

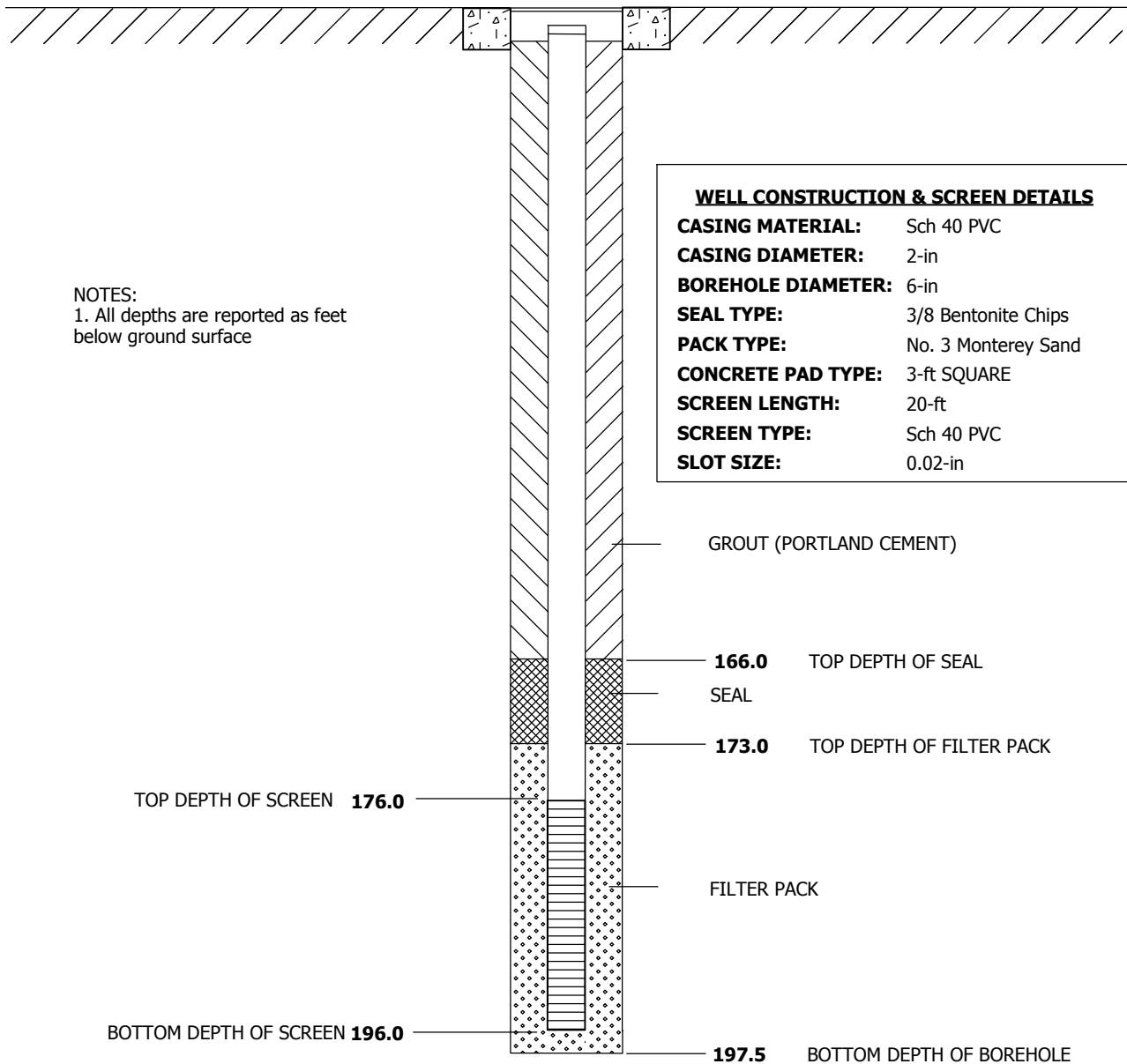
# WELL COMPLETION DIAGRAM

|                                    |  |                                  |
|------------------------------------|--|----------------------------------|
| <b>PROJECT NO:</b> 417981.ER.02.FW | <b>PROJECT:</b> ER-TCS Groundwater Investigation | <b>WELL NO:</b> <i>MW-69-195</i> |
|------------------------------------|--|----------------------------------|

**LOCATION:** Site 4

|  |  |
|--|--|
| <b>DRILLING CONTRACTOR:</b> Boart Longyear (R. Sawrey)   | <b>DRILLING START:</b> 5/30/2011   |
| <b>DRILLING METHOD:</b> Rotosonic/Wireline Rotary Core   | <b>DRILLING END:</b> 6/22/2011   |
| <b>LOGGER:</b> A. Brewster (Northstar)                   | <b>WELL COMPLETION DATE:</b> 6/22/2011   |
| <b>GROUND SURFACE ELEVATION (NAVD 88):</b> 632.1 ft AMSL | <b>GENERAL REMARKS:</b> Centralizers at 22, 35, 55, 75, 95, 115, 135, 155, and 175 feet bgs. |
| <b>NORTHING (CCS NAD 83 Z 5):</b> 2100291.55             |  |

## 12-IN DIAMETER WELL VAULT (FLUSH WITH GRADE)



**NOTES:**  
1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE



|   |                                |               |
|---|--------------------------------|---------------|
| PROJECT NUMBER:<br><b>417981.ER.02.FW</b> | BORING NUMBER:<br><b>BH-69</b> | SHEET 1 OF 10 |
| <b>SOIL BORING LOG</b>                    |                                |               |

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : Site 4 (2100291.6 N, 7615143.0 E)  
 ELEVATION : 632.1 ft      DRILLING CONTRACTOR : Boart Longyear (R. Sawrey)  
 DRILLING EQUIPMENT AND METHOD : RS-350, Rotosonic      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 178 ft BGS      START : 5/31/2011      END : 6/20/2011      LOGGER : A. Brewster (Northstar)

| DEPTH BELOW EXISTING GRADE (ft) |      | RECOVERY (in) | LAB SAMPLE | USCS CODE/<br>LITHOLOGY | SOIL DESCRIPTION  | SYMBOLIC LOG | COMMENTS  |
|---------------------------------|------|---------------|------------|-------------------------|---|--------------|---|
| INTERVAL (ft)                   |      |               |            |                         |   |              |   |
| 0.0                             | 1.0  | COMPLETE      | 10401      | GW                      | <b>Well Graded Gravel (GW)</b><br>0.0-42.0' - light yellowish brown, (2.5Y 6/3), dry, loose, 40% gravel, 40% sand, 20% fines, subangular to subrounded, no dominant mineralogy. |              | Soil sample collected between 0.0 and 1.0 ft bgs.   |
| 2.0                             | 3.0  |               | 10402      |                         |   |              | Soil sample collected between 2.0 and 3.0 ft bgs.   |
| 5.0                             | 6.0  |               | 10403      |                         |   |              | Soil sample collected between 5.0 and 6.0 ft bgs.   |
| 9.0                             | 10.0 |               | 10404      |                         |   |              | Soil sample collected between 9.0 and 10.0 ft bgs.  |
| 14.0                            | 15.0 |               | 10405      |                         |   |              | Soil sample collected between 14.0 and 15.0 ft bgs. |
| 19.0                            | 20.0 |               | 10406      |                         |   |              | Soil sample collected between 19.0 and 20.0 ft bgs. |









|   |                                |               |
|---|--------------------------------|---------------|
| PROJECT NUMBER:<br><b>417981.ER.02.FW</b> | BORING NUMBER:<br><b>BH-69</b> | SHEET 5 OF 10 |
| <b>SOIL BORING LOG</b>                    |                                |               |

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : Site 4 (2100291.6 N, 7615143.0 E)  
 ELEVATION : 632.1 ft      DRILLING CONTRACTOR : Boart Longyear (R. Sawrey)  
 DRILLING EQUIPMENT AND METHOD : RS-350, Rotosonic      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 178 ft BGS      START : 5/31/2011      END : 6/20/2011      LOGGER : A. Brewster (Northstar)

| DEPTH BELOW EXISTING GRADE (ft) | INTERVAL (ft) | RECOVERY (in) | LAB SAMPLE | USCS CODE/<br>LITHOLOGY | SOIL DESCRIPTION  | SYMBOLIC LOG | COMMENTS   |
|---------------------------------|---------------|---------------|------------|-------------------------|---|--------------|--|
|                                 |               |               |            |                         |   |              | DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION                                |
| 85                              |               | COMPLETE      |            |                         | <b>Metadiorite (pTbr)</b><br>42.0-157.0' - dusky yellowish green, (10GY 3/2), predominantly sodium feldspar, phaneritic, slight weathered, strong, massive, slightly fractured and healed with chlorite cement, non-foliated.<br><br>82' - Color change to greenish black (5GY 2/1) |              |  |
| 90                              |               |               |            | pTbr                    | 87' - Change to moderately weathered, moderately foliated, highly fractured along foliation plane and perpendicular to foliation plane, presence of iron staining on all fracture surfaces and some calcite mineralization on surfaces.   |              | Drill rate 87-97 ft: 0.77 FPM<br><br>Lost circulating water at approximately 93 ft below ground surface (bgs). |
| 95                              |               |               |            |                         |   |              | Stop 6/1/2011 at 1530 at 97 ft bgs.<br>Drill rate 97-107 ft: 0.91 FPM  |
| 100                             |               |               |            |                         |   |              |  |





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| PROJECT NUMBER:<br><b>417981.ER.02.FW</b> | BORING NUMBER:<br><b>BH-69</b> | SHEET 7 OF 10 |
| <b>SOIL BORING LOG</b>                    |                                |               |

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : Site 4 (2100291.6 N, 7615143.0 E)  
 ELEVATION : 632.1 ft      DRILLING CONTRACTOR : Boart Longyear (R. Sawrey)  
 DRILLING EQUIPMENT AND METHOD : RS-350, Rotosonic      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 178 ft BGS      START : 5/31/2011      END : 6/20/2011      LOGGER : A. Brewster (Northstar)

| DEPTH BELOW EXISTING GRADE (ft) | INTERVAL (ft) | RECOVERY (in) | LAB SAMPLE   | USCS CODE/<br>LITHOLOGY | SOIL DESCRIPTION  | SYMBOLIC LOG | COMMENTS  |
|---------------------------------|---------------|---------------|--|-------------------------|---|--------------|---|
|                                 |               |               |  |                         | SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY  |              | DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION |
| 125                             |               | COMPLETE      |  | pTbr                    | <b>Metadiorite (pTbr)</b><br>42.0-157.0' - pale olive, (10Y 6/3), predominantly sodium feldspar, strong (R4), slightly weathered, massive, moderately fractured with chlorite cement, non-foliated, some iron staining on surfaces, minor presence of calcite infill. |              |   |
| 130                             |               |               | 127' - Less fracturing and moderately foliated; presence of iron and manganese staining on surfaces. |                         | Drill rate 127-137 ft: 0.37 FPM   |              |   |
| 135                             |               |               | 137' - Fracture at approximately 80 degree dip, iron and black-colored staining.                     |                         | Drill rate 137-147 ft: 0.56 FPM   |              |   |
| 140                             |               |               |  |                         |   |              |   |







|   |                                |               |
|---|--------------------------------|---------------|
| PROJECT NUMBER:<br><b>417981.ER.02.FW</b> | BORING NUMBER:<br><b>BH-69</b> | SHEET 9 OF 10 |
| <b>ROCK CORE LOG</b>                      |                                |               |

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : Site 4 (2100291.6 N, 7615143.0 E)  
 ELEVATION : 632.1 ft      DRILLING CONTRACTOR : Boart Longyear (R. Sawrey)  
 CORING EQUIPMENT AND METHOD : RS-350, HQ Wire-Line Rotary      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 178 ft BGS      START : 5/31/2011      END : 6/20/2011      LOGGER : A. Brewster (Northstar)

| DEPTH BELOW SURFACE (ft) | CORE RUN LENGTH AND RECOVERY (%) | DISCONTINUITIES   |                    |  |  | SYMBOLIC LOG   | LITHOLOGY            | COMMENTS |
|--------------------------|----------------------------------|---|--------------------|--|--|--|----------------------|----------|
|                          |                                  | R Q D (%)   | FRACTURES PER FOOT | DESCRIPTION  |  |  |                      |          |
|                          |                                  |   |                    | DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS  |  |  |                      |          |
| 157.0                    | Run 1<br>4 ft<br>100%            | 10.4  | 3                  | 157.5, 157.8, 157.9' - Joint (3), 80, 30, and 30 deg, smooth at 157.5, rough at 157.8, 157.9, undulating, 5mm max calcite infilling, some iron staining, tight at 157.5, narrow at 157.8, 157.9. |  | Metadiorite<br>dusky yellow green, (5GY 5/2), predominantly sodium feldspar and amphiboles, hard, slight to no foliation, highly fractured and healed with chlorite cement, massive. | Run 1: 13 min 50 sec |          |
| 160                      |                                  |   | >10                | 158.0-158.6' - Highly fractured  |  |  |                      |          |
|                          |                                  |   | >10                | 158.7, 158.8' - Joint, 30 deg, smooth, undulating, <2mm calcite infilling, iron staining, tight.   |  |  |                      |          |
| 161.0                    |                                  |   | >10                | 159.1, 159.2, 159.3' - Joint, 30, 50, and 40 deg, rough, undulating, <1mm calcite infilling, iron staining, narrow.  |  |  |                      |          |
|                          | 2                                | 159.5-160.4' - Highly fractured, presence of sedimentary infill (coarse sand, silt).  |                    |  |  |  |                      |          |
|                          | >10                              | 160.4, 160.9' - Mechanical breaks.  |                    |  |  |  |                      |          |
|                          | Run 2<br>5 ft<br>100%            | 35  | 2                  | 161.5, 161.7' - Joint, 30 deg and 20 deg, rough, undulating, iron staining, no infill, narrow.   |  | Run 2: 25 min 0 sec  |                      |          |
| 165                      |                                  |   | >10                | 162.0, 162.3' - Mechanical breaks.   |  |  |                      |          |
|                          |                                  |   | >10                | 162.2' - Joint, 80 deg, smooth, undulating, <4mm calcite infilling, iron staining, tight.  |  |  |                      |          |
|                          |                                  |   | 2                  | 162.7-164.0' - Highly fractured, no infill, iron staining.   |  |  |                      |          |
|                          | 1                                | 164.2, 164.8' - Joint, 20 deg and 50 deg, rough, stepped at 164.2, undulating at 164.8, <1mm calcite infilling, no iron staining, tight |                    |  |  |  |                      |          |
|                          | >10                              | 165.6' - Mechanical breaks.   |                    |  |  |  |                      |          |
|                          | Run 3<br>3.3 ft<br>100%          | 12.5  | >10                | 166.1-166.4' - Highly fractured, no infill, iron and black staining.   |  | Run 3: 65 min 30 sec   |                      |          |
|                          |                                  |   | >10                | 166.6' - Joint, 50 deg, rough, undulating, no infill, iron and black staining, narrow.   |  |  |                      |          |
|                          |                                  |   | >10                | 167.3-167.6, 167.8-168.1' - Highly fractured, calcite infill (<5mm), iron staining.  |  |  |                      |          |
| 169.3                    | Run 4<br>1.7 ft<br>100%          | 24.5  | 4                  | 168.1, 168.6' - Joint, 80 deg, smooth, undulating, iron staining, no infill, tight.  |  | Run 4: 14 min 30 sec   |                      |          |
|                          |                                  |   | 3                  | 168.7-169.0' - highly fractured, some calcite infill (<1mm), iron staining.  |  |  |                      |          |
|                          | Run 5<br>5 ft<br>100%            | 35  | 2                  | 169.3' - Mechanical breaks.  |  | Run 5: 22 min 10 sec   |                      |          |
|                          |                                  |   | 2                  | 169.6, 169.7, 169.9' - Joint (3), 30, 10, and 40 deg, smooth, undulating, <1mm calcite infilling, some iron staining, tight.   |  |  |                      |          |
|                          |                                  |   | 3                  | 170.4, 170.7, 170.9' - Joint (3), 20, 20, and 30 deg, rough, undulating, some iron staining, no infill, narrow.  |  |  |                      |          |
|                          |                                  |   | >10                | 171.1, 171.7' - Joint, 30 deg, rough, undulating, <1mm calcite infilling, iron staining, tight.  |  |  |                      |          |
| 175                      |                                  |   | 2                  | 172.1, 172.5' - Joint, 30 deg, rough, undulating, <1mm calcite infilling, iron staining, tight.  |  | Run 6: 14 min 30 sec   |                      |          |
|                          |                                  |   | 3                  | 173.3, 173.7, 173.8' - Joint (3), 30, 30, and 60 deg, rough, undulating, <5mm calcite infilling, iron staining, narrow.  |  |  |                      |          |
|                          |                                  |   | 2                  | 174.1, 174.9' - Joint, 30 deg and 80 deg, rough, undulating, iron and black staining, narrow.  |  |  |                      |          |
|                          |                                  |   | 3                  | 174.5-174.9' - Highly fractured, some iron staining.   |  |  |                      |          |
|                          |                                  |   |                    | 175.3, 175.7' - Joint, 30 deg and 30 deg, rough, undulating, iron staining, narrow.  |  |  |                      |          |
|                          |                                  |   |                    | 176.4' - Change to foliated  |  |  |                      |          |



|   |                                |                |
|---|--------------------------------|----------------|
| PROJECT NUMBER:<br><b>417981.ER.02.FW</b> | BORING NUMBER:<br><b>BH-69</b> | SHEET 10 OF 10 |
| <b>ROCK CORE LOG</b>                      |                                |                |

PROJECT : PG&E Topock, ER-TCS Investigation      LOCATION : Site 4 (2100291.6 N, 7615143.0 E)  
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 CORING EQUIPMENT AND METHOD : RS-350, HQ Wire-Line Rotary      ORIENTATION : Vertical  
 WATER LEVELS : Approx. 178 ft BGS      START : 5/31/2011      END : 6/20/2011      LOGGER : A. Brewster (Northstar)

| DEPTH BELOW SURFACE (ft) | CORE RUN LENGTH AND RECOVERY (%) | DISCONTINUITIES |                    |  | SYMBOLIC LOG   | LITHOLOGY   | COMMENTS |
|--------------------------|----------------------------------|-----------------|--------------------|--|--|---|----------|
|                          |                                  | R Q D (%)       | FRACTURES PER FOOT | DESCRIPTION  |  |   |          |
|                          |                                  |                 |                    | DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS  |  |   |          |
| 180                      | Run 6<br>5 ft<br>100%            | 80              | 0                  | 176.4, 176.7, 176.9' - Joint (3), 20, 30, and 60 deg, rough, undulating, <1mm calcite infilling, iron staining, tight.                                       | Metadiorite<br>dusky yellow green, (5GY 5/2), predominantly sodium feldspar and amphiboles, hard, foliated from 176.4 ft. bgs, highly fractured and healed with chlorite cement, massive | Run 7: 17 min 0 sec   |          |
|                          |                                  |                 | 2                  | 178.1, 178.9' - Joint, 50 deg and 30 deg, rough, undulating, some black staining, tight.   |  |   |          |
|                          |                                  |                 | 2                  |  |  |   |          |
| 181.0                    |                                  |                 | 1                  | 179.7, 179.8' - Joint, 30 deg and 60 deg, rough, undulating at 179.7, stepped at 179.8, <10 mm calcite infilling, iron staining, healing incomplete (voids). |  |   |          |
|                          |                                  |                 | 0                  | 180.5' - Joint, 30 deg, rough, undulating, <1mm calcite infilling, some iron staining, tight.  |  |   |          |
|                          | Run 7<br>5 ft<br>100%            | 58.3            | >10                | 182.3-183.0' - Highly fractured, calcite infill (<3mm), no staining.   |  |   |          |
|                          |                                  |                 | 5                  | 183.0-185.0' - Healed shear zone with 5 mm displacement  |  |   |          |
| 185                      |                                  |                 | 3                  | 183.6, 183.7, 183.7, 183.8, 183.9' - Joint (5), 30, 60, 30, 80, and 30 deg, rough, undulating, <1mm calcite infilling, iron staining, tight to narrow,       |  |   |          |
|                          |                                  |                 | 3                  | 184.1, 184.5, 184.9' - Joint (3), 30, 30, and 80 deg, rough, stepped, <1mm calcite infilling, iron staining, narrow.   |  |   |          |
| 186.0                    |                                  |                 | 1                  | 185.5, 185.8, 186.0' - Joint (3), 30 deg, rough, undulating, <2mm calcite infilling, some iron staining, narrow.   | Run 8: 40 min 50 sec   |   |          |
|                          |                                  |                 | 0                  | 187' - Mechanical breaks.  |  |   |          |
|                          | Run 8<br>5 ft<br>100%            | 56              | 3                  | 188.2, 188.3, 188.7' - Joint (3), 20, 80, and 80 deg, rough, undulating to stepped, <1mm calcite infilling, some iron staining, tight.                       |  |   |          |
|                          |                                  |                 | 2                  | 189.4' - Mechanical breaks.  |  |   |          |
|                          |                                  |                 | >10                | 189.7' - Joint, 60 deg, rough, undulating, no staining, tight.   |  |   |          |
| 190                      |                                  |                 | >10                | 190.6-191.0' - Multiple fractures, calcite infill (<1mm), manganese staining, narrow.  |  |   |          |
|                          |                                  |                 | >10                | 191.0-192.0' - Multiple mechanical fractures.  |  |   |          |
|                          | Run 9<br>5 ft<br>100%            | 45              | 1                  | 192.3' - Joint, 80 deg, rough, undulating, <0.5mm calcite infilling, some iron staining, narrow.   |  |   |          |
|                          |                                  |                 | 3                  | 193.2, 193.3, 193.7' - Mechanical fractures.   |  |   |          |
| 195                      |                                  |                 | 3                  | 194.3, 194.7' - Joint, 40 deg and 50 deg, rough, undulating, no staining, tight.   | Run 9: 46 min 0 sec  |   |          |
|                          |                                  |                 | >10                | 195.0-196.0' - Multiple fractures, no infill, iron staining.   |  |   |          |
| 196.0                    |                                  |                 | >10                |  |  |   |          |
|                          |                                  |                 |                    |  | End Drilling on 6/20/2011<br>Total Borehole Depth: 196.0 ft bgs  | This borehole was converted into the following monitoring well(s):<br>MW-69-195 |          |