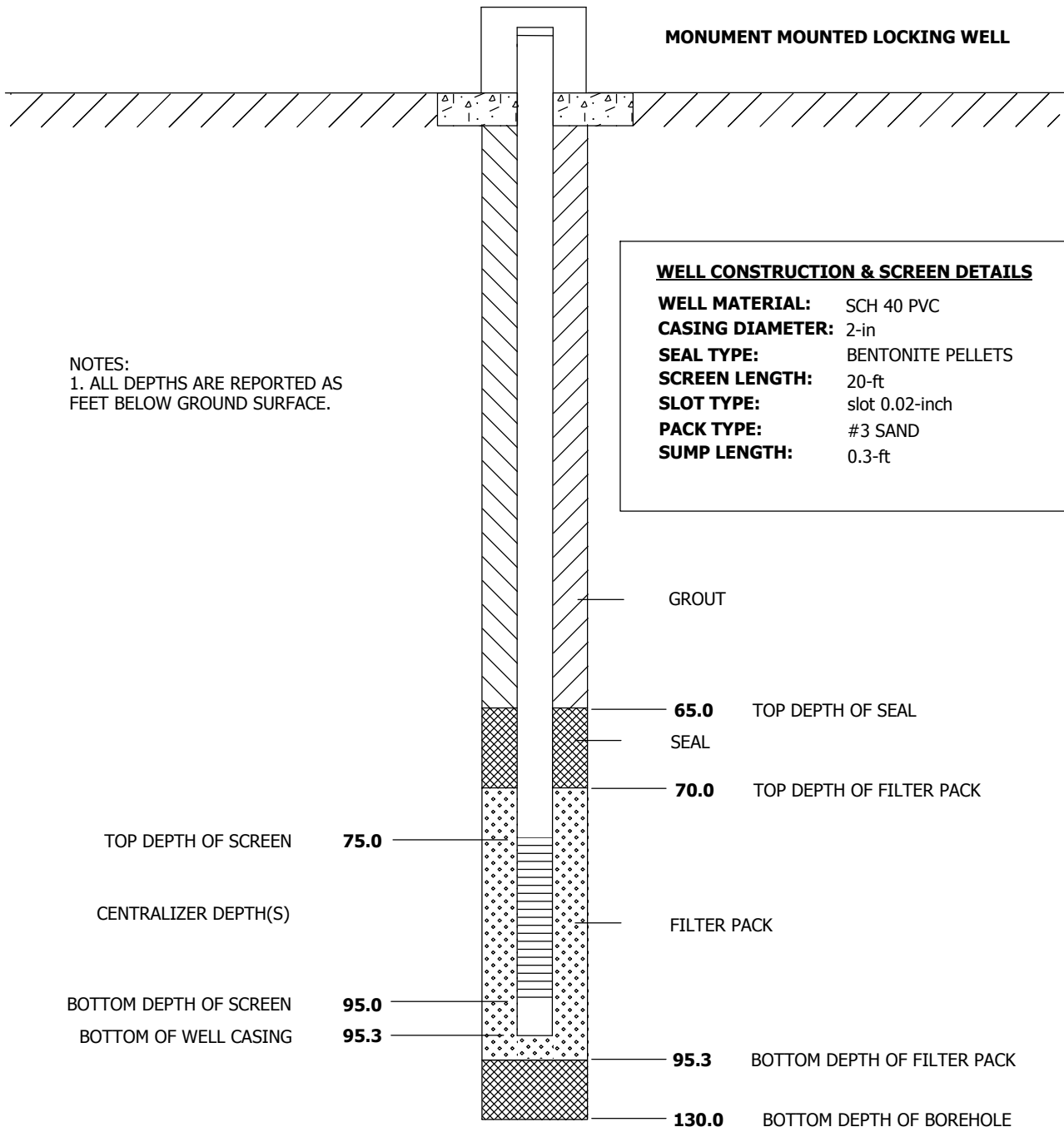


WELL COMPLETION DIAGRAM

PROJECT NO: 315024.IM.02	PROJECT: PG&E Topock IM Investigation (Phase 5 2004)	WELL NO: MW-38S
LOCATION: South Bat Cave Wash Topock, CA. - Approximately 575' south of I-40. Access by PG&E station northeast gate, or by long road from Park Moabi exit South.		
DRILLING CONTRACTOR: WDC Exploration and Wells, Montclair, CA		DRILLING START DATE: 04/11/2004
DRILLING METHOD: Rotosonic		DRILLING END DATE: 04/11/2004
LOGGER: S. Cooper		WELL COMPLETION DATE: 04/12/2004
TOP OF WELL CASING (NGVD 29): 525.51		NORTHING COORDINATE (CCS DAND 27, ZONE 5): 2101279.65
GROUND SURFACE ELEVATION (NGVD 29): 522.80		EASTING COORDINATE (CCS NAD 27 ZONE 5): 7614918.75



WELL DIAGRAM IS NOT TO SCALE

SOIL BORING LOG

PROJECT NAME:		HOLE DEPTH (ft): 195.0		DRILLING CONTRACTOR:	
SURFACE ELEVATION: 523.0 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,101,264.32	EASTING (CCS NAD 27 Z 5): 7,614,918.79	DATE AND TIME STARTED:	DATE AND TIME COMPLETED:	
DRILLING METHOD:		WATER LEVEL (ft): ---		DRILLING EQUIPMENT:	
LOCATION:				LOGGED BY:	

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	TYPE/NUMBER	RECOVERY (ft)			
5				GW	WELL GRADED GRAVEL (GW) - 7.5YR5/3, 60% subang to ang f-m gravel, 40% well graded subang to ang sand, trace coarse gravel and cobbles, moist.	
10					Core unloggable due to interference of hydrated bentonite from casing.	
15				SC	CLAYEY SAND (SC) - 50% well graded subang sand, 40% fines, 10% ang gravel up to 1, qtz, slightly moist.	
20				ML	SANDY SILT WITH GRAVEL (ML) - 7.5YR6/1, 65% silt grading into silty gravel, 25% f sand, 10% gravel, ang, loose, dry.	grain size
25						
30				SC	CLAYEY SAND (SC) - 7.5YR6/1, 60% well graded ang to subang sand, 30% fines, 10% subang gravel up to 0.25, dry.	lost all but top 2' of core. Broke drill pipe when attempting to retrieve logging based on mixed material
35						

SOIL BORING LOG

PROJECT NAME:		HOLE DEPTH (ft): 195.0	DRILLING CONTRACTOR:	
SURFACE ELEVATION: 523.0 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,101,264.32	EASTING (CCS NAD 27 Z 5): 7,614,918.79	DATE AND TIME STARTED:	DATE AND TIME COMPLETED:
DRILLING METHOD:		WATER LEVEL (ft): ---	DRILLING EQUIPMENT:	
LOCATION:			LOGGED BY:	

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	TYPE/NUMBER	RECOVERY (ft)			
40				SC	<p>CLAYEY SAND (SC) - 7.5YR6/1, 60% well graded ang to subang sand, 30% fines, 10% subang gravel up to 1.4, dry.</p> <p>- 7.5YR5/3, 70% well graded ang sand, 30% fines, trace ang gravel, decreasing clay, cohesive, dry</p> <p>- increasing cementation</p>	<p>9:15 lost bottom 2' of core to heat blowout</p> <p>grain size</p>
45						
50				GC	<p>CLAYEY GRAVEL (GC) - 50% well graded ang gravel to 3, 30% well graded ang sand, 20% fines, moderate cementation, dry.</p>	
55				SC	<p>CLAYEY SAND (SC) - lighter color 7.5YR7/1, 60% well graded ang sand, 20% f ang gravel, 20% fines, limestone, qtz, cohesive but not cemented, moist.</p>	<p>grain size (preserved core)</p>
60						
65					<p>- cobble layer</p> <p>- 7.5YR7/2, 60% well graded ang sand, 30% fines, 10% well graded ang gravel, moist</p>	
70					<p>- dry</p>	

SOIL BORING LOG

PROJECT NAME:		HOLE DEPTH (ft): 195.0		DRILLING CONTRACTOR:	
SURFACE ELEVATION: 523.0 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,101,264.32	EASTING (CCS NAD 27 Z 5): 7,614,918.79	DATE AND TIME STARTED:	DATE AND TIME COMPLETED:	
DRILLING METHOD:		WATER LEVEL (ft): ---		DRILLING EQUIPMENT:	
LOCATION:			LOGGED BY:		

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	TYPE/NUMBER	RECOVERY (ft)			
75				SC	CLAYEY SAND (SC) - lighter color 7.5YR7/1, 60% well graded ang sand, 20% f ang gravel, 20% fines, limestone, qtz, cohesive but not cemented, moist. - cobbles	casing ~173' @12:30
80				CL	LEAN CLAY WITH SAND (CL) - 10YR7/1, 80% fines, 20% well graded subang to ang sand, medium plasticity, dry.	
85				SC	CLAYEY SAND (SC) - 7.5YR5/2, 50% well graded ang sand, 30% ang f gravel, 20% clay, wet. - less gravel	preserved core
90				GC	CLAYEY GRAVEL (GC) - 50% f ang gravel, 30% well graded ang sand, 20% fines, high dry strength.	
95				SC	CLAYEY SAND (SC) - 50% well graded subang to ang sand, 30% fines, 10% subrnd to subang f gravel, qtz, gneiss, low to medium dry strength, low to medium plasticity, wet.	
95				CL	SANDY CLAY (CL) - multicolored 7.5YR5/3, 5YR5/1, some lt green areas and red staining, 60% clay, 30% subang sand, 10% gravel, qtz perphyroblasts, gneiss, subang black igneous, wet.	
100				SC	CLAYEY SAND (SC) - 7.5YR5/3, decreasing clay.	preserved core', chromium jar qtz, green mineral with bonding
105				GC	CLAYEY GRAVEL (GC) - 10YR4/2, 40% subang to ang f gravel, 30% well graded f-m sand, 30% fines, high dry strength, medium plasticity.	

SOIL BORING LOG

PROJECT NAME:		HOLE DEPTH (ft): 195.0	DRILLING CONTRACTOR:	
SURFACE ELEVATION: 523.0 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,101,264.32	EASTING (CCS NAD 27 Z 5): 7,614,918.79	DATE AND TIME STARTED:	DATE AND TIME COMPLETED:
DRILLING METHOD:		WATER LEVEL (ft): ---	DRILLING EQUIPMENT:	
LOCATION:			LOGGED BY:	

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	TYPE/NUMBER	RECOVERY (ft)			
110				GC	CLAYEY GRAVEL (GC) - 10YR4/2, 40% subang to ang f gravel, 30% well graded f-m sand, 30% fines, high dry strength, medium plasticity. - grading into clay	chromium jar
115				SW/SC	WELL GRADED SAND WITH CLAY (SW/SC) - 75% well graded subang to ang sand, 15% fines, 10% vf-f subang gravel, thin zone of decreased clay.	preserved core, chromium jar
120				NR	No Recovery	preserved core chromium jar
125				GC	CLAYEY GRAVEL (GC) - 35% subang vf-f gravel, 35% fines, 30% well graded ang fines, m stiff, medium plasticity, wet, 7.5YR4/3.	chromium jar
130				SC	CLAYEY SAND (SC) - slightly moist, not as cohesive, crumbly.	chromium jar
135				CL	LEAN CLAY WITH SAND (CL) - 80% silty clay, 20% f-m sand, soft, wet, 7.5YR5/3.	chromium jar
140				GC	CLAYEY GRAVEL (GC) - increasing sand, increasing gravel, m stiff, wet, white, orange and bright green deposits of heavily weathered minerals, 10YR4/2.	chromium jar

SOIL BORING LOG

PROJECT NAME:		HOLE DEPTH (ft): 195.0	DRILLING CONTRACTOR:	
SURFACE ELEVATION: 523.0 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,101,264.32	EASTING (CCS NAD 27 Z 5): 7,614,918.79	DATE AND TIME STARTED:	DATE AND TIME COMPLETED:
DRILLING METHOD:		WATER LEVEL (ft): ---	DRILLING EQUIPMENT:	
LOCATION:			LOGGED BY:	

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	TYPE/NUMBER	RECOVERY (ft)			
145				GC	CLAYEY GRAVEL (GC) - 10YR4/2, white orange and bright green deposits of heavily weathered minerals, increasing sand, increasing gravel, m stiff, wet. CLAYEY SAND (SC) - grading into clayey sand	preserved core, chromium jar
				SC		
150				GC	CLAYEY GRAVEL (GC) - ang f gravel, clay, uniform core, 10YR4/2.	grain size, chromium jar
				GC		
155				GC		preserved core, chromium jar
				GC		
160				GP	POORLY GRADED GRAVEL (GP) - 75% ang vf-f gravel, 15% well graded ang sand, 10% fines, loose, very wet.	chromium jar
				GP		
165				GW/GC	WELL GRADED GRAVEL WITH CLAY (GW/GC) - 60% well graded ang f-c gravel up to 2, 30% well graded ang sand, 10% clay.	grain size
				GW/GC		
170				GC	CLAYEY GRAVEL (GC) - 7.5YR3/2, 25% clay, subrnd to ang gravel. - layer of heavily weathered rock with clay	
				GC		
175				SC/GC	CLAYEY SAND WITH GRAVEL (SC/GC) - some reddish areas but mostly medium brn, very firm, slightly moist.	

SOIL BORING LOG

PROJECT NAME:		HOLE DEPTH (ft): 195.0	DRILLING CONTRACTOR:	
SURFACE ELEVATION: 523.0 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,101,264.32	EASTING (CCS NAD 27 Z 5): 7,614,918.79	DATE AND TIME STARTED:	DATE AND TIME COMPLETED:
DRILLING METHOD:		WATER LEVEL (ft): ---	DRILLING EQUIPMENT:	
LOCATION:			LOGGED BY:	

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	TYPE/NUMBER	RECOVERY (ft)			
180				SC/GC	CLAYEY SAND WITH GRAVEL (SC/GC) - some reddish areas but mostly medium brn, very firm, slightly moist.	
185				SC	CLAYEY SAND (SC) - 50% well graded sand, 30% fines, 20% f gravel, soft, wet, soft. - 65% well graded subang sand, 25% fines, 10% subang vf gravel, soft, very wet	
190					- loosely consolidated bedrock, f sand, multicolored, moist - very stiff and moist	
195					Boring Terminated at 195 ft	refusal, broken bit refusal, no core

ABBREVIATIONS

- cc = continuous core run
- brn = brown
- lt = light
- dk = dark
- vf = very fine-grained
- f = fine-grained
- m = medium-grained
- c = 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