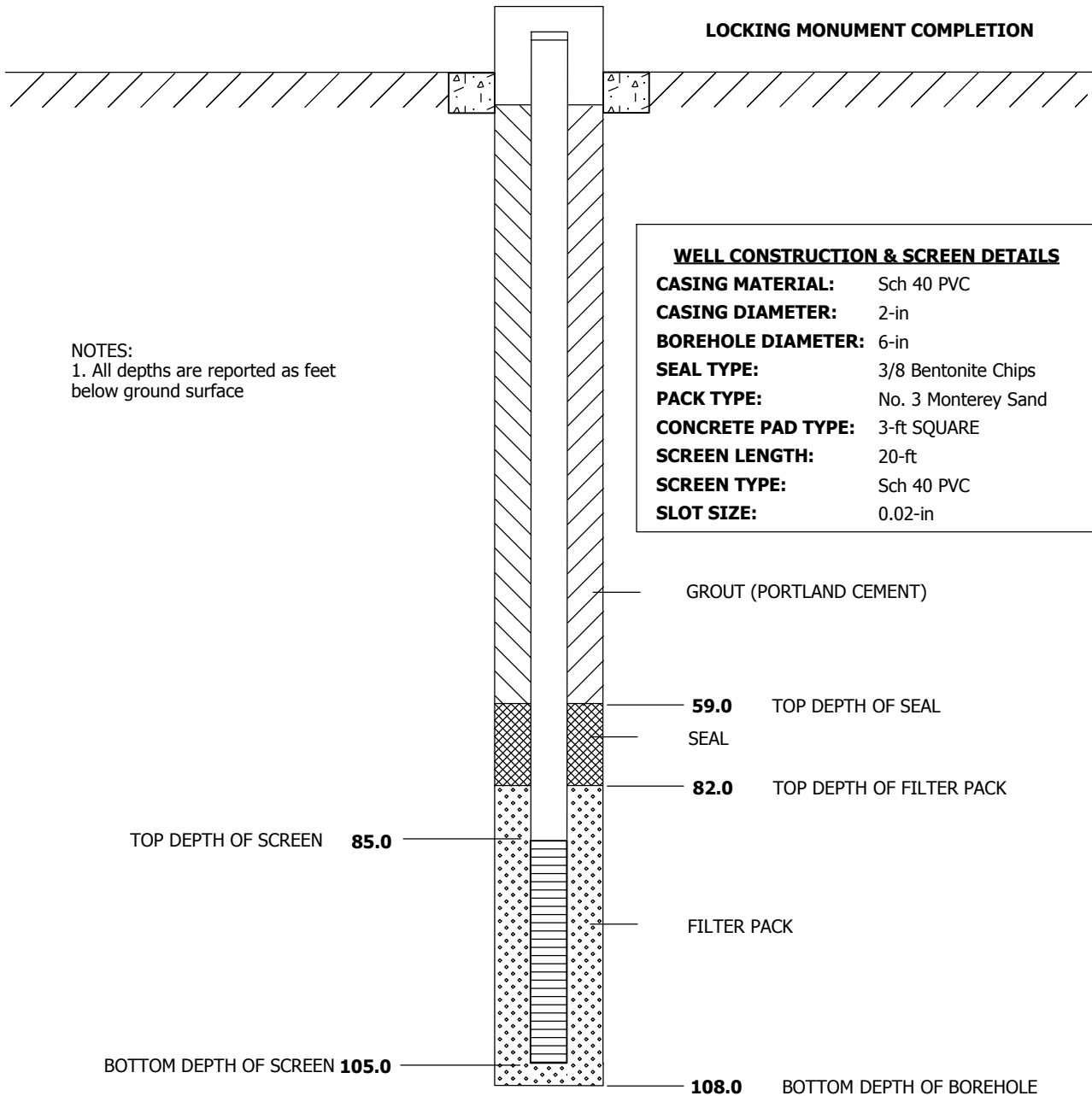


# WELL COMPLETION DIAGRAM

**PROJECT NO:** 417981.ER.02.FW      **PROJECT:** ER-TCS Groundwater Investigation      **WELL NO:** *MW-70-105*

**LOCATION:** Site H

<b>DRILLING CONTRACTOR:</b> Boart Longyear (R. Sawrey)	<b>DRILLING START:</b> 5/24/2011
<b>DRILLING METHOD:</b> Rotosonic/Wireline Rotary Core	<b>DRILLING END:</b> 5/29/2011
<b>LOGGER:</b> A. Brewster (Northstar)	<b>WELL COMPLETION DATE:</b> 5/29/2011
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 538.9 ft AMSL	<b>GENERAL REMARKS:</b> Centralizers at 20, 40, 60, and 80 feet bgs.
<b>NORTHING (CCS NAD 83 Z 5):</b> 2100513.91	
<b>EASTING (CCS NAD 83 Z 5):</b> 7615825.97	



WELL DIAGRAM IS NOT TO SCALE



PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 1 OF 12
<b>SOIL BORING LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)  
 ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)  
 DRILLING EQUIPMENT AND METHOD : RS-350, Rotosonic      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)		RECOVERY (in)	LAB SAMPLE	USCS CODE/ LITHOLOGY	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (in)							
	LAB SAMPLE							
0.0	0.5	COMPLETE	10501		SM	<b>Silty Sand (SM)</b> 0-68.5' - yellowish brown, (10YR 5/4), dry, loose, 10% gravel, 60% sand, 30% fines, subangular to subrounded, poorly graded, predominantly quartz sand 1' - Color change to light olive brown (2.5Y 5/3)	Soil sample collected between 0.0 and 1.0 ft bgs.  Soil sample collected between 2.0 and 3.0 ft bgs.  Soil sample collected between 5.0 and 6.0 ft bgs.  Soil sample collected between 9.0 and 10.0 ft bgs.  Soil sample collected between 14.0 and 15.0 ft bgs.  Soil sample collected between 19.0 and 20.0 ft bgs.	
2.0	3.0		10502					
5.0	6.0		10503					
9.0	10.0		10504					
14.0	15.0		10505					
19.0	20.0		10506, 50015					



PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 2 OF 12
<b>SOIL BORING LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)  
 ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)  
 DRILLING EQUIPMENT AND METHOD : RS-350, Rotosonic      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW EXISTING GRADE (ft)		RECOVERY (in)	LAB SAMPLE	USCS CODE/ LITHOLOGY	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
INTERVAL (ft)							
		COMPLETE			<b>Silty Sand (SM)</b> 0-68.5' - light olive brown, (2.5Y 5/3), dry, loose, 10% gravel, 60% sand, 30% fines, subangular to subrounded, poorly graded, predominantly quartz sand  23' - Change to partially consolidated, color change to light olive brown (2.5Y 5/3)		
25							
29.0							
30	30.0		10507	SM			Soil sample collected between 29.0 and 30.0 ft bgs.
35							
39.0							
40	40.0		10508		31' - Color change to olive brown (2.5Y 5/3)		Soil sample collected between 39.0 and 40.0 ft bgs.



PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 3 OF 12
<b>SOIL BORING LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)  
 ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)  
 DRILLING EQUIPMENT AND METHOD : RS-350, Rotosonic      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW EXISTING GRADE (ft)		RECOVERY (in)	LAB SAMPLE	USCS CODE/ LITHOLOGY	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
INTERVAL (ft)	DEPTH BELOW EXISTING GRADE (ft)						
		COMPLETE			<b>Silty Sand (SM)</b> 0-68.5' - light yellowish brown, (10YR 6/4), dry, partially consolidated from 23.0 ft. bgs, 10% gravel, 60% sand, 30% fines, subangular to subrounded, poorly graded, predominantly quartz sand and mixed gravel		
45							
	49.0						
50	50.0		10509	SM			Soil sample collected between 49.0 and 50.0 ft bgs.
	59.0						
60	60.0		10510		59' - Increase in fraction of metadiorite in gravel; change to 20% gravel, 50% sand, and 30% fines.		Soil sample collected between 59.0 and 60.0 ft bgs.



<b>PROJECT NUMBER:</b> <b>417981.ER.02.FW</b>	<b>BORING NUMBER:</b> <b>BH-70</b>
<b>SHEET 4 OF 12</b>	
<b>SOIL BORING LOG</b>	

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)

ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)

DRILLING EQUIPMENT AND METHOD : RS-350, Rotosonic      ORIENTATION : Vertical

WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	LAB SAMPLE	USCS CODE/ LITHOLOGY	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
65		COMPLETE		SM	<p><b>Silty Sand (SM)</b> 0-68.5' - light yellowish brown, (10YR 6/4), dry, partially consolidated from 23.0 ft. bgs, 20% gravel, 50% sand, 30% fines, subangular to subrounded, poorly graded, predominantly quartz sand and mixed gravel</p> <p>64' - Color change to brown (10YR 5/3), change to moist</p>		
70	69.0 70.0		10511	ML	<p><b>Rock Flour (ML)</b> 68.5' - yellowish brown, (10YR 5/4), metadiorite fragments with weathered surfaces</p> <p>Color change to olive (5Y 5/3), highly angular metadiorite fragments with some weathering</p>		<p>Soil sample collected between 69.0 and 70.0 ft bgs.</p> <p>Stop 5/24/2011 at 1530 at 76 ft. bgs. Resume 5/25/2011 at 715.</p>
80							



PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 5 OF 12
<b>SOIL BORING LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)

ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)

DRILLING EQUIPMENT AND METHOD : RS-350, Rotosonic      ORIENTATION : Vertical

WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW EXISTING GRADE (ft)		USCS CODE/ LITHOLOGY	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
INTERVAL (ft)	RECOVERY (in)				
LAB SAMPLE					
	COMPLETE		<b>Rock Flour (ML)</b> 68.5-87.0' - yellowish brown, (10YR 5/4), metadiorite fragments with weathered surfaces		
85		ML			
87.0			Begin rock coring from 87.0 ft bgs See the next page for the rock core log.		
90					
95					
100					



PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 6 OF 12
<b>ROCK CORE LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)  
 ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)  
 CORING EQUIPMENT AND METHOD : RS-350, HQ Wire-Line Rotary      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW SURFACE (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
87.0	Run 1 3.2 ft 100%	71	>10	87.0-87.2' - Highly fractured, iron stained, calcite infill. 87.6' - Mechanical break	Metadiorite (pTbr) greyish olive green, (5GY 3/2), strong (R4), slightly weathered, slightly foliated, moderately disintegrated and cemented. Chlorite cement throughout Change to phaneritic, predominantly feldspar and quartz	Run 1: 15 min 40 sec	
88.1'		>10	88.1' - Joint, 60 deg, rough, planar, iron staining, calcite mineralization (<1mm), iron staining, narrow. 88.2' - Fracture zone, 30 deg, 40mm chlorite infilling				
90	Run 2 5 ft 100%	43	2	88.3' - Joint, 30 deg, rough, stepped, 5mm calcite infilling, no staining, tight 88.7' - Mechanical break	Metadiorite (pTbr) greyish olive green, (5GY 3/2), strong (R4), slightly weathered, slightly foliated, moderately disintegrated and cemented, predominantly quartz and feldspar with chlorite cement	Run 2: 24 min 40 sec	
90.2		2	88.9' - Joint, 15 deg, rough, stepped, 1mm calcite infilling, no staining, tight 90.2' - Mechanical break				
95	Run 3 2.1 ft 100%	42	3	90.8' - Joint, 60 deg, rough, undulating, <1mm calcite infilling, no staining, tight 91' - Mechanical break	95' - Change to thickly foliated	Run 3: 11 min 20 sec	
95.2		3	91.3' - Joint, 30 deg, smooth, undulating, <1mm calcite infilling, no staining, tight 91.7' - Joint, 30 deg, smooth, undulating, <1mm calcite infilling, no staining, tight 92.1' - Joint, 30 deg, smooth, undulating, <1mm calcite infilling, no staining, tight 92.5, 92.6' - Joint, 30 deg, rough, stepped, <1mm calcite infilling, no staining, tight to narrow				
97.3	Run 4 2.9 ft 100%	44	>10	93.0, 93.2' - Joint, 60 deg and 30 deg, rough, stepped, iron staining, narrow 94.8' - Joint, 30 deg, rough, stepped, iron staining, narrow 95.1, 95.3, 95.8' - Joint (3), 60, 30, and 30 deg, rough, stepped, no staining, tight 96.0-96.6' - highly fractured, evidence of joints at 80° dip, rough, stepped to undulating, some calcite infill in healed fractures (<1mm), presence of sedimentary infill (quartz silt, sand) on surfaces (<5mm thick), narrow apertures, no staining. 97.2, 97.3, 97.7, 97.8' - Joint (4), 20, 40, 20, and 20 deg, rough, stepped, 1mm calcite infilling, no staining, very narrow apertures 97.3-97.4' - Highly fractured	97' - Change to non-foliated	Run 4: 12 min 15 sec	
100	Run 5 4.5 ft 100%	20	>10	98.3, 98.5' - Joint, 30 deg and 30 deg, smooth, stepped, <1mm calcite infilling, silt infill (<5mm), no staining, narrow aperture 98.5-99.2' - Highly fractured, iron staining 99.5, 99.6' - Joint, 20 deg, smooth, undulating, 1mm calcite infilling, no staining, very narrow apertures 100.1, 100.2, 100.7, 100.8' - Joint (4), 20, 20, 30, and 60 deg, rough, undulating, <3mm calcite infilling, iron staining at 100.7 and 100.8, very narrow to tight apertures 100.3' - Healed shear with 50mm of displacement, 60° dip. 101.3-107.8' - Highly fractured, calcite on some surfaces (<1mm), minimal iron staining, some silt infill (<1mm), rough, undulating		98.5' - Change to aphanitic	Run 5: 53 min 40 sec
105	Run 6 3.1 ft 100%	0	>10		99.3' - Megacryst of chlorite (10 x 35mm) 99.5-100.0' - Megacryst of feldspar (>40mm) 100.4-100.7' - Color change to very dusky red (10R 2/2). 100.5' - Fracture at 40 degree dip healed with very dusky red (10R 2/2) mineralization 100.6' - presence of xenocryst (max diameter of 25mm) 100.9-101.4' - Medium banding (<120mm thick) with metadiorite, feldspar, and chlorite bands		Run 6: 61 min 0 sec
			>10				



PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 7 OF 12
<b>ROCK CORE LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)  
 ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)  
 CORING EQUIPMENT AND METHOD : RS-350, HQ Wire-Line Rotary      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW SURFACE (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
107.8			>10	~	<b>Metadiorite (pTbr)</b> greyish olive green, (5GY 3/2), strong (R4), slightly weathered, none-foliated, moderately disintegrated and cemented, chlorite cement in fractures	Stop 5/27/2011 at 1700.	
110				~			
115				~			
120				~			
125				~			





PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 8 OF 12
<b>ROCK CORE LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)  
 ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)  
 CORING EQUIPMENT AND METHOD : RS-350, HQ Wire-Line Rotary      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW SURFACE (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
130	130.0							
	Run 1 2 ft 85%	55	0					Begin wire-line HQ rock coring
	132.0		2	131.4, 131.7' - Joint, 30 deg, rough, undulating, <1mm calcite infilling, manganese staining, narrow aperture		131' - Change to phaneritic		Run 1: drill rate = 0.27 feet per minute (ft/min)
			>10					Run 2: drill rate = 0.35 ft/min
	Run 2 4.5 ft 100%	27	2	133.5, 133.7' - Joint, 50 deg and 60 deg, rough, stepped, <1mm calcite infilling, no staining, tight aperture		134.0-135.0' - Foliated		
135			>10					
	136.5		2	135.6, 135.8' - Joint, 20 deg, rough, undulating, <1mm calcite infilling, iron staining, tight aperture		135.6-135.8' - Shear zone		Run 3: drill rate = 0.20 ft/min
	Run 3 4.5 ft 100%	37	1	136' - Joint, 70 deg, rough, undulating, <2mm calcite infilling, no staining, narrow				
			3	137.3, 137.6, 137.8' - Joint, 30 deg, rough, undulating, <1mm calcite infilling, no staining, tight				
			3	138.1, 138.3, 138.6' - Joint, 30 deg, rough, undulating, <1mm calcite infilling, no staining, tight				
			>10	139.0-140.0' - Multiple fractures, calcite infill (<1mm), iron and manganese staining				
140			4	140.2, 140.6, 140.7, 140.9' - Joint (4), 60, 70, 70, and 20 deg, rough, undulating, <2mm calcite infilling, iron and manganese stained, tight				Run 4: drill rate = 0.21 ft/min
	141.0		1	141.5, 142.3, 142.6, 143.5' - Joint (4), 30, 20, 30, and 20 deg, rough, undulating, <1mm calcite infilling, iron and manganese stained, tight				
	Run 4 5 ft 100%	50	2					
			>10					
			4	144.3, 144.4, 144.5, 144.6' - Joint (4), 30 deg, rough, undulating, no infill, iron stained, tight				
145			3	145.1, 145.5, 145.7' - Joint (3), 20, 20, and 70 deg, rough, undulating, no infill, iron stained, tight				
	146.0		>10					Run 5: drill rate = 0.25 ft/min



PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 9 OF 12
<b>ROCK CORE LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)  
 ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)  
 CORING EQUIPMENT AND METHOD : RS-350, HQ Wire-Line Rotary      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW SURFACE (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
150	Run 5 5 ft 100%	72	0			Metadiorite (pTbr) dusky yellow green, (5GY 5/2), predominantly quartz, feldspar, amphiboles, non-foliated, highly fractured and healed with chlorite cement, strong, massive		
			0	148.8' - Joint, 10 deg, rough, undulating, <1mm calcite infilling, iron and manganese staining, tight				
			>10					
			>10					
151.0								
155	Run 6 3.5 ft 100%	79	1	151.1' - Joint, 60 deg, rough, undulating, <1mm calcite infilling, iron and manganese staining, tight	152.4' - Change to aphanitic, lightly fractured and healed with chlorite cement, higher average density		Run 6: drill rate = 0.32 ft/min	
			1	152' - Joint, 10 deg, rough, highly fractured, white clay infill (<2mm), iron stained				
			0					
			>10	154.5-156.0'				
154.5								
160	Run 7 1.5 ft 100%	0	>10		157.6' - Foliated		Run 7: drill rate is not available	
			>10					
			2	156.2, 156.8' - Joint, 10 deg and 30 deg, rough, undulating, <1mm calcite infilling, iron and manganese staining, tight				
			>10	157.8-158.6' - Highly fractured, silt infill (<2mm), manganese staining				
156.0								
165	Run 8 4.2 ft 100%	45	1	160-161.4' - Highly fractured, some calcite (<2mm), some manganese and iron staining.	159.4-159.6' - Shear zone		Run 8: drill rate = 0.20 ft/min	
			>10					
			>10					
			2	161.8, 162.0, 162.9, 163.7, 164.0, 164.9' - Joint (6), 20, 20, 20, 10, 10, and 10 deg, rough, undulating, <1mm calcite infilling, manganese and iron staining, tight				
160.2								
165	Run 9 5 ft 100%	58	1	160-161.4' - Highly fractured, some calcite (<2mm), some manganese and iron staining.	166.0-167.0' - Foliated		Run 9: drill rate = 0.21 ft/min	
			>10					
			>10					
			2	161.8, 162.0, 162.9, 163.7, 164.0, 164.9' - Joint (6), 20, 20, 20, 10, 10, and 10 deg, rough, undulating, <1mm calcite infilling, manganese and iron staining, tight				
165.2								
165			>10	165.2-166.0' - Highly fractured, calcite infill (<1mm), manganese staining			Run 10: drill rate = 0.18 ft/min	
			1	166' - Joint, 20 deg, rough, undulating, <1mm manganese staining, tight				
165.2								



PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 10 OF 12
<b>ROCK CORE LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)  
 ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)  
 CORING EQUIPMENT AND METHOD : RS-350, HQ Wire-Line Rotary      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW SURFACE (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
170	Run 10 4 ft 100%	33	>10	1	166.8-167.5' - Highly fractured, silty infill, manganese and iron staining 167.5, 167.7, 168.9, 169.2, 170.0, 170.3' - Joint (6), 10, 20, 70, 30, 30, and 30 deg, rough, undulating, <1mm calcite infilling, manganese staining, tight	Metadiorite (pTbr) dusky yellow green, (5GY 5/2), predominantly quartz, feldspars, and amphiboles, aphanitic, non-foliated, lightly fractured and healed with chlorite cement, slightly weathered to fresh, strong, massive 167.6-168.0' - Phaneritic 169.2-187.3' - Phaneritic	Run 11: drill rate = 0.26 ft/min	
			1					
	Run 11 5 ft 100%	78	1	171.6' - Joint, 70 deg, rough, stepped, no infill, manganese staining, tight.	171.2-179.2' - Intermittent veins (<10mm) of sodium feldspar			
			0					
175	Run 12 5 ft 100%	68	3	4	173.3, 173.6, 173.7' - Joint (3), 30, 10, and 30 deg, rough, undulating, <1mm manganese staining, tight	176.4-176.6' - Foliated	Run 12: drill rate = 0.20 ft/min	
			0					
	Run 13 4.8 ft 100%	54	4	1	176.0, 176.3, 176.4, 176.8' - Joint (4), 60, 60, 60, and 60 deg, rough, undulating, <1mm calcite infilling, manganese staining, tight			
			0					
180	Run 14 5 ft 100%	64	1	4	177.5, 178.2, 178.4, 178.7, 178.9' - Joint (5), 30, 30, 60, 30, and 60 deg, rough, undulating, <1mm manganese staining, narrow aperture	179.4-180.5' - Large increase in proportion of quartz, sodium feldspar, and chlorite	Run 13: drill rate = 0.13 ft/min	
			3					
	Run 13 4.8 ft 100%	54	0	1	179.2, 179.4, 179.6' - Joint (3), 60, 30, and 30 deg, rough, undulating, <1mm calcite infilling, manganese staining, tight			
			1					
185	Run 13 4.8 ft 100%	54	1	5	181.2, 182.2, 182.3, 182.5, 182.7, 182.8, 183.6' - Joint (7), 50, 30, 50, 40, 60, 60, and 40 deg, rough, undulating, <1mm calcite infilling, manganese and iron staining, tight	Run 14: drill rate = 0.24 ft/min		
			1					
	Run 14 5 ft 100%	64	1	4	184.5' - Joint, 20 deg, rough, stepped, <1mm calcite infilling, manganese staining, tight 185.0, 185.5, 186.2, 186.4, 186.5, 186.6' - Joint (6), 20, 20, 50, 10, 50, and 40 deg, rough, undulating (stepped at 186.2), <1mm calcite infilling, white silt infill at 186.2 (<1mm), manganese staining, tight			
			2					



PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 11 OF 12
<b>ROCK CORE LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation	LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)
ELEVATION : 538.9 ft	DRILLING CONTRACTOR : Boart Longyear (B. Bradford)
CORING EQUIPMENT AND METHOD : RS-350, HQ Wire-Line Rotary	ORIENTATION : Vertical
WATER LEVELS : Approx. 78 ft BGS	START : 5/24/2011
	END : 10/22/2011
	LOGGER : R. Tweidt (Northstar)

DEPTH BELOW SURFACE (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
189.0			2	187.0, 187.2, 188.3, 188.6, 188.8' - Joint (5), 20, 20, 30, 30, and 60 deg, rough, undulating, <1mm calcite infilling, manganese staining, tight	<b>Metadiorite (pTbr)</b> dusky yellow green, (5GY 5/2), predominantly quartz, feldspars, and amphiboles, phaneritic, non-foliated, lightly fractured and healed with chlorite cement, slightly weathered to fresh, strong, massive 187.3' - Change to aphanitic 188.0-199.0' - Phaneritic  191.6-192.6' - Highly weathered  Run 15: drill rate = 0.18 ft/min  Run 16: drill rate = 0.28 ft/min  Run 17: drill rate = 0.33 ft/min  Run 18: drill rate = 0.22 ft/min		
			3				
190	Run 15 5 ft 100%		2	189.4, 189.6, 190.7' - Joint (3), 50, 50, and 30 deg, rough, undulating, <1mm calcite infilling, iron and manganese staining, tight			
			>10				
		15	>10	190.8-193.0' - Highly fractured, moderately weathered, calcite infill (<4mm), manganese and iron staining			
			>10				
			>10				
194.0			>10	193.6-193.8' - Highly fracture, white silt infill (<1mm), iron staining			
195	Run 16 2.5 ft 100%		1	194.7, 195.1, 195.5, 196.8' - Joint (4), 10, 60, 40, and 20 deg, rough, undulating, <1mm calcite infilling, iron and manganese staining, tight			
		80	2				
196.5			1				
			3	197.1, 197.4, 197.8' - Joint (3), 10, 30, and 30 deg, rough, undulating, no infill, iron staining, tight			
			0				
		100	0				
			0				
201.5	Run 17 5 ft 100%		1	201.5, 202.4, 202.5, 202.6, 202.9' - Joint (5), 30, 30, 80, 20, and 20 deg, rough, undulating, <1mm calcite infilling, manganese and iron staining, tight			
			4				
			2	203.4, 203.7, 204.3, 204.5, 204.7' - Joint (5), 20, 70, 20, 60, and 30 deg, rough, undulating, <1mm calcite infilling, white silt infill (<1mm) in 203.7, manganese and iron staining, tight.			
		51	3				
205	Run 18 5 ft 100%		2	205.5, 205.6, 206.5, 207.6' - Joint (4), 60, 40, 30, and 10 deg, rough, undulating, <1mm calcite infilling, iron staining, tight			
			1				
206.5				206.2-207.1' - Foliated			



PROJECT NUMBER: <b>417981.ER.02.FW</b>	BORING NUMBER: <b>BH-70</b>	SHEET 12 OF 12
<b>ROCK CORE LOG</b>		

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : PG&E Topock, Site H (2100513.9 N, 7615826.0 E)  
 ELEVATION : 538.9 ft      DRILLING CONTRACTOR : Boart Longyear (B. Bradford)  
 CORING EQUIPMENT AND METHOD : RS-350, HQ Wire-Line Rotary      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 78 ft BGS      START : 5/24/2011      END : 10/22/2011      LOGGER : R. Tweidt (Northstar)

DEPTH BELOW SURFACE (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
210	207.4 Run 19 0.9 ft 100%	100	>10	207.4-207.6' - Multiple fractures, calcite infill, no staining	Metadiorite (pTbr) dusky yellow green, (5GY 5/2), predominantly quartz, feldspars, and amphiboles, phaneritic, non-foliated, lightly fractured and healed with chlorite cement, slightly weathered to fresh, strong, massive 208.8-209.4' - Aphanitic	Run 19: drill rate = 0.15 ft/min Run 20: drill rate = 0.27 ft/min			
	Run 20 4 ft 100%	80	2	208.2, 208.4, 209.2, 210.0, 210.1' - Joint (5), 10, 10, 40, 10, and 30 deg, rough, undulating, <1mm calcite infilling, manganese staining, tight					
		80	1						
	215	211.4	74	1			211.4, 212.4, 212.9, 213.1, 213.6' - Joint (5), 20, 20, 20, 20, and 30 deg, rough, undulating, <1mm calcite infilling, manganese and iron staining, tight	212.5-212.8' - Foliated	Run 21: drill rate = 0.25 ft/min
				2					
				2					
				>10			214.2-214.9' - Highly fractured, calcite infill (<1mm), manganese and iron staining		
	220	216.4	0	2			215.4, 215.7, 216.3, 216.4' - Joint (4), 40, 20, 40, and 30 deg, rough, undulating, <1mm calcite infilling, manganese and iron staining, tight	216.6-219.2' - Increase in proportion of feldspars	Run 22: drill rate = 0.13 ft/min. Driller loses all drill fluid in this zone.
				>10			216.4-220.4' - Highly fractured, no infill, heavy iron staining		
				>10					
>10									
>10				216.4-220.4' - Highly fractured, no infill, heavy iron staining					
>10									
225	Run 23 5.1 ft 100%	80	1	221.1, 222.0, 222.2, 222.6, 222.7' - Joint (5), 30, 60, 60, 60, and 30 deg, rough, undulating, <1mm calcite infilling, iron and manganese staining, tight					
			4						
			3	223.3, 223.4, 223.7, 224.7, 224.8' - Joint (5), 30, 30, 40, 30, and 10 deg, rough, undulating, <1mm calcite infilling, iron and manganese staining, tight					
			2						
			>10	225.5-226.4' - Highly fractured, calcite infill (<1mm), manganese and iron staining					
	Run 24 1.5 ft 100%	30	>10	226.4, 227' - Joint, 30 deg and 40 deg, rough, undulating, <1mm calcite infilling, iron staining, tight	End Drilling on 10/22/2011 Total Borehole Depth: 227.0 ft bgs	Run 24: drill rate = 0.38 ft/min This borehole was converted into the following monitoring well(s): MW-70-105 and MW-70BR-225			
			>10						