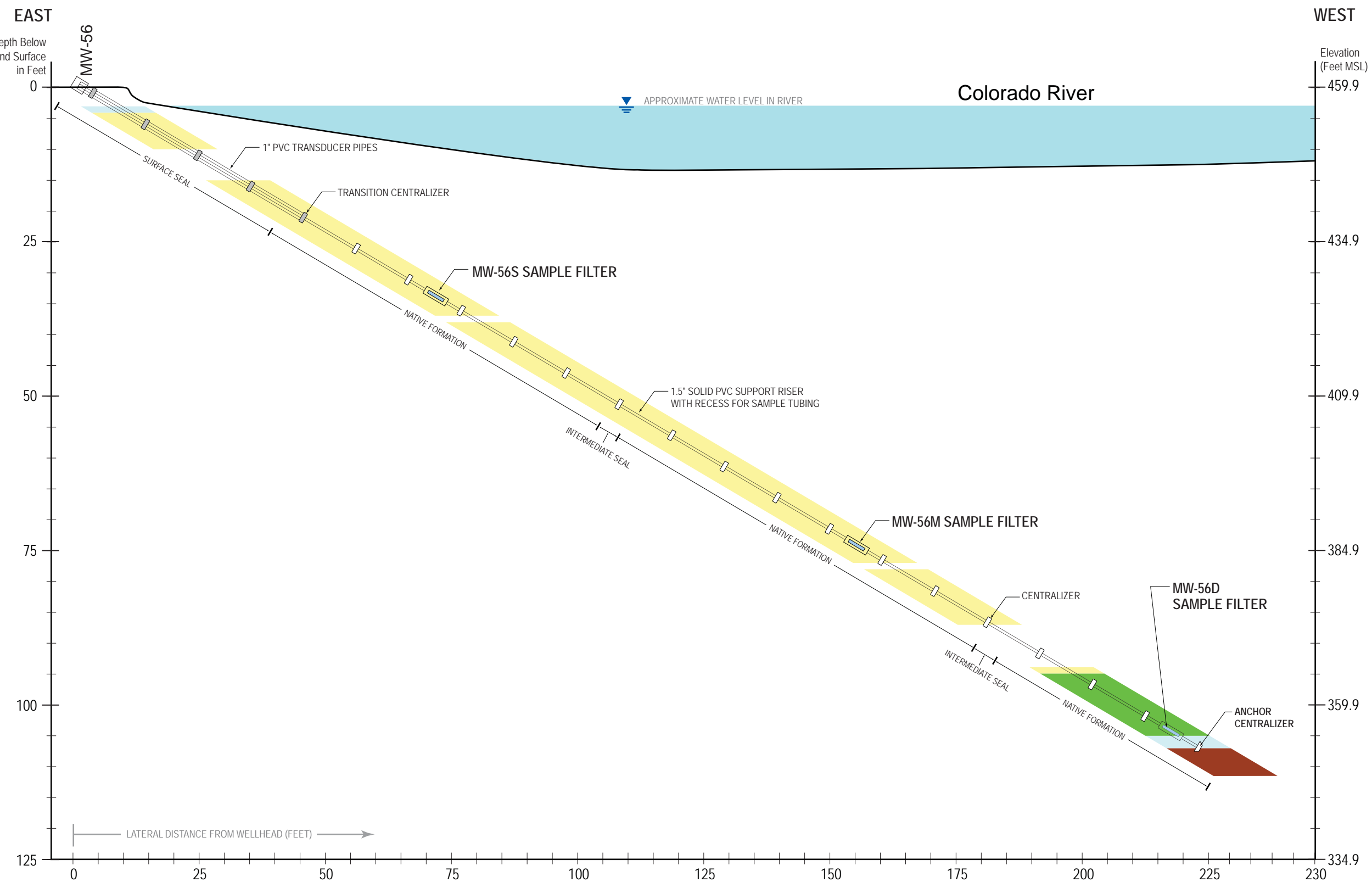


% Gravel	% Sand	% Sand	% Sand	% Fine	USCS
5	31	32	32	100	NR SW SP
			98	2	SP NR
			98	2	SP
		10	88	2	SP
15			85		SP
2	10	10	78		SP
			90		SP
	10		85	5	SP
			90	10	SP
		10	85	5	SP
5			85	10	SP
20			80		SP
2		20	78		SP
					NR
15			80	5	SP
60			10	30	GM
10	30	30	30		SW
					BR

Contacts are generalized.
Refer to boring log for precise depths and description.

LEGEND

 SP	 GM
 SW	 BR
	 NR - No Recovery



Well Construction Information

Drilling Contractor: Prosonic/Boart-Longyear (Driller-Denzil Roberts)
 Drilling Method: Rotasonic
 Drilling Start: April 9, 2008
 Drilling End: April 13, 2008
 Well Installation Complete: April 20, 2008
 Logged By: Rob Tweidt (Northstar)

Borehole Diameter: 6 inches
 Borehole Angle: 30 Degrees from Horizontal
 Borehole Azimuth: 270 Degrees
 Drilled Borehole Depth: 223 feet

Annular Materials:
 Native Formation - Native sands and gravels as logged.
 Intermediate Seal - Native sands and gravels with bentonite slurry grout (10 gallons injected at depths indicated).
 Surface Seal - Portland cement grout.

Completion Type: 10" steel monument casing placed at an angle within 3'x3'x4" concrete pad.

- Notes:**
- Drawing scale is approximate.
 - Lithology is conceptual. Color bands should not be interpreted as laterally extensive stratigraphic units.
 - River bed depth estimated from "Transect B" of July 2005 Riverbed Survey.

**MULTI-LEVEL MONITORING
WELL CONSTRUCTION DIAGRAM
MW-56 LOCATION**
 PG&E TOPOCK COMPRESSOR STATION
 NEEDLES, CALIFORNIA

SOIL BORING LOG

PROJECT NAME: Topock AZ Drilling		HOLE DEPTH (ft): 223.0	DRILLING CONTRACTOR: Boart-Longyear (Denzil Roberts)	
SURFACE ELEVATION (NAVD 88): 459.9 ft. MSL	NORTHING (CCS NAD 83 Z 5): 2,101,569.18	EASTING (CCS NAD 83 Z 5): 7,617,644.91	DATE STARTED: 4/9/2008	DATE COMPLETED: 4/13/2008
DRILLING METHOD: Rotosonic - continuous core			DRILLING EQUIPMENT: 4" core barrel, 6" casing	
LOCATION: Site AB-2 - Alternate			LOGGED BY: C. Kreller	

DEPTH BGS (feet)	SAMPLE				USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	ISOFLOW SAMPLE	SOIL SAMPLE			
40		20			SP	POORLY GRADED SAND (SP) - Yellowish brn (10YR 5/6), 100% fn sand, loose, slightly moist.	
45			MW56-GGW-01				Isoflow sample #1: 43-53' bgs Sample ID: MW56-GGW-01
50				CS			Collect soil sample MW56-CS-49-50
55		10				- SP AS ABOVE: yellowish brn (10YR 5/4), increase in med sand [10%med sand, 88% fn sand, 2% silt]	
60				CS	SP		Collect soil sample MW56-CS-59-60
65			MW56-GGW-02				Isoflow #2: 63-73' bgs Water used: 170 gallons Sample ID: MW56-GGW-02
70		13		CS		- POORLY GRADED SAND with GRAVEL (SP): yellowish brown (10YR5/4), 15% subrnd-rnd gravel, 85% fn-cse sand	Collect soil sample MW56-CS-69-70

SOIL BORING LOG

PROJECT NAME: Topock AZ Drilling		HOLE DEPTH (ft): 223.0	DRILLING CONTRACTOR: Boart-Longyear (Denzil Roberts)	
SURFACE ELEVATION (NAVD 88): 459.9 ft. MSL	NORTHING (CCS NAD 83 Z 5): 2,101,569.18	EASTING (CCS NAD 83 Z 5): 7,617,644.91	DATE STARTED: 4/9/2008	DATE COMPLETED: 4/13/2008
DRILLING METHOD: Rotosonic - continuous core			DRILLING EQUIPMENT: 4" core barrel, 6" casing	
LOCATION: Site AB-2 - Alternate			LOGGED BY: C. Kreller	

DEPTH BGS (feet)	SAMPLE				USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	ISOFLOW SAMPLE	SOIL SAMPLE			
75		0				<p>POORLY GRADED SAND (SP)- Yellowish brn (10YR 5/6), 100% fn sand, loose, slightly moist.</p> <p>- (at 70'bgs) SP AS ABOVE: 2% subrnd gravel, 98% subrnd sand [10% cse sand, 10% med sand, 78% fn sand], no fines, very moist. Iron oxide staining present.</p>	
80		5			CS	<p>- SP AS ABOVE: greyish brn (10YR 5/2)</p>	Collect soil sample MW56-CS-79-80
85		10	MW56-GGW-03			<p>- POORLY GRADED SAND with GRAVEL (SP): dk greysih brn (10YR 4/2), composition change to 15% subrnd-rnd fn-cse gravel and 85% fn-cse sand, significant organic (wood) material present.</p> <p>- SP AS ABOVE: gravel content decreases, predominantly fn-cse sand with trace subrnd-rnd fn-cse gravel (up to 2.5 cm), very moist.</p>	Isoflow #3: 83-93' bgs Water used: 150 gallons Sample ID: MW56-GGW-03 Drill rate = 1.1 ft/min Collect MW56-WOOD-86
90					CS		Collect soil sample MW56-CS-89-90
95		10					
100					CS		Collect soil sample MW56-CS-99-100
105						<p>- SP AS ABOVE: Composition change to 85% fn sand, 10% cse sand, 5% fines.</p> <p>- SP AS ABOVE: dk grey (10YR 4/1) med sand layer</p>	Isoflow #4: 103-113' bgs Water used: 150 gallons Sample ID: MW56-GGW-04

SOIL BORING LOG

PROJECT NAME: Topock AZ Drilling		HOLE DEPTH (ft): 223.0	DRILLING CONTRACTOR: Boart-Longyear (Denzil Roberts)	
SURFACE ELEVATION (NAVD 88): 459.9 ft. MSL	NORTHING (CCS NAD 83 Z 5): 2,101,569.18	EASTING (CCS NAD 83 Z 5): 7,617,644.91	DATE STARTED: 4/9/2008	DATE COMPLETED: 4/13/2008
DRILLING METHOD: Rotosonic - continuous core			DRILLING EQUIPMENT: 4" core barrel, 6" casing	
LOCATION: Site AB-2 - Alternate			LOGGED BY: C. Kreller	

DEPTH BGS (feet)	SAMPLE				USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	ISOFLOW SAMPLE	SOIL SAMPLE			
110		10	MW56-GGW-04	CS	SP	<p>POORLY GRADED SAND (SP)- Yellowish brn (10YR 5/6), 100% fn sand, loose, slightly moist.</p> <p>- SP AS ABOVE: dk grey (10YR 4/1), 98% fn sand, 2% silt</p>	Collect soil sample MW56-CS-109-110
115		10				- SP AS ABOVE: very dk greyish brn (10YR 3/2), 90% fn sand, 10% fines.	
120				CS		- SP AS ABOVE: very dk greyish brn (10YR 3/2), with very dk grey (10YR 4/1) mottling throughout, wet.	Collect soil sample MW56-CS-119-120
125		10	MW56-GGW-05		SP	- SP AS ABOVE: less fines, presence of organic (wood) material, 85% fn sand, 10% med sand, 5% fines, very moist.	Isoflow #5: 123-133' bgs Water used: 150 gallons Sample ID: MW56-GGW-05
130				CS		- SP AS ABOVE: greysih brn (10YR 5/2)	Collect soil sample MW56-CS-129-130
135		10				- SP AS ABOVE: dk greyish brn (10YR 4/2), 5% subrnd gravel (up to 5 cm), 85% fn sand, 10% fines, organic (wood) material present, wet.	
140				CS			Collect soil sample MW56-CS-139-140

SOIL BORING LOG

PROJECT NAME: Topock AZ Drilling		HOLE DEPTH (ft): 223.0	DRILLING CONTRACTOR: Boart-Longyear (Denzil Roberts)	
SURFACE ELEVATION (NAVD 88): 459.9 ft. MSL	NORTHING (CCS NAD 83 Z 5): 2,101,569.18	EASTING (CCS NAD 83 Z 5): 7,617,644.91	DATE STARTED: 4/9/2008	DATE COMPLETED: 4/13/2008
DRILLING METHOD: Rotasonic - continuous core			DRILLING EQUIPMENT: 4" core barrel, 6" casing	
LOCATION: Site AB-2 - Alternate			LOGGED BY: C. Kreller	

DEPTH BGS (feet)	SAMPLE				USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	ISOFLOW SAMPLE	SOIL SAMPLE			
145		13	MW56-GGW-06		SP	<p>POORLY GRADED SAND (SP)- Yellowish brn (10YR 5/6), 100% fn sand, loose, slightly moist.</p> <p>- SP AS ABOVE: dk greyish brn (10YR 4/2); very moist. Small lenses of very dk grey (2.5YR 3/1) present, wood present at 142' and 144'.</p> <p>- SP AS ABOVE: Increase in concentration of cse sand.</p> <p>- POORLY GRADED SAND with GRAVEL (SP): Composition change to 20% subrnd-rnd fn-cse gravel (up to 7.5 cm), 80% fn sand.</p>	<p>Collect MW-56-142 wood sample Sample ID: MW56-GGW-03 Collect MW-56-144 wood sample</p> <p>Isoflow #6: 143-153' bgs Water used: 150 gallons Sample ID: MW56-GGW-06</p>
150				CS		<p>Collect soil sample MW56-CS-149-150</p>	
155		0				<p>- SP AS ABOVE: dk grey (10YR4/1)</p> <p>- Poor recovery from 153' to 155'</p>	<p>Collect MW-56-151 wood sample</p>
160		5		CS		<p>- SP AS ABOVE: dk grey (10YR 3/1), 78% fn sand, 20% med sand, 2% subrnd-rnd gravel (up to 2.5 cm), moist.</p>	<p>Collect soil sample MW56-CS-159-160</p>
165		13	MW56-GGW-07			<p>- 6-inch interval of organic material (wood)</p>	<p>Isoflow #7: 163-173' bgs Water used: 170 gallons Sample ID: MW56-GGW-07 Collect MW-56-164 wood sample</p>
170				CS		<p>- SP AS ABOVE: very dk grey (10YR 3/1), 2% subrnd-rnd gravel (up to 6.5 cm), 98% fn-med sand, moist. 6-inch interval of organic material (wood) present.</p>	<p>Collect soil sample MW56-CS-169-170</p>
175						<p>- 6-inch interval of black organic material (wood)</p> <p>No recovery</p>	<p>Collect MW-56-172 wood sample</p>

SOIL BORING LOG

PROJECT NAME: Topock AZ Drilling		HOLE DEPTH (ft): 223.0	DRILLING CONTRACTOR: Boart-Longyear (Denzil Roberts)	
SURFACE ELEVATION (NAVD 88): 459.9 ft. MSL	NORTHING (CCS NAD 83 Z 5): 2,101,569.18	EASTING (CCS NAD 83 Z 5): 7,617,644.91	DATE STARTED: 4/9/2008	DATE COMPLETED: 4/13/2008
DRILLING METHOD: Rotosonic - continuous core			DRILLING EQUIPMENT: 4" core barrel, 6" casing	
LOCATION: Site AB-2 - Alternate			LOGGED BY: C. Kreller	

DEPTH BGS (feet)	SAMPLE				USCS CODE	SOIL DESCRIPTION SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	COMMENTS DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	ISOFLOW SAMPLE	SOIL SAMPLE			
180		0			NR	No recovery	Drill rate = 1.5 ft/min Isoflow #8: 183-193' bgs Water used: 220 gallons Sample ID: MW56-GGW-08
185			MW56-GGW-08				
190		3		CS	SP	<u>POORLY GRADED SAND with GRAVEL (SP)</u> - Very dk greyish brn (2.5YR 3/2), 15% gravel (up to 6 cm), 80% fn sand, 5% fines, loose, slightly moist.	
195		10				<u>SILTY GRAVEL (GM)</u> - Very dk brn (10YR 2/2), 60% ang-subang gravel (up to 10 cm), 10% fn sand, 30% fines, poorly graded, gravel becomes well rnd with depth	Drill rate from 193-213' = 5.0 ft/min
200				CS			Collect soil sample MW56-CS-199-200
205		10					Isoflow #9: 203-213' bgs Water used: 300 gallons Sample ID: MW56-GGW-09
210			MW56-GGW-09	CS			Collect soil sample MW56-CS-209-210

SOIL BORING LOG

PROJECT NAME: Topock AZ Drilling		HOLE DEPTH (ft): 223.0	DRILLING CONTRACTOR: Boart-Longyear (Denzil Roberts)	
SURFACE ELEVATION (NAVD 88): 459.9 ft. MSL	NORTHING (CCS NAD 83 Z 5): 2,101,569.18	EASTING (CCS NAD 83 Z 5): 7,617,644.91	DATE STARTED: 4/9/2008	DATE COMPLETED: 4/13/2008
DRILLING METHOD: Rotosonic - continuous core			DRILLING EQUIPMENT: 4" core barrel, 6" casing	
LOCATION: Site AB-2 - Alternate			LOGGED BY: C. Kreller	

DEPTH BGS (feet)	SAMPLE				USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	ISOFLOW SAMPLE	SOIL SAMPLE			
215		10			SW	WELL GRADED SAND WITH GRAVEL (SW) - Yellowish brn (10YR), 10% gravel (up to 3 cm), 90% subang-subrnd sand, no fines, well graded, sand is fining upwards, wet.	Drill rate from 213-219' = 0.4 ft/min Drill rate from 219-223' = 0.2 ft/min Collect soil sample MW56-CS-219-220
220				BR	MIOCENE CONGLOMERATE (BR) - Reddish brn (2.5YR 4/4), consolidated, dry. - Pulverized by drilling.		
		3		CS			
Boring Terminated at 223 ft							
<p>ABBREVIATIONS</p> <p>cc = continuous core run brn = brown lt = light dk = dark vf = very fine-grained fn = fine-grained med = medium-grained cse = coarse-grained vc = very coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded br = bedrock formation ss = sandstone conglom = conglomerate comptd = compacted qtz = quartz</p>							