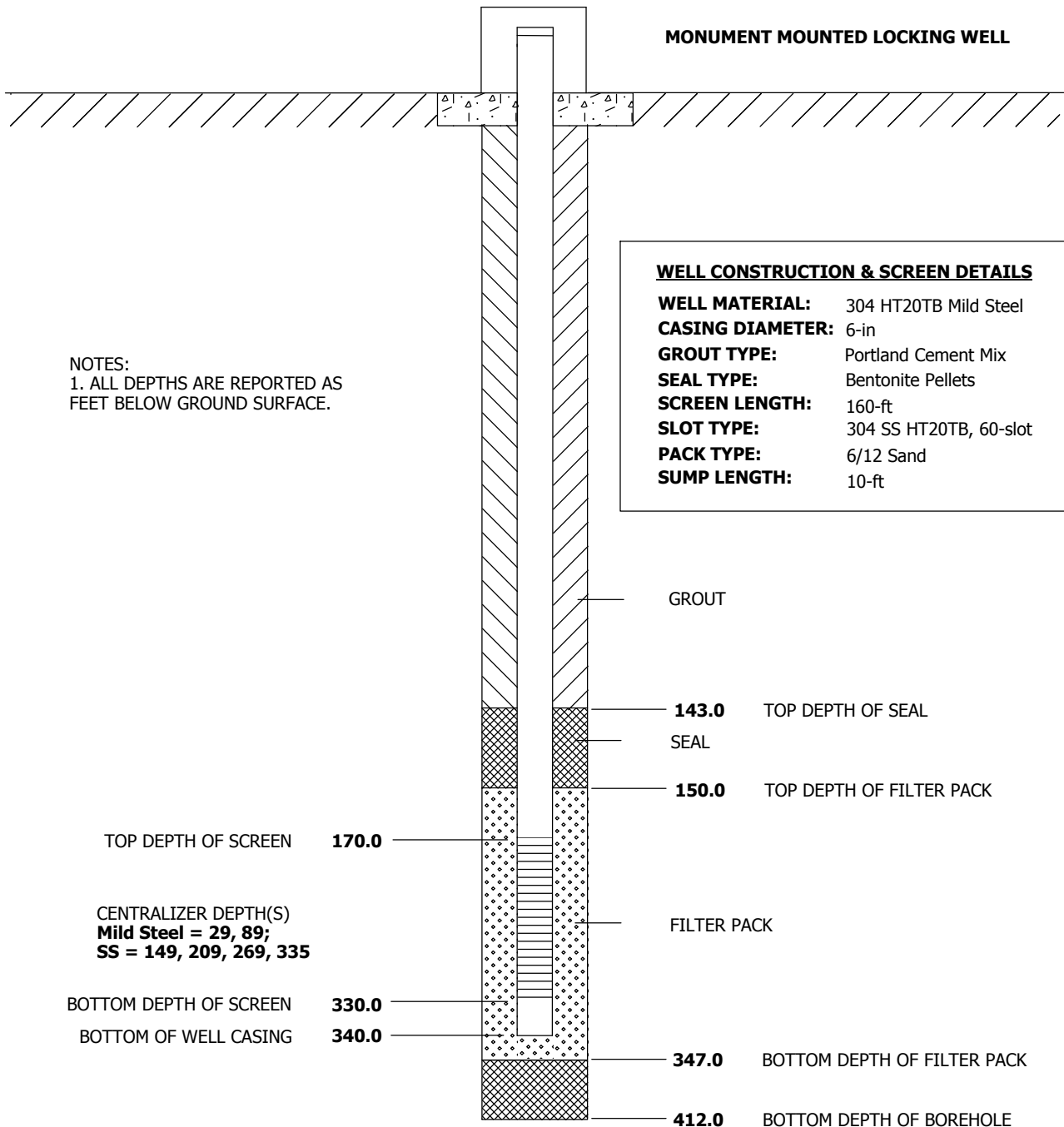


# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 326128.01.07.AR	<b>PROJECT:</b> IM-3 Hydrogeologic Investigation, PG&E Topock	<b>WELL NO:</b> IW-2
<b>LOCATION:</b> East Mesa, Parcel No. 650-151-06		
<b>DRILLING CONTRACTOR:</b> WDC Exploration & Wells, Montclair, CA	<b>DRILLING START DATE:</b> 12/13/2004	
<b>DRILLING METHOD:</b> Mud Rotary	<b>DRILLING END DATE:</b> 12/16/2004	
<b>LOGGER:</b> S. Mellon	<b>WELL COMPLETION DATE:</b> 12/16/2004	
<b>TOP OF WELL CASING (NGVD 29):</b> 550.11	<b>NORTHING COORDINATE (CCS DAND 27, ZONE 5):</b> 2103104.94	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 546.54	<b>EASTING COORDINATE (CCS NAD 27 ZONE 5):</b> 7613363.87	



WELL DIAGRAM IS NOT TO SCALE

## SOIL BORING LOG

<b>PROJECT NAME:</b> IM-3 Hydrogeologic Investigation, PG&E Topock		<b>HOLE DEPTH (ft):</b> 412.0	<b>DRILLING CONTRACTOR:</b> WDC Exploration & Wells, Montclair, CA	
<b>SURFACE ELEVATION:</b> 546.5 ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> 2,103,104.94	<b>EASTING (CCS NAD 27 Z 5):</b> 7,613,363.87	<b>DATE STARTED:</b> 12/13/2004	<b>DATE COMPLETED:</b> 12/16/2004
<b>DRILLING METHOD:</b> Mud Rotary		<b>WATER LEVEL (ft):</b> ---	<b>DRILLING EQUIPMENT:</b> WDC 30K	
<b>LOCATION:</b> East Mesa, Parcel No. 650-151-06			<b>LOGGED BY:</b> S. Mellon	

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)			
0					<b>NO FORMAL LOG</b> -see boring log for well OW-2 completed ~50 ft north of IW-2	Conductor casing set to 10 ft bgs, wash casing to 200 ft bgs without collection of core or chips.  hard chatter from 178-186 ft, viscosity = 33sec, density = 8.8 lbs/gal, pH=8  penetration rate from 180-2000' is 100 ft/hr
200					- began collecting chips at 200 ft at 10 ft intervals  - metamorphic angular rock fragments, typical chip size 5mm	chatter from 200-210 ft, slow hard drilling, penetration rate from 200-220 ft is 33 ft/hr
205						
210						

**SOIL BORING LOG**

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<b>DRILLING METHOD:</b> Mud Rotary		<b>WATER LEVEL (ft):</b> ---	<b>DRILLING EQUIPMENT:</b> WDC 30K	
<b>LOCATION:</b> East Mesa, Parcel No. 650-151-06			<b>LOGGED BY:</b> S. Mellon	

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)			
215					NO FORMAL LOG  - ang to subang metamorphic rock chips, typical chip size ~3 mm	slow drilling but no chatter, possible circulation problems
220						
225					- ang to subang metamorphic rock fragments, typical chip size ~5 mm	slow drilling but no chatter, penetration rate from 220-240 ft is 46 ft/hr, not running sanders, sand = 2%
230						
235						
240						
245						penetration rate from 240-260' is 46 ft/hr, viscosity = 43 sec, density 9 lbs/gal, sand <0.5%, pH=8

**SOIL BORING LOG**

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<b>LOCATION:</b> East Mesa, Parcel No. 650-151-06			<b>LOGGED BY:</b> S. Mellon	

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)			
250					NO FORMAL LOG  - ang to subang metamorphic rock fragments, typical chip size ~3 mm	
255						
260					- typical chip size ~5 mm	improved pump circulation and penetration rate (~2100psi was 1300 psi); penetration rate from 260-280 ft is 100 ft/hr
265						
270					- typical chip size ~10 mm	
275						
280						

### SOIL BORING LOG

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<b>LOCATION:</b> East Mesa, Parcel No. 650-151-06			<b>LOGGED BY:</b> S. Mellon	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)			
285					<p><b>NO FORMAL LOG</b></p> <p>- ang to subang metamorphic rock fragments, typical chip size ~15 mm</p>	<p>viscosity = 33 sec, density 9 lbs/gal, pH=8, sand &lt;0.5%</p> <p>chatter</p>
290						
295						
300						
305						
310						
315					<p>- ang to subang metamorphic rock fragments, typical chip size 5-10 mm</p>	
					<p>- same as above, typical chip size ~3 mm</p>	

**SOIL BORING LOG**

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<b>SURFACE ELEVATION:</b> 546.5 ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> 2,103,104.94	<b>EASTING (CCS NAD 27 Z 5):</b> 7,613,363.87	<b>DATE STARTED:</b> 12/13/2004	<b>DATE COMPLETED:</b> 12/16/2004
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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)			
320					NO FORMAL LOG	tripping out to set up split core barrel and kriss bit, attempting to core from 320 ft
325						
330					- typical chip size ~5 mm - core black green gray metamorphic rock. Rock types include gneiss, quartzite, some evidence of oxidation at joint faces, slim veins (>1 mm) various orientation	continuous coring started at 330 ft bgs. viscosity = 36 sec, density 9 lbs/gal, pH=8, sand <0.5%, 30 ft/hr
335			0.75			
340					- black green metamorphic rock, salt and pepper look (metadiorite?), some oxidation at joints, some qtz veins (<1mm), minor felsic rock fragments	possible bedrock encountered viscosity = 36 sec, density 8.9 lbs/gal, pH=8, sand <0.5%, 75 ft/hr
345			0.5			
350					- chips ang to subang metamorphic rock fragments. Typical chip size ~5mm, core gneiss, black white rock, oxidation surfaces at some joints, minor felsic rock fragments	43 ft/hr
355			0.5			
360					- core same, less felsic rock fragments	11 ft/hr
365			0.17			

**SOIL BORING LOG**

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<b>SURFACE ELEVATION:</b> 546.5 ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> 2,103,104.94	<b>EASTING (CCS NAD 27 Z 5):</b> 7,613,363.87	<b>DATE STARTED:</b> 12/13/2004	<b>DATE COMPLETED:</b> 12/16/2004
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<b>LOCATION:</b> East Mesa, Parcel No. 650-151-06			<b>LOGGED BY:</b> S. Mellon	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION	COMMENTS	
	INTERVAL	TYPE/NUMBER	RECOVERY (ft)				
355			0.67	BR	<p><b>BEDROCK (BR)</b> - mixture of metamorphic rocks, consolidated reddish brown conglomerate, and silty sandstone, v hard metamorphic / felsic rock fragments, may be some megabreccia deposits.</p> <p>- chips same, typical chip size 3 mm, core is black white metamorphic rock, oxidation on some joint surfaces</p>	switched to solid core barrel	
			0.42			trying slower rotation	
360			0.58			viscosity = 42 sec, density 8.8 lbs/gal	
			0			trying faster rotation	
365			0			- chips same, typical chip size ~ 5mm	
			0.38			- metamorphic rock with oxidation on some joint surfaces gneiss, 4 mm wide qtz vein	
370			0.33			- metamorphic rock black green gray, salt and pepper look (gneiss or metadiorite), 1 mm wide qtz filled vein parallel with core axis	viscosity = 37 sec, density 8.8 lbs/gal
			0			6.8 ft/hr	
375			0.33			- same with oxidation on joint surface	5.8 ft/hr
			0.63			- same but with traces of consolidated alluvial material (c sand, red brn)	21 ft/hr
380			0.46	- same but larger piece of consolidated alluvial material, well graded f sand to f gravel, grain supported	21.4 ft/hr		
			0				
385							



## SOIL BORING LOG

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<b>LOCATION:</b> East Mesa, Parcel No. 650-151-06			<b>LOGGED BY:</b> S. Mellon	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	TYPE/NUMBER	RECOVERY (ft)			
390			0.13		<p><b>BEDROCK (BR)</b> - mixture of metamorphic rocks, consolidated reddish brown conglomerate, and silty sandstone, v hard metamorphic / felsic rock fragments, may be some megabreccia deposits.</p> <p>- metamorphic rock, salt and pepper look (metadiorite?) oxidation on joint surface</p> <p>- mixture of broken up rock ~0.5" to 2" combination of metamorphic rock and consolidated alluvial material - grains supported</p>	<p>25 ft/hr</p> <p>25 ft/hr</p> <p>19 ft/hr</p> <p>viscosity = 39 sec, density 8.8 lbs/gal, pH=8, sand &lt;0.5%</p>
			0			
			0			
			0			
395			0			
			0			
400			0			
			0			
405			0.42			
410			0			
Boring Terminated at 412 ft						
<p><b>ABBREVIATIONS</b></p> <p>cc = continuous core run            brn = brown            lt = light            dk = dark            vf = very fine-grained            f = fine-grained            m = medium-grained            c = coarse-grained</p>						





**SOIL BORING LOG**

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	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)			
					vc = very coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded br = bedrock formation ss = sandstone conglom = conglomerate comptd = compacted qtz = quartz	