

WELL COMPLETION DIAGRAM

PROJECT NO: 315024.IM.02

PROJECT: PG&E Topock Interim Measures

WELL NO: TW-2D

LOCATION: MW-20 Bench

DRILLING CONTRACTOR: WDC Exploration and Wells, Montclair, CA

DRILLING START DATE: 03/30/2004

DRILLING METHOD: Mud Rotary

DRILLING END DATE: 04/01/2004

LOGGER: J. Sarabia

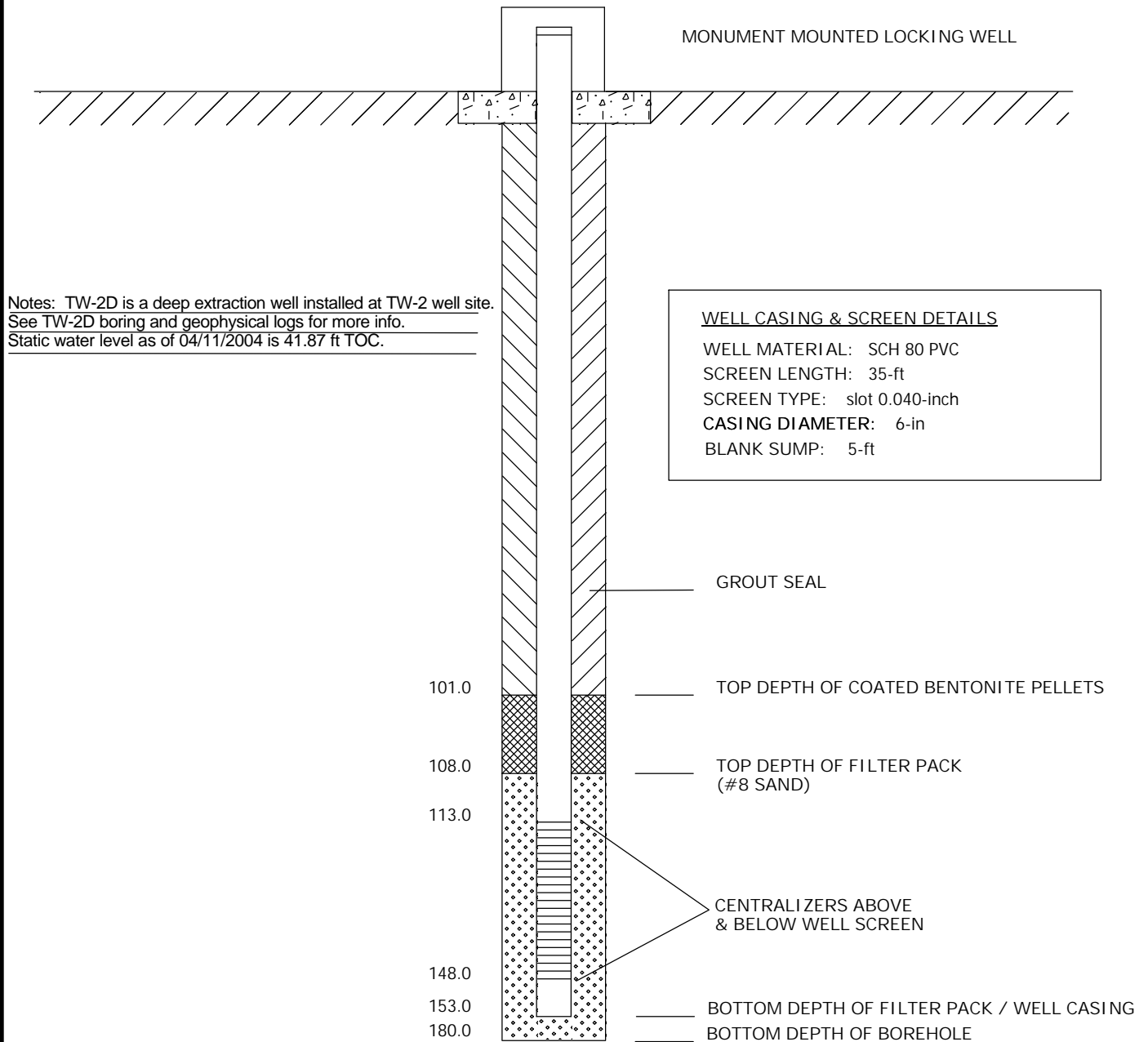
WELL COMPLETION DATE: 04/03/2004

TOP OF WELL CASING (NGVD 29): 499.57

NORTHING COORDINATE (CCS DAND 27, ZONE 5): 2102633.34

GROUND SURFACE ELEVATION (NGVD 29): 497.00

EASTING COORDINATE (CCS NAD 27 ZONE 5): 7615861.57



ALL DEPTHS ARE FEET BELOW GROUND SURFACE (NOT TO SCALE)

SOIL BORING LOG

| | | | | |
|---|---|--|---|---|
| PROJECT NAME: PG&E Topock IM Investigation (Phase 1 2004) | | HOLE DEPTH (ft): 180.0 | DRILLING CONTRACTOR: WDC Exploration and Wells, Montclair, CA | |
| SURFACE ELEVATION: 497.0 ft. MSL | NORTHING (CCS NAD 27 Z 5): 2,102,633.34 | EASTING (CCS NAD 27 Z 5): 7,615,861.57 | DATE AND TIME STARTED: 03/30/2004 | DATE AND TIME COMPLETED: 04/01/2004 |
| DRILLING METHOD: Mud Rotary | | WATER LEVEL (ft): --- | DRILLING EQUIPMENT: Speedstar 30K Rig with 94-mm Punch Core | |
| LOCATION: MW-20 Bench | | | LOGGED BY: J. Sarabia | |

| 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 | | | | | No core | AM activities: rig-up, set conductor casing to 17' bgs with air rotary. P.M. activities: set up mud circulation system, drill direct 17'-40' bgs. 15:30 begin first core run |
| 10 | | | | | | |
| 15 | | | | | | |
| 20 | | | | | | |
| 25 | | | | | | |
| 30 | | | | | | |
| 35 | | | | | | |

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|------------------|----------|-------------|---------------|-----------|--|---|
| | INTERVAL | TYPE/NUMBER | RECOVERY (ft) | | | |
| 40 | | | | | No core | |
| 45 | | CC124 | 0.75 | SW | WELL GRADED SAND WITH GRAVEL (SW) - brn 10YR4/3, well graded sand, c silt, f gravel up to 3/4, subang to ang. SILT WITH GRAVEL (ML) - brn 10YR4/3, sand fraction nearly absent. WELL GRADED SAND WITH GRAVEL (SW) - brn 10YR4/3, 80% well graded c silt to f gravel, m gravel up to 2, ang. | very slow coring very slow - rig maxed out hard coring |
| | | CC125 | 0.5 | ML | | |
| | | CC126 | 3.5 | SW | | |
| | | CC127 | 0.5 | SW | | |
| | | CC128 | 2 | SW | | |
| | | CC129 | 0.5 | SW | | |
| 50 | | CC130 | 2.25 | SM | SILTY SAND WITH GRAVEL (SM) - brn 10YR4/3, well graded c silt to 0.75 gravel, subang to ang, slight plasticity. | |
| | | CC131 | 0.75 | SM | | |
| 55 | | CC132 | 3.5 | SM | WELL GRADED SAND WITH GRAVEL (SW) - brn 10YR4/3, c silt, gravel up to 1, subang to subrnd. | moderate to hard coring, core is less dense/consolidated-remains intact after extraction from core barrel very hard coring |
| | | CC133 | 0.5 | SM | | |
| | | CC134 | 1.5 | SM | | |
| | | CC135 | 0 | SM | | |
| 60 | | CC136 | 1.5 | SM | - 1/8 to 1 ang gravel, subrnd cobbles to 2.5 | very hard coring, obstruction at 57' - will try to drill through with bit drill ahead to try to get through obstruction attempt to core- no recovery hard coring cannot core, will drill ahead and attempt to core at 62' bgs attempted to core at 62'bgs - too many rocks, will drill to 65' bgs |
| | | | | | | |
| 65 | | | | | | attempted to core at 65'bgs - too many rocks, will drill ahead to 67' bgs and attempt to core attempted to core at 67'bgs - too many rocks, will drill ahead to 70' bgs and attempt to core |
| 70 | | | | | | |

SOIL BORING LOG

| | | | | |
|---|---|--|---|---|
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| SURFACE ELEVATION: 497.0 ft. MSL | NORTHING (CCS NAD 27 Z 5): 2,102,633.34 | EASTING (CCS NAD 27 Z 5): 7,615,861.57 | DATE AND TIME STARTED: 03/30/2004 | DATE AND TIME COMPLETED: 04/01/2004 |
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| LOCATION: MW-20 Bench | | | LOGGED BY: J. Sarabia | |

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|------------------|----------|-------------|---------------|-----------|---|--|
| | INTERVAL | TYPE/NUMBER | RECOVERY (ft) | | | |
| 75 | | | | SW | WELL GRADED SAND WITH GRAVEL (SW) - brn 10YR4/3, c silt, gravel up to 1, subang to subrnd. | attempted to core at 70'bgs - refusal, will drill ahead rig chatter significant in this zone, becomes progressively harder to drill with depth, and impossible to core (possible basal conglomerate) |
| 80 | | | | | | at ~79.5 bgs, rig chatter subsides (possible lith, contact), will attempt to core at 80'bgs attempted to core at 80' bgs, could not advance the core barrel - will continue to attempt to get core. |
| 85 | | | | | | attempted to core - could not advance core, will drill forward and attempt to core when lithology changes or 90' bgs (which ever comes first) |
| 90 | | | | | | |
| 95 | | | | | SILTY SAND WITH GRAVEL (SM) - brn 10YR4/3, silt. | core barrel cannot be advanced (too many rocks/ cobbles. Will continue to drill direct with tricone bit and attempt to core every 3-5 feet. continued strong rig chatter. Still unable to advance core barrel |
| 100 | | | | GM | | |
| 105 | | | | | | |

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| | INTERVAL | TYPE/NUMBER | RECOVERY (ft) | | | |
| 110 | | | | | SILTY SAND WITH GRAVEL (SM) - brn 10YR4/3, silt. | |
| 115 | | CC137 | 2.75 | SW | WELL GRADED SAND WITH GRAVEL (SW) - reddish brn 2.5YR4/4, well graded c silt, gravel up to 2, subang to ang, massive. | lithology still causing rig chatter, but will attempt core run. |
| 120 | | CC138 | 1.75 | | | partial core recovery; core color implies geologic contact |
| 125 | | CC139 | 1 | | | poor core recovery, punch coring bit has been chewed up due to cobbles/rocks. Well put on another bit. Very hard coring |
| | | CC140 | 1.75 | | | hard to very hard coring |
| | | CC141 | 2 | | | very hard coring |
| 130 | | CC142 | 0.5 | SM | SILTY SAND (SM) - reddish brn 2.5YR4/4, increasing silts and clays, ang gravel clasts, variable mineralogy, massive. | very hard coring |
| | | CC143 | 4 | | | hard coring - good core recovery and competence (less very large stones/cobbles, more cohesion in lithology) |
| 135 | | CC144 | 2.5 | | | alternating moderate to hard coring |
| | | CC145 | 2 | | | stones/cobbles stuck on both ends of returned core preventing better recovery |
| 140 | | CC146 | 2 | | | moderate to easy coring |
| | | | | | | moderate coring difficulty |

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| | INTERVAL | TYPE/NUMBER | RECOVERY (ft) | | | |
| 145 | | CC147 | 3 | SC | CLAYEY GRAVEL WITH SAND (SC) - dk reddish brn 2.5YR3/4, well graded vf sand to 0.125, 20% gravel up to 2. | very easy coring very hard coring |
| | | CC148 | 3 | | | |
| | | CC149 | 3 | | | |
| 150 | | CC150 | 2 | SC | CLAYEY GRAVEL WITH SAND (SC) - dk reddish brn 2.5YR3/4, well graded vf sand to 0.125, 20% gravel up to 2. | very hard coring, probable geologic contact at 150' very dense/tough material |
| | | CC151 | 0.5 | | | |
| 155 | | CC152 | 1.5 | SC | SILTY SAND WITH GRAVEL (SC) - dk reddish brn 2.5YR3/4, well graded vf sand, 20% gravel 0.125 up to 2. - dark red, geologic contact, dense, lithified, stiff, rock-like | extremely hard coring extremely hard coring, will drill 2.5' drill ahead due to difficult or impossible coring |
| | | CC153 | 2 | | | |
| 160 | | CC154 | 0.4 | SM | SILTY SAND WITH GRAVEL (SC) - dk reddish brn 2.5YR3/4, well graded vf sand, 20% gravel 0.125 up to 2. - dark red, geologic contact, dense, lithified, stiff, rock-like | extremely hard core refusal drill ahead due to core refusal, will attempt to core again at 162' bgs |
| | | CC155 | 0.3 | | | |
| 165 | | CC156 | 0.5 | SM | SILTY SAND WITH GRAVEL (SC) - dk reddish brn 2.5YR3/4, well graded vf sand, 20% gravel 0.125 up to 2. - dark red, geologic contact, dense, lithified, stiff, rock-like | very slow drill with abundant rig chatter extremely hard core refusal at 6 drill ahead due to core refusal, will attempt to core again at 167' bgs |
| | | CC157 | 0.25 | | | |
| 170 | | CC157 | 0.25 | SM | SILTY SAND WITH GRAVEL (SC) - dk reddish brn 2.5YR3/4, well graded vf sand, 20% gravel 0.125 up to 2. - dark red, geologic contact, dense, lithified, stiff, rock-like | lots of rig chatter, very slow drilling extremely hard core, refusal at 6 drill ahead due to core refusal |
| 175 | | CC157 | 0.25 | SM | SILTY SAND WITH GRAVEL (SC) - dk reddish brn 2.5YR3/4, well graded vf sand, 20% gravel 0.125 up to 2. - dark red, geologic contact, dense, lithified, stiff, rock-like | extremely slow drilling, abundant rig chatter, will attempt core run at 172' attempted core run, refusal at 3, will drill ahead |

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| | INTERVAL | TYPE/NUMBER | RECOVERY (ft) | | | |
| 180 | | | | | <p>SILT SAND WITH GRAVEL (SC) - silts and clays, 25% to 34% graded, 20% gravel 0.125 up to 2.0 mm, variable mineralogy, massive.</p> <p>Boring Terminated at 180 ft</p> <p>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</p> | extremely hard drilling to 180' bgs |