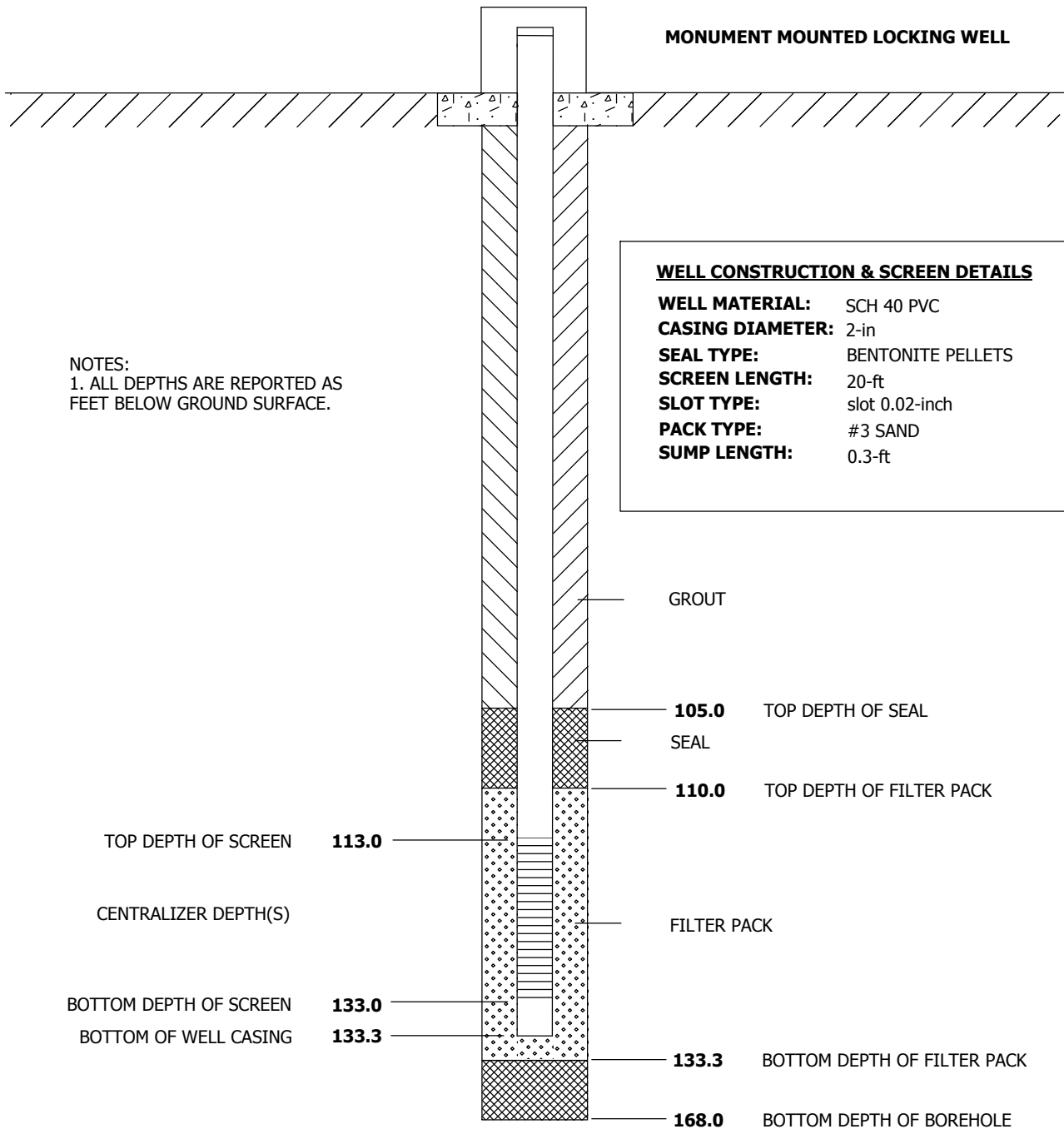


WELL COMPLETION DIAGRAM

PROJECT NO: 315024.IM.02	PROJECT: PG&E Topock IM Investigation (Phase 5 2004)	WELL NO: MW-31-135
LOCATION: MW20 Bench Topock, CA. - Along east side of old Route 66 just north of extraction well structures.		
DRILLING CONTRACTOR: WDC Exploration and Wells, Montclair, CA		DRILLING START DATE: 03/23/2004
DRILLING METHOD: Rotosonic		DRILLING END DATE: 03/26/2004
LOGGER: J. Piper		WELL COMPLETION DATE: 03/26/2004
TOP OF WELL CASING (NGVD 29): 498.11		NORTHING COORDINATE (CCS DAND 27, ZONE 5): 2102835.29
GROUND SURFACE ELEVATION (NGVD 29): 495.10		EASTING COORDINATE (CCS NAD 27 ZONE 5): 7615819.13



WELL DIAGRAM IS NOT TO SCALE

SOIL BORING LOG

PROJECT NAME: PG&E Topock IM Investigation (Phase 1 2004)		HOLE DEPTH (ft): 168.0	DRILLING CONTRACTOR: WDC Exploration and Wells, Montclair, CA	
SURFACE ELEVATION: 495.1 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,102,835.29	EASTING (CCS NAD 27 Z 5): 7,615,819.13	DATE AND TIME STARTED: 03/23/2004	DATE AND TIME COMPLETED: 03/26/2004
DRILLING METHOD: Rotosonic		WATER LEVEL (ft): ---	DRILLING EQUIPMENT: Standard Access Rig with continuous 4 core, 6 casing	
LOCATION: MW20 Bench Topock, CA. - Along east side of old Route 66 just north of extraction well structures.			LOGGED BY: J. Piper	

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		CC16	2	SW	WELL GRADED SAND WITH GRAVEL (SW) - 7.5YR6/3, vf subang to ang sand, some m-c sand, rnd gravel clasts, quartzite, limestone, gneiss, dry.	9:50, let sample barrel cool
10	+	CC17	7			
15						
		CC18	3	SM	SILTY SAND (SM) - 7.5YR7/2, c sand, f pebbles, subrnd to rnd gravel, quartzite, chert.	10:25, let sample barrel cool
20				SC	CLAYEY SAND WITH GRAVEL (SC) - 7.5YR4/1-3/1, dry. - gravelly zone	
25		CC19	10	SM	SILTY SAND (SM)	
				SC	CLAYEY SAND (SC) - 7.5YR4/1-3/1, clayey, moist. - clasts more ang - gravelly, increasing clay, moist - gravel gneiss and foliated mm rocks	
30				SM	SILTY SAND WITH GRAVEL (SM) - some weakly cemented zones, dry.	
				SC	CLAYEY SAND (SC) - 7.5YR6/2, gneiss cobbles, grades finer, moist.	
35		CC20	10	CL	LEAN CLAY (CL) - 7.5YR5/2, weakly cemented, green mm clasts, moist.	

SOIL BORING LOG

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DRILLING METHOD: Rotasonic		WATER LEVEL (ft): ---		DRILLING EQUIPMENT: Standard Access Rig with continuous 4 core, 6 casing	
LOCATION: MW20 Bench Topock, CA. - Along east side of old Route 66 just north of extraction well structures.				LOGGED BY: J. Piper	

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)			
				CL	LEAN CLAY (CL) - 7.5YR5/2, weakly cemented, moist.	clayey zones >25' suggest debris flow EOD USGS pour water at 49', and 53' water in sonic string after advance 63-74, examine sluff in pipe above 63'bgs
				SM	SILTY SAND (SM) - 7.5YR6/2 to 7/2, dry.	
40		CC21	10	SC	CLAYEY SAND (SC) - 7.5YR4/2, clayey sand, grades to silty, weakly cemented, dry. - f-c pebbles are ang to subang, clast of greenish mm with qtz weathering out in relief, f qtz pebbles, c gneiss sand	
45						
50					CLAYEY SAND WITH GRAVEL (SC) - 7.5YR5/3-4/3, gravelly, moist.	
55		CC22	10	SC	- caliche cemented zone	
60		CC23	5	SM	SILTY SAND WITH GRAVEL (SM) - 7.5YR5/2, 25% gravel, interbedded silt, ang qtz, weathered mm rocks, grades coarser at depth, slightly moist. - thin silt layers	
65				SC	CLAYEY SAND WITH GRAVEL (SC) - 7.5YR4/2, 15% gravel, f-m pebbles, ang to subang clasts, gneiss and green mm, wet. - 30% gravel	
70		CC24	11	SM	SILTY SAND WITH GRAVEL (SM) - 7.5YR5/1, 15% gravel, moist.	

SOIL BORING LOG

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DRILLING METHOD: Rotasonic		WATER LEVEL (ft): ---		DRILLING EQUIPMENT: Standard Access Rig with continuous 4 core, 6 casing	
LOCATION: MW20 Bench Topock, CA. - Along east side of old Route 66 just north of extraction well structures.				LOGGED BY: J. Piper	

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)			
				SM	SILTY SAND WITH GRAVEL (SM) - 7.5YR5/1, 15% gravel, moist.	
75					CLAYEY SAND WITH GRAVEL (SC) - 7.5YR4/3, c sand, f pebbles, 25% gravel, weakly cemented, wet.	well graded sand and f gravel brought up when casing advanced 38-73'
80		CC25	14	SC		USGS samples at 63'/sluff, 64', 67.5', 73', 79, 87'
85					- 50% gravel, gravelly silt, moist, 7.5YR4/4.	
90				SM	SILTY SAND WITH GRAVEL (SM) - 10% gravel, 2-3 cobbles, moist.	
95		CC26	10		SILTY GRAVEL WITH SAND (GM) - 7.5YR4/3, well graded sand, f-m pebbles, wet.	
100				GM	- 30% gravel, silt drapes, sand, clasts are qtz, black-gray and greenish mm, wk cement in sandy/gravelly zones.	
105		CC27	10			USGS samples at 103', 107'

SOIL BORING LOG

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DRILLING METHOD: Rotasonic		WATER LEVEL (ft): ---		DRILLING EQUIPMENT: Standard Access Rig with continuous 4 core, 6 casing	
LOCATION: MW20 Bench Topock, CA. - Along east side of old Route 66 just north of extraction well structures.				LOGGED BY: J. Piper	

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)			
				GM	SILTY GRAVEL WITH SAND (GM) - 7.5YR4/3, well graded sand, f-m pebbles, wet.	
110						10' of sluff in barrel above 108-118 sample
115		CC28	10	SM	SILTY SAND (SM) - 5YR4/3, sand, f-m pebbles, some silt, mm or qtz clasts, moist. - subround pebble clasts	USGS sample at 117?
120				SC	CLAYEY SAND (SC) - moist to wet.	
125				SM	SILTY SAND WITH GRAVEL (SM) - silty sand and gravel, wet. - coarsens with depth - sand fining, silt, and caliche cementing - more silt, sand rnd	wet water sample collected from 125-128 core
130		CC29	15	GW	WELL GRADED GRAVEL WITH SAND (GW) - sandy gravel with silt, loose. - coarsens with depth	
135				GM	SILTY GRAVEL WITH SAND (GM) - silty sand and gravel, moist.	
				CL	SANDY LEAN CLAY WITH GRAVEL (CL) - top of red fanglomerate dense clay, 5YR4/3, 20% gravel, clayey or silty vf sand, f laminations.	driller reports void at 113-116(casing dropped when advancing for 133' core run)
140		CC30	5	GM	SILTY GRAVEL WITH SAND (GM) - 5YR4/4, 50% sand and gravel, clay.	fravel in shoe

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	INTERVAL	TYPE/NUMBER	RECOVERY (ft)			
145					SILTY GRAVEL WITH SAND (GM) - 5YR4/4, 50% sand and gravel, clay. - 3 cobbles, mm, qtz, gneiss, foliated schist, ang to subang	
150		CC31	10	GM	- very gravelly - grades finer	8:20 run core 158-168' log 148-158 from sluff
155					- more gravel	core barrel advanced 148-158 push (no resistance)
160					- 5YR4/4, clayey, silty, well graded sand and gravel	sonic core past 158'
165		CC32	10	SW	WELL GRADED SAND WITH GRAVEL (SW) - 50% f-c sand.	
				SM	SILTY SAND WITH GRAVEL (SM) - silty sand with gravel, few cobbles.	
				GM	SILTY GRAVEL WITH SAND (GM) - 5YR4/3, 25% gravel and well graded sand, dense.	
Boring Terminated at 168 ft						
ABBREVIATIONS cc = continuous core run brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained						

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	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)			
					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	