102	CS-C31-102N-0414	N	4/16/2014	1.8	A3, J	µg/L	0.01	0.01	1	1.8	J	No action
CS-C32-120	CS-C32-120N-0414	N	4/16/2014	1.7	A3, J	µg/L	0.01	0.01	1	1.7	J	No action
PWA-05	PWA-5N-0414	N	4/16/2014	5.1	A3, J	µg/L	0.01	0.01	1	5.1	J	No action
PWA-01	PWA-1N-0414	N	4/16/2014	18	A3, J	µg/L	0.01	0.01	1	18	J	No action
PWA-04	PWA-4N-0414	N	4/16/2014	12	A3, J	µg/L	0.01	0.01	1	12	J	No action
PWA-13	PWA-13N-0414	N	4/16/2014	2.7	A3, J	µg/L	0.01	0.01	1	2.7	J	No action
PWA-03	PWA-3N-0414	N	4/16/2014	1.5		µg/L	0.01	0.01	1	1.5		No action

TABLE 4-2
Field and Equipment Blank Evaluation
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Well	Field Sample ID	QA/QC Type	Sample Date	Result	Laboratory Qualifier	Units	MDL	RL	Dilution	Final Result	Final Qualifier	Comment
Equipment Blank	EB-0414Q-03	EB	4/17/2014	0.03	A3, J	µg/L	0.01	0.01	1	0.03	J	No action
PWA-09	PWA-9N-0414	N	4/17/2014	0.01	UA3, J, U	µg/L	0.01	0.01	1	0.01	U	No action
CS-C42-059	CS-C42-059N-0414	N	4/17/2014	8.1	A3, J	µg/L	0.01	0.01	1	8.1	J	No action
CS-C40-079	CS-C40-079N-0414	N	4/17/2014	16	A3, J	µg/L	0.01	0.01	1	16	J	No action
V13DRMW9	V13DRMW9N-0414	N	4/17/2014	15	A3, J	µg/L	0.01	0.01	1	15	J	No action
PWA-06	PWA-6N-0414	N	4/17/2014	7.1	A3, J	µg/L	0.01	0.01	1	7.1	J	No action
PWA-12	PWA-12N-0414	N	4/17/2014	3.7	A3, J	µg/L	0.01	0.01	1	3.7	J	No action
PWA-10	PWA-10N-0414	N	4/17/2014	16	A3, J	µg/L	0.01	0.01	1	16	J	No action
PWA-08	PWA-8N-0414	N	4/17/2014	3.4	A3, J	µg/L	0.01	0.01	1	3.4	J	No action
V14AMPW1	V14AMPW1N-0414	N	4/17/2014	120		µg/L	0.1	0.1	10	120		No action
Equipment Blank	EB-0414Q-04	EB	4/21/2014	0.03		µg/L	0.01	0.01	1	0.03		No action
V13GPPW2	V13GPPW2N-0414	N	4/21/2014	110	A3, J	µg/L	0.1	0.1	10	110	J	No action
V13GPP13	V13GPP13N-0414	N	4/21/2014	23	A3, J	µg/L	0.01	0.01	1	23	J	No action
FCR-WCW4	FCR-WCW4N-0414	N	4/21/2014	2.1	A3, J	µg/L	0.01	0.01	1	2.1	J	No action
V13DRMW1	V13DRMW1N-0414	N	4/21/2014	520	A3, J	µg/L	0.5	0.5	50	520	J	No action
V13DRMW1	V13DRMW1D-0414	FD	4/21/2014	520	A3, J	µg/L	0.5	0.5	50	520	J	No action
V13DWBW1	V13DWBW1N-0414	N	4/21/2014	2,400	A3, J	µg/L	1	1	100	2400	J	No action
V13DWBW3	V13DWBW3N-0414	N	4/21/2014	13	A3, J	µg/L	0.01	0.01	1	13	J	No action
Equipment Blank	EB-0414Q-05	EB	4/22/2014	0.04	A3, J	µg/L	0.01	0.01	1	0.04	J	No action
V13DRMW4	V13DRMW4N-0414	N	4/22/2014	3.1	A3, J	µg/L	0.01	0.01	1	3.1	J	No action
V13DRMW6	V13DRMW6N-0414	N	4/22/2014	4.7	A3, J	µg/L	0.01	0.01	1	4.7	J	No action
V13DRMW5	V13DRMW5N-0414	N	4/22/2014	240	A3, J	µg/L	0.2	0.2	20	240	J	No action
V13DRMW3	V13DRMW3N-0414	N	4/22/2014	10,000	A3, J	µg/L	10	10	1000	10000	J	No action
V13DRMW3	V13DRMW3D-0414	FD	4/22/2014	9,800	A3, J	µg/L	10	10	1000	9800	J	No action
PWA-07	PWA-7N-0414	N	4/22/2014	72	A3, J	µg/L	0.1	0.1	10	72	J	No action
PWA-07	PWA-7D-0414	FD	4/22/2014	67	A3, J	µg/L	0.1	0.1	10	67	J	No action
GNP-10	GN-P10N-0414	N	4/22/2014	6.6	A3, J	µg/L	0.01	0.01	1	6.6	J	No action
V14AMPW3R	V14AMPW3RN-0414	N	4/22/2014	330	A3, J	µg/L	0.2	0.2	20	330	J	No action
Equipment Blank	EB-0414Q-06	EB	4/23/2014	0.02	A3, J	µg/L	0.01	0.01	1	0.02	J	No action
CS-C35-041	CS-C35-041N-0414	N	4/23/2014	22	A3, J	µg/L	0.01	0.01	1	22	J	No action
CS-C34-065	CS-C34-065N-0414	N	4/23/2014	18	A3, J	µg/L	0.01	0.01	1	18	J	No action
GSP-13	GS-P13N-0414	N	4/23/2014	8.2	A3, J	µg/L	0.01	0.01	1	8.2	J	No action
CS-C38-051	CS-C38-051N-0414	N	4/23/2014	0.87	A3, J	µg/L	0.01	0.01	1	0.87	J	No action
CS-C38-051	CS-C38-051D-0414	FD	4/23/2014	0.9	A3, J	µg/L	0.01	0.01	1	0.9	J	No action

TABLE 4-2

Field and Equipment Blank Evaluation

Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Well	Field Sample ID	QA/QC Type	Sample Date	Result	Laboratory Qualifier	Units	MDL	RL	Dilution	Final Result	Final Qualifier	Comment
Equipment Blank	Equipment Blank	EB	7/16/2014	0.02		µg/L	0.02	0.02	1	0.02		No action
	CS-C46-45	N	7/16/2014	2.2		µg/L	0.02	0.02	1	2.2		No action
	V14AMPW3RN-0714	N	7/16/2014	250	A3, J	µg/L	0.02	0.02	1	250	J	No action
Equipment Blank	EC-0717	EB	7/17/2014	0.23		µg/L	0.02	0.02	1	0.23		
	CS-C44-120	N	7/17/2014	4.6	A3, J	µg/L	0.02	0.02	1	4.6	J	
	CS-C45-54	N	7/17/2014	2.3	A3, J	µg/L	0.02	0.02	1	2.3	J	
CS-C30-120	CS-C47-53	N	7/17/2014	3.7	A3, J	µg/L	0.02	0.02	1	3.7	J	No action

Notes:

µg/L - micrograms per liter

MDL - method detection limit

QA - quality assurance

QC - quality control

RL - reporting limit

Data Qualifiers:

A3 - the sample was prepped/analyzed past the recommended holding time

J - the reported concentration should be considered an estimated value

U - analyte not detected

UA3 -

TABLE 4-3
Field Duplicate Evaluation
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

				Parent Sample Results				Field Duplicate Results							Comparison to Evaluation Criteria in Event of Disagreement or Major Disagreement
Well	**Parent Sample ID**	**Field Duplicate ID**	**Sample Date**	**Result**	**Q**	**MDL**	**RL**	**Result**	**Q**	**MDL**	**RL**	**RPD**	**Conclusion**	**Reporting Criteria**	
CS-C31-102	Y8H52	Y8H53	9/6/2012	0.601		0.02	0.05	0.594		0.02	0.05	1.2%	Agreement	Use higher concentration	---
V13DRMW2	MY8KY6	MY8KY7	10/17/2012	229		1	2	243		1	2	5.9%	Agreement	Use higher concentration	---
CS-C31-102	MY8KZ8	MY8L00	10/19/2012	2.22	J	0.02	0.05	2.3	J	0.02	0.05	3.5%	Agreement	Use higher concentration	---
FCR-OW3	MY8L14	MY8L16	11/1/2012	33.9		1	5	33.6		1	5	0.9%	Agreement	Use higher concentration	---
CS-C33-059	Y8MY2	Y8MY4	1/22/2013	90.2	J	1	3	97.2	J	1	3	7.5%	Agreement	Use higher concentration	---
PWA-10	Y8N02	Y8N04	1/28/2013	8.54	J	0.1	0.25	10.4	J	0.1	0.25	19.6%	Agreement	Use higher concentration	---
V13GPP13	Y8N26	Y8N28	1/30/2013	28.7		0.2	0.5	28.9		0.2	0.5	0.7%	Agreement	Use higher concentration	---
PWA-01	MY8SP9	MY8SQ1	5/2/2013	11.8		0.1	0.25	12.4		0.1	0.25	5.0%	Agreement	Use higher concentration	---
V13DRMW4	MY8ST1	MY8ST3	5/8/2013	4.45		1	4	4.43		1	4	0.5%	Agreement	Use higher concentration	---
V13DRMW1	MY8SW1	MY8SW3	5/8/2013	555		10	40	552		10	40	0.5%	Agreement	Use higher concentration	---
CS-C40-079	Y8WP5	Y8WP7	6/20/2013	20.9		0.2	0.5	26.4		0.2	0.5	**23.3%**	Disagreement	Use higher concentration	Compare with mean historical detections.
CS-C38-051	Y8WR7	Y8WR9	6/25/2013	0.25		0.02	0.05	0.272		0.02	0.05	8.4%	Agreement	Use higher concentration	---
PWA-06	MY8XP5	MY8XP7	7/24/2013	18.8		0.1	0.25	16.6		0.1	0.25	12.4%	Agreement	Use higher concentration	---
PWA-10	MY8XS3	MY8XS5	7/29/2013	12.6		0.2	0.5	17.6		0.2	0.5	**33.1%**	Disagreement	Use higher concentration	Compare with mean historical detections.
CS-C34-065	MY8XX9	MY8XY1	8/2/2013	8.53		1	4	8.59		1	4	0.7%	Agreement	Use higher concentration	---
CS-C37-035	MY8XY5	MY8XY7	8/2/2013	15.7		1	4	14		1	4	11.4%	Agreement	Use higher concentration	---
V13DRMW5	MY8XZ5	MY8XZ7	8/5/2013	875		20	80	907		20	80	3.6%	Agreement	Use higher concentration	---
V13DRMW8	MY8Y17	MY8Y19	8/7/2013	5.87		1	4	6.21		1	4	5.6%	Agreement	Use higher concentration	---
V13EEMW1	MY95F7	MY95G8	11/13/2013	0.2	U	0.041	0.2	0.2	U	0.041	0.2	-	Agreement	Use reporting limit	---
CS-C30-200	MY95C1	MY95G4	11/20/2013	4.4		0.041	0.2	4.5		0.041	0.2	2.2%	Agreement	Use higher concentration	---
CS-C39-073	MY95D1	MY95G5	11/20/2013	220		0.2	1	230		0.2	1	4.4%	Agreement	Use higher concentration	---
V13DRMW6	MY95D6	MY95G6	11/21/2013	7.9		0.041	0.2	7.6		0.041	0.2	3.9%	Agreement	Use higher concentration	---
V13DRMW1	V13DRMW1N-0414	V13DRMW1D-0414	4/21/2014	520	J	0.5	0.5	520	J	0.5	0.5	0.0%	Agreement	Use higher concentration	---
V13DRMW3	V13DRMW3N-0414	V13DRMW3D-0414	4/22/2014	10,000	J	10	10	9,800	J	10	10	2.0%	Agreement	Use higher concentration	---
PWA-07	PWA-7N-0414	PWA-7D-0414	4/22/2014	72	J	0.1	0.1	67	J	0.1	0.1	7.2%	Agreement	Use higher concentration	---
CS-C38-051	CS-C38-051N-0414	CS-C38-051D-0414	4/23/2014	0.87	J	0.01	0.01	0.9	J	0.01	0.01	3.4%	Agreement	Use higher concentration	---

Notes:
MDL - method detection limit
Q - data qualifier
RL - reporting limit
RPD - relative percent difference

Data Qualifiers:
J - the reported concentration should be considered an estimated value
U - analyte not detected

TABLE 4-4

Secondary Data Usability Assessment Summary

Glendale Chromium Operable Unit, San Fernando Valley Superfund Site

QA Element	EPA	Excello (CAO)		Excello (WDR)		ITT (CAO)		ITT (WDR)		Menasco (CAO)			PRC Desoto (CAO)		PRC Desoto (WDR)		City of Glendale	
		Information	Rank	Information	Rank	Information	Rank	Information	Rank	Information	Rank	Rank	Information	Rank	Information	Rank	Information	Rank
Data Collection																		
Ground water sampling method	- Low flow with portable pumps and dedicated tubing - 3-volume purge for EPA SFV RI wells	'- 3-volume purge and sample with bailer	3	- 3-volume purge and sample with bailer - purge logs not available	3	- Low flow using dedicated sampling equipment	3	- Low flow with portable pumps and dedicated tubing	3	- 3-volume purge and sample from pump or purge and sample with bailer	3	3	- Low flow with portable pumps and dedicated tubing	3	- Low flow with portable pumps and dedicated tubing	3	- Sample tap for extraction wells '- 3-volume purge and sample from pump or purge and sample with bailer	3
Decontamination procedure	triple rinse	triple rinse	3	wash/rinse	2	NA	3	triple rinse	3	wash/rinse	2	2	triple rinse	3	triple rinse	3	wash/rinse	2
Sample Handling																		
Consultant	OTIE/CH2M HILL	CCI		Kleinfelder		ENVIRON		Geosyntec		AMEC			Stantec		Stantec		CDM	
Sample collection organization	OTIE/CH2M HILL	ERM		Kleinfelder		ENVIRON		Blaine Tech		AMEC			Stantec		Stantec		CDM/Blaine Tech	
COC (acceptable)	-	Y	3	Y	3	Y	3	Y	3	Y	3	3	Y	3	Y	3	Y	3
Storage and preservative (acceptable)	-	Y	3	Y	3	Y	3	Y	3	Y	3	3	Y	3	Y	3	Y	3
Shipping (acceptable)	-	Y	3	Y	3	Y	3	Y	3	Y	3	3	Y	3	Y	3	Y	3
Analytical Requirements																		
Laboratory	AETL, CEL, R9	TestAmerica		Enviro-Chem, Inc.		TestAmerica		Applied Speciation and Consulting, LLC		TestAmerica			TestAmerica		TestAmerica		Eurofins	
Laboratory Certified	NELAP/ELAP	NELAP/ELAP	3	ELAP	3	NELAP/ELAP	3	NELAP	3	NELAP/ELAP	3	3	NELAP/ELAP	3	NELAP/ELAP	3	NELAP/ELAP	3
Cr6 Method	EPA 218.6	EPA 7199 and 218.6	3	EPA 218.6	3	EPA 218.6	3	EPA 7199 M	3	EPA 218.6	3	3	EPA 218.6	3	EPA 218.6	3	EPA 218.6	3
RL/PQL	0.01 - 0.2	0.3	2	0.2	3	1	2	1	2	0.3	2	2	0.3	2	0.3	2	0.02	3
MDL	0.01 - 0.041	0.25	2	0.2	2	0.25	2	0.5	2	0.25	2	2	0.25	2	0.25	2	0.02	3
Field QC Requirements																		
Equipment Blank (Y/N)	Y	N	1	N	1	Y	3	Y	3	Y	3	3	Y	3	Y	3	N	1
Duplicate (Y/N)	Y	N	2	N	2	Y	3	Y	3	Y	3	3	N	2	N	2	Y	3
Data Review and Validation																		
External Review (Y/N)	Y	N		N		Y	3	N		N			N		N		N	
If no external review, laboratory QC samples acceptable (Y/N)	-	Y	2	Y	2	-		Y (1)	2	Y	2	2	Y	2	Y	2	Y	2
Report Reviewed	-	CCI, 2012		Kleinfelder, 2014		ENVIRON, 2014		Geosyntec, 2014		AMEC, 2014a			Stantec, 2014a		Stantec, 2014b		See Note (2)	
	Average Rank	**2.5**		**2.5**		**2.8**		**2.8**		**2.7**			**2.7**		**2.7**		**2.7**	

Notes:

(1) Reviewed laboratory reports for piezometers from 2014 annual sampling event

(2) (MS/MSD is low, but attributed to reducing character of samples)

AETL - American Environmental Testing Laboratory, Inc.
CEL - Calscience Environmental Laboratories, Inc.
CAO - Cleanup and Abatement Order
COC - chain of custody
ELAP - Environmental Laboratory Accreditation Program
MS/MSD - matrix spike/matrix spike duplicate
N - no
NELAP - National Environmental Laboratory Accreditation Program
QA - quality assurance
QC - quality control
R9 - EPA Region 9 Laboratory
WDR - Waste Discharge Requirement
Y - yes

Appendix A
Technical Memorandum: Field Oversight, Split Sample Collection, and Data Evaluation for the San Fernando Valley Area 2 Superfund Site – Glendale Chromium Operable Unit

Field Oversight, Split Sample Collection, and Data Evaluation for the San Fernando Area 2 Superfund Site - Glendale Chromium Operable Unit

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DATE: September 6, 2013

PROJECT NUMBER: 431469.DE.01

This technical memorandum presents the results of the oversight tasks performed by CH2M HILL on behalf of the U.S. Environmental Protection Agency (EPA) for the Glendale Chromium Operable Unit (GCOU). EPA conducted oversight of the GCOU Respondents Group (Respondents) field activities, including drilling and monitoring well installation, collection of geotechnical soil samples and ground water sampling. In addition, EPA collected and evaluated split and performance evaluation (PE) sample data associated with baseline sampling of the Respondents new ground water monitoring wells.

Data collected during the Respondents field activities is an important source of secondary data for the GCOU Remedial Investigation (RI); therefore, EPA's overall objectives for conducting field oversight and collecting and evaluating split and PE samples are as follows:

- Field oversight – evaluate the general capability of the Respondents field representatives and subcontractors to execute the field activities as outlined in the planning documents approved by EPA.
- Split sampling – establish a measure of comparability between Respondents and EPA sampling and analytical programs for ground water monitoring during the GCOU RI.
- PE sample analysis – evaluate the accuracy of the Respondents and EPA analytical programs.

Field oversight and results of split and PE samples will be used to assess the usability of the Respondents data for the GCOU RI. The results of EPA's oversight tasks indicate that data generated during the Respondents field activities are acceptable, specifically:

- Field oversight – the Respondents' field representatives and subcontractors were competent and effective in implementing the field activities and observed deviations will not impact the usability of data generated by the Respondents.
- Split samples – EPA and Respondents split sample results are found to be in agreement and comparable.
- PE sample analysis – PE sample results indicate that the accuracy of the EPA and Respondents analytical programs are within acceptable limits.

EPA's oversight tasks are discussed in more detail in the following sections.

Scope of Field Oversight

In April, May, June, September and October 2012, CH2M HILL, on behalf of the EPA, conducted field oversight of the work performed by Respondents field representatives and subcontractors. The oversight activities were

performed in accordance with the Technical Memorandum (TM) dated March 28, 2012 entitled, "*Glendale Chromium Operable Unit Field Oversight, Split Sample Collection, and Data Evaluation Plan*" (CH2M HILL, 2012).

CH2M HILL focused the oversight on the Respondents key investigation activities, including observing all major components of their field program at least once. CH2M HILL or E2 Consulting Engineers, Inc. (E2) (a team subcontractor to CH2M HILL) provided oversight for the following investigation activities:

- Geotechnical borings and soil sampling
- Monitoring well drilling, installation, and development
- Ground water sampling

In addition, CH2M HILL either coordinated with EPA in reviewing and approving, or reviewed and approved on behalf of EPA, the well screen intervals for each monitoring well prior to the commencement of well construction. Approval of well screen intervals was either provided in the field by CH2M HILL's representative field hydrogeologist or via teleconference with the Respondents.

CH2M HILL performed oversight more frequently at the onset of the field program to address any potential concerns early in the field effort (April through June 2012). Based on observations of the apparent competence and effectiveness of the Respondents field representatives and subcontractors in executing the field activities, CH2M HILL reduced the level of oversight accordingly (September and October 2012).

CH2M HILL recorded notes and took photographs during the oversight of Respondents activities to document the general work area and setup as well as any noteworthy observations or departures from the approved plans. Field oversight observations were summarized in a brief electronic mail correspondence and ultimately sent to EPA. Table 1 provides a summary of the Respondents activities observed including the location of each activity, contractor(s) and subcontractor(s) present, and any deviations or other pertinent observations. The Respondents locations listed in the table are shown on Figure 1. Additional details on observations made during the oversight activities are available in the electronic mail correspondence and accompanying field notes (Attachment 1). Attachment 2 contains a photo log of photographs taken during the field oversight activities. For each photograph taken, the photo log provides the date and a brief description of the activities captured in the photo.

The notes and photos of the field oversight activities indicate that the:

- Respondents' field representatives and subcontractors were competent and effective in implementing and completing their tasks as outlined in the Field Sampling Plan (FSP) (ERM, 2012) or as discussed and approved via teleconferences.
- Observed deviations or departures from approved plans were either insignificant, adequately addressed, or exceeded expectations and outlined in approved plans. The deviations or departures, as observed, will not impact the usability of data generated by the Respondents.

Split Sample Program

EPA has used the analytical results from ground water samples collected by both EPA and the Respondents during the initial sampling event and subsequent quarterly sampling events to:

- evaluate the distribution of CrVI in ground water; and,
- support the decision process for the final number and location of Phase 2B monitoring wells installed by EPA.

Therefore, collection of ground water split samples by the Respondents and the EPA to establish a measure of comparability between the sampling and analytical programs used during the GCOU RI effort by the Respondents and the EPA is warranted.

A split sample is a sample that has been homogenized (where homogenization is needed) and equally divided into two or more subsamples. The intent of the split sample analysis program is to duplicate the sample preparation, handling, and analysis being conducted by the Respondents consultant (ERM) and laboratory (Test America located in Irvine, California) on a subset of the RI samples. The split samples represent a small percentage of the overall data and provide one approach to evaluating data quality and representativeness of site conditions. The quality assurance / quality control (QA/QC) information for both laboratories and data, as outlined in the respective planning documents, field/lab oversight, laboratory final data packages, as well as data validation reports, must also be taken into consideration.

Collection of split soil samples for chemical or geotechnical analyses was not considered critical. The primary focus of EPA's RI is on defining the nature and extent of regional chromium contamination in ground water and evaluating potential risks to human health or the environment. The soil samples collected by the Respondents will not be directly used for either of these purposes.

Collection of Split Samples and Analytical Results

On October 29 and 30, 2012, CH2M HILL collected split ground water samples on behalf of the EPA at eight of the new monitoring wells installed by the Respondents and submitted them to American Environmental Testing Laboratory, Inc. (AETL) located in Burbank, California. EPA split ground water samples were only analyzed for hexavalent chromium (CrVI) even though the corresponding Respondents samples might also have been analyzed for other target analytes. Split ground water samples were analyzed for CrVI using EPA Method 218.6 as outlined in the Quality Assurance Project Plan (QAPP) (EPA, 2009).

The CrVI analytical results for both the EPA split and Respondents ground water samples are presented in Table 2. The left side of Table 2 lists the sample identification numbers for the EPA split and corresponding Respondents samples.

Data Validation

Prior to using the EPA ground water analytical data for split sample comparison, the data were validated to ascertain their usability for the comparison. Two levels of review and validation were performed on the analytical result of the ground water samples collected by CH2M HILL on EPA's behalf:

1) at the laboratory, and
2) outside the laboratory by CH2M HILL per the QAPP, that had been approved by the EPA Region 9 Quality Assurance Office.

Tier 3 data review was performed on 100 percent of the CrVI analytical results for the split samples.

The data validation indicates that the EPA data are usable for the split sample comparison and evaluation. The validation reports for the two split sample analytical batches of CrVI results are included as Attachment 3.

Split Sample Data Evaluation

The validated split sample data were compared and evaluated in accordance with the processes identified in the March 2012 TM as described below. The results of the comparison are presented in Tables 2 and 3.

EPA has compared the split samples, on a sample-by-sample basis, to the associated Respondents validated analytical results. The comparison included:

- Calculating the relative percent difference (RPD) between the each split sample pair in the two data sets.
- Comparing each split sample pair in the two data sets using the agreement/disagreement criteria outlined in the TM (CH2M HILL, 2012).

Relative Percent Difference

The relative percent difference (RPD) is calculated as follows:

$$RPD = \frac{(C_1 - C_2)}{(C_1 + C_2)/2} \times 100\%$$

Where:

RPD	=	relative percent difference
C_1	=	larger of the two observed values
C_2	=	smaller of the two observed values

The RPDs for the split sample results are presented in Table 2 and the findings for RPD values are summarized in Table 3.

Lower RPD values correlate to increased precision. Additionally, the RPD values increase the closer the results are to the detection limit; this is due to the decrease in sensitivity/precision/accuracy of the instrument used by the laboratory. Accordingly, RPDs calculated from concentrations that are less than 5 times the reporting limits are shaded in Table 2 to indicate discriminated use of RPDs to establish agreement between the two analytical results.

The remaining results (i.e., those results that are not highlighted in the table) are >5 times the reporting limit and have RPDs of less than 30%, which indicate good agreement between the split sample results. Because of the good agreement between the data sets, additional statistical analysis of the split sample data, as discussed in the March 2012 TM, is not warranted.

Agreement Factor / Multiplier Factor Comparisons

The agreement factor evaluation was conducted on Respondents/EPA split sample results where both results are detected values. Agreement factors cannot be calculated for non-detect results. Agreement factors were calculated by dividing the larger of the two split sample result by the smaller of the two split sample result. The magnitude of the resulting factor, shown in Table 2, is then used to evaluate agreement between the two results. The decision rules and agreement factor rankings defined in the March 2012 TM are outlined in Table 4.

The agreement evaluations are presented in Table 2. The data show agreement between the two sets of results for samples with detectable levels of CrVI; no disagreements or major disagreements were observed between sample pairs. Split sample analytical data statistics are summarized below; a complete analysis is provided in Table 3.

- Eight sample pairs were compared
- No split sample pairs have one detect and one non-detect result
- Two of eight split sample pairs have both non-detect results
- Six of eight split sample pairs have two detections; the same six of eight pairs are in agreement.

Project Action Level Comparisons

The March 2012 TM indicates that the split sample concentrations could be compared to the following screening criteria:

- EPA regional screening level (RSL) for tap water for CrVI (0.031 µg/L), and
- California maximum contaminant level (CA MCL) for total chromium (50).

However, because the EPA RSL for tap water (0.031 µg/L) is so much lower than the reporting limits for the CrVI analyses, it is not particularly useful as a comparison tool. Because the only parameter included in the split sample analyses is CrVI, it seems appropriate to use a screening criteria focused on CrVI rather than the CA MCL for total chromium which at 50 µg/L is considerably higher than levels of concern for CrVI. The City of Glendale has

adopted a voluntary standard of 5 µg/L for CrVI in the City's drinking delivered water (henceforth, "advisory level"). This concentration is potentially in a similar range as the future State of California MCL for CrVI. The EPA and Respondents analytical data were compared against the advisory level of 5 µg/L since there are no regulatory action levels that can be applied to the CrVI data at this time. EPA and the Respondents CrVI data were compared to the advisory level to establish if both sets are consistently above or below the advisory level as an indication of overall agreement.

The paired EPA and Respondents split sample results below and exceeding the advisory level were found to be in agreement/comparable. Because the data sets were in agreement, the level of deviation between the two sets of data were not evaluated. Table 2 summarizes the results of each split sample pair comparison to the advisory level.

Summary of Split Sample Evaluations

The split sample evaluations are summarized in Tables 2 and 3. The data sets for the parent and split samples show agreement between the EPA and Respondents data. Therefore, additional statistical analysis based on split sample pair analyses to include detect-detect, nondetect-nondetect, and detect-nondetect analyses of the split sample data is not warranted.

It should be noted that the split samples collected and evaluated in this effort represent a small percentage of the overall data and the comparison provides one approach to evaluating the precision and accuracy of the data. QA/QC information for both laboratories and data, as detailed in the planning documents, field/lab oversight, and laboratory final data packages as well as data validation reports should also be used to evaluate the accuracy and precision of the data.

Performance Evaluation Sample Evaluation

The purpose of the PE sample analysis is to evaluate the accuracy of analytical programs used by the Respondents and the EPA. A PE sample was prepared for CrVI by Shaw Environmental & Infrastructure [SHAW] in Las Vegas, California as arranged by the EPA Region 9 QAO. The PE sample was prepared with a CrVI concentration of 20 µg/L to be representative of the general concentration range of interest. SHAW sent the PE samples to the Respondents and CH2M HILL for analysis along with samples collected during the initial ground water and split sampling event at the Respondents new monitoring wells.

The prepared PE samples were submitted blind, labeled and packaged using the same procedures as field samples as follows:

- The Respondents submitted the PE sample to Test America in Irvine California, their contracted laboratory.
- CH2M HILL submitted the PE sample to AETL in Burbank, California.
- CH2M HILL also submitted a PE sample to the EPA Region 9 Laboratory as a Quality Control (QC) check sample.

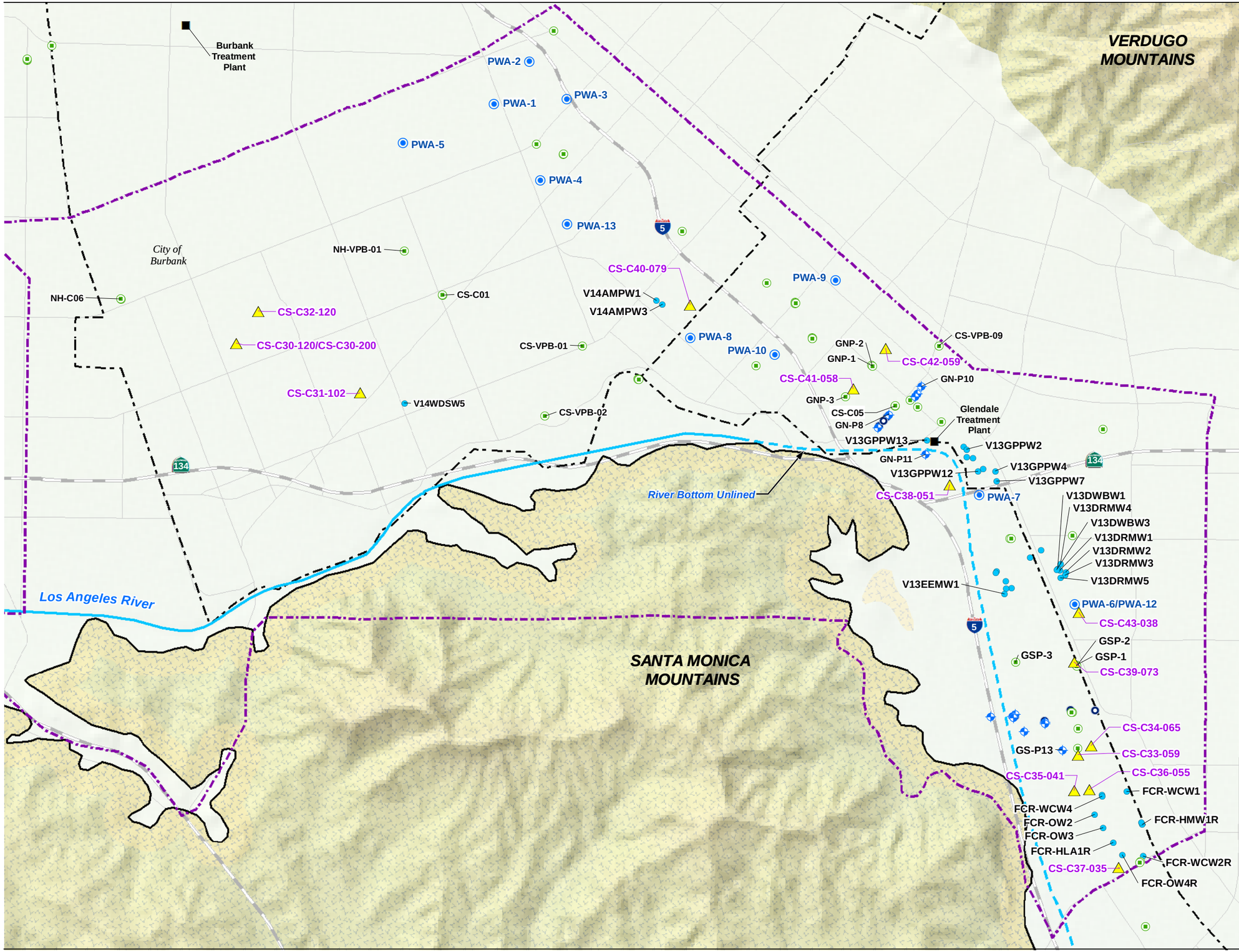
The PE sample scoring and evaluation reports for each of the three laboratories are included as Attachment 4. The results of the PE evaluation indicate that the accuracy of the analytical programs at all three laboratories passed and are within acceptable limits.

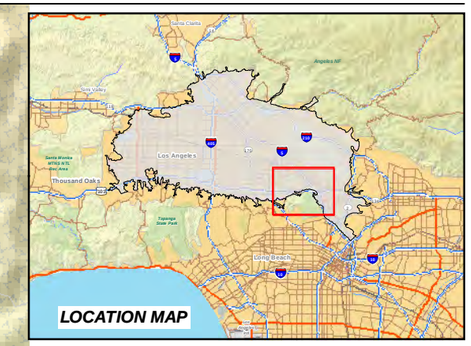
References

CH2M HILL. 2012. Technical Memorandum. *Glendale Chromium Operable Unit Field Oversight, Split Sample Collection, and Data Evaluation Plan*. March 28.

Environmental Resources Management (ERM). 2012. *Field Sampling Plan, Glendale Chromium Operable Unit, San Fernando Valley Superfund Site – Area 2*. February.

U.S. Environmental Protection Agency (EPA). 2009. *Quality Assurance Project Plan, Glendale Chromium Operable Unit, Remedial Investigation/ Feasibility Study Oversight, San Fernando Valley Superfund Site (Area 2).* July.





LEGEND

- RI Monitoring Well Installed by EPA
- RI Monitoring Well Installed by Respondents
- Existing Monitoring Well or Well Cluster
- New Glendale OU FFS Monitoring Well
- Facility Monitoring Well
- Operable Unit Extraction Well
- Operable Unit Treatment Plant
- Municipal Boundary
- Approximate Boundary of Glendale Investigation Areas for San Fernando Valley Superfund Sites

NOTE:

1. The original figure is produced in color. Significant information is lost if copied in black and white.

Figure 1
Locations of Remedial Investigation Monitoring Wells

Glendale Chromium Operable Unit
San Fernando Valley Area 2 Superfund Site

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Table 1
Summary of Oversight of GCOU Respondents Group Activities
Glendale Chromium Operable Unit, San Fernando Valley Area 2 Superfund Site

Date	Location(s)	Respondents' Activity(ies)	Contractor(s) / Subcontractor(s) Present	Deviations from ERM's FSP (ERM, 2012) or Other Pertinent Observations
3/14/2012	GC-4	Drilling Collection of Soil Samples	ERM Cascade Drilling	None
4/12/2012	GC-5	Drilling Collection of Soil Samples	ERM Cascade Drilling	None
4/23/2012	PWA-6	Drilling	ERM Cascade Drilling	None
4/24/2012	PWA-6	Well Installation	ERM Cascade Drilling	None
5/15/2012	PWA-8	Well Installation	ERM Cascade Drilling	None
5/21/2012	PWA-8	Well Development	ERM Cascade Drilling	None
6/18/2012	PWA-9	Well Development	ERM Cascade Drilling	Due to shallower-than-expected static ground water level the well screen is submerged. This is not anticipated to be a problem unless ground water levels rise significantly.
9/21/2012	PWA-3	Well Installation	ERM Cascade Drilling	None
9/24/2012	PWA-1	Drill rig set up	ERM Cascade Drilling	None
9/25/2012	PWA-1	Drilling	ERM Cascade Drilling	Soil cuttings logged at 5-foot intervals instead of 10-foot intervals as proposed in February 2012 Field Sampling Plan.
	PWA-3	Well Development	ERM Cascade Drilling	Well screen almost completely submerged prior to well development. Well dewatered during well development. No post-development ground water sample will be collected from PWA-3 due to slow recharge.
10/3/2012	PWA-5	Drilling	ERM Cascade Drilling	None
10/10/2012	PWA-13	Well Installation	ERM Cascade Drilling	None
10/19/2012	PWA-10	Well Development	ERM Cascade Drilling	2-inch-diamter electric submersible (ES) pump used instead of 3- or 4-inch-diameter ES pump.
10/29/2012	V13EEMW-1 PWA-6 PWA-12 PWA-7	Collection of Split Samples for CrVI analysis	ERM Blaine Tech	None
10/30/2012	PWA-10 PWA-9 PWA-8 PWA-13	Collection of Split Samples for CrVI analysis	ERM Blaine Tech	Filtering of sample prior to collection in a 250mL amber glass bottle for dissolved organic carbon analysis. ERM's FSP does not indicate that this sample required filtering prior to collection.

Notes:
ERM – Environmental Resources Management
FSP – Field Sampling Plan

TABLE 2
Split Sample Analytical Data and Comparisons
Glendale Chromium Operable Unit, San Fernando Valley Area 2 Superfund Site

Station Location	Sample ID	Respondents' Sample ID	Date Collected	Method	Parameter	Units	EPA Sample Results			Respondents' Sample Results			Advisory Limit[1]					%RPD[2]	Agreement Factor[3] (Ratio of the Two Results)		Agreement Conclusion[4]
													AL	Did the Reporting Limit Exceed Advisory Limit?		Did the Result Exceed Advisory Limit?					
							Result	RL	DL	Result	RL	DL		EPA	Resp.	EPA	Resp.				
PWA-6	PWA-6	GCOU-PWA-6-90.05-GW-87-102912	10/29/12	218.6	Chromium (VI)	µg/L	7.17	0.05	0.02	6.8	1	0.25	5	No	No	Yes	Yes	5.3%	1.05	<2	Agreement
PWA-7	PWA-7	GCOU-PWA-7-26.41-GW-50-102912	10/29/12	218.6	Chromium (VI)	µg/L	64.7	0.05	0.02	61	1	0.25	5	No	No	Yes	Yes	5.9%	1.06	<2	Agreement
PWA-8	PWA-8	GCOU-PWA-8-85.20-GW-72-103012	10/30/12	218.6	Chromium (VI)	µg/L	1.62	0.05	0.02	2.4	1	0.25	5	No	No	No	No	-38.8%	1.48	<2	Agreement
PWA-9	PWA-9	GCOU-PWA-9-95.35-GW-92-103012	10/30/12	218.6	Chromium (VI)	µg/L	0.02 U	0.05	0.02	0.25 U	1	0.25	5	No	No	No	No	NC	NC	--	--
PWA-10	PWA-10	GCOU-PWA-10-80.10-GW-77-103012	10/30/12	218.6	Chromium (VI)	µg/L	7.92	0.05	0.02	8.1	1	0.25	5	No	No	Yes	Yes	-2.2%	1.02	<2	Agreement
PWA-12	PWA-12	GCOU-PWA-12-164.10-GW-161-102912	10/29/12	218.6	Chromium (VI)	µg/L	3.1	0.05	0.02	3.2	1	0.25	5	No	No	No	No	-3.2%	1.03	<2	Agreement
PWA-13	PWA-13	GCOU-PWA-13-105.71-GW-89-103012	10/30/12	218.6	Chromium (VI)	µg/L	1.34	0.05	0.02	2.4	1	0.25	5	No	No	No	No	-56.7%	1.79	<2	Agreement
V13EEMW1	V13EEMW1	GCOU-V13EEMW1-33.95-GW-31-102912	10/29/12	218.6	Chromium (VI)	µg/L	0.02 U	0.05	0.02	0.25 U	1	0.25	5	No	No	No	No	NC	NC	--	--

Notes:

[1] Currently no specific regulatory or risk criteria are being applied to the CrVI data. The voluntary standard of 5µg/L, adopted by the City of Glendale for their drinking water system, is used as the advisory limit.

[2] The RPD is calculated as follows:

$$RPD = \frac{(C_1 - C_2)}{(C_1 + C_2)/2} \times 100\%$$

Where:

RPD = relative percent difference

C_1 = larger of the two observed values

C_2 = smaller of the two observed values

[3] Refer to Table 4 for additional details on guidance for comparing split sample data.

Shaded values indicate RPD calculated from concentrations less than 5 times the reporting limit

AL - advisory limit
DL - detection limit
EPA - Environmental Protection Agency
NC - not calculated
Resp. - Respondents'
RL - reporting limit
RPD - Relative percent difference
µg/L - micrograms per liter

TABLE 3
Split Sample Analytical Data Statistics
Glendale Chromium Operable Unit, San Fernando Valley Area 2 Superfund Site

Type	Count	Percentage	Percentage Calculation
Total number of Sample Results for EPA Data	8		
Total number of Sample Results for Respondents Data	8		
Total number of Sample Results for EPA Data with Corresponding Respondents Data	8		
Total Number of EPA results with no counterpart Respondents Result	0	0.00%	0 / 8 results
Total Number of Respondents Results with no counterpart EPA Result	0	0.00%	0 / 8 results
Number of Sample Pairs Compared	8		
Number of Sample Pairs with One Detect and One Nondetect	0	0.00%	0 / 8 pairs
Number of Sample Pairs with Both Nondetects	2	25.00%	2 / 8 pairs
Number of Sample Pairs with Two Detections	6	75.00%	6 / 8 pairs
Counts of Evaluation for RPD:			
Total Number of Pairs Reported with Calculable RPDs	6	75.00%	6 / 8 pairs
Number of Pairs with Both Concentrations >5x the Reporting Limit	3	50.00%	3 / 6 pairs
Number of Pairs >50% and Concentration >5x the Reporting Limit			
- Compared to Total Number of Calculable RPDs	1	16.67%	1 / 6 pairs
- Compared to Number of Pairs with Both Concentrations >5x the Reporting Limit		33.33%	1 / 3 pairs
Number of Pairs >30% and Concentration >5x the Reporting Limit			
- Compared to Total Number of Calculable RPDs	2	33.33%	2 / 6 pairs
- Compared to Number of Pairs with Both Concentrations >5x the Reporting Limit		66.67%	2 / 3 pairs
Not Calculable	2	25.00%	2 / 8 pairs
Counts of Evaluation for Agreement Factors:			
Agreement	6	75.00%	6 / 8 pairs
Disagreement	0	0.00%	0 / 8 pairs
Major Disagreement	0	0.00%	0 / 8 pairs
Not Calculable	2	25.00%	2 / 8 pairs
Comparison of Data to Action Levels/Criteria (Advisory Limit)			
Number of Data that Exceeded Criteria (Flagged with "Yes" Designation):			
Number of EPA Reporting Limits that Exceeded Criteria	0	0.00%	0 / 8 pairs
Number of Respondents Reporting Limits that Exceeded Criteria	0	0.00%	0 / 8 pairs
Number of EPA Results that Exceeded Criteria	3	37.50%	3 / 8 pairs
Number of Respondents Results that Exceeded Criteria	3	37.50%	3 / 8 pairs
Counts for Criteria Exceedances in Agreement Factor Evaluations:			
Number of Reporting Limits that Exceeded Criteria			
- with "Agreement" Conclusion		0.00%	0 / 8 pairs
- with Disagreement Conclusion		0.00%	0 / 8 pairs
- with Major Disagreement Conclusion		0.00%	0 / 8 pairs
Number of Results that Exceeded Criteria			
- with "Agreement" Conclusion			
EPA "Yes" Criteria Exceedance and Respondents "Yes" Criteria Exceedance	3	37.50%	3 / 8 pairs
EPA "Yes" Criteria Exceedance and Respondents "No" Criteria Exceedance	0	0.00%	0 / 8 pairs
EPA "No" Criteria Exceedance and Respondents "Yes" Criteria Exceedance	0	0.00%	0 / 8 pairs
EPA "No" Criteria Exceedance and Respondents "No" Criteria Exceedance	0	0.00%	0 / 8 pairs
- with Disagreement Conclusion		0.00%	0 / 8 pairs
- with Major Disagreement Conclusion		0.00%	0 / 8 pairs

Table 4
Guidance for Comparing Split Sample Data
Glendale Chromium Operable Unit, San Fernando Valley Area 2 Superfund Site

Situation	Disagreement	Major Disagreement
CrVI detected above RL in both Respondents and EPA samples	>2x difference	>3x difference
One result is less than RL	>3x difference	>5x difference
One result is less than DL	>5x difference	>10x difference

Notes:

DL- detection limit
RL- reporting limit

Derived from: CRREL Special Report No. 96-9, "Comparison Criteria for Environmental Chemical Analyses of Split Samples Sent to Different Laboratories - Corps of Engineers Archived Data", Grant, C.G., Jenkins, T.F., and Mudambi, A.R., USACE Cold Regions & Environmental Research Laboratory, Hanover NH, May1996.

Attachment 1

Electronic Mail Correspondence to EPA
And
Field Notes

From: Towell, David/LAC
Sent: Thursday, March 15, 2012 4:51 PM
To: 'Lisa Hanusiak/EPA Region 9'
Subject: FW: GCOU Oversight of ERM yesterday 3-14-12
Attachments: GCOU Oversight of ERM 3-14-12.pdf

Hi Lisa,

Please see below Matt's summary of his GCOU Oversight activities yesterday. Let me know if you have any questions.

Thanks,

David

From: Mayry, Matthew/SCO
Sent: Thursday, March 15, 2012 9:58 AM
To: Towell, David/LAC
Cc: Lechler, Benjamin/SCO
Subject: GCOU Oversight of ERM yesterday 3-14-12

David,

Attached are my field notes from field oversight of ERM's GC-4 geotechnical boring investigation yesterday.

I observed ERM's field procedures for: logging, sampling, health and safety implementation, and subcontractor direction of Cascade Drilling. ERM's field procedures appeared to be in accordance with their approved workplan.

Sample Collection and Handling, Logging, and Soil Screening
ERM continuously sampled just above the water table to obtain samples for laboratory analysis in the 1. Vadose zone, 2. Capillary fringe, and 3. Saturated zone. Depth to water was observed at approximately 11.5 ft bgs, and ERM's saturated sample was collected at 14 ft to 16.5 ft where they informed me that they were most confident collecting the first saturated sample. They immediately packaged samples and placed them on ice after obtaining a small quantity for: soil screening by PID, logging, and archiving in chip trays.

Decontamination
ERM ensured that Cascade Drilling properly decontaminated split spoon samplers between soil collection, and they contained their decontamination water with buckets and plastic.

Overall Site Conditions and Health and Safety
ERM maintained a clean site overall and delineated the work area with caution tape and safety cones to protect the general public from entering work areas. ERM conducted a Health and Safety meeting before work commenced and ensured that all staff were wearing proper PPE.

ERM stated that they may install the monitoring wells at the locations in the City of Glendale during the week of March 26th to 30th, and they may install geotechnical boring GC-5 via rotosonic drilling next week.

Matt

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EPA GCOU oversight

3-14-2012 GC-4 Geotechnical Boring

M. Mayry

(Hydrogeologist CH2MHill)

0740 Onsite at Griffith Park by Pole Field. Cascade Drilling preparing to drill.

0800 Mike and Alyssa from ERM onsite.

0820 H&S mtg. Cascade preparing to drill. They will begin sampling at 7' bgs.

0850 Begin split spoon sampling with HSA CME-95 rig

0920 Reached water table DTW ≈ 11.5' bgs (Air Knife) 7.0 (previous day)

Samples Taken:
Vadose Zone = GC-4 8.5'-10'
Capillary Fringe = GC-4 10.5'-11.5'
Saturated ≈ GC-4 14'-16.5'

Samples to be analyzed for chemical and geotechnical analyses.

0953 Call BJ to discuss the proposed total depth of 80 ft bgs.

1035 ERM states that TD of borehole could be shallower by about 5 ft; however, the benefit to shorten by 5 ft is minor, so ERM will proceed to drill to 80 ft bgs.

1130 Mike ERM offsite to pick up lunch. Alyssa (ERM) and Cascade continue to drill.

1225 Matt offsite for the day. ERM will try to drill in Glendale March 26-30. They may install GC-5 next week.

GC-4 Lithology summary

7'-11.5' SP Sand fine to coarse sand trace clay. PID readings were 3.6 to 3.7 ppm here.
11.5'-18' SW and SP with some trace gravel.
18'-21' SM
21'-23' Interbedded SM with small pockets of SP
23'-25' Some CL Clay PID = 7.7 ppm in fine grained
25'-26' SP sand
26.5' GP Gravel with Sand
27'-39' Interbedded SP and SW with trace fine gravel.
39'-40' SW-SP with Gravel fine to coarse gravel
40'-41.5' SP sand
41.5' Fine grained SM
41.5'-43' SP sand
43'-45' SP with fine gravel
45'-48.5' SP sand some SW
48.5'-49.5' SW-SP with fine gravel
49.5'-53.0' SW-SP fine to coarse sand
53'-55' SP-GP sand with fine gravel

From: Towell, David/LAC
Sent: Wednesday, April 25, 2012 3:42 PM
To: Lisa Hanusiak
Subject: Oversight of GCOU Respondents' Fieldwork
Attachments: GCOU Oversight of ERM 4-25-12, PWA #6; GCOU Oversight of ERM yesterday 4-13-12 at GC-5

Hi Lisa,

Please find attached summaries of our last two field oversight visits. Let me know if you have any questions. We also have lots of photos if there is anything in particular you would like to see.

Thanks,

David Towell
Sr. Project Manager

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From: Mayry, Matthew/SCO
Sent: Friday, April 13, 2012 11:23 AM
To: Towell, David/LAC
Cc: Lechler, Benjamin/SCO
Subject: GCOU Oversight of ERM yesterday 4-13-12 at GC-5
Attachments: 4-13-12 GCOU Field Oversight GC-5.pdf

David,

Attached are my field notes from field oversight of ERM's GC-5 geotechnical boring investigation yesterday.

Field Photos are saved here:
\\cheron\projects\EPA\386243GlendaleChOU\427727_RemedialInvestigation\Field_Program\GCOU_Oversight_Photos

I observed ERM's field procedures for: logging, sampling, health and safety implementation, and subcontractor direction of Cascade Drilling.

Sample Collection and Handling, Logging, and Soil Screening
ERM continuously sampled just above the water table to obtain samples for laboratory analysis in the 1. Vadose zone, 2. Capillary fringe, and 3. Saturated zone. Depth to water was observed at approximately 45 ft bgs, and ERM's saturated sample was collected at 45 ft to 47 ft. They packaged the samples after obtaining a small quantity for: soil screening by PID, logging, and archiving in chip trays.

Decontamination
ERM ensured that Cascade Drilling properly decontaminated split spoon samplers between soil collection, and they contained their decontamination water with buckets and plastic.

Overall Site Conditions and Health and Safety
ERM maintained a clean site overall and delineated the work area with caution tape and safety cones to protect the general public from entering work areas.

ERM stated that they will install monitoring wells by Mud Drilling at 700 Hawthorne in Glendale next week beginning Monday. They aren't sure if they will build the first well Monday or Tuesday, so I will call them Monday morning to verify. If they build the well Monday afternoon then I will go observe construction and ensure they don't use a stainless steel bottom cap or screen.

Matt

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EPA GCOU oversight

4-12-12 GC-5 partly cloudy, 70's M. Mayry

1230 M. Mayry onsite at GC-5 on the corner of Brunswick and Goodwin. Cascade Sonic Rig beginning to drill. Alyssa from ERM onsite as contractor.

1310 The hole is caving so Cascade will try to case the hole at 20' bgs.

1330 ERM and a Cascade helper offsite to pick up equipment.

1345 ERM back onsite

1400 Drilled to 34' bgs. Hard drilling, (pulverized rock in sample).

1456 Sample from 40' to 42' bgs with stainless steel sleeves for geotech analyses

1502 Sample from 42'-44' bgs in sleeves for geotech analysis

1520 Sampled 45'-47' bgs. Reached water table. Samples are wet.

1540 Matt offsite.

GC-5 lithology summary

10'-13' = grayish brown, dry, Sand to Silty Sand

13'-15' = brown, dry Silty Sand

15'-18' = yellowish brown, dry, Sand

18'-22' = as above with some gray Silty Sand, little fine to coarse gravel, subangular to subrounded

22'-25' = Sand with co gravel and cobbles

25'-28' = Silty Sand, grayish brown (added water)

28'-32' = dry, powdery silt (pulverized gravel?), cobbles present.

32'-34' = brown, dry, Silty Sand

34'-38' = brown, Gravelly Sand with Silt (added water), fine to med. sand, f-c gravel, cobbles, subrounded.

38'-40' = yellowish brown, Sand with gravel. Fine to med sand, dry sample

40'-42' = transitioning into Poorly Graded Sand (SP)

42'-44' = Sand (SP), moist

45'-47' = Sand with Gravel (SP), wet, subrounded gravel, fine to coarse sand

From: Mayry, Matthew/SCO
Sent: Wednesday, April 25, 2012 2:40 PM
To: Towell, David/LAC
Cc: Lechler, Benjamin/SCO
Subject: GCOU Oversight of ERM 4-25-12, PWA #6
Attachments: GCOU Oversight PWA #6.pdf

David,

I observed ERM's installation of PWA #6 yesterday in Glendale.
The field notes are attached, and I'm also uploading them to the oversight folder I started.

I observed the well casing installation, filter pack installation, well screen surging to settle the filter pack, bentonite pellet transition seal installation, and the lowering of the tremie pipe to 35' bgs in preparation to install the cement-bentonite grout.

The work has generally been at a slow "laid back" pace and yesterday was no different, so unfortunately I wasn't able to observe the grout installation because I had another commitment later in the afternoon.

From my observations, the well installation was acceptable.

Matt

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Staff Hydrogeologist

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PWA #6 Glendale

M. Mayry 4/24/12

0950 Matt onsite. Thinning mud to prepare to install well from 50' to 90' bgs, with 4" SCH40 0.02" slotted screen. Backfill with bentonite pellets to 45' bgs.

1020 Alyssa/ERM states that work will pause until LA County responds stating if they will come onsite to observe sanitary seal emplacement. Cascade will transport IDW to their staging area in the interim.

1040 Matt informs BJ of delay. Offsite for internet connection.

1130 Alyssa/ERM calls to confirm that work will resume and PM Mike Makarov is onsite.

1450 Matt onsite. Mike/ERM onsite waiting for Cascade to return from dropping off IDW.

1230 Cascade onsite. Preppare to install well.

1245. Install screen from 50' to 90' bgs.

1300 Install #3 filter pack sand.
50lb bags ||||/|||| ||||/|||| ||||/||

1320 Surge screen to settle filter pack

1340 Finished surging. Filter Pack dropped. Add 1 bag of #3 sand. Sand to 45' bgs.

1345 Add Bentonite pellets as transition seal.
(2 buckets 5.5 gallon) to 40' bgs.
1400 Install tremie pipe to 35' bgs.
1410 Cascade to take lunch break.
Matt offsite for the day.

From: Towell, David/LAC
Sent: Friday, April 27, 2012 11:45 AM
To: 'Lisa Hanusiak/EPA Region 9'
Subject: FW: Oversight of Drilling at PWA #6

Hi Lisa,

Here are BJ's observations from oversight of the mud rotary drilling activities conducted earlier this week. On Monday, we will get all of the photos copied over to the SharePoint site and figure out the access issue.

David

From: Lechler, Benjamin/SCO
Sent: Thursday, April 26, 2012 1:15 PM
To: Towell, David/LAC
Cc: Mayry, Matthew/SCO
Subject: Oversight of Drilling at PWA #6

David,

Below are my observations of borehole drilling at PWA #6.

- Alyssa Beach/ERM was the geologist onsite and Cascade Drilling provided mud rotary drilling services.
- Newly installed monitoring well PWA #12, approximately 10-20 ft east of PWA #6, was gauged prior to my arriving onsite. The depth to water in this well was approximately 62 feet below ground surface (ft bgs). This measurement corresponds well to the predicted depth to water at this location which was based on the geophysical log of the pilot borehole and a groundwater elevation contour map from Spring 2011.
- I observed drilling from 20 to 100 ft bgs. Cuttings were collected with a fine-mesh strainer from the mud discharge to the shaker table for soil classification.
- Based on my visual inspection of cuttings coming off of the shaker table, soil encountered during drilling was a mixture of fine to coarse sand with variable percentages of each at different depth intervals. No silt or clay "balls" were observed coming off the shaker.

The field activities observed were all executed in accordance with the EPA approved Field Sampling Plan.

I will place photos taken of the drilling setup at the below link (note I moved this folder to the oversight project):
\\CHERON\Proj\EPA\386243GlendaleChOU\431649_Oversight\GCOU_Oversight_Photos\4-23-12

Let me know if you have any questions,

BJ

From: Towell, David/LAC
Sent: Wednesday, May 23, 2012 9:43 AM
To: 'Lisa Hanusiak/EPA Region 9'
Subject: Field Oversight - ERM's work for the GCOU Respondents
Attachments: GCOU Oversight of ERM yesterday 5-21-12 at PWA-08; GCOU Oversight of ERM yesterday 5-16-12 at PWA-08

Hi Lisa,

Please find attached the summaries from our two oversight visits to the PWA-8 well. Disregard the link to the photos that is provided within the attached e-mails to me- it is too our local server. The photos are being uploaded to the same SharePoint site you accessed last time and should be there by the end of the day. Let me know if you have any problems accessing the site or if you have any other questions.

Thanks,

David Towell
Sr. Project Manager

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From: Mayry, Matthew/SCO
Sent: Wednesday, May 16, 2012 12:01 PM
To: Towell, David/LAC
Cc: Lechler, Benjamin/SCO
Subject: GCOU Oversight of ERM yesterday 5-16-12 at PWA-08

David,
(This is a resent message with a revised subject title)

Attached are my field notes from field oversight of ERM's PWA-08 monitoring well installation yesterday by ERM's subcontractor Cascade Drilling.

Field Photos are saved here:
\\cheron\projects\EPA\386243GlendaleChOU\431649_Oversight

Well Annular Material Installation and well Screen Surging
After well screen installation from 45 to 85 ft bgs, Cascade emplaced the #3 filter pack by gravity-feeding into the borehole annulus. After emplacing the filter pack, they surged the screen for over 15 minutes to ensure filter pack would settle out. Cascade added extra filter sand after surging when it was noted that the sand had settled below the target depth of 40 ft bgs. Cascade installed the bentonite pellet transition seal by gravity feed on top of the filter sand. The pellets were allowed to hydrate for 30 minutes while Cascade prepared to grout the remaining annulus with a cement-bentonite grout seal. Cascade pumped the grout seal into place via tremie pipe in accordance with ERM's workplan.

Decontamination
Decontamination procedures were not performed while CH2MHill was onsite. ERM's subcontractor Cascade Drilling did properly contain waste in drums and ensured that plastic was placed under all equipment to ensure that materials were contained during operation.

Overall Site Conditions and Health and Safety
ERM maintained a clean site overall and delineated the work area with caution tape and delineators. They did receive feedback from an adjacent property owner to move some equipment away from the property. ERM was in the process of correcting the request to move equipment away from the private property.

ERM stated that they will develop the PWA-08 monitoring well next Monday.

Matt

Matthew Mayry, P.G.
Staff Hydrogeologist

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From: Mayry, Matthew/SCO
Sent: Tuesday, May 22, 2012 6:43 PM
To: Towell, David/LAC
Cc: Lechler, Benjamin/SCO
Subject: GCOU Oversight of ERM yesterday 5-21-12 at PWA-08
Attachments: GCOU Field Notes 5-21-12.pdf

David,

Attached are my field notes from field oversight of ERM's PWA-08 monitoring well development yesterday by ERM's subcontractor Cascade Drilling.

Field Photos are saved here:
\\cheron\projects\EPA\386243GlendaleChOU\431649_Oversight

We will have to follow up with Rosa Esquivel for a Sharepoint folder to upload these field photos.

Well Pump Development

- ERM bailed and surged the screen to prepare for well development. They bailed 55 gallons of liquid with some drilling mud.
- ERM stated that there was very little sediment recovered from the bottom of the well (< 1 inch) during bailing.
- At the beginning of pump development, there was 1% silt with about 20% muddy water. The water quickly cleared to <10% mud and <0.5% silt.
- During pump development, maximum drawdown was 0.24 ft at 3 gpm. Initial depth to water before pumping was 58.32 ft bTOC.
- Pump development removed 150 gallons of water for a total of 205 gallons with pumping and bailing combined.
- The final turbidity after removing 210 gallons was the target value of 5 NTU. The final mud and silt content was 0%.

Overall Site Conditions and Health and Safety

ERM maintained a clean site overall and delineated the work area with caution tape and delineators. Their equipment was not staged on the private property adjacent to the work area.

ERM asked us to coordinate future field oversight with Mike Makerov, ERM.

Matt

Matthew Mayry, P.G.
Staff Hydrogeologist

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PWA-Ø8 | Well Development

5/24/12 M. Mayry

0845 Bailed 55 gallons, mostly drilling mud.

0945 M. Mayry onsite. ERM is pump developing the well. Turbidity is ~200 NTU. Silty and cloudy water (1% silt)

1005 Water is clearing up. Turbidity is 68.5 NTU. 135 gallons purged.

1015 Turbidity equals 13.2 NTU. 165 gallons purged. 3 gpm flow rate

1025 Pumped 195 gallons. Turbidity = 7.3 NTU. 3 gpm flow rate.
Initial DTW before pumping was 58.32 ft
DTW during pumping was 58.56 ft bgs.

1030 Stop pumping. Pumped 205 gallons. Final turbidity is 5.0 NTU.
10 well volumes was 195 gallons.

1035 ERM and Cascade cleaning up site. Matt asks ERM about upcoming work. ERM field geologist states to discuss with Mike Makerov.

1055 ERM, Cascade, and CH2MHill offsite.

M Mayry

From: Towell, David/LAC
Sent: Wednesday, June 20, 2012 2:55 PM
To: 'Lisa Hanusiak/EPA Region 9'
Subject: FW: Glendale Chromium PWA #9 Well Development Oversight

Hi Lisa,

See below for BJ's summary of PRP well development oversight. The photos can be viewed on the same SharePoint site that you already have access information for (not from the folder listed below). Let me know if you have any problems accessing the photos or have any questions.

Thanks,

David

From: Lechler, Benjamin/SCO
Sent: Monday, June 18, 2012 4:26 PM
To: Towell, David/LAC
Subject: Glendale Chromium PWA #9 Well Development Oversight

David,

Below are my key observations from oversight of well development at the Respondents monitoring well PWA #9. I uploaded pictures to the project Sharepoint Site and to the server (\\cheron\Proj\EPA\386243GlendaleChOU\431649_Oversight\GCOU_Oversight_Photos\6-18-12).

- The static water level prior to performing any well development was 53.95 ft below top of casing (feet btoc). The water level after development was completed was 54.16 feet btoc. This is much shallower than Mike Makerov/ERM and myself predicted using nearby well data and groundwater elevation contour maps. The entire well screen (55 – 95 feet bgs) is saturated when the intention was to have 5-10 feet of screen above the water table to accommodate a rise in water levels. This will not pose a problem unless water levels increase significantly.
- Well development was performed as specified in the approved field sampling plan (FSP) with one exception. The FSP specified that a 3 to 4-inch submersible pump would be used for pump development, but a 2-inch pump was used instead. Photographs show the well development setup and the tools used during development.
- Development continued until filed parameters were stable and turbidity was <10 NTU. Final field parameters were:
    - pH = 6.85
    - Conductivity = 1,311 µS/cm
    - Temperature = 24.1 deg C
    - Turbidity = 1.75 NTU\
- Pump development was at a rate of 1.5 gallons per minute. A total of approximately 150 gallons were removed during development. Over 7 feet of drawdown was observed during pump development and while bailing the well was drawn down significantly, but in each event the well recharged rather quickly.
- ERM collected a water sample during pump development for waste characterization purposes.

Let me know if you have any questions.

BJ

From: Lechler, Benjamin/SCO
Sent: Monday, October 01, 2012 1:56 PM
To: 'Lisa Hanusiak'
Cc: Towell, David/LAC
Subject: Field Oversight Summary

Hi Lisa,

Below are summaries of our field oversight observations from 9/21, 9/24, and 9/25. Photos are uploaded to the project Sharepoint site. Please let me know if you have any questions. – BJ

PWA-3: Well Construction Oversight by Alex Lapostol/E2 9/21/12

Well Annular Material Installation and Well Screen Surging

- Well screen installation interval was determined yesterday to be from 95-135 ft bgs.
- Arrived at 0745 hrs and observed Cascade Drilling backfill borehole with drilling mud to approximately 5 ft. Cascade then proceeded to thin out the drilling mud. All well materials were installed according to the work plan.
- Crew began to set well casing at noted depth, place #3 sand filter pack by gravity-feeding into the borehole annulus. After emplacing the filter pack, they surged the screen for over 15 minutes to ensure filter pack would settle out. Cascade installed the bentonite pellets as a transition seal, poured on top of the filter sand. The pellets were allowed to hydrate for 30 minutes while Cascade prepared to grout the remaining annulus with a Portland cement-bentonite grout seal. Cascade pumped the grout seal into place via tremie pipe in accordance with ERM's work plan. Left the site at approximately 1000 hrs.

Decontamination

- Decontamination procedures were not performed while I was present onsite. ERM's subcontractor Cascade Drilling did properly contain waste in drums and ensured that plastic was placed under all equipment to ensure that materials were contained during operation.

Overall Site Conditions

- ERM maintained a clean site overall. Site is naturally isolated, with lots of room to work.

ERM stated that they will develop the PWA-3 and PWA-2 monitoring wells next Monday.

PWA-1: Oversight by Caroline Carter/CH2M HILL 9/24/12

The PRP Oversight site visit on Monday, September 24, 2012 at GCOU was relatively quiet, so I took advantage of the opportunity to meet with Alyssa Beach/ERM. The following bullets summarize the site visit and/or my discussion with Ms. Beach:

- Due to a mandatory H&S meeting at Cascade Drilling this morning, the drilling crew did not arrive at the site until shortly before I did. During the oversight, Cascade was in the process of mobilizing the drilling rig and the support equipment on to PWA-1.
- Planned activities at PWA-1 are:
    - Schedule of operations will be only from 8:30-15:30 due to lane closure restrictions.
    - If the crew is allowed to leave the rig over the hole nightly; PWA-1 will reach total depth tomorrow end of day. If they are not allowed to leave the rig over the hole, it will take most of the week to drill and install PWA-1.

- Install temporary conductor casing to 10 feet bgs (this 12-inch-diameter boring was generated using airknifing techniques). The casing will be pushed into the formation and the annulus will be backfilled with soil cuttings generated during airknifing.
- Attempts will be made to start the drilling late this afternoon. If not, definitely first thing tomorrow morning.
- If the rig is allowed to stay over borehole overnight, then it is very likely that the boring will be drilled to total depth by 15:00(ish). ERM is hoping to have the geophysics performed tomorrow afternoon, if not, then first thing Wednesday morning.
- Planned total depth is 160 ft bgs. Samples will not be collected from this boring.

- Well development activities were postponed to tomorrow to take advantage of developing PWA-2 (installation completed last Tuesday) and PWA-3 (installation completed last Friday) in a single day. According to Ms. Beach, both wells will be developed within the 3-7 day window between the well installation and the start of well development.
- No photographs were taken.

PWA-1 and PWA-3: Oversight by Caroline Carter/CH2M HILL 9/25/12

The following bullets summarize the GCOU PRP oversight on Tuesday, September 25, 2012 from 08:00 to 11:45:

PW-1 Drilling

- Drilling of PWA-1 was in progress. Total depth of borehole was approximately 100 ft bgs at time of departure.
  - Soil samples are not planned to be collected from this location.
  - Soil cuttings in shaker were logged every 5 feet, which is more frequently than Revised Final FSP (February 2012) (soil cuttings to be logged at approximately 10-foot intervals).
  - Representative samples of soil cuttings were placed in chip trays.
  - Drilling at PWA-1 was shut down for 45 minutes to replace a hydraulic hose that was inadvertently severed while the drill head was raised. Hydraulic fluid sprayed onto rig, driller's platform, and driller. It does not appear the hydraulic fluid had sprayed into the mud pit.

PW-3 Development

- Development of PWA-3 was in progress. Plan was to purge well 10 borehole volumes (~1000 gallons) or until turbidity reaches <5 NTU. However, this well was bailed dry and was still recharging at the time of departure. Bailed water was brown and very turbid.
  - Pre-development DTW was 96.60 ft bgs.
  - Tagged bottom depth of well was 135.80 ft bgs after surging and bailing.
  - The well has 40 ft of screen; the screen was almost fully inundated (or was inundated) just before development.
  - No post-development samples will be collected from PWA-3. However, ERM will be collecting a purge water sample for waste characterization (VOCs, SVOCs, metals, pH, and Flashpoint) later in the day.

Benjamin J. Lechler, P.G.
Project Hydrogeologist

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Mobile 714.697.4203
www.ch2mhill.com

From: Lapostol, Alex/BAO
Sent: Friday, September 21, 2012 1:25 PM
To: Towell, David/LAC; Lechler, Benjamin/SCO
Subject: GCOU - PRP Group Well Installation Oversight - PWA-3

David and BJ -

See notes below on activities observed this morning, 21 Sept 2012 at PWA-3

Well Annular Material Installation and well Screen Surging

I arrived at 0745 hrs. to observe Cascade Drilling begin to backfill borehole with drilling mud, approx.~ 5 ft., then proceeded to thin out mud. I Observed that all well materials were according to the worplan specs.

Well screen installation interval was determined yesterday to be from 95-135 ft bgs.

Crew began to set well casing at noted depth, place #3 sand filter pack by gravity-feeding into the borehole annulus. After emplacing the filter pack, they surged the screen for over 15 minutes to ensure filter pack would settle out. Cascade installed the bentonite pellets as a transition seal, poured by on top of the filter sand. The pellets were allowed to hydrate for 30 minutes while Cascade prepared to grout the remaining annulus with a Portland cement-bentonite grout seal. Cascade pumped the grout seal into place via tremie pipe in accordance with ERM's workplan. At this time, I prepared to leave the site at approx. 1000 hrs, and spoke for with ERM's onsite Geo - Brett Eddington.

Decontamination

Decontamination procedures were not performed while I was present onsite. ERM's subcontractor Cascade Drilling did properly contain waste in drums and ensured that plastic was placed under all equipment to ensure that materials were contained during operation.

Overall Site Conditions and Health and Safety

ERM maintained a clean site overall. Site is naturally isolated, with lots of room to work.

ERM stated that they will develop the PWA-3 and PWA-2 monitoring wells next Monday.

I will scan my field book notes, and send photos on Monday.

Regards,

Alex Lapostol, P.G.
Senior Technical Consultant
E2 Consulting Engineers - USEPA Contractor
213-576-6801 (Regional Board office)
510-590-6218 (cell)

CH2MHILL

Observation Report

PROJECT NO. 431649.FI.01

(1)	DAY:	Monday	DATE:	09/24/12	WORK PERIOD: (observed)	1045	a.m. p.m.	TO	1130	a.m. p.m.	REPORT NO.	

WEATHER:	Sunny, light breeze	TEMP.	low ~80s	°F:	MI		°F:	Precipitation:	None

(2) NUMBER AND CLASS OF CONTRACTOR PERSONNEL OBSERVED ON SITE:

Foreman		1	Operator / Driller	2	Labor / Driller's Assistant
Welder			Drivers	1	Consultant

(3) MAJOR EQUIPMENT ON PROJECT

No.	Description	Size/Capacity	In Use Y/N
1	Mud rig, shaker, tender truck		N
1	Traffic control (on Chandler)		Y

Observations:

(4) 1045 Carter (CH2M Hill) onsite @ PWA-1. Met w/ Alyssa Beach (ERM). No activities except for mobilizing drill rig + supporting equipment onto PWA-1. Traffic control already set up. Late start is due to Cascade Drilling having a mandatory H+S meeting this morning. Plans for PWA-1:

- Install a 10-foot-long ~~con~~ temporary conductor casing (cwe 09/24/12) to just shy of 10 ftbgs. Casing will be pushed a few inches in to the bottom of the 10-foot-deep boring. The annulus will be backfilled w/ cuttings generated from the airknifing. (The 10-foot-deep borehole was advanced in conjunction w/ utility clearance (cwe 09/24/12) / airknifing activities).
- PWA-1 will be advanced using mud rotary. Est. TD is ~160 ft bgs. Expects to reach TD tomorrow + geolog the boring on Wednesday morning. No samples will be collected.

Well development activities to start tomorrow (@ 7am)

- PWA-2: Installation completed on Tuesday (~7 days ago)
- PWA-3: Installation completed on Friday (~3 days ago)

(continued)

(5)	Caroline Carter Proj Hydrogeologist	Caroline Carter / Proj Hydrogeologist	09/24/12
		SIGNATURE/TITLE	DATE

CONTINUED FROM ITEM:

CH2MHILL

Observation Report

PROJECT NO. 431649.FI.01

Observations:

(4) (cont'd)

Alyssa informed me that due to traffic control restrictions activities @ PWA-1 will not start until 8:30am tomorrow morning. [No photographs taken]

11:30 Carter offsite

CWC 09/24/12

(5)

Caroline Carter / Proj. Hydrogeologist

Caroline Carter

SIGNATURE/TITLE

09/24/12

DATE

REV 9/83 FORM 21A

CH2MHILL

Observation Report

PROJECT NO. 431649.FI.01

(1)	DAY:	Tuesday	DATE:	09/25/12	WORK PERIOD: (observed)	08:00	a.m. p.m.	TO 11:45	a.m. p.m.	REPORT NO.	CWC002

WEATHER:	Sunny	TEMP.	70's	°F:	MI		°F:	Precipitation:	None

(2) **NUMBER AND CLASS OF CONTRACTOR PERSONNEL OBSERVED ON SITE:**

Foreman	2	Operator/driller/well developer	2	Labor/driller's assistant
Welder		Drivers	2	ERM Staff

(3) **MAJOR EQUIPMENT ON PROJECT**

No.	Description	Size/Capacity	In Use Y/N
	PWA-3 : SMEEL rig, decon trailer with holding tank	500	Y
	PWA-1: Mud rotary rig, shaker, tender truck, hopper for soil cuttings, traffic control	Unknown	Y

Observations:

(4) **08:00:** Carter onsite at PWA-3. Carter meets with Brett Eddington (ERM). Rig is running late and is just setting up over PWA-3. Discussed development plans for well - purge 10 borehole volumes (~1,000 gallons) or until turbidity is <5 NTUs. Holding tank on decon trailer is only 500 gallon; if full will need to take holding tank in IDW area at LA county Parks and Recreation, which is located on Colorado.

08:50: Carter mobilizes to PWA-1.

09:15: Carter onsite at PWA-1. Carter meets with Alyssa Beach (ERM). Drilling shuts down due to a hydraulic hose being caught up on the mast and was severed as the drill head was raised. Most of hydraulic fluid sprayed on to rig, driller, and driller's platform; it does not appear the hydraulic fluid spray reached mud pit. Drillers offsite to drive to local business to buy replacement hose. Borehole depth is at 60 ft bgs. Lithology is predominantly fine- to medium-grained sand with the exception of coarse grained sand at 35 ft bgs. According to Beach, mud properties are monitored by the drillers and recorded on their dailies and she sees them at the end of the day. She also visually monitors the mud thickness during drilling. She does comment that she has observed more liquid in the hopper the deeper they go (hopper is at the downstream end of the shaker); she will ask the driller why. Regional depth to water is likely approximately 115 ft bgs, but she will have a better idea when she hears the DTW in PWA-3 from Eddington. Also, Beach observed that the further north the locations are, the cobble content appear to decrease.

10:05: Drilling resumes at PWA-1. Strong rig chatter at 65 - 80 ft bgs; possible presence of gravels/cobbles. Cuttings in shaker do not indicate presence of cobbles or gravels, only coarse-grained sand. Beach was expecting gravel fragments due to rig chatter, but did not see any in cuttings in shaker.

10:45: Carter mobilizes to PWA-3.

10:56: At PWA-3. Well is currently dry; Eddington is waiting for well to recharge since 10:50. Well was bailed to remove sediments, surged for 50 minutes, then was bailed dry. Initial depth to water was 96.60 ft below top of casing (btoc). Total depth of well is 135.80 feet below top of casing, no sump except for stainless steel end cap. Well has 40 feet of screen. Parameters are not being recorded during bailing. According to Eddington, the SOP says that parameters do not need to be recorded until purging with a pump. No post-development samples will be collected from this well. However, IDW samples will be collected (sampling time TBD, will likely collected it when the water is transferred to designated holding tank in IDW area) for VOCs, SVOCs, metals, pH, and flashpoint.

11:01: Depth to water is now at 111.15 ft btoc. Carter takes photo of setup at PWA-3.

11:10: Carter mobilizes to PWA-1.

11:22: At PWA-3. Borehole currently approximately 100 ft bgs. Beach said that Pacific Surveys will be onsite at 13:00 to perform geophysical logging of borehole and she believes that they will reach TD after 13:00, but before the end of the day. Drilling mud appears sufficiently thick for borehole stability. Carter takes photos of operations at PWA-1, including drilling mud and soil cuttings. Soil cuttings in photo show coarse-grained sand at approximately 100 ft bgs.

11:45: Carter offsite for the day.

(5)	Caroline Carter / Hydrogeologist	09/25/12
	SIGNATURE/TITLE	DATE

From: Lechler, Benjamin/SCO
Sent: Thursday, November 08, 2012 3:03 PM
To: Lisa Hanusiak
Cc: Towell, David/LAC
Subject: GCOU - Field Oversight Summary October 2012

Hi Lisa,

Below are summaries of our field oversight observations from 10/03, 10/10, and 10/19. Photos have been uploaded to the project Sharepoint site. Please let me know if you have any questions. – BJ

PWA-5: Borehole Drilling Oversight by Alex Lapostol/E2 10/03/12

Alyssa Beach/ERM was the geologist onsite and Cascade Drilling provided mud rotary drilling services. The following bullets summarize the site visit:

- I observed drilling from site setup, and continuation of pre-cleared borehole from 10 to 105 feet below ground surface (feet bgs).
- Cuttings were collected with a fine-mesh strainer from the mud discharge to the shaker table for soil classification.
- Based on my visual inspection of cuttings coming off of the shaker table, soil encountered during drilling was a mixture of medium to very coarse sand with variable percentages of each at different depth intervals from 10 feet to approximately 65 feet there was fine gravel. It was interbedded medium to coarse sand and fine gravels from 65 feet to 105 feet, approximately.
- The field activities observed were all executed in accordance with the EPA approved Field Sampling Plan.

PWA-13: Well Construction Oversight by B.J. Lechler/CH2M HILL 10/10/12

Alyssa Beach/ERM was the geologist onsite and Cascade Drilling provided mud rotary drilling and well installation services. The following bullets summarize the site visit:

- A conference call was held earlier in the day with ERM, the GCOU Respondents, EPA, and CH2M HILL to discuss the well completion interval. The agreed upon screen interval was 65-105 feet bgs.
- Cascade proceeded to thin out the drilling mud and run in the PVC well casing. A PVC endcap was used at the bottom of the well. Cemex #3 sand was used as filter pack material. Following placement of the #3 sand, the well screen was swabbed for 30 minutes to facilitate setting of the filter pack. Pel-Plug bentonite pellets were used as the transition seal material. All well materials were installed according to the EPA-approved planning documents.
- Following placement of the bentonite seal, the drillers took a lunch break to allow for hydration of the pellets. I departed the site at this time.

PWA-10: Well Development Oversight by Alex Lapostol/E2 10/03/12

The following bullets summarize the site visit:

- The well screen was reported to be from 40-80 feet bgs.
- Pre-development depth to water was 49.8 feet below top of casing (feet btoc).
- Approximately 45 gallons of water were removed during surging/bailing of the well. The water level was measured at 53.1 ft. btoc after the surging and bailing.
- At the time prior to my departure, will pumping from the lowest portion of well screen the parameters were:
    - pH = 7.32

    - Conductivity = 0.867 mS/cm
    - Temperature = 25.4 deg C
    - Turbidity = 99 NTU (this was collected in the bottom section of the well; NTU's were approx. in the 20's in the upper section)
    - Dissolved oxygen (DO) = 5.81 mg/L
    - Oxidation-reduction potential (ORP) = 313 mV
- The downhole pumping was steady at a rate of 3 gallons per minute (gpm). A total of approximately 255 gallons were removed during my field oversight visit.
- The well exhibited rapid recharge and maintained a 3 gpm pump rate without significant drawdown. In fact, the well level rose about 8 ft. after the second surging and bailing, of approx. 45 gal. per event.
- ERM collected water samples during pump development.
- Well development was performed as specified in the approved field sampling plan (FSP) with one exception. The FSP specified that a 3 to 4-inch submersible pump would be used for pump development, but a 2-inch pump was used instead. Photographs show the well development setup and the tools used during development.

Benjamin J. Lechler, P.G.
Project Hydrogeologist

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Cr^6 - PRP oversight 1/2

PWA-5 30OCT2012 Burbank, CA

ALEX LAPOSTOL - E2 Consulting Eng. @ Chandler & Orchard Blvd. Dr.

Cascade Drilling - Mud Rotary Rig, equip.

ERM Geo: Alyssa Beach

Arrival Time: 0945 hrs.

Activity: Crew has set up decon area and support equipment; delineation of work area on Orchard Drive. Driller backed into place and towered up @ 1000 hrs.

@ 1054 hrs - Short conductor casing (surface) installed and lead tricone bit setup for mudpit. Mud pit not setup yet.

@ 1208 hrs - Crew & ERM take a quick lunch break. At this time, drill pipe is in the hole at 10 feet (when Airknife left off); Mud is mixed - pump running, now ready to drill - after break.

@ 1235 hrs - drilling commences -
10-20' - shaker table shows a nice silty Sand. (SW)
@ 1254 hrs - add 2nd 20ft. pipe casing.
20'-40' - Sand; inc. coarse grain; less silt
40'-50' as above
55'-65' inc. coarse sand; fine gravel. @ 1305 hrs.
65' ~ 70' very Coarse Sand; poorly sorted.
70' - 80' back to Sand; w/silt diminished grain size.
80'-85 inc. Coarseness
90' - back to very Coarse sand; fine gravel

PWA-5 Bobbank
Respondents RI well @ Chandler/orchard.

@ 1345 hrs. — 95' – 105' As above – Very coarse sand, fine gravel – some silt in fines.

Speak w/ Geo: Work being conducted according to workplan.
Take final photos – notes.

@ 1355 hrs – Prepare to leave site.

Talk to BJ re: site conditions at Clark and Rosemary –

From: Lapostol, Alex/BAO
Sent: Monday, October 22, 2012 1:40 PM
To: Lechler, Benjamin/SCO
Subject: RE: Oversight at PWA-10 well development
Attachments: pwa 10 dev rig.jpg; pwa 10 lowering pump.jpg; pwa 10 ntu sample.jpg; pwa 10 parameters.jpg; pwa 10 set up to sample parameters.jpg

BJ - Below are my observations from oversight of well development at the GCOU respondents monitoring well PWA-10 on the morning of 19 October 2012 from 0800-1230 hrs.:

The static water level prior to performing well development was 49.8 ft below top of casing (feet btoc). Well screen is reported to be from 40-80 ft. bg. Water level was measured at 53.1 ft. btoc after the surging and bailing of 45 gallons.
Well development was performed as specified in the approved field sampling plan (FSP) with one exception. The FSP specified that a 3 to 4-inch submersible pump would be used for pump development, but a 2-inch pump was used instead. Photographs show the well development setup and the tools used during development.

e At the time prior to my departure, will pumping from the lowest portion of well screen the parameters were:

pH = 7.32
Conductivity = 0.867 (forgot to write down the units...does not look like µS/cm, dont want to assume, so left blank)
Temperature = 25.4 deg C
Turbidity = 99 NTU (this was collected in the bottom section of the well; NTU's were approx. in the 20's in the upper section)
DO = 5.81
ORP = 313

- The downhole pumping was steady at a rate of 3 gallons per minute. A total of approximately 255 gallons were removed during my field oversight visit.
The well exhibited rapid recharge, and maintained a 3 gpm pump rate with the Grunfos pump with out significant drawdown. In fact, the well level rose about 8 ft. after the second surging and bailing, of approx. 45 gal. per event.

- ERM collected water samples during pump development.
Photos attached.

Regards,
Alex Lapostol, P.G.
Senior Technical Consultant
E2 Consulting Engineers - USEPA Contractor
213-576-6801 (Regional Board office)
510-590-6218 (cell)

mike Palm ERM Split Sampling 10.29.12

0700 - Arrived @ V13EEMW1, meet up with Eric from ERM (209) 896-6236 and Blaine Tech. V13EEMW-1 is located at 4585 Electronics Place. Well is on Quixote studios property. Checked in at the guard shack. And was advised to park down by studio 6. Had to walk to the well location. By the time I arrived Blaine Tech had the equipment calibrated. Using YSI Pro Plus, Hach Turbidy

0720 - went over H&S plan from both ERM & Blaine Tech.

0730 - Blaine Tech lowered a Bladder pump down well. Well is 4 in PVC DTW = 20.06 TD = 33.95, Equipment Blank GW-EB1-102912-0730

0740 - Start purging well @ 500 ml/min. Pump is set @ 31 feet. using low-flow purging methods. Taking parameters every 3 min. No Order

0801 - Final parameter before sample: Temp - 20.8°C, pH - 6.98, Cond = 1047 uS/cm Turbidity = 2, D.O. - 0.77 mg/L, ORP - -129.1 water Removed - 10,500 mL, DTW = 20.13

0806 - Sample, ERM-GCOU-V13EEMW-1-GW-31-102912, There Dup = V13EEMW101

mike Palm ERM Split Sampling 10.29.12

0806 - CH2MHILL Sample labled - V13EEMW1

0820 - Cleaned up work area, Decon pump

0830 - Arrived @ PWA-6. Located Near 703 Hawthorne St. Comercial Area.

0900 - Gauged PWA-6, DTW = 62.95 TD = 90.05, 4 in PVC

0905 - Began lowering bladder pump down well using new tubing each time. Pump is set at 87 feet.

0915 - Began purging well @ 500 ml/min taking parameters every 3 min.

0936 - Final parameter before sample: Temp = 20.0°C, pH - 7.01, Cond - 1050, Turb - 2 D.O. - 7.04, ORP - 89.4. Water Removed 10500 mL, DTW 62.98

0940 - ERM Sample - GCOU - PWA-6 - 90.05 - GW-87-102912. CH2M Sample PWA-6

1000 - moved up to PWA-12 which is Just up from PWA-6, Deconed pump

1006 - Gauged PWA-16, DTW = 63.09 TD = 164.10, 4 in PVC

1010 - Lowered bladder pump down to 161 feet.

mike Pain ERM Split Sampling 10.29.12

1023 - began purging PWA-12 @ 500mL/min
Taking parameters every 3 min. No Odor

1047 - final parameter before Sample -
Temp - 20.0, pH - 6.98, Cond - 1024, Turb 5,
D.O. - 6.17, ORP - 97.1, Water Removed - 12,000
mL, DTW = 63.13.

1100 - Sampled PWA-12. ERM's Sample ID
GCOU-PWA-12-164.10-GW-161-102912
CH2M : PWA-12

1110 - Cleaned up work area. Deconned pump

1130 - arrived @ PWA-7, Located North
side on near 4560 Doran Street.

1135 - Gauged PWA-7, DTW = 26.41 TD = 53.41
4in PVC

1140 - Lowered bladder pump down well, using
new tubing - pump is @ 50 feet. Taking
parameters every 3 min.

1204 - Took final parameter before Sampling:
Temp - 21.5, ph - 7.00, Cond. 1147, Turb - 10
DO - 1.88, ORP 63.3, Water Removed 12,000
mL, DTW = 26.44

1205 - Sampled PWA-7. ERM Sample ID:
GCOU-PWA-7-53.41-GW-50-102912.
CH2M Sample ID: PWA-7

mike Pain ERM Split Sampling 10.29.12

1210 - cleaned up work area. / CH2MHILL
left to deliver sample to AETL.

1230 - Dropped samples off @ Lab.
offsite

- CH2MHILL is sampling for:
Hexavalent Chromium, LAB AETL

- ERM is sampling for: Dissolved
Metals, Hexavalent Chromium, Ph, DO,
ORP, Inorganic Anions, DOC, Divalent Iron,
Alkalinity, TDS, TSS, VOC'S, LAB is
Test America

10-29-12

mike Palm ERM Split Sampling 10.30.12

0700 - Arrived @ Location PWA-10. Well is Located near 1500 Emmens way

0720 - Went over H & S from ERM and Blaine Tech.

0730 - Blaine Tech to calibrate YSI Pro plus and Hach Turbidity meter

0740 - Gauged PWA-10, DTW = 47.40 TD = 80.10. 4in PVC

0750 - Lowered bladder pump down to 77 ft using new tubing. Taking parameters every 3min

0800 - Began purging PWA-10 @ 500ml/min

0818 - Took final parameter before Sampling Temp-19.9, pH-7.16, Cond-1148, Turb-9, D.O.-3.16, ORP-79.0, water Removed 9000 ml, DTW = 47.44

0730 - Equipment Blank: GW-EB1-103012-0730

0819 - Sampled PWA-10, ERM's Sample ID: GCOU-PWA-10-80.10-GW-77-103012 CH2M Sample ID: PWA-10

0830 - Cleaned up work area, deconned pump.

0850 - Arrived @ PWA-9, well is located on south side near 6501 San Fernando Rd. Cal Barricade has set up traffic control

mike Palm ERM Split Sampling 10.30.12

0855 - Gauged PWA-9, DTW = 56.03 TD = 95.35, 4in PVC.

0900 - Started purging PWA-9 @ 400ml/min taking parameters every 3min.

0930 - Took final parameter before Sampling Temp - 22.50, Ph - 6.87, Cond - 1152, Turb 195 D.O. 0.58, ORP - 98.4, water removed - 12,000 ml, DTW = 56.11

0935 - Sampled PWA-9, ERM Sample ID: GCOU-PWA-9-95.35-GW-92-103012 CH2M Sample ID: PWA-9

0940 - Cleaned up work area, deconned pump

1000 - Arrived @ PWA-8, well is located in a Alley, Behind 1851 Victory way.

1010 - Gauged PWA-8, DTW = 58.45, TD = 85.20 4in PVC

1012 - Lowered bladder pump down to 72 feet

1016 - Began purging PWA-8 @ 500ml/min

1037 - Took final parameter before Sampling Temp - 21.1, pH - 7.03, Cond - 1095, Turb - 5 D.O. - 4.21, ORP - 74.0, water removed 10,500ml/min, DTW = 58.52

1040 - Sampled PWA-8

Mike Pain ERM Split Sampling 10.30.12

1040 - ERM's Sampled ID: GCOU-PWA-8-85.20-GW-72-103012, CH2MHILL Sample ID: PWA-8.

1050 - Cleaned up work area, decomed pump.

1100 - Arrive @ PWA-13. Well is located North Side 262 West Tujunga Ave.

1115 - Gauged PWA-13, DTW=72.83 TD=105.71 4in PVC

1118 - Lowered bladder pump down well to 89 feet, using new tubing.

1125 - Began purging PWA-13 @ 500ml/min taking parameters every 3 min.

1143 - Took final parameter before sample Temp=21.1, pH-7.09, Cond-1318, Turb-8 D.O. 3.59, ORP-84.0, Water Removed-9000ml, DTW=72.86

1145 - Sampled PWA-13, ERM's Sample ID: GCOU-PWA-13-105.71-GW-89-103012 CH2M Sample ID: PWA-13

1155 - Cleaned up work area, CH2MHILL is offsite to deliver samples to Lab

1215 - Dropped Samples off @ AETL. Same Sample Analysis as yesterday.

10.30.12

Attachment 2

Photo Log of Photographs Taken During Oversight of Respondents Field Activities

Photo No.	001	**Date**	04/12/12	**View Direction**	Southeast

Sonic rig set up over GC-5.

Photo No.	002	**Date**	04/12/12	**View Direction**	West

Sonic rig set up over GC-5.

Photo No.	003	***Date***	04/12/12
View Direction	East-northeast		

Bagging a core sample generated by sonic rig at GC-5.

Photo No.	004	***Date***	04/12/12
View Direction	Southwest		

Typical drill bit used by sonic rig at GC-5.

Photo No.	005	***Date***	04/12/12	***View Direction***	North

ERM work area adjacent to sonic rig at GC-5.

Photo No.	006	**Date**	04/12/12	**View Direction**	Down

Sonic cores from GC-5 from 13 to approximately 25 feet below ground surface.

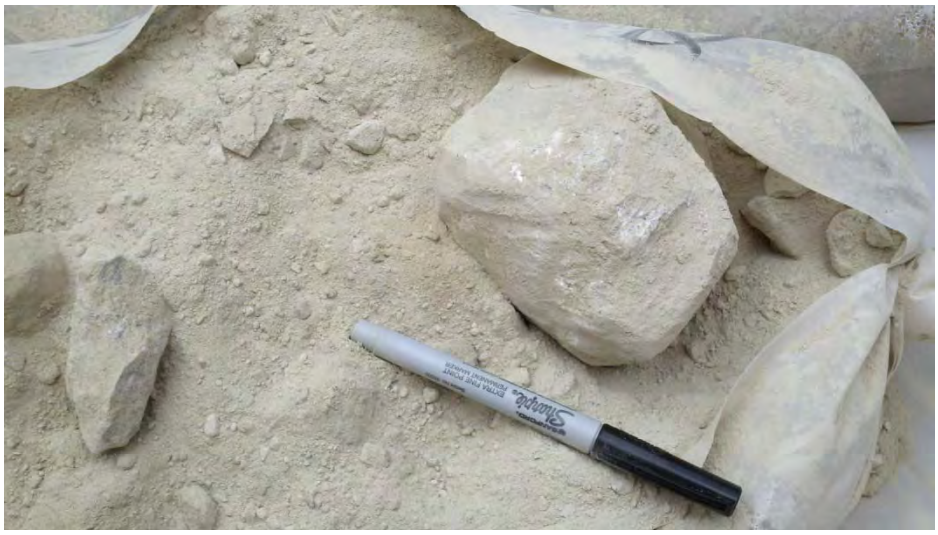

Photo No.	007	**Date**	04/12/12	**View Direction**	Unknown

Close-up of sonic core run from 28 to 32 feet below ground surface from GC-5.

Photo No.	008	**Date**	04/12/12	**View Direction**	Unknown

Close-up of sonic core run from 34 to 36 feet below ground surface from GC-5.

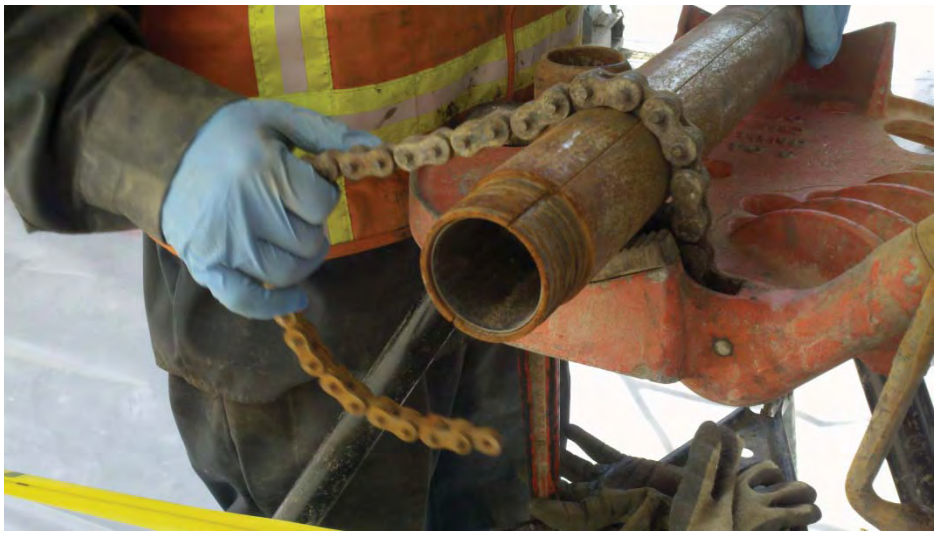

Photo No.	009	**Date**	04/12/12	**View Direction**	Unknown

Preparing California-modified split-spoon sampler for collection of soil samples from GC-5 for geotechnical analysis. Split-spoon sampler is lined with 6-inch-long sleeves.

Photo No.	010	**Date**	04/12/12	**View Direction**	Down

Sand trap for split spoon sampler used at GC-5.

Photo No.	011	**Date**	04/12/12	**View Direction**	Down

Preparing soil geotechnical samples from GC-5 (40-42 feet below ground surface) for submittal to laboratory.

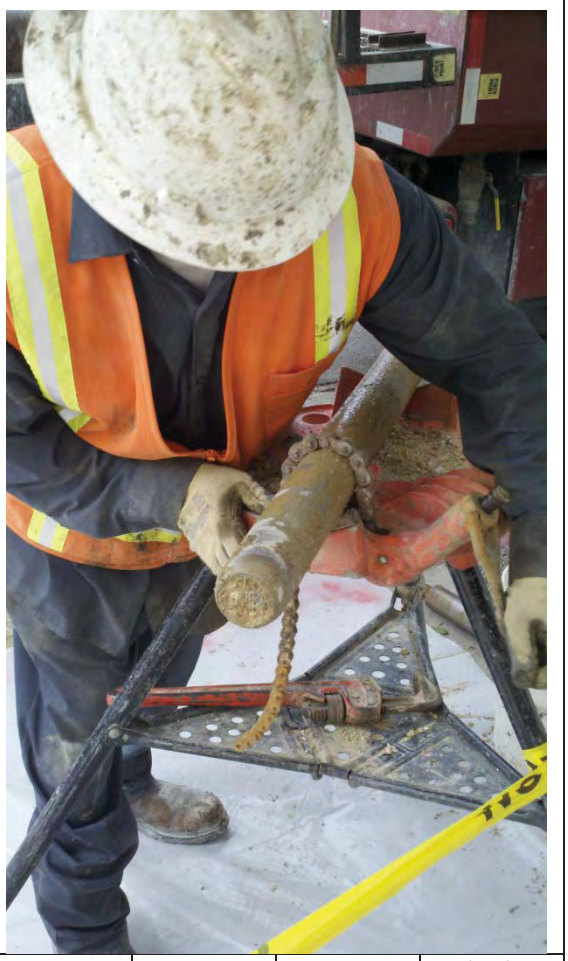

Photo No.	012	***Date***	04/12/12
View Direction	Unknown		

Filled split spoon sampler from GC-5.

Photo No.	013	***Date***	04/12/12
View Direction	Down		

Geotechnical samples collected from 45 to 47 feet below ground surface using split-spoon sampler.

Photo No.	014	***Date***	04/23/12	***View Direction***	Southeast

Set up of work area containing mud rotary drilling rig and shaker at PWA-6.

Photo No.	015	***Date***	04/23/12
View Direction	Southwest		

Set up of traffic control, mud rotary drilling rig, and shaker at PWA-6.

Photo No.	016	***Date***	04/23/12
View Direction	East		

Typical soil cuttings recovered during drilling of PWA-6.

Photo No.	017	***Date***	04/24/12
View Direction	Down		

Close-up of 4-inch-diameter Schedule 40 0.020-inch slotted PVC screen with end cap to be installed at PWA-6.

Photo No.	018	***Date***	04/24/12
View Direction	Southeast		

Photo of 4-inch-diameter Schedule 40 PVC screen, blank casing, and end cap that will be installed at PWA-6.

Photo No.	019	***Date***	04/24/12
View Direction	North		

Well installation in progress at PWA-6.

Photo No.	020	***Date***	04/24/12
View Direction	North-northeast		

Swab block used to surge the filter pack to remove any bridging of filter pack prior to emplacement of bentonite pellets at PWA-6. A 5-foot section of screen was used in lieu of a 5-foot section of blank casing until well installation was complete; this 5-foot section was to be removed during well vault box installation and surface completion.

Photo No.	021	**Date**	04/24/12	**View Direction**	Northeast

Set up for emplacement of cement-bentonite grout. Note the stick-up screen has been cut and taped prior to grout emplacement to ensure that grout does not enter the well at PWA-6.

Photo No.	022	**Date**	05/15/12
View Direction	Unknown		

Surging of filter pack sand at PWA-8 in progress.

Photo No.	023	**Date**	05/15/12
View Direction	Unknown		

Emplacing additional No. 3 Monterey filter pack sand after surging of filter pack sand at PWA-8.

Photo No.	024	***Date***	05/15/12
View Direction	Unknown		

Emplacing bentonite pellets during well installation at PWA-8.

Photo No.	025	***Date***	05/15/12
View Direction	Unknown		

Installing tremie pipe in preparation for emplacement of cement-bentonite grout during well installation at PWA-8.

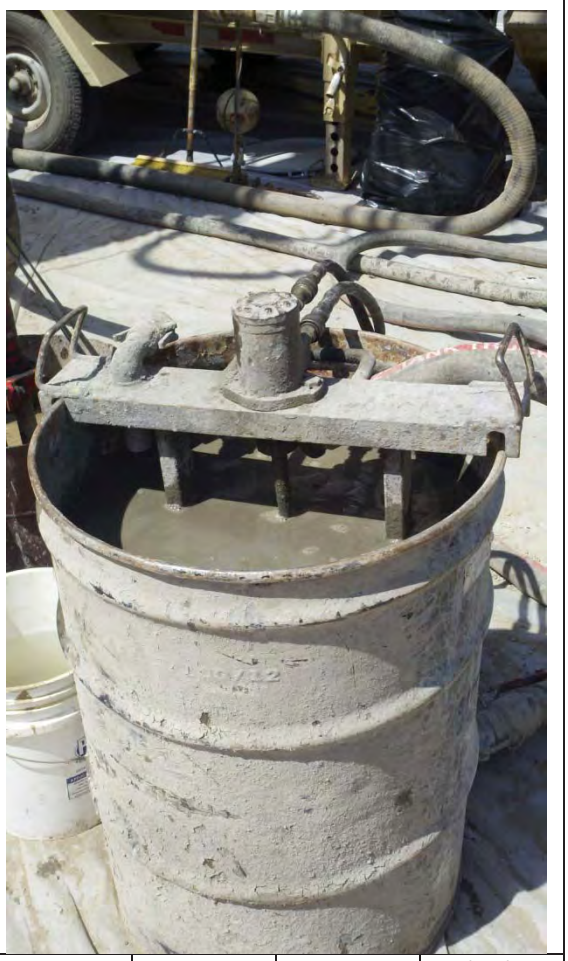

Photo No.	026	***Date***	05/15/12
View Direction	Unknown		

Mixing of cement-bentonite grout at PWA-8.

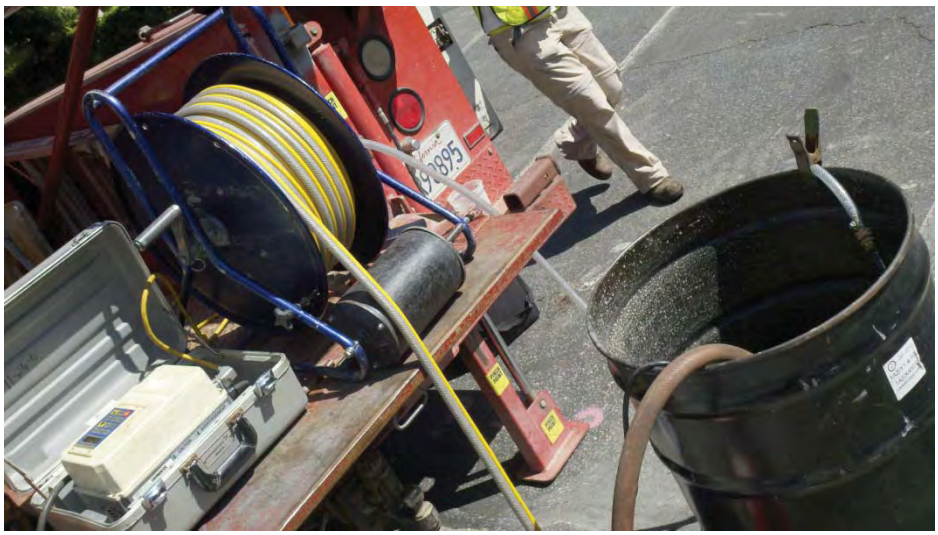

Photo No.	027	***Date***	05/21/12	***View Direction***	Unknown

Development in progress at well PWA-8.

Photo No.	028	**Date**	05/21/12	**View Direction**	Unknown

Initial set of Imhoff Cones with mud settleout during development of Well PWA-8.

Photo No.	029	**Date**	05/21/12	**View Direction**	Unknown

Close-up of typical swab block used to surge well during well development.

Photo No.	030	**Date**	05/21/12	**View Direction**	Unknown

Close-up of stainless steel bailer used to bail sediment and remaining drilling mud out of well during development of Well PWA-8.

Photo No.	031	**Date**	05/21/12	**View Direction**	Unknown

Next set of Imhoff Cones showing progression of well development at PWA-8.

Photo No.	032	***Date***	06/18/12
View Direction	East		

Using a stainless steel bailer to remove drilling mud and sediments from Well PWA-9 during development.

Photo No.	033	***Date***	06/18/12
View Direction	Southwest		

Set of Imhoff Cones showing progression of development at Well PWA-9.

Photo No.	034	***Date***	06/18/12
View Direction	Southeast		

Two-inch-diameter electric submersible pump was used during the development of Well PWA-9.

Photo No.	035	***Date***	06/18/12
View Direction	Southeast		

Delineation of work/exclusion zone during development of Well PWA-9.

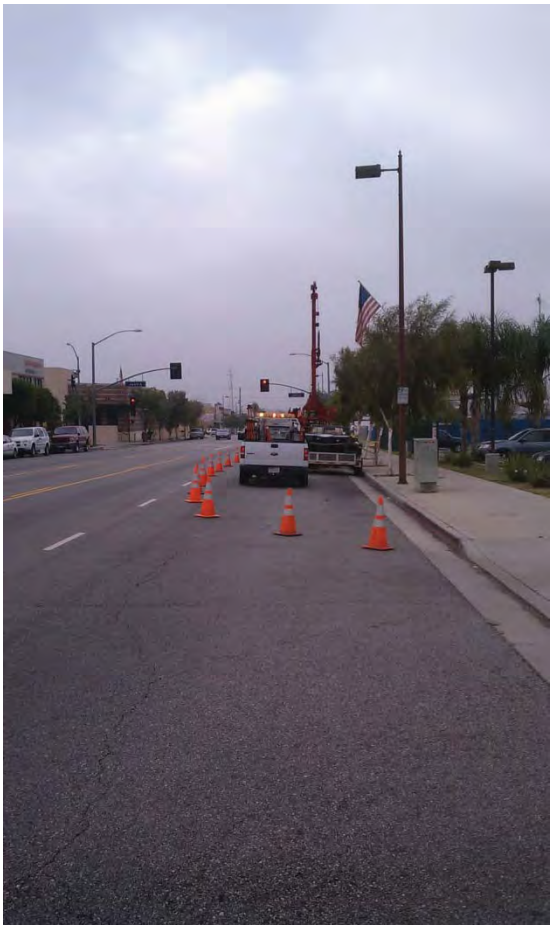

Photo No.	036	***Date***	06/18/12
View Direction	Southeast		

Traffic control implemented during development of Well PWA-9.

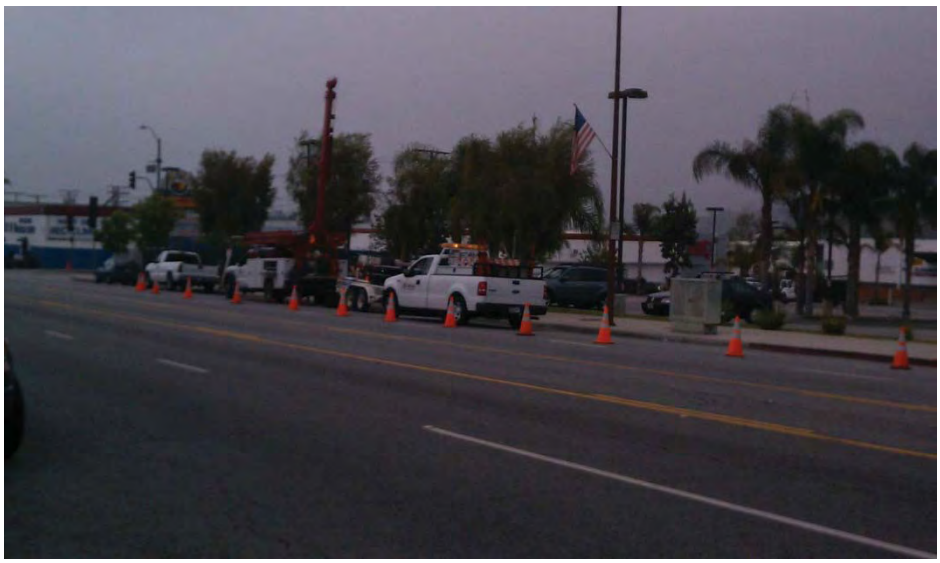

Photo No.	037	***Date***	06/18/12	***View Direction***	South

Set up of SMEEL rig and traffic control during development of Well PWA-9.

Photo No.	038	**Date**	09/21/12	**View Direction**	Southeast

Set up of drilling rig and mud shaker at PWA-3. Drillers prepare for installation of Well PWA-3. A section of 4-inch-diameter Schedule 40 PVC blank well casing is in foreground still wrapped in plastic.

Photo No.	039	**Date**	09/21/12	**View Direction**	Northeast

Pallet of Lapis Lustre No. 3 Sand supplied by CEMEX used as filter pack during installation of Well PWA-3.

Photo No.	040	**Date**	09/21/12	**View Direction**	South

Lowering swab block inside PWA-3 to surge emplaced filter pack sand prior to emplacement of bentonite pellets during installation of Well PWA-3.

Photo No.	041	**Date**	09/21/12	**View Direction**	Unknown

5-Gallon buckets of 3/8-inch-diameter bentonite pellets used to provide annular seal during installation of Well PWA-3. Orange object on top of bucket is a typical lockable well lid that is used to secure each well.

Photo No.	042	**Date**	09/21/12	**View Direction**	Northeast

Pallet of Portland Cement, one of three components that make up the cement-bentonite grout annular seal used during the installation of Well PWA-3 (the other two components are bentonite and water [not shown in photo]).

Photo No.	043	**Date**	09/25/12	**View Direction**	Northeast

Set up of traffic control, drilling rig, mud shaker, and water truck at PWA-1.

Photo No.	044	**Date**	09/25/12	**View Direction**	North

Soil cuttings from approximately 100 feet below ground surface at PWA-1.

Photo No.	045	**Date**	09/25/12	**View Direction**	North

Mud pit and drilling mud; total depth of PWA-1 at time of photo was 100 feet below ground surface.

Photo No.	046	***Date***	09/25/12	***View Direction***	Northwest

Set up of SMEEL rig and water trailer at PWA-3 during well development.

Photo No.	047	***Date***	10/03/12	***View Direction***	West-southwest

Driller preparing to connect drill bit to drill pipes at PWA-5.

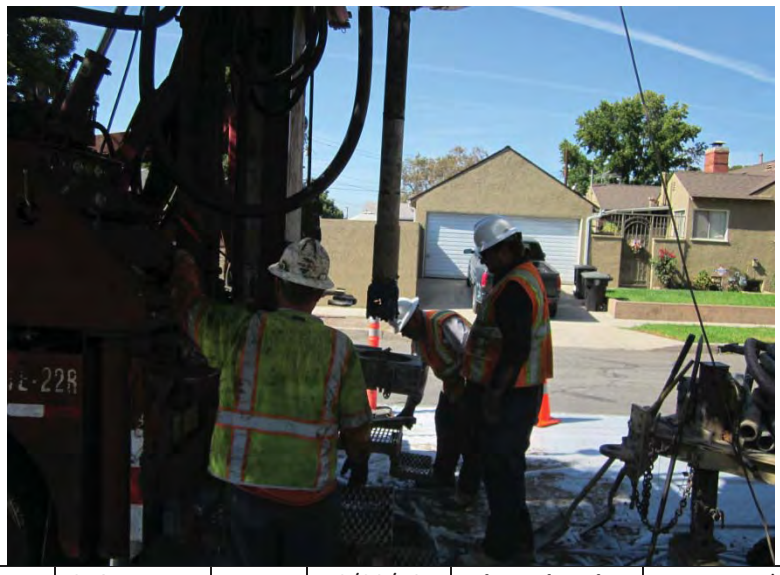

Photo No.	048	**Date**	10/03/12	**View Direction**	West-southwest

Drill bit connected to drill pipes at PWA-5.

Photo No.	049	**Date**	10/03/12	**View Direction**	South

Set up of mud pit at PWA-5.

Photo No.	050	***Date***	10/03/12	***View Direction***	North

Setup of drilling rig, mud shaker, and water truck at PWA-5.

Photo No.	051	***Date***	10/03/12	***View Direction***	South-southwest

Soil cuttings from PWA-5 (depth unknown).

Photo No.	052	***Date***	10/10/12
View Direction	Unknown		

Well installation in progress at PWA-13.

Photo No.	053	***Date***	10/10/12
View Direction	Unknown		

Setup of drilling rig, mud shaker, plastic totes at PWA-13.

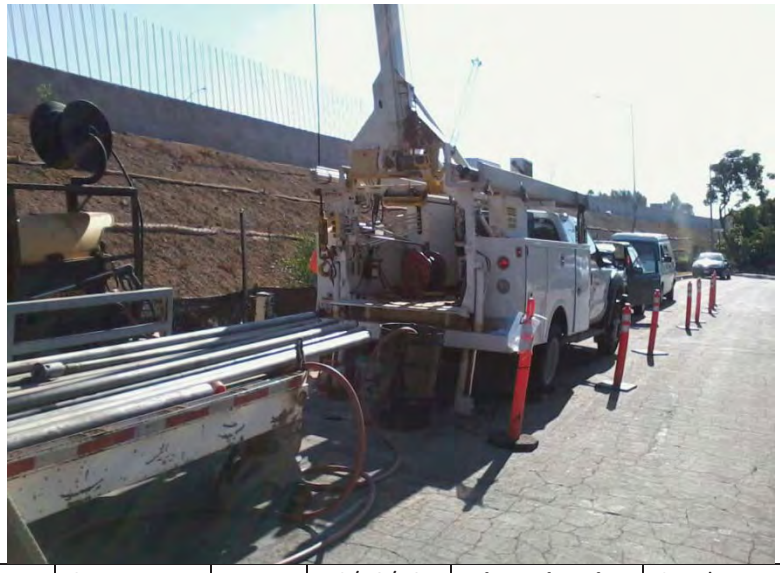

Photo No.	054	***Date***	10/19/12	***View Direction***	Southeast

SMEEL rig at PWA-10 for well development.

Photo No.	055	***Date***	10/19/12
View Direction	East		

Developer is preparing to lower electric submersible pump down PWA-10 in preparation for well development.

Photo No.	056	***Date***	10/19/12
View Direction	West		

Collecting a turbidity sample during development of Well PWA-10.

Photo No.	057	***Date***	10/19/12
View Direction	Northwest		

Turbidity meter (left side of photo) and water quality meter (right side of photo) used during development of Well PWA-10.

Photo No.	058	***Date***	10/19/12
View Direction	East		

Well development and sampling manifold set up at PWA-10.

Photo No.	059	***Date***	10/30/12	***View Direction***	Down

View of PWA-9 during low-flow sampling using a portable bladder pump. White and blue tubes are the discharge and air lines, respectively. Twine is holding the pump.

Photo No.	060	**Date**	10/30/12	**View Direction**	Southwest

Filling 40mL VOA vials with groundwater from PWA-9 for volatile organic compound analysis.

Photo No.	061	**Date**	10/30/12	**View Direction**	Northeast

Filled and labeled 40mL VOA vials; vials are filled with groundwater purged from PWA-9 using the low-flow purging methodology.

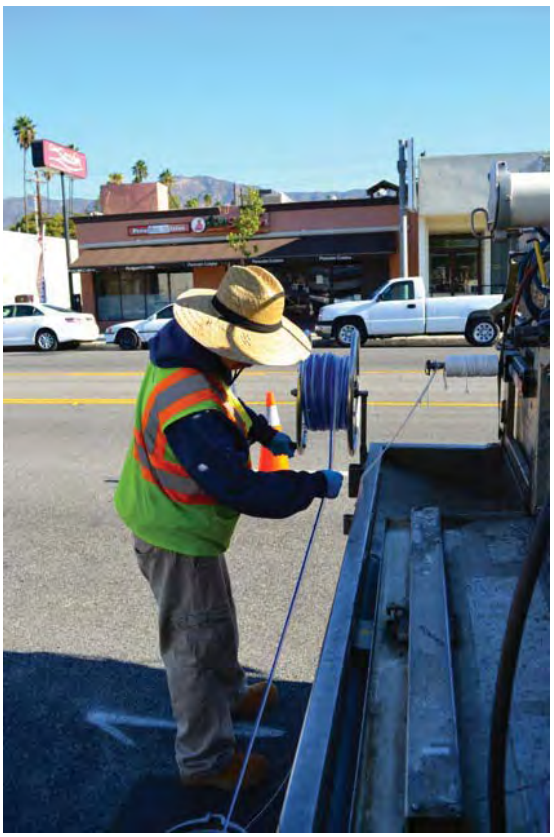

Photo No.	062	***Date***	10/30/12
View Direction	Northeast		

Blaine Tech pulling up bladder pump out of PWA-9.

Photo No.	063	***Date***	10/30/12	***View Direction***	Northwest

Set up of sampling truck and delineation of work area at PWA-8.

Photo No.	064	***Date***	10/30/12	***View Direction***	Down

Measuring depth to groundwater in PWA-8.

Photo No.	065	***Date***	10/30/12
View Direction	Down		

Lowering decontaminated low-flow bladder pump down PWA-8.

Photo No.	066	***Date***	10/30/12
View Direction	West		

Lowering low-flow bladder pump down PWA-8. White and blue tubes are the discharge and air lines, respectively. Twine is holding the pump.

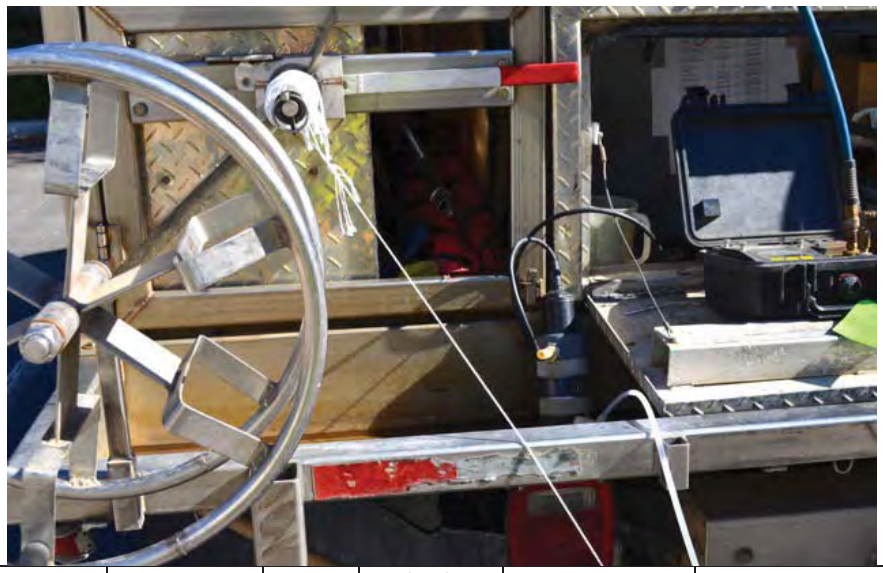

Photo No.	067	***Date***	10/30/12	***View Direction***	Northeast

Twine supporting low-flow bladder pump in PWA-8 is securely fastened to Blaine Tech sampling truck.

Photo No.	068	***Date***	10/30/12
View Direction	East		

Filtering groundwater from PWA-8 prior to collection of sample for dissolved organic carbon analysis.

Photo No.	069	Date	10/30/12	View Direction	Northeast

Blaine Tech set up during groundwater sample collection from PWA-9.

Photo No.	070	Date	10/30/12
View Direction	North-northwest		

Disassembling the portable low-flow bladder pump in preparation for decontamination.

Photo No.	071	***Date***	10/30/12	***View Direction***	East

Disassembled components of low-flow bladder pump used during groundwater purging and sampling at PWA-8.

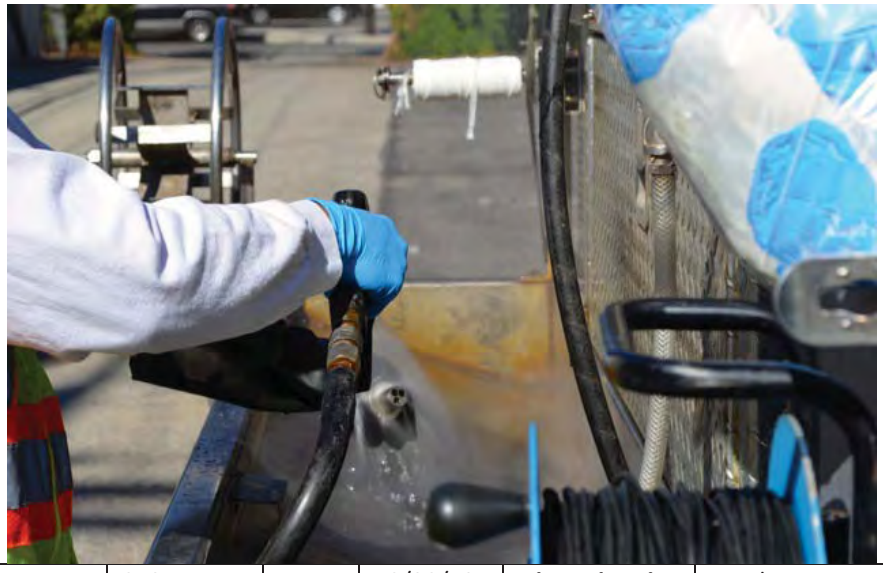

Photo No.	072	***Date***	10/30/12	***View Direction***	Northwest

Decontaminating an internal component of the portable low-flow bladder pump by pressure washing/steam cleaning.

Photo No.	073	***Date***	10/30/12	***View Direction***	Northwest

Decontaminating an external component of the portable low-flow bladder pump by pressure washing/steam cleaning.

Attachment 3

Data Validation Reports for Split Samples Collected by CH2M HILL on October 29 and 30, 2012

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 67303

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
V13EEMW1	Field Sample	10/29/12	Water
PWA-6	Field Sample	10/29/12	Water
PWA-12	Field Sample	10/29/12	Water
PWA-7	Field Sample	10/29/12	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥ 0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries were within criteria. However, RPD was outside criteria.

SDG	Associated Samples	Analyte	MS/MSD % R (limits)	RPD (limits)	Flag	A or P
67303	All	Cr(VI)	94.6/125 (70-140)	27.7 (20)	All J	A

c. Laboratory Duplicates

Sample V13EEMW1 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 67303

SDG	Associated Samples	Analyte	Flag	A or P	Reason
67303	All	Cr (VI)	All J	A	MS/MSD

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 67303

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 67314

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
PWA-10	Field Sample	10/30/12	Water
PWA-9	Field Sample	10/30/12	Water
PWA-8	Field Sample	10/30/12	Water
PWA-13	Field Sample	10/30/12	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥ 0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries were outside criteria. RPD was within criteria.

SDG	Associated Samples	Analyte	MS/MSD % R (limits)	RPD (limits)	Flag	A or P
67314	All	Cr(VI)	30.4/26.8 (70-140)	12.6 (20)	All J	A

c. Laboratory Duplicates

Sample PWA-9 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 67314

SDG	Associated Samples	Analyte	Flag	A or P	Reason
67314	All	Cr (VI)	All J	A	MS/MSD

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 67314

No data have been flagged due to blanks.

Attachment 4

PE Sample Scoring Evaluation Reports by Shaw Environmental & Infrastructure

QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY

PES SCORING EVALUATION REPORT – FOR AGENCY USE ONLY

PES:	SRS1486	**EPA Sample No.:**	MY8L27	**Report Date:**	02/06/2013
Lab Name:	USEPA Region 9 Laboratory	**Case No.:**	R13S09	**Lab Code:**	R9
Contract:	NA	**Matrix:**	Water	**Lab Sample ID:**	1211007-01
SDG No.:	12307A	**Date Received:**	11/02/2012	**Lab File ID:**	NR
Units:	µg/L	**Date Analyzed:**	11/05/2012	**Dilution Factor:**	1.0
Method:	EPA Method 218.6/SOP525				
Comments:	Scored by Shaw Personnel				

CAS No.	Analyte	Laboratory Results		PES Evaluation		Acceptance Limits				Spike Conc.
		Concentration	Q			Low Action	Low Warning	High Warning	High Action	
18540-29-9	Hexavalent Chromium	20		Pass	Within Limits	13	15	25	27	20
****	END All Analytes	**********	****	******	**********	********	********	********	********	********

NL = No Limit
NR = Not Reported
NE = Not Evaluated
NA = Not Applicable

Document ID#: 2003-02062013-3

The Quality Assurance Technical Support Program's Quality Management System is certified to the ISO 9001:2008 International Standard

QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY

PES SCORING EVALUATION REPORT – FOR AGENCY USE ONLY

PES:	SRS1487	**EPA Sample No.:**	MY8L26	**Report Date:**	02/06/2013
Lab Name:	American Environmental Testing Laboratory, Inc.	**Case No.:**	427727.F1.01	**Lab Code:**	AETL
Contract:	NA	**Matrix:**	Water	**Lab Sample ID:**	67347.07
SDG No.:	MY8L14	**Date Received:**	11/01/2012	**Lab File ID:**	NR
Units:	µg/L	**Date Analyzed:**	11/01/2012	**Dilution Factor:**	1.0
Method:	EPA Method 218.6				
Comments:	Scored by Shaw Personnel				

CAS No.	Analyte	Laboratory Results		PES Evaluation		Acceptance Limits				Spike Conc.
		Concentration	Q			Low Action	Low Warning	High Warning	High Action	
18540-29-9	Hexavalent Chromium	16		Pass	Within Limits	13	15	25	27	20
****	END All Analytes	**********	****	******	**********	********	********	********	********	********

NL = No Limit
NR = Not Reported
NE = Not Evaluated
NA = Not Applicable

Document ID#: 2003-02062013-5

The Quality Assurance Technical Support Program's Quality Management System is certified to the ISO 9001:2008 International Standard

QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY

PES SCORING EVALUATION REPORT – FOR AGENCY USE ONLY

PES:	SRS1488	**EPA Sample No.:**	GW-PE-1-103112	**Report Date:**	02/06/2013
Lab Name:	TestAmerica Irvine	**Case No.:**	GCOU	**Lab Code:**	TAI
Contract:	NA	**Matrix:**	Water	**Lab Sample ID:**	440-28244-7
SDG No.:	GW-EB1-103112-0700	**Date Received:**	10/31/2012	**Lab File ID:**	NR
Units:	µg/L	**Date Analyzed:**	11/04/2012	**Dilution Factor:**	1.0
Method:	EPA Method 218.6				
Comments:	Scored by Shaw Personnel				

CAS No.	Analyte	Laboratory Results		PES Evaluation		Acceptance Limits				Spike Conc.
		Concentration	Q			Low Action	Low Warning	High Warning	High Action	
18540-29-9	Hexavalent Chromium	20		Pass	Within Limits	13	15	25	27	20
****	END All Analytes	**********	****	******	**********	********	********	********	********	********

NL = No Limit
NR = Not Reported
NE = Not Evaluated
NA = Not Applicable

Document ID#: 2003-02062013-7

The Quality Assurance Technical Support Program's Quality Management System is certified to the ISO 9001:2008 International Standard

Appendix B
Data Validation Reports

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 66764

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8H50	Field Sample	09/06/12	Water
Y8H51	Field Sample	09/06/12	Water
Y8H52	Field Sample	09/06/12	Water
Y8H53	Field Sample	09/06/12	Water
Y8H54	Field Sample	09/06/12	Water
Y8H50 Filtered	Field Sample	09/06/12	Water
Y8H51 Filtered	Field Sample	09/06/12	Water
Y8H52 Filtered	Field Sample	09/06/12	Water
Y8H53 Filtered	Field Sample	09/06/12	Water
Y8H54 Filtered	Field Sample	09/06/12	Water
Y8H50 Unfiltered	Field Sample	09/06/12	Water
Y8H51 Unfiltered	Field Sample	09/06/12	Water
Y8H52 Unfiltered	Field Sample	09/06/12	Water
Y8H53 Unfiltered	Field Sample	09/06/12	Water
Y8H54 Unfiltered	Field Sample	09/06/12	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Laboratory Duplicates

As all samples were filtered prior to analysis, samples Y8H50 Filtered and Y8H50 Unfiltered are essentially duplicate samples. Result of sample and sample duplicate (RPD) were within QC limits of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 66764

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 66764

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 67153

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8KY0	Field Sample	10/16/12	Water
MY8KY1	Field Sample	10/16/12	Water
MY8KY2	Field Sample	10/16/12	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥ 0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

Two sets of LCS/LCSD were analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

Two sets of MS/MSD were analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Laboratory Duplicates

Samples MY8KY0 and MY8KY3 were analyzed in duplicates. Both RPDs were within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 67153

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 67153

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 67168

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8KY3	Field Sample	10/17/12	Water
MY8KY4	Field Sample	10/17/12	Water
MY8KY5	Field Sample	10/17/12	Water
MY8KY6	Field Sample	10/17/12	Water
MY8KY7	Field Sample	10/17/12	Water
MY8KY8	Field Sample	10/17/12	Water
MY8KY9	Field Sample	10/17/12	Water
MY8KZ0	Field Sample	10/17/12	Water
MY8KZ1	Field Sample	10/17/12	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥ 0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

Two sets of LCS/LCSD were analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

Two sets of MS/MSD were analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Laboratory Duplicates

Samples MY8KY2 and MY8KZ1 were analyzed in duplicates. Both RPDs were within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 67168

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 67168

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 67184

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8KZ2	Field Sample	10/18/12	Water
MY8KZ4	Field Sample	10/18/12	Water
MY8KZ6	Field Sample	10/18/12	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥ 0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

Two sets of LCS/LCSD were analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

Two sets of MS/MSD were analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Laboratory Duplicates

Samples MY8KZ2 and MY8KZ4 were analyzed in duplicates. Both RPDs were within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 67184

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 67184

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 67204

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8KZ8	Field Sample	10/19/12	Water
MY8L00	Field Sample	10/19/12	Water
MY8L02	Field Sample	10/19/12	Water
MY8L04	Field Sample	10/19/12	Water
MY8L06	Field Sample	10/19/12	Water
MY8L08	Field Sample	10/19/12	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥ 0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries were outside criteria. RPD was within criteria.

SDG	Associated Samples	Analyte	MS/MSD % R (limits)	RPD (limits)	Flag	A or P
67204	All	Cr(VI)	249/244 (70-140)	2.0 (20)	Detects J	A

c. Laboratory Duplicates

Sample MY8KZ8 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 67204

SDG	Associated Samples	Analyte	Flag	A or P	Reason
67204	All	Cr (VI)	Detects J	A	MS/MSD

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 67204

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 67216

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8L10	Field Sample	10/22/12	Water
MY8L12	Field Sample	10/22/12	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥ 0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Laboratory Duplicates

Sample MY8L10 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 67216

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 67216

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 67303

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
V13EEMW1	Field Sample	10/29/12	Water
PWA-6	Field Sample	10/29/12	Water
PWA-12	Field Sample	10/29/12	Water
PWA-7	Field Sample	10/29/12	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥ 0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries were within criteria. However, RPD was outside criteria.

SDG	Associated Samples	Analyte	MS/MSD % R (limits)	RPD (limits)	Flag	A or P
67303	All	Cr(VI)	94.6/125 (70-140)	27.7 (20)	All J	A

c. Laboratory Duplicates

Sample V13EEMW1 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 67303

SDG	Associated Samples	Analyte	Flag	A or P	Reason
67303	All	Cr (VI)	All J	A	MS/MSD

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 67303

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 67314

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
PWA-10	Field Sample	10/30/12	Water
PWA-9	Field Sample	10/30/12	Water
PWA-8	Field Sample	10/30/12	Water
PWA-13	Field Sample	10/30/12	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥ 0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries were outside criteria. RPD was within criteria.

SDG	Associated Samples	Analyte	MS/MSD % R (limits)	RPD (limits)	Flag	A or P
67314	All	Cr(VI)	30.4/26.8 (70-140)	12.6 (20)	All J	A

c. Laboratory Duplicates

Sample PWA-9 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 67314

SDG	Associated Samples	Analyte	Flag	A or P	Reason
67314	All	Cr (VI)	All J	A	MS/MSD

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 67314

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 68212

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8MX0	Field Sample	01/21/13	Water
Y8MX2	Field Sample	01/21/13	Water
Y8MX4	Field Sample	01/21/13	Water
Y8MX6	Field Sample	01/21/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was 0.997 for linear regression.

SDG	Associated Samples	Analyte	ICAL R^2 (criteria)	Flag	A or P
68212	All	Cr(VI)	0.997(≥0.999)	All J	P

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries were outside criteria according to the case narrative which states that "Percent recoveries for MS/MSD were not within QC limits, so they have not been included in this report."

SDG	Associated Samples	Analyte	MS/MSD % R (limits)	RPD (limits)	Flag	A or P
68212	All	Cr(VI)	Not Reported*	Not Reported	All J	A

* Case narrative which states that "Percent recoveries for MS/MSD were not within QC limits, so they have not been included in this report."

c. Laboratory Duplicates

Sample Y8MX4 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 68212

SDG	Associated Samples	Analyte	Flag	A or P	Reason
68212	All	Cr (VI)	All J	A	MS/MSD
68212	All	Cr (VI)	All J	P	ICAL

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 68212

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 68222

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8MX8	Field Sample	01/22/13	Water
Y8MY0	Field Sample	01/22/13	Water
Y8MY2	Field Sample	01/22/13	Water
Y8MY4	Field Sample	01/22/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were outside criteria.

SDG	Associated Samples	Analyte	MS/MSD % R (limits)	RPD (limits)	Flag	A or P
68222	All	Cr(VI)	37.8/57.8 (70-140)	41.8 (20)	All J	A

c. Laboratory Duplicates

Sample Y8MX8 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 68222

SDG	Associated Samples	Analyte	Flag	A or P	Reason
68222	All	Cr (VI)	All J	A	MS/MSD

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 68222

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 68244

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8MY6	Field Sample	01/23/13	Water
Y8MY8	Field Sample	01/23/13	Water
Y8MZ0	Field Sample	01/23/13	Water
Y8MZ2	Field Sample	01/23/13	Water
Y8MZ4	Field Sample	01/23/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was 0.9962 for linear regression.

SDG	Associated Samples	Analyte	ICAL R^2 (criteria)	Flag	A or P
68212	All	Cr(VI)	0.9962(≥0.999)	All J	P

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries were outside criteria. RPD was within criteria.

SDG	Associated Samples	Analyte	MS/MSD % R (limits)	RPD (limits)	Flag	A or P
68244	All	Cr(VI)	64/62 (70-140)	3.2 (20)	All J	A

c. Laboratory Duplicates

Sample Y8MY6 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 68244

SDG	Associated Samples	Analyte	Flag	A or P	Reason
68244	All	Cr (VI)	All J	A	MS/MSD
68244	All	Cr (VI)	All J	P	ICAL

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 68244

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 68306

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8MZ6	Field Sample	01/28/13	Water
Y8MZ8	Field Sample	01/28/13	Water
Y8N00	Field Sample	01/28/13	Water
Y8N02	Field Sample	01/28/13	Water
Y8N04	Field Sample	01/28/13	Water
Y8N06	Field Sample	01/28/13	Water
Y8N08	Field Sample	01/28/13	Water
Y8N10	Field Sample	01/28/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was 0.997 for linear regression.

SDG	Associated Samples	Analyte	ICAL R^2 (criteria)	Flag	A or P
68306	All	Cr(VI)	0.997(≥0.999)	All J	P

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Laboratory Duplicates

Sample Y8N10 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 68306

SDG	Associated Samples	Analyte	Flag	A or P	Reason
68306	All	Cr (VI)	All J	P	ICAL

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 68306

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 68317

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8N12	Field Sample	01/29/13	Water
Y8N14	Field Sample	01/29/13	Water
Y8N16	Field Sample	01/29/13	Water
Y8N18	Field Sample	01/29/13	Water
Y8N20	Field Sample	01/29/13	Water
Y8N22	Field Sample	01/29/13	Water
Y8N24	Field Sample	01/29/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value except for the following:

SDG	Associated Samples	Analyte	ICAL %R (criteria)	Flag	A or P
68317	All	Cr(VI)	124.8 (80-120)	Detects J	P

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries were within criteria. RPD was outside criteria.

SDG	Associated Samples	Analyte	MS/MSD % R (limits)	RPD (limits)	Flag	A or P
68317	All	Cr(VI)	72/104 (70-140)	36.4 (20)	All J	A

c. Laboratory Duplicates

Sample Y8N14 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 68317

SDG	Associated Samples	Analyte	Flag	A or P	Reason
68317	All	Cr (VI)	Detects J	A	MS/MSD
68317	All	Cr (VI)	All J	P	ICV

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 68317

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 68329

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8N26	Field Sample	01/30/13	Water
Y8N28	Field Sample	01/30/13	Water
Y8N30	Field Sample	01/30/13	Water
Y8N32	Field Sample	01/30/13	Water
Y8N34	Field Sample	01/30/13	Water
Y8N36	Field Sample	01/30/13	Water
Y8N38	Field Sample	01/30/13	Water
Y8N40	Field Sample	01/30/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was ≥0.999 for linear regression.

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Laboratory Duplicates

Sample Y8N40 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 68329

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 68329

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sample Delivery Group (SDG): 68345

Parameters: Hexavalent Chromium

Method: EPA Method 218.6

Laboratory: American Testing Laboratory, Inc., Burbank, CA

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8N42	Field Sample	01/31/13	Water
Y8N44	Field Sample	01/31/13	Water
Y8N46	Field Sample	01/31/13	Water
Y8N48	Field Sample	01/31/13	Water
Y8N50	Field Sample	01/31/13	Water
Y8N52	Field Sample	01/31/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6.

II. Calibration

An initial minimum of five-standards and a blank calibration was performed prior to sample analysis.

The correlation coefficient (R^2) was 0.9971 for linear regression.

SDG	Associated Samples	Analyte	ICAL R^2 (criteria)	Flag	A or P
68345	All	Cr(VI)	0.9971 (≥0.999)	All J	P

Initial calibration verification (ICV) was performed daily using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within ±20% of the expected value.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Laboratory Duplicates

Sample Y8N52 was analyzed in duplicates. RPD was within criteria of 20%.

d. System Monitoring Compounds

No surrogate analysis was reported with this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 68345

SDG	Associated Samples	Analyte	Flag	A or P	Reason
68345	All	Cr (VI)	All J	P	ICAL

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 68345

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69337

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Well ID/ Sample ID	Sample Type	Collection Date	Matrix
CS-C32-120/ MY8SM5	Field Sample	04/30/13	Water
CS-C30-200/ MY8SM7	Field Sample	04/30/13	Water
CS-C30-120/ MY8SM9	Field Sample	04/30/13	Water
CS-C31-102/ MY8SN1	Field Sample	04/30/13	Water
CS-C33-059/ MY8SN3	Field Sample	04/30/13	Water
Equip Blank/ MY8SN5	Equipment Blank	04/30/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. Relative Response Factors had a CSV of 6.5%. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV was 103% of nominal value, which met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. CCV was 114% of nominal value. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch. The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

Equipment Blank result was not detected.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries were within QC criteria. RPD of 30.2% exceeded listed laboratory acceptance limit of 20%. Since the LCS/LCSD data satisfied precision acceptance criteria, data qualification of sample results is not necessary.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8SM9. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69337

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69337

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69351

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8SN7	Field Sample	05/01/13	Water
MY8SN9	Field Sample	05/01/13	Water
MY8SP1	Field Sample	05/01/13	Water
MY8SP3	Field Sample	05/01/13	Water
MY8SP5	Field Sample	05/01/13	Water
MY8SP7	Equipment Blank	05/01/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis were performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch. The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

Equipment Blank result was not detected.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8SN9. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69351

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69351

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69365

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8SP9	Field Sample	05/02/13	Water
MY8SQ1	Field Sample	05/02/13	Water
MY8SQ3	Field Sample	05/02/13	Water
MY8SQ5	Field Sample	05/02/13	Water
MY8SQ7	Field Sample	05/02/13	Water
MY8SQ9	Equipment Blank	05/02/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis were performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.
The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

Equipment Blank result was not detected.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8SQ7. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69365

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69365

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69380

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8SR1	Field Sample	05/03/13	Water
MY8SR3	Field Sample	05/03/13	Water
MY8SR5	Field Sample	05/03/13	Water
MY8SR7	Equipment Blank	05/03/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.
The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

Equipment Blank result was not detected.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8SR1. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69380

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69380

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69414

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8SR9	Field Sample	05/07/13	Water
MY8SS1	Field Sample	05/07/13	Water
MY8SS3	Field Sample	05/07/13	Water
MY8SS5/V13DWBW3	Field Sample	05/07/13	Water
MY8SS7	Field Sample	05/07/13	Water
MY8SS9	Equipment Blank	05/07/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.
The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

Equipment Blank result was equal to 1.2 µg/L. Results less than 5 times this value require qualification as an estimated value ("J-flag").

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

Two sets of MS/MSD were analyzed with this SDG. Percent recoveries and RPD were outside QC criteria. However, the sample concentrations were much higher than the spike added. Also, as the LCS/LCSD were acceptable, no qualification of the data is required.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on samples MY8SR9 and MY8SS5. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable with qualification per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69414

See below.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69414

The following sample data have been flagged due to the equipment blank: V13DWBW3 (MY8SS5).

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69446

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID/ Well ID	Sample Type	Collection Date	Matrix
MY8ST1/ V13DRMW4	Field Sample	05/08/13	Water
MY8ST3/ V13DRMW4	Field Duplicate	05/08/13	Water
MY8ST5/ V13DRMW3	Field Sample	05/08/13	Water
MY8ST7/ V13DRMW2	Field Sample	05/08/13	Water
MY8ST9	Equipment Blank	05/08/13	Water
MY8SW1/ V13DRMW1	Field Sample	05/08/13	Water
MY8SW3/ V13DRMW1	Field Duplicate	05/08/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis were performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.
The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

Equipment Blank result was equal to 0.532 µg/L. Results less than 5 times this value require qualification as an estimated value ("J-flag").

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on samples MY8ST1 and MY8ST9. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69446

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69446

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69827

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Well ID/ Sample ID	Sample Type	Collection Date	Matrix
V13EEMW1/ Y8WM5	Field Sample	06/17/13	Water
V13EEMW3/ Y8WM7	Field Sample	06/17/13	Water
V13EEMW4/ Y8WM9	Field Sample	06/17/13	Water
Equip. Blank/ Y8WN1	Equipment Blank	06/17/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. Relative Response Factors had a CSV of 13%. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV was 107% of nominal value, which met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. CCV was 88% of nominal value. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.
The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

Equipment Blank result was not detected.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample Y8WM7. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69827

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69827

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69851

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8WN3	Field Sample	06/19/13	Water
Y8WN5	Field Sample	06/19/13	Water
Y8WN7	Field Sample	06/19/13	Water
Y8WN9	Equipment Blank	06/19/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample Y8WN3. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69851

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69851

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69868

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8WP1	Field Sample	06/20/13	Water
Y8WP3	Field Sample	06/20/13	Water
Y8WP5	Field Sample	06/20/13	Water
Y8WP7	Field Sample	06/20/13	Water
Y8WP9	Field Sample	06/20/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample Y8WP1. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69868

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69868

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69882

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8WQ1	Field Sample	06/21/13	Water
Y8WQ5	Field Sample	06/21/13	Water
Y8WQ7	Field Sample	06/21/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample Y8WQ5. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69882

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69882

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69889

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8WQ9	Field Sample	06/24/13	Water
Y8WR1	Field Sample	06/24/13	Water
Y8WR3	Field Sample	06/24/13	Water
Y8WR5	Field Sample	06/24/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample Y8WQ9. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69889

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69889

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69899

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8WR7	Field Sample	06/25/13	Water
Y8WR9	Field Sample	06/25/13	Water
Y8WS1	Field Sample	06/25/13	Water
Y8WS3	Field Sample	06/25/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample Y8WR7. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69899

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69899

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 69914

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Y8WS5	Field Sample	06/26/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample Y8WS5. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 69914

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 69914

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70069

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
CSC43083071613	Field Sample	07/16/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. Relative Response Factors had a CSV of 9.8%. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV was 112% of nominal value, which met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. CCV was 104% of nominal value. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample CSC43083071613. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70069

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70069

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70115

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XM5	Field Sample	07/22/13	Water
MY8XM7	Field Sample	07/22/13	Water
MY8XM9	Field Sample	07/22/13	Water
MY8XN1	Field Sample	07/22/13	Water
MY8XN3	Field Sample	07/22/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

Two sets of MS/MSD were analyzed with this SDG. Percent recovery for one set was outside (below) QC criteria; RPD was outside QC criteria. The other set of MS/MSD met criteria for percent recoveries (accuracy) and RPD (precision). Since one set of MS/MSD met QC criteria and the LCS/LCSD data satisfied acceptance criteria, sample results are acceptable without qualification.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XM5. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70115

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70115

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70130

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XN5	Field Sample	07/23/13	Water
MY8XN7	Field Sample	07/23/13	Water
MY8XN9	Field Sample	07/23/13	Water
MY8XP1	Field Sample	07/23/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were outside QC criteria. However, the sample concentration was about 10 times higher than the spike added (5.92 ug/L versus 0.50 ug/L). Also, as the LCS/LCSD were acceptable, no qualification of the data is required.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XN5. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70130

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70130

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70141

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XP3	Field Sample	07/24/13	Water
MY8XP5	Field Sample	07/24/13	Water
MY8XP7	Field Sample	07/24/13	Water
MY8XP9	Field Sample	07/24/13	Water
MY8XQ1	Field Sample	07/24/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XP9. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70141

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70141

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70148

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XQ3	Field Sample	07/25/13	Water
MY8XQ5	Field Sample	07/25/13	Water
MY8XQ7	Field Sample	07/25/13	Water
MY8XQ9	Field Sample	07/25/13	Water
MY8XR1	Field Sample	07/25/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were outside QC criteria. However, as the LCS/LCSD were acceptable, no qualification of the data is required.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XQ7. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70148

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70148

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70158

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XR3	Field Sample	07/26/13	Water
MY8XR5	Field Sample	07/26/13	Water
MY8XR7	Field Sample	07/26/13	Water
MY8XR9	Field Sample	07/26/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. One of the percent recoveries was within QC criteria, while the other percent recovery and RPD were outside QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XR3. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70158

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70158

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70167

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XS1/PWA-8	Field Sample	07/29/13	Water
MY8XS3/PWA-10	Field Sample	07/29/13	Water
MY8XS5/PWA-10	Field Duplicate	07/29/13	Water
MY8XS7/CS-33-059	Field Sample	07/29/13	Water
MY8XS9	Equipment Blank	07/29/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were outside QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XS1. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70167

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70167

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70173

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XT1	Field Sample	07/30/13	Water
MY8XT3	Field Sample	07/30/13	Water
MY8XT5	Field Sample	07/30/13	Water
MY8XT7	Field Sample	07/30/13	Water
MY8XT9	Field Sample	07/30/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XT3. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70173

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70173

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70191

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XW1	Field Sample	07/31/13	Water
MY8XW3	Field Sample	07/31/13	Water
MY8XW5	Field Sample	07/31/13	Water
MY8XW7	Field Sample	07/31/13	Water

Introduction/Summary

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This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XW3. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70191

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70191

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70207

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XW9	Field Sample	08/01/13	Water
MY8XX1	Field Sample	08/01/13	Water
MY8XX3	Field Sample	08/01/13	Water
MY8XX5	Field Sample	08/01/13	Water
MY8XX7	Field Sample	08/01/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XX3. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70207

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70207

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70221

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XX9	Field Sample	08/02/13	Water
MY8XY1	Field Sample	08/02/13	Water
MY8XY3	Field Sample	08/02/13	Water
MY8XY5	Field Sample	08/02/13	Water
MY8XY7	Field Sample	08/02/13	Water
MY8XY9	Field Sample	08/02/13	Water
MY8XZ1	Field Sample	08/02/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XX9. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70221

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70221

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70234

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8XZ3	Field Sample	08/05/13	Water
MY8XZ5	Field Sample	08/05/13	Water
MY8XZ7	Field Sample	08/05/13	Water
MY8XZ9	Field Sample	08/05/13	Water
MY8Y01	Field Sample	08/05/13	Water
MY8Y03	Field Sample	08/05/13	Water

Introduction/Summary

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This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8XZ3. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70234

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70234

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70245

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8Y05	Field Sample	08/06/13	Water
MY8Y07	Field Sample	08/06/13	Water
MY8Y09	Field Sample	08/06/13	Water
MY8Y11	Field Sample	08/06/13	Water
MY8Y13	Field Sample	08/06/13	Water

Introduction/Summary

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This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

Two sets of MS/MSD were analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on samples MY8Y05 and MY8Y11. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70245

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70245

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70254

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8Y15	Field Sample	08/07/13	Water
MY8Y17	Field Sample	08/07/13	Water
MY8Y19	Field Sample	08/07/13	Water
MY8Y21	Field Sample	08/07/13	Water
MY8Y23	Field Sample	08/07/13	Water
MY8Y25	Field Sample	08/07/13	Water

Introduction/Summary

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Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8Y17. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70254

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70254

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: American Environmental Testing Laboratory, Inc. **(**AETL), Burbank, CA

Sample Delivery Group (SDG): 70263

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY8Y27	Field Sample	08/08/13	Water
MY8Y29	Field Sample	08/08/13	Water
MY8Y31	Field Sample	08/08/13	Water
MY8Y33	Field Sample	08/08/13	Water
MY8Y35	Field Sample	08/08/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The initial calibration met acceptance criteria.

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. ICV met acceptance criteria.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS/LCS DUP were analyzed with this SDG. Percent recoveries (accuracy) and RPD (precision) were within QC criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within QC criteria.

c. Laboratory Duplicates

Laboratory duplicates were analyzed on sample MY8Y29. Results of precision (RPD) were within QC criteria.

d. Field Duplicates

Field duplicates were not collected (or not identified) for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 70263

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 70263

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sampling Event: 2013Q4

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: Calscience Environmental Laboratories, Inc., Garden Grove, CA

Sample Delivery Group (SDG): 13-11-1039

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY95C6	Field Sample	11/13/13	Water
MY95F9	Field Sample	11/13/13	Water
MY95F8	Field Sample	11/13/13	Water
MY95F7	Field Sample	11/13/13	Water
MY95G8	Field Duplicate	11/13/13	Water
MY95F1	Field Sample	11/13/13	Water
MY95H4	Field Sample	11/13/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.
Manual integrations were performed in one or more of the ICAL standards to correct the peak and/or baseline integration.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The correlation coefficient (R^2) for linear regression was within acceptance criteria (>0.990).

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Continuing Calibration Verification (CCV) standard and blank standard analysis were performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Field Duplicates

Field duplicates were collected: MY95F7 and MY95G8. Results of both samples were not detected (ND), and thus precision (RPD) cannot be calculated.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 13-11-1039

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 13-11-1039

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sampling Event: 2013Q4

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: Calscience Environmental Laboratories, Inc., Garden Grove, CA

Sample Delivery Group (SDG): 13-11-1186

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY95E1	Field Sample	11/14/13	Water
MY95E2	Field Sample	11/14/13	Water
MY95D9	Field Sample	11/14/13	Water
MY95E5	Field Sample	11/14/13	Water
MY95E6	Field Sample	11/14/13	Water
MY95D3	Field Sample	11/14/13	Water
MY95D2	Field Sample	11/14/13	Water
MY95E8	Field Sample	11/14/13	Water
MY95D0	Field Sample	11/14/13	Water
MY95H5	Field Sample	11/14/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.
Manual integrations were performed in one or more of the ICAL standards to correct the peak and/or baseline integration.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The correlation coefficient (R^2) for linear regression was within acceptance criteria (>0.990).

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Continuing Calibration Verification (CCV) standard and blank standard analysis were performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Field Duplicates

Field duplicates were not collected for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 13-11-1186

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG13-11-1186

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sampling Event: 2013Q4

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: Calscience Environmental Laboratories, Inc., Garden Grove, CA

Sample Delivery Group (SDG): 13-11-1308

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY95D4	Field Sample	11/15/13	Water
MY95C7	Field Sample	11/15/13	Water
MY95C9	Field Sample	11/15/13	Water
MY95C8	Field Sample	11/15/13	Water
MY95H6	Field Sample	11/15/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.
Manual integrations were performed in one or more of the ICAL standards to correct the peak and/or baseline integration.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The correlation coefficient (R^2) for linear regression was within acceptance criteria (>0.990).

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Continuing Calibration Verification (CCV) standard and blank standard analysis were performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Field Duplicates

Field duplicates were not collected for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 13-11-1308

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary – SDG 13-11-1308

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sampling Event: 2013Q4

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: Calscience Environmental Laboratories, Inc., Garden Grove, CA

Sample Delivery Group (SDG): 13-11-1416

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY95G1	Field Sample	11/18/13	Water
MY95G0	Field Sample	11/18/13	Water
MY95G3	Field Sample	11/18/13	Water
MY95G2	Field Sample	11/18/13	Water
MY95F5	Field Sample	11/18/13	Water
MY95F6	Field Sample	11/18/13	Water
MY95F2	Field Sample	11/18/13	Water
MY95H8	Field Sample	11/18/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.
Manual integrations were performed in one or more of the ICAL standards to correct the peak and/or baseline integration.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The correlation coefficient (R^2) for linear regression was within acceptance criteria (>0.990).

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Continuing Calibration Verification (CCV) standard and blank standard analysis were performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Field Duplicates

Field duplicates were not collected for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 13-11-1416

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 13-11-1416

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sampling Event: 2013Q4

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: Calscience Environmental Laboratories, Inc., Garden Grove, CA

Sample Delivery Group (SDG): 13-11-1518

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY95E9	Field Sample	11/19/13	Water
MY95E7	Field Sample	11/19/13	Water
MY95C4	Field Sample	11/19/13	Water
MY95C3/CS-C31-102	Field Sample	11/19/13	Water
MY95H9	Field Sample	11/19/13	Water
MY95F3	Field Sample	11/19/13	Water
MY95E3	Field Sample	11/19/13	Water
MY95E0	Field Sample	11/19/13	Water
MY95E4	Field Sample	11/19/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.
Manual integrations were performed in one or more of the ICAL standards to correct the peak and/or baseline integration.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The correlation coefficient (R^2) for linear regression was within acceptance criteria (>0.990).

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Continuing Calibration Verification (CCV) standard and blank standard analysis were performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

Two sets of MS/MSD were analyzed with this SDG.
Percent recoveries and RPD were within criteria for the QC batch associated with the following samples: MY95E9, MY95E7, MY95C4, MY95H9, MY95F3, MY95E3, MY95E0, MY95E4.
Percent recoveries were within criteria but the RPD exceeded criteria for the QC batch associated with sample MY95C3. The result needs to be qualified as estimated (J-flagged). (A).

c. Field Duplicates

Field duplicates were not collected for this SDG.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications except for sample MY95C3, which result has been qualified as estimated (J-flagged) as noted above under introduction/summary

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 13-11-1518

The result for sample MY95C3 needs to be qualified as estimated (J-flagged). (A)

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 13-11-1518

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sampling Event: 2013Q4

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: Calscience Environmental Laboratories, Inc., Garden Grove, CA

Sample Delivery Group (SDG): 13-11-1639

Data Evaluation Level: **Tier 3 (Level IV)**

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY95D5	Field Sample	11/20/13	Water
MY95C5	Field Sample	11/20/13	Water
MY95D1	Field Sample	11/20/13	Water
MY95G5	Field Duplicate	11/20/13	Water
MY95F4	Field Sample	11/20/13	Water
MY95C1	Field Sample	11/20/13	Water
MY95G4	Field Duplicate	11/20/13	Water
MY95C2	Field Sample	11/20/13	Water
MY95F0	Field Sample	11/20/13	Water
MY95J0	Field Sample	11/20/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.
Manual integrations were performed in one or more of the ICAL standards to correct the peak and/or baseline integration.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The correlation coefficient (R^2) for linear regression was within acceptance criteria (>0.990).

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Continuing Calibration Verification (CCV) standard and blank standard analysis were performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

Two sets of MS/MSD were analyzed with this SDG.
Percent recoveries and RPD were within criteria for the QC batch associated with the following samples: MY95E9, MY95E7, MY95C4, MY95H9, MY95F3, MY95E3, MY95E0, MY95E4.
Percent recoveries were within criteria but the RPD exceeded criteria for the QC batch associated with sample MY95C3.

c. Field Duplicates

Two pairs of field duplicates were collected: MY95D1 and the duplicate MY95G5, and MY95C1 and the duplicate MY95G4. Result of precision for both pairs of sample and sample duplicate (RPD) were within QC limits of 20%.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications except for precision of the MS/MSD pair. Since two pairs of field duplicates were found to have acceptable precision, no qualification is necessary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 13-11-1639

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 13-11-1639

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sampling Event: 2013Q4

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: Calscience Environmental Laboratories, Inc., Garden Grove, CA

Sample Delivery Group (SDG): 13-11-1763

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
MY95G6	Field Duplicate	11/21/13	Water
MY95K9	Field Sample	11/21/13	Water
MY95D8	Field Sample	11/21/13	Water
MY95D6	Field Sample	11/21/13	Water
MY95D7	Field Sample	11/21/13	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from specified protocols (P) or is of a technical advisory nature due to sample matrix (A).

Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples.

II. Calibration

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria.
Manual integrations were performed in one or more of the ICAL standards to correct the peak and/or baseline integration.

An initial calibration with a minimum of five standards and a blank calibration were performed prior to sample analysis. The correlation coefficient (R^2) for linear regression was within acceptance criteria (>0.990).

Initial calibration verification (ICV) was performed using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value.

Continuing Calibration Verification (CCV) standard and blank standard analysis were performed prior to sample analysis. The values were within acceptance criteria.

Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

Method blank analysis was performed at the frequency of once for every analytical batch.

The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.

IV. Accuracy and Precision Data

a. Laboratory Control Sample

An LCS was analyzed with this SDG. Percent recoveries and RPD were within criteria.

b. Matrix Spike/Matrix Spike Duplicates

An MS/MSD was analyzed with this SDG. Percent recoveries and RPD were within criteria.

c. Field Duplicates

Field duplicates were collected: MY95D6 and MY95G6. Result of precision for sample and sample duplicate (RPD) was within QC limits of 20%.

V. Compound Quantitation and Reporting Limits

Compound quantitation algorithm was verified to be correct.

The MDLs have been provided by the laboratory on the sample reports along with the reporting limits. The laboratory has established method detection limits (MDLs) per 40 CFR Part 136 Appendix B. The laboratory MDLs are found to be consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium – Data Qualification Summary – SDG 13-11-1763

No data have been qualified with this SDG.

Glendale Chrome Operating Unit (GCOU) Hexavalent Chromium - Blanks Data Qualification Summary - SDG 13-11-1763

No data have been flagged due to blanks.

Data Validation Report

Project/Site Name: Glendale Chrome Operating Unit (GCOU)

Sampling Event: RI Phase 3 New Wells

Parameters: Hexavalent Chromium [Cr(VI)]

Method: EPA Method 218.6

Laboratory: EPA Region 9 Lab, Concord, CA

Sample Delivery Group (SDG): 14198A

Data Evaluation Level: Tier 3 (Level IV)

Samples:

Sample ID	Sample Type	Collection Date	Matrix
Samples received and analyzed 7/17/14:			
CS-C46-45	Field Sample	7/16/14	Water
V14AMPW3RN-0714	Field Sample	7/16/14	Water
Equipment Blank	Field QC	7/16/14	Water
Field Blank	Field QC	7/16/14	Water
Samples received and analyzed 7/18/14:			
CS-C44-120	Field Sample	7/17/14	Water
CS-C45-54	Field Sample	7/17/14	Water
CS-C47-53	Field Sample	7/17/14	Water
Equipment Blank	Field QC	7/17/14	Water
Field Blank	Field QC	7/17/14	Water

Introduction/Summary

This data review report covers the sample delivery group and associated samples listed on the cover sheet. The analyses were per USEPA Method 218.6 (Hexavalent Chromium by Ion Chromatography). The quality assurance and quality control procedures (QA/QC) were per project specific sampling and analysis plan.

This review is based on the method and project approved QA/QC procedures and guidelines; the following subsections correlate to these guidelines. The sections detail noted deviations if any. Tables summarizing all data qualification flags are provided at the end of this report. Data qualifiers, if any, are summarized at the end of this report.

I. Holding Times

Samples were not all analyzed within 24 hours of collection as required by EPA Method 218.6 for unpreserved samples. This was known and accepted in the planning stages. It was expected that the holding time would be met if possible, but, given the contingencies of shipping samples overnight, it may not be possible. Therefore, slight exceedances of the 24 hour holding time did not lead to data rejection, but were qualified as estimated values (J-flag).

The following sample was analyzed within 24 hours from collection: CS-C46-45 (23 hours). The following samples were analyzed beyond 24 hours from collection, and were qualified as estimated results: CS-C44-120 (28 hours), CS-C45-54 (24.25 hours), CS-C47-53 (26 hours) and V14AMPW3RN-0714 (24.25 hours).

II. Calibration

The stock and working standards records were examined. All calculations were recalculated and verified for molar weight, stock standard and working standards preparations and concentration calculations. The expiration dates were checked and found to be within valid dates of use.

Initial Calibration, Initial Calibration Verification and Initial Calibration Blank:
All values were within acceptance criteria. No manual integrations were performed in the ICAL standards to correct the peak and/or baseline integration.

An initial calibration with a minimum of five standards and a blank calibration was performed prior to sample analysis. The correlation coefficient (R^2) for linear regression was recalculated based on peak areas and verified to be within acceptance criteria (>0.990).

Secondary calibration verification (SCV) was performed using a secondary source standard before sample analysis. The Cr(VI) concentration levels were within ±20% of the expected value. The SCV was confirmed to be from a different source than the calibration standards.

Continuing Calibration Verification (CCV) standard and blank standard analysis was performed prior to sample analysis. The values were within acceptance criteria. Calibration was verified after every 10 samples and at the end of the analysis. All concentration levels were within acceptance criteria.

III. Blanks

a. **Method Blanks:** Method blank analysis was performed at the frequency of at least once for every analytical batch. The concentrations of analytes in the method blanks were less than the reporting limits with no detections reported.
b. **Field Blanks:** Field blanks were collected each day samples were collected. The laboratory did not perform analysis on the field blanks.

c. **Equipment Blanks:** Equipment blanks were collected each day samples were collected. The equipment blank collected on 7/16/14 had a result of 0.02 µg/L. The equipment blank collected on 7/17/14 had a result of 0.23 µg/L. Since all sample results exceeded these values by more than a factor of 5, no data were qualified.

IV. Accuracy and Precision Data

a. **Laboratory Control Sample**
An LCS was analyzed with this SDG. Accuracy (percent recovery) was within acceptance criteria.
b. **Matrix Spike/Matrix Spike Duplicates**
MS/MSD analysis was not performed with this SDG.
c. **Field Duplicates**
Field duplicates were not collected.
d. **Sample Duplicates**
Sample duplicate analysis was performed. Precision (RPD) was within acceptance criteria.

V. Compound Quantitation and Reporting Limits

Sample concentrations were recalculated based on instrument signal (peak area). Compound quantitation algorithm was verified to be correct.

The laboratory reporting limit of 0.02 µg/L is consistent with project needs.

VI. Overall Assessment

All data were found to be acceptable per specifications as noted above under introduction/summary.

Hexavalent Chromium – Data Qualification Summary – SDG 14198A

The following data in this SDG have been qualified as estimated results due to slight exceedances of the holding time: CS-C44-120, CS-C45-54, CS-C47-53, and V14AMPW3RN-0714.

Hexavalent Chromium - Blanks Data Qualification Summary - SDG 14198A

No data have been flagged due to blanks.

Appendix C
Interview Checklists

Regional Water Quality Control Board Facilities - Checklist for Secondary Data Assessment
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Interview Date: 08/20/2014

Attendees:

Benjamin Lechler/CH2M HILL
Rich Freitas/EPA
Larry Moore/LARWQCB

1) Planning Documents

a) Individual facility monitoring requirements are outlined in the CAO for the facility.

b) Work approaches for facilities are documented in work plans which are reviewed and approved by LARWQCB prior to implementing the work.

c) The general QAPP prepared for SFV and SGV Superfund Sites is available to facilities for reference, but is not a binding document.

2) Responsible Agency

a) Description: LARWQCB

b) Contact: Larry Moore/LARWQCB

3) Sampling Purpose-Data End Use

Comply with CAO or WDR requirements.

4) Matrix: Ground water

5) Frequency of Collection: Semiannual

6) External oversight performed

LARWQCB staff generally conduct facility site visits on an annual basis.

7) Designated individuals responsible for implementation of QA Program:

QA of the analytical data beyond laboratory QC is not required by the LARWQCB. See summary of individual facilities for details regarding data review and validation.

8) Internal oversight performed:

See summary of individual facilities for details regarding data review and validation.

9) Sample collection organization(s)

Name	Dates Used
Various – see summary of individual facilities for details	

10) Laboratory used

Name	Dates Used
Various – see summary of individual facilities for details	

11) Internal data review performed

See summary of individual facilities for details regarding data review and validation.

12) External data review performed

See summary of individual facilities for details regarding data review and validation.

13) Data available electronically **Yes**

Data are provided to EPA for upload to the SFV database and also available on the LARWQCB's GeoTracker website.

14) Final Report

a) Reports submitted semiannually

b) Date: various

c) Submitted to: LARWQCB

d) Data quality assessment included **No**

Notes:

CAO - cleanup and abatement order

EPA - United States Environmental Protection Agency

LARWQCB - California Regional Water Quality Control Board, Los Angeles Region

QA – quality assurance

QAPP – quality assurance project plan

QC – quality control

SGV – San Gabriel Valley

SFV – San Fernando Valley

WDR – waste discharge requirements

City of Glendale Interview - Checklist for Secondary Data Assessment
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Interview Date: 09/02/2014

Attendees:

Benjamin Lechler/CH2M HILL
Charles Cron/CDM
Leo Chan/Glendale
Dave Massie/Glendale

1) Planning Documents

a) QAPP

i) Draft Operational Quality Assurance Project Plan

ii) Date Issued: April 29, 1999

iii) Approved By

b) SAP

i) Glendale Respondents Group LLC Final Operational Sampling and Analysis Plan

ii) Date Issued: August 30,2001

iii) Approved By

2) Responsible Agency

a) Description: CDDW

b) Contact: Thomas Tsui/CDDW

3) Sampling Purpose-Data End Use

Comply with drinking water permit for operation of GNOU and GSOU extraction wells as a public water supply.

4) Matrix: Ground water

5) Frequency of Collection: Weekly to monthly

6) External oversight performed: No

7) Designated individuals responsible for implementation of QA Program:

Charles Cron/CDM, Barb Wells/CDM, Dave Tripp/Eurofins, Leo Chan/Glendale

8) Internal oversight performed: Yes

a) Type: Oversight of analytical reporting.

b) Performed by: Barb Wells/CDM, Charles Cron/CDM, Leo Chan/Glendale.

c) Frequency: continuously as data are reported until final report issued.

d) Internal oversight documentation available:

No, oversight is performed through frequent communication as data is reported.

9) Sample collection organization(s)

Name	Dates Used
CDM (extraction wells)	ongoing
Blaine Tech (piezometers)	ongoing

10) Laboratory used

Name	Dates Used
Eurofins/Eaton Analytical	ongoing

11) Internal data review performed **No**

12) External data review performed **No**

13) Data available electronically **Yes**

14) Final Report

a) Monthly Progress Report – Glendale OU Superfund Activities

b) Date: submitted monthly

c) Submitted to: Lisa Hanusiak/EPA

d) Data quality assessment included **No**

Notes:

CDDW - California State Water Resources Control Board Drinking Water Division

CDM – CDM Smith

Glendale – City of Glendale

QA – quality assurance

APPENDIX E

Hydrographs and Hexavalent Chromium
Concentrations for Selected Monitoring Wells

GCOU Hydrographs – Select Wells

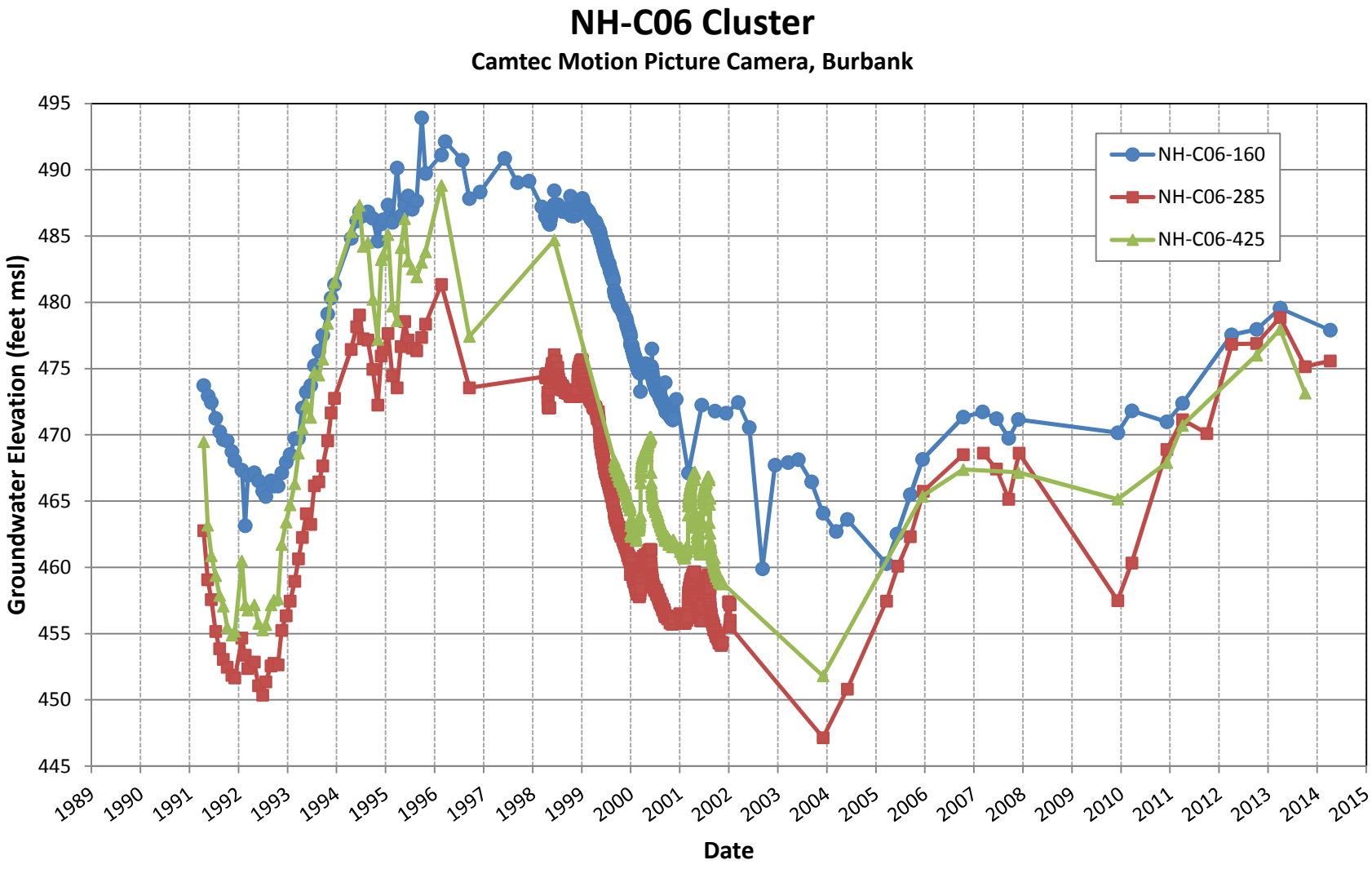

FIGURE E-1
NH-C06 Cluster Well Hydrographs
Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

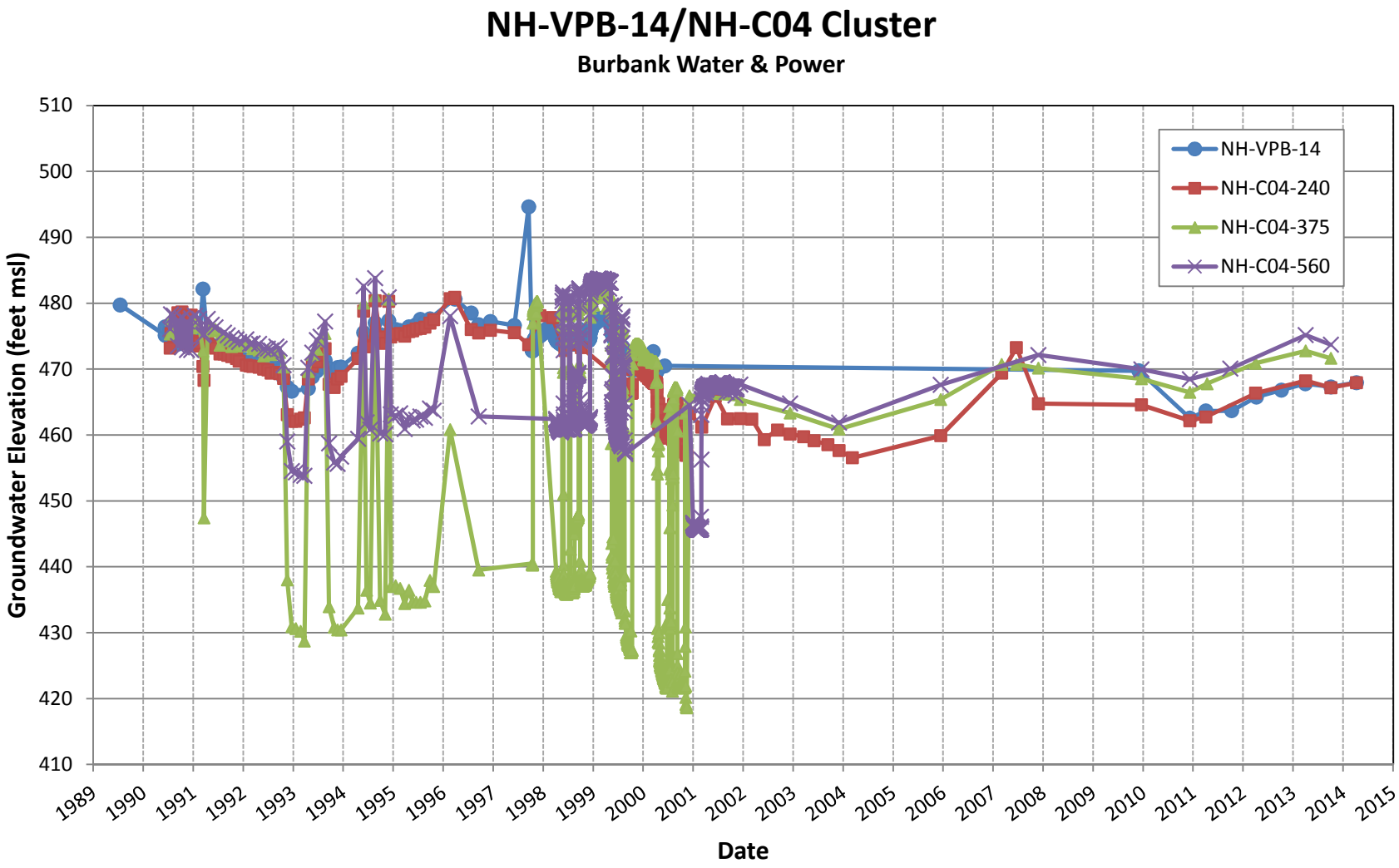

FIGURE E-2
NH-VPB-14/NH-C04 Cluster Well Hydrographs
Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

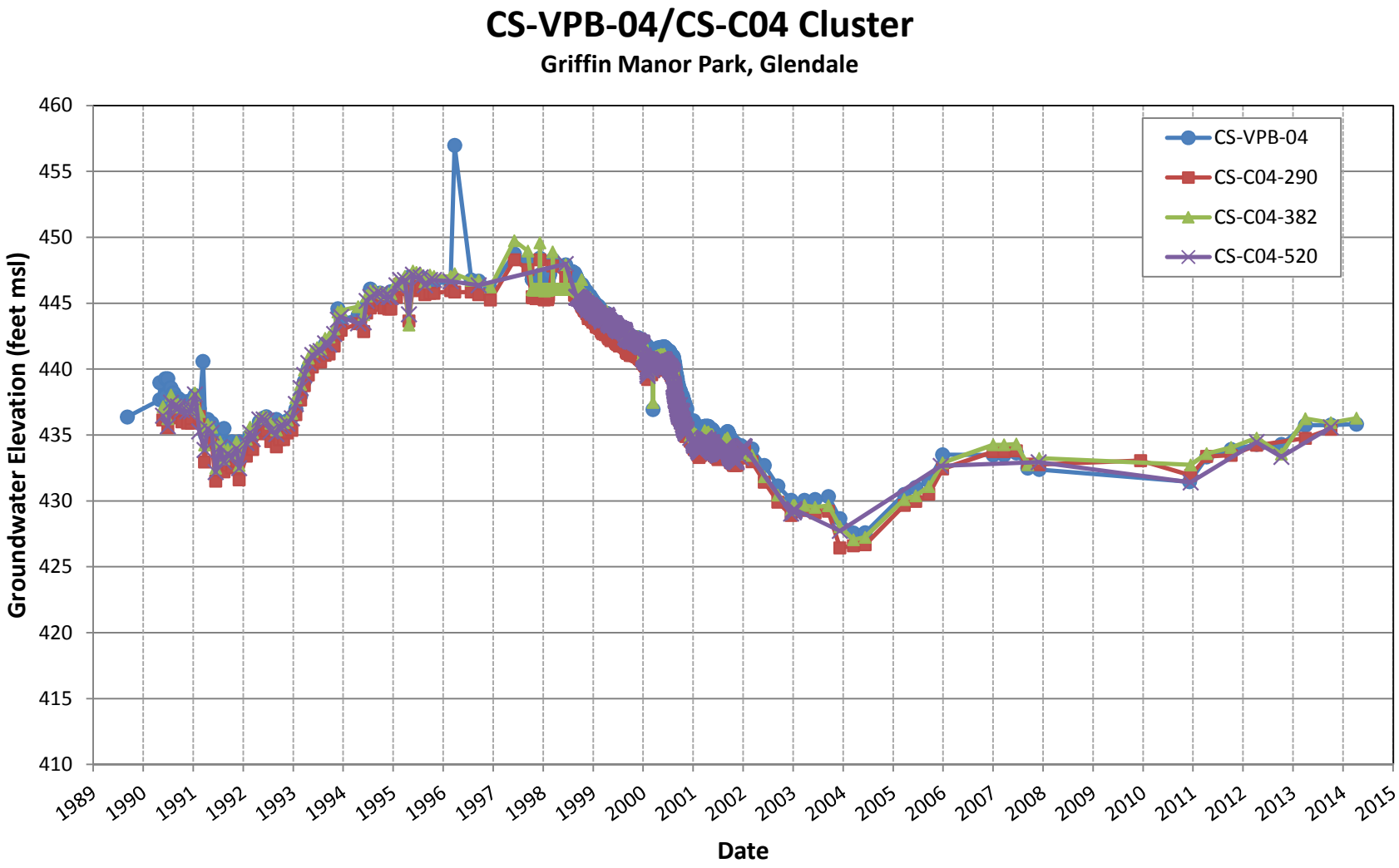

FIGURE E-3
CS-VPB-04/CS-C04 Cluster Well Hydrographs
Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

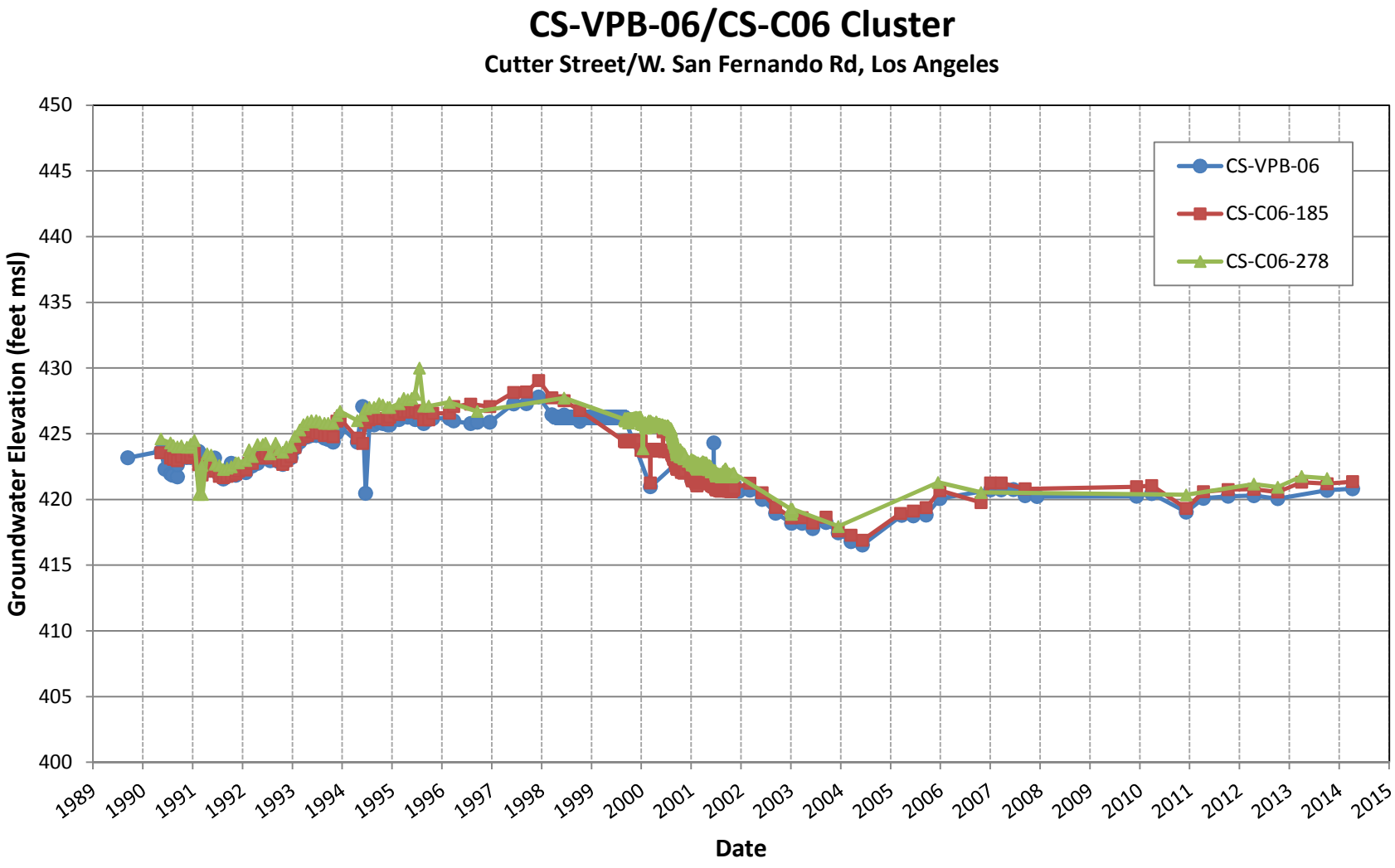

FIGURE E-4
CS-VPB-06/CS-C06 Cluster Well Hydrographs
Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

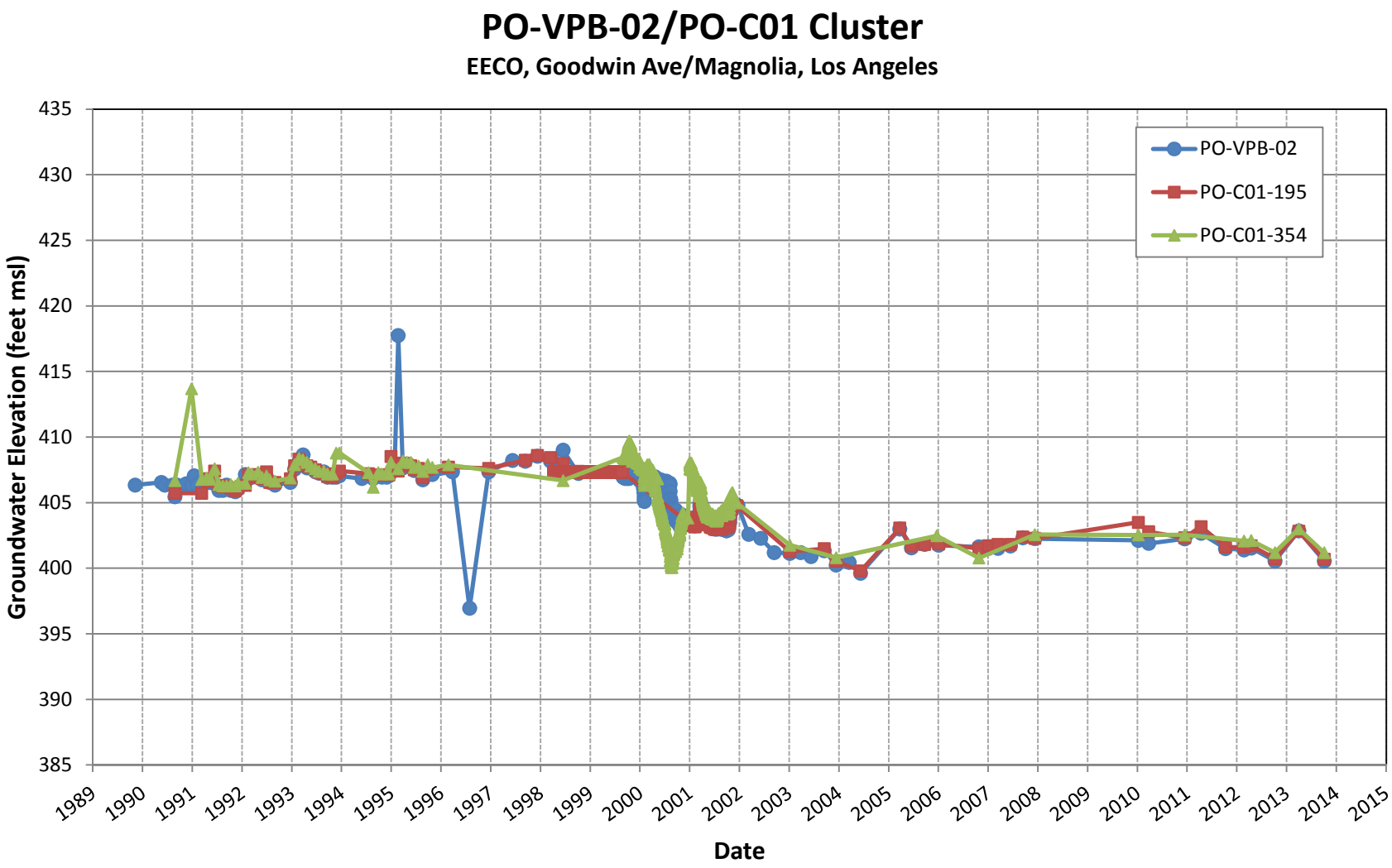

FIGURE E-5
PO-VPB-02/PO-C01 Cluster Well Hydrographs
Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

GCOU Cr6 Concentration Trends

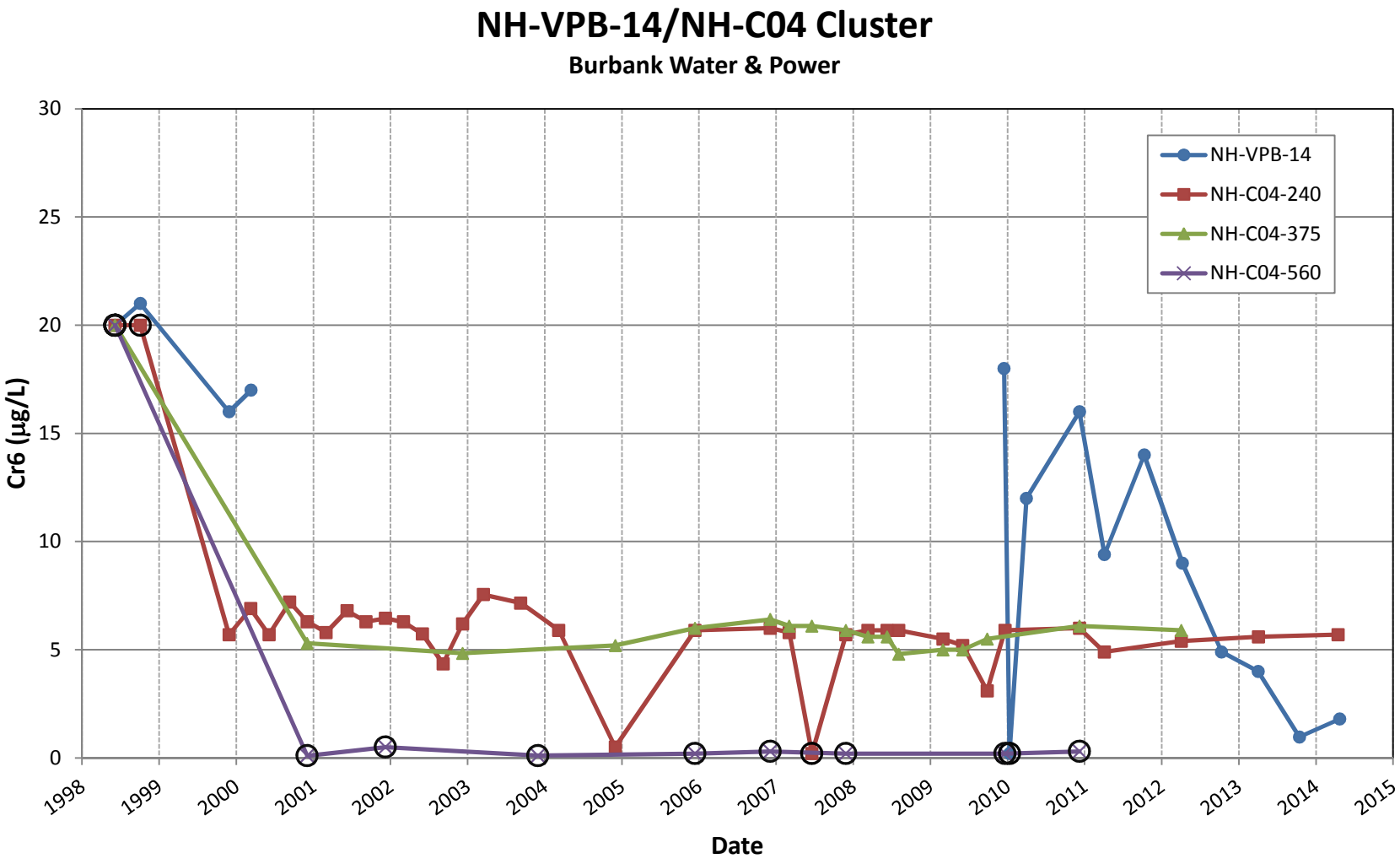

FIGURE E-6

NH-VPB-14/NH-C04 Cluster Well Cr6 Time Series

Glendale Chromium Operable Unit

San Fernando Valley Superfund Sites

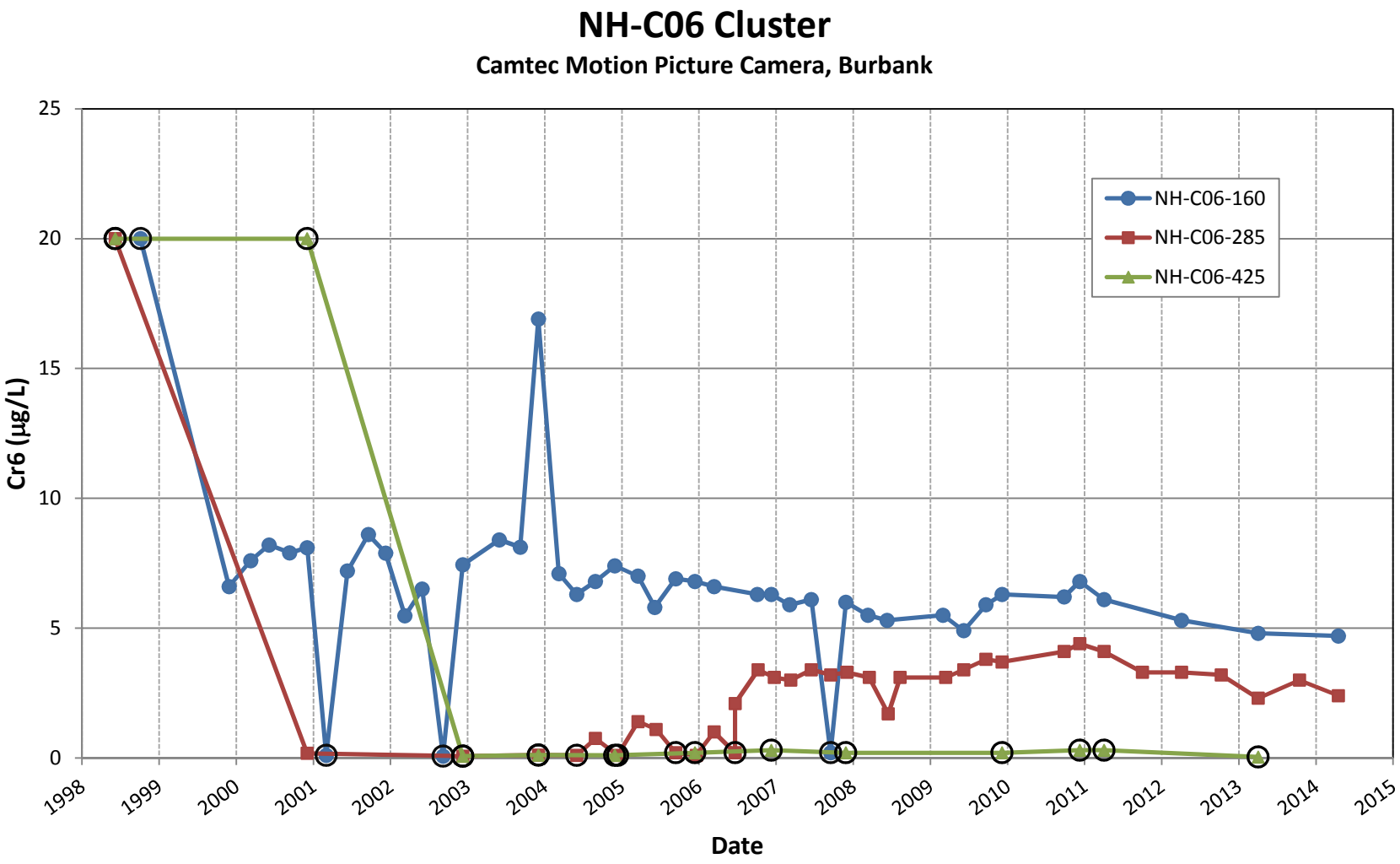

FIGURE E-7

NH-C06 Cluster Well Cr6 Time Series

Glendale Chromium Operable Unit

San Fernando Valley Superfund Sites

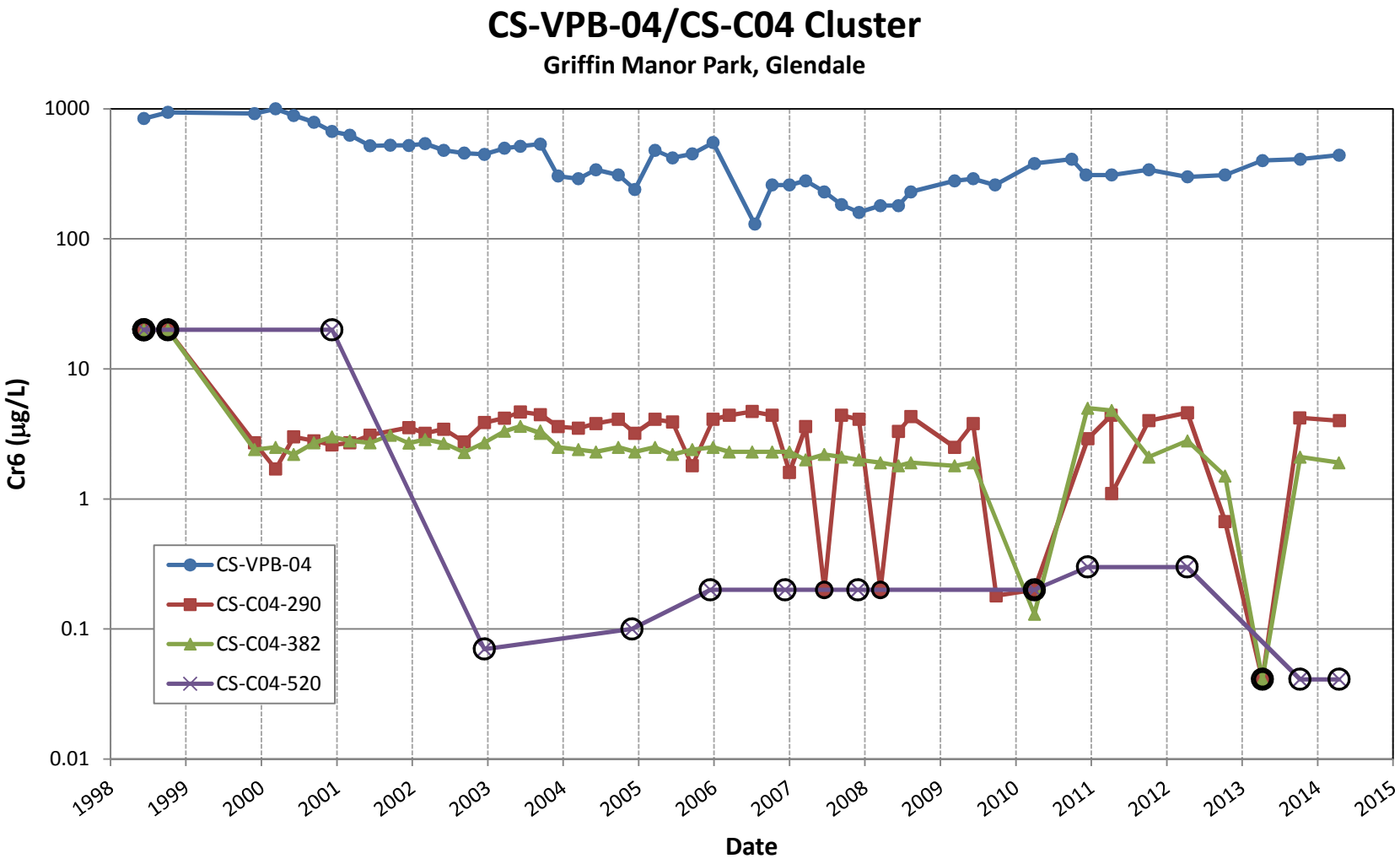

FIGURE E-8

CS-VPB-04/CS-C04 Cluster Well Cr6 Time Series

Glendale Chromium Operable Unit

San Fernando Valley Superfund Sites

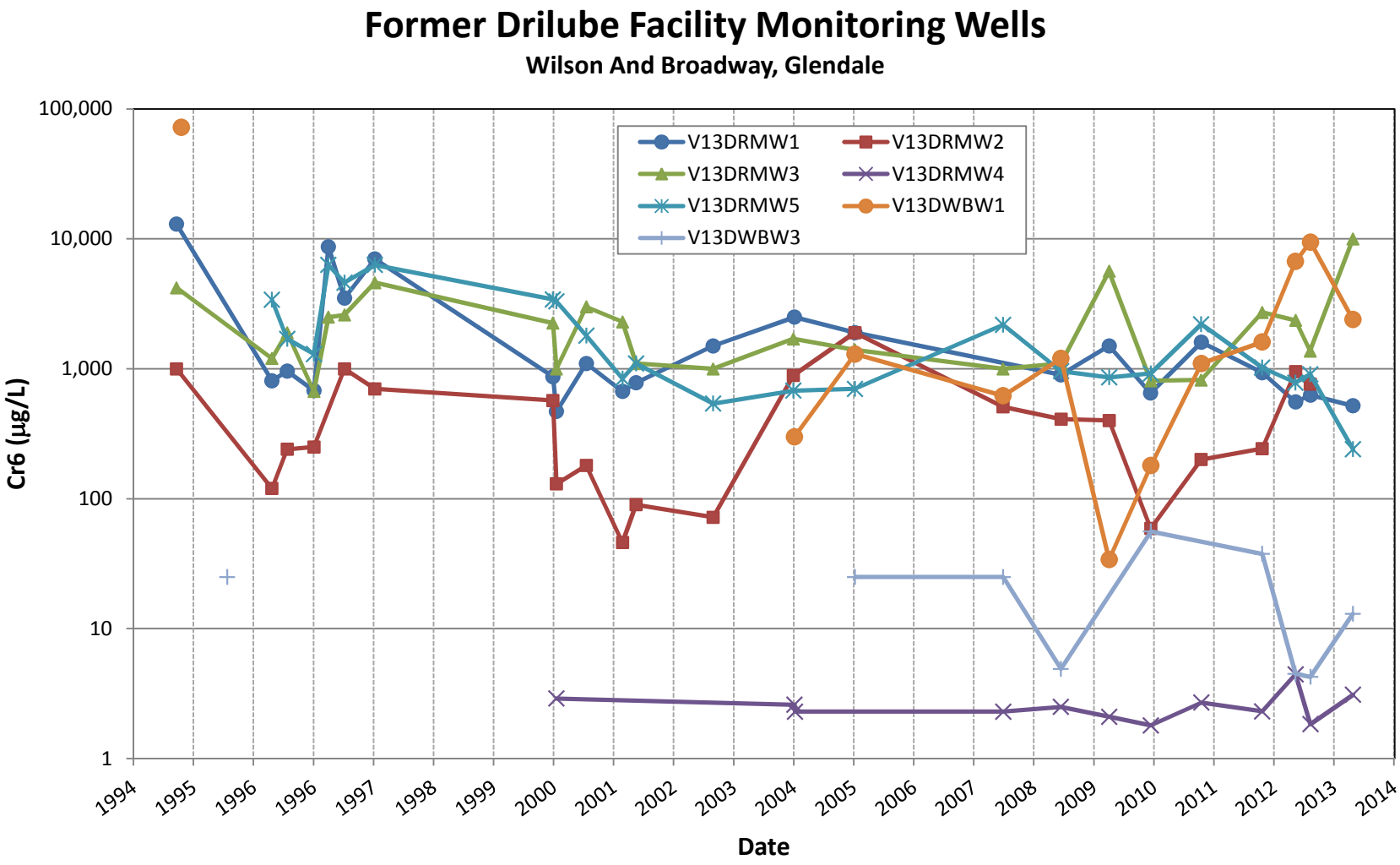

FIGURE E-9

Former Drilube Facility Monitoring Well Cr6 Time Series

Glendale Chromium Operable Unit

San Fernando Valley Superfund Sites

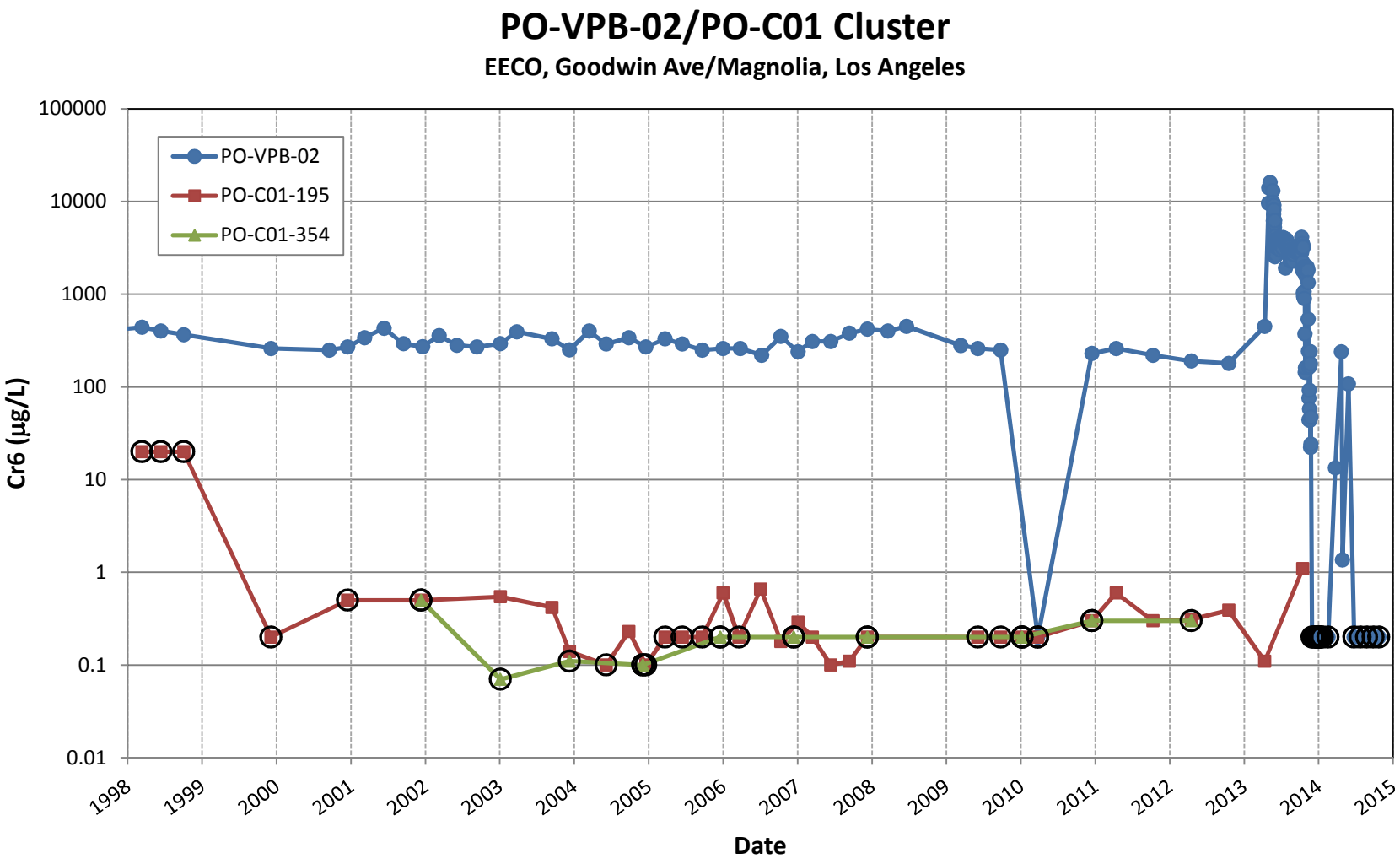

FIGURE E-10

PO-VPB-02/PO-C01 Cluster Well Cr6 Time Series

Glendale Chromium Operable Unit

San Fernando Valley Superfund Sites

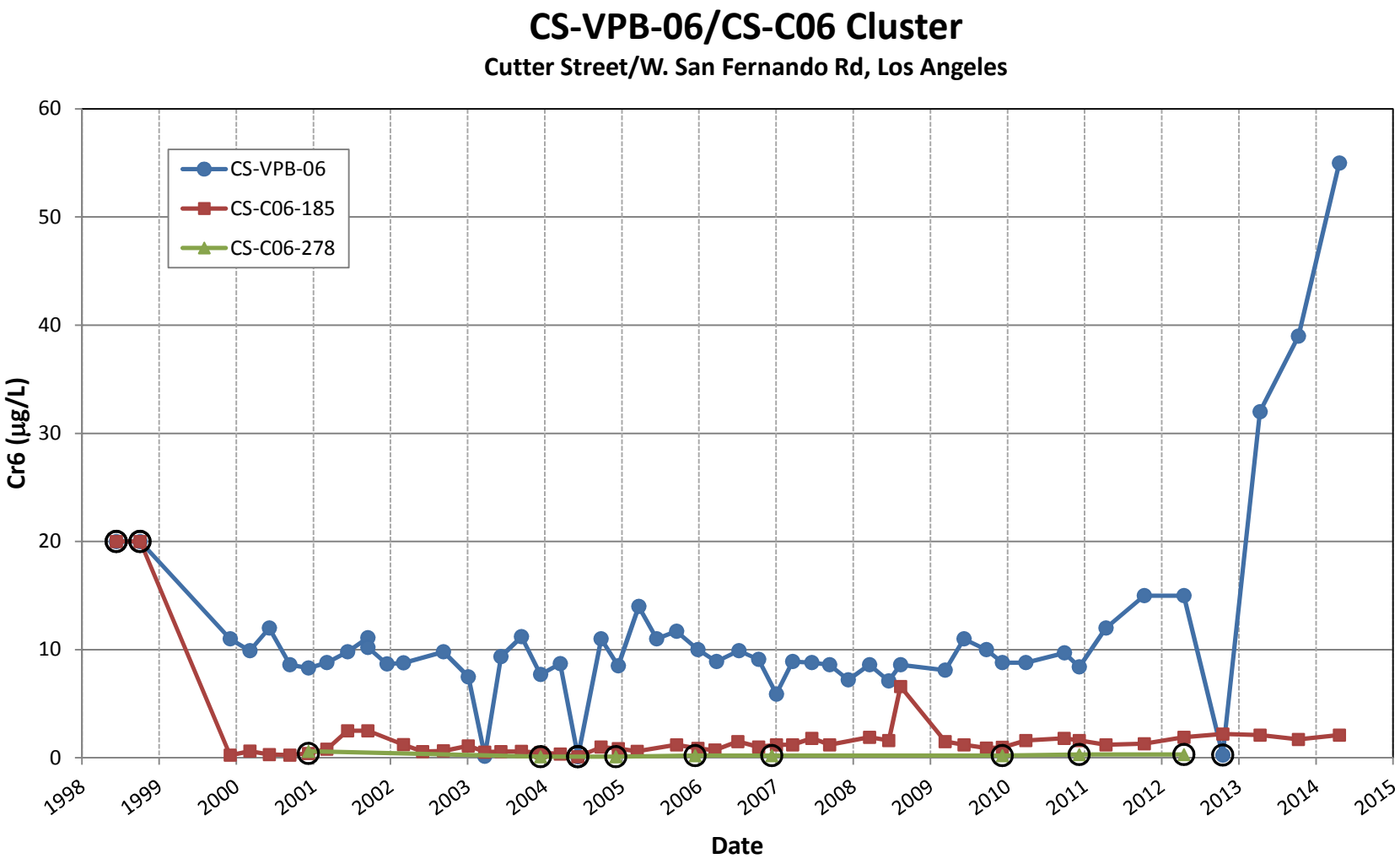

FIGURE E-11

CS-VPB-06/CS-C06 Cluster Well Cr6 Time Series

Glendale Chromium Operable Unit

San Fernando Valley Superfund Sites

APPENDIX F

Groundwater Geochemistry Stiff Diagrams

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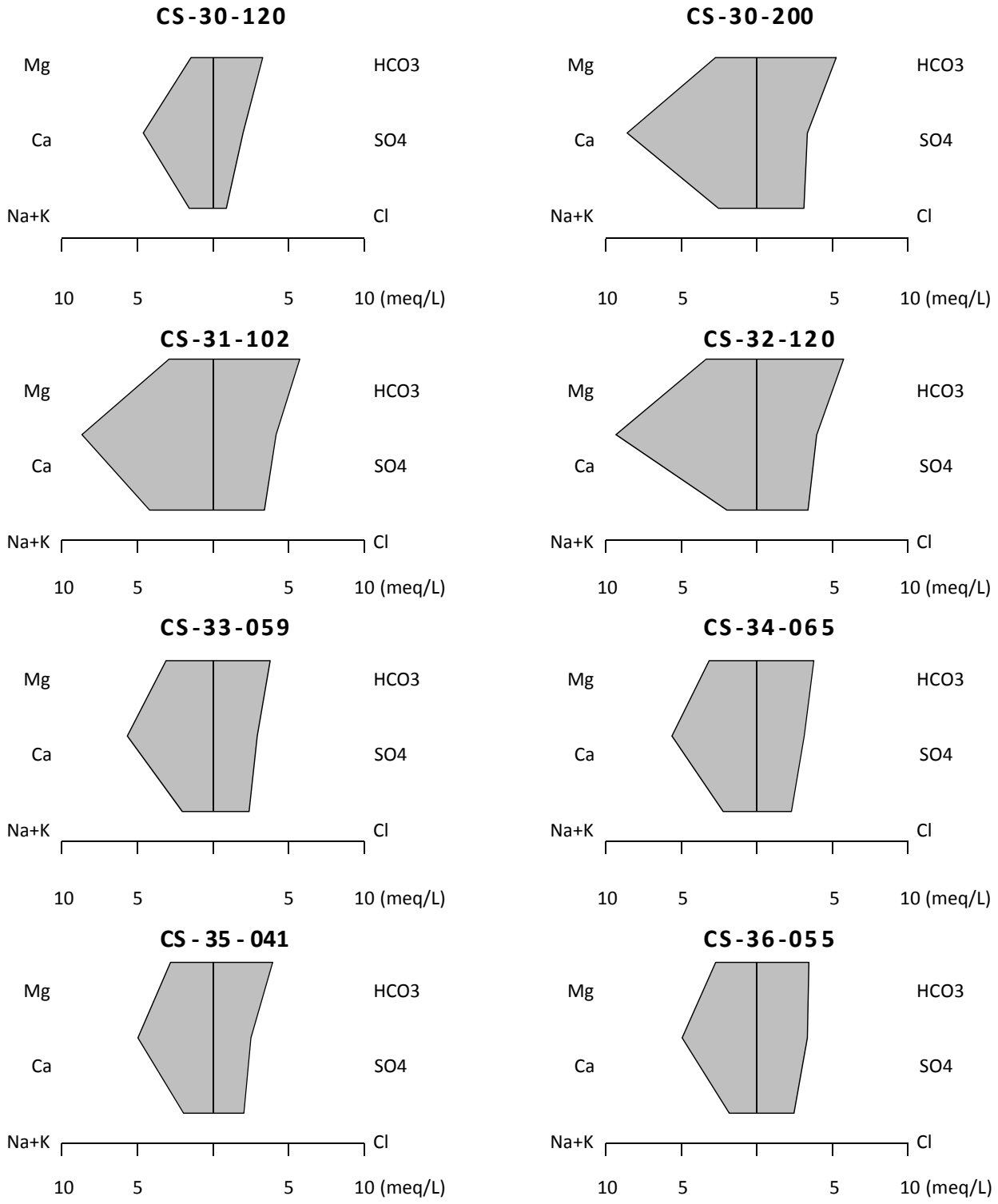
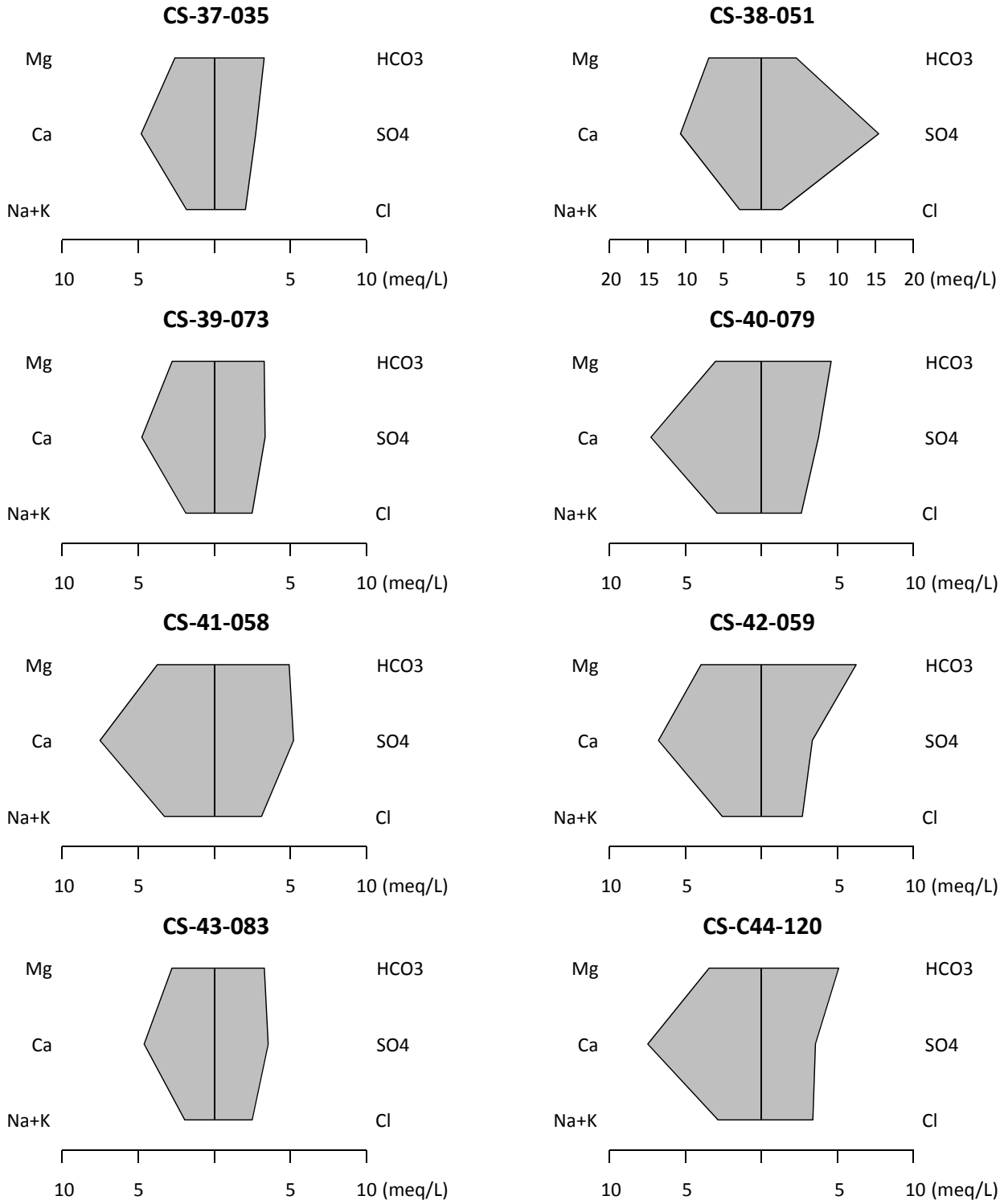


DESCRIPTION: With Sodium and Potassium summed (Na+K)

Notes:
Ca - calcium
K - potassium
Mg - magnesium
Na - sodium
meq/L - milliequivalents per liter
Cl - chloride
HCO3 - bicarbonate
SO4 - sulfate

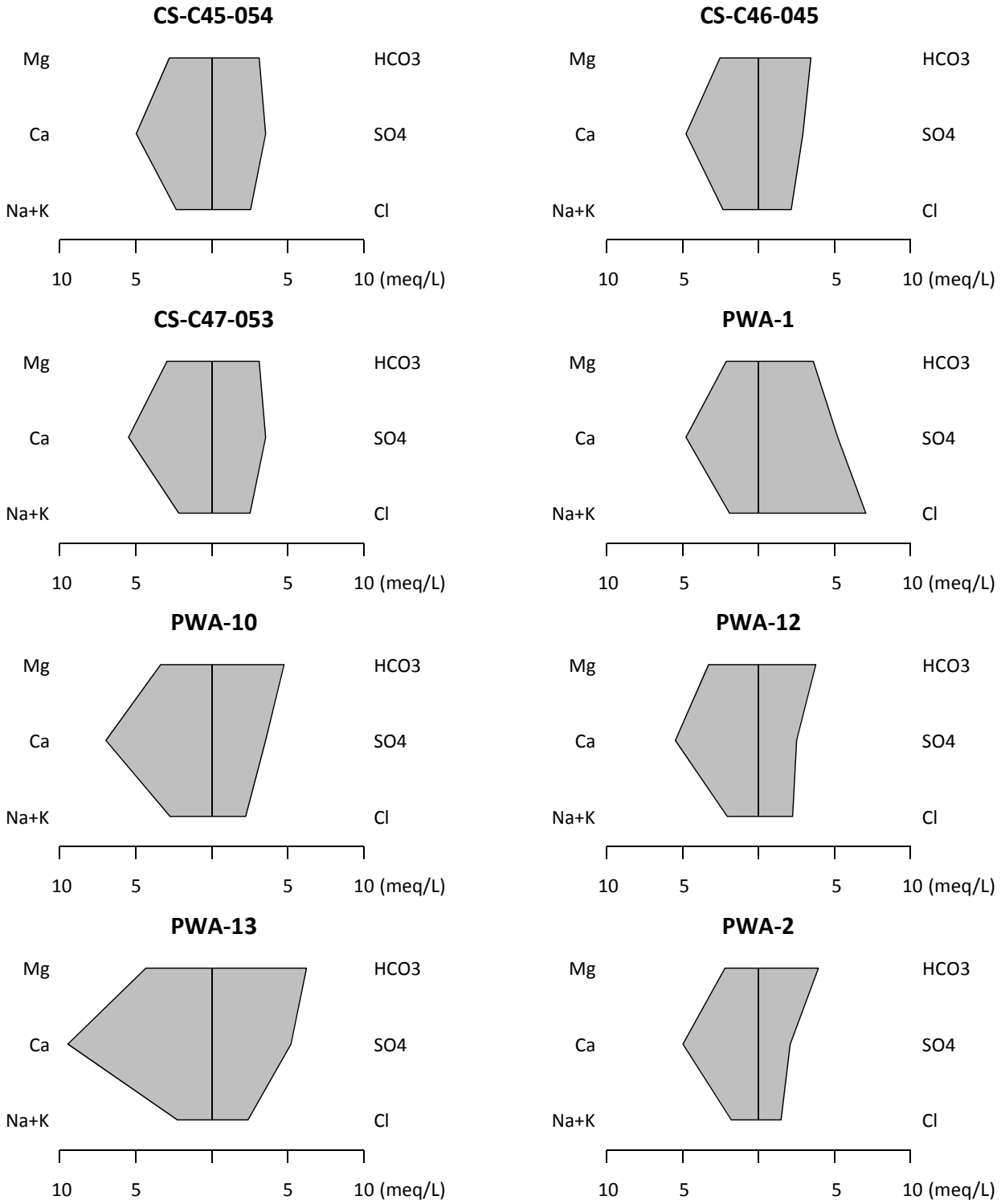
PROJECT: GCOU Remedial Investigation	PROJECT NO: 481299.01.09.01
CLIENT: EPA	DATE: April 23, 2015



DESCRIPTION: With Sodium and Potassium summed (Na+K)

Notes:
Ca - calcium
K - potassium
Mg - magnesium
Na - sodium
meq/L - milliequivalents per liter
Cl - chloride
HCO3 - bicarbonate
SO4 - sulfate

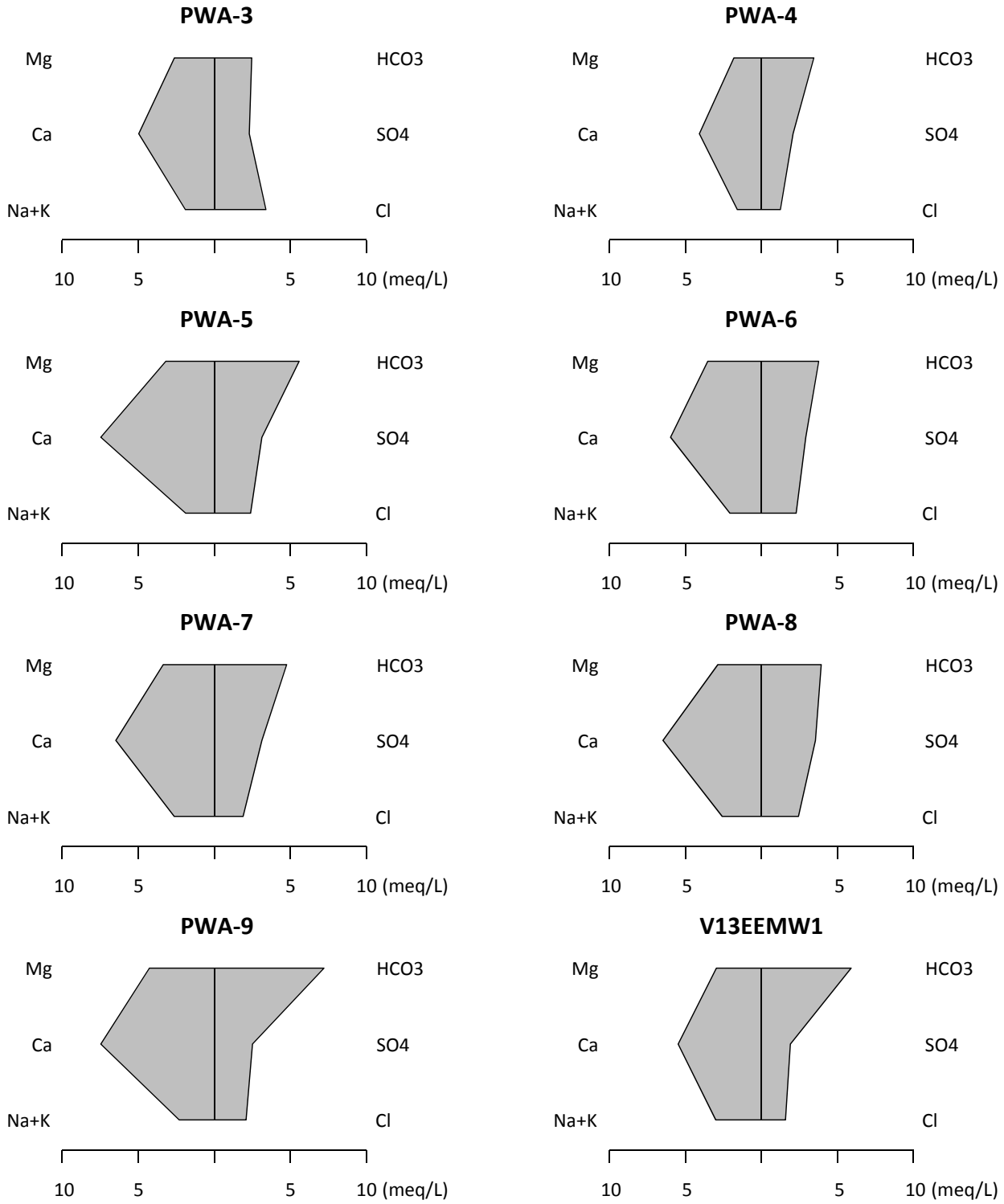
PROJECT: GCOU Remedial Investigation	PROJECT NO: 481299.01.09.01
CLIENT: EPA	DATE: April 23, 2015



DESCRIPTION: With Sodium and Potassium summed (Na+K)

Notes:
Ca - calcium
K - potassium
Mg - magnesium
Na - sodium
meq/L - milliequivalents per liter
Cl - chloride
HCO3 - bicarbonate
SO4 - sulfate

PROJECT: GCOU Remedial Investigation	PROJECT NO: 481299.01.09.01
CLIENT: EPA	DATE: April 23, 2015



DESCRIPTION: With Sodium and Potassium summed (Na+K)

Notes:
Ca - calcium
K - potassium
Mg - magnesium
Na - sodium
meq/L - milliequivalents per liter
Cl - chloride
HCO3 - bicarbonate
SO4 - sulfate

PROJECT: GCOU Remedial Investigation	PROJECT NO: 481299.01.09.01
CLIENT: EPA	DATE: April 23, 2015

APPENDIX G

Screening Level Ecological Risk Assessment Addendum

FINAL
SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT ADDENDUM
Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

EPA CONTRACT NO. EP-S9-13-01
GLENDALE CHROMIUM OPERABLE UNIT RI/FS
EPA TASK ORDER NO. 005-RICO-09N2
DCN: EPS91301-005-0010

Prepared for:

United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA 94105

Prepared by:

317 E. Main Street
Ventura, CA 93001

With:

6 Hutton Centre Drive
Suite 700
Santa Ana, California 92707

January 15, 2015

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Appendix

A Ecological Field Survey

Acronyms and Abbreviations

µg/L	micrograms per liter
95UCL	95 percent upper confidence limit on the arithmetic mean
ATSDR	Agency for Toxic Substances and Disease Registry
BCF	bioconcentration factor
CCC	criterion continuous concentration
CDFW	California Department of Fish and Wildlife
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CMC	criterion maximum concentration
CNDDB	California Natural Diversity Database
COPEC	contaminant of potential ecological concern
Cr	chromium
Cr6	hexavalent chromium
CSM	conceptual site model
EcoSSL	Ecological Soil Screening Level
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ERA	ecological risk assessment
ESV	ecological screening value
FD	field duplicate (sample)
GCOU	Glendale Chromium Operable Unit
GNOU	Glendale North Operable Unit
GSOU	Glendale South Operable Unit
HHRA	human health risk assessment
HQ	hazard quotient
JMM	James M. Montgomery Consulting Engineers, Inc.
kg	kilogram(s)
L	liter(s)
LOAEL	lowest observed adverse effect level
mg	milligram(s)
mg/L	milligrams per liter
N	normal (sample)
NOAEL	no observed adverse effect level
NPL	National Priorities List

NRWQC	National Recommended Water Quality Criteria
OU	operable unit
RI	remedial investigation
RME	reasonable maximum exposure
SFV	San Fernando Valley
SLERA	screening-level ecological risk assessment
total Cr	total chromium
TRV	toxicity reference value
UCL	upper confidence limit
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound

SECTION 1

Introduction

The U.S. Environmental Protection Agency (EPA) is conducting a remedial investigation (RI) to investigate regional chromium (primarily hexavalent chromium [Cr6]) contamination in ground water in the Glendale Chromium Operable Unit (GCOU) of the San Fernando Valley (SFV) Superfund Sites in Los Angeles County, California. Under the Authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), EPA placed the four areas of the SFV Superfund Sites on the National Priorities List (NPL). EPA subsequently removed Area 3 (the Verdugo Basin) from the NPL in October 2004. The list below provides a summary of the active areas and operable units (OUs).

- Area 1 contains the North Hollywood OU and Burbank OU
- Area 2 contains the Glendale OU, including the Glendale North OU (GNOU) and Glendale South OU (GSOU)
- Area 4 contains the Pollock OU

1.1 Background

EPA established the GCOU in 2007. After initially focusing on identifying additional potential sources of Cr6, EPA formally initiated the GCOU RI in 2011 to characterize the distribution of chromium in ground water of the SFV Superfund Sites. The GCOU is the latest SFV OU to enter the RI phase of the Superfund remedial response process.

An ecological assessment was conducted for the Glendale Study Area (SFV Area 2) for exposure to volatile organic compounds (VOCs), as documented in the RI Report for the Glendale Study Area (James M. Montgomery, Consulting Engineers, Inc. [JMM], 1992). However, a complete ecological “risk” assessment (ERA) was not originally performed because SFV Area 2 was considered fully developed for commercial, industrial, and residential use; urbanization had reduced habitat quality; and significant wildlife populations and natural vegetative cover were not present. In addition, although some potential receptors were identified in and near the Los Angeles River, it was concluded that ground water discharges to the Los Angeles River, if any occurred, would be infrequent, seasonal, and localized. However, a recent focused evaluation of the potential for discharge from ground water to the Los Angeles River was completed and indicated that ground water could potentially discharge to surface water in both GNOU and GSOU depending on regional ground water conditions (CH2M HILL, 2014b).

As part of the GCOU RI, EPA requested that an ecological assessment addendum be prepared to address potential ecological exposure to Cr6 in ground water, including an updated evaluation of potential habitat and receptors in the GCOU area, particularly along the Los Angeles River in the GCOU. This report represents a screening-level ERA (SLERA) that addresses potential pathways and receptors, and provides a comparison of chromium concentrations in ground water to ecological screening values (ESVs), as well as a comparison of food web dose estimates, based on ground water concentrations, to toxicity reference values (TRVs).

The primary mechanism for potential ecological exposure to chromium is potential discharge of chromium-contaminated ground water to surface water along unlined sections of the Los Angeles River. This SLERA evaluates potential risks to aquatic organisms, plants, and higher trophic-level wildlife (reptiles, birds, and mammals) from potential exposure to chromium. The results of the risk analysis indicate there does not appear to be unacceptable risks to ecological receptors from potential discharge of chromium-contaminated ground water to Los Angeles River surface water.

1.2 Technical Approach

This SLERA was completed using EPA guidance for conducting ERAs (*Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* [EPA, 1997] and *Final Guidelines for Ecological Risk Assessment* [EPA, 1998]. As recommended in these guidance documents, ERAs are prepared in phases (sometimes referred to as steps, tiers, or levels). This approach entails increasingly sophisticated levels of data collection and analysis, wherein the conservative assumptions of the initial evaluations are replaced by more site-specific data and more ecologically realistic assumptions. A phased approach serves to reduce conservatism and uncertainties in the later phases of the ERA process, allowing it to focus on issues most likely to drive remedial or other management actions.

The first phase of risk assessment is the SLERA (Steps 1 and 2 of the ERA process). This phase employs existing data and conservative assumptions to develop a screening-level problem formulation (including a preliminary ecological conceptual site model [CSM]), exposure evaluation, toxicity evaluation, and risk calculation. The SLERA integrates conservative measures of exposure with conservative measures of effects to differentiate between analytes, receptors, and locations for which there are clearly no unacceptable risks and those for which further evaluation is necessary. A refined SLERA (Step 3A of the ERA process), in which less-conservative exposure assumptions are employed may be conducted as a secondary step (for those analytes that “fail” the initial screening-level step) without the collection of additional site data. Although the supplemental guidance for a refined SLERA (*The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments* (EPA, 2001)) also allows for consideration of background concentrations, these are not considered in this SLERA addendum because upgradient sources of Cr6 were included in this investigation and it is unlikely that the conditions are present for naturally occurring Cr6.

The second major phase of an ERA consists of a baseline ERA. In this phase, the collection and interpretation of additional site-specific data are completed to further refine the conclusions of the SLERA or refined SLERA.

The approaches and methods for a SLERA and a refined SLERA were used to complete the ecological evaluation for the GCOU. In addition to the primary guidance (EPA, 1997, 1998), this assessment is also consistent with the following EPA guidance: *The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments* (EPA, 2001).

SECTION 2

Problem Formation

The primary goal of the problem formulation phase is to develop a CSM and to identify the following:

- Environmental setting and chemicals known or suspected to exist at a site
- Chemical fate and transport mechanisms that might exist at a site
- Mechanisms of ecotoxicity associated with relevant chemicals, and likely categories of receptors that could be affected
- Complete exposure pathways that might exist at the site (a complete exposure pathway is one whereby site-specific chemicals can be traced or expected to travel from the source to a receptor)
- Development of assessment and measurement endpoints, and identification of representative receptors

These five items are discussed in more detail in the following subsections.

2.1 Site Location and History

The site is located in the SFV in Los Angeles County along the Los Angeles River and includes a section of the river known as the Glendale Narrows (Figure 1). In 1986, EPA established the SFV Superfund Sites due to the presence of VOC contamination in ground water throughout the SFV. The RI for the Glendale Study Area (a portion of SFV Area 2) was completed in 1992 and included a human health risk assessment (HHRA) and a qualitative ecological evaluation. Some risks to human health were identified. However, the qualitative ecological evaluation concluded that there is limited potential for exposure to contaminated ground water because of the lack of suitable habitat, receptors, and potential exposure pathways. The primary potential exposure pathway would be direct ground water discharge to the Los Angeles River. These ground water discharges, if any occur, were expected to be infrequent, seasonal, and localized. Accordingly, there was no expectation for significant impacts to potential environmental receptors. However, as described above, more recent evaluations have concluded that ground water could potentially discharge to the Los Angeles River water in both GNOU and GSOU areas depending on regional ground water conditions (CH2M HILL, 2014b).

In 1993, interim pump-and-treat remedies were selected to address the large plumes of VOC contamination in the GNOU and GSOU areas. Implementation of these remedies began in 2000 and they were operational by 2002. Treated ground water is blended with water from other sources and incorporated into the City of Glendale's water supply system. In 2007, EPA established the GCOU based on the presence of Cr6 in ground water throughout the eastern SFV and the identification of many potential Cr6 sources.

2.2 Environmental Setting

2.2.1 U.S. Army Corps of Engineers Habitat Evaluation

The U.S. Army Corps of Engineers (USACE) recently conducted a habitat evaluation as part of the *Los Angeles River Ecosystem Restoration Feasibility Study* (USACE, 2013). Reaches 2, 3, and 4 in this study generally correspond to the portion of the Los Angeles River located within the GCOU, extending from the soft-bottomed portion of the river upstream of the southward bend down to Los Feliz Boulevard (Figure 1). USACE (2013) notes that the soft-bottomed or unlined portions of the river (shown as a double blue line in Figure 1) have concrete banks, but a natural bottom because a high ground water table precluded lining the river bed with concrete at the time of channelization. These soft-bottomed areas were found to support degraded riparian habitat.

Evaluation of satellite and aerial photographs resulted in the following acres of habitat for each reach:

- Reach 2 – 12 acres Eucalyptus, 2 acres open water channel, 4 acres riparian, 13 acres urban, and 10 acres low density urban
- Reach 3 – 31 acres open water channel, 7 acres riparian, 39 acres urban, and 25 acres low-density urban
- Reach 4 – 29 acres open water channel, 8 acres riparian, 36 acres urban, and 20 acres urban golf course

Three verification transects were surveyed within these reaches: two in Reach 2 and one in Reach 4. Section 3.5 of USACE (2013) contains a detailed description of the biological resources (vegetation, wildlife, and special-status species) occurring or potentially occurring in the portions of the Los Angeles River included in the study. The USACE study recommends that restoration efforts for these three reaches focus on habitat improvements to recreational areas that are adjacent to the channel, with minimal effort to alter the current condition of the channel itself.

2.2.2 GCOU Ecological Field Survey

An ecological field survey for the GCOU was conducted on September 24, 2014. The purpose of this study was to identify, if present, potential habitat and receptors that could potentially be exposed to Cr6 in the ground water should it discharge to the river. The Los Angeles River was accessed at three locations within the study area: one location off Victory Boulevard and upstream of the concrete-lined southward bend of the river, one location off Chevy Chase Drive, and one location off Los Feliz Boulevard just south of the concrete-lined portion of the river that runs under Los Feliz Bridge (see Figure 1).

The area surrounding the river was estimated to be 10 percent urban (including roads), 55 percent residential, 10 percent light industrial, and 25 percent recreational (including parks such as Griffith Park and golf courses). All three areas of the river surveyed have been channelized and have concrete banks with a combination of concrete-lined and unlined bottom sections. The concrete-lined portions of the river provide minimal habitat. The earthen, unlined portions support riparian vegetation, including native and non-native mature trees, but a majority of the locations contained non-native species. Species observed during the ecological field survey along with their native or non-native status are presented in Table 1.

Vegetation observed included eucalyptus (*Eucalyptus* sp.), sycamore (*Platanus* sp.), giant reed (*Arundo donax*), castor bean (*Ricinus* sp.), Mexican fan palm (*Washingtonia robusta*), willow (*Salix* sp.), mule fat (*Baccharis salicifolia*), and ash (*Fraxinus* sp.). Wildlife species observed at the first location included great blue heron (*Ardea herodias*), black phoebe (*Sayornis nigricans*), snowy egret (*Egretta thula*), rock dove (*Columba livia*), and mallard (*Anas platyrhynchos*). At the second location, mallard, black-necked stilt (*Himantopus mexicanus*), Anna's hummingbird (*Calypte anna*), and Canada goose (*Branta canadensis*) were observed. Canada goose, rock dove, great blue heron, and egrets were also recorded at the third location. Mallard was the most common species observed, with groups ranging from 4 to 21 individuals at each location.

Ecological field survey forms and photographs are provided in Appendix A.

2.3 Special-Status Plants and Animals

The potential for special-status species was assessed based on the field survey and a search of the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) that included a nine-quad summary and a 1-mile focused query around the Los Angeles River. Special-status avian species that have been documented within 1 mile of the river are listed in Table 2. None of these species has a high probability of being present at the site due to either a lack of suitable habitat, or limited suitable habitat. However, all three locations support a variety of species protected under the Migratory Bird Treaty Act and birds protected under CDFW code. Several special-status bat species also have been recorded within 1 mile of the river (Table 2); however, the majority of occurrence records for these species are historical and recent survey data are lacking. Based on current species distribution information, the western yellow bat (*Lasiurus xanthinus*) and the hoary bat (*Lasiurus cinereus*) have the potential to occur in the project area. Neither of

these bats are federally threatened or endangered, but the western hoary bat is listed as a species of special concern in California (Table 2).

2.4 Ecological Conceptual Site Model

The ecological CSM illustrates exposure pathways to be evaluated in the SLERA and provides other key information such as chemical sources, release and transport mechanisms, and the relative importance of exposure pathways to specific receptor groups. The ecological CSM includes the following components:

- Chemical stressors
- Fate and transport
- Exposure pathways
- Assessment and measurement endpoints

The following sections briefly describe the ecological CSM (shown in Figure 2).

2.4.1 Selection of COPECs

Contaminants of potential ecological concern (COPECs) are those site-related chemicals that may be present in concentrations that exceed ESVs and/or TRVs. These chemicals are identified by the evaluation of known site history and analytical results. This SLERA is limited to an evaluation of chromium (primarily Cr6). Other COPECs, primarily VOCs, are also present in the ground water at elevated concentrations. However, this SLERA is being prepared in support of the GCOU RI and does not consider VOCs.

Ground water data collected between 2011 and July 2014 for Cr6 and total chromium (total Cr) were used in this evaluation. These data represent Cr6 and total Cr concentrations in filtered ground water, also known as dissolved Cr6 and dissolved total Cr. Only dissolved chromium data are considered in this evaluation because chemicals in ground water are most likely to travel dissolved in water rather than adhered to particles as they must travel through soil pores or fractured rock. Similarly, when ground water discharges to a water body (at which time ecological exposures become possible), the bulk of the discharged chemicals are likely to be dissolved in water because the discharge must pass through the pores in the underlying sediments. Thus, the dissolved concentrations are likely to be more representative of what would be transported via the ground water than the total concentrations. Once discharged, the dissolved metal fraction in water (filtered samples) is more representative of the bioavailable fraction to aquatic receptors than the total metal fraction (unfiltered samples) (EPA, 1996). This is reflected in how the most recent Ambient Water Quality Criteria have been developed for many metals; that is, they are based on the dissolved fraction.

The data considered in this evaluation were collected as part of field investigations conducted in 2012 to 2014 by EPA and in 2011 to 2014 by the GCOU Respondents, Glendale Respondents Group, City of Glendale, and various facilities doing work under the direction of the State of California. The technical approach technical memorandum for the ecological assessment (CH2M HILL, 2014a) proposed that the same reasonable maximum exposure (RME) concentrations developed for the individual shallow well groupings defined in the HHRA addendum would also be used for the initial ecological screening (SLERA). However, these RMEs are not representative of ground water that has the greatest potential to discharge to the Los Angeles River because most of the data points included in the HHRA are from wells located relatively far from the river. Instead, data from ground water wells closest to the river were evaluated for use in the SLERA. These wells are clustered into subgroups within HHRA Well Groups 2, 3, and 4 and are named Ecological Well Groups 2a, 3a, 3b, 3c, 3d, 3e, and 4a (see Figure 1).

2.4.2 Fate and Transport

Fate and transport describe the processes by which contaminants are transferred between media, and mechanisms whereby contaminants may be degraded or otherwise altered. Some of the processes influence contaminant transport between media and describe the eventual fate of the contaminants, while others directly influence the bioavailability and toxicity of contaminants. The transport and fate of inorganic and

organic contaminants in ground water, surface water, and sediment are influenced by physical, chemical, and biological factors, often acting in combination.

Chromium primarily occurs in the environment as either +3 or +6 valence states. Although the +2, +4, and +5 valence states may occur, they are unstable and are rapidly converted to the +3 valence state (Eisler, 2000). In freshwater, hydrolysis and precipitation are the major processes that determine the fate of chromium. In contrast, bioaccumulation and adsorption have only minor effects on the fate of chromium. In water with little organic matter, chromium is mostly found in its +6 valence state (hexavalent or Cr6). In the GCOU, the majority of dissolved chromium in ground water occurs as Cr6. In ground water, Cr6 is often mobile, whereas trivalent chromium (Cr3) is relatively immobile in ground water (Eisler, 2000). When discharged to surface water, Cr6 is often reduced to Cr3 and most of the chromium that is released to water is deposited in the sediment over time. A small percentage of chromium will remain in the water column in both the soluble and insoluble forms, with Cr3 generally occurring as suspended solids adsorbed onto clayish materials, organics, or iron oxides that are in the water (Agency for Toxic Substances and Disease Registry [ATSDR], 2012).

Cr6 is the most toxic and most bioavailable form of chromium because of its high oxidation potential and the ease with which it penetrates biological membranes (Steven et al., 1976; Taylor and Parr, 1978). However, Cr6 rapidly reduces to Cr3 in all types of soils. Cr3, the predominant form in the environment, has relatively low bioavailability and mobility. The mobility of Cr3 is promoted by very acidic soils or sediments; however, almost all of it will precipitate at a pH of 5.5 or higher (Bodek et al., 1988). In most soils and aerobic sediments, chromium is primarily present as precipitated Cr3, which has limited bioavailability and has not been known to biomagnify through food chains in its inorganic form (Eisler, 2000).

2.4.3 Exposure Pathways Analysis

Exposure pathway analysis for the GCOU evaluates the potential for contact between Cr6 in ground water and the ecological receptors that are present or have the potential to occur at the site. Potential exposure pathways must meet specific criteria for an exposure to occur. Aside from necessary habitat for ecological receptors, a complete exposure pathway must include the following elements:

- Contaminant source (for example, ground water)
- Primary and/or secondary mechanisms for contaminant release and transport (for example, discharge to surface water)
- Exposure point (for example, surface water)
- Feasible route of exposure (for example, ingestion)
- Receptor (for example, plant, invertebrate, bird, or mammal)

In the GCOU, it is important to determine whether there is potential for ground water to reach surface water bodies via anthropogenic or natural processes. A possible mechanism for anthropogenic discharge is the use of ground water to maintain community ponds within the urban landscape that surrounds the site (at parks or golf courses for example). However, the City of Glendale is currently not using ground water to maintain any community ponds in the area. Therefore, this pathway is currently incomplete.

A preliminary evaluation of the potential for natural discharge from ground water to the Los Angeles River was recently conducted for the GNOU and GSOU (CH2M HILL, 2014b). GCOU includes portions of the river in both the GNOU and GSOU. Results of the evaluation indicated that during periods of high ground water elevations (as occurred in 1997), ground water could potentially discharge to surface water in both the GNOU and GSOU within the unlined portions of the river downstream of the southward bend in the river. In lower ground water periods (as in the current conditions), the potential for ground water discharge to the Los Angeles River is likely a concern only in the unlined portion of the river south of the GSOU extraction wells, where 2013 ground water elevations are estimated to be higher than the bottom of the river channel

(CH2M HILL, 2014b). Therefore, potentially complete exposure pathways from ground water to sediment pore water and surface water in the unlined portions of the Los Angeles River to ecological receptors exist, with discharge of ground water considered the primary release mechanism. Ground water is not expected to discharge to the concrete-lined portions of the river adjacent to Ecological Well Groups 3a, 3b, and 3c; and aquatic and riparian vegetation are not present in the lined stretches of the river (Figure 1). Therefore, exposure pathways from ground water to surface water in this portion of the river are incomplete and are not evaluated further.

There are potentially complete exposure pathways from surface water to aquatic organisms (aquatic plants, water-column invertebrates, amphibians, and fish), aquatic reptiles, aquatic birds, and mammals. Additionally, aquatic invertebrates and rooted aquatic/riparian plants may be exposed to ground water via sediment pore water; deep-rooting plants such as riparian trees and shrubs may have a direct exposure pathway to ground water, which is less than 10 feet below the river bottom across much of the unlined portions of the river. Transport and fate analysis indicates that a majority of chromium released to surface water is ultimately deposited to sediment (ATSDR, 2012) resulting in potentially complete exposure pathways from sediment to aquatic plants, benthic macroinvertebrates, aquatic birds, amphibians, aquatic reptiles, and mammals. However, the focus of this ecological assessment is on ground water discharge to surface water; therefore, only pathways associated with sediment pore water (rather than bulk sediment) and surface water are evaluated.

Potentially complete/significant exposure pathways to ecological receptors that are evaluated in this SLERA include the following:

- Direct contact and ingestion of chromium in surface water by aquatic organisms (aquatic plants, water-column invertebrates, amphibians, and fish)
- Direct contact/root uptake of chromium from pore water or ground water by plants
- Ingestion of chromium in surface water and food-chain transfer of chromium in surface water through ingestion of contaminated aquatic plants, aquatic invertebrates, and/or fish by higher trophic-level wildlife (reptiles, birds, and mammals)

2.4.4 Assessment and Measurement Endpoints

Assessment endpoints are an expression of the important ecological values that should be protected (Suter, 1990, 1993; EPA, 1998; Suter et al., 2000). Assessment endpoints are developed based on known information concerning the contaminants present, the study area, and the ecological CSM. There are three components to each assessment endpoint:

- An entity (for example, birds)
- An attribute of that entity (survival, reproduction, etc.)
- A measure (a measurable value such as an effect level)

2.4.4.1 Assessment Endpoint Entities

The assessment endpoint entities for the GCOU were selected based on the following principal criteria:

- Ecological relevance
- Societal relevance
- Susceptibility (or high exposure) to known or potential stressors at the site

Where appropriate, representative ecological receptors (specific species) were selected from aquatic communities to fulfill as many of the following criteria as possible:

- Species that are known to occur or are likely to occur at the site

- Species that relate to the assessment endpoints selected
- Species that are likely to be maximally exposed to the site-related chromium
- Sedentary species or species with a small home range
- Species with high reproductive rates
- Species that are known to play an integral role in the ecological community structure at the site
- Species that are known or likely to be especially sensitive to the site-related chromium, and thus are an indication of ecological change
- Species that are representative of the foraging guild (that is, a group of species with similar ecological resource requirements and foraging strategies and, therefore, similar roles in the ecosystem) or that serve as food items for higher trophic levels

For the purposes of this SLERA, the following assessment endpoint entities and representative bird and mammal receptors were evaluated:

- Aquatic organisms – aquatic plants, water-column invertebrates, amphibians, and fish potentially present in the Los Angeles River.
- Riparian plants – present in the unlined portions of the Los Angeles River
- Aquatic reptiles (for example, turtles) – potentially present in the Los Angeles River
- Mallard (omnivorous bird) – observed at all three field survey locations; evaluated in this SLERA as an herbivore (100 percent plant diet) and an insectivore (100 percent aquatic invertebrate diet)
- Great blue heron (piscivorous bird) – observed at two field survey locations
- Little brown bat (insectivorous mammal) – surrogate for bat species that may forage in the riparian areas of the Los Angeles River
- Raccoon (omnivorous mammal) – may forage in the Los Angeles River; evaluated as a piscivore (100 percent fish diet)

2.4.4.2 Assessment Endpoint Attributes

The attributes selected for each entity consisted of growth, reproduction, or survival of receptor populations. ESVs and/or TRVs for those endpoints are available primarily from laboratory studies. Maximum acceptable adverse effect levels generally selected for all receptors at the screening level are screening-level benchmarks (for example, ESVs for aquatic organisms) or no observed adverse effect levels (NOAELs) for wildlife. Comparison to the lowest observed adverse effect levels (LOAELs) for wildlife also was included in the refined SLERA to provide a range of risk.

2.4.4.3 Assessment Endpoint Measures

Measures (formerly referred to as measurement endpoints) are measurable attributes used to evaluate potential effects on the assessment endpoints (EPA, 1998). The three categories of measures include the following:

- Measures of exposure – Used to evaluate levels at which exposures may be occurring.
- Measures of effect – Used to evaluate the response of the assessment endpoints when exposed to the stressors.
- Measures of ecosystem and receptor characteristics – Used to evaluate the ecosystem characteristics that influence the assessment endpoints, the distribution of stressors, and the characteristics of the assessment endpoints that may affect exposure or response to the stressor. These are not available for the GCOU.

Measures of exposure and measures of effects were used for this SLERA as follows:

- Measures of exposure – Measures of exposure are typically an exposure point concentration (EPC) of a chemical in an environmental medium or food item, or a related dose estimate. The maximum detected concentration of Cr6 and total Cr from the wells nearest to the river in each of Ecological Well Groups 2a, 3d, 3e, and 4a are used as EPCs for the SLERA.
- Measures of effect – Measures of effect in a SLERA include medium-specific, literature-based ESVs and TRVs. ESVs and TRVs used in the screening calculations are represented by literature-based screening benchmarks and NOAELs. For birds and mammals, the LOAELs also are used to provide a range of risk. Toxicity studies included in the development of Ecological Soil Screening Levels (EcoSSLs) for chromium (EPA, 2008) were identified and used to determine a low TRV (NOAEL-based) and a high TRV (LOAEL-based). Additionally, published screening values for aquatic organisms (National Recommended Water Quality Criteria [NRWQC]) (EPA, 2013a) and plants (Efroymson et al., 1997) were selected as ESVs. Toxicity data for reptiles are lacking.

SECTION 3

Analysis

The analysis portion of the SLERA links the Problem Formulation phase (Section 2) with the Risk Characterization phase (Section 4), and consists of the technical evaluation of ecological and chemical data to estimate potential ecological exposures and develop effect levels.

3.1 Ecological Exposure Characterization

The Exposure Characterization is used to evaluate the relationship between receptors at the site and potential stressors (Cr6). Exposure is defined as the co-occurrence of a stressor and a receptor in both space and time. There must be a potential for exposure before there can be a potential for risk. The methods used to estimate exposure are described in this section.

3.1.1 Concentration-Based Exposure Models

Exposure models describe the relationships and equations used to estimate how much of a given chemical in a given medium is being taken up by the receptor through a given exposure route. These relationships can be simple or complex depending on the receptor involved and the number of exposure routes evaluated.

Concentration-based models were used in this SLERA. The exposure model for aquatic organisms and rooted-aquatic and riparian plants is very simple, and is expressed as the concentration of each chemical in the medium to which the receptor is most likely exposed. Aquatic organisms are exposed to surface water. Rooted-aquatic plants are exposed to pore water (assumed to be affected by ground water discharge) and deep-rooted riparian plants may be directly exposed to ground water. EPCs for these receptors are represented by maximum ground water concentrations in ground water wells nearest the river. For the initial screening assessment, it is assumed that chromium concentrations in sediment pore water and surface water in the Los Angeles River are equal to concentrations in the nearest ground water wells with no dilution occurring during transport and upon discharge. In the refined screening, dilution is considered.

The second concentration-based model is one where a medium-based benchmark is calculated using a dosage-based TRV and applicable species-specific exposure factors. This model is used to derive water-based benchmarks for aquatic birds and mammals exposed to ground water COPECs, which have potentially discharged to surface water and bioaccumulated into prey (aquatic plants, aquatic invertebrates, and fish) of different trophic levels. Aquatic reptiles have the potential to be exposed via these same pathways; however, exposure models and toxicity data needed to calculate water-based benchmarks for reptiles are lacking. Therefore, analyses for birds were used as a surrogate. Water-based benchmarks for aquatic birds and mammals are developed using the following equation:

$$Benchmark = \frac{TRV}{WIR + (FIR \bullet BAF)}$$

$$where:$$

$$BAF = BCF \bullet FCM$$

Where:

Benchmark	=	Food-web-based ecological screening value (milligrams per liter [mg/L])
TRV	=	toxicity reference value (milligrams per kilogram per day [mg/kg/day])
FIR	=	food ingestion rate normalized to body weight (kg/kg/day, wet weight)
WIR	=	water ingestion rate normalized to body weight (L/kg/day)
BAF	=	bioaccumulation factor (L/kg, wet weight)
BCF	=	bioconcentration factor (L/kg, wet weight)
FCM	=	food chain multiplier (unitless)

3.1.2 Exposure Factors

Species-specific life history factors are needed to estimate exposure for each representative species. These include body weight, food and water ingestion rates, dietary composition, and fraction of diet composed of each food type. These parameters are summarized in Table 3.

3.1.3 Bioconcentration Factors

The measurement and/or estimation of concentrations of COPECs in wildlife food items is necessary to evaluate how much of a receptor's exposure is through food versus direct ingestion of surface water. Although the preferred data are direct measurements of concentrations in biota samples collected from the site, such data were not available for GCOU and are not typically available at the SLERA phase. Therefore, literature-reported values were used to estimate bioaccumulation. For water-to-organism bioaccumulation, the bioconcentration factor (BCF) was used. BCFs for total chromium from EPA (1999) were used and include:

- Water-to-algae – 4,406 L/kg, wet weight
- Water-to-aquatic invertebrates – 3,000 L/kg, wet weight
- Water-to-fish – 19 L/kg, wet weight

Food chain multipliers to estimate transfer to trophic levels 3 and 4 (where the associated wildlife receptors reside) are reported in Sample et al. (1996). For inorganic compounds other than mercury (including chromium), food chain multipliers of 1 are recommended.

Calculated concentration-based benchmarks for aquatic birds and mammals are presented in Table 4.

3.1.4 Exposure Point Concentrations

The EPCs for the initial screening are the maximum detected concentration of Cr6 and total Cr from the wells nearest to the river in each of Ecological Well Groups 2a, 3d, 3e, and 4a. (Note: exposure pathways from Ecological Well Groups 3a, 3b, and 3c to the concrete-lined portion of the Los Angeles River adjacent to these wells are incomplete.) In the refined screening, the EPCs consist of the 95 percent upper confidence limit on the arithmetic mean (95UCL) for Cr6 and total Cr in Ecological Well Groups 2a, 3d, 3e, and 4a. These 95UCLs were calculated using the most recent statistical models as contained in the ProUCL software, Version 5.0 (EPA, 2013b). The most appropriate method for calculating the 95UCL for each Ecological Well Group was determined by sample size, goodness of fit for data distributions, variability, and skewness. For samples with field duplicates, concentrations were determined using the following criteria:

- When the field duplicate (FD) and normal (N) results were both detects, the maximum result was used.
- When both the FD and N were nondetects, the lower result was used.
- When either the FD or N result was a detect and the other was a nondetect, the detected result was used.

3.2 Ecological Effects Characterization

The ecological effects characterization consists of an evaluation of available toxicity or other effects information that can be used to represent a threshold for an adverse effect. Stressor-response (effects) data that can be used to evaluate ecological risks resulting from chemical exposures comprise three general categories: literature-derived or site-specific single-chemical toxicity data, site-specific ambient media toxicity tests, and site-specific field surveys (Suter et al., 2000). Site-specific toxicity studies or quantitative field surveys were not conducted for this SLERA. Therefore, single-chemical toxicity data found in the literature were used. The specific toxicity values for each receptor group are presented below along with the sources of the values.

3.2.1 Aquatic Organisms

Toxicity values for aquatic organisms are concentration-based ESVs. Chronic benchmarks are generally protective of most (95 percent) aquatic receptors that reside in the water column including aquatic plants, water-column invertebrates, and fish. Ground water is not directly accessible to aquatic organisms in the GCOU. However, ground water may discharge to the Los Angeles River, particularly in the unlined portion of the river near Well Group 3 or elsewhere under high ground water conditions. EPA NRWQC (EPA, 2013a) for Cr6 and Cr3 were selected to evaluate aquatic organisms. The criterion maximum concentration (CMC; acute) and criterion continuous concentration (CCC; chronic) are as follows:

- Dissolved Cr6 – CMC of 16 micrograms per liter (µg/L) and a CCC of 11 µg/L
- Dissolved Cr3 at a water hardness of 100 mg/L – CMC of 570 µg/L and a CCC of 74 µg/L

Chronic values were used in the initial screening; both chronic and acute values were considered in the refined screening.

3.2.2 Rooted Aquatic Plants and Riparian Plants

Deep-rooted riparian plants (for example, trees and shrubs) may be directly exposed to ground water at the site. Additionally, other rooted aquatic plants may be exposed to ground water discharged to sediment pore water. Efroymson et al. (1997) developed solution-based screening-level benchmarks for plants that are applicable to ground water and pore water exposures. The chromium benchmark of 50 µg/L is based on data derived from studies of both Cr6 and Cr3, and was therefore used to evaluate both Cr6 and Cr3 toxicity.

3.2.3 Birds and Mammals

EPA has developed bird- and mammal-based EcoSSLs for exposure to soils (EPA, 2008). While these EcoSSLs (which are for soil) are not directly applicable to this evaluation, the NOAEL used to derive the final EcoSSL was selected as the low TRV for use in the risk calculations. NOAELs for Cr3 were available for both birds and mammals. However, avian toxicity data for Cr6 were not sufficient to meet the EcoSSL data requirements. For both the bird and mammal EcoSSL, the NOAEL was based on the geometric mean of available NOAELs for growth and reproduction endpoints. The geometric mean of LOAELs for growth and reproduction endpoints from the EcoSSL document was selected as the high TRV for this SLERA. NOAEL and LOAEL values for birds and mammals are presented in Table 5.

3.2.4 Aquatic Reptiles

Toxicity data to support development of TRVs for reptiles are lacking. Therefore, TRVs developed for birds were identified as a surrogate for reptiles.

SECTION 4

Risk Characterization

The Risk Characterization (Calculation) evaluates the evidence linking exposure to site-specific analytes with the potential ecological effects on the receptors identified for the site. This evaluation is completed through the integration of information gathered in the Problem Formulation phase (Section 2), the results of the Analysis phase (Section 3), and other lines of evidence. This SLERA includes measured chemical concentrations in abiotic media (ground water), modeled concentrations in biota (food-chain uptake), exposure estimates for representative species, toxicity information obtained from the literature, and quantitative risk evaluations. The Risk Characterization includes the following three main components: Risk Estimation, Risk Description, and Uncertainty Analysis. These three components were used together to identify and evaluate the potential risks and make recommendations for the site.

4.1 Risk Estimation

The Risk Estimation phase focuses primarily on quantitative methods to evaluate the potential for risk. The results of the Risk Estimation are presented as hazard quotients (HQs). For this SLERA, HQs were calculated by direct comparisons of measured concentrations in ground water with the ESVs for aquatic organisms, rooted aquatic plants and riparian plants, and aquatic birds and mammals, as follows:

$$HQ = \left(\frac{EPC\ (\mu g / L)}{Benchmark\ (\mu g / L)} \right)$$

Exposure and effects information for reptiles were limited or lacking, precluding development of appropriate benchmarks for aquatic reptiles. Therefore, risk analyses for birds were identified as a surrogate for aquatic reptiles.

All initial evaluations were completed using the maximum detected concentration within each group of wells (Ecological Well Groups 2a, 3d, 3e, and 4a) and screening-level benchmarks (aquatic organisms, and rooted aquatic/riparian plants) or low TRV (NOAEL)-based benchmarks (birds and mammals). HQs equal to or exceeding 1 indicate the potential for unacceptable risk because the constituent concentration (exposure) exceeds the screening value (effect). HQs less than 1 indicate that unacceptable risks are unlikely. Additional qualitative evaluation in the risk description is provided for exposure/receptor combinations with HQs greater than 1.

Initial risk estimates for aquatic organisms, rooted-aquatic plants and riparian plants, and aquatic birds and mammals are presented in Tables 5 and 7. Maximum, undiluted Cr6 and/or total Cr in Ecological Well Group 4a exceeded one or more of the aquatic organism and rooted aquatic plant/riparian plant benchmarks (Table 6). Additionally, one or more low TRV-based benchmarks for multiple bird and mammal receptors were exceeded in each Ecological Well Group (Table 8). Refined risk estimates for these exceedances are presented in Tables 6 and 8.

4.2 Risk Description and Risk Refinement

The Risk Description incorporates the results of the risk estimates along with any other available and appropriate lines of evidence to evaluate potential risks to ecological receptors at the site. Information considered in the determination of unacceptable risks includes use of the 95UCL as the EPC, potential future site conditions, dilution of ground water discharged to pore water and surface water, exceedance of the low TRV-based benchmarks versus high TRV-based benchmarks for birds and mammals that are not special-status species, and other information that is specific to a given receptor.

Considerations that apply to one or more receptors include:

- USACE (2013) recommends restoration of areas along the Los Angeles River within the GCOU; however, this restoration is to focus on habitat improvements to recreational areas that are adjacent to the channel, with minimal effort to alter the current condition of the channel itself. This restoration is expected to increase use of the river corridor and may increase the number of potential receptors at the site, but does not change the risk conclusions for ecological receptors evaluated in the SLERA.
- Although ecological receptors (other than deep-rooted riparian plants) do not have direct exposure to ground water, undiluted analytical ground water data were used in the initial screening to provide a conservative evaluation of the potential for significant contaminant transport via ground water to the Los Angeles River. The comparison of undiluted ground water concentrations with surface water screening values is very conservative and likely significantly overestimates potential ecological exposures to sediment pore water in the biologically active zone and, especially, in the water column. In the absence of site-specific dilution factors for ground water, Buchman (1999) recommends using a dilution factor of 10 to account for the dilution expected upon discharge of ground water to surface water. In the refined SLERA, a dilution factor of 10 was considered for all pore water and surface water exposures that exceeded effect levels in the SLERA. The actual dilution factor in the Los Angeles River is likely much higher than 10.
- Bats were assumed to forage exclusively on emergent aquatic insects. A recent evaluation of contaminant concentrations prior to and after metamorphosis in aquatic insects indicates that the aquatic larval stage has about 5 times more chromium than the emergent adult stage (Kraus et al., 2014). Therefore, the BCF for water-to-aquatic invertebrate (3,000 L/kg, wet weight) was divided by 5 to approximate the water-to-emergent aquatic insect BCF (600 L/kg, wet weight).

Refined risks are discussed by receptor below.

4.2.1 Aquatic Organisms

There were no exceedances of the chronic (CCC) benchmarks for aquatic organisms in Ecological Well Groups 2a, 3d, or 3e; therefore, there are no unacceptable risks to aquatic organisms in the areas of the river adjacent to these wells (Table 6). The maximum undiluted concentration of total Cr in Ecological Well Group 4a exceeded the CCC (Table 6); however, the 95UCL undiluted concentration did not exceed the CCC (HQ = 0.5; Table 7). Therefore, no unacceptable risks are predicted. Exposure is also reduced when the dilution factor of 10 is applied, which adds support to this risk conclusion.

The overall conclusion is that there are no unacceptable risks to aquatic organisms (aquatic plants, water-column invertebrates, amphibians, and fish) from ground water discharge to the Los Angeles River.

4.2.2 Rooted Aquatic Plants and Riparian Plants

Rooted-aquatic plants may be exposed via ground water discharge to sediment pore water, whereas deep-rooted riparian plants (such as trees and shrubs) may be directly exposed to ground water at the site.

- Rooted aquatic plants – As with aquatic organisms, no unacceptable risks to rooted aquatic plants were predicted for Ecological Well Groups 2a, 3d, or 3e (Table 6). No unacceptable risks were predicted in Ecological Well Group 4a when the ESV for plants was compared to the 95UCL (Table 7). Application of the dilution factor further reduces potential exposure and risk.
- Deep-rooted riparian plants – No unacceptable risks to deep-rooted riparian plants for Ecological Well Groups 2a, 3d, or 3e were predicted (Table 6). No unacceptable risks were predicted in Ecological Well Group 4a when the ESV for plants was compared to the 95UCL (Table 7). During the site field survey, no obvious signs of stressed vegetation were observed in this portion of the river. This provides further support for the risk conclusion.

The overall conclusion is that there are no unacceptable risks to rooted aquatic plants or deep-rooted riparian plants from ground water discharge to sediment pore water in the Los Angeles River.

4.2.3 Birds and Mammals

Results of the initial screening indicate that there are no unacceptable risks to piscivorous birds and mammals as represented by the great blue heron or raccoon. For the remaining receptors, there were exceedances of either the low TRV-based benchmark, the high TRV-based benchmark, or both at Ecological Well Groups 2a, 3d, 3e, and 4a for total Cr, and at Ecological Well Group 2a for Cr6 (Table 8). Therefore, risks to these receptors were refined by:

- The 95UCL concentrations for these Ecological Well Groups were used for EPCs.
- 95UCL concentrations of total Cr and Cr6 were diluted to more accurately represent discharge to surface water by using a dilution factor of 10 as recommended in Buchman (1999).
- Low and high TRV-based benchmarks for the little brown bat that were calculated using a water-to-emergent aquatic insect BCF of 600, were used (see Table 4 for benchmark values).

When these refinements were applied to risk estimation, the diluted 95UCL for Cr6 was less than the low TRV-based benchmarks for the herbivorous and insectivorous mallard, as well as for the little brown bat (Table 9). The diluted 95UCL for total Cr at Ecological Well Groups 2a, 3d, and 3e was less than the low TRV-based benchmarks for the herbivorous mallard, insectivorous mallard, and little brown bat. Therefore, no unacceptable risks to these receptors are predicted for Ecological Well Groups 2a, 3d, and 3e.

For Ecological Well Group 4a, the diluted 95UCL for total Cr was less than the low TRV-based benchmarks for the insectivorous mallard and little brown bat. The low TRV-based benchmark for herbivorous mallard was slightly exceeded (HQ = 1.004), but the high TRV-based benchmark was not (HQ = 0.17). Because the mallard is not a special-status species and special-status avian species are not likely to be present at the site, unacceptable risks to avian populations are not predicted. It also should be noted that the Group 4a wells are about 1,000 feet to the east of the river and may not represent concentrations of ground water under or near the river. Well data from locations closer to the river in Ecological Well Group 3e (immediately to the north) suggest that chromium concentrations decrease as the distance from the ground water well to the river decreases. Therefore, total Cr concentrations in Ecological Well Group 4a are likely overestimated, and thus exposure and risks are likely overestimated.

The overall conclusion is that there are no unacceptable risks to aquatic birds and mammals from ground water discharge to surface water in the Los Angeles River.

4.2.4 Aquatic Reptiles

Risk analyses for birds were identified as a surrogate for aquatic reptiles due to limited or lacking exposure and effects information for reptiles. Based on the results for avian receptors, risks to aquatic reptiles from exposure to Cr6 are not predicted for any Ecological Well Group, and risks to aquatic reptiles from exposure to total Cr are not predicted for Ecological Well Groups 2a, 3d, or 3e. Potential risk to individual aquatic reptiles may exist for Ecological Well Group 4a (exceedance of the low TRV-based benchmark observed for herbivorous mallard); however, as with birds, there were no special-status reptiles identified at the site and risks to populations are not predicted (that is, the high TRV-based benchmark for herbivorous mallard was not exceeded).

4.3 Uncertainties

Uncertainties are inherent in all aspects of an ERA. The nature and magnitude of uncertainties depend on the amount and quality of the data available, the degree of knowledge concerning site conditions, and the assumptions made to perform the risk assessment. A qualitative evaluation of the major uncertainties associated with this assessment is presented in Table 10.

This SLERA addendum does not provide total risks due to exposure to all contaminants in ground water at the site. A baseline HHRA was conducted for exposure to VOCs and metals in ground water (JMM, 1992); however, those results are not included in this SLERA addendum. The contributions from other chemicals known to be present in GCOU ground water would result in higher risks and hazards than the estimates provided herein.

Background concentrations of Cr6 are not considered in this SLERA addendum because upgradient sources of Cr6 have been included in this investigation and it is unlikely that the conditions are present for naturally occurring Cr6. Even if there were potential for background Cr6, Well Group 1 is the only exposure area where the California Cr6 MCL exceedance ratio is less than 1 and potential background levels could impact the results. At all other areas the California Cr6 MCL exceedance ratio is high enough that EPA's evaluation of the Cr6 contamination at the site is unlikely to be substantially changed by a more definitive evaluation of background.

SECTION 5

Conclusions

Prior ecological evaluations within the study area concluded that there is a limited potential for exposure to contaminated ground water because of the lack of suitable habitat, receptors, and potential exposure pathways. However, recent concerns regarding Cr6 in ground water prompted a re-evaluation (a SLERA) of the habitat, receptors, exposure pathways, and possible ecological risks.

Objectives for the SLERA addendum were to:

- Conduct a focused ecological field survey to identify potential habitat and receptors that have the potential to be exposed to contaminated ground water, and determine if habitat is present and ground water pathways are possible.
- Update the qualitative assessment of the potential for ground water discharge to the Los Angeles River and evaluate potential exposure pathways if habitat exists in the study area.
- If habitat and potential receptors are identified and potential exposure pathways to ground water are possible, provide the following elements:
  - Qualitative ecological effects assessment that includes comparison to screening benchmarks and TRVs
  - Risk characterization and uncertainty analysis

The results of the SLERA are as follows:

- The City of Glendale operates the interim GNOU and GSOU remedies, which include extraction and treatment of Cr6-contaminated ground water prior to putting the water into their distribution system for municipal use. Ground water from the city's distribution system is not currently used to maintain community ponds or other significant surface water features in the area; therefore, this exposure pathway is incomplete.
- Potential habitat and receptors that may be exposed to ground water are present in the unlined portions of the Los Angeles River.
- A preliminary evaluation of the potential for natural discharge from ground water to the Los Angeles River indicated that ground water discharge to unlined sections of the river in the southern portion of the Glendale Narrows may occur based on recent ground water elevations (measured in 2013) (CH2M HILL, 2014b). Additional unlined sections of the river also may receive ground water discharge during high ground water conditions (as occurred in 1997).
- Based on the ecological field survey and evaluation of the likelihood of ground water discharge, potentially complete exposure pathways from ground water to sediment pore water and surface water exist along the unlined sections of the Los Angeles River in the southern portion of the study area.
- Potentially complete/significant exposure pathways to ecological receptors that were evaluated in this SLERA include:
  - Direct contact and ingestion of chromium in surface water by aquatic organisms (aquatic plants, water-column invertebrates, amphibians, and fish)
  - Direct contact/root uptake of chromium from pore water or ground water by plants
  - Ingestion of chromium in surface water and food-chain transfer of chromium in surface water through ingestion of contaminated aquatic plants, aquatic invertebrates, and/or fish by higher trophic-level wildlife (reptiles, birds, and mammals)

- The results of the risk analysis indicate that there are no unacceptable risks to aquatic organisms or aquatic birds and mammals from ground water discharge to Los Angeles River surface water. Based on the results for birds, unacceptable risks to aquatic reptiles are also unlikely. Additionally, there are no unacceptable risks to rooted aquatic plants or deep-rooted riparian plants (such as trees and shrubs) from ground water discharge to sediment pore water or to deep-rooted riparian plants from direct contact with ground water.
- Potential unacceptable risks to individual birds (and possibly to individual aquatic reptiles) were identified for the unlined portion of the river adjacent to Ecological Well Group 4a; however, risks to populations are not predicted (that is, the high TRV-based benchmark was not exceeded). Additionally, the monitoring wells for Well Group 4a are approximately 1,000 feet from the Los Angeles River channel. In adjacent Well Group 3e to the north, there is a pattern of decreasing chromium with decreasing distance from the well to the river; therefore, exposure and potential risks to individual birds (or aquatic reptiles) are likely overestimated in this conservative SLERA. However, lack of ground water data directly adjacent to the Los Angeles River in southern Area 2 (represented by Well Group 4a) may be considered a data gap.

SECTION 6

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2012. *Toxicological Profile for Chromium*. U.S. Department of Health and Human Services, Public Health Service, September. Available online at: http://www.atsdr.cdc.gov/toxprofiles/index.asp.

Beyer, W. N., E. Conner, and S. Gerould. 1994. "Estimates of soil ingestion by wildlife." *J. Wildl. Manage*. 58:375-382.

Bodek, I., W.J. Lyman, W.F. Reehl, and D.H. Rosenblatt. 1988. *Environmental Inorganic Chemistry: Properties, Processes and Estimation Methods.* Pergamon Press, Elmsford, NY.

Buchman, M.F. 1999. NOAA screening quick reference tables. NOAA HAZMAT Report 99-1, Seattle, WA. 12 pp.

Butler, R.W. 1992. Great Blue Heron (*Ardea herodias*). p. 1-19. *In* Poole A., P. Stettenheim and F. Gill (ed.) *The Birds of North America*. No. 25. The Birds of North America, Inc. Philadelphia, PA, USA.

Calder, W.A. and E.J. Braun. 1983. "Scaling of osmotic regulation in mammals and birds." *Am J Physiol.* 224:R601-R606.

CH2M HILL. 2014a. Technical Memorandum. *Technical Approach for Human Health Risk Assessment and Ecological Assessment Addenda, San Fernando Valley Superfund Site, Glendale Chromium Operable Unit.* Prepared for U.S. Environmental Protection Agency, Region 9. September 10.

CH2M HILL. 2014b. Technical Memorandum. *Preliminary Evaluation of Potential Discharge of Ground Water to the Los Angeles River in Glendale North and Glendale South Operable Units.* Prepared for U.S. Environmental Protection Agency, Region 9. August 13.

Conover, M.R. 1989. "Potential compounds for establishing conditioned food aversions in raccoons." *Wildl. Soc. Bull.* 17:430-435.

Efroymson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten. 1997. *Toxicological benchmarks for screening contaminants of potential concern for effects on terrestrial plants*: 1997 Revision, ES/ER/TM-85/R3. Oak Ridge National Laboratory, Oak Ridge, TN.

Eisler, R. 2000. *Handbook of chemical risk assessment: Health hazards to humans, plants, and animals.* Vol. 1: Metals. Lewis Publishers. Boca Raton, FL. 738 pp.

James M. Montgomery, Consulting Engineers, Inc. (JMM). 1992. *Remedial Investigation Report for the Glendale Study Area.* Submitted to Department of Water and Power, City of Los Angeles, California. January.

Kraus, J.M., D.M. Walters, J.S. Wesner, C.A. Stricker, T.S. Schmidt, and R.E. Zuellig. 2014. "Metamorphosis alters contaminants and chemical tracers in insects: Implications for food webs." *Environ. Sci. Tech.* 48:10957-10965.

Nagy, K.A. 2001. "Food Requirements of wild Animals: Predictive Equations for Free-Living Mammals, Reptiles, and Birds." *Nutrition Abstracts and Reviews Series B: Livestock Feeds and Feeding.* Vol. 71, No. 10.

Sample, B.E., D.M. Opresko, and G.W Suter II. 1996. *Toxicological Benchmarks for Wildlife*: 1996 Revision. Oak Ridge National Laboratory, Oak Ridge, Tennessee. 227 pp, ES/ER/ TM-86/R3.

Sample, B.E., and G.W. Suter II. 1994. *Estimating exposure of terrestrial wildlife to contaminants*. Oak Ridge National Laboratory, Oak Ridge TN. ES/ER/TM-125.

Suter, G.W., II. 1990. Endpoints for ecological risk assessments. *Environ. Manage.* 14:9-23.

Suter, G.W., II. 1993. *Ecological Risk Assessment*. Lewis Publishers, Chelsea, MI.

Suter, G.W., II, R.A. Efroymson, B.E. Sample, and D.S. Jones. 2000. *Ecological Risk Assessment for Contaminated Sites*. Lewis Publishers, Boca Raton, Florida.

Steven, J.D., L.J. Davies, E.K. Stanley, R.A. Abbott, M. Ihnat, L. Bidstrup, and J. F. Jaworski. 1976. *Effects of Chromium in the Canadian Environment*. NRCC No. 151017, National Research Council of Canada, Ottawa, ON. 168 pp.

Taylor, F.G., Jr., and P.D. Parr. 1978. Distribution of chromium in vegetation and small mammals adjacent to cooling towers. *J. Tenn. Acad. Sci.* 53:87-91.

U.S. Army Corps of Engineers (USACE). 2013. *Los Angeles River Ecosystem Restoration Integrated Feasibility Report. Feasibility Study and Environmental Impact Statement/Environmental Impact Report, Los Angeles County, California*. Draft. Prepared by U.S. Army Corps of Engineers, Los Angeles District. September.

U.S. Environmental Protection Agency (EPA). 1993. *Wildlife Exposure Factors Handbook. Volume I.* Office of Research and Development. Washington, DC. EPA/600/R-93/187a.

U.S. Environmental Protection Agency (EPA). 1996. *Ecotox Thresholds*. Eco Update, Volume 3, Number 2. EPA/540/F-95/038. 12 pp.

U.S. Environmental Protection Agency (EPA). 1997. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final*. Office of Solid Waste and Emergency Response. EPA 540-R-97-006. June.

U.S. Environmental Protection Agency (EPA). 1998. *Final Guidelines for Ecological Risk Assessment, Risk Assessment Forum.* U.S. EPA, Washington, D.C., EPA/630/R-95/002F. April. http://www.epa.gov/region6/6pd/rcra_c/protocol/slerap.htm.

U.S. Environmental Protection Agency (EPA). 1999. *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities.* U.S. EPA, Washington, D.C., EPA/530/D-99/001A. August.

U.S. Environmental Protection Agency (EPA). 2001. *The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments*. Office of Solid Waste and Emergency Response, *ECO Update*. Intermittent Bulletin, Publication 9345.0-14, EPA 540/F-01/014. June.

U.S. Environmental Protection Agency (EPA). 2008. *Ecological Soil Screening Levels for Chromium*. Interim Final, Office of Solid Waste and Emergency Response, Washington, D.C., OSWER Directive 9285.7-66. April.

U.S. Environmental Protection Agency (EPA). 2013a. *National Recommended Water Quality Criteria*. Office of Science and Technology. http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm.

U.S. Environmental Protection Agency (EPA). 2013b. ProUCL Version 5.0.00, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations. Office of Research and Development. September. http://www.epa.gov/osp/hstl/tsc/software.htm

Tables

TABLE 1

Species Recorded During the Ecological Field Survey

Screening-Level Ecological Risk Assessment Addendum

Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Common Name	Species	Number of Individuals Recorded			Native or Non-native Status
		Location 1	Location 2	Location 3	
Eucalyptus	*Eucalyptus* sp.	NA	NA	NA	Non-native
Sycamore	*Platanus* sp.	NA	NA	NA	Native
Giant reed	*Arundo donax*	NA	NA	NA	Non-native
Castor bean	*Ricinus* sp.	NA	NA	NA	Native
Mexican fan palm	*Washingtonia robusta*	NA	NA	NA	Non-native
Willow	*Salix* sp.	NA	NA	NA	Native
Mule fat	*Baccharis salicifolia*	NA	NA	NA	Native
Ash	*Fraxinus* sp.	NA	NA	NA	Native
Great blue heron	*Ardea herodias*	1	--	2	Native
Black phoebe	*Sayornis nigricans*	1	--		Native
Snowy egret	*Egretta thula*	1	--	1	Native
Rock dove	*Columba livia*	1	--	--	Non-native
Mallard	*Anas platyrhynchos*	4	37	--	Non-native
Goose	unknown species	--	1	--	Non-native
Black-necked stilt	*Himantopus mexicanus*	--	4	--	Native
Anna's hummingbird	*Calypte anna*	--	1	--	Native
Canada goose	*Branta canadensis*	--	16	--	Native

Notes:

Plant and wildlife species observed during the Ecological Field Survey conducted on September 24, 2014.

Location 1 = area of Los Angeles River off Victory Boulevard and upstream of the concrete-lined southwest bend of the river

Location 2 = area of Los Angeles River off Chevy Chase Drive

Location 3 = area of Los Angeles River off Los Feliz Boulevard just south of the concrete-lined portion of the river that runs under Los Feliz Bridge

-- = none were observed at this location

NA = individual plants were not counted

TABLE 2

Special-Status Species Recorded within a 1-Mile Radius of the Los Angeles River

Screening-Level Ecological Risk Assessment Addendum

Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Common Name	Species	Federal Status	State Status	Rare Plant Rank/CDFW SSC	Potential to Occur in Study Area	Notes
California Walnut Woodland		None	None		Not likely	Walnut trees not observed in the riparian areas of the site
Many-stemmed dudleya	*Dudleya multicaulis*	None	None	1B.2	Not likely	Historical occurrence (1925); habitat not likely in the study area; possibly extirpated
Mesa horkelia	*Horkelia cuneeta var. puberula*	None	None	1B.1	Not likely	Historical occurrence (1895 and 1918); habitat not likely in the study area; possibly extirpated
Parish's brittlescale	*Atriplex parishii*	None	None	1B.1	Not likely	Suitable habitat does not exist in the study area
Round-leaved filaree	*California macrophylla*	None	None	1B.1	Not likely	Historical occurrence (1906); habitat not likely in the study area; possibly extirpated
San Fernando Valley spineflower	*Chorizanthe parryi var. fernandina*	Candidate	Endangered	1B.1	Not likely	Historical occurrence (1890); habitat not likely in the study area; possibly extirpated
Southern coast live oak riparian forest		None	None		Not likely	Oak trees not observed in the riparian areas of the site
Southern cottonwood willow riparian forest		None	None		Not likely	Observed in 1935; currently listed as extirpated in the study area
Southern sycamore alder riparian woodland		None	None		Possible	Sycamore trees were observed during the site visit; however, this specific riparian habitat type would be of very low quality in the study area
Silvery legless lizard	*Anniella pulchra pulchra*	None	None	SSC	Not likely	Recorded within a 1-mile radius of the study area in 2009; however, habitat (sandy or loose loamy soils; leaf litter) in the study area is lacking
Western pond turtle	*Emys marmorata*	None	None	SSC	Not likely	Historical occurrence (1917); habitat likely limited in the study area; possibly extirpated
Burrowing owl	*Athene cunicularia*	None	None	SSC	Not likely	Historical occurrence (1921); habitat currently lacking in the study area
Least Bell's vireo	*Vireo bellii pusilus*	Endangered	Endangered		Not likely	Historical occurrence (1914 and 1922); habitat currently lacking in the study area
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Endangered		Not likely	Historical occurrence (1894); habitat currently lacking in the study area
American badger	*Taxidea taxus*	None	None	SSC	Not likely	Although within the range of this species, habitat in the study area is lacking
Big free-tailed bat	*Nyctinomops macrotis*	None	None	SSC	Not likely	Recorded within a 1-mile radius of the study area in 1987; however, habitat lacking within the study area
Hoary bat	*Lasiurus cinereus*	None	None		Possible	Recorded within a 1-mile radius of the study area in 1992; study area falls within in the current range of the species
Pallid bat	*Antrozous pallidus*	None	None	SSC	Not likely	Historical occurrence (1905); usually occurs in open, dry habitats with rocky areas that are not part of the riverine habitat within the study area

TABLE 2

Special-Status Species Recorded within a 1-Mile Radius of the Los Angeles River

Screening-Level Ecological Risk Assessment Addendum

Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Common Name	Species	Federal Status	State Status	Rare Plant Rank/CDFW SSC	Potential to Occur in Study Area	Notes
San Diego desert woodrat	*Neotoma lepida intermedia*	None	None	SSC	Not likely	Recorded within a 1-mile radius of the study area in 2006; however, habitat in the study area is lacking
Western mastiff bat	*Eumops perotis californicus*	None	None	SSC	Not likely	Recorded within a 1-mile radius of the study area in 1987; however, habitat lacking within the study area
Western yellow bat	*Lasiurus xanthinus*	None	None	SSC	Possible	Recorded within a 1-mile radius of the study area in 1984; study area falls within in the current range of the species

Notes:

Table produced from search of the CDFW California Natural Diversity Database (CNDDB) that included a nine-quad summary and a 1-mile focused query around the Los Angeles River

1B.1 = Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California (California Native Plant Society List)

1B.2 = Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in California (California Native Plant Society List)

CDFW = California Department of Fish and Wildlife

SSC = species of special concern in California

TABLE 3
Exposure Factors for Representative Species
Screening-Level Ecological Risk Assessment Addendum
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

	Exposure Factors								Feeding Habits and Foraging Range											
	Body Weight		Ingestion Rate - food wet weight			Ingestion Rate - water			Biotic Dietary Items (fraction of diet)						Abiotic Media Ingestion (fraction of diet)			Foraging Range		
Species	**Mean (kg)**	**Reference**	**Mean (kg/kg bw/d)**	**Notes**	**Reference**	**Mean (L/kg bw/d)**	**Notes**	**Reference**	**Aquatic Plants**	**Aquatic Invertebrates**	**Fish**	**Notes**	**Major Food Items**	**Reference**	**Soil/ Sediment**	**Notes**	**Reference**	**Hectares**	**Notes**	**Reference**
Birds																				
Mallard - Herbivore	1.134	Nelson and Martin 1953 in EPA 1993	0.152	Allometric estimation for 'omnivorous birds' normalized to body weight	Nagy 2001	0.057	Allometric estimation for 'birds' normalized to body weight	Calder and Braun 1983	1	--	--	Diet assumed to be 100% aquatic plants for this evaluation	Diet includes gastropods, insects, crustacea, annelids, plants; data for breeding female in June in ND prairie potholes; literature indicates 20% aquatic plants, 45% aquatic invertebrates, and 25% benthic invertebrates	EPA 1993	0.033		Beyer et al. 1994	468	Spring home range for females in North Dakota prairie potholes	EPA 1993
Mallard - Insectivore	1.134	Nelson and Martin 1953 in EPA 1993	0.205	Allometric estimation for 'insectivorous birds' normalized to body weight	Nagy 2001	0.057	Allometric estimation for 'birds' normalized to body weight	Calder and Braun 1983	--	1	--	Diet assumed to be 100% aquatic invertebrates for this evaluation	Diet includes gastropods, insects, crustacea, annelids, plants; data for breeding female in June in ND prairie potholes; literature indicates 20% aquatic plants, 45% aquatic invertebrates, and 25% benthic invertebrates	EPA 1993	0.033		Beyer et al. 1994	468	Spring home range for females in North Dakota prairie potholes	EPA 1993
Great blue heron	2.5	Butler 1992	0.222	Allometric estimation for 'carnivorous birds' normalized to body weight	Nagy 2001	0.044	Allometric estimation for 'birds' normalized to body weight	Calder and Braun 1983	--	--	1	Diet assumed to be 100% fish for this evaluation	Fish are the preferred prey, but may also eat amphibians, reptiles, crustaceans, insects, birds, and mammals	EPA 1993	0.00	Assuming foraging on fish in water column - therefore limited exposure to sediment	Sample and Suter 1994	7 to 8 km, mean 7.5 km (~750 ha)	Foraging distance from colony	EPA 1993
Mammals																				
Little Brown Bat	0.009	Nagy 2001	0.539	Calculated based on a fresh (wet) matter intake rate of 4.85 g/d	Nagy 2001	0.159	Allometric estimation for 'mammals' normalized to body weight	Calder and Braun 1983	--	1	--	Diet assumed to be 100% emergent aquatic insects			0.00	Bats catch insects on the fly and are expected to have limited incidental media ingestion	Sample and Suter 1994			
Raccoon	5.75	EPA 1993	0.535	Fresh weight food ingestion reported at 9.3% of body weight	Conover 1989	0.083	Allometric estimation for 'mammals' normalized to body weight	Calder and Braun 1983	--	--	1	Diet assumed to be 100% fish for this evaluation	Omnivorous and opportunistic, feed primarily on fleshy fruits, nuts, acorns, and corn, but also aquatic insects, frogs, crayfish, eggs, and virtually any other animal and vegetable matter. Plants usually a more important component of diet, but location can influence.	EPA 1993	0.094		Beyer et al. 1994	Male: 2560 spring 204 winter Female: 806 spring 108 winter Male: 65 Female: 39	North Dakota and Michigan Coastal island in Georgia	EPA 1993

Notes:
-- not applicable
kg = kilogram
kg/kg/d = kilograms food per kilogram body weight per day
L/kg/d = liters water per kilogram body weight per day

Nagy 2001 food intake regression equation based on dry matter ---> $FI(kg_{food}/kg_{bw}/day = a\,(\text{grams body weight})^{b}$ / grams body weight

Group	***a***	***b***
insectivorous birds	1.633	0.705
omnivorous birds	2.094	0.627
carnivorous birds	3.048	0.665
all mammals	0.794	0.773

Calder and Braun 1983 water intake rates -->$WI(L/kgbw/day) = a\,(\text{kilograms body weight})^{b}$ / kilograms body weight

Group	***a***	***b***
birds	0.059	0.67
mammals	0.099	0.9

TABLE 4
Calculation of Benchmarks for Birds and Mammals
Screening-Level Ecological Risk Assessment Addendum
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Analyte	Receptor	Life History Parameters			BCF[a] (L/kg, wet weight)	FCMs		TRVs (mg/kg-d)		Screening Benchmarks (µg/L)	
		Food Intake (kg/kg/d, wet weight)	Water Intake (L/kg/d)	Assumed Diet		Trophic Level 3	Trophic Level 4	Low TRV	High TRV	Low TRV-based	High TRV-based
Total Chromium	Mallard-herbivore	0.152	0.057	100% plants	4406	1	1	2.66	16	4.0	23.9
Total Chromium	Mallard-insectivore	0.205	0.057	100% aquatic invertebrates	3000	1	1	2.66	16	4.3	26.0
Total Chromium	Great blue heron	0.222	0.044	100% fish	19	1	1	2.66	16	624	3754
Total Chromium	Little Brown Bat	0.539	0.159	100% aquatic invertebrates	3000	1	1	2.4	58	1.5	35.9
Total Chromium	Little Brown Bat[b]	0.539	0.159	100% emergent aquatic insects	600	1	1	2.4	58	7.4	179
Total Chromium	Raccoon	0.535	0.083	100% fish	19	1	1	2.4	58	234	5660
Hexavalent Chromium	Little Brown Bat	0.539	0.159	100% aquatic invertebrates	3000	1	1	9.24	38	5.7	23.5
Hexavalent Chromium	Little Brown Bat[b]	0.539	0.159	100% emergent aquatic insects	600	1	1	9.24	38	28.6	117
Hexavalent Chromium	Raccoon	0.535	0.083	100% fish	19	1	1	9.24	38	902	3708

Notes:

BCF = bioconcentration factor (from EPA 1999)

FCM = food chain multiplier from Sample et al. (1996)

kg/kg/d = kilograms food per kilogram body weight per day

L/kg/d = liters water per kilogram body weight per day

L/kg = liters per kilogram

TRV = toxicity reference value

[a] The aquatic invertebrate larval stage has about 5 times more chromium than the emergent adult insect stage (Kraus et al., 2014). Therefore, the BCF for water-to-aquatic invertebrate (3,000 L/kg, wet weight) was divided by 5 to approximate the water-to-emergent aquatic insect BCF.

[b] Benchmarks based on the emergent aquatic insect BCF were used in the refined risk estimate.

TABLE 5
Toxicity Reference Values for Birds and Mammals
Screening-Level Ecological Risk Assessment Addendum
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

	Derivation of Low TRV									Derivation of High TRV								
	Toxicity Information						Conversion Factors			Toxicity Information						Conversion Factors		
Analyte	Test Species	Toxicity Value (mg/kg/d)	Endpoint	Type	Effects	Source	LD50 to chronic Low TRV UF	LOAEL or Acute NOAEL to Low TRV UF	Final Low TRV (mg/kg/d)	Test Species	Toxicity Value (mg/kg/d)	Endpoint	Type	Effects	Source	LD50 to chronic High TRV UF	Upward Low TRV to High TRV UF	Final High TRV (mg/kg/d)
Trivalent Chromium (Cr3)	Chicken, duck, turkey	2.66	NOAEL	Chronic	Geometric mean of studies for growth, reproduction, survival - used as TRV for EcoSSL value	EPA 2008	1	1	2.66	Chicken/ duck/ turkey	16	LOAEL	Chronic	Geometric mean of studies for growth and reproduction	EPA 2008	1	1	16
Trivalent Chromium (Cr3)	Mouse, rat, pig, cattle	2.40	NOAEL	Chronic	Geometric mean of NOAEL for growth - used as TRV for EcoSSL	EPA 2008	1	1	2.40	Mouse, rat, pig, cattle	58	LOAEL	Chronic	Geometric mean of LOAEL for reproduction and growth	EPA 2008	1	1	58
Hexavalent Chromium (Cr6)	Mouse, rat	9.24	NOAEL	Chronic	Geometric mean of NOAEL for growth - used as TRV for EcoSSL	EPA 2008	1	1	9.24	Mouse, rat	38	LOAEL	Chronic	Geometric mean of LOAEL for reproduction and growth	EPA 2008	1	1	38

Notes:

LD50 = lethal dosage to 50% of test population

LOAEL = lowest observed adverse effect level

NOAEL = no observed adverse effect level

mg/kg/d = milligram per kilogram body weight per day

TRV = toxicity reference value

UF = uncertainty factor

TABLE 6
Initial Risk Estimation for Aquatic Organisms and Riparian Plants
Screening-Level Ecological Risk Assessment Addendum
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Ecological Well Group	Analyte[a]	Ground Water (µg/L)		ESVs (µg/L)		Hazard Quotients		Retain for Further Evaluation?	Rationale
		Min Detect	Max Detect	Aquatic Organisms (CCC)[b]	Plants[c]	Aquatic Organisms (CCC)	Plants		
2a	Hexavalent Chromium	2.8	4.9	11	50	0.45	0.10	No	No exceedances; therefore, no unacceptable risks
	Total Chromium	1.1	38	74	50	0.51	0.76	No	No exceedances; therefore, no unacceptable risks
3d	Hexavalent Chromium		0.3	11	50	0.03	0.01	No	No exceedances; therefore, no unacceptable risks. (Note: all Cr6 data for these wells were nondetected [ND], so used maximum ND concentration for the evaluation)
	Total Chromium	0.17	13.9	74	50	0.19	0.28	No	No exceedances; therefore, no unacceptable risks
3e	Hexavalent Chromium	0.65	1.8	11	50	0.16	0.04	No	No exceedances; therefore, no unacceptable risks
	Total Chromium	1	17	74	50	0.23	0.34	No	No exceedances; therefore, no unacceptable risks
4a	Hexavalent Chromium	0.3	1.4	11	50	0.13	0.03	No	No exceedances; therefore, no unacceptable risks
	Total Chromium	5.6	93.8	74	50	**1.27**	**1.88**	Yes	Exceedance of both the aquatic organism and plant ESVs

Notes:

µg/L = micrograms per liter

CCC = criterion continuous concentration

Cr6 = hexavalent chromium

ESV = ecological screening value

[a] Dissolved fraction

[b] National Recommended Water Quality Criteria (EPA, 2013); Chromium III (Cr3) used to evaluated total chromium; Cr3 criteria are water hardness dependent - a water hardness of 100 mg/L CaCO3 was assumed for this screening assessment.

[c] Solution-based screening-level benchmarks for terrestrial plants (Efryomson et al., 1997)

TABLE 7

Refined Risk Estimation for Aquatic Organisms and Riparian Plants

Screening-Level Ecological Risk Assessment Addendum

Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

		Ground Water (µg/L)				ESVs (µg/L)			Hazard Quotients				
						Aquatic Organisms[b]			Aquatic Organisms				
Ecological Well Group	**Analyte[a]**	**Min Detect**	**Max Detect**	**95UCL**	**95 UCL Basis**	**CMC**	**CCC**	**Plants[c]**	**CMC**	**CCC**	**Plants**	**Risk Conclusions**	**Rationale**
4a	Total Chromium	5.6	93.8	39.86	95% Student's-t	570	74	50	0.07	0.54	0.80	No unacceptable risk	No exceedances of the ESVs

Notes:

95UCL = 95 percent upper confidence limit of the arithmetic mean

µg/L = micrograms per liter

CCC = criterion continuous concentration

CMC = criterion maximum concentration

ESV = ecological screening value

[a] Dissolved fraction

[b] National Recommended Water Quality Criteria (EPA, 2013); Chromium III (Cr3) used to evaluated total chromium; Cr3 criteria are water hardness dependent - a water hardness of 100 mg/L CaCO3 was assumed for this screening assessment.

[c] Solution-based screening-level benchmarks for terrestrial plants (Efryomson et al., 1997)

TABLE 8
Initial Risk Estimation for Aquatic Birds and Mammals
Screening-Level Ecological Risk Assessment Addendum
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Analyte[a]	Ecological Well Group	Ground Water (µg/L) Total Chromium		Low TRV-Based Screening Benchmarks[b]					Low TRV-Based Hazard Quotients					Retain for Further Evaluation?	Rationale
		Min Detect	Max Detect	Mallard-H	Mallard-I	Heron	Bat	Raccoon	Mallard-H	Mallard-I	Heron	Bat	Raccoon		
Total Chromium	2a	1.1	38	4.0	4.3	624	1.5	234	**9.57**	**8.79**	0.06	**25.6**	0.16	Yes, all but heron and raccoon	No exceedances for heron and raccoon; low TRV-based benchmark exceeded for other receptors
Total Chromium	3d	0.17	13.9	4.0	4.3	624	1.5	234	**3.50**	**3.21**	0.02	**9.37**	0.06	Yes, all but heron and raccoon	No exceedances for heron and raccoon; low TRV-based benchmark exceeded for other receptors
Total Chromium	3e	1	17	4.0	4.3	624	1.5	234	**4.28**	**3.93**	0.03	**11.5**	0.07	Yes, all but heron and raccoon	No exceedances for heron and raccoon; low TRV-based benchmark exceeded for other receptors
Total Chromium	4a	15.2	93.8	4.0	4.3	624	1.5	234	**23.6**	**21.7**	0.15	**63.2**	0.40	Yes, all but heron and raccoon	No exceedances for heron and raccoon; low TRV-based benchmark exceeded for other receptors
Hexavalent Chromium	2a	2.8	4.9	4.0	4.3	624	5.7	902	**1.23**	**1.13**	0.01	0.86	0.01	Yes, mallard-H and Mallard-I	No exceedances for heron, bat, and raccoon; low TRV-based benchmark exceeded for mallard
Hexavalent Chromium	3d		0.3	4.0	4.3	624	5.7	902	0.08	0.07	0.00	0.05	0.00	No	No exceedances
Hexavalent Chromium	3e	0.65	1.8	4.0	4.3	624	5.7	902	0.45	0.42	0.00	0.32	0.00	No	No exceedances
Hexavalent Chromium	4a	0.3	1.4	4.0	4.3	624	5.7	902	0.35	0.32	0.00	0.25	0.00	No	No exceedances

Notes:

µg/L = micrograms per liter

Mallard-H = herbivorous mallard (assumed 100% plant diet)

Mallard-I = Insectivorous mallard (assumed 100% aquatic invertebrate diet)

TRV = toxicity reference value

[a] Dissolved fraction

[b] TRVs for total chromium are lacking; therefore, chromium (III) data were used to develop benchmarks for total chromium. Avian TRVs for hexavalent chromium (Cr6) were also lacking; therefore, the benchmarks calculated for total chromium were used to evaluate Cr6 exposure to birds.

TABLE 9
Refined Risk Estimation for Aquatic Birds and Mammals
Screening-Level Ecological Risk Assessment Addendum
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

		Ground Water (µg/L)					Low TRV-Based Screening Benchmarks[c]			High TRV-Based Screening Benchmarks[c]			Low TRV-Based Hazard Quotients			High TRV-Based Hazard Quotients				
Analyte[a]	**Ecological Well Group**	**Min Detect**	**Max Detect**	**95UCL**	**Basis**	**Diluted 95 UCL[b]**	**Mallard-H**	**Mallard-I**	**Bat[d]**	**Mallard-H**	**Mallard-I**	**Bat[d]**	**Mallard-H**	**Mallard-I**	**Bat**	**Mallard-H**	**Mallard-I**	**Bat**	**Risk Conclusion**	**Rationale**
Total Chromium	2a	1.1	38	6.5	95% Student's-t	0.65	4.0	4.3	7.4	23.9	26.0	179	0.16	0.15	0.09	0.03	0.03	0.00	No unacceptable risk	No exceedances of the low or high TRV-based benchmarks
Total Chromium	3d	0.17	13.9	4.9	95% Adjusted Gamma	0.49	4.0	4.3	7.4	23.9	26.0	179	0.12	0.11	0.07	0.02	0.02	0.00	No unacceptable risk	No exceedances of the low or high TRV-based benchmarks
Total Chromium	3e	1	17	2.9	95% Chebyshev	0.29	4.0	4.3	7.4	23.9	26.0	179	0.07	0.07	0.04	0.01	0.01	0.00	No unacceptable risk	No exceedances of the low or high TRV-based benchmarks
Total Chromium	4a	15.2	93.8	39.9	95% Student's-t	3.99	4.0	4.3	7.4	23.9	26.0	179	**1.004**	0.92	0.54	0.17	0.15	0.02	No unacceptable risk	No exceedances of the low or high TRV-based benchmarks for insectivorous mallard and bat; low-TRV based benchmark slightly exceeded for the herbivorous mallard, but high TRV-based benchmark was not exceeded - because the mallard is not a special status species, risks are not unacceptable. Additionally, these wells are some distance from the river (over 1,000 feet away) and may not represent concentrations of ground water under or near the river. Well data from locations closer to the river in other Ecological Well Groups suggest that chromium concentrations decrease as you move closer to the river. Therefore, concentrations that may discharge to this portion of the river are likely to be lower and not a risk to herbivorous bird populations (represented by the mallard).
Hexavalent Chromium	2a	2.8	4.9	4.5	95% Student's-t	0.5	4.0	4.3	28.6	23.9	26.0	117	0.11	0.11	0.02	0.02	0.02	0.00	No unacceptable risk	No exceedances of the low or high TRV-based benchmarks

Notes:

95UCL = 95 percent upper confidence limit of the arithmetic mean

µg/L = micrograms per liter

Mallard-H = herbivorous mallard (assumed 100% plant diet)

Mallard-I = Insectivorous mallard (assumed 100% aquatic invertebrate diet)

TRV = toxicity reference value

[a] Dissolved fraction

[b] A literature-based dilution factor of 10 was applied to the 95 UCL (i.e., the 95UCL was divided by 10) to account for the dilution expected during migration and upon discharge of ground water to surface water (Buchman, 1999).

[c] TRVs for total chromium are lacking; therefore, chromium (III) data were used to develop benchmarks for total chromium. Avian TRVs for hexavalent chromium (Cr6) were also lacking; therefore, the benchmarks calculated for total chromium were used to evaluate Cr6 exposure to birds.

[d] The refined benchmarks for the little brown bat were adjusted to account for the loss of chromium when emergent aquatic insects undergo metamorphosis; the bioconcentration factor for aquatic invertebrates was reduced by 5 times based on values reported in Kraus et al. (2014).

TABLE 10
Uncertainty Analysis
Screening-Level Ecological Risk Assessment Addendum
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Problem Formulation			
Fate and Transport	It is assumed that chemical concentrations will not change over time, and that concentrations are constant during the exposure duration. Natural attenuation and/or other degradation processes may be significant in some areas resulting in an overestimation of exposure.	Moderate	Over-estimation of exposure/risk
Data Collection/Analysis	Variability in analyses, laboratories, representativeness of samples, and sampling errors can influence quality and quantity of data used in the risk assessment. Much of the analytical data went through data validation, but the type and level of data review/validation varies between sampling programs.	Unknown	Over- or under-estimation of exposure/risk
Representative Species	Representative species were selected to reduce uncertainty; however, differences among species including physiology, reproductive biology, and/or foraging habits can result in different exposures and sensitivities for different receptors.	Low	Over- or under-estimation of exposure/risk
Exposure Pathway Analysis	Several exposure routes were considered minor and were not included in the exposure analysis. Although exposure via these routes still contributes to the total risk to each receptor, potential risks may be underestimated because these routes were not quantified. For example, dermal contact with sediment or surface water is considered to be a minor secondary route of exposure for birds and mammals. Dermal contact is of concern primarily with organic chemicals that are lipophilic (i.e., have an affinity for fats) such as organochlorine pesticides, which were not COPECs for this SLERA.	Low	Under-estimation of exposure/risk
Exposure Pathway Analysis	Sediment data were unavailable and exposure pathways from sediment to ecological receptors could not be evaluated. However, the focus of this ecological assessment is direct risks from ground water discharge to surface water; therefore, only pathways associated with sediment pore water and surface water are evaluated.	Low	Under-estimation of exposure/risk
Analysis			
Wildlife Exposure Factors	Life history data for birds and mammals specific to the GCOU were not available. Exposure parameters were either modeled using allometric relationships (e.g., food ingestion rates) or data from the same species in other portions of its range.	Moderate	Over- or under-estimation of exposure/risk
Bioconcentration Factors	Site-specific data on COPEC concentrations in wildlife foods were not available. Literature-based bioconcentration factors were used to estimate bioaccumulation. The suitability of these bioconcentration factors to conditions at the site is unknown. Therefore, concentrations of COPECs in biota present at the site and, consequently, the dietary exposures of birds and mammals, may be either higher or lower than values estimated in the SLERA.	Moderate	Over- or under-estimation of exposure/risk
Bioavailability	Bioavailability of COPECs was assumed to be 100 percent. This likely overestimates risk to receptors at the site.	Low	Over-estimation of exposure/risk
Area Use Factors	Area use factors were not considered in the SLERA. Some birds and mammals (e.g., great blue heron) have large home ranges and do not likely forage exclusively within the GCOU.	Low	Over-estimation of exposure/risk

TABLE 10
Uncertainty Analysis
Screening-Level Ecological Risk Assessment Addendum
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Exposure Point Concentrations	Exposure point concentrations for ground water discharge were assumed to be equal to the closest adjacent ground water wells in Ecological Well Groups 2a, 3a-e, and 4a. In some cases (e.g., 4a) wells were distant from the Los Angeles River (about 1,000 feet to the east) and may not be representative of ground water that is likely to discharge to the river. Given that there is a pattern of decreasing Cr6 concentration with decreasing distance from the well to the river, the wells used to evaluate 4a may overestimate exposure and risk.	Moderate	Over-estimation of exposure/risk
Toxicity Reference Values/Ecological Screening Values	Literature-derived toxicity data from laboratory studies were the only toxicity data used to evaluate risk to all receptor groups. Effects observed in laboratory species were assumed to be indicative of effects that would occur in wild species. The suitability of this assumption is unknown. Therefore, risk may be either overestimated or underestimated.	Moderate	Over- or under-estimation of risks
Toxicity Reference Values/Ecological Screening Values	Available chromium toxicity data for amphibians were considered sufficient to use in the development of the NRWQC for chromium. However, NRWQC are calculated to be protective of 95% of aquatic receptors and are expected to be protective of amphibians. Because amphibian toxicity data were not included in the development of the NRWQC, risks to amphibians may be under- or over-estimated.	Moderate	Over- or under-estimation of risks
Toxicity Reference Values/Ecological Screening Values	Toxicity data were not available for reptiles; therefore, the avian toxicity information was used as a surrogate to evaluate risks to aquatic reptiles. The applicability of the avian toxicity data to reptiles is unknown and risks may be overestimated or underestimated.	Moderate	Over- or under-estimation of risks
Risk Characterization			
Risk Estimation	Dilution at the ground water interface with pore water and surface water is likely to occur. Site-specific dilution factors have not been calculated. A literature-referenced default dilution factor was applied in the refined concentration-based evaluation. This default dilution factor is likely lower than actual dilution at the site.	Moderate	Over-estimation of exposure/risk
Risk Estimation	Concentrations of metals in emergent aquatic insects have been found to decrease during metamorphosis. Site-specific information on the magnitude of this decrease is unavailable. A literature-referenced value for chromium was applied in the refined concentration-based evaluation for bats. The suitability of this decrease in chromium for emergent aquatic insects at the site is unknown.	Moderate	Over- or under-estimation of exposure/risk
Risk Estimation/Description	Risk analyses for birds were identified as a surrogate for aquatic reptiles due to limited or lacking exposure and effects information for reptiles. The suitability of exposure and risk to birds for aquatic reptiles is unknown.	Moderate	Over- or under-estimation of exposure/risk

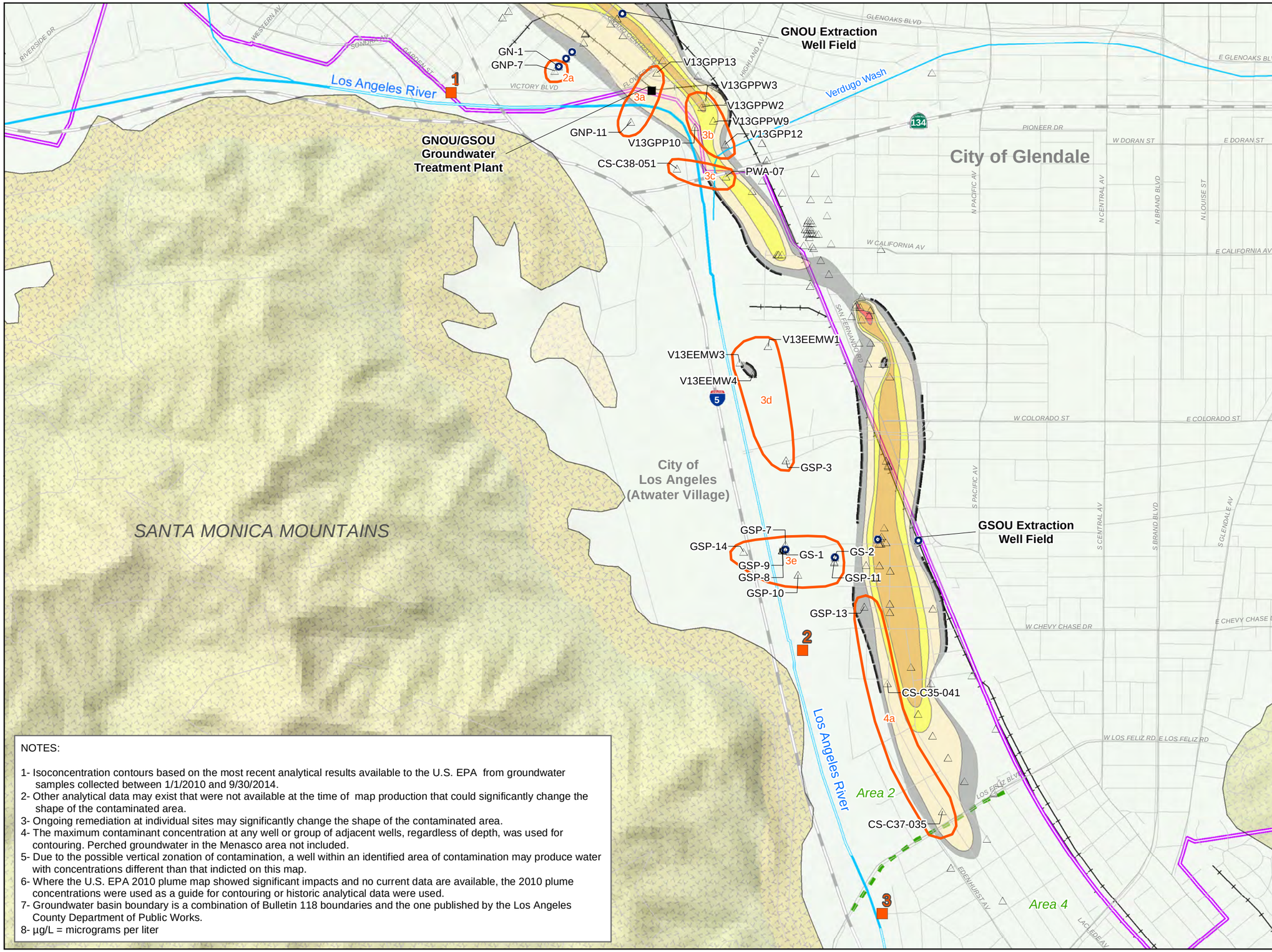
Notes:

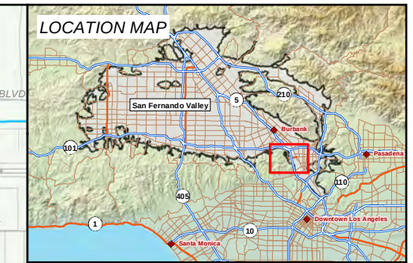
COPEC - chemical of potential ecological concern

SLERA - screening-level ecological risk assessment

NRWQC - National Recommended Water Quality Criteria

Figures





LEGEND

- Monitoring Wells
- Extraction Well
- Ecological Assessment Field Survey Location
- Operable Unit Ground Water Treatment Plant
- Ecological Assessment Well Groups
- Municipal Boundary
- Approximate Boundaries of Investigation Areas for San Fernando Valley Superfund Sites
- Freeway
- Major Surface Street
- Los Angeles River
- Unlined Section of Los Angeles River
- Stream

Most Recent Cr6 Concentration
(Jan 2010 - Aug 2014)

- >1,000 µg/L
- 100-1,000 µg/L
- 50-100 µg/L
- 10-50 µg/L
- 5-10 µg/L
- Dashed where uncertain

N

0 750 1,500 3,000 Feet

NOTES:

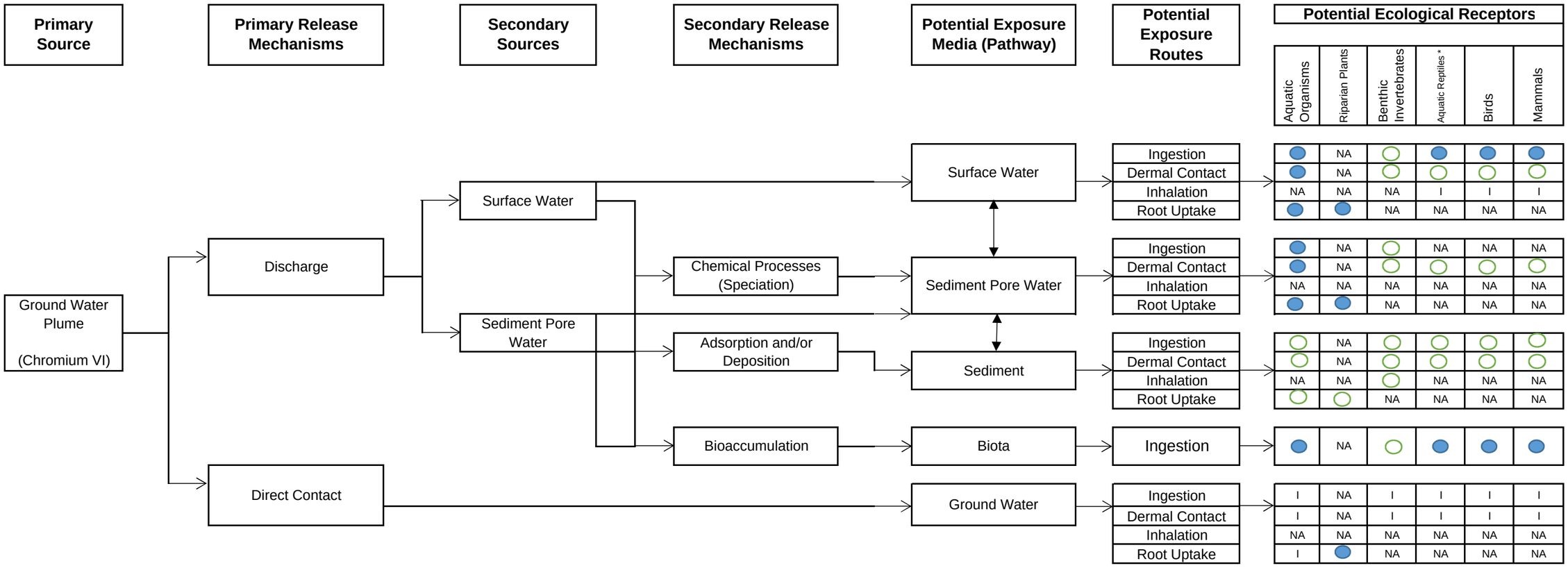
1- Isoconcentration contours based on the most recent analytical results available to the U.S. EPA from groundwater samples collected between 1/1/2010 and 9/30/2014.
2- Other analytical data may exist that were not available at the time of map production that could significantly change the shape of the contaminated area.
3- Ongoing remediation at individual sites may significantly change the shape of the contaminated area.
4- The maximum contaminant concentration at any well or group of adjacent wells, regardless of depth, was used for contouring. Perched groundwater in the Menasco area not included.
5- Due to the possible vertical zonation of contamination, a well within an identified area of contamination may produce water with concentrations different than that indicted on this map.
6- Where the U.S. EPA 2010 plume map showed significant impacts and no current data are available, the 2010 plume concentrations were used as a guide for contouring or historic analytical data were used.
7- Groundwater basin boundary is a combination of Bulletin 118 boundaries and the one published by the Los Angeles County Department of Public Works.
8- µg/L = micrograms per liter

Figure 1
Ecological Field Survey and Monitoring Well Locations

Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

OTIE
Oneida Total Integrated Enterprises

SCO \\CHERON\PROJECTS\EPA\386243GLENDALECHOU\GIS\MAPFILES\2015\RI_REPORT\REVISIONS_NOV2015\FIG1_ERA_WELLGROUPSANDSAMPLELOCS_REV111615_101.MXD BLECHLER 11/17/2015 3:49:13 PM



Notes:

● = Potentially significant complete exposure pathway, addressed in this SLERA

○ = Potentially complete pathway, but not addressed in this SLERA

I = incomplete pathway

NA = not applicable pathway

* Birds used as a surrogate for aquatic reptiles

FIGURE 2

Conceptual Site Model for Ecological Exposures

Screening-Level Ecological Risk Assessment Addendum
Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

Appendix A
Ecological Field Survey

LOCATION #1

IV. AQUATIC HABITAT CHECKLIST—FLOWING SYSTEMS

Note *Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.*

1. What type(s) of flowing water system(s) is(are) present at the site?

   ☒ River ☐ Stream ☐ Creek
   ☐ Dry wash ☐ Arroyo ☐ Brook
   ☐ Artificially created (ditch, etc.) ☐ Intermittent Stream ☐ Channeling
   ☐ Other (specify) _____

2. If known, what is the name of the waterbody? LOS ANGELES RIVER (CONCRETE BANKS, PARTIALLY CONCRETE LINED & EARTHEN BOTTOM)

3. For natural systems, are there any indicators of physical alteration (e.g., channeling, debris, etc.)?

   ☒ yes ☐ no if yes, please describe indicators that were observed.

   CHANNELING - SEE NOTES FOR #2

4. What is the general composition of the substrate? Check all that apply.

   ☐ Bedrock ☐ Sand (coarse) ☐ Muck (fine/black)
   ☐ Boulder (>10 in.) ☐ Silt (fine) ☐ Debris
   ☐ Cobble (2.5-10 in.) ☐ Marl (shells) ☐ Detritus
   ☐ Gravel (0.1-2.5 in.) ☐ Clay (slick) ☒ Concrete (PARTIALLY)
   ☒ Other (specify) NOT CLOSE ENOUGH TO SEE SUBSTRATE

5. What is the condition of the bank (e.g., height, slope, extent of vegetative cover)?

   >20' HEIGHT OF BANK; 2:1 SLOPE; ISOLATED, BUT CONTINUOUS PATHES OF RIPARIAN VEGETATION

6. Is the system influenced by tides? ☐ yes ☒ no What information was used to make this determination?

   DISTANCE FROM PACIFIC OCEAN

7. Is the flow intermittent? ☐ yes ☒ no If yes, please not the information that was used in making this determination.

DOUBLE CHECK w/ REPORT

8. Is there a discharge from the site to the waterbody? ☐ yes ☐ no If yes, please describe the discharge and its path.

9. Is there a discharge from the waterbody? ☐ yes ☐ no if yes, and the information is available, please identify what the waterbody discharges to and whether the discharge is on site or off site.

UNCERTAIN

10. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected, provide the measurement and the units of measure in the appropriate space below:

NOT ACCESSIBLE

_____ Width (ft.)

_____ Depth (ft.)

_____ Velocity (specify units): _____

_____ Temperature (depth of the water at which the reading was taken _____)

_____ pH

_____ Dissolved oxygen

_____Salinity

_____Turbidity (clear, slightly turbid, turbid, opaque)

(Secchi disk depth _____)

_____ Other (specify) _____

11. Describe observed color and area of coloration.

BROWNISH GREEN WATER

12. Is any aquatic vegetation present? ☐yes ☐no If yes, please identify the type of vegetation present, if known.

☒ Emergent ☐ Submergent ☐ Floating

13. Mark the flowing water system on the attached site map.

14. What observations were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

BIRDS PRESENT ; UNABLE TO ACCESS SURFACE WATER TO OBSERVE BENTHIC MACRO INVERTEBRATE

LOCATION #1

APPENDIX A—CHECKLIST FOR ECOLOGICAL ASSESSMENT/SAMPLING

Introduction

The checklist that follows provides guidance in making observations for an ecological assessment. It is not intended for limited or emergency response actions (e.g., removal of a few drums) or for purely industrial settings with no discharges. The checklist is a screening tool for preliminary site evaluation and may also be useful in planning more extensive site investigations. It must be completed as thoroughly as time allows. The results of the checklist will serve as a starting point for the collection of appropriate biological data to be used in developing a response action. It is recognized that certain questions in this checklist are not universally applicable and that site-specific conditions will influence interpretation. Therefore, a site synopsis is requested to facilitate final review of the checklist by a trained ecologist.

Checklist

The checklist has been divided into sections that correspond to data collection methods and ecosystem types. These sections are:

I. Site Description

   1A. Summary of Observations and Site Setting

II. Terrestrial Habitat Checklist

   IIA. Wooded
   IIB. Shrub/Scrub
   IIC. Open Field
   IID. Miscellaneous

III. Aquatic Habitat Checklist—Non-Flowing systems

IV. Aquatic Habitat Checklist—Flowing systems

V. Wetlands Habitat Checklist

Checklist for Ecological Assessment/Sampling

I. SITE DESCRIPTION

1. Site Name: GLENDALE CHROMIUM ECOLOGICAL ASSESSMENT
   Location: LOS ANGELES RIVER; NEAR WELL GROUP 2

   County: LOS ANGELES City: GLENDALE State: CA

2. Latitude: N 34° 09.388' Longitude W -118° 17.536'

3. What is the approximate area of the site? Several square miles (calculate at a later date) _____

4. Is this the first site visit? ☒ yes ☐ no If no, attach trip report of previous site visit(s), if available.

5. Please attach to the checklist USGS topographic map(s) of the site, if available.

6. Are aerial or other site photographs available? ☒ yes ☐ no If yes, please attach any available photo(s) to the site map at the conclusion of this section.

7. The land use on the site is:

   100 % Urban CONCRETE BANKS LA RIVER, SOME PORTION ARE LINED & OTHERS ARE EARTHEN
   ____ % Rural
   ____ % Residential
   ____ % Industrial (☐ light ☐ heavy)
   ____ % Agricultural
   (*Crops:* _____)
   ____ % Recreational
   ____ % Undisturbed
   ____ % Other

   The area surrounding the site is:

   1 Mile radius

   18 % Urban (INCLUDING ROADWAYS
   ____ % Rural
   55 % Residential
   10 % Industrial (☒ light ☐ heavy)
   ____ % Agricultural
   (*Crops:* _____)
   25 % Recreational
   INCLUDING PARKS & GRIFFITH PARK
   ____ % Undisturbed
   ____ % Other - livestock

8. Has any movement of soil taken place at the site? ☐ yes ☒ no. If yes, please identify the most likely cause of this disturbance:

_____ Agricultural Use _____ Heavy Equipment _____ Mining

_____ Natural Events _____ Erosion _____ Other

Please describe:

9. Do any potentially sensitive environmental areas exist adjacent to or in proximity to the site, e.g., Federal and State parks, National and State monuments, wetlands, prairie potholes? *Remember, flood plains and wetlands are not always obvious; do not answer "no" without confirming information/*

USFWS NATIONAL WETLAND INVENTORY (NWI) RIVERINE SYSTEM. SOME OPEN SPACE IS PRESENT ON THE SOUTH SIDE OF THE RIVER; RIPARIAN HABITAT PRESENT WITHIN OBSERVABLE REACH.

Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

10. What type of facility is located at the site?

☐ Chemical ☐ Manufacturing ☐ Mixing ☐ Waste disposal

☒ Other (specify) LA RIVER; SURROUNDING LAND USES INCLUDE URBAN DEVELOPMENT; INCLUDING PARKS & RESIDENTIAL

11. What are the suspected contaminants of concern at the site? If known, what are the maximum concentrations levels?

12. Check any potential routes of off-site migration of contaminants observed at the site:

☐ Swales ☐ Depressions ☒ Drainage ditches

☒ Runoff ☒ Windblown particulates ☐ Vehicular traffic

☐ Other (specify) _____

13. If known, what is the approximate depth to the water table? _____

14. Is the direction of surface runoff apparent from site observations? ☐ yes ☐ no If yes, to which of the following does the surface runoff discharge: Indicate all that apply.

☒ Surface water ☐ Groundwater ☐ Sewer ☐ Collection impoundment

15. Is there a navigable waterbody or tributary to a navigable waterbody? ☒ yes ☐ no

16. Is there a waterbody anywhere on or in the vicinity of the site? If yes, also complete Section III: Aquatic Habitat Checklist—Non-Flowing Systems and/or Section IV: Aquatic Habitat Checklist—Flowing Systems.

☒ yes (approx. distance – within site _____) ☐ no LA RIVER

17 Is there evidence of flooding? ☐ yes ☐ no *Wetlands and flood plains are not always obvious; do not answer "no" without confirming information. If yes, complete Section V: Wetland Habitat Checklist.*

18. If a field guide was used to aid any of the identifications, please provide a reference. Also, estimate the time spent identifying fauna. (Use a blank sheet if additional space is needed for text.)

To be added at a later date (after field work) SIBLEY FIELD GUIDE TO BIRDS, WESTERN NORTH AMERICA (<5 MIN TO CONFIRM AN ID).

19. Are any threatened and/or endangered species (plant or animal) known to inhabit the area of the site? ☐yes ☒ no *If yes, you are required to verify this information with the U.S. Fish and Wildlife Service.* If species' identities are known, please list them next.

ALTHOUGH NO SPECIAL-STATUS SPECIES HAVE BEEN DOCUMENTED AT LOCATION #1, A CNDDB SEARCH WAS CONDUCTED FOR SPECIAL-STATUS SPECIES WITHIN 1 MILE OF THE LA RIVER AND A 9-QUAD QUERY WAS CONDUCTED.

20. Record weather conditions at the time this checklist was prepared:

DATE: 24 SEPT. 2014

87 Temperature (°C/°F) — Normal daily high temperature

SW @ 8-10MPH Wind (direction/speed) NONE Precipitation (rain, snow)

0% Cloud cover

IA. SUMMARY OF OBSERVATIONS AND SITE SETTING

To be filled in later THE SURVEYED PORTION OF THE LA RIVER, NEAR WELL GROUP 2, HAS BEEN CHANNELIZED. THERE IS A COMBINATION OF CONCRETE-LINED AND UNLINED SECTIONS WITHIN THE REACH. THE EARTHEN/UNLINED PORTIONS SUPPORT RIPARIAN VEGETATION, INCLUDING MATURE TREES (BOTH NATIVE AND NON-NATIVE SPECIES), BUT A MAJORITY OF THE SITE CONTAINED NON-NATIVE SPECIES. VEGETATION OBSERVED INCLUDED EUCALYPTUS (EUCALYPTUS SP.), SYCAMORE (PLATANUS SP.), GIANT REED (ARUNDO DONAX), CASTOR BEAN (RICINUS SP.), MEXICAN FAN PALM (WASHINGTONIA ROBUSTA), WILLOW (SALIX SSP.), MULEFAT (BACCHARIS SALICIFOLIA), & ASH (FRAXINUS SP.). THE POTENTIAL FOR SPECIAL-STATUS SPECIES WAS GENERALLY ASSESSED BASED ON A SITE SURVEY AND THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW) CALIFORNIA NATURAL DIVERSITY DATABASE (CNDDB), INCLUDING A 9-QUAD SUMMARY AND 1-MILE FOCUSED QUERY AROUND THE LA RIVER. SPECIAL-STATUS SPECIES OF PRIMARY CONCERN WERE BIRDS AND BATS SINCE THE LA RIVER HAS BEEN ALTERED SO EXTENSIVELY. AVIAN SPECIES THAT HAVE BEEN RECORDED WITHIN 1 MILE INCLUDE: BURROWING OWL (ATHENE CUNICULARIA; LOW POTENTIAL - LACK OF SUITABLE HABITAT); SOUTHWESTERN WILLOW FLYCATCHER (EMPIDONAX TRAILLII EXTIMUS; LOW POTENTIAL - HISTORIC RECORDS, LIMITED HABITAT) & LEAST BELL'S VIREO (VIREO BELLII PUSILLUS; LOW TO MODERATE POTENTIAL, 2 OBSERVED NEAR HANSEN DAM PARK, BUT LIMITED NATIVE VEGETATION PRESENT). LOCATION #1 SUPPORTS A →

Completed by MELISSA FOWLER Affiliation CH2M HILL

Additional Preparers BJ LECHLER

Site Manager —

Date 24 SEPT. 2014

WIDE VARIETY OF MIGRATORY BIRD TREATY ACT (MBTA) PROTECTED SPECIES AND BIRDS PROTECTED UNDER FISH AND GAME CODE. BAT SPECIES THAT HAVE BEEN DOCUMENTED WITHIN 1 MILE OF THE LA RIVER INCLUDE: WESTERN YELLOW BAT (LASIURUS XANTHINUS), WESTERN MASTIFF BAT (EUMOPS PEROTIS CALIFORNICUS), PALLID BAT (ANTROZOUS PALLIDUS), BIG FREE-TAILED BAT (NYCTINOMOPS MACROTIS), AND HOARY BAT (LASIURUS CINEREUS). THE MAJORITY OF THE OCCURRENCES RECORDS FOR THESE SPECIES ARE HISTORIC AND NO RECENT SURVEY DATA IS AVAILABLE. THE FOLLOWING BAT SPECIES HAVE POTENTIAL TO OCCUR IN THE PROJECT AREA: WESTERN YELLOW BAT AND HOARY BAT.

Wildlife Survey Form

Location: LOS ANGELES RIVER
Date: 24 SEPT. 2014
Observer: M. FOWLER
24 Hour time-Begin- 1130 End- 1315
Wind (mph) SW @ 8-10 MPH
Clouds (%) 0
Temperature- Start 89°F End-
Moon phase:
General comments: GOOD VISIBILITY (10.0 MI.), 21% HUMIDITY

Species	Number	Observation	Remarks/Behavior
GREAT BLUE HERON	1	FLYING SE	LOCATION #1
BLACK PHOEBE	1	PERCHING ON ELECTRICAL WIRE	" "
SNOWY EGRET	1	WALKING IN RIVER	" "
ROCK PIGEON	1	FLYING N OF RIVER	" "
MALLARD	4	LOAFING ON RIVER	" "
GOOSE	1	STANDING IN RIVER	LOCATION # 2 N 34° 07.944' W -118° 16.417
MALLARD	16	LOAFING ON RIVER	" "
BLACK-NECKED STILT	4	FORAGING ALONG BANK	" "
ANNA'S HUMMINGBIRD	1	FLYING N SIDE OF RIVER	" "
MALLARD	21	RESTING ON BOULDERS	" "
CANADIAN GEESE	5	GROOMING FEATHERS	ON BOULDERS (LOCATION #2)
CANADIAN GEESE	11	LOAFING ON ROCKS/BOULDERS	(LOCATION #2)
ROCK PIGEON	1	FLYING OVER RIVER	HEADED SOUTH (LOCATION #2)
GREAT BLUE HERON	1	STANDING ON VEGETATION	MIDDLE OF RIVER LOCATION #3 N34° 07.238'
EGRET	2	WADING IN WATER	LOCATION #3 W -118° 16.150

Survey Location 1

Survey Location 1

Survey Location 1

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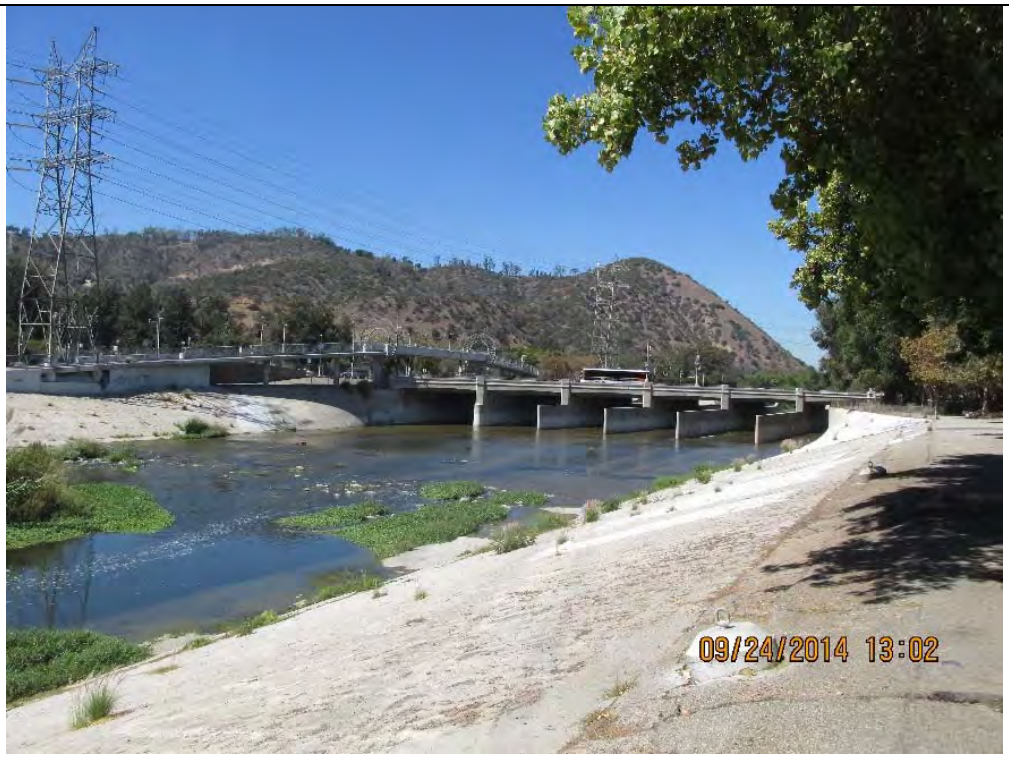

Survey Location 3

APPENDIX H

Human-Health Risk Assessment Addendum

FINAL
HUMAN HEALTH RISK ASSESSMENT ADDENDUM
Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

EPA CONTRACT NO. EP-S9-13-01
GLENDALE CHROMIUM OPERABLE UNIT RI/FS
EPA TASK ORDER NO. 005-RICO-09N2
DCN: EPS91301-005-0009

Prepared for:

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January 15, 2015

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B ProUCL Output

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1 Well Groupings for the HHRA Addendum and Hexavalent Chromium Distribution (Jan 2010-Aug 2014)

Acronyms and Abbreviations

µg/L	micrograms per liter
Cal-EPA	California Environmental Protection Agency
CDDW	California [State Water Resources Control Board] Division of Drinking Water
Cr6	hexavalent chromium
DTSC	California Department of Toxic Substances Control
ELCR	excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
FD	field duplicate (sample)
GCOU	Glendale Chromium Operable Unit
GNOU	Glendale North Operable Unit
GSOU	Glendale South Operable Unit
HHRA	human health risk assessment
HI	hazard index
IRIS	Integrated Risk Information System
JMM	James M. Montgomery Consulting Engineers
MOA	mode of action
MCL	maximum contaminant level
N	normal (sample)
NJDEP	New Jersey Department of Environmental Protection
OU	operable unit
PHG	public health goal
RI	remedial investigation
RME	reasonable maximum exposure
ROD	Record of Decision
RSL	regional screening level
SFV	San Fernando Valley
UCL	upper confidence limit
VOC	volatile organic compound

SECTION 1

Introduction and Background

This Human Health Risk Assessment Addendum (HHRA addendum) evaluates potential risks to human health from hexavalent chromium (Cr6) contamination in ground water of the Glendale Chromium Operable Unit (GCOU), San Fernando Valley (SFV) Superfund Sites, in Los Angeles County, California. The HHRA addendum has been prepared as part of the GCOU remedial investigation (RI) of Cr6 contamination in ground water.

1.1 Problem Statement and Purpose of HHRA Addendum

Baseline HHRAs were previously conducted for SFV Area 2, as documented in the *Remedial Investigation Report for the Glendale Study Area* (James M. Montgomery Consulting Engineers [JMM], 1992). This HHRA addendum includes screening-level evaluations focused only on the potential risks posed by Cr6 in ground water, which were not explicitly evaluated in the baseline HHRAs. Other contaminants that are also present in the ground water, primarily volatile organic compounds (VOCs), were already evaluated in the baseline HHRA and are not considered in this HHRA addendum.

The U.S. Environmental Protection Agency (EPA) established the GCOU in response to widespread contamination from Cr6 in ground water and observed adverse impacts to the operation of the interim Glendale Operable Unit (OU) pump-and-treat remedies due to Cr6 contamination. The interim remedies were designed to address only contamination from VOCs in ground water. Because the interim remedies are already impacted by Cr6 and concentrations in GCOU ground water exceed the Cr6 drinking water maximum contaminant level (MCL), a response to address Cr6 in ground water is warranted. This HHRA addendum provides additional support of the need for remedial action.

This HHRA addendum evaluates whether the Cr6 contamination poses a significant risk to human health if human receptors (for example, local residents) were exposed to untreated groundwater. For this assessment, drinking water MCLs are used to evaluate potential risks. Because federal and state drinking water regulations make it very unlikely that residential consumers would actually be exposed to contaminated ground water, this health risk evaluation is considered conservative and likely overestimates the actual exposures and risks.

This risk evaluation covers the following topics:

- Data compilation
- Exposure assessment
- Toxicity assessment and risk characterization
- Uncertainties
- Conclusions

1.2 History of Glendale Operable Units

In 1986, EPA established the SFV Superfund Sites because of the presence of VOC contamination in ground water throughout eastern SFV. Two operable units (OUs) were initially identified in the Glendale study area within SFV Area 2: Glendale North Operable Unit (GNOU) and Glendale South Operable Unit (GSOU). The GNOU and GSOU together comprise what is now commonly called the “Glendale OU.”

The original RI for the Glendale study area, completed in 1992 (JMM, 1992), documented conditions in the GNOU and GSOU and included baseline HHRAs for each OU. Exhibit 1 summarizes the findings of the baseline HHRAs.

EXHIBIT 1
Results of Baseline GNOU and GSOU HHRAs
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Operable Unit	Ground Water Zone[a]	Approximate ELCR	ELCR Within Risk Management Range?	Estimated HI	Remedial Action Warranted?
GNOU	Upper	4x10-3	No	16	Yes
	Lower	7x10-5	Yes	1.1	Potentially
GSOU	Upper	6x10-3	No	130	Yes
	Lower	5x10-5	Yes	0.8	Potentially

[a] The "Upper" zone included wells screened in the upper 50 feet of the water table; the "Lower" zone included wells screened deeper than 50 feet below the water table.
ELCR – excess lifetime cancer risk
HI – hazard index

The Records of Decision (RODs) for the GNOU and GSOU (EPA, 1993a and 1993b) selected interim pump-and-treat remedies for ground water to address large plumes of VOC contamination, primarily trichloroethene and tetrachloroethene. The remedial action objectives in each ROD included inhibiting vertical and horizontal migration of ground water contamination, and removing contaminant mass from the upper zone of the aquifer in both OUs.

The interim pump-and-treat remedies began operation in 2000; extraction wells were operational by 2002 in both OUs. Currently, eight extraction wells (four in each OU) pump water to a single VOC treatment plant. The treated water is blended with water from other sources and incorporated into the City of Glendale's water supply system. Concentrations of all contaminants, including Cr6, in the treated and blended water are below state and federal MCLs before the water leaves the treatment plant. The treated water is closely monitored to verify compliance.

The impacted aquifer in the GNOU, GSOU, and GCOU, is a source of drinking water. However, the eight remedy extraction wells are the only active drinking water supply wells in the area.

For the GCOU, key milestones are summarized as follows:

- In 2007, EPA established the GCOU based on the presence of Cr6 in ground water throughout eastern SFV and the identification of many potential Cr6 sources.
- Between 2008 and 2011, EPA focused on identification of additional Cr6 sources and negotiated with owners of facilities identified as potential sources of Cr6 regarding implementation of the RI.
- From 2011 to 2014, EPA and a group of potentially responsible parties each completed portions of the RI. RI fieldwork included installation of 31 new ground water monitoring wells and collection of data from 68 different ground water monitoring wells.

SECTION 2

Data Compilation

Ground water data collected between 2011 and July 2014 for Cr6 are used in this HHRA addendum screening evaluation. EPA collected ground water data from 2012 to 2014 as part of the GCOU RI. The EPA data were supplemented with data collected from 2011 to 2014 by the GCOU Respondents and Glendale Respondents Group (working under EPA direction), the City of Glendale, and individual facilities doing work under Regional Water Quality Control Board direction. It should be noted that most of the ground water data used in the evaluation are from samples that were filtered at the laboratory as part of the standard Cr6 analysis by EPA Method 218.6.

For data with field duplicates, results were selected using the following criteria:

- When the field duplicate (FD) and normal (N) samples both produced detected results, the maximum concentration between the two was used.
- When both the FD and N samples were nondetect, the lower detection limit was used.
- When either the FD or N sample result was a detected value and the other was a nondetect, the detected result was used.

An overall evaluation of the quality of data generated for the GCOU RI is included in the *Draft Data Quality and Usability Assessment, Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites* (EPA, 2014c).

SECTION 3

Exposure Assessment

Receptors that could potentially be exposed to untreated, contaminated ground water include current and future residents that theoretically could receive drinking water from ground water wells located in Cr6-contaminated areas. Exposure could occur through ingestion, dermal contact, or inhalation of the Cr6 present in the ground water. In accordance with EPA guidance for a baseline HHRA (EPA, 1989), federal and state drinking water regulations that prohibit the use of contaminated water (which would eliminate this exposure pathway) are not considered in this risk assessment.

Another pathway considered but eliminated was potential exposure to Cr6 in surface water that has been impacted by ground water discharges. An evaluation of the potential for natural discharge from ground water to the Los Angeles River was recently conducted for the GNOU and GSOU (CH2M HILL, 2014). The GCOU includes portions of the river in both the GNOU and GSOU. The evaluation indicated that ground water could potentially discharge to surface water within the unlined portions of the Los Angeles River in the GCOU, with the area south of the GSOU extraction wells having the larger potential for ground water discharges. However, this potential exposure pathway is not considered in this screening-level HHRA addendum for three main reasons:

- The volume of ground water discharge, if any occurs, is expected to be small compared to the volume of surface water already flowing in the river channel.
- There is currently no routine recreational use of the river channel in this area, eliminating the potential for recurring exposure.
- The quality of the surface water at the location of any potential ground water discharges is unknown and there is considerable uncertainty in the fate of Cr6 in the small volume ground water discharges.

For the purpose of this HHRA addendum, ground water data have been grouped into six exposure areas or well groups based primarily on geographic distribution, well depth, and proximity to known sources of Cr6 contamination, as shown in Figure 1 and described below.

- Well Group 1 (shallow wells) (“shallow” refers to wells screened in the upper 50 feet of the water table): Western part of GCOU; widely distributed contamination that is generally at low concentrations.
- Well Group 2 (shallow wells): One of two primary Cr6 source areas; situated upgradient of the GNOU remedy extraction wells.
- Well Group 3 (shallow wells): Second of the primary Cr6 source areas; situated upgradient of the GSOU remedy extraction wells (and downgradient of the GNOU extraction wells).
- Well Group 4 (shallow wells): Represents the Cr6 contamination that has migrated beyond the GSOU extraction wells and beyond the influence of the interim remedy hydraulic containment.
- Well Group 5a (deep wells) (“deep” refers to wells screened more than 50 feet below the water table): Deep wells located throughout the GCOU, except for those located at two facilities (see Well Group 5b); overall, there is very limited deep Cr6 contamination.
- Well Group 5b (deep wells): Deep wells associated with two Cr6 source facilities located in the primary source area upgradient of the GNOU remedy extraction wells.

High-end exposure assumptions are used to estimate reasonable maximum exposure (RME) conditions to provide a bounding estimate on exposure. EPA and the California Department of Toxic Substances Control (DTSC) consider the 95 percent upper confidence limit (UCL) on the mean concentration as a conservative upper-bound estimate that is not likely to underestimate the mean concentration. Exposure point concentrations (EPCs) were calculated for Cr6 in ground water from each of the assumed well groups using

ProUCL Version 5.0 (EPA, 2013). This procedure identifies the statistical distribution type (that is, normal, lognormal, or nonparametric) within the defined well groups and computes the corresponding 95 percent UCL for the identified distribution type. The lower of the 95 percent UCL or the maximum concentration was used as the EPC. The summary statistics and EPCs for each well group are provided in Appendix A. ProUCL outputs are provided in Appendix B.

It should be noted that most of the data points included in the well groups described above are from monitoring wells installed specifically to characterize potential releases from contaminant sources and associated downgradient migration. Sampling results from these types of monitoring wells are often quite different from the data generated from deeper extraction wells that extract large volumes of water from screens covering significant vertical intervals in the aquifer. These deeper extraction wells in the GNOU and GSOU are the wells that produce water to be treated and distributed to the City of Glendale's water distribution system for use as drinking water. The GNOU and GSOU extraction wells are included with other deep monitoring wells in Well Group 5a (EPC of 20 micrograms per liter [µg/L]), while monitoring wells located in the immediate vicinity of contaminant sources are included in Well Groups 2, 3, and 5a (EPCs ranging from 242 to 14,681 µg/L). A small percentage of the shallow monitoring wells included in Well Group 2 are screened in perched groundwater zones where the current connection to the regional aquifer has not been evaluated. However, to be conservative Cr6 data from perched zone wells were used in the EPC calculations.

The water entering the City of Glendale's water distribution system following treatment and blending has Cr6 concentrations in the 3 to 5 µg/L range, which is consistent with Cr6 levels found in drinking water systems throughout the State of California. Based on data compiled by the California State Water Resources Control Board, Division of Drinking Water (CDDW), 86 percent of the drinking water sources tested between 2000 and 2012 had peak Cr6 concentrations between 1 and 10 µg/L (CDDW, 2014b).

SECTION 4

Toxicity Assessment and Risk Characterization

Hexavalent chromium is considered by regulatory agencies to be a carcinogen via inhalation and oral routes of exposure. Hypothetical future exposure to Cr6 in GCOU ground water is assumed to occur through potential ingestion, dermal contact, and inhalation (for example, while showering).

EPA has developed a regional screening level (RSL) for tap water (0.035 µg/L) that is based on exposure through ingestion and dermal contact. The State of California public health goal (PHG) for Cr6 (0.02 µg/L) is based on risk associated with the ingestion of drinking water with a very small contribution from the inhalation of aerosol droplets generated during showering.

It should be noted that ongoing evaluations are being conducted by both EPA and the State of California that could ultimately result in changes to the EPA RSL and the California PHG. EPA's Integrated Risk Information System (IRIS) program is actively reviewing potential risks associated with hexavalent chromium.

EPA, under the Superfund program, generally considers action to be warranted when the multi-chemical aggregate cancer risk for all exposure routes within a specific exposure scenario exceeds 1×10^{-4}. Generally, action is not explicitly required for risks falling within 1×10^{-6} and 1×10^{-4} (often called the risk management range); however, this is judged on a case-by-case basis (EPA, 1991). Considering the potential for future changes to the federal and state screening levels (RSL and PHG) that currently represent the lower end (1×10^{-6}) of EPA's risk management range, at this time EPA will not be developing numeric estimates of risks associated with theoretical exposure to Cr6 in GCOU ground water. Instead, the EPCs will be compared to the State of California MCL for Cr6 of 10 µg/L (CDDW, 2014a) and the EPA MCL for total chromium of 100 µg/L (EPA, 2014a). For each well group, an MCL exceedance ratio is calculated by dividing the ground water EPC by the respective MCL.

Exhibit 2 presents the MCL exceedance ratio for each EPC compared to the State of California MCL for Cr6 and the EPA MCL for total chromium. The California Cr6 MCL exceedance ratio is less than 1 for Well Group 1 and above 1 for the other well groups. This means that only Well Group 1 has an EPC less than the California Cr6 MCL. The EPA total chromium MCL exceedance ratio is less than 1 for Well Groups 1, 4, and 5a, and above 1 for Well Groups 2, 3, and 5b.

Although the exceedance ratios in Exhibit 2 can be used to assess the impacts of hypothetical future residential exposure to untreated ground water, it should be recognized that these ratios are not likely indicative of actual health outcomes, and only provide a general frame of reference for risk management decision making. Any actual impacts could be expected to be much lower, considering existing state and federal regulations that prohibit municipal use of water containing contaminant concentrations that exceed an MCL.

EXHIBIT 2
MCL Exceedance Ratios for Total and Hexavalent Chromium
Human Health Risk Assessment Addendum
Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

		Reasonable Maximum Exposure		MCL (µg/L)		MCL Exceedance Ratio	
Exposure Area	**Analyte**	**EPC (µg/L)**	**EPC Basis**	**EPA (Total Chromium)**	**Cal-EPA (Hexavalent Chromium)**	**EPA (Total Chromium)**	**Cal-EPA (Hexavalent Chromium)**
Well Group 1	Hexavalent Chromium	3.7	95% KM (Chebyshev) UCL	100	10	0.0	0.4
Well Group 2	Hexavalent Chromium	6,371	97.5% KM (Chebyshev) UCL	100	10	64	637
Well Group 3	Hexavalent Chromium	242	95% Chebyshev (Mean, Sd) UCL	100	10	2.4	24
Well Group 4	Hexavalent Chromium	66	97.5% KM (Chebyshev) UCL	100	10	0.7	6.6
Well Group 5a	Hexavalent Chromium	20	95% Chebyshev (Mean Sd) UCL	100	10	0.2	2.0
Well Group 5b	Hexavalent Chromium	14,681	95% Chebyshev (Mean Sd) UCL	100	10	147	1,468

Cal-EPA – California Environmental Protection Agency

SECTION 5

Uncertainties

As described in Section 4, potential cancer risks have not been estimated in this HHRA addendum in part because of uncertainties associated with the Cr6 toxicity factors. The New Jersey Department of Environmental Protection (NJDEP) determined that Cr6 by ingestion is likely to be carcinogenic in humans; EPA currently adopts the NJDEP oral slope factor for purposes of screening and includes this value in the derivation of their RSL. However, Cr6 is currently under review by EPA's IRIS program.

EPA's current screening level for Cr6 (EPA, 2014b) assumes a mutagenic mode of action for carcinogenesis by all exposure routes and at all levels of exposure. External reviewers have questioned the evidence used to support a mutagenic mode of action for carcinogenesis for Cr6 (EPA, 2012). The Cal-EPA PHG Technical Support Document has concluded that Cr6 is both genotoxic and mutagenic (Cal-EPA, 2011).

The relatively high oral cancer potency of Cr6 (which forms the basis for current cancer risk-based screening levels) is based on the interpretation that Cr6 acts via a mutagenic mode of action (MOA) at all levels of exposure. However, some scientists believe that a mutagenic MOA is not operative at environmentally relevant exposure concentrations. If a mutagenic MOA is not operative at Cr6 concentrations relevant to the contamination levels at the Glendale site (or to the MCL), the cancer potency of Cr6 would be significantly lower. In this event, both cancer risk-based screening levels (for example, RSLs) and the protective exposure range calculated under Superfund would be proportionately higher.

Other uncertainties that have been noted with respect to Cr6 toxicity are associated with how representative the existing laboratory animal studies are of human conditions. There are notable structural and functional differences between the gastrointestinal tracts of rodents and humans. For example, stomach pH is lower in humans, and low pH is known to increase the rate at which hexavalent chromium is reduced to trivalent chromium (a detoxification pathway).

EPA expects to revisit the total Cr MCL, or set a Cr6-specific MCL, once the IRIS toxicity revision is complete. Once the MCL is revised (or a Cr6 MCL set), a reassessment of potential Cr6 risks at GCOU would be conducted either as part of an eventual GCOU ROD or under EPA's 5-Year Review program.

This HHRA addendum also does not evaluate total risks due to exposure to all contaminants in ground water at the site. A baseline HHRA was conducted for exposure to VOCs and metals in ground water (JMM, 1992); however, those results are not included in this HHRA addendum. The contributions from other chemicals known to be present in GCOU ground water would result in higher risks.

Background concentrations of Cr6 are not considered in this HHRA addendum because upgradient sources of Cr6 have been included in this investigation and it is unlikely that the conditions are present for naturally occurring Cr6. Even if there were potential for background Cr6, Well Group 1 is the only exposure area where the California Cr6 MCL exceedance ratio is less than 1 and potential background levels could impact the results. At all other areas the California Cr6 MCL exceedance ratio is high enough that EPA's evaluation of the Cr6 contamination at the site is unlikely to be substantially changed by a more definitive evaluation of background.

SECTION 6

Conclusions

Risks from potential residential exposure to Cr6 in ground water were evaluated for six separate well groups in the GCOU area (see Section 4). An EPC has been calculated for each well group and compared to the California and EPA MCLs for Cr6 and total chromium, respectively.

The screening-level risk evaluations do not consider background or baseline chromium concentrations in the GCOU aquifer, although as noted earlier, a definitive assessment of baseline concentrations is unlikely to impact potential GCOU cleanup levels and response actions.

SECTION 7

References

California Environmental Protection Agency (Cal-EPA). 2011. *Public Health Goal for Hexavalent Chromium (Cr VI) in Drinking Water.* Pesticide and Environmental Toxicology Branch, Office of Environmental Health Hazard Assessment. July. http://www.oehha.ca.gov/water/phg/pdf/Hexavalent chromiumPHG072911.pdf

California State Water Resources Control Board, Division of Drinking Water (CDDW). 2014a. *Comparison of MCLs and PHGs for Regulated Contaminants in Drinking Water.* Last updated June 1. http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.shtml

California State Water Resources Control Board, Division of Drinking Water (CDDW). 2014b. *Chromium-6 in Drinking Water Sources: Sampling Results.* Last updated July 11. http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Chromium6sampling.shtml

CH2M HILL. 2014. Technical Memorandum. *Preliminary Evaluation of Potential Discharge of Ground Water to the Los Angeles River in Glendale North and Glendale South Operable Units.* Prepared for U.S. Environmental Protection Agency, Region 9. August 13.

James M. Montgomery, Consulting Engineers, Inc. (JMM). 1992. *Remedial Investigation Report for the Glendale Study Area.* Submitted to Department of Water and Power, City of Los Angeles, California. January.

U.S. Environmental Protection Agency (EPA). 1989. *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Part A*. EPA/540/1-89/002. December.

U.S. Environment Protection Agency (EPA). 1991. *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part B, Development of Risk Based Preliminary Remediation Goals), Interim Final (RAGS)*. EPA/540/R-92/003. December.

U.S. Environment Protection Agency (EPA). 1993a. *Glendale North Operable Unit Record of Decision, San Fernando Valley Area 2 Superfund Site, Los Angeles County, California*. June.

U.S. Environment Protection Agency (EPA). 1993b. *Glendale South Operable Unit Record of Decision, San Fernando Valley Area 2 Superfund Site, Los Angeles County, California*. June.

U.S. Environment Protection Agency (EPA). 2012. IRIS Toxicological Review of Hexavalent Chromium (2010 External Review Draft). http://cfpub.epa.gov/ncea/iris_drafts/recordisplay.cfm?deid=221433

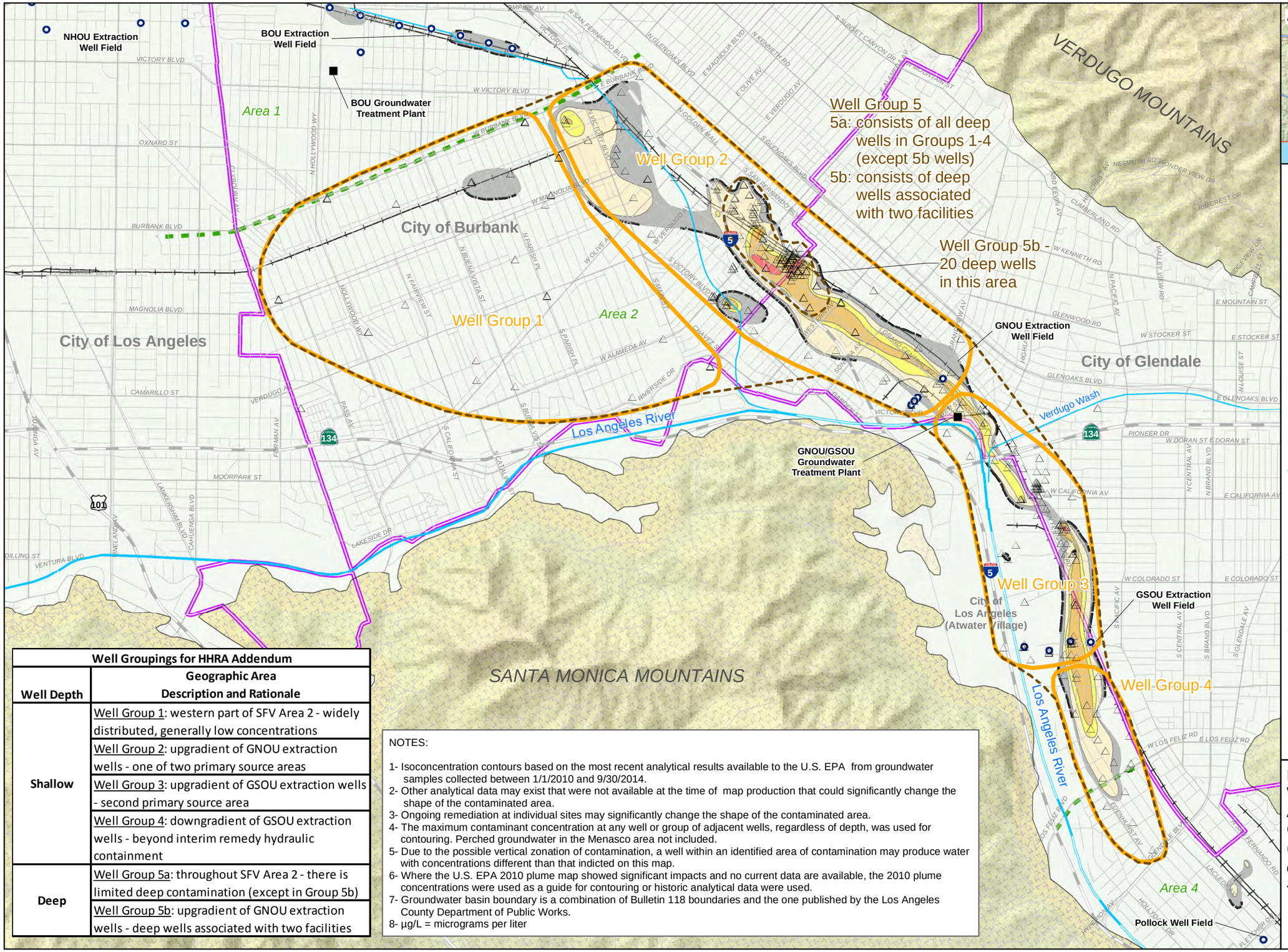
U.S. Environment Protection Agency (EPA). 2013. Statistical Software ProUCL 5.0.00 for Environmental Applications for Data Sets with and without Nondetect Observations. http://www.epa.gov/osp/hstl/tsc/software.htm

U.S. Environment Protection Agency (EPA). 2014a. Regional Screening Levels. May. http://www.epa.gov/region9/superfund/prg/

U.S. Environment Protection Agency (EPA). 2014b. Users Guide for Regional Screening Levels. May. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm

U.S. Environment Protection Agency (EPA). 2014c. *Draft Data Quality and Usability Assessment, Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites*. October 27.

Figure



Well Groupings for HHRA Addendum	
Well Depth	**Geographic Area Description and Rationale**
Shallow	Well Group 1: western part of SFV Area 2 - widely distributed, generally low concentrations
	Well Group 2: upgradient of GNOU extraction wells - one of two primary source areas
	Well Group 3: upgradient of GSOU extraction wells - second primary source area
	Well Group 4: downgradient of GSOU extraction wells - beyond interim remedy hydraulic containment
Deep	Well Group 5a: throughout SFV Area 2 - there is limited deep contamination (except in Group 5b)
	Well Group 5b: upgradient of GNOU extraction wells - deep wells associated with two facilities

NOTES:

1- Isoconcentration contours based on the most recent analytical results available to the U.S. EPA from groundwater samples collected between 1/1/2010 and 9/30/2014.
2- Other analytical data may exist that were not available at the time of map production that could significantly change the shape of the contaminated area.
3- Ongoing remediation at individual sites may significantly change the shape of the contaminated area.
4- The maximum contaminant concentration at any well or group of adjacent wells, regardless of depth, was used for contouring. Perched groundwater in the Menasco area not included.
5- Due to the possible vertical zonation of contamination, a well within an identified area of contamination may produce water with concentrations different than that indicted on this map.
6- Where the U.S. EPA 2010 plume map showed significant impacts and no current data are available, the 2010 plume concentrations were used as a guide for contouring or historic analytical data were used.
7- Groundwater basin boundary is a combination of Bulletin 118 boundaries and the one published by the Los Angeles County Department of Public Works.
8- µg/L = micrograms per liter

LOCATION MAP

LEGEND

- Monitoring Wells
- Operable Unit Extraction Well
- Operable Unit Ground Water Treatment Plant
- Municipal Boundary

HHRA Well Groups

- Shallow
- Deep
- Approximate Boundaries of Investigation Areas for San Fernando Valley Superfund Sites
- Freeway
- Major Surface Street
- Railroads
- Los Angeles River
- Unlined Section of Los Angeles River
- Stream

Most Recent Cr6 Concentration (Jan 2010 - Aug 2014)

- >1,000 µg/L
- 100-1,000 µg/L
- 50-100 µg/L
- 10-50 µg/L
- 5-10 µg/L
- Dashed where uncertain

N

0 1,500 3,000 6,000 Feet

Figure 1
Well Groupings for the HHRA Addendum and Hexavalent Chromium Distribution (Jan 2010-Aug 2014)

Glendale Chromium Operable Unit
San Fernando Valley Superfund Sites

OTIE Oneida Total Integrated Enterprises

SCO \\CHERON\PROJECTS\EPA\386243GLENDALECHOU\GIS\MAPFILES\2015\RI_REPORT\REVISIONS_NOV2015\FIG1_HHRA_WELLGROUPS_REV111615.MXD BLECHLER 11/17/2015 3:30:01 PM

Appendix A
Summary Statistics and Exposure Point Concentrations

APPENDIX A

Summary Statistics and Exposure Point Concentrations

Human Health Risk Assessment Addendum

Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Exposure Area	Chemical	Number of Detects	Number of Nondetects	Number of Analyses	Frequency of Detects	Percent Detects	Units	Minimum Detected Value	Maximum Detected Value	Minimum Nondetect Value	Maximum Nondetect Value
Well Group 1	Hexavalent Chromium	68	70	138	68/138	49%	µg/L	0.226	12	0.047	0.25
Well Group 2	Hexavalent Chromium	615	44	659	615/659	93%	µg/L	0.02	250,000	0.01	150
Well Group 3	Hexavalent Chromium	298	238	536	298/536	56%	µg/L	0.037	10,000	0.02	6
Well Group 4	Hexavalent Chromium	60	2	62	60/62	97%	µg/L	0.3	170	0.05	0.3
Well Group 5a	Hexavalent Chromium	362	18	380	362/380	95%	µg/L	0.053	110	0.02	0.3
Well Group 5b	Hexavalent Chromium	105	7	112	105/112	94%	µg/L	0.55	300,000	0.3	1.5

Notes:

µg/L - micrograms per liter

EPC - exposure point concentration

UCL - upper confidence limit

APPENDIX A

Summary Statistics and Exposure Point Concentrations

Human Health Risk Assessment Addendum

Glendale Chromium Operable Unit, San Fernando Valley Superfund Sites

Exposure Area	Chemical	Arithmetic Mean Value	Standard Deviation	95 UCL	95 UCL Basis	EPC (may be Max)	EPC Basis (may be Max)
Well Group 1	Hexavalent Chromium	2.6	2.1	3.7	95% KM (Chebyshev) UCL	3.7	95% KM (Chebyshev) UCL
Well Group 2	Hexavalent Chromium	2061	18,918	6,371	97.5% KM (Chebyshev) UCL	6,371	97.5% KM (Chebyshev) UCL
Well Group 3	Hexavalent Chromium	195	941	242	95% Chebyshev (Mean, Sd) UCL	242	95% Chebyshev (Mean, Sd) UCL
Well Group 4	Hexavalent Chromium	30	47	66	97.5% KM (Chebyshev) UCL	66	97.5% KM (Chebyshev) UCL
Well Group 5a	Hexavalent Chromium	17	20	20	95% Chebyshev (Mean Sd) UCL	20	95% Chebyshev (Mean Sd) UCL
Well Group 5b	Hexavalent Chromium	81	29,246	14,681	95% Chebyshev (Mean Sd) UCL	14,681	95% Chebyshev (Mean Sd) UCL

Notes:

µg/L - micrograms per liter

EPC - exposure point concentration

UCL - upper confidence limit

Appendix B
ProUCL Output

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	Date/Time of Computation			9/19/2014 12:57:54 PM								
5	From File			WorkSheet.xls								
6	Full Precision			ON								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10	Cr6											
11												
12	General Statistics											
13	Total Number of Observations					70.000000	Number of Distinct Observations					56.000000
14	Number of Detects					68.000000	Number of Non-Detects					2.0000000
15	Number of Distinct Detects					54.000000	Number of Distinct Non-Detects					2.0000000
16	Minimum Detect					0.2260000	Minimum Non-Detect					0.0470000
17	Maximum Detect					12.000000	Maximum Non-Detect					0.2500000
18	Variance Detects					4.5565297	Percent Non-Detects					2.8571429%
19	Mean Detects					2.6234706	SD Detects					2.1346029
20	Median Detects					2.1100000	CV Detects					0.8136561
21	Skewness Detects					2.0198524	Kurtosis Detects					5.3870132
22	Mean of Logged Detects					0.6743465	SD of Logged Detects					0.7998811
23												
24	Normal GOF Test on Detects Only											
25	Shapiro Wilk Test Statistic					0.8136081	Normal GOF Test on Detected Observations Only					
26	5% Shapiro Wilk P Value					1.318E-11	Detected Data Not Normal at 5% Significance Level					
27	Lilliefors Test Statistic					0.2102688	Lilliefors GOF Test					
28	5% Lilliefors Critical Value					0.1074433	Detected Data Not Normal at 5% Significance Level					
29	Detected Data Not Normal at 5% Significance Level											
30												
31	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
32	Mean					2.5511357	Standard Error of Mean					0.2565498
33	SD					2.1305682	95% KM (BCA) UCL					3.0179143
34	95% KM (t) UCL					2.9788654	95% KM (Percentile Bootstrap) UCL					2.9861667
35	95% KM (z) UCL					2.9731226	95% KM Bootstrap t UCL					3.0393271
36	90% KM Chebyshev UCL					3.3207851	95% KM Chebyshev UCL					3.6694104
37	97.5% KM Chebyshev UCL					4.1532887	99% KM Chebyshev UCL					5.1037740
38												
39	Gamma GOF Tests on Detected Observations Only											
40	A-D Test Statistic					0.6798068	Anderson-Darling GOF Test					
41	5% A-D Critical Value					0.7647127	Detected data appear Gamma Distributed at 5% Significance Level					
42	K-S Test Statistic					0.1134648	Kolmogrov-Smirnoff GOF					
43	5% K-S Critical Value					0.1096160	Detected Data Not Gamma Distributed at 5% Significance Level					
44	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
45												
46	Gamma Statistics on Detected Data Only											
47	k hat (MLE)					1.8726996	k star (bias corrected MLE)					1.7998844
48	Theta hat (MLE)					1.4009031	Theta star (bias corrected MLE)					1.4575773
49	nu hat (MLE)					254.68714	nu star (bias corrected)					244.78428
50	MLE Mean (bias corrected)					2.6234706	MLE Sd (bias corrected)					1.9554823
51												
52	Gamma Kaplan-Meier (KM) Statistics											
53	k hat (KM)					1.4337593	nu hat (KM)					200.72630

	A	B	C	D	E	F	G	H	I	J	K	L
54					Approximate Chi Square Value (200.73, α)	168.94511					Adjusted Chi Square Value (200.73, β)	168.33546
55					95% Gamma Approximate KM-UCL (use when n>=50)	3.0310438					95% Gamma Adjusted KM-UCL (use when n<50)	3.0420212
56												
57					Gamma ROS Statistics using Imputed Non-Detects							
58					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
59					GROS may not be used when kstar of detected data is small such as < 0.1							
60					For such situations, GROS method tends to yield inflated values of UCLs and BTVs							
61					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
62					Minimum	0.0100000					Mean	2.5488000
63					Maximum	12.000000					Median	2.1000000
64					SD	2.1486688					CV	0.8430119
65					k hat (MLE)	1.3557120					k star (bias corrected MLE)	1.3071339
66					Theta hat (MLE)	1.8800453					Theta star (bias corrected MLE)	1.9499150
67					nu hat (MLE)	189.79968					nu star (bias corrected)	182.99874
68					MLE Mean (bias corrected)	2.5488000					MLE Sd (bias corrected)	2.2293370
69											Adjusted Level of Significance (β)	0.0465714
70					Approximate Chi Square Value (183.00, α)	152.70830					Adjusted Chi Square Value (183.00, β)	152.12958
71					95% Gamma Approximate UCL (use when n>=50)	3.0543670					95% Gamma Adjusted UCL (use when n<50)	3.0659862
72												
73					Lognormal GOF Test on Detected Observations Only							
74					Lilliefors Test Statistic	0.0904688					Lilliefors GOF Test	
75					5% Lilliefors Critical Value	0.1074433					Detected Data appear Lognormal at 5% Significance Level	
76					Detected Data appear Lognormal at 5% Significance Level							
77												
78					Lognormal ROS Statistics Using Imputed Non-Detects							
79					Mean in Original Scale	2.5566869					Mean in Log Scale	0.6191145
80					SD in Original Scale	2.1397033					SD in Log Scale	0.8525859
81					95% t UCL (assumes normality of ROS data)	2.9830722					95% Percentile Bootstrap UCL	2.9850417
82					95% BCA Bootstrap UCL	3.0755423					95% Bootstrap t UCL	3.0690126
83					95% H-UCL (Log ROS)	3.3315633						
84												
85					UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed							
86					KM Mean (logged)	0.5789363					95% H-UCL (KM -Log)	3.6953694
87					KM SD (logged)	0.9670090					95% Critical H Value (KM-Log)	2.2384817
88					KM Standard Error of Mean (logged)	0.1172587						
89												
90					DL/2 Statistics							
91					DL/2 Normal						DL/2 Log-Transformed	
92					Mean in Original Scale	2.5506357					Mean in Log Scale	0.5717909
93					SD in Original Scale	2.1465117					SD in Log Scale	1.0021418
94					95% t UCL (Assumes normality)	2.9783778					95% H-Stat UCL	3.8411792
95					DL/2 is not a recommended method, provided for comparisons and historical reasons							
96												
97					Nonparametric Distribution Free UCL Statistics							
98					Detected Data appear Approximate Gamma Distributed at 5% Significance Level							
99												
100					Suggested UCL to Use							
101					95% KM (Chebyshev) UCL	3.6694104					95% GROS Approximate Gamma UCL	3.0543670
102					95% Approximate Gamma KM-UCL	3.0310438						
103												
104					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
105					Recommendations are based upon data size, data distribution, and skewness.							
106					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	Date/Time of Computation			9/19/2014 1:02:42 PM								
5	From File			WorkSheet.xls								
6	Full Precision			ON								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10	Cr6											
11												
12	General Statistics											
13	Total Number of Observations					659.00000	Number of Distinct Observations					235.00000
14	Number of Detects					615.00000	Number of Non-Detects					44.000000
15	Number of Distinct Detects					228.00000	Number of Distinct Non-Detects					11.000000
16	Minimum Detect					0.0200000	Minimum Non-Detect					0.0100000
17	Maximum Detect					250000.00	Maximum Non-Detect					150.00000
18	Variance Detects					3.5789E+8	Percent Non-Detects					6.6767830%
19	Mean Detects					2060.8796	SD Detects					18917.851
20	Median Detects					17.000000	CV Detects					9.1795032
21	Skewness Detects					10.332499	Kurtosis Detects					109.70025
22	Mean of Logged Detects					3.3852622	SD of Logged Detects					2.0159006
23												
24	Normal GOF Test on Detects Only											
25	Shapiro Wilk Test Statistic					0.1004515	Normal GOF Test on Detected Observations Only					
26	5% Shapiro Wilk P Value					0	Detected Data Not Normal at 5% Significance Level					
27	Lilliefors Test Statistic					0.4932770	Lilliefors GOF Test					
28	5% Lilliefors Critical Value					0.0357270	Detected Data Not Normal at 5% Significance Level					
29	Detected Data Not Normal at 5% Significance Level											
30												
31	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
32	Mean					1923.4105	Standard Error of Mean					712.19002
33	SD					18267.757	95% KM (BCA) UCL					3144.2796
34	95% KM (t) UCL					3096.5106	95% KM (Percentile Bootstrap) UCL					3159.2743
35	95% KM (z) UCL					3094.8588	95% KM Bootstrap t UCL					3705.4380
36	90% KM Chebyshev UCL					4059.9805	95% KM Chebyshev UCL					5027.7748
37	97.5% KM Chebyshev UCL					6371.0357	99% KM Chebyshev UCL					9009.6117
38												
39	Gamma GOF Tests on Detected Observations Only											
40	A-D Test Statistic					123.24444	Anderson-Darling GOF Test					
41	5% A-D Critical Value					0.9451337	Detected Data Not Gamma Distributed at 5% Significance Level					
42	K-S Test Statistic					0.3731466	Kolmogrov-Smirnoff GOF					
43	5% K-S Critical Value					0.0421537	Detected Data Not Gamma Distributed at 5% Significance Level					
44	Detected Data Not Gamma Distributed at 5% Significance Level											
45												
46	Gamma Statistics on Detected Data Only											
47	k hat (MLE)					0.1766769	k star (bias corrected MLE)					0.1768990
48	Theta hat (MLE)					11664.683	Theta star (bias corrected MLE)					11650.033
49	nu hat (MLE)					217.31254	nu star (bias corrected)					217.58581
50	MLE Mean (bias corrected)					2060.8796	MLE Sd (bias corrected)					4899.9301
51												
52	Gamma Kaplan-Meier (KM) Statistics											
53	k hat (KM)					0.0110860	nu hat (KM)					14.611303

	A	B	C	D	E	F	G	H	I	J	K	L
54					Approximate Chi Square Value (14.61, α)	6.9919713					Adjusted Chi Square Value (14.61, β)	6.9804096
55					95% Gamma Approximate KM-UCL (use when n>=50)	4019.4005					95% Gamma Adjusted KM-UCL (use when n<50)	4026.0578
56					Gamma (KM) may not be used when k hat (KM) is < 0.1							
57												
58					Gamma ROS Statistics using Imputed Non-Detects							
59					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
60					GROS may not be used when kstar of detected data is small such as < 0.1							
61					For such situations, GROS method tends to yield inflated values of UCLs and BTVs							
62					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
63					Minimum	0.0100000					Mean	1923.2798
64					Maximum	250000.00					Median	14.000000
65					SD	18281.646					CV	9.5054534
66					k hat (MLE)	0.1614293					k star (bias corrected MLE)	0.1617061
67					Theta hat (MLE)	11914.068					Theta star (bias corrected MLE)	11893.678
68					nu hat (MLE)	212.76383					nu star (bias corrected)	213.12859
69					MLE Mean (bias corrected)	1923.2798					MLE Sd (bias corrected)	4782.7680
70											Adjusted Level of Significance (β)	0.0496358
71					Approximate Chi Square Value (213.13, α)	180.34339					Adjusted Chi Square Value (213.13, β)	180.27802
72					95% Gamma Approximate UCL (use when n>=50)	2272.9189					95% Gamma Adjusted UCL (use when n<50)	2273.7431
73												
74					Lognormal GOF Test on Detected Observations Only							
75					Lilliefors Test Statistic	0.1345712					Lilliefors GOF Test	
76					5% Lilliefors Critical Value	0.0357270					Detected Data Not Lognormal at 5% Significance Level	
77					Detected Data Not Lognormal at 5% Significance Level							
78												
79					Lognormal ROS Statistics Using Imputed Non-Detects							
80					Mean in Original Scale	1923.4059					Mean in Log Scale	3.1186439
81					SD in Original Scale	18281.633					SD in Log Scale	2.2156336
82					95% t UCL (assumes normality of ROS data)	3096.4423					95% Percentile Bootstrap UCL	3150.1081
83					95% BCA Bootstrap UCL	3388.0438					95% Bootstrap t UCL	3689.1105
84					95% H-UCL (Log ROS)	348.51169						
85												
86					DL/2 Statistics							
87					DL/2 Normal						DL/2 Log-Transformed	
88					Mean in Original Scale	1923.5927					Mean in Log Scale	3.0203874
89					SD in Original Scale	18281.614					SD in Log Scale	2.4828121
90					95% t UCL (Assumes normality)	3096.6278					95% H-Stat UCL	629.73565
91					DL/2 is not a recommended method, provided for comparisons and historical reasons							
92												
93					Nonparametric Distribution Free UCL Statistics							
94					Data do not follow a Discernible Distribution at 5% Significance Level							
95												
96					Suggested UCL to Use							
97					97.5% KM (Chebyshev) UCL	6371.0357						
98												
99					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
100					Recommendations are based upon data size, data distribution, and skewness.							
101					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
102					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
103												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			9/19/2014 1:06:09 PM								
5	From File			WorkSheet.xls								
6	Full Precision			ON								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Cr6											
12												
13	General Statistics											
14	Total Number of Observations					536.00000	Number of Distinct Observations					172.00000
15							Number of Missing Observations					0
16	Minimum					0.0200000	Mean					108.49301
17	Maximum					10000.000	Median					0.8950000
18	SD					707.84413	Std. Error of Mean					30.574210
19	Coefficient of Variation					6.5243296	Skewness					11.275564
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.1591799	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.4391029	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.0382694	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					158.87034	95% Adjusted-CLT UCL (Chen-1995)					174.69389
31							95% Modified-t UCL (Johnson-1978)					161.35210
32												
33	Gamma GOF Test											
34	A-D Test Statistic					92.643757	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.9427432	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.3254079	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.0442221	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.1788540	k star (bias corrected MLE)					0.1790968
42	Theta hat (MLE)					606.60081	Theta star (bias corrected MLE)					605.77868
43	nu hat (MLE)					191.73153	nu star (bias corrected)					191.99174
44	MLE Mean (bias corrected)					108.49301	MLE Sd (bias corrected)					256.36449
45							Approximate Chi Square Value (0.05)					160.93643
46	Adjusted Level of Significance					0.0495522	Adjusted Chi Square Value					160.86058
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					129.42850	95% Adjusted Gamma UCL (use when n<50)					129.48953
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.8397291	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk P Value					0	Data Not Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
54					Lilliefors Test Statistic	0.1953532	Lilliefors Lognormal GOF Test					
55					5% Lilliefors Critical Value	0.0382694	Data Not Lognormal at 5% Significance Level					
56	Data Not Lognormal at 5% Significance Level											
57												
58	Lognormal Statistics											
59					Minimum of Logged Data	-3.912023			Mean of logged Data			0.5005442
60					Maximum of Logged Data	9.2103404			SD of logged Data			2.4147180
61												
62	Assuming Lognormal Distribution											
63					95% H-UCL	44.581226			90% Chebyshev (MVUE) UCL			47.717508
64					95% Chebyshev (MVUE) UCL	55.827035			97.5% Chebyshev (MVUE) UCL			67.082744
65					99% Chebyshev (MVUE) UCL	89.192403						
66												
67	Nonparametric Distribution Free UCL Statistics											
68	Data do not follow a Discernible Distribution (0.05)											
69												
70	Nonparametric Distribution Free UCLs											
71					95% CLT UCL	158.78311			95% Jackknife UCL			158.87034
72					95% Standard Bootstrap UCL	158.63539			95% Bootstrap-t UCL			202.82638
73					95% Hall's Bootstrap UCL	182.30011			95% Percentile Bootstrap UCL			162.53502
74					95% BCA Bootstrap UCL	180.82579						
75					90% Chebyshev(Mean, Sd) UCL	200.21563			95% Chebyshev(Mean, Sd) UCL			241.76290
76					97.5% Chebyshev(Mean, Sd) UCL	299.42888			99% Chebyshev(Mean, Sd) UCL			412.70255
77												
78	Suggested UCL to Use											
79					95% Chebyshev (Mean, Sd) UCL	241.76290						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												

	A	B	C	D	E	F	G	H	I	J	K	L
1					UCL Statistics for Data Sets with Non-Detects							
2												
3				User Selected Options								
4				Date/Time of Computation	9/19/2014 1:07:20 PM							
5				From File	WorkSheet.xls							
6				Full Precision	ON							
7				Confidence Coefficient	95%							
8				Number of Bootstrap Operations	2000							
9												
10	Cr6											
11												
12					General Statistics							
13				Total Number of Observations	62.000000		Number of Distinct Observations	57.000000				
14				Number of Detects	60.000000		Number of Non-Detects	2.0000000				
15				Number of Distinct Detects	56.000000		Number of Distinct Non-Detects	2.0000000				
16				Minimum Detect	0.3000000		Minimum Non-Detect	0.0500000				
17				Maximum Detect	170.00000		Maximum Non-Detect	0.3000000				
18				Variance Detects	2199.4553		Percent Non-Detects	3.2258065%				
19				Mean Detects	30.156617		SD Detects	46.898350				
20				Median Detects	6.9500000		CV Detects	1.5551596				
21				Skewness Detects	1.6693045		Kurtosis Detects	1.4237091				
22				Mean of Logged Detects	1.9979257		SD of Logged Detects	1.8243042				
23												
24					Normal GOF Test on Detects Only							
25				Shapiro Wilk Test Statistic	0.6579221		Normal GOF Test on Detected Observations Only					
26				5% Shapiro Wilk P Value	0		Detected Data Not Normal at 5% Significance Level					
27				Lilliefors Test Statistic	0.3011314		Lilliefors GOF Test					
28				5% Lilliefors Critical Value	0.1143821		Detected Data Not Normal at 5% Significance Level					
29					Detected Data Not Normal at 5% Significance Level							
30												
31					Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs							
32				Mean	29.185435		Standard Error of Mean	5.8987157				
33				SD	46.057853		95% KM (BCA) UCL	39.359581				
34				95% KM (t) UCL	39.037585		95% KM (Percentile Bootstrap) UCL	39.259081				
35				95% KM (z) UCL	38.887959		95% KM Bootstrap t UCL	40.730336				
36				90% KM Chebyshev UCL	46.881582		95% KM Chebyshev UCL	54.897341				
37				97.5% KM Chebyshev UCL	66.022903		99% KM Chebyshev UCL	87.876915				
38												
39					Gamma GOF Tests on Detected Observations Only							
40				A-D Test Statistic	2.7002911		Anderson-Darling GOF Test					
41				5% A-D Critical Value	0.8260707		Detected Data Not Gamma Distributed at 5% Significance Level					
42				K-S Test Statistic	0.1704209		Kolmogrov-Smirnoff GOF					
43				5% K-S Critical Value	0.1220195		Detected Data Not Gamma Distributed at 5% Significance Level					
44					Detected Data Not Gamma Distributed at 5% Significance Level							
45												
46					Gamma Statistics on Detected Data Only							
47				k hat (MLE)	0.4573153		k star (bias corrected MLE)	0.4455606				
48				Theta hat (MLE)	65.942728		Theta star (bias corrected MLE)	67.682410				
49				nu hat (MLE)	54.877833		nu star (bias corrected)	53.467274				
50				MLE Mean (bias corrected)	30.156617		MLE Sd (bias corrected)	45.178230				
51												
52					Gamma Kaplan-Meier (KM) Statistics							
53				k hat (KM)	0.4015365		nu hat (KM)	49.790520				

	A	B	C	D	E	F	G	H	I	J	K	L
54					Approximate Chi Square Value (49.79, α)	34.589465				Adjusted Chi Square Value (49.79, β)		34.287854
55					95% Gamma Approximate KM-UCL (use when n>=50)	42.011578				95% Gamma Adjusted KM-UCL (use when n<50)		42.381131
56												
57					Gamma ROS Statistics using Imputed Non-Detects							
58					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
59					GROS may not be used when kstar of detected data is small such as < 0.1							
60					For such situations, GROS method tends to yield inflated values of UCLs and BTVs							
61					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
62					Minimum	0.0100000				Mean		29.184145
63					Maximum	170.00000				Median		4.9300000
64					SD	46.434665				CV		1.5910922
65					k hat (MLE)	0.4122012				k star (bias corrected MLE)		0.4030087
66					Theta hat (MLE)	70.800723				Theta star (bias corrected MLE)		72.415671
67					nu hat (MLE)	51.112952				nu star (bias corrected)		49.973078
68					MLE Mean (bias corrected)	29.184145				MLE Sd (bias corrected)		45.971616
69										Adjusted Level of Significance (β)		0.0461290
70					Approximate Chi Square Value (49.97, α)	34.741826				Adjusted Chi Square Value (49.97, β)		34.439509
71					95% Gamma Approximate UCL (use when n>=50)	41.978840				95% Gamma Adjusted UCL (use when n<50)		42.347340
72												
73					Lognormal GOF Test on Detected Observations Only							
74					Lilliefors Test Statistic	0.1393108				Lilliefors GOF Test		
75					5% Lilliefors Critical Value	0.1143821				Detected Data Not Lognormal at 5% Significance Level		
76					Detected Data Not Lognormal at 5% Significance Level							
77												
78					Lognormal ROS Statistics Using Imputed Non-Detects							
79					Mean in Original Scale	29.186636				Mean in Log Scale		1.8547912
80					SD in Original Scale	46.433076				SD in Log Scale		1.9605276
81					95% t UCL (assumes normality of ROS data)	39.035931				95% Percentile Bootstrap UCL		39.470040
82					95% BCA Bootstrap UCL	39.723342				95% Bootstrap t UCL		41.199860
83					95% H-UCL (Log ROS)	94.125706						
84												
85					DL/2 Statistics							
86					DL/2 Normal					DL/2 Log-Transformed		
87					Mean in Original Scale	29.186645				Mean in Log Scale		1.8433798
88					SD in Original Scale	46.433072				SD in Log Scale		1.9933798
89					95% t UCL (Assumes normality)	39.035939				95% H-Stat UCL		101.65634
90					DL/2 is not a recommended method, provided for comparisons and historical reasons							
91												
92					Nonparametric Distribution Free UCL Statistics							
93					Data do not follow a Discernible Distribution at 5% Significance Level							
94												
95					Suggested UCL to Use							
96					97.5% KM (Chebyshev) UCL	66.022903						
97												
98					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
99					Recommendations are based upon data size, data distribution, and skewness.							
100					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
101					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
102												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			10/3/2014 2:29:18 PM								
5	From File			WorkSheet.xls								
6	Full Precision			ON								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Chromium6**											
12												
13	**General Statistics**											
14	Total Number of Observations					380.00000	Number of Distinct Observations					142.00000
15							Number of Missing Observations					0
16	Minimum					0.0200000	Mean					15.933024
17	Maximum					110.00000	Median					3.7000000
18	SD					19.726579	Std. Error of Mean					1.0119522
19	Coefficient of Variation					1.2380939	Skewness					1.6271777
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.7536841	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.2734465	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.0454508	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					17.601615	95% Adjusted-CLT UCL (Chen-1995)					17.687794
31							95% Modified-t UCL (Johnson-1978)					17.615694
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					12.285205	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.8285194	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.1622868	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.0494170	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					0.4762259	k star (bias corrected MLE)					0.4742206
42	Theta hat (MLE)					33.456864	Theta star (bias corrected MLE)					33.598340
43	nu hat (MLE)					361.93165	nu star (bias corrected)					360.40763
44	MLE Mean (bias corrected)					15.933024	MLE Sd (bias corrected)					23.137051
45							Approximate Chi Square Value (0.05)					317.41250
46	Adjusted Level of Significance					0.0493684	Adjusted Chi Square Value					317.26075
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					18.091232	95% Adjusted Gamma UCL (use when n<50)					18.099886
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.9023102	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.1794077	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.0454508	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-3.912023				Mean of logged Data		1.4244414
60					Maximum of Logged Data	4.7004804				SD of logged Data		2.0672500
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	49.380445				90% Chebyshev (MVUE) UCL		53.531547
64					95% Chebyshev (MVUE) UCL	62.107234				97.5% Chebyshev (MVUE) UCL		74.009955
65					99% Chebyshev (MVUE) UCL	97.390545						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	17.597537				95% Jackknife UCL		17.601615
72					95% Standard Bootstrap UCL	17.604561				95% Bootstrap-t UCL		17.715768
73					95% Hall's Bootstrap UCL	17.722759				95% Percentile Bootstrap UCL		17.553255
74					95% BCA Bootstrap UCL	17.663763						
75					90% Chebyshev(Mean, Sd) UCL	18.968880				95% Chebyshev(Mean, Sd) UCL		20.344021
76					97.5% Chebyshev(Mean, Sd) UCL	22.252663				99% Chebyshev(Mean, Sd) UCL		26.001820
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	20.344021						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			10/3/2014 2:31:18 PM								
5	From File			WorkSheet_a.xls								
6	Full Precision			ON								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Cr6**											
12												
13	**General Statistics**											
14	Total Number of Observations					112.00000	Number of Distinct Observations					78.000000
15							Number of Missing Observations					0
16	Minimum					0.3000000	Mean					3017.1772
17	Maximum					300000.00	Median					66.000000
18	SD					28319.690	Std. Error of Mean					2675.9592
19	Coefficient of Variation					9.3861539	Skewness					10.577725
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.1037639	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.5025815	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.0837191	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					7455.7840	95% Adjusted-CLT UCL (Chen-1995)					10276.613
31							95% Modified-t UCL (Johnson-1978)					7901.5547
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					13.786479	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.9254228	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.3109424	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.0961516	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					0.1922661	k star (bias corrected MLE)					0.1930685
42	Theta hat (MLE)					15692.718	Theta star (bias corrected MLE)					15627.498
43	nu hat (MLE)					43.067601	nu star (bias corrected)					43.247338
44	MLE Mean (bias corrected)					3017.1772	MLE Sd (bias corrected)					6866.6537
45							Approximate Chi Square Value (0.05)					29.168089
46	Adjusted Level of Significance					0.0478571	Adjusted Chi Square Value					29.017611
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					4473.5493	95% Adjusted Gamma UCL (use when n<50)					4496.7480
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.9440334	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk P Value	2.3591E-4	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.1271932	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.0837191	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-1.203973				Mean of logged Data		4.1609403
60					Maximum of Logged Data	12.611538				SD of logged Data		2.5246302
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	4034.1514				90% Chebyshev (MVUE) UCL		3152.1020
64					95% Chebyshev (MVUE) UCL	3950.3351				97.5% Chebyshev (MVUE) UCL		5058.2517
65					99% Chebyshev (MVUE) UCL	7234.5394						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	7418.7384				95% Jackknife UCL		7455.7840
72					95% Standard Bootstrap UCL	7523.5771				95% Bootstrap-t UCL		175429.49
73					95% Hall's Bootstrap UCL	61588.709				95% Percentile Bootstrap UCL		8350.1036
74					95% BCA Bootstrap UCL	11158.787						
75					90% Chebyshev(Mean, Sd) UCL	11045.055				95% Chebyshev(Mean, Sd) UCL		14681.413
76					97.5% Chebyshev(Mean, Sd) UCL	19728.537				99% Chebyshev(Mean, Sd) UCL		29642.635
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	14681.413						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												