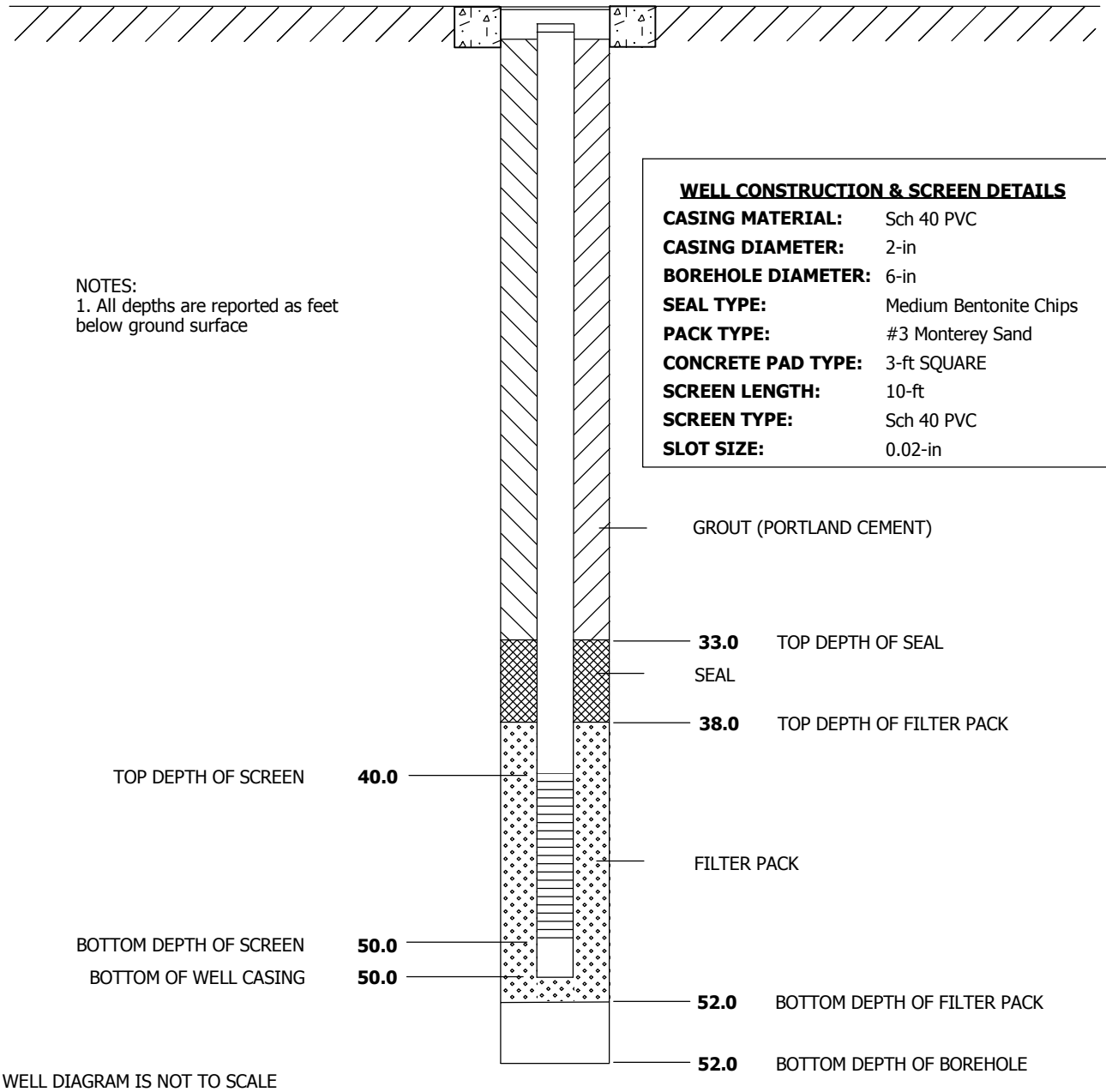
WELL COMPLETION DIAGRAM

PROJECT NO: 382653.FP.04.FW	**PROJECT:** PG&E Topock - ERGI	**WELL NO:** ***MW-57-050***
LOCATION: Site B		

DRILLING CONTRACTOR: Boart Longyear (D. Roberts)	**DRILLING START:** 1/21/2009
DRILLING METHOD: Rotosonic	**DRILLING END:** 1/21/2009
LOGGER: A. Brewster (Northstar)	**WELL COMPLETION DATE:** 1/21/2009
GROUND SURFACE ELEVATION (NAVD 88): 508.97 ft AMSL	**GENERAL REMARKS:** Alias during field work: MW-57S
NORTHING (CCS NAD 83 Z 5): 2100906.35 / **EASTING (CCS NAD 83 Z 5):** 7616384.35	

12-IN DIAMETER WELL VAULT (FLUSH WITH GRADE)



NOTES:
1. All depths are reported as feet below ground surface

WELL CONSTRUCTION & SCREEN DETAILS

CASING MATERIAL:	Sch 40 PVC
CASING DIAMETER:	2-in
BOREHOLE DIAMETER:	6-in
SEAL TYPE:	Medium Bentonite Chips
PACK TYPE:	#3 Monterey Sand
CONCRETE PAD TYPE:	3-ft SQUARE
SCREEN LENGTH:	10-ft
SCREEN TYPE:	Sch 40 PVC
SLOT SIZE:	0.02-in

WELL DIAGRAM IS NOT TO SCALE

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
382653.FP.04.FW	MW-57 SHEET 1 OF 11

SOIL BORING LOG

PROJECT : PG&E Topock - ERGI
LOCATION : Site B (2100899.6 N, 7616389.4 E)
ELEVATION : 509.0 ft
DRILLING CONTRACTOR : Boart Longyear (D. Roberts)
DRILLING EQUIPMENT AND METHOD : Track-mounted Rig, Rotosonic drill head and tools
ORIENTATION : Vertical
WATER LEVELS : Approx. 52 ft BGS
START : 1/14/2009
END : 1/20/2009
LOGGER : A. Brewster (Northstar)

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	LAB SAMPLE	USCS CODE/ LITHOLOGY	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		COMPLETE		ML	**Sandy Silt With Gravel (ML)** 0.0-3.0' - dark brown, (7.5YR 3/3), dry, loose, 20% gravel, 30% sand, 50% fines, angular gravel, poorly graded, no dominant mineralogy, matrix-supported, max clast size = 10 mm		Boring initially drilled to 70' bgs using Rotosonic tools up to 10-in in diameter. Permanent 5-in PVC conductor casing installed from ground surface to 70' bgs (portland cement grout). Boring drilled from 70' bgs to total depth of 192' bgs using diamond bit rotary core tools (HQ-size, 3.8-in diameter)
	3.0 4.0		10:10	GM	**Silty Gravel (GM)** 3.0-46.0' - dark brown, (7.5YR 3/3), dry, loose, 40% gravel, 20% sand, 40% fines, angular gravel, poorly graded, no dominant mineralogy, matrix-supported, max clast size = 100 mm		
5							
	8.0 9.0		11:00, 14:00 (FD)				
10							
15							
	18.0 19.0		11:10				
20							

PROJECT NUMBER:	BORING NUMBER:
382653.FP.04.FW	MW-57 SHEET 2 OF 11

SOIL BORING LOG

PROJECT : PG&E Topock - ERGI
LOCATION : Site B (2100899.6 N, 7616389.4 E)
ELEVATION : 509.0 ft
DRILLING CONTRACTOR : Boart Longyear (D. Roberts)
DRILLING EQUIPMENT AND METHOD : Track-mounted Rig, Rotosonic drill head and tools
ORIENTATION : Vertical
WATER LEVELS : Approx. 52 ft BGS
START : 1/14/2009
END : 1/20/2009
LOGGER : A. Brewster (Northstar)

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	LAB SAMPLE	USCS CODE/ LITHOLOGY	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
25		COMPLETE			**Silty Gravel (GM)** 3.0-46.0' - dark brown, (7.5YR 3/3), dry, loose, 40% gravel, 20% sand, 40% fines, angular gravel, poorly graded, no dominant mineralogy, matrix-supported, max clast size = 100 mm		
30				GM			
35							
40							

PROJECT NUMBER: 382653.FP.04.FW	BORING NUMBER: MW-57	SHEET 3 OF 11

SOIL BORING LOG

PROJECT : PG&E Topock - ERGI

LOCATION : Site B (2100899.6 N, 7616389.4 E)

ELEVATION : 509.0 ft

DRILLING CONTRACTOR : Boart Longyear (D. Roberts)

DRILLING EQUIPMENT AND METHOD : Track-mounted Rig, Rotosonic drill head and tools

ORIENTATION : Vertical

WATER LEVELS : Approx. 52 ft BGS

START : 1/14/2009

END : 1/20/2009

LOGGER : A. Brewster (Northstar)

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	LAB SAMPLE	USCS CODE/ LITHOLOGY	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		COMPLETE		GM	**Silty Gravel (GM)** 3.0-46.0' - dark brown, (7.5YR 3/3), dry, loose, 40% gravel, 20% sand, 40% fines, angular gravel, poorly graded, no dominant mineralogy, matrix-supported, max clast size = 100 mm		
45							
				Tmc	**Conglomerate (Tmc)** 46.0-145.5' - bedrock is consolidated. Drilling method pulverizes most of the core. Intact portions of core are yellowish red (5YR 4/6), dry, matrix-supported conglomerate with no dominant clast mineralogy		
50							
55							
60							

PROJECT NUMBER: 382653.FP.04.FW	BORING NUMBER: MW-57	SHEET 4 OF 11

SOIL BORING LOG

PROJECT : PG&E Topock - ERGI
LOCATION : Site B (2100899.6 N, 7616389.4 E)
ELEVATION : 509.0 ft
DRILLING CONTRACTOR : Boart Longyear (D. Roberts)
DRILLING EQUIPMENT AND METHOD : Track-mounted Rig, Rotosonic drill head and tools
ORIENTATION : Vertical
WATER LEVELS : Approx. 52 ft BGS
START : 1/14/2009
END : 1/20/2009
LOGGER : A. Brewster (Northstar)

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	LAB SAMPLE	USCS CODE/ LITHOLOGY	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
65		COMPLETE		Tmc	**Conglomerate (Tmc)** 46.0-145.5' - bedrock is consolidated. Drilling method pulverizes most of the core. Intact portions of core are yellowish red (5YR 4/6), dry, matrix-supported conglomerate with no dominant clast mineralogy		
70	70.0				Begin rock coring from 70.0 ft bgs See the next page for the rock core log.		Boring by Rotosonic completed 1/14/09. Install permanent 5-in diameter PVC conductor casing (portland cement grout). Begin rotary core drilling at 70.0' bgs.
75							
80							

PROJECT NUMBER: 382653.FP.04.FW	BORING NUMBER: MW-57	SHEET 5 OF 11

ROCK CORE LOG

PROJECT : PG&E Topock - ERGI
LOCATION : Site B (2100899.6 N, 7616389.4 E)
ELEVATION : 509.0 ft
DRILLING CONTRACTOR : Boart Longyear (D. Roberts)
CORING EQUIPMENT AND METHOD : Track-mounted Rig, LF-70 Drill Head and HQ-sized tools (diamond bit)
ORIENTATION : Vertical
WATER LEVELS : Approx. 52 ft BGS
START : 1/14/2009
END : 1/20/2009
LOGGER : A. Brewster (Northstar)

DEPTH AND ELEVATION BELOW SURFACE (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, HARDNESS, WEATHERING, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
	70.0					**No Recovery** 70-75.3'	
	R1 5.3 ft 0%	0	NR				
75	75.3						R1 = 23.0 min
			0			**Conglomerate (Tmc)** 75.3-145.5' - light brown, (5YR 5/6), no dominant clast mineralogy, fine to coarse grained, medium strong (R3), unweathered, matrix-supported, massive	
			0				
			0				
			0				
	R2 9.5 ft 103%	100	0				
80			0				
			0				
			0				
			0				
			0				
	84.8		0				Added Approx. 50 gallons of water
85			0				
			0				
			0				
			0				
	R3 10 ft 100%	100	0				
90							

PROJECT NUMBER: 382653.FP.04.FW	BORING NUMBER: MW-57	SHEET 6 OF 11

ROCK CORE LOG

PROJECT : PG&E Topock - ERGI

LOCATION : Site B (2100899.6 N, 7616389.4 E)

ELEVATION : 509.0 ft

DRILLING CONTRACTOR : Boart Longyear (D. Roberts)

CORING EQUIPMENT AND METHOD : Track-mounted Rig, LF-70 Drill Head and HQ-sized tools (diamond bit)

ORIENTATION : Vertical

WATER LEVELS : Approx. 52 ft BGS

START : 1/14/2009

END : 1/20/2009

LOGGER : A. Brewster (Northstar)

DEPTH AND ELEVATION BELOW SURFACE (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, HARDNESS, WEATHERING, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
			0			**Conglomerate (Tmc)** 75.3-145.5' - light brown, (5YR 5/6), no dominant clast mineralogy, fine to coarse grained, medium strong (R3), unweathered, matrix-supported, massive	
			0				
			0				
			0				
			0				Added approx. 25 gallons of water. R3 = 10.0 min
95	94.8						
			0				
			0				
			0				
			1	98.5, 99.0' - Joint, 35 deg, rough, undulating, reddish staining, tight		98.5-98.7' - slightly weathered	
100	R4 10 ft 100%	70	1				
			0				
			0				
			0				
			>10	103.0-105.0' - Multiple breaks, difficult to ascertain if jointed or caused by drilling.			
			>10				R4 = 10.5 min
105	104.8						
			0				
			0				
			0				
			0				
110	R5 10 ft 100%	97	0				

PROJECT NUMBER: 382653.FP.04.FW	BORING NUMBER: MW-57	SHEET 7 OF 11

ROCK CORE LOG

PROJECT : PG&E Topock - ERGI
LOCATION : Site B (2100899.6 N, 7616389.4 E)
ELEVATION : 509.0 ft
DRILLING CONTRACTOR : Boart Longyear (D. Roberts)
CORING EQUIPMENT AND METHOD : Track-mounted Rig, LF-70 Drill Head and HQ-sized tools (diamond bit)
ORIENTATION : Vertical
WATER LEVELS : Approx. 52 ft BGS
START : 1/14/2009
END : 1/20/2009
LOGGER : A. Brewster (Northstar)

DEPTH AND ELEVATION BELOW SURFACE (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, HARDNESS, WEATHERING, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
			0			**Conglomerate (Tmc)** 75.3-145.5' - light brown, (5YR 5/6), no dominant clast mineralogy, fine to coarse grained, medium strong (R3), unweathered, matrix-supported, massive	
			0				
			0				
			1	113.1' - Joint, 35 deg, rough, undulating, reddish staining, tight			
			0				Added approx. 25 gallons of water. R5 = 12.5 min
115	114.8						
			0				
			0				
			0				
			0				
	R6 10 ft 100%	100	1	119.3' - Joint, 35 deg, rough, planar, reddish staining, tight			
120							
			0				
			0				
			0				
			0				
			0				R6 = 14.0 min
125	124.8						
			0				
			0				
			0				
			0				
	R7 9.9 ft 100%	100	0				
130							

PROJECT NUMBER: 382653.FP.04.FW	BORING NUMBER: MW-57	SHEET 8 OF 11

ROCK CORE LOG

PROJECT : PG&E Topock - ERGI

LOCATION : Site B (2100899.6 N, 7616389.4 E)

ELEVATION : 509.0 ft

DRILLING CONTRACTOR : Boart Longyear (D. Roberts)

CORING EQUIPMENT AND METHOD : Track-mounted Rig, LF-70 Drill Head and HQ-sized tools (diamond bit)

ORIENTATION : Vertical

WATER LEVELS : Approx. 52 ft BGS

START : 1/14/2009

END : 1/20/2009

LOGGER : A. Brewster (Northstar)

DEPTH AND ELEVATION BELOW SURFACE (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, HARDNESS, WEATHERING, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
			0			**Conglomerate (Tmc)** 75.3-145.5' - light brown, (5YR 5/6), no dominant clast mineralogy, fine to coarse grained, medium strong (R3), unweathered, matrix-supported, massive	
			0				
			0				
			1	133' - Joint, 35 deg, rough, planar, < 1 mm calcite infilling, reddish staining, tight (likely caused by drilling)			
	134.7		0				R7 = 15.0 min
135			1	135' - Joint, 60 deg, rough, undulating, < 2 mm calcite infilling, reddish staining, tight			
			0				
			1	137.1' - Joint, 35 deg, rough, undulating, reddish staining, minor yellow staining, tight			
			0				
	R8 10.1 ft 100%	100	0				
140			0				
			1	141' - Joint, 80 deg, rough, undulating, reddish staining, tight (likely caused by drilling)			
			0				
			0				
			1	144' - Joint, 45 deg, rough, stepped, reddish staining, tightness uncertain			R8 = 14.5 min
145	144.8						
			0			145.5-153.1' - moderate reddish orange, (10R 6/6), no dominant clast mineralogy, fine to coarse grained, medium strong (R3), completely weathered, matrix-supported, foliated	Conglomerate from 144.5.-153.1 is altered. The matrix of the rock rapidly dissolves on contact with water as evident from the outer portion of the recovered core exposed to drilling fluids and fragments of core intentionally submersed in water.
			0				
			0	146.8-152.6' - Multiple fractures caused by drilling. Preferential clevage 25 to 35 deg, undulating, slickensided, no infill, reddish staining			
			0				
	R9 10.1 ft 99%	98	0				
150							

PROJECT NUMBER: 382653.FP.04.FW	BORING NUMBER: MW-57	SHEET 9 OF 11

ROCK CORE LOG

PROJECT : PG&E Topock - ERGI
LOCATION : Site B (2100899.6 N, 7616389.4 E)
ELEVATION : 509.0 ft
DRILLING CONTRACTOR : Boart Longyear (D. Roberts)
CORING EQUIPMENT AND METHOD : Track-mounted Rig, LF-70 Drill Head and HQ-sized tools (diamond bit)
ORIENTATION : Vertical
WATER LEVELS : Approx. 52 ft BGS
START : 1/14/2009
END : 1/20/2009
LOGGER : A. Brewster (Northstar)

DEPTH AND ELEVATION BELOW SURFACE (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DISCONTINUITIES – DESCRIPTION: DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	LITHOLOGY: ROCK TYPE, COLOR, MINERALOGY, TEXTURE, HARDNESS, WEATHERING, AND ROCK MASS CHARACTERISTICS	COMMENTS: SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
			0			**Conglomerate (Tmc)** 145.5-153.1' - moderate reddish orange, (10R 6/6), no dominant clast mineralogy, fine to coarse grained, medium strong (R3), completely weathered, matrix-supported, foliated	
			0				
			0				
			0	153.5, 154.5' - Mechanical break, 35 deg, undulating to planar, brownish with black staining, no infill, slickensided, tight		**Metaconglomerate (Tmc)** 153.1-154.6' - dark yellowish orange, (10YR 6/6), strong (R4), unweathered, massive, moderate HCl reaction, conglomerate matrix has been largely replaced with minerals that have a moderate reaction with HCl, however relict conglomerate structure is apparent.	R9 = 17.5 min
155	154.9		0	154.6-155.6' - Fracture zone, healed fractures with random orientation			
	R10 4.8 ft 100%	58	>10			**Altered Metadiorite (pTbr)** 154.6-155.6' - moderate yellowish brown, (10YR 5/4), largely felsic mineralogy, medium grained, strong (R4), unweathered, no HCL reaction, portions of this interval exhibit mylonitic texture	
			0				
			0				
			1	158.2' - Joint, 60 deg dip along multiple planes, rough, undulating, < 1 mm calcite infilling covering 50% of one plane, yellowish staining, tightness uncertain		**Metadiorite (pTbr)** 155.6-191.9' - dusky yellowish green, (10GY 3/2), intermediate (dioritic) mineralogy, fine to medium grained, strong (R4), unweathered, massive to foliated	General Note: The metadiorite bedrock exhibits many small healed fractures (1-3 mm) of somewhat random orientation. These healed fractures create weaknesses in the rock. It can be difficult to determine if the metadiorite is jointed in-situ, or if the discontinuities are caused by the drilling method. Intervals with fracture per foot counts >10 are likely caused by drilling.
	159.7		0				
160							
			0				
	R11 4.7 ft 100%	51	>10	160.9-164.2' - Fracture zone, reddish staining, yellow staining from 162.3-164.2'			R10 = 23.0 min
			>10				
			>10				
	164.4		0				R11 = 13.3 min
165							
			0				
	R12 4.6 ft 100%	53	1	166.1' - Mechanical break, near 90 deg, calcite infilling, calcite healed fracture, most likely induced by drilling		166.8-167.0' - slightly weathered	
			0	167.7-170.0' - Mechanical break (6), 35 deg and 45 deg, calcite infilling, along calcite healed fractures, likely induced by drilling			
	169.0		0				R12 = 19.3 min
170							

PROJECT NUMBER: 382653.FP.04.FW	BORING NUMBER: MW-57	SHEET 10 OF 11

ROCK CORE LOG

PROJECT : PG&E Topock - ERGI
LOCATION : Site B (2100899.6 N, 7616389.4 E)
ELEVATION : 509.0 ft
DRILLING CONTRACTOR : Boart Longyear (D. Roberts)
CORING EQUIPMENT AND METHOD : Track-mounted Rig, LF-70 Drill Head and HQ-sized tools (diamond bit)
ORIENTATION : Vertical
WATER LEVELS : Approx. 52 ft BGS
START : 1/14/2009
END : 1/20/2009
LOGGER : A. Brewster (Northstar)

DEPTH AND ELEVATION BELOW SURFACE (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, HARDNESS, WEATHERING, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
	R13 4.8 ft 100%	69	0			**Metadiorite (pTbr)** 155.6-191.9' - dusky yellowish green, (10GY 3/2), intermediate (dioritic) mineralogy, fine to medium grained, strong (R4), unweathered, massive to foliated	Last 1.5' = 2-3x faster drill rate
			0				
			>10	172.2-173.8' - Fracture zone, reddish staining			
	R14 0.5 ft 100%		>10				R13 = 25.3 min
173.8							
174.3		0					R14 = 7.5 min
			1	174.4' - Joint, 30 deg, smooth, undulating, < 1 mm calcite infilling, reddish staining, tight			
175							
	R15 3.4 ft 100%	71	0	175.2' - Mechanical break, 35 deg, < 2 mm calcite infilling, along calcite healed fracture			@ 175' bgs: drill rate increases
			1	176.6' - Joint, 60 deg, rough, undulating, reddish staining, tight			
			1	177.3' - Joint, 30 deg, rough, undulating, < 1 mm calcite infilling, reddish staining, tight			R15 = 17.0 min
177.7							
			0				
	R16 4.2 ft 100%	100	1	179.1' - Joint, 20 deg, rough, undulating, < 1 mm calcite infilling, reddish staining, tight			
180							
			1	180' - Joint, 30 deg, rough, undulating, minor reddish staining, tight			
			1	181.2' - Joint, 25 deg, rough, undulating, < 1 mm calcite infilling, reddish and black staining, tight			R16 = 15.5 min
181.9							
			1	182.1, 189.6' - Joint (2), 10 deg, smooth, undulating, < 1 mm clay infilling, reddish staining, tight, clay infilling is dark-reddish brown			
			0				
			0				
185							
			0				
	R17 10 ft 100%	92	0	185.8 - 186.0' - Multiple breaks, likely induced by drilling			
			0				
			1				
			0				
190							

PROJECT NUMBER: 382653.FP.04.FW	BORING NUMBER: MW-57	SHEET 11 OF 11

ROCK CORE LOG

PROJECT : PG&E Topock - ERGI

LOCATION : Site B (2100899.6 N, 7616389.4 E)

ELEVATION : 509.0 ft

DRILLING CONTRACTOR : Boart Longyear (D. Roberts)

CORING EQUIPMENT AND METHOD : Track-mounted Rig, LF-70 Drill Head and HQ-sized tools (diamond bit)

ORIENTATION : Vertical

WATER LEVELS : Approx. 52 ft BGS

START : 1/14/2009

END : 1/20/2009

LOGGER : A. Brewster (Northstar)

DEPTH AND ELEVATION BELOW SURFACE (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, HARDNESS, WEATHERING, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
			0			**Metadiorite (pTbr)** 155.6-191.9' - dusky yellowish green, (10GY 3/2), intermediate (dioritic) mineralogy, fine to medium grained, strong (R4), unweathered, massive to foliated	R17 = 35.5 min
			0				
	191.9					End Drilling on 1/20/2009 Total Borehole Depth: 191.9 ft bgs	
195							
200							
205							
210							