DENVER
THE MILE HIGH CITY

Department of Environmental Health
Division of Environmental Quality

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8 April 2011

Mr. Sam Garcia
United States Environmental Protection Agency
1595 Wynkoop St.
Denver, CO 80202-1129

Dear Mr. Garcia,

Thank you for your patience as we have gathered the information Mr. Ross requested regarding the groundwater at VB/I-70 Operable Unit 2 (OU2). Since the EPA and the CDPHE determined that groundwater is not a potential exposure pathway and the chemicals of potential concern (COPC) for the site are arsenic and lead in soil, Denver does not see the need to provide this information. The Remedial Investigation (RI) was approved by EPA on February 23, 2010 and the Feasibility Study (FS) on October 22, 2010. Regardless, Denver has reviewed Mr. Ross' requests and have attempted to address his comments to the extent possible. Following is the list from the original e-mail with Denver's response to each item.

1. *Documentation of well construction details for monitoring wells MW-1 through MW-6, and for the Denver Coliseum cooling wells.*

Denver was able to find the original hard copy boring logs for the ASARCO groundwater monitoring wells (MWs) and included them as an attachement. The four Coliseum cooling wells (quads) are approximately 25 feet deep on the west end and 35 feet deep on the east end. Denver does not have any other construction information on the wells.

2. *Documentation of lithology encountered during the installation of Monitoring wells MW-1 through MW-6 (and the Denver Coliseum wells if available).*

The lithology for the MWs is in the bore logs mentioned in Item #1. The situation remains the same for the quad wells.

3. *Monitoring wells MW-1 through MW-6 should be surveyed and depth to water measurements should be made for at least four consecutive quarters (wells should all be checked for LNAPL and DNAPL during gauging as a result of the landfill).*

At the EPA's request, Denver has surveyed the five MWs. The survey data is attached. Given that groundwater was previously determined to not be a potential exposure pathway and the likelihood that groundwater flows in a convergent direction toward the river, Denver is not interested in re-opening the site investigations to collect additional quarterly water level

311 for City Services
Denver gets it done!

measurements for one year. Historical water level data provides sufficient information regarding depth to groundwater and direction of groundwater flow. Since neither LNAPL nor DNAPL are chemicals of concern for OU2, Denver does not intend to sample for those constituents.

4. *Based on depth to groundwater data, quarterly potentiometric maps should be created to determine groundwater flow direction, seasonal variations to groundwater flow, and the influence of the Denver Coliseum cooling wells.*

Again, given that groundwater was previously determined to not be a potential exposure pathway and the likelihood that groundwater flows in a convergent direction toward the river, Denver is not interested in re-opening the site investigations to collect additional quarterly water level measurements for one year to create potentiometric maps.

5. *Based on the presence of the municipal landfill, detections of VOCs and PAHs in soil samples, and visual observations made during the soil borings, groundwater from monitoring wells MW-1 through MW-6, and the Denver Coliseum wells should be analyzed for VOCs and SVOCs for four consecutive quarters (We still may want to ask them to analyze for metals as well to get current data). If the wells are to be sampled, I recommend that they be properly developed. As per our discussion with CCoD and EMSI, the wells were never developed following installation by ASARCO/EnviroGroup.*

The landfill was never part of OU2 and Denver collected samples for its own use solely to give Denver better information on the nature and extent of the fill area. Given that EPA's risk analyst agreed that groundwater is not a potential exposure pathway, and prior monitoring data indicate that there are no impacts to the river from the COPCs for OU2, and that the RI and the FS have already been finalized and approved by EPA, Denver will not agree to sample the MW wells again.

6. *Comparison of COPC concentrations in soil vs. Residential Screening Level Soil to Groundwater Supporting values (VOCs, SVOCs, and metals).*

Denver will create comparison tables and will compare COPC concentrations in soil (metals) vs. commercial/industrial standards. The reasonably foreseeable land use is commercial/industrial. EPA has previously acknowledged this fact and agreed that residential screening levels are inapplicable to OU2.

7. *Documentation of the Denver Coliseum cooling well extraction rates, periods of operation, and disposal of cooling water.*

Following is the operational history and extraction rates of the quads for the past three years (the wells typically run for 12 hours and flow metering is conducted one per year during operation):

2008:

The four quads were operated on:
June 29
July 19
August 30

Results from flow metering were:

Quad 1:	277 gal/min
Quad 2:	243 gal/min
Quad 3:	204 gal/min
Quad 4:	264 gal/min

Quads 1 & 4 converge for Outfall 2 (total of 541 gal/min) & Quads 2 & 3 converge for Outfall 1 (total of 447 gal/min).

2009:

The quads were operated on:
July 12 (all 4 quads)
August 7 (quads 2 & 3 only)
August 8 (quads 2 & 3 only)
August 22 (all 4 quads)
September 17 (all 4 quads)
September 18 (quads 1, 2 & 3)

Results from flow metering were:

Quad 1:	318 gal/min
Quad 2:	254 gal/min
Quad 3:	154 gal/min
Quad 4:	232 gal/min

Quads 1 & 4 converge for Outfall 2 (total of 550 gal/min) & Quads 2 & 3 converge for Outfall 1 (total of 408 gal/min).

2010:

The quads were not operated in 2010 (i.e., discharge did not occur, therefore we did not sample nor measure flow).

Please note that the facility has remained in compliance with conditions of the discharge permit (Permit No. COG-6050000 - Facility No. COG-605010) without violation.

Denver is willing to set a meeting or a conference call at your convenience to discuss these items.

Sincerely,

Lisa Farrell
City and County of Denver, Environmental Health
Project Manager, VB/I-70 OU2

cc: Alice Nightengale, City and County of Denver, Environmental Health
Jackie Berardini, City and County of Denver City Attorney's Office
Katie Wilmoth, City and County of Denver City Attorney's Office

Enclosures:

1. MW boring logs
2. MW surveying results

BOREHOLE LOG

CLIENT: ASARCO
PROJECT LOCATION: VBI 70 (OU2)
PROJECT NO.: AS-0423

BH NO.: MW-01
PAGE 1 OF 4

NORTH	DRILLER	Site Services, Inc.		DATE START	12/14/04
EAST	RIG	CME-75		DATE FINISH	12/14/04
GRD ELEV.	BITS	8.25" HSA	FLUIDS N/A	TOTAL DEPTH	29.0'
TOC ELEV.	LOGGED BY	Gary Stanley		WATER DEPTH	22.0'

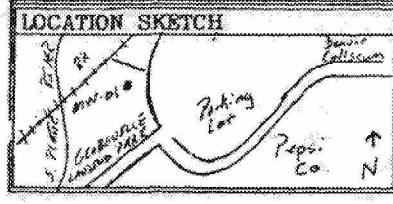
SAMPLE TYPES:
CT Cuttings — WS Wash
SS Split Spoon — NX NX Core
DC Dry Core — CS Continuous Sampler
Other:

SAMPLER SPECIFICATIONS:
Length: 5 foot
O.D.: 4 inch
I.D.: 3 inch
Material: Steel
Liner:
Other:

SURFACE CONDITION: Grass

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR PID ☐ FID ☐ BG	HS	Core
0										
1							0.0-0.3 Grass and topsoil. 0.3-2.6 Med. stiff dark brown Clay (Fill Material) some silt, some large pieces of orange brick, concrete, little wood pieces, little m.g. to c.g. sand, trace roots, no odors, no staining, dry grading to damp.			
2		2.0-2.5'	CS	2.6/4.0						
3						NR				
4							2.6-4.0 No Recovery			
5	8.25" HSA						4.0-5.4 Fill Material: Med. stiff dark gray and black, clay little silt, little f.g. to u.c.g. sand, trace wood pieces, trace glass pieces, trace orange fragments of brick, trace cobbles, no odors detected, trace black staining of material, damp.			
6		6.0-6.5'	CS	2.9/5.0						
7										
8						NR				
9							5.4-5.8 Loose, tan, Sand, medium grained no odors, no staining, damp. 5.8-6.9 Same as 4.0-5.4.			
10							6.9-9.0 No Recovery.			

LOCATION SKETCH



DENSITY: GRANULAR		COHESIVE:		PROPORTIONS:	
0-10	Loose	0-4	Soft	0-10%	Trace
10-30	Med Dense	4-8	Med Stiff	10-20%	Little
30-50	Dense	8-15	Stiff	20-35%	Some
>50	Very Dense	15-30	Very Stiff	35-50%	And

REMARKS/WEATHER
Sunny, ~40°F
Light Breeze

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

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CLIENT ASARCO
PROJECT LOCATION VBI70 (OU2)
PROJECT NO. AS-0423

BOREHOLE LOG

BH NO. MW-01
PAGE 2 OF 4

NORTH	DRILLER Site Services, Inc.		DATE START 12/14/04
EAST	RIG CME-75		DATE FINISH 12/14/04
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH 29.0'
TOC ELEV.	LOGGED BY Gary Stanley		WATER DEPTH 22.0'

SAMPLE TYPES:
CT Cuttings, WS Wash, SS Split Spoon, NX NX Core, DC Dry Core, CS Continuous Sampler, Other:

SAMPLER SPECIFICATIONS:
Length 5 foot, O.D. 4 inch, I.D. 3 inch, Material Steel, Liner, Other

SURFACE CONDITION: Grass

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR PID FID BG	HS	Core
10										
11		11.0-11.5	CS	3.1/5.0		NR	9.0-10.8 Fill Material Med. st. ff, dark gray and black, Clay, some silt, little f.g. to v.c.g. sand, little orange brick fragments, little wood fragments up to 4 inches long, trace gravel, trace vitreous black glass, no odors, no stains, damp.			
12										
13										
14							10.8-12.1 Fill Material Med st.ff to st.ff, gray, Clay, little silt, trace white chalky material, trace wood fragments up to 2 inches long, trace cigarette butts, trace small fragments of concrete, no odors, no stains, damp.			
15	8.25" HSA									
16		16.5-17.3	CS	3.3/5.0						
17							12.1-14.0 No Recovery. 14.0 Possible Top of Weathered Bedrock?			
18						NR	14.0-15.4 Med. st.ff to st.ff, gray Weathered Claystone, trace cobble, moist of 14.0' grading to dry by 15.0', no odor, no stain			
19		19.0-19.5					15.4-16.8 Med. dense to dense, dark brown silt, some f.g. sand, trace gravel, no odors			
20										

LOCATION SKETCH	DENSITY: GRANULAR	DENSITY: COHESIVE	PROPORTIONS:	REMARKS/WEATHER
	0-10 Loose	0-4 Soft	0-10% Trace	
	10-30 Med Dense	4-8 Med Stiff	10-20% Little	
	30-50 Dense	8-15 Stiff	20-35% Some	
	>50 Very Dense	15-30 Very Stiff	35-50% And	

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

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BOREHOLE LOG

CLIENT ASARCO
PROJECT LOCATION V8570 (OU2)
PROJECT NO. AS-0423

BH NO. MW-01
PAGE 3 OF 4

NORTH	DRILLER Site Services, Inc.		DATE START 12/14/04
EAST	RIG CME-75		DATE FINISH 12/14/04
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH 29.0'
TOC ELEV.	LOGGED BY Gary Stanley		WATER DEPTH 22.0'

SAMPLE TYPES:
CT Cuttings — WS Wash
SS Split Spoon — NX NX Core
DC Dry Core — CS Continuous Sampler
Other:

SAMPLER SPECIFICATIONS:
Length 5 feet — Material Steel
O.D. 4 inch — Liner
I.D. 3 inch — Other

SURFACE CONDITION: Grass

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR PID ☐ FID ☐ BG	HS	Core
20										
			CS	1.8/3.0			no stains, damp			
21						NR	16.8-17.3 Med dense to dense, black, silt Charcoal-like, little white mineral grains throughout, one sub-angular piece of gravel			
22							no odors, no stains, damp. Fill?			
			CS	2.0/2.0			17.3-19.0 N.R			
23							19.0-19.8 Med stiff, dark brown and black CLAY, Fill Material, some silt, little gravel, little garnet color and gray island glass-like fragments about ½ inch long, fine sand, free iron-oxide staining, no odor, damp to moist			
24										
25	8.25" HSA									
26			CS	1.4/5.0		NR	19.8-20.8 Loose, brown and multicolored Sand f.g to v.c.g, some gravel, little cobbles, trace silt, no odors, no stains, moist			
27							20.8-22.0 N.R.			
28							22.0-24.0 Loose, brown and multicolored Sand f.g to v.c.g, some gravel, no odors, no stains, wet			
29							24.0-25.4 Loose, brown and multicolored,			
30										

LOCATION SKETCH	DENSITY: GRANULAR		COHESIVE:		PROPORTIONS:		REMARKS/WEATHER
	0–10	Loose	0–4	Soft	0–10%	Trace	
	10–30	Med Dense	4–8	Med Stiff	10–20%	Little	
	30–50	Dense	8–15	Stiff	20–35%	Some	
	>50	Very Dense	15–30	Very Stiff	35–50%	And	

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

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BOREHOLE LOG

CLIENT ASARCO
PROJECT LOCATION VBI 10 (Ouz)
PROJECT NO. AS-0423

BH NO. MW-01
PAGE 4 OF 4

NORTH	DRILLER Site Services, Inc.		DATE START 12/14/04
EAST	RIG CME-75		DATE FINISH 12/14/04
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH 29.0'
TOC ELEV.	LOGGED BY Gary Stanley		WATER DEPTH 22.0'

SAMPLE TYPES:
CT Cuttings — WS Wash
SS Split Spoon — NX NX Core
DC Dry Core — CS Continuous Sampler
Other:

SAMPLER SPECIFICATIONS:
Length 5 feet — Material Steel
O.D. 4 inch — Liner
I.D. 3 inch — Other

SURFACE CONDITION: Grass

DEPTH (FT.)	HIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR PID FID BG	HS	Core
30							Sand, fg to mcg little gravel, little silt, little cobbles, no odor, no stains, wet.			
31							25.4-29.0 N.R. Per driller, drilled same as above.			
32										
33							TD = 29.0' Set 2 inch PVC well.			
34										
35	8.25" HSA									
36										
37										
38										
39										
40										

LOCATION SKETCH	DENSITY: GRANULAR		COHESIVE:		PROPORTIONS:		REMARKS/WEATHER
	0-10	Loose	0-4	Soft	0-10%	Trace	
	10-30	Med Dense	4-8	Med Stiff	10-20%	Little	
	30-50	Dense	8-15	Stiff	20-35%	Some	
	>50	Very Dense	15-30	Very Stiff	35-50%	And	

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

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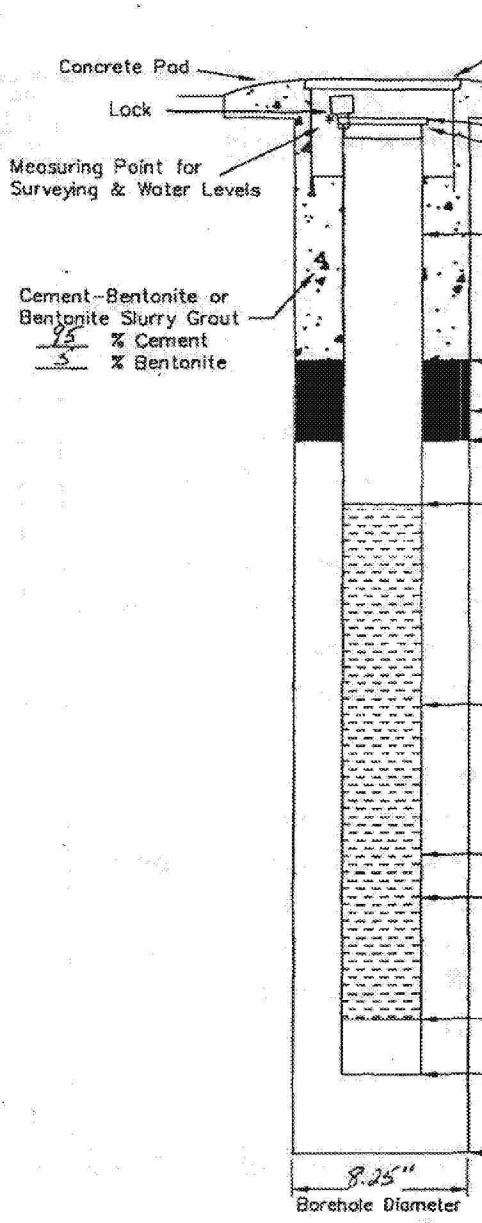
Project No: AS-0423 Client: ASARCO Site: VBTTO (OU2) WELL NO: MW-01

Well Location: ~18 ft West of Northernmost lightpost in Globeville Landing Park Date Installed: 12/14/04

Contractor: Site Services, Inc. Method: Hollow Stem Auger

MONITORING WELL CONSTRUCTION DETAIL
(Flush Mount)



	Depth from G.S. (feet)	Elevation
Top of Steel Guard Pipe	G.S.	
Ground Surface (G.S.)	G.S.	
Water Tight Cap		
Top of Riser Pipe		
Riser Pipe: Length; Inside Diameter (ID) 2"; Type of Material PVC		
Top of Bentonite Seal	1.0'	
Bentonite Seal Thickness 16.0'		
Top of Sand	17.0'	
Top of Screen	18.79'	
Stabilized Water Level, Date 6/22/05	22.72	
Screen: Length 10'; Inside Diameter 2"; Slot Size 0.02"; Type of Material PVC		
Type/Size of Sand Co. Silica #10/20		
Sand Pack Thickness 12.0'		
Bottom of Screen	28.79'	
Bottom of Tail Pipe, Length 0.21'	29.0'	
Bottom of Borehole	29.0'	

EnviroGroup Limited
Englewood, Colorado

* Describe Measuring Point:
Ground Surface

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WELFLS.D

CLIENT ASARCO INC.
PROJECT LOCATION VB I-70 (OU2)
PROJECT NO. AS-0423

BOREHOLE LOG

BH NO. MW-02
PAGE 1 OF 2

NORTH	DRILLER Site Services, Inc.		DATE START 3/24/05
EAST	RIG CME-75		DATE FINISH 3/24/05
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH 19.0'
TOC ELEV.	LOGGED BY Martin Litasi		WATER DEPTH ~9.0'

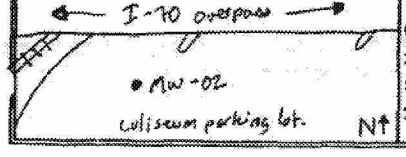
SAMPLE TYPES:
CT Cuttings — WS Wash
SS Split Spoon — NX NX Core
DC Dry Core — (CS) Continuous Sampler
Other:

SAMPLER SPECIFICATIONS:
Length 5 feet — Material Steel
O.D. 4" — Liner
I.D. 3" — Other

SURFACE CONDITION: Asphalt

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR PID☐ FID☐ BG	HS	Core
0							0.0-0.4 Asphalt			
1							0.4-0.9 Fill Material loose, dk. brown, sand f.g. to c.g., little gravel, little silt, no odor, no stain, damp.			
2		2.0-2.5	CS	2.8/4.0			0.9-1.6 loose, dk grey to grey brown, silt tr. clay, tr. f.g. sand, black staining, no odor, damp.			
3						NR				
4	8.25" HSA						1.6-2.8 loose, grey to black, sand, v.f.g. to c.g., little c.g., tr. coal, + other black organic material, tr. wood fragments, tr. gravel, tr. red/orange brick fragments, slight petroleum odor, no stain, damp.			
5		5.0-5.5								
6			CS	2.4/5.0			2.8-4.0 No Recovery			
7						NR	4.0-6.4 med. stiff to stiff, black clay, little silt, tr. f.g. sand, tr. wood + brick fragments, tr. black organic material, tr. metal pieces, slight petroleum odor, semi blocky texture, tr. gravel, no stain, damp.			
8										
9							6.4-9.0 No Recovery			
10										

LOCATION SKETCH



DENSITY: GRANULAR		COHESIVE:		PROPORTIONS:	
0-10	Loose	0-4	Soft	0-10%	Trace
10-30	Med Dense	4-8	Med Stiff	10-20%	Little
30-50	Dense	8-15	Stiff	20-35%	Some
>50	Very Dense	15-30	Very Stiff	35-50%	And

REMARKS/WEATHER: Cloudy, rain, slight breeze ~45°F

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

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BOREHOLE LOG

CLIENT ASARCO INC.
PROJECT LOCATION VB I-70 (OU2)
PROJECT NO. AS-0423

BH NO. MW-02
PAGE 2 OF 2

NORTH	DRILLER Site Services, Inc.		DATE START 3/24/05
EAST	RIG CME-75		DATE FINISH 3/24/05
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH 19.0'
TOC ELEV.	LOGGED BY Martin Litasi		WATER DEPTH ~9.0'

SAMPLE TYPES:
CT Cuttings, WS Wash, SS Split Spoon, NX NX Core, DC Dry Core, (CS) Continuous Sampler, Other:

SAMPLER SPECIFICATIONS:
Length 5 feet, O.D. 4", I.D. 2", Material Steel, Liner, Other

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: Asphalt SOIL/ROCK DESCRIPTION	SOIL VAPOR PID ☐ FID ☐ BG	HS	Core
10										
11			CS	3.4/5.0			9.0-12.4 soft to med. stiff, gray to dk. brown to black, CLAY, some silt, tr. fg to cg sand, tr. gravel, tr. 0.05' black band @ ~avg. 5', tr. black organic material, slight petroleum odor, no stain, wet @ 9.0'			
12										
13						NR	12.4-14.0 No Recovery			
14	8.25" HSA									
15			CS	4.3/5.0			14.0-16.1 soft to med. stiff, dk. brown, CLAY, some silt, tr. fg. to cg. sand, tr. gravel, slight petroleum odor, no stain, wet.			
16							16.1-17.3 soft, dk. brown, CLAY, little silt, no odor, no stain, wet.			
17							17.3-18.0 soft to med. stiff, dk brown, CLAY, some silt, tr. fg. to cg sand, cg. sand lenses throughout, no odor, no stain, wet.			
18						NR	18.0-18.3 loose, dk. brown to multicolored, SAND, vfg to vcg., tr silt, no odor, no stain, wet.			
19							18.3-19.0 No Recovery			
20							TD = 19.0' set 2" pvc well @ 18.5'			

LOCATION SKETCH: N↑

DENSITY: GRANULAR		COHESIVE:		PROPORTIONS:	
0-10	Loose	0-4	Soft	0-10%	Trace
10-30	Med Dense	4-8	Med Stiff	10-20%	Little
30-50	Dense	8-15	Stiff	20-35%	Some
>50	Very Dense	15-30	Very Stiff	35-50%	And

REMARKS/WEATHER

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

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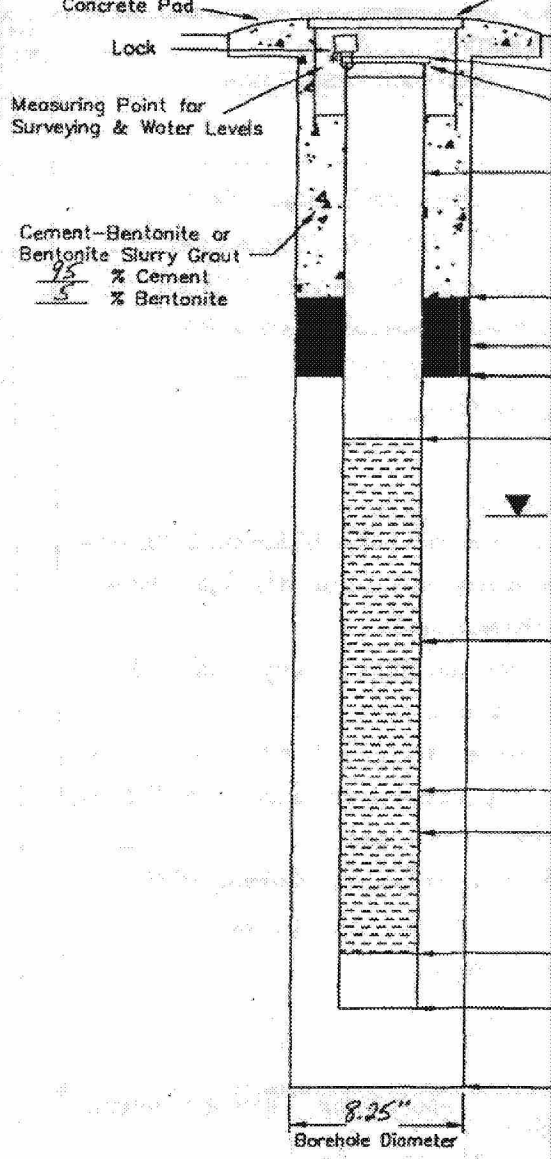
Project No: AS-0423 Client: ASARCO Site: VB570 (OU2) WELL NO: MW-02

Well Location: NW corner of Denver Coliseum Parking lot, ~50' S from I-70 overpass. Date Installed: 3/24/05

Contractor: Site Services, Inc. Method: Hollow Stem Auger

MONITORING WELL CONSTRUCTION DETAIL
(Flush Mount)



	Depth from G.S. (feet)	Elevation
Top of Steel Guard Pipe	G.S.	
Ground Surface (G.S.)	G.S.	
Water Tight Cap		
Top of Riser Pipe		
Riser Pipe: Length; Inside Diameter (ID) 2"; Type of Material PVC		
Top of Bentonite Seal	1.0'	
Bentonite Seal Thickness 5.5'		
Top of Sand	6.5'	
Top of Screen	8.32'	
Stabilized Water Level, Date 6/22/05	10.03	
Screen: Length 10'; Inside Diameter 2"; Slot Size 0.02"; Type of Material PVC		
Type/Size of Sand Co Silica #10/20		
Sand Pack Thickness 12.0'		
Bottom of Screen	18.32'	
Bottom of Tail Pipe, Length 0.18	18.5'	
Bottom of Borehole	19.0'	

EnviroGroup Limited
Englewood, Colorado

* Describe Measuring Point: Ground Surface

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WELLFLS.D

BOREHOLE LOG

CLIENT Asarco
PROJECT LOCATION VBI70 (OU2)
PROJECT NO. AS-0423

BH NO. MW-03
PAGE 1 OF 3

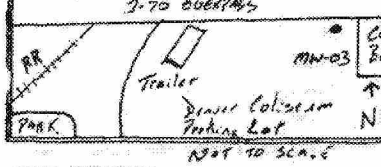
NORTH	DRILLER Site Services, Inc.	DATE START 12/14/04
EAST	RIG CME-75	DATE FINISH 12/14/04
GRD ELEV.	BITS 8.25" HSA / FLUIDS N/A	TOTAL DEPTH 20.0'
TOC ELEV.	LOGGED BY Gary Stanley	WATER DEPTH 11.0'

SAMPLE TYPES:
CT Cuttings, WS Wash, SS Split Spoon, NX NX Core, DC Dry Core, CS Continuous Sampler, Other:

SAMPLER SPECIFICATIONS:
Length 5 feet, O.D. 3 inch, I.D. 3 inch, Material Steel, Liner, Other

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: Asphalt SOIL/ROCK DESCRIPTION	SOIL VAPOR PID / FID BG	HS	Core
0										
							0.0-0.3 Asphalt			
1							0.3-0.5 Fill Material Med. dense, brown, Sand, some silt, trace small gravel, no odors, no stains, damp.			
2		1.8-2.3	CS	3.6/3.9			0.5-2.2 Fill Material Alternating bands of Med. dense, black silt little Sand, trace small gravel, damp, trace broken glass fragments and black wood fragments from 2.0' to 2.2' and medium stiff, gray and bluish-green, Clay little silt, trace small gravel, trace cobbles, no odors, no other stains, damp.			
3		Black wood fragments								
4						NR				
5	8.25" HSA	5.5-6.0								
6			CS	2.1/3.0			2.2-2.5 Med. dense, brownish-gray Sand, very fine grained, no odor, no stains, damp.			
7						NR	2.5-3.6 Fill Material. Medium dense, dark brown and whitish-gray Silt, little Sand, trace small gravel, no odors, two thin, black horizontal stains at 2.9' to 3.0', damp.			
8										
9		9.0-9.5								
10						NR	3.6-3.9 No Recovery.			

LOCATION SKETCH



DENSITY: GRANULAR		COHESIVE		PROPORTIONS:	
0-10	Loose	0-4	Soft	0-10%	Trace
10-30	Med Dense	4-8	Med Stiff	10-20%	Little
30-50	Dense	8-15	Stiff	20-35%	Some
>50	Very Dense	15-30	Very Stiff	35-50%	And

REMARKS/WEATHER
Mostly Sunny ~45°F

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

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CLIENT ASARCO
PROJECT LOCATION VBI70 (OU2)
PROJECT NO. AS-0423

BOREHOLE LOG

BH NO. MW-03
PAGE 2 OF 3

NORTH	DRILLER Site Services, Inc.		DATE START 12/14/04
EAST	RIG CME-75		DATE FINISH 12/14/04
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH 20.0'
TOC ELEV.	LOGGED BY Gary Stanley		WATER DEPTH 11.0'

SAMPLE TYPES:
CT Cuttings
SS Split Spoon
DC Dry Core
Other:
WS Wash
NX NX Core
CS Continuous Sampler

SAMPLER SPECIFICATIONS:
Length 5 foot
O.D. 4 inch
I.D. 3 inch
Material Steel
Liner
Other

SURFACE CONDITION: Asphalt

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR PID ☐ FID ☐ BG	HS	Core
10										
11			CS	0.8/5.0		NR	3.9-5.4 Fill Material, med. dense, gray and blackish-gray, silt, some sand, trace gravel, trace orange brick fragments, trace small wood fragments, trace black staining, no odors, damp.			
12										
13							5.4-6.0 Fill Material, med. dense, black silt, trace f.g. sand, some wood fragments up to 3 inches long, little pieces of broken glass, little "mass" of garbage including newspaper and tape, mild unknown odor, no stains, damp to moist.			
14										
15	8.25" HSA									
16			CS	0.1/5.0		NR	6.0-8.9 No Recovery. 8.9-9.7 Fill Material Med. dense, black silt, some garbage as before, large piece of metal filled with orange brick, little sand, trace white chalky material, ~~[illegible]~~ mild petroleum odor?, no stain, damp grading to moist.			
17										
18										
19							9.7-13.9 N.R. Due to metallic object above.			
			CT	1.1/1.1			13.9-14.0 Fill Material? Part of a cobble, trace black wood fragments adhered to cobble,			
20										

LOCATION SKETCH	DENSITY: GRANULAR		COHESIVE		PROPORTIONS:		REMARKS/WEATHER
	0-10	Loose	0-4	Soft	0-10%	Trace	
	10-30	Med Dense	4-8	Med Stiff	10-20%	Little	
	30-50	Dense	8-15	Stiff	20-35%	Some	
	>50	Very Dense	15-30	Very Stiff	35-50%	And	

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

C:\Drawings\STD\Borelog5.dwg 11/02/04 at 14:24

BOREHOLE LOG

CLIENT Asarco
PROJECT LOCATION VBI70 (OU2)
PROJECT NO. AS-0423

BH NO. MW-03
PAGE 3 OF 3

NORTH	DRILLER Site Services, Inc.		DATE START 12/14/04
EAST	RIG CME-75		DATE FINISH 12/14/04
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH 20.0'
TOC ELEV.	LOGGED BY Gary Stanley		WATER DEPTH 11.0'

SAMPLE TYPES:
CT Cuttings, WS Wash, SS Split Spoon, NX NX Core, DC Dry Core, CS Continuous Sampler, Other:

SAMPLER SPECIFICATIONS:
Length 5 feet, O.D. 4 inch, I.D. 3 inch, Material Steel, Liner, Other

DEPTH (FT.)	BIT / CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: Asphalt SOIL/ROCK DESCRIPTION	SOIL VAPOR PID ☐ FID ☐ BG	HS	Core
20										
21							Strong petroleum odor, luster on cobble and wood fragments, wet.			
22							14.0-18.9 No Recovery. Drilled very soft per driller. Cuttings consist of black silt and garbage as before. Core barrel wet. Petroleum Sheen.			
23							18.9-20.0' Cuttings consist of black silt and garbage as before.			
24							TD=20.0'			
25	8.25" HSA						Set 2" PVC well.			
26							Note: Water ~11 ft bgs in borehole.			
27										
28										
29										
30										

LOCATION SKETCH

DENSITY:

GRANULAR:		COHESIVE:	
0-10	Loose	0-4	Soft
10-30	Med Dense	4-8	Med Stiff
30-50	Dense	8-15	Stiff
>50	Very Dense	15-30	Very Stiff

PROPORTIONS:

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

REMARKS/WEATHER

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

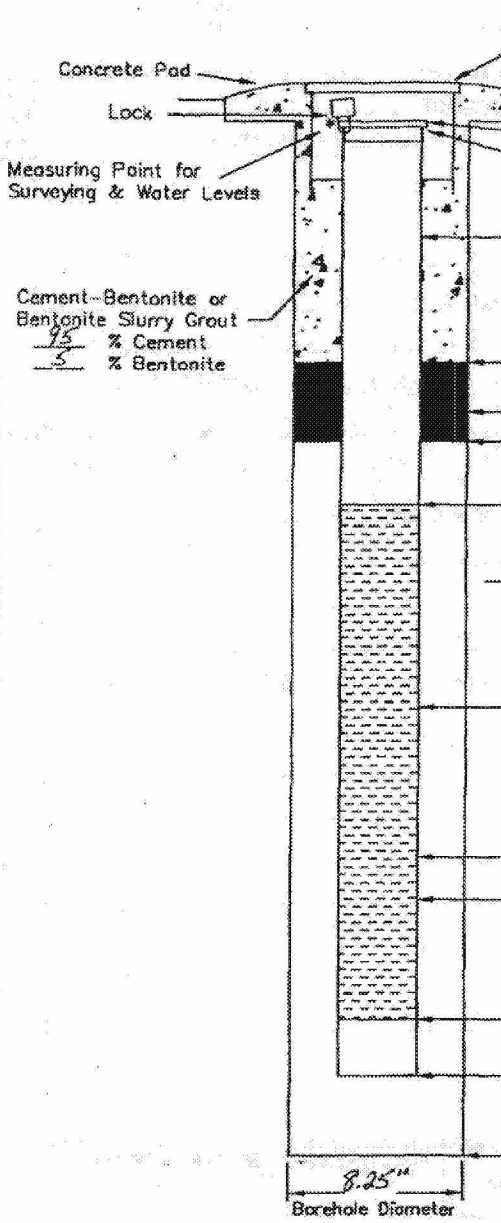
C:\Drawings\STD\Borelog5.dwg, 11/02/04 at 14:24

Project No: AS-0423 Client: ASARCO Site: VBS70 (OU2) **WELL NO: MW-03**

Well Location: ~100' west of Denver Coliseum, ~20' south of I-70 in coliseum parking lot. Date Installed: 12/14/04

Contractor: Site Services, Inc. Method: Hollow Stem Auger

MONITORING WELL CONSTRUCTION DETAIL
(Flush Mount)



	Depth from G.S. (feet)	Elevation
Top of Steel Guard Pipe	G.S.	
Ground Surface (G.S.)	G.S.	
Water Tight Cap		
Top of Riser Pipe		
Riser Pipe: Length ___ Inside Diameter (ID) 2" Type of Material PVC		
Top of Bentonite Seal	1.0'	
Bentonite Seal Thickness 6.0'		
Top of Sand	7.0'	
Top of Screen	8.75'	
Stabilized Water Level Date 6/22/05	9.42	
Screen: Length 10' Inside Diameter 2" Slot Size 0.02" Type of Material PVC		
Type/Size of Sand Co Silica #10/20		
Sand Pack Thickness 12.0'		
Bottom of Screen	18.75'	
Bottom of Tail Pipe Length 0.25'	19.0'	
Bottom of Borehole	20.0'	

EnviroGroup Limited
Englewood, Colorado

* Describe Measuring Point: Ground Surface

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WELLFLSD

BOREHOLE LOG

CLIENT ASARCO INC.
PROJECT LOCATION VB I-70 (OU2)
PROJECT NO. AS-0421

BH NO. MW-06
PAGE 1 OF 4

NORTH	DRILLER Site Services, Inc.		DATE START 3/24/05
EAST	RIG CME-75		DATE FINISH 3/24/05
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH 39.0'
TOC ELEV.	LOGGED BY Martin Litasi		WATER DEPTH ~29.0'

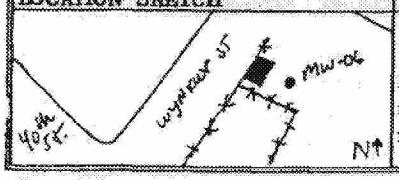
SAMPLE TYPES:
CT Cuttings
SS Split Spoon
DC Dry Core
Other:
WS Wash
NX NX Core
(CS) Continuous Sampler

SAMPLER SPECIFICATIONS:
Length 5 feet
O.D. 4"
I.D. 3"
Material Steel
Liner
Other

SURFACE CONDITION: Asphalt

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR PID ☐ FID ☐ BG	HS	Core
0							0.0-0.2 Asphalt			
1		1.6 2.1	CS	3.3/4.0			0.2-1.6 Fill Material. Loose to med. dense, Brown to dk. brown to black, SAND, vfg to crg., tr. gravel. No odor + no stain, damp.			
2							1.6-3.3 Soft to med. stiff, brown to black, CLAY, tr. fg. sand, tr. silt, tr. wood chips, tr. roots tr. gravel, tr. black organic material. No odor, no stain, damp.			
3										
4	8.25" HSA					NR	3.3-4.0 No Recovery.			
5		5.0 5.5					4.0-4.4 Soft to med. stiff, brown, CLAY, little gravel, tr. fg. sand, tr. silt, tr black organic material. No odor, no stain, damp.			
6			CS	2.7/5.0			4.4-6.7 loose, brown to lt. brown to multicolored SAND, cg. grading to fine grained to cg. little sm. pebbles, no odor, orange/rust colored staining, damp to moist.			
7										
8						NR	6.7-9.0 No Recovery.			
9							9.0-10.4 loose, brown to multicolored (lt. peach to white) SAND, vfg to crg., little sm. pebbles + gravel, no odor + stain, damp.			
10										

LOCATION SKETCH



DENSITY:

GRANULAR:		COHESIVE:	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	Med. Stiff
30-50	Dense	8-15	Stiff
>50	Very Dense	15-30	Very Stiff

PROPORTIONS:

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

REMARKS/WEATHER
Cloudy, rain
Slight breeze
~45°F

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

C:\Drawings\STD\Borelog5.dwg, 11/02/04 at 14:24

CLIENT ASARCO INC.
PROJECT LOCATION VB I-70 (OU2)
PROJECT NO. AS-0421

BOREHOLE LOG

BH NO. MW-06
PAGE 2 OF 4

NORTH	DRILLER Site Services, Inc.		DATE START 3/24/05
EAST	RIG CME-75		DATE FINISH 3/24/05
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH 39.0'
TOC ELEV.	LOGGED BY Martina Litasi		WATER DEPTH ~29.0'

SAMPLE TYPES:
CT Cuttings, WS Wash, SS Split Spoon, NX NX Core, DC Dry Core, (CS) Continuous Sampler, Other:

SAMPLER SPECIFICATIONS:
Length 5 feet, O.D. 4", I.D. 2", Material Steel, Liner, Other

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: Asphalt / SOIL/ROCK DESCRIPTION	SOIL VAPOR PID FID BG	HS	Core
10							10.4-14.0 No Recovery			
11				1.4/5.0						
12			CS			NR				
13										
14	8.25" HSA						14.0-18.1 med. stiff, brown, clay, silty, tr. white chalky material, tr. gravel tr. fg. sand. No odor & stain, damp to moist.			
15		15.0-15.5								
16			CS	4.6/5.0			18.1-18.6 loose, brown to multicolored (lt. peach + white) SAND, little sm. pebbles + gravel, no odor, no stain, damp.			
17							18.6-19.0 No Recovery			
18										
19						NR				
20										

LOCATION SKETCH	DENSITY: GRANULAR		COHESIVE:		PROPORTIONS:		REMARKS/WEATHER
N↑	0-10	Loose	0-4	Soft	0-10%	Trace	
	10-30	Med Dense	4-8	Med Stiff	10-20%	Little	
	30-60	Dense	8-15	Stiff	20-35%	Some	
	>60	Very Dense	15-30	Very Stiff	35-60%	And	

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

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BOREHOLE LOG

CLIENT ASARCO INC.
PROJECT LOCATION VB I-70 (OU2)
PROJECT NO. AS-0423

BH NO. MW-06
PAGE 3 OF 4

NORTH	DRILLER Site Services, Inc.		DATE START 3/24/05
EAST	RIG CME-75		DATE FINISH 3/24/05
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH 39.0'
TOC ELEV.	LOGGED BY Martin Litasi		WATER DEPTH ~29.0'

SAMPLE TYPES:
CT Cuttings, WS Wash, SS Split Spoon, NX NX Core, DC Dry Core, (CS) Continuous Sampler, Other:

SAMPLER SPECIFICATIONS:
Length 5 feet, O.D. 4", I.D. 2", Material Steel, Liner, Other

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: Asphalt SOIL/ROCK DESCRIPTION	SOIL VAPOR PID ☐ FID ☐ BG	HS	Core
20		20.0-20.5					19.0-20.8 loose, brown to multicolored, SAND, little sm. pebbles + gravel, little cobbles, no odor, no stain, damp to moist			
21										
22			CS	1.8/5.0		NR	20.8-24.0 No Recovery			
23										
24	8.25" HSA						24.0-26.1 loose, brown to multicolored, vg hvy SAND, little sm. pebbles + gravel, little large cobbles, no odor, tr. black stain @ 24.6-24.7, damp, moist to wet @ 24.7-24.9.			
25										
26			CS	2.1/5.0						
27							26.1-29.0 No Recovery			
28						NR				
29										
30										

LOCATION SKETCH: N↑

DENSITY:

GRANULAR		COHESIVE:	
0–10	Loose	0–4	Soft
10–30	Med Dense	4–8	Med Stiff
30–50	Dense	8–15	Stiff
>50	Very Dense	15–30	Very Stiff

PROPORTIONS:

0–10%	Trace
10–20%	Little
20–35%	Some
36–50%	And

REMARKS/WEATHER

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

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CLIENT ASARCO INC.
PROJECT LOCATION VB I-70 (OU2)
PROJECT NO. AS-0423

BOREHOLE LOG

BH NO. MW-06
PAGE 4 OF 4

NORTH	DRILLER Site Services, Inc.		DATE START 3/24/05
EAST	RIG CME-75		DATE FINISH 3/24/05
GRD ELEV.	BITS 8.25" HSA	FLUIDS N/A	TOTAL DEPTH ~34.0'
TOC ELEV.	LOGGED BY Martin Litasi		WATER DEPTH ~29.0'

SAMPLE TYPES:
CT Cuttings, WS Wash, SS Split Spoon, NX NX Core, DC Dry Core, (CS) Continuous Sampler, Other:

SAMPLER SPECIFICATIONS:
Length 5 feet, O.D. 4", I.D. 2", Material Steel, Liner, Other

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: SOIL/ROCK DESCRIPTION	SOIL VAPOR FID BG	FID BH	FID Core
30										
31				1.8/5.0			29.0 - 30.8 loose, brown and a little multi-colored, SAND, vfg to vcg, little silt, little gravel, black stain @ 30.2-30.3, no odor, wet.			
32			CS			NR	30.8 - 34.0 No Recovery.			
33										
34	8.25" HSA	34.0'-39.3					34.0 - 36.6 loose, brown and multicolored SAND, vfg to vcg, little silt, little gravel, no odor, no stain, wet.			
35										
36			CS	2.6/5.0			36.6 - 39.0 No Recovery.			
37							TD = 39.0' Set 2" PVC well @ 38.5'			
38						NR				
39										
40										

LOCATION SKETCH	DENSITY: GRANULAR		COHESIVE:		PROPORTIONS:		REMARKS/WEATHER
N↑	0-10	Loose	0-4	Soft	0-10%	Trace	
	10-30	Med Dense	4-8	Med Stiff	10-20%	Little	
	30-50	Dense	8-15	Stiff	20-35%	Some	
	>50	Very Dense	15-30	Very Stiff	35-50%	And	

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

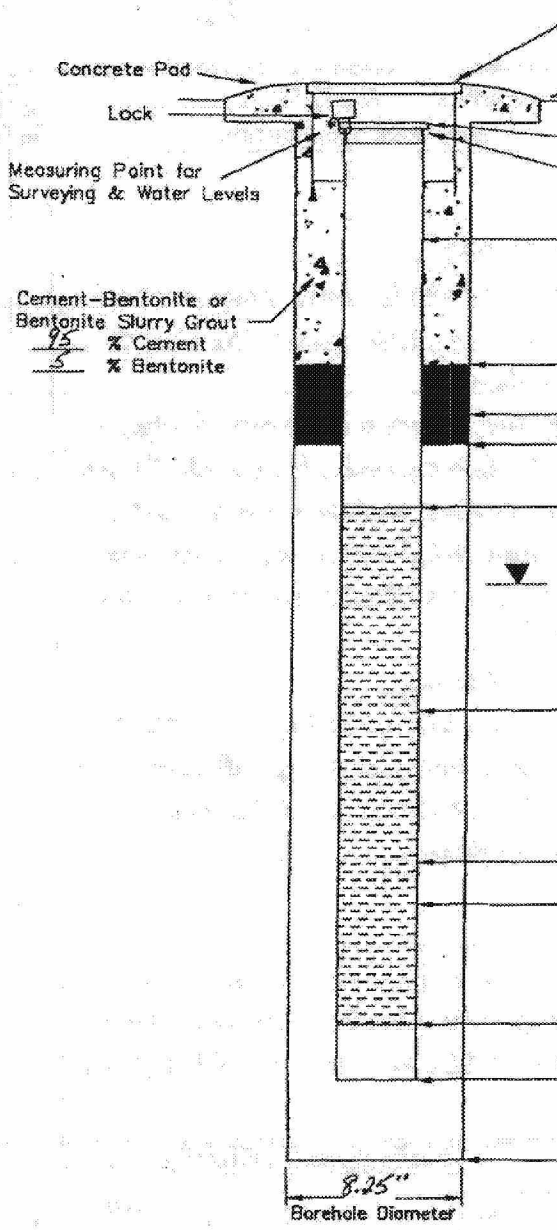
C:\Drawings\STD\Borelog5.dwg 11/02/04 at 14:24

Project No: AS-0423 Client: ASARCO Site: VB570 (OU2) WELL NO: MW-06

Well Location: 4120 Brighton Blvd., In parking lot, SW of Building 8. Date Installed: 3/24/05

Contractor: Site Services, Inc. Method: Hollow Stem Auger

MONITORING WELL CONSTRUCTION DETAIL
(Flush Mount)



	Depth from G.S. (feet)	Elevation
Top of Steel Guard Pipe	G.S.	
Ground Surface (G.S.)	G.S.	
Water Tight Cap		
Top of Riser Pipe		
Riser Pipe: Length; Inside Diameter (ID) 2"; Type of Material PVC		
Top of Bentonite Seal	1.0'	
Bentonite Seal Thickness 25.5'		
Top of Sand	26.5'	
Top of Screen	28.32'	
Stabilized Water Level, Date 6/22/05	31.65'	
Screen: Length 10'; Inside Diameter 2"; Slot Size 0.02"; Type of Material PVC		
Type/Size of Sand CO Silica #10/20		
Sand Pack Thickness 12.0'		
Bottom of Screen	38.32'	
Bottom of Tail Pipe, Length 0.18	38.5'	
Bottom of Borehole	39.0'	

EnviroGroup Limited
Englewood, Colorado

* Describe Measuring Point: Ground Surface

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WELLFLS.D

BOREHOLE LOG

CLIENT: ASARCO, INC.
PROJECT LOCATION: VB I-70 (Ouz)
PROJECT NO.: AS-0423

BH NO.: MW-05
PAGE 1 OF 4

NORTH	DRILLER: Site Services, Inc.		DATE START: 3/20/05
EAST	RIG: CME-75		DATE FINISH: 3/20/05
GRD ELEV.	BITS: 8.25" HSA	FLUIDS: N/A	TOTAL DEPTH: 38.5'
TOC ELEV.	LOGGED BY: Martina Litasi		WATER DEPTH: ~28.5'

SAMPLE TYPES:
CT Cuttings, WS Wash, SS Split Spoon, NX NX Core, DC Dry Core, (CS) Continuous Sampler, Other:

SAMPLER SPECIFICATIONS:
Length: 5 foot
O.D.: 4"
I.D.: 3"
Material: steel
Liner:
Other:

SURFACE CONDITION: Asphalt

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR PID BG	PID HS	PID Core
0							0.0-0.3 Asphalt			
1		0.7-10.2					0.3-0.7 Fill Material. Loose, brown, to dk. brown, SAND, fg. to c.g., little gravel. No odor, No Stain, damp.			
2			CS	2.3/3.5			0.7-1.7 Soft, brown to dk. brown, CLAY, tr. Silt, tr. fg to mg sand, tr. gravel, damp to moist, no odor, black stain from 0.7-0.8.			
3						NR				
4	8.25" HSA						1.7-2.3 med. stiff, brown, CLAY, some sand, fg. to c.g., little silt, no odor, no stain, damp to moist.			
5		4.5-5.0					2.3-3.5 No Recovery			
6			CS	2.1/5.0			3.5-5.6 loose, brown from 3.0-3.4, orange to red in rest., SAND, vfg to mg, little sm. pebble + gravel, red staining, no odor, moist.			
7						NR	5.1-8.5 No Recovery.			
8										
9							8.5-9.1 loose, brown + multi-colored, SAND, vfg to vcg, little gravel, tr. cobbles, no odor, FeO Stain @ 9.1', black stain from 8.8-9.0', moist			
10		9.5-10.0								

LOCATION SKETCH: 4/20 Uptown Ave. Wyatt St. MW-05 N

DENSITY:

GRANULAR:		COHESIVE:	
0-10	Loose	0-4	Soft
10-30	Med Dense	4-8	Med Stiff
30-50	Dense	8-15	Stiff
>50	Very Dense	15-30	Very Stiff

PROPORTIONS:

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

REMARKS/WEATHER: ptly cloudy slight breeze ~50-70°F

LOG STATUS:
PRELIMINARY: FINAL:

EnviroGroup Limited
Englewood, Colorado

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BOREHOLE LOG

CLIENT: ASARCO, INC.
PROJECT LOCATION: VB I-70 (UV2)
PROJECT NO.: AS-0403

BH NO.: MW-05
PAGE 2 OF 4

NORTH	DRILLER: Site Services, Inc.	DATE START: 3/28/05
EAST	RIG: CME-75	DATE FINISH: 3/28/05
GRD ELEV.	BITS: 8.25" HSA / FLUIDS: N/A	TOTAL DEPTH: 38.5'
TOC ELEV.	LOGGED BY: Martina Litasi	WATER DEPTH: ~28.5'

SAMPLE TYPES:
CT Cuttings, SS Split Spoon, DC Dry Core, WS Wash, NX NX Core, (CS) Continuous Sampler, Other:

SAMPLER SPECIFICATIONS:
Length: 5 feet, O.D.: 9", I.D.: 7", Material: Steel, Liner:, Other:

SURFACE CONDITION: Asphalt

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR FID / FID BG	HS	Core
10							9.1-10.0 loose to med. dense, brown, silt, tr. clay, tr. vfg sand, no odor, no stain, moist			
11										
12			CS	1.5/5.0		NR	10.0-13.5 No Recovery			
13										
14	8.25" HSA						13.5-16.9 Soft to med. stiff, brown, clay, little silt, tr. fg to mg. sand, large gravel from ~~[illegible]~~ 11.2-16.5', tr. black organic material, no odor, no stain, damp			
15		15.9-16.5								
16			CS	3.4/5.0			16.9-18.5 No Recovery			
17										
18						NR				
19										
20						NR				

LOCATION SKETCH

DENSITY:

GRANULAR:		COHESIVE:	
0-10	Loose	0-4	Soft
10-30	Med Dense	4-8	Med Stiff
30-50	Dense	8-15	Stiff
>50	Very Dense	15-30	Very Stiff

PROPORTIONS:

0-10%	Trace
10-20%	Little
20-35%	Some
35-50%	And

REMARKS/WEATHER

LOG STATUS:

PRELIMINARY: FINAL:

EnviroGroup Limited
Englewood, Colorado

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BOREHOLE LOG

CLIENT: ASARCO, INC.
PROJECT LOCATION: VR I-70 (OU2)
PROJECT NO.: AS-0423

BH NO.: MW-05
PAGE 3 OF 4

NORTH	DRILLER: Site Services, Inc.		DATE START: 3/20/05
EAST	RIG: CME-75		DATE FINISH: 3/20/05
GRD ELEV.	BITS: 8.25" HSA	FLUIDS: N/A	TOTAL DEPTH: 38.5'
TOC ELEV.	LOGGED BY: Martina Litasi		WATER DEPTH: ~28.5'

SAMPLE TYPES:
CT Cuttings, WS Wash, SS Split Spoon, NX NX Core, DC Dry Core, CS Continuous Sampler, Other:

SAMPLER SPECIFICATIONS:
Length: 5 foot, O.D.: 4", I.D.: 3", Material: Steel, Liner:, Other:

SURFACE CONDITION: Asphalt

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR FID BG	FID HS	FID Core
20										
21			CS	1.1/5.0		NR	18.5-19.6 loose, brown, SAND, some large gravel & cobbles, vfg to vcg, tr. silt, no odor, no stain, moist.			
22							19.6-23.5 No Recovery			
23										
24	8.25" HSA	23.5-24.1					23.5-24.8 loose, brown, SAND, some large gravel & cobbles, vfg to vcg, tr. silt, no odor, no stain, moist			
25							24.8-28.5 No Recovery			
26			CS	1.3/5.0		NR	Note: cobble stuck in core barrel			
27										
28										
29										
30						NR				

LOCATION SKETCH	DENSITY: GRANULAR		DENSITY: COHESIVE		PROPORTIONS:		REMARKS/WEATHER
	0-10	Loose	0-4	Soft	0-10%	Trace	
	10-30	Med Dense	4-8	Med Stiff	10-20%	Little	
	30-50	Dense	8-15	Stiff	20-35%	Some	
	>50	Very Dense	15-30	Very Stiff	35-50%	And	

LOG STATUS:
PRELIMINARY: FINAL:

EnviroGroup Limited
Englewood, Colorado

C:\Drawings\STD\Borelog-5.dwg 11/02/04 at 14:24

BOREHOLE LOG

CLIENT ASARCO INC.
PROJECT LOCATION VB I-70 (OU2)
PROJECT NO. AS-0423

BH NO. MW-05
PAGE 4 OF 4

NORTH	DRILLER Site Services, Inc.	DATE START 3/28/05
EAST	RIG CME-75	DATE FINISH 3/28/05
GRD ELEV.	BITS 8.25" HSA / FLUIDS N/A	TOTAL DEPTH 38.5
TOC ELEV.	LOGGED BY Martin Litasi	WATER DEPTH ~28.5

SAMPLE TYPES:
CT Cuttings — WS Wash
SS Split Spoon — NX NX Core
DC Dry Core — (CS) Continuous Sampler
Other:

SAMPLER SPECIFICATIONS:
Length 5 feet — Material Steel
O.D. 4" — Liner
I.D. 3" — Other

SURFACE CONDITION: Asphalt

DEPTH (FT.)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SOIL/ROCK DESCRIPTION	SOIL VAPOR PID BG	PID HS	PID Core
30										
31							28.5-29.6 loose, brown, sand, some large gravel & cobbles, vcg to vcg, little silt, no odor, no stain, wet.			
32			CS	1.1/5.0		NR	29.6-32.5 No Recovery			
33										
34	8.25" HSA						33.5-34.4 loose, multicolored, sand, fg grading to cg. by 33.7, tr. gravel, tr. vcg sand, little silt from 34.1-34.4, no odor, no stain, wet.			
35							34.4-34.5 brown, clay, mod. stiff. no odor, no stain, wet.			
36			CS	1.1/5.0		NR	34.5-34.6 SAND AS ABOVE.			
37							34.6-38.5 No Recovery.			
38							TD = 38.5' set 2" well (PVC)			
39										
40										

LOCATION SKETCH	DENSITY: GRANULAR		DENSITY: COHESIVE		PROPORTIONS:		REMARKS/WEATHER
N↑	0-10	Loose	0-4	Soft	0-10%	Trace	
	10-30	Med Dense	4-8	Med Stiff	10-20%	Little	
	30-50	Dense	8-15	Stiff	20-35%	Some	
	>50	Very Dense	15-30	Very Stiff	35-50%	And	

LOG STATUS:
PRELIMINARY: X FINAL:

EnviroGroup Limited
Englewood, Colorado

C:\Drawings\STD\Borehole5.dwg 11/02/04 at 14:24

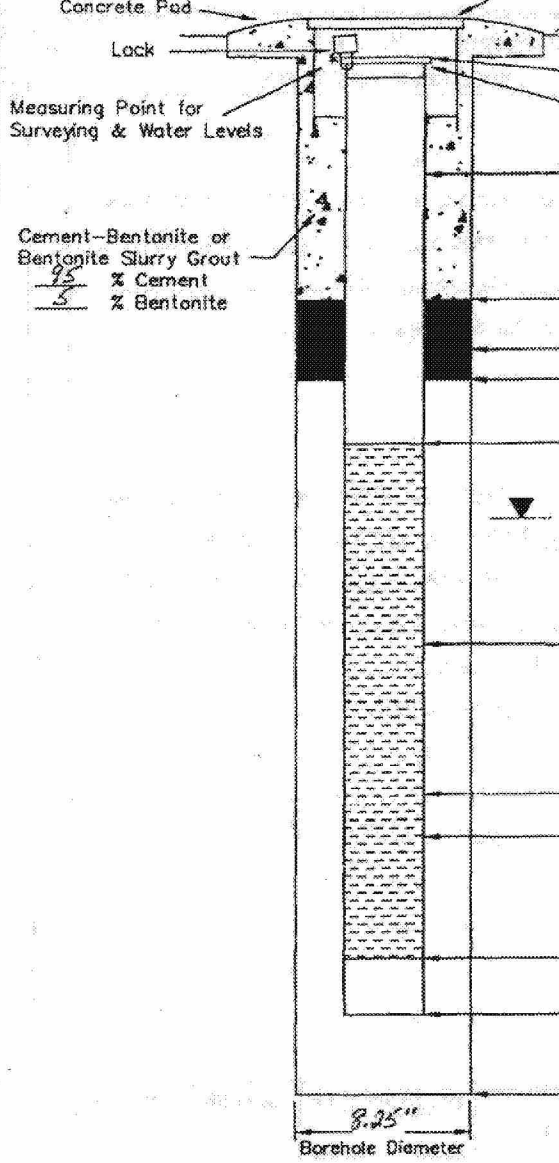
C:\Drawings\STD\WELLFLS.DWG, 11/0. at 14:28

Project No: AS-0423 Client: ASARCO Site: VB570 (OU2) **WELL NO: MW-05**

Well Location: 4120 Brighton Blvd, SW side of loading dock area in center of property, off of Wynkoop St. Date Installed: 3/28/05

Contractor: Site Services, Inc. Method: Hollow Stem Auger

MONITORING WELL CONSTRUCTION DETAIL
(Flush Mount)



	Depth from G.S. (feet)	Elevation
Top of Steel Guard Pipe	G.S.	
Ground Surface (G.S.)	G.S.	
Water Tight Cap		
Top of Riser Pipe		
Riser Pipe: Length; Inside Diameter (ID) 2"; Type of Material PVC		
Top of Bentonite Seal	1.0	
Bentonite Seal Thickness 25.0'		
Top of Sand	26.0'	
Top of Screen	28.32'	
Stabilized Water Level; Date 6/22/05	29.91'	
Screen: Length 10'; Inside Diameter 2"; Slot Size 0.02"; Type of Material PVC		
Type/Size of Sand CO Silica #10/20		
Sand Pack Thickness 12.5'		
Bottom of Screen	38.32'	
Bottom of Tail Pipe; Length 0.18	38.5'	
Bottom of Borehole	38.5'	

EnviroGroup Limited
Englewood, Colorado

* Describe Measuring Point: Ground Surface

WELLFLS.D