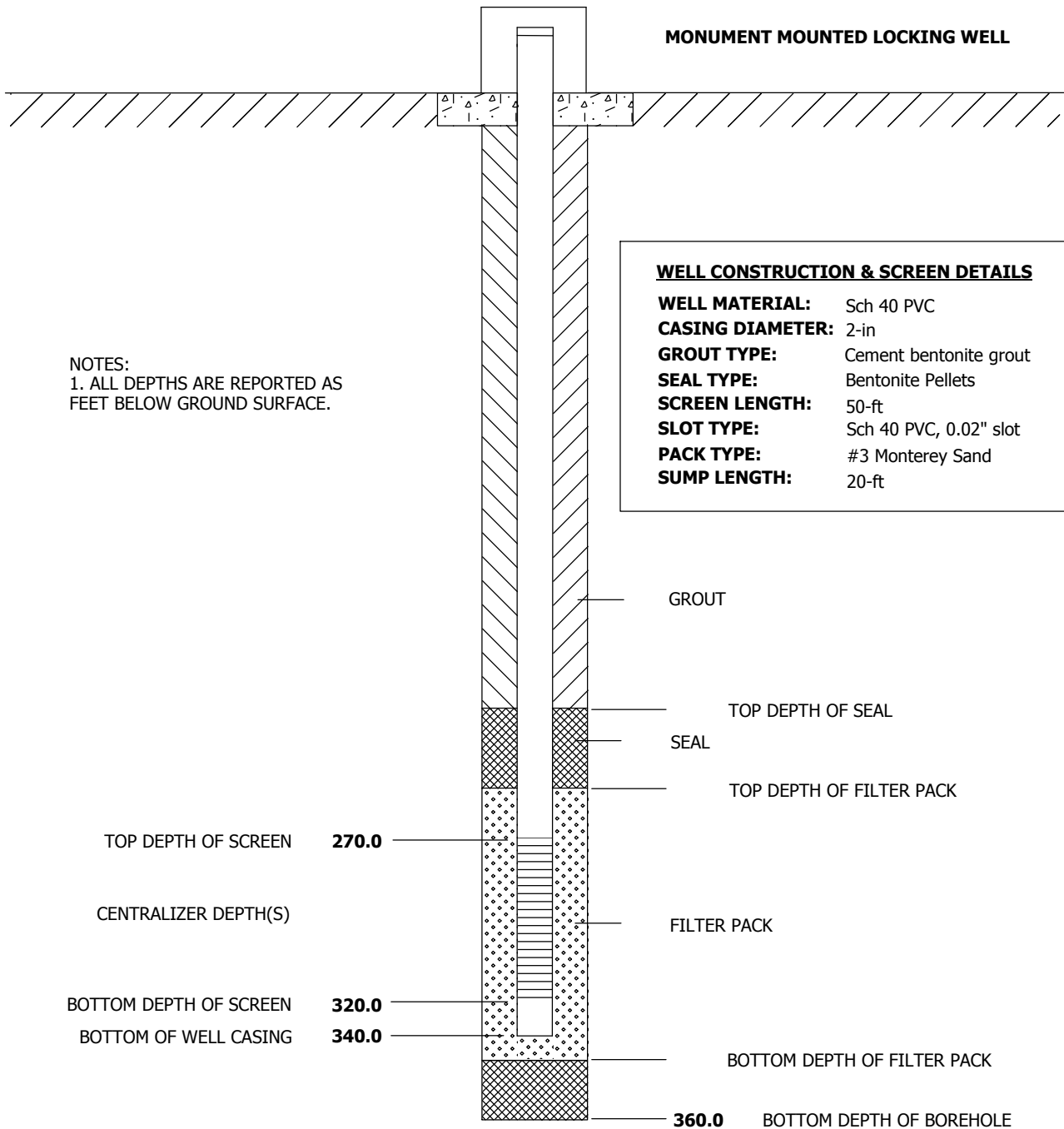


WELL COMPLETION DIAGRAM

PROJECT NO: 326128.01.07.AR	PROJECT: IM-3 Hydrogeologic Investigation, PG&E Topock	WELL NO: CW-3D
LOCATION: East Mesa Area, Parcel No. 650-151-06		
DRILLING CONTRACTOR: WDC Exploration & Wells, Montclair, CA	DRILLING START DATE: 01/19/2005	
DRILLING METHOD: Rotosonic	DRILLING END DATE: 01/25/2005	
LOGGER: C. Dougherty	WELL COMPLETION DATE: 01/01/2005	
TOP OF WELL CASING (NGVD 29): 534.14	NORTHING COORDINATE (CCS DAND 27, ZONE 5): 2103348.44	
GROUND SURFACE ELEVATION (NGVD 29): 531.53	EASTING COORDINATE (CCS NAD 27 ZONE 5): 7613849.33	



WELL DIAGRAM IS NOT TO SCALE

SOIL BORING LOG

PROJECT NAME: IM-3 Hydrogeologic Investigation, PG&E Topock		HOLE DEPTH (ft): 360.0	DRILLING CONTRACTOR: WDC Exploration & Wells, Montclair, CA	
SURFACE ELEVATION: 531.5 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,103,348.44	EASTING (CCS NAD 27 Z 5): 7,613,849.33	DATE STARTED: 01/19/2005	DATE COMPLETED: 01/25/2005
DRILLING METHOD: Rotasonic		WATER LEVEL (ft): ---	DRILLING EQUIPMENT: Gefco SS-15K-HL	
LOCATION: East Mesa Area, Parcel No. 650-151-06			LOGGED BY: C. Dougherty	

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						Conductor casing set to 10 ft bgs, wash casing to 70 ft bgs without collection of core. Per work-plan, drilled interval in unsaturated zone was not logged.
10						
15						
20						
25						
30						
35					WELL GRADED SAND (SW) - olive gray (5YR4/2) 50% m sand, 20% f sand, 5% gravel, ang. - mostly f sand and silt	logged from cuttings

SOIL BORING LOG

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DRILLING METHOD: Rotasonic		WATER LEVEL (ft): ---	DRILLING EQUIPMENT: Gefco SS-15K-HL	
LOCATION: East Mesa Area, Parcel No. 650-151-06			LOGGED BY: C. Dougherty	

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		CC1	10	SP	<p>POORLY GRADED SAND WITH SILT AND GRAVEL (SP) - brn 10YR5/3, 40% f-m sand, 20% c sand, 10-15% silt, 10% subang gravel, gneiss as large as 4 cm, firm, moist.</p> <p>- silty more silt and clay in thin layers</p> <p>- gravel increasing in size to 6-7 cm, silty more clay</p>	<p>continuous coring started at 70 ft bgs</p> <p>large gravel possibly cobble fragments?</p>
80						
85				SW-SM	<p>WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM) - brn 10YR5/3, 30% m sand, 25% f sand, 20% ang c sand, 15% ang to subang gravel up to 6 cm size, 10% silt-clay, firm moist.</p> <p>- some caliche, slit imbrication of fine gravel at base of core, dry</p>	
90		CC2	20	SM	<p>SILTY SAND (SM) - brn 10YR5/3, 50% f sand, 25% m and c ang sand, 20% silt, 5% subang gravel, firm, clasts are gneiss-few larger than 2 cm, moist.</p> <p>- decreasing silt and increasing c sand</p>	
95						
100					<p>WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM) - brn 10YR5/3, 30% m sand, 30% f sand, 25% ang c sand, 10% silt-clay, 5% subang gravel generally 2 cm or less, firm moist.</p>	
105					<p>- silt and clay increased to 20%, 15% decreased c sand</p>	

SOIL BORING LOG

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SURFACE ELEVATION: 531.5 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,103,348.44	EASTING (CCS NAD 27 Z 5): 7,613,849.33	DATE STARTED: 01/19/2005	DATE COMPLETED: 01/25/2005
DRILLING METHOD: Rotasonic		WATER LEVEL (ft): ---	DRILLING EQUIPMENT: Gefco SS-15K-HL	
LOCATION: East Mesa Area, Parcel No. 650-151-06			LOGGED BY: C. Dougherty	

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		CC3	20	SW-SM	WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM) - brn 10YR5/3, 30% m sand, 30% f sand, 25% ang c sand, 10% silt-clay, 5% subang gravel generally 2 cm or less, firm moist. - increased 10% gravel content, color mottled with brn (7.5YR4/4) - dry	groundwater grab sample collected from 120-136 ft bgs	
115							
120							
125		CC4	16	SW	WELL GRADED SAND (SW) brn 10YR5/3, 10% c sand, 5% silt and clay, <5% gravel, saturated, clasts are ang.		
				SM	SILTY SAND WITH GRAVEL (SM) - brn 7.5YR5/3, 30% f sand, 20% ang gravel up to 4cm, 20% c sand, 20% m sand, 15% silt, firm, moist, gradational contact above, abrupt below.		
130				SM	SILTY SAND (SM) - brn 10YR4/3, 30% m sand, 25% f sand, 20% ang c sand, 20% silt, 5% subang gravel up to 2cm size, firm. - increased gravel content		
135				SM	- slit increase in clay		
140					NO RECOVERY		

SOIL BORING LOG

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SURFACE ELEVATION: 531.5 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,103,348.44	EASTING (CCS NAD 27 Z 5): 7,613,849.33	DATE STARTED: 01/19/2005	DATE COMPLETED: 01/25/2005
DRILLING METHOD: Rotosonic		WATER LEVEL (ft): ---	DRILLING EQUIPMENT: Gefco SS-15K-HL	
LOCATION: East Mesa Area, Parcel No. 650-151-06			LOGGED BY: C. Dougherty	

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					<p>SILTY SAND (SM) - brn 10YR4/3, 30% m sand, 25% f sand, 20% ang c sand, 20% silt, 5% subang gravel up to 2cm size, firm. - 9 cm cobble</p> <p>- brn 10YR5/3, 30% f sand, 25% silt, 15% ang c sand, <5% ang gravel</p> <p>- moderately firm, dry, moist</p> <p>- increasing c sand 25%</p> <p>- increasing gravel 5-10%</p> <p>- several 2cm to 4cm gravel, less gravel below 152ft, Increased clay at 152-153.5 ft, very moist</p> <p>- silty sand, brn 7.5YR5/4, 5% ang gravel up to 2 cm or less, 25% silt, 20% c sand, 20% f sand</p> <p>- caliche, moist</p>	<p>cobble possibly part of larger rock</p> <p>hard drilling</p>
150		CC5	20	SM		
155						
160						
165				SC	<p>CLAYEY SAND (SC) - brn 10YR5/3, 70% f to m sand, 20% silt and clay, <10% c sand, <5% gravel, firm, moist to wet.</p> <p>- color mottled with reddish brn 2.5YR4/4, decreasing 65% m and f sand, increasing 15% c sand</p> <p>SILTY SAND (SM) - brn 10YR5/3, 50% f and m sand, 25% c sand, 15% silt, 10% f gravel, silty soft, moist to wet.</p> <p>- some reddish brn 2.5YR4/4 mottling, large 4-6cm gravel</p> <p>WELL GRADED SAND WITH GRAVEL (SW) - brn 10YR4/3, 40% c sand, 35% f and m sand, 15% f gravel, 5% silt, ang to subang, loose.</p>	<p>drill pipe broken when just starting to push core</p>
170		CC6	20	SM		
175				SW		

SOIL BORING LOG

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DRILLING METHOD: Rotasonic		WATER LEVEL (ft): ---	DRILLING EQUIPMENT: Gefco SS-15K-HL	
LOCATION: East Mesa Area, Parcel No. 650-151-06			LOGGED BY: C. Dougherty	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	TYPE/NUMBER	RECOVERY (ft)			
180					<p>WELL GRADED SAND WITH GRAVEL (SW) - brn 10YR4/3, 40% c sand, 35% f and m sand, 15% f gravel, 5% silt, ang to subang, loose.</p> <hr/> <p>WELL GRADED SAND WITH SILT (SW-SM) - brn 10YR 4/3 and dk reddish brn (2.5YR3/4) mottled, 40% c sand, 40% f and m sand, 10% f gravel, 10% silt, moderately firm.</p> <p>- thin zone of dark greenish gray (5GY4/1), silt, some caliche</p>	groundwater grab sample collected from 180-200 ft bgs
185			SW-SM	<p>- pale brn (10YR6/3), 35% c sand, 15% gravel, saturated, soft, clasts are angular up to 6 cm size</p>		
190		CC7	20	<p>SILTY SAND (SM) - mottled dk grayish brn 2.5YR4/2 and brn 7.5YR4/4, 60% f and m sand, 15% silt, 15% c sand, 10% f gravel, firm, moist.</p>		
195			SM	<p>- larger gravel clasts (2-4 cm)</p> <p>- larger gravel clasts (2-4 cm)</p>		
200				NO RECOVERY	lost core due to broken core barrel down hole	
205					hard drilling	
210						

SOIL BORING LOG

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DRILLING METHOD: Rotasonic		WATER LEVEL (ft): ---	DRILLING EQUIPMENT: Gefco SS-15K-HL	
LOCATION: East Mesa Area, Parcel No. 650-151-06			LOGGED BY: C. Dougherty	

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		CC8	0		NO RECOVERY	periodic hard drilling
220					WELL GRADED SAND WITH SILT (SW-SM) - dk grayish brn 2.5YR4/2, 40% m ang sand, 25% c ang sand, 20% f ang sand, 10% silt, 5% f subang gravel up to 2 cm, moderately firm, moist to wet.	
225						
230		CC9	20	SW-SM		
235					- large gravel 3-4 cm, also increasing c sand - mottling with reddish brn 5YR4/4	dry, maybe from drilling friction heat?
240					- dry	
245				SM	SILTY SAND (SM) - brn 7.5YR4/4, 50% f to m sand, 25% c sand, 20% silt, 5% gravel, moderately soft, moist. - 7 cm cobble	collected grab groundwater sample, ID: CW-3-260 at 14:40 hrs, pH=8.9/8.7, conductivity = 730/850 ms, TDS = 4500/5100 ppm hard drilling



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DRILLING METHOD: Rotosonic		WATER LEVEL (ft): ---	DRILLING EQUIPMENT: Gefco SS-15K-HL	
LOCATION: East Mesa Area, Parcel No. 650-151-06			LOGGED BY: C. Dougherty	

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		CC10	6		NO RECOVERY	groundwater grab sample collected from 246-260 ft bgs
255						
260						
265				GW	WELL GRADED GRAVEL WITH SAND (GW) - grayish brn 2.5YR5/2, 35% f ang to subang gravel, 30% c ang sand, 20% c ang to subang gravel, 15% f sand, 5% silt, soft, saturated, clasts are metamorphic rock.	periodic hard drilling
				SW-SM	WELL GRADED SAND WITH SILT (SW-SM) - grayish brn 2.5YR5/2, 40% f and m sand, 30% c sand, 20% silt, 10% f gravel, soft, saturated.	
270				GW	WELL GRADED GRAVEL WITH SAND (GW) - grayish brn 2.5YR5/2, 35% f ang to subang gravel, 30% c ang sand, 20% c ang to subang gravel, 15% f sand, 5% silt, soft, saturated, clasts are metamorphic rock.	
				SM	SILTY SAND (SM) - brn 10YR5/3, 40% m sand, 20% silt, 20% c sand, 20% f sand, very soft, saturated.	
275		CC11	16	SW-SM	WELL GRADED SAND WITH SILT (SW-SM) - brn 10YR5/3, 30% f sand, 25% c sand, 10% silt, 5% f gravel, soft, saturated. - some f gravel (<5%), less silt, grades into SW below - coarse gravel present (3cm in size- rock fragments) - increasing silt, less c sand - caliche and mottling with reddish br (5YR4/4)	
280					NO RECOVERY	very hard drilling



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DRILLING METHOD: Rotosonic		WATER LEVEL (ft): ---	DRILLING EQUIPMENT: Gefco SS-15K-HL	
LOCATION: East Mesa Area, Parcel No. 650-151-06			LOGGED BY: C. Dougherty	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION	COMMENTS	
	INTERVAL	TYPE/NUMBER	RECOVERY (ft)				
320				SW	<p>WELL GRADED SAND (SW) - reddish brn 5YR5/3, 40% m subang to ang sand, 25% c subang to ang sand, 20% f subang to ang sand, 10% subang to subrnd gravel, 5% silt, soft, wet.</p> <p>- few clasts of lithified matrix</p>	<p>collected grab groundwater sample, ID: CW-3-320 at 9:32 hrs, from 300-320 ft interval</p>	
325					<p>- slit color change to 5YR4/3, 25-30% increasing sand, 20% f sand, increasing gravels to 15%, c sand, 5% silt</p>		
330					<p>- few clasts of lithified matrix</p>		
335							
340					<p>- 40% gravel up to 9 cm, multiple lithologies</p>		<p>groundwater grab sample collected from 340-360 ft bgs</p>
345							
350							



SOIL BORING LOG

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DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	TYPE/NUMBER	RECOVERY (ft)			
355					WELL GRADED SAND (SW) - reddish brn 5YR5/3, 40% m subang to ang sand, 25% c subang to ang sand, 20% f subang to ang sand, 10% subang to subrnd gravel, 5% silt, soft, wet. - color to 5YR4/3	total drilled depth
360				- brn (7.5YR5/2), 45% m sand, 30% c sand, 10% f sand, 10% gravel, <5% silt		
				Boring Terminated at 360 ft 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		