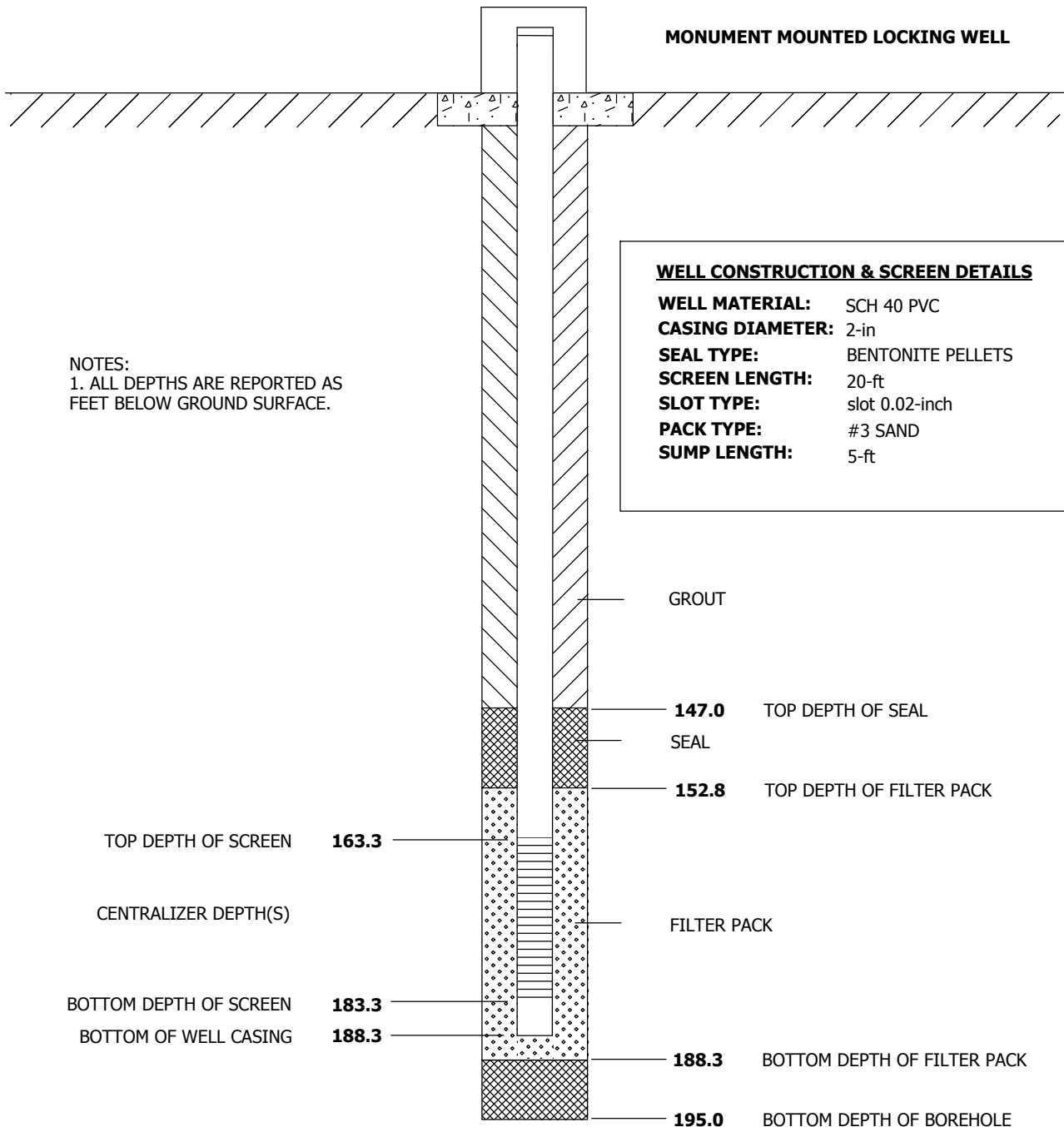


# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 315024.IM.02	<b>PROJECT:</b> PG&E Topock IM Investigation (Phase 5 2004)	<b>WELL NO:</b> MW-38D
<b>LOCATION:</b> 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.		
<b>DRILLING CONTRACTOR:</b> WDC Exploration and Wells, Montclair, CA	<b>DRILLING START DATE:</b> 04/06/2004	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END DATE:</b> 04/11/2004	
<b>LOGGER:</b> R. Edwards / S. Cooper	<b>WELL COMPLETION DATE:</b> 04/10/2004	
<b>TOP OF WELL CASING (NGVD 29):</b> 525.31	<b>NORTHING COORDINATE (CCS DAND 27, ZONE 5):</b> 2101264.32	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 523.00	<b>EASTING COORDINATE (CCS NAD 27 ZONE 5):</b> 7614918.79	



WELL DIAGRAM IS NOT TO SCALE

**SOIL BORING LOG**

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

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	<b>WELL GRADED GRAVEL (GW)</b> - 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	<b>CLAYEY SAND (SC)</b> - 50% well graded subang sand, 40% fines, 10% ang gravel up to 1, qtz, slightly moist.	
20				ML	<b>SANDY SILT WITH GRAVEL (ML)</b> - 7.5YR6/1, 65% silt grading into silty gravel, 25% f sand, 10% gravel, ang, loose, dry.	grain size
30				SC	<b>CLAYEY SAND (SC)</b> - 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**

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<b>SURFACE ELEVATION:</b> 523.0 ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> 2,101,264.32	<b>EASTING (CCS NAD 27 Z 5):</b> 7,614,918.79	<b>DATE AND TIME STARTED:</b>	<b>DATE AND TIME COMPLETED:</b>	
<b>DRILLING METHOD:</b>		<b>WATER LEVEL (ft):</b> ---		<b>DRILLING EQUIPMENT:</b>	
<b>LOCATION:</b>			<b>LOGGED BY:</b>		

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><b>CLAYEY SAND (SC)</b> - 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					GC	<p><b>CLAYEY GRAVEL (GC)</b> - 50% well graded ang gravel to 3, 30% well graded ang sand, 20% fines, moderate cementation, dry.</p>
50				SC		<p><b>CLAYEY SAND (SC)</b> - 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>- cobble layer</p> <p>- 7.5YR7/2, 60% well graded ang sand, 30% fines, 10% well graded ang gravel, moist</p> <p>- dry</p>
55						
60						
65						
70						

**SOIL BORING LOG**

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<b>SURFACE ELEVATION:</b> 523.0 ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> 2,101,264.32	<b>EASTING (CCS NAD 27 Z 5):</b> 7,614,918.79	<b>DATE AND TIME STARTED:</b>	<b>DATE AND TIME COMPLETED:</b>	
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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	<b>CLAYEY SAND (SC)</b> - 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	<b>LEAN CLAY WITH SAND (CL)</b> - 10YR7/1, 80% fines, 20% well graded subang to ang sand, medium plasticity, dry.	
85				SC	<b>CLAYEY SAND (SC)</b> - 7.5YR5/2, 50% well graded ang sand, 30% ang f gravel, 20% clay, wet.  - less gravel	preserved core
90				GC	<b>CLAYEY GRAVEL (GC)</b> - 50% f ang gravel, 30% well graded ang sand, 20% fines, high dry strength.	
95				SC	<b>CLAYEY SAND (SC)</b> - 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	<b>SANDY CLAY (CL)</b> - 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	<b>CLAYEY SAND (SC)</b> - 7.5YR5/3, decreasing clay.	preserved core', chromium jar qtz, green mineral with bonding
105				GC	<b>CLAYEY GRAVEL (GC)</b> - 10YR4/2, 40% subang to ang f gravel, 30% well graded f-m sand, 30% fines, high dry strength, medium plasticity.	

**SOIL BORING LOG**

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<b>DRILLING METHOD:</b>		<b>WATER LEVEL (ft):</b> ---	<b>DRILLING EQUIPMENT:</b>	
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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	<b>CLAYEY GRAVEL (GC)</b> - 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	<b>WELL GRADED SAND WITH CLAY (SW/SC)</b> - 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
125				GC	<b>CLAYEY GRAVEL (GC)</b> - 35% subang vf-f gravel, 35% fines, 30% well graded ang fines, m stiff, medium plasticity, wet, 7.5YR4/3.	chromium jar
130				SC	<b>CLAYEY SAND (SC)</b> - slightly moist, not as cohesive, crumbly.	chromium jar
135				CL	<b>LEAN CLAY WITH SAND (CL)</b> - 80% silty clay, 20% f-m sand, soft, wet, 7.5YR5/3.	chromium jar
140				GC	<b>CLAYEY GRAVEL (GC)</b> - increasing sand, increasing gravel, m stiff, wet, white, orange and bright green deposits of heavily weathered minerals, 10YR4/2.	chromium jar

**SOIL BORING LOG**

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

**SOIL BORING LOG**

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	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