FWDA GROUND WATER MONITORING PROGRAM

APPENDIX E

OCTOBER 2009 SAMPLING EVENT

NEW MONITORING WELL LOGS AND WELL COMPLETION DIAGRAMS
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Borehole Type</th>
<th>Sample ID</th>
<th>Blow Count</th>
<th>USGS Class</th>
<th>Contact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-22.5</td>
<td></td>
<td>1-2-3</td>
<td>22.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.5-24.5</td>
<td></td>
<td></td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.5-31.5</td>
<td></td>
<td></td>
<td>6.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.5-41.5</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41.5-48.5</td>
<td></td>
<td></td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48.5-56.5</td>
<td></td>
<td></td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GEOLOGIC NOTES:**
- Alluvium
- Upper silt - surface casing 8" set to 25 ft
- Interbedded red & white silt
- Fault - clayey silt layer 37.3 - 37.4 ft
- Remaining depth red, white silt
- 65 - core detached to contact with blue clay (unreliability in boring bar) as well
- Recover from top of clay mass at depth of...
- Clayey silt with depth...

**Descriptive and Comments:**
- Clayey silt with depth...
- Recover from top of clay mass at depth...
- Clayey silt with depth...
- Clayey silt with depth...
## GEOLOGIC BORING/WELL LOG

**Project #:** DH68C  
**Project Name:** Var P-22  
**Boring/Well #:** L-1 TMW31  
**Geologist:** AEW Martineau  
**Driller/Company:** USGS  
**Drilling Equip.:** Gardner Denver/LIME  
**Date Start:** 11/13/09  
**Date Completed:** 11/18/09

### Method of Drilling

<table>
<thead>
<tr>
<th>Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hollow Stem</td>
<td>See Installation Report</td>
</tr>
<tr>
<td>Air Rotary</td>
<td></td>
</tr>
<tr>
<td>Bucket Auger</td>
<td></td>
</tr>
<tr>
<td>Mud Rotary</td>
<td></td>
</tr>
<tr>
<td>Light Auger</td>
<td></td>
</tr>
</tbody>
</table>

### Gaging/Riser Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>Towed</td>
<td></td>
</tr>
<tr>
<td>Tensioned</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td></td>
</tr>
<tr>
<td>Surface</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>PVC</td>
</tr>
<tr>
<td>Diameter</td>
<td>2½&quot;</td>
</tr>
<tr>
<td>Length</td>
<td>10/30</td>
</tr>
<tr>
<td>Set between</td>
<td>10½&quot;</td>
</tr>
<tr>
<td>Slot size</td>
<td>0.01</td>
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### Filter Pack

<table>
<thead>
<tr>
<th>Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>Sand</td>
</tr>
<tr>
<td>Volume Used</td>
<td>60 bags / 6 bags</td>
</tr>
<tr>
<td>Depth to top of fp</td>
<td>111.5 ft</td>
</tr>
</tbody>
</table>

### Annulus Seal

<table>
<thead>
<tr>
<th>Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealing depth</td>
<td>S/D</td>
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### Annulus Seal

<table>
<thead>
<tr>
<th>Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of install</td>
<td>Core samples</td>
</tr>
<tr>
<td>Composition</td>
<td>Sand</td>
</tr>
<tr>
<td>Volume Used</td>
<td>60 bags / 6 bags</td>
</tr>
<tr>
<td>Depth from fp</td>
<td>111.5 ft</td>
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</tbody>
</table>

### Well Head Completion

<table>
<thead>
<tr>
<th>Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of Install</td>
<td>Core samples</td>
</tr>
<tr>
<td>Material</td>
<td>Drill pipe</td>
</tr>
</tbody>
</table>

### Development

<table>
<thead>
<tr>
<th>Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial State Water Level</td>
<td>33.71 / 24.25</td>
</tr>
<tr>
<td>Development</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>12/12-12/29</td>
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</table>

### Drilling

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Type</th>
<th>Blow Count</th>
<th>Recovery</th>
<th>USCS Class</th>
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<tbody>
<tr>
<td>6.5</td>
<td></td>
<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>5.12</td>
<td></td>
<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>10.15</td>
<td></td>
<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>15.25</td>
<td></td>
<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>20.15</td>
<td></td>
<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>25.15</td>
<td></td>
<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>30.15</td>
<td></td>
<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>35.15</td>
<td></td>
<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>40.15</td>
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<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>45.15</td>
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<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>50.15</td>
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<td>0.5</td>
<td>6.12</td>
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</tr>
<tr>
<td>55.15</td>
<td></td>
<td>0.5</td>
<td>6.12</td>
<td></td>
</tr>
</tbody>
</table>

### Sample

- 6.5: Clayey silt & clay
- 5.12: Clayey silt & clay
- 10.15: Clayey silt & clay
- 15.25: Clayey silt & clay
- 20.15: Clayey silt & clay
- 25.15: Clayey silt & clay
- 30.15: Clayey silt & clay
- 35.15: Clayey silt & clay
- 40.15: Clayey silt & clay
- 45.15: Clayey silt & clay
- 50.15: Clayey silt & clay
- 55.15: Clayey silt & clay
<table>
<thead>
<tr>
<th>Depth</th>
<th>PBP Reading (ft)</th>
<th>Sample No.</th>
<th>Sample Id</th>
<th>Blow Count</th>
<th>Recovery</th>
<th>USGS Ores</th>
<th>Contact Depth</th>
<th>Descriptions and Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>60.69</td>
<td>68-72</td>
<td></td>
<td></td>
<td>2.6</td>
<td>66</td>
<td>71</td>
<td></td>
<td>CME auger - claystone contact</td>
</tr>
<tr>
<td>72-82</td>
<td></td>
<td></td>
<td></td>
<td>7.15</td>
<td>66-71</td>
<td>71</td>
<td></td>
<td></td>
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<tr>
<td>82-87</td>
<td></td>
<td></td>
<td></td>
<td>5.2</td>
<td>66-71</td>
<td>71</td>
<td></td>
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<tr>
<td>87.42</td>
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<td></td>
<td></td>
<td>4.9</td>
<td>66-71</td>
<td>71</td>
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<tr>
<td>82-87</td>
<td></td>
<td></td>
<td></td>
<td>4.4</td>
<td>66-71</td>
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<td>92-94</td>
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<td>4.4</td>
<td>66-71</td>
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<td>97-102</td>
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<td></td>
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<td>2.2</td>
<td>66-71</td>
<td>71</td>
<td></td>
<td>Change to gray, silt, silty clay, sandy clay, softstone</td>
</tr>
<tr>
<td>102-104</td>
<td></td>
<td></td>
<td></td>
<td>1.7</td>
<td>66-71</td>
<td>71</td>
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</tr>
<tr>
<td>104-112</td>
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**Drilling**: GD/CME  
**Date Start**: 11/13/09  
**Date Completed**: 11/18/09  
**Surface Elev.**: 6738.1 ft  
**Top of Dosing Elev.**: 112 ft  
**Total Depth**: 112 ft  
**Well Depth**: 6010 ft  

**Geologist**: A.M. Mathewne  
**Driller/Company**: USGS  
**Boring/Well #:** 1-WEB-028-09
**GEOLOGIC BORING/WELL LOG**

<table>
<thead>
<tr>
<th>Method of Drilling</th>
<th>Casing/Riser Type</th>
<th>Screen Portion of Well</th>
</tr>
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<table>
<thead>
<tr>
<th>Filter Pack</th>
<th>Annulus Seal</th>
<th>Grout</th>
</tr>
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<tbody>
<tr>
<td>Site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method of Install</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume Used (5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth to top of p. 168 + 865</td>
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<table>
<thead>
<tr>
<th>Well Headed Completion</th>
<th>Development</th>
<th>Static Water Level</th>
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<tbody>
<tr>
<td></td>
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<table>
<thead>
<tr>
<th>Drilling</th>
<th>Sample</th>
<th>GEOLOGIC LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td></td>
<td>Descriptions and Comments</td>
</tr>
<tr>
<td></td>
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<td></td>
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</tbody>
</table>

**Drilling Data**

- **Project #: THW 32**
- **Project Name:** FWCA
- **Boring/Well #: THW 32 (1-3)**
- **Geologist:** AM Magness
- **Diller/Company:** USGS
- **Drilling Equip.: Flight Auger**
- **Date Start:** 11/19/09
- **Date Completed:** 12/26/09
- **Surface Elev.: 670 + 836 ft**
- **Top of Casing Elev.: 670 + 301 ft**
- **Total Depth:** 139 ft
- **Well Depth:** 139 ft
- **Material:** Cement
- **Diameter:** 2.14 in
- **Length:** 20 ft
- **Set between:** 117 ft and 137 ft
- **Size:** 0.010

**Well Headed Completion**

- **Method of Install:** Tbra (tbra)
- **Composition:** sand
- **Volume Used:** (5)
- **Depth to top of p.: 168 + 865**

**Development**

- **Method:** 26 pm trash wmp
- **Gasoline Evacuated:** 240 gal/803 lb
- **Date:** 12/5/09
- **Initial:** 51 ft
- **Development:** 51 ft
- **24 hr.:** 37 ft

**GEOLOGIC LOG**

- **Depth:**
  - 64-72
  - 75-78
  - 78-82
  - 87-92
  - 93-103
  - 108-113
  - 112.1
  - 124
  - 13-133

- **Sample:**
  - 7.6
  - 4.7
  - 0.5
  - 6.0
  - 10.3

- **USGS Core:**
  - 43: Top of ssf.
  - 67: Ss to claysone
  - Claystone
  - Claystone to ssf
  - Valor ssf/banded begin making water
  - 1245 clay partings most
  - Core - brown to blue mottled
  - 0.5: blue banded ssf
<table>
<thead>
<tr>
<th>Depth (FT)</th>
<th>Sample Type</th>
<th>Sample ID</th>
<th>Blow Count</th>
<th>USCS Class</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>34-38</td>
<td></td>
<td>48</td>
<td></td>
<td></td>
<td>Unconsolidated, clay, silty sand with pebbles and gravel. Yellow-red-brown slightly moist, lost 4&quot; @ bottom.</td>
</tr>
<tr>
<td>38-42</td>
<td></td>
<td>55</td>
<td></td>
<td></td>
<td>Very tight, silty clay with calcite inclusions, dark brown, slightly moist. Break @ 48&quot;, 13&quot; slough, lost 6&quot; @ bottom.</td>
</tr>
<tr>
<td>42-46</td>
<td></td>
<td>48</td>
<td></td>
<td></td>
<td>Very tight, silty clay, dark red-brown, slightly moist, lost 5&quot; @ bottom.</td>
</tr>
<tr>
<td>44-47</td>
<td></td>
<td>48</td>
<td></td>
<td></td>
<td>Squeezing @ 42-45, tapped bottom of hole @ 441.9', 3&quot; slough.</td>
</tr>
<tr>
<td>47-49</td>
<td></td>
<td>19</td>
<td></td>
<td></td>
<td>Clay, friable, dark brown-green clay inclusions, slightly moist, no loss. Suspected refusal @ 47', but going to try again.</td>
</tr>
<tr>
<td>49-58</td>
<td></td>
<td>19</td>
<td></td>
<td></td>
<td>Friable, silty clay, dark red, slightly moist.</td>
</tr>
<tr>
<td>58-62</td>
<td></td>
<td>48</td>
<td></td>
<td></td>
<td>Tried boots stopped @ 45', cored to 49', but got little recovery 16&quot;, stopping @ 48.4'.</td>
</tr>
<tr>
<td>62-64</td>
<td></td>
<td>19</td>
<td></td>
<td></td>
<td>Cuttings show more moisture. 58', possible caliche layer was tougher, darker, more soft. But getting higher - Sheared soil.</td>
</tr>
<tr>
<td>64</td>
<td></td>
<td>48</td>
<td></td>
<td></td>
<td>Start caving</td>
</tr>
</tbody>
</table>
## Geologic Boring/Well Log

### General Information
- **Project #:** DHEX2C
- **Project Name:** FVCAW 16110
- **Drillers/Company:** USGS
- **Geologist:** DALE BASKIN
- **Drilling Date:** 1/19/99
- **Date Completed:** 12/01/99
- **Surface Elev.:** 6707.83 ft
- **Top of casing Elev.:** 6707.84 ft
- **Total Depth:** 159.0 ft
- **Well Depth:** 137.5 ft

### Method of Drilling
- **Rotary Drilling:**
  - **Material:** Sanoat
  - **Diameter:** 2.5 ft
  - **Length:** 20 ft
  - **Get:** 117 ft
  - **Ecl size:** 0.10

### Filter Pack
- **Size:**
- **Material of Filter:** Sand
- **Volume Used:** 35
- **Depth to top of t.p.:** 106 ft

### Annulus Seal
- **Bentonite Pellets:**
- **Volume Used:** 5

### Development
- **Method:** 2.5 ft from pump
- **Initial:** 51.6 ft
- **Depth from top:** 37.8 ft
- **Volume Used:** Cement (4) bags

### Drilling Details
<table>
<thead>
<tr>
<th>Depth</th>
<th>Blowing Count</th>
<th>Blow Count</th>
<th>USCS Class</th>
<th>Grain Size</th>
<th>Description and Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>34</td>
<td>86</td>
<td>50-40</td>
<td>Grad. 3</td>
<td>clayey silt, red-br, dry, lost 4 ft. at bottom.</td>
</tr>
<tr>
<td>4-8</td>
<td>38</td>
<td>38</td>
<td>50-40</td>
<td>Grad. 3</td>
<td>clayey silt, red-br, dry, lost 6 ft. at bottom.</td>
</tr>
<tr>
<td>10-14</td>
<td>41</td>
<td>36</td>
<td>50-40</td>
<td>Grad. 3</td>
<td>Silty clay, red-br, dry, lost 6 ft. at bottom.</td>
</tr>
<tr>
<td>14-18</td>
<td>52</td>
<td>50</td>
<td>60-40</td>
<td>Grad. 3</td>
<td>Sandy silty clay, red-br, dry, lost 6 ft. at bottom.</td>
</tr>
<tr>
<td>18-22</td>
<td>52</td>
<td>50</td>
<td>60-40</td>
<td>Grad. 3</td>
<td>Silty clay, red-br, dry, lost 6 ft. at bottom.</td>
</tr>
<tr>
<td>22-26</td>
<td>52</td>
<td>50</td>
<td>60-40</td>
<td>Grad. 3</td>
<td>Sandy silty clay, red-br, dry, lost 6 ft. at bottom.</td>
</tr>
<tr>
<td>26-30</td>
<td>46</td>
<td>46</td>
<td>60-40</td>
<td>Grad. 3</td>
<td>Sandy silty clay, red-br, dry, lost 7 ft. at bottom.</td>
</tr>
<tr>
<td>30-34</td>
<td>46</td>
<td>46</td>
<td>60-40</td>
<td>Grad. 3</td>
<td>Sandy silty clay, red-br, dry, lost 8 ft. at bottom.</td>
</tr>
</tbody>
</table>

### Notes
- **Sample Type:**
- **Sample Description:**
  - Clayey silt, red-br, dry, lost 4 ft. at bottom.
  - Sandy silty clay, red-br, dry, lost 6 ft. at bottom.
  - Sandy silty clay, red-br, dry, lost 6 ft. at bottom.
<table>
<thead>
<tr>
<th>Depth</th>
<th>PTD Reading (ppm)</th>
<th>Sample Type</th>
<th>Sample ID</th>
<th>0.5</th>
<th>6-12</th>
<th>12-24</th>
<th>Recovery (%)</th>
<th>USCS Class</th>
<th>Contact Depth</th>
<th>Descriptions and Comments</th>
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</thead>
<tbody>
<tr>
<td>123-133</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Sst into conglomeritic clay blue clay last 1 ft.</td>
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<tr>
<td>133-138</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>180</td>
<td>Contact Sst / claystone</td>
</tr>
<tr>
<td></td>
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<td>0-4</td>
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<td>clay, dark red-brown, moist, lost 16&quot; from bottom</td>
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<td>8-12</td>
<td>32</td>
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<td>12-16</td>
<td>29</td>
<td>clayey, sandy silt at bottom, yellow-red-brown, moist, lost 9&quot; from bottom</td>
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<td>16-20</td>
<td>29</td>
<td>clayey, sandy silt at bottom, yellow-red-brown, moist, lost 9&quot; from bottom</td>
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<tr>
<td>20-25</td>
<td>33</td>
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<tr>
<td>30-34</td>
<td>39</td>
<td>silty clay at bottom, dark brown, moist, lost 38&quot; from bottom</td>
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<td>34-40</td>
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<td>silty sandy, clay at bottom, dark brown, moist, lost 38&quot; from bottom</td>
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</tbody>
</table>

Note: The log includes additional descriptions and measurements not fully transcribed due to the handwriting and clarity of the document.
### GEOLOGIC BORING WELL LOG

**Project:** DAERA  
**Project Name:**  
**Boring Well:** T.U.3.3

**Geoprobe:** All Matherne  
**Driller/Company:** HGS

**Drilling Equip:** L120  
**Date Start:** 12/03/91  
**Date Completed:** 12/03/91

**Surface Elev:**  
**Top of Casing Elev:**  
**Total Depth:** 57.5  
**Well Depth:** 57

**Method of Drilling:**
- [ ] Hollow Stem
- [ ] Air Rotary
- [ ] MUD Rotary
- [ ] Flight Auger

**Casing/Rein Type:**
- [ ] Steel
- [ ] Threaded
- [ ] Gravel
- [ ] Solvent
- [ ] SS
- [ ] Welded

**Material:** Saltcut  
**Diameter:** 2½”  
**Length:** 20 ft.  
**Sec between:** 3 ft. and 57 ft.

**Hole Diameter:** 8”

**Filter Pack:**
- [ ] Sand

**Annular Seal:**
- [ ] Air Grout

**Grout:**
- [ ] Used?
- [ ] Yes
- [ ] No

**Fracture:**
- [ ] Proppant Pellets
- [ ] Chips
- [ ] Gravel

**Complimentary:**
- [ ] Swenson

**Volume Used:** 25 bags

**Method of Instal:**
- [ ] Cemented

**Depth to top of Lp:**
- [ ] 2.0 ft.

**Well Head Completion:**
- [ ] Flap Valve
- [ ] Stand-Up

**Cement:**
- [ ] Cem 1/4 bag

**Depth to top of w:\**
- [ ] 11.0 ft.

**Development:**
- [ ] 42 ft.

**Static Water Level:**
- [ ] 42 ft.

**Descriptions and Comments:**
- [ ] alluvium - see Geoprobe records.
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<th>Depth</th>
<th>Soil Description</th>
<th>USGS Code</th>
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<th>Notes</th>
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<td>1-4</td>
<td>Silty sandy clay @ bottom</td>
<td>29</td>
<td>18.27</td>
<td>Silty sandy clay @ bottom</td>
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<td>Dark brown, wet</td>
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<tr>
<td></td>
<td>Bottom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DK @ Bottom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-8</td>
<td>Clay @ Bottom, dark brown</td>
<td>50</td>
<td>12.12</td>
<td>Very moist, wet inside tube</td>
</tr>
<tr>
<td></td>
<td>Very moist, wet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inside tube</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34-38</td>
<td>Had 10&quot; more recovery than</td>
<td>58</td>
<td>6.12</td>
<td>Had 10&quot; more recovery than</td>
</tr>
<tr>
<td></td>
<td>it should, may be scraping</td>
<td></td>
<td></td>
<td>it should, may be scraping</td>
</tr>
<tr>
<td></td>
<td>side as barrel goes down</td>
<td></td>
<td></td>
<td>side as barrel goes down</td>
</tr>
<tr>
<td></td>
<td>hole</td>
<td></td>
<td></td>
<td>hole</td>
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<tr>
<td>38-42</td>
<td>Silty clay/mica-lignite</td>
<td></td>
<td></td>
<td>Silty clay/mica-lignite</td>
</tr>
<tr>
<td>42-46</td>
<td>DK brown, wet</td>
<td></td>
<td></td>
<td>DK brown, wet</td>
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<tr>
<td></td>
<td>Difficulty extracing</td>
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<td>One cannot measure</td>
<td></td>
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<td>One cannot measure</td>
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<td>recovery, sample bagged</td>
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<td>recovery, sample bagged</td>
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<td>- Going 12 stoppin'</td>
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<td>- Going 12 stoppin'</td>
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<td>Procedure</td>
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<td>46-50</td>
<td>Silty clay @ bottom</td>
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<td>5.1</td>
<td>Silty clay @ bottom</td>
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<td>DK brown</td>
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<tr>
<td></td>
<td>Top: loosely consolidated</td>
<td></td>
<td></td>
<td>Top: loosely consolidated</td>
</tr>
<tr>
<td></td>
<td>DK, LR</td>
<td></td>
<td></td>
<td>DK, LR</td>
</tr>
<tr>
<td></td>
<td>Moist clay</td>
<td></td>
<td></td>
<td>Moist clay</td>
</tr>
<tr>
<td></td>
<td>Bottom: Very tight, dry</td>
<td></td>
<td></td>
<td>Bottom: Very tight, dry</td>
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<tr>
<td></td>
<td>Red-brown clay</td>
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<td>Red-brown clay</td>
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<tr>
<td>50-54</td>
<td>57 missing 50-50.75</td>
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<td></td>
<td>57 missing 50-50.75</td>
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<tr>
<td></td>
<td>Moist.</td>
<td></td>
<td></td>
<td>Moist.</td>
</tr>
<tr>
<td></td>
<td>Contact DK moist/dry clay</td>
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<td></td>
<td>Contact DK moist/dry clay</td>
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<td>Very tight, dry red-brown clay</td>
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<td>Very tight, dry red-brown clay</td>
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<td>54-62.5</td>
<td>Refusal @ 65</td>
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<td>Refusal @ 65</td>
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<td>62.5-65</td>
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<td>62.5-65</td>
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</tbody>
</table>
# GEOLOGIC BORING/WELL LOG

**Project #:** DHBPC  
**Project Name:**  
**Boring/Well #:** IMW 24

**Geologist:** Dale Rankin  
**Diller/Company:** USGS

**Drilling Equip.:**  
**Date Start:** 12/02/09  
**Date Completed:**

**Surface Elev.:** 6684.573'  
**Top of Casing Elev.:** 6689.874'  
**Total Depth:** 59.414'  
**Well Depth:** 57.351'

<table>
<thead>
<tr>
<th>Method of Drilling</th>
<th>Casing/Riser Type</th>
<th>Screen Portion of Well</th>
<th>Material</th>
<th>Diameter</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Hollow Stem</td>
<td>□ Steel</td>
<td>Height above bottom</td>
<td>Sand clay</td>
<td>2.674'</td>
<td>20.4'</td>
</tr>
<tr>
<td>□ Direct Rotary</td>
<td>□ Threaded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Air Rotary</td>
<td>□ Galv</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Mud Rotary</td>
<td>□ PVC</td>
<td></td>
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<td>□ Right Auger</td>
<td>□ Solvent</td>
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</tr>
<tr>
<td>□ Sl</td>
<td>□ Welded</td>
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<tr>
<td>Hole Diameter:</td>
<td>□ SS</td>
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<tr>
<td></td>
<td>□ Yes</td>
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<tr>
<td></td>
<td>□ No</td>
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<tr>
<td></td>
<td>Drive Shoe? □ Yes</td>
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</tbody>
</table>

**Filter Pack**  
**Annulus Seal**  
**Grout**

**Size:**  
**Method of Install:** Slump

**Composition:** Silica sand and %

**Volume Used:** (22) 50 lb bags

**Depth to top of f.p.:** 31.4 ft.

**Well Head Completion**  
**Development**  
**Static Water Level**

**Method:** Ann pump

**Gallons Drawn:** 10.7

**Date:** 12/10, 12/16, 1/2/10

**24 hr. Initial:** 39.6 ft

**Volume Used:** Cement (47.946)

<table>
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<tr>
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<th>SAMPLE</th>
<th>GEOLOGIC LOG</th>
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<td>Depth</td>
<td>PFD Reading (ppm)</td>
<td>Sample Type</td>
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<tr>
<td>0-5</td>
<td>510</td>
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<td>5-10</td>
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<td>20-24</td>
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<td>24-28</td>
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<td>52-55</td>
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<td>55-58</td>
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<tr>
<td>58-60</td>
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**Descriptions and Comments**

Silty Clay, DK Brown, Dry
Top: Silty Clay, DK Brown
Bottom: Sandy Clay, BF Brown
Sandy Clay, DK Brown
Sandy Clay, BF Brown
Silty Clay, DK Brown, Imbressed Top: Clay, DK Brown
DK Brown
DK Brown
DK Brown
DK Brown
DK Brown
DK Brown
DK Brown
DK Brown
DK Brown
DK Brown
DK Brown
DK Brown
Silty Clay, DK Brown, Wet
DK Brown, Silty Clay, Very Fine, Dry
DK Brown, Very Fine, Dry
<table>
<thead>
<tr>
<th>ft.</th>
<th>DRILLING</th>
<th>SAMPLE</th>
<th>GEOLOGIC LOG</th>
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<td>60-64</td>
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<td>76-80</td>
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</table>
**GEOLOGIC BORING/WELL LOG**

**Project #: DHBRC**  
**Project Name: FWDA**  
**Boring/Well #: 7MW 35**

**Geologist: DAVE RANKIN**  
**Driller/Company: USGS**  
**Drilling Equip.:**  
**Date Start: 12/15/09**  
**Date Completed: 12/18/09**

<table>
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<th>Surface Elev.: 6688.197</th>
<th>Top of Casing Elev.: 6686.8314</th>
<th>Total Depth: 57.34 ft</th>
<th>Well Depth: 55 ft</th>
</tr>
</thead>
</table>

**Method of Drilling**  
- [ ] Hollow Stem  
- [ ] Chisel Rotary  
- [X] Air Rotary  
- [ ] Bucket Auger  
- [ ] MUD Rotary  
- [ ] Flight Auger  
- [ ] HCA Diameter: 2.5 ft

**Casing/Packer Type**  
- [ ] Steel  
- [X] Threaded  
- [ ] Height above/below surface: 2.34 ft

**Screen Portion of Well**  
- [X] Material: Sawcut  
- [ ] Diameter: 2 1/2 in  
- [X] Length: 20 ft  
- [ ] Set between: 35 ft and 35 ft  
- [ ] Diameter: 2 1/2 in  
- [ ] Slot size: 0.09 in

**Filter Pack**  
- [ ] Size:  
- [ ] Method of Install: Slow Pour  
- [ ] Composition: 4/10 silica sand and 2/40-50 lb. bags  
- [ ] Volume Used: (4) 5-gal buckets  
- [ ] Method of Install: Slow Pour  
- [ ] Depth to top of ltr: 25 ft  
- [ ] Depth: from 10 ft to 25 ft

**Annulus Seal**  
- [ ] Bentonite Fill  
- [ ] Chips  
- [ ] Used? [X] Yes  
- [ ] No Volume: [ ] 65 lb. bags

**Grout**  
- [ ] Material:  
- [ ] Method of Install:  
- [ ] Depth: from 10 ft to 25 ft

**Well Head Completion**  
- [ ] Crushmount  
- [ ] Stand Up  
- [ ] Cap Type: N/A  
- [ ] Date: 1/4/12, 12/8, 12/13  
- [ ] Volume Used: Cement  
- [ ] Odor:

**Development**  
- [ ] Method: 26PM Trash Pump  
- [ ] Initial: 41.02 ft  
- [ ] Development: 41.02 ft  
- [ ] 24 hr: 41.02 ft

**Static Water Level**  
- [ ] Initial: 41.02 ft  
- [ ] Development: 41.02 ft  
- [ ] 24 hr: 41.02 ft

**DRILLING**  

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Type</th>
<th>Sample ID</th>
<th>Slow Count</th>
<th>USCS Class</th>
<th>Descriptions and Comments</th>
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<td>50-55</td>
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</tr>
<tr>
<td>55' - TD</td>
<td></td>
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</tr>
</tbody>
</table>

**GEOLOGIC LOG**  
- Tight silty clay, Rd - BR, Dry  
- Very tight clay, Dk. BR, Dry  
- Red Bottom, Rd - BR, Very Dry  
- Silty clay, Rd - BR, moister  
- Bottom: Silty sand, Rd - BR, Dry  
- Bottom: Coarse Gr. Silty sand, Rd - BR, Dry  
- Bottom: Coarse Gr. Clayey Silty sand, Rd - BR, Very Silty clay, Rd - BR, Very moist - wet  
- Top: Clayey Dirt, Red BR, Top is wet  
- Silty clay, clayey silt, red BR, wet
# GEOLOGIC BORING/WELL LOG

**Project #:** OMBRE  
**Project Name:** FWDO  
**Driller/Company:** USGS  
**Geologist:** Dale Rankin  
**Date Start:** 01/03/09  
**Date Completed:**  
**Surface Elev.:** 6699.3'  
**Top of Casing Elev.:** 6700.9'  
**Total Depth:** 15868.7'  
**Well Depth:** 15868.7'

<table>
<thead>
<tr>
<th>Depth</th>
<th>PID Reading (rpm)</th>
<th>Sample Type</th>
<th>Sample ID</th>
<th>10'</th>
<th>6-12'</th>
<th>12-18'</th>
<th>18-24'</th>
<th>Recovery (%)</th>
<th>USCS Class</th>
<th>Descriptions and Comments</th>
</tr>
</thead>
</table>
| 24-32 | 33 | 49 | 48 | 50 | 50 | 50 | 50 | 50 | 50 | Clay*Clay* **R**: RB64 T: 9" S: tillage RY: 10.0
  DRY: 11 CTB 64 B: P 11/4 T: 8" S: tillage RY: 10.0
| 33-41 | 49 | 49 | 48 | 50 | 50 | 50 | 50 | 50 | 50 | Clay*Clay* **R**: RB64 T: 9" S: tillage RY: 10.0
  DRY: 11 CTB 64 B: P 11/4 T: 8" S: tillage RY: 10.0
| 41-45 | 49 | 49 | 48 | 50 | 50 | 50 | 50 | 50 | 50 | Clay*Clay* **R**: RB64 T: 9" S: tillage RY: 10.0
  DRY: 11 CTB 64 B: P 11/4 T: 8" S: tillage RY: 10.0
| 45-53 | 49 | 49 | 48 | 50 | 50 | 50 | 50 | 50 | 50 | Clay*Clay* **R**: RB64 T: 9" S: tillage RY: 10.0
  DRY: 11 CTB 64 B: P 11/4 T: 8" S: tillage RY: 10.0
| 53-575 | 49 | 49 | 48 | 50 | 50 | 50 | 50 | 50 | 50 | Clay*Clay* **R**: RB64 T: 9" S: tillage RY: 10.0
  DRY: 11 CTB 64 B: P 11/4 T: 8" S: tillage RY: 10.0
| 575 | 49 | 49 | 48 | 50 | 50 | 50 | 50 | 50 | 50 | Clay*Clay* **R**: RB64 T: 9" S: tillage RY: 10.0
  DRY: 11 CTB 64 B: P 11/4 T: 8" S: tillage RY: 10.0

---

* Clay
* Claystone
* Sand
* Sandstone
* Claystone
* Sandstone
* Claystone
* Sandston
# GEOLOGIC BORING/WELL LOG

**Project #:** DHBRC  
**Project Name:** Flat A Pinell  
**DHEW #:** TMW 36  
**Geologist:** Dale Bankin  
**Sampler/Company:** 

**Drilling Equip.:** Kayak  
**Date Start:** 1/08/09  
**Date Completed:** 

**Surface Elev.:** 6699.727  
**Top of Casing Elev.:** 6700.95  
**Total Depth:** 157.1 ft  
**Well Depth:** 157.1 ft  

### Method of Drilling
- **Hollow Stem:** 
- **Air Rotary:** Buckets Auger  
- **MUD Rotary:** Flight Auger  

### Casing/Rein Type
- **Steel:** Threaded  
- **Galv:** Welded  
- **SS:** Welded  

### Screen Portion of Well
- **Material:** 2 1/2"  
- **Length:** 20 ft  
- **Set between:** 13 1/2 ft and 15 2/3 ft  
- **Slot size:** 0.010

### Filter Pack
- **Size:** 
- **Method of Install:** Slowpump  
- **Completion:** 1975 Silica Sand  
- **Volume Used:** (314)50/65 bags  

### Annulus Seal
- **Grout**
- **Used:** Yes  
- **Volume:** (314)50/65 bags  
- **Bentonite Pellets:** 
- **Chips:**

### Well Head Completion
- **Flashmount:** 
- **Cap Type:** 
- **Lock #:** 
- **Volume Used:** Cement (4)94/6 bags

### Development
- **Method:** 2 1/6 ft trash pump  
- **Gallons Evacuated:** 88 gallons  
- **Initial:** 38.79 ft  
- **Development:** 38.79 ft  
- **24 hr:** 38.79 ft

### DRILLING

<table>
<thead>
<tr>
<th>Depth</th>
<th>Blow Count</th>
<th>Sample</th>
<th>Description and Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>33 39 53 45</td>
<td></td>
<td>Silty clay T: RBY47</td>
</tr>
<tr>
<td>4-8</td>
<td>45 54</td>
<td></td>
<td>Silty clay T: CTRB</td>
</tr>
<tr>
<td>8-12</td>
<td>42 41</td>
<td></td>
<td>Silty clay T: LTRB</td>
</tr>
<tr>
<td>12-16</td>
<td>42 41</td>
<td></td>
<td>Silty clay T: LTRB</td>
</tr>
<tr>
<td>16-20</td>
<td></td>
<td></td>
<td>Silty clay T: LTRB</td>
</tr>
<tr>
<td>20-24</td>
<td></td>
<td></td>
<td>Silty clay T: LTRB</td>
</tr>
<tr>
<td>24-28</td>
<td></td>
<td></td>
<td>Silty clay T: LTRB</td>
</tr>
<tr>
<td>28-29</td>
<td></td>
<td></td>
<td>Silty clay T: LTRB</td>
</tr>
</tbody>
</table>
### GEOLOGIC BORING/WELL LOG

**Project #:** DHR2
**Project Name:** FWDA PWRD
**Boring/Well #:** TMW 36

**Geologist:** Dale Rankin
**Driller/Company:** USGS

**Drilling Equip.:**

**Date Start:** 11/08/09
**Date Completed:**

**Surface Elev.:** 6699.34
**Top of Casing Elev.:** 6700.71
**Total Depth:** 158.68 ft
**Well Depth:** 157.4 ft

<table>
<thead>
<tr>
<th>Depth</th>
<th>PFO Reading (rpm)</th>
<th>Sample Type</th>
<th>Sample ID</th>
<th>Core</th>
<th>8-12&quot;</th>
<th>12-16&quot;</th>
<th>16-24&quot;</th>
<th>Recovery (ft)</th>
<th>USCS Class</th>
<th>Contact Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>152-157</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Descriptions and Comments:**

- **152 SS/CS (CONTACT)
  - (49-152 transitional)
  - SS interval is 130-152
  - (20 Screen in interval)**
**GEOLOGIC BORING/WELL LOG**

<table>
<thead>
<tr>
<th>Length</th>
<th>Pro Reading (ft)</th>
<th>Sample Type</th>
<th>Sample ID</th>
<th>Core Ext. 90°</th>
<th>Core Ext. 180°</th>
<th>Recovery %</th>
<th>USCS Class</th>
<th>Comment</th>
<th>Descriptions and Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-25</td>
<td></td>
<td></td>
<td></td>
<td>0.6</td>
<td>6-12</td>
<td>15-24</td>
<td></td>
<td></td>
<td>4.7</td>
</tr>
<tr>
<td>25-30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-34</td>
<td></td>
<td></td>
<td></td>
<td>5.0</td>
<td>0.6</td>
<td>15-24</td>
<td>3</td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td>34-38</td>
<td></td>
<td></td>
<td></td>
<td>5.0</td>
<td>0.6</td>
<td>15-24</td>
<td>3</td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td>38-42</td>
<td></td>
<td></td>
<td></td>
<td>5.0</td>
<td>0.6</td>
<td>15-24</td>
<td>3</td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td>42-46</td>
<td></td>
<td></td>
<td></td>
<td>5.0</td>
<td>0.6</td>
<td>15-24</td>
<td>3</td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td>46-495</td>
<td></td>
<td></td>
<td></td>
<td>5.0</td>
<td>0.6</td>
<td>15-24</td>
<td>3</td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td>50-55</td>
<td></td>
<td></td>
<td></td>
<td>0.6</td>
<td>6-12</td>
<td>15-24</td>
<td>3</td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td>55-60</td>
<td></td>
<td></td>
<td></td>
<td>0.6</td>
<td>6-12</td>
<td>15-24</td>
<td>3</td>
<td></td>
<td>5.0</td>
</tr>
</tbody>
</table>

**Drilling**
- Surface Elev. 6710.85 ft
- Top of casing elev. 6713.15 ft
- Total Depth: 111.4 ft
- Well Depth: 108.7 ft

**Notes:**
- **DRILLING:**
  - *12/11/09* Date Completed
  - *12/11/09* Date Started
- **SAMPLE:**
  - *Driller/Company: USGS*
  - *Geologist: Rober Boor*
- **GEOLLCIC LOG:**
  - *CID/CME* Drilling Equip.
**GEOLOGIC BORING/WELL LOG**

**Project #**: DHE-12

**Project Name**: FWDA (Site ID: 123)

**Boring/Well #:**: TMN 37 (Site 3, 4)

**Geologist**: A. ROBERTSON

**Driller/Company**: USGS

**Drilling Unit**: LTJ/CEME

**Date Started**: 12/1/09

**Date Completed**: 12/1/09

**Surface Elev.:**: 670.8 ft

**Top of Casing Elev.:**: 671.1 ft

**Total Depth**: 11 ft

**Well Depth**: 10.8 ft

### Method of Drilling

- [ ] Hollow Stem
- [ ] Direct Rotary
- [X] Air rotary
- [ ] Bucket Auger
- [ ] MUD Rotary
- [ ] Flight Auger

**Hole Diameter**: 5" (5.0"

### Gazeting/Rese Type

- [ ] Steel
- [ ] Threaded
- [X] GFC
- [ ] Sovent
- [ ] SS
- [ ] Waxed

**Height above bottom surface**: 2.28

**Material**: Sawcut

**Diameter**: 2.75" (2.75"

**Length**: 20 ft

**Set between**: 80 ft and 10 ft

**Slot size**: 0.10 ft

### Filter Pack

**Annulus Seal**: 1/4" Bitonite Pellets

**Chip**: Chips

**Volume Used**: 3.5 gal buckets

**Volume Used**: 0.5 gal buckets

### Well Head Completion

- [ ] Flushmount
- [ ] Stand Up

**Depth to top of T.P.**: 11 ft

**Method of install**: Slow Pour

**Depth from**: 10 ft to 61 ft

### Development

- **Method**: EGM In Trash Pump

- **Gallons Evacuated**: 101 gallons

- **Volume Used**: Cement (4) 90 lb bags

- **Date**: 12/14/93/12/10

### Static Water Level

**Initial**: 50.8 ft

**Development**: 50.8 ft

**24 hr**: 50.8 ft

### DRILLING

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>PDI Reading (KPM)</th>
<th>Sample Type</th>
<th>Sample ID</th>
<th>Blow Count</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5.0</td>
<td></td>
<td></td>
<td></td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>5-10.0</td>
<td></td>
<td></td>
<td></td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>10-15.0</td>
<td></td>
<td></td>
<td></td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>15-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### GEOLOGIC LOG

**Description and Comments**

- Reddish brown sandy silt to 7.5 ft.
- DRY, fine sand, some gravel, sub-accreted with sorted
- Reddish brown, silty-clayey clay, some silt
- Maybe wet
- Same as 31.9 above
- Same as 31.9 above
- Dry
- Dry
<table>
<thead>
<tr>
<th>Depth</th>
<th>PDC Reading (gpm)</th>
<th>Sample Type</th>
<th>Sample ID</th>
<th>Blow Count</th>
<th>Recovery (%)</th>
<th>USCS Class</th>
<th>Contact Depth</th>
<th>Descriptions and Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>57-68</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Reddish claystone with minor interbedded brownish green clay, slight HC, marl, and thin gray silt.</td>
</tr>
<tr>
<td>68-71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silty CS (673-714) <em>Sandy claystone</em> minor gravel concretions in sandy claystone</td>
</tr>
<tr>
<td>71-72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>83 C CONTACT CS/SS</td>
</tr>
<tr>
<td>72-102</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>83-6-92 FN-COARSE SS3 vs. conditions bending near bottom.</td>
</tr>
<tr>
<td>102-106</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Softer 2y of 53 screen set from 88 - 105.</td>
</tr>
<tr>
<td>106-111</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bottom@ 111.</td>
</tr>
</tbody>
</table>

**GEOLOGIC BORING/WELL LOG**

**Project #:** BGC

**Project Name:** F/EWA #407 (surf 5-1)

**Boring/WELL #:** THIV 37

**Geologist:** A. Roberts

**Driller/Company:** USGS

**Date Start:** 12/1/09

**Date Completed:** 1/14/09

**Surface Elev.:** 6710.84

**Top of Casing Elev.:** 6751.17

**Total Depth:** 111.17

**Well Depth:** 108.75
WELL COMPLETION DIAGRAMS
**Installation Report**

**Monitoring Well S-1**

**Project:** DABRC  
**Job No.:**  
**Date:** 11/09/91

**Location:** Parcel 21  
**HC Observer:** Madonna  
**Driller:** USGS/Grant

**Type of Well:** Observation, Sampling, Vapor Extraction

**Stick up in Feet:** 2.25

**Soil Log Components in Feet:**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>36.5</td>
<td></td>
</tr>
<tr>
<td>30.5</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

**Approximate Ground Surface Elevation in Feet:** 9712.318

**Type of Monument:** 10" steel u/c lock

**Type of Surface Seal:** Bentonite cement

**Diameter and Type of Casing/Riser Pipe:** 2.067

**Type of Grout:** Bentonite chips - 40 lb/s.

**Type of Plug:** Teflon/Filter - 7 buckets

**Type of Filter Material:** Sand

**Type of End Cap/Tail Pipe:** no cap/well plug

**Diameter of Borehole:** 5"

**Screen Diameter, Slot Size, and Type:** 2.78" E.D. 0.010 cement, 10 ft. length

**Remarks:** TD 51.5 ft. Plug with teflon/tail to 45 ft. Contact with limestone

**Materials Tally:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>110 lbs</td>
</tr>
<tr>
<td>Cement</td>
<td>3.64 lbs</td>
</tr>
<tr>
<td>Bentonite</td>
<td>4.0 lbs</td>
</tr>
<tr>
<td>Monument</td>
<td>10&quot; steel</td>
</tr>
<tr>
<td>PVC 10 screen/35 pipe</td>
<td>Other</td>
</tr>
</tbody>
</table>
Installation Report

Monitoring Well

Project: FLDD 1-V P22
Job No.

Location:
X 108°35'1.43" W
Y 35°30'25.07" N
HC Observer: Matherne
Driller: U.S.A.S.

Type of Well: (Observation, Sampling, Vapor Extraction) Monitoring

Soil Log: Depth of Components in Feet

- Stick up in Feet 150 Relative to Approximate Ground Surface Elevation in Feet 6788.98
- 10
- ▽ 33.71
- 63
- 74
- 14
- 18.3

Remarks: Deep well of dual completion

- Diameter of Borehole 5"
- Screen Diameter, Slot Size, and Type 30 ft Length
- Type of Filter Material Sand
- Type of End Cap/Tail Pipe No Swag Pack Point
- Bentonite

Materials Used:
- Sand 6 bags
- Cement
- Bentonite 5 bags
- Monument 10' Steel
- PVC 80/30 screen, 2 1/8" ID
- Other
Installation Report

Project: EWDN 1-V R22
Job No: 
Date: 7/19/01

Location:
X: 108° 33’ 11.43” W
Y: 35° 38’ 25.09” N

Type of Well (Observation, Sampling, Vapor Extraction): Monitoring

Soil Log Components in Feet

- Stick up in Feet
  - Relative to
    - Approximate Ground
    - Surface Elevation in Feet: 6788.99

- Type of Monument: 10” Metal Marker
- Type of Surface Seal Cement
- Diameter and Type of Casing/Riser Pipe: 2 1/2” PVC
- Type of Grout
- Type of Plug: Bentonite
- Diameter of Borehole: 8 inches
- Screen Diameter, Slot Size, and Type: 0.01 sand, 10 ft
- Type of Filter Material: Sand
- Type of End Cap/Tail Pipe: Well point/no sump

Remarks: Shallow well of dual completion

Materials Tally:
- Sand: 16 bags
- Cement: 3 bags
- Bentonite: 24 bags
- Monument: 10” steel
- PVC 60 pipe/10 screen (ft)
- Other: 24.5 inches
Installation Report

Project: DHBRQ
Location: EWDAPZ

Job No. 

Date: 12/2/09

HC Observer: Maksim Driller: W. 533/Grant

Type of Well (Observation, Sampling, Vapor Extraction): Monitoring

Stick up in Feet
147

Surface Elevation in Feet: 6707.957

Type of Monument: 10" Steel

Type of Surface Seal: Portland cement

Diameter and Type of Casing/Riser Pipe: 2 1/8" ID PVC

Type of Grout: Bentonite

Type of Plug: Bentonite

Diameter of Borehole: 4 7/8"

Screen Diameter, Slit Size, and Type: 4.010" slotted

Type of Filter Material: Sand

Type of End Cap/Tail Pipe: Well plug

Remarks:

Materials Tally:

Sand: 5
cement: 4
Bentonite: 35

Monument: 10" steel
PVC 21/2" screen 120# pipe, 2 1/8" ID

Other:
Installation Report  Monitoring Well IMW33

Project: DABRC  Job No.  Date: 7/6/03

Location: EWDA/P11  HC Observer: Meherne  Driller: USGS/Ground

X: 108°35'19.33" W  Y: 35°30'58.12" N

Type of Well (Observation, Sampling, Vapor Extraction):

Depth of Components in Feet

- Stick up in Feet: 2.91
- Relative to Approximate Ground Surface Elevation in Feet: 612.83.780

Type of Monument: 10" Steel, Parking

Type of Surface Seal: Portland Cement

Diameter and Type of Casing/Riser Pipe: 2.5" PVC

Type of Grout: Holcim

Type of Plug: Pelleflex

Diameter of Borehole: 8"

Screen Diameter, Slot Size, and Type: 0.010, 70 ft

Type of Filter Material: Sand

Type of End Cap/Tail Pipe: 0.5 ft Well Plug

Remarks:

Materials Tally:

- Sand: 25 bags
- Cement: 4 bags
- Bertonite: 5 buckets, 14 bags
- Monument: 10" Steel
- PVC 20 ft screen, 40 ft pipe
- Other: 


Installation Report          Monitoring Well, TMN 34

Project: FWDA
Location: Parcel II
   Pr. Wingeon, Dept. Activity, NM
Type of Well: Observation, Sampling, Vapor Extraction, observation and sampling

Depth of Soil Layers in Feet:

- 0'
- 10'
- 27'
- 31'
- 37'
- 57'
- 57.15'
- 57.25'

- Stick up in Feet: 2.67
- Relative to
- Approximate Ground Surface Elevation in Feet: 6084.645
- Type of Monument: USGS, Brass Cap
- Type of Surface Seal: Portland Cement
- Diameter and Type of Casing/Riser Pipe: 2.5" sch 80 PVC
- Type of Grout: Bentonite Chips (3/8")
- Type of Plug: Bentonite Pellets (1/4")
- Diameter of Borehole: 10.34"
- Screen Diameter, Slot Size, and Type: 2.5" x 0.11" saw cut
- Type of Filter Material: 10/20 Silica Sand
- Type of End Cap/Fair 3" type PVC, well point

Remarks:


Materials Tally:

- Sand: 22 - 50 lb bags
- Cement: 4 - 44 lb bags
- Bentonite chips: 14 - 50 lb bags
- Monument: 1
- PVC: 2 - 10' screens, 4 - 10' risers
- Other: 10' screens, 5 gal buckets
Installation Report

Monitoring Well WM-35

Project: FWDA
W 35° 40' 36.61" X 35° 40' 59.28" N
Location: Parcel 11

Type of Well: Observation, Sampling, Vapor Extraction

Observer: DRILLER U.S.G.S.

Depth Components in Feet:

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0'</td>
<td>Stick up in Feet</td>
</tr>
<tr>
<td>10'</td>
<td>Relative to Approximate Ground Surface Elevation in Feet</td>
</tr>
<tr>
<td>41.62</td>
<td>6684.26</td>
</tr>
<tr>
<td>25'</td>
<td>Diameter and Type of Casing/Riser Pipe: 2.5&quot; sch. 80 PVC</td>
</tr>
<tr>
<td>28'</td>
<td>Type of Grout: Bentonite chips (1/4&quot;&quot;)</td>
</tr>
<tr>
<td>35'</td>
<td>Type of Plug: Bentonite Pellers (1/4&quot;&quot;)</td>
</tr>
<tr>
<td>55'</td>
<td>Type of Filter Material: 10/20 silica sand</td>
</tr>
<tr>
<td>55'</td>
<td>Type of End Cap/ Tail Pipe: PVC well point</td>
</tr>
</tbody>
</table>

Remarks:

Materials Used:

- 24 - 50 lb. bags of Cement
- 10 - 50 lb. bags of Bentonite chips
- 4 - 1 gal. buckets
- Monument: 1
- PVC: 2 10' screens, 4 10' risers
- Other:
Installation Report

Monitoring Well TMW 36

Project: FWDA  
Jet No.: 9636DHBP1  
Date: 12/5/09

Location: Parcel 22  
Ft. Wingate Depot Activity, N.M.

Type of Well: Observation, Sampling, Vapor Extraction; Observation and sampling

Stick up in Feet Relative to Approximate Ground Surface Elevation in Feet: 1.69 6.699.323

Type of Monument: USGS Brass Cap

Type of Surface Seal: Portland Cement

Diameter and Type of Diving/Riser Pipe: 2.5" sch 40 PVC

Type of Drift: Bentonite Chips (1/4"

Type of Plug: Bentonite Pellets (1/4"

Diameter of Borehole: 10 1/4" -> 5"

Screen Diameter, Slot Size, and Type: 2.5" + 0.01", saw cut

Type of Filter Material: 10/30 Silica sand

Type of End Cap/Tail Pipe: PVC well point

Remarks:

Materials Used:

- Sand: 3.75 - 50 lb bags
- Cement: 4 - 94 lb bags
- Bentonite chips: 32 50 lb bags
  - Pellets: 7 5 gal buckets

Monument: 1

PVC: 2 10' screens, 4 10' risers

Other:
Installation Report

Monitoring Well TMW 37

Project: FWDA

X 108° 35' 17.88" W  Y 35° 30' 24.65" N

Location: Parcel 22, AH, Observer: Driller: USGS

Type of Well: Observation, Sampling, Vapor Extraction, observation and sampling

Depth of Skim Log Components in Feet

- Stick up in Feet: 2.28
- Relative to approximate ground level: 710.876

Type of Monument: USGS Brass Cap

Type of Surface Seal: Portland Cement

Diameter and Type of Casing/Riser Pipe: 2.5" sch 80 PVC

- Type of Grout: Bentonite Chips (1/8"

- Type of Plug: Bentonite Pellets (1/4"

- Diameter of Borehole: 10.24" to 5"

- Screen Diameter: 2.5", 0.011" saw cut

- Type of Filter Material: 10/20 Silica Sand

- Type of End Cap/Tail Pipe: PVC well point

Remarks:

- Additional remarks...

Material's Taken:
- Sand: 5.25 - 50 lb bags
- Cement: 4 - 94 lb bags
- Bentonite Chips: 34 - 50 lb bags
- Pellers: 8 - 5 gal buckets

Monument: 1

PVC: 2 10' screens, 4 10' risers

Other: ...