Monitoring Well Installation Report

Comanche Station

Xcel Energy

August 1, 2016

Updated June 14, 2018
Table of Contents

1.0 Introduction ......................................................................................................................... 1
2.0 Background Information ....................................................................................................... 1
3.0 Field and Laboratory Methods .............................................................................................. 5
  3.1 Borehole Drilling .................................................................................................................. 5
  3.2 Soil Samples - Geotechnical Analysis .................................................................................. 5
  3.3 Well Construction ............................................................................................................... 6
  3.4 Well Development .............................................................................................................. 6
  3.5 Well Survey ....................................................................................................................... 7
  3.6 Groundwater Level Measurement and Aquifer (Slug) Testing ............................................ 7
  3.7 Decontamination of Field Equipment ................................................................................. 7
4.0 Field and Laboratory Results ................................................................................................ 7
  4.1 Borehole Drilling .................................................................................................................. 7
  4.2 Soil Samples – Geotechnical Analysis ............................................................................... 8
  4.3 Well Construction ............................................................................................................. 8
  4.4 Well Development ........................................................................................................... 10
  4.5 Well Survey ...................................................................................................................... 10
  4.6 Groundwater Level Measurement and Aquifer (Slug) Testing ......................................... 10
5.0 References .......................................................................................................................... 11

List of Tables

Table 1. Summary of Geotechnical Testing Results at Comanche Station, 2015 .................. 8
Table 2. Well Construction Details for Groundwater Monitoring Wells W-4, W-5, W-6, MW-5, MW-6 at Comanche Station, 2015 - 2017 ................................................................. 9

List of Figures

Figure 1. Vicinity Map for Comanche Station .............................................................................. 3
Figure 2. Well Location Map, Comanche Station ........................................................................ 4
List of Appendices

A. Borehole Logs

B. Geotechnical Soil Testing Results and Chain of Custody Records

C. Well Construction Diagrams

D. State Well Permits
# Table of Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMSL</td>
<td>above mean sea level</td>
</tr>
<tr>
<td>bgs</td>
<td>below ground surface</td>
</tr>
<tr>
<td>BTOC</td>
<td>below top of casing</td>
</tr>
<tr>
<td>CCR</td>
<td>Coal Combustion Residuals</td>
</tr>
<tr>
<td>cm/sec</td>
<td>centimeter per second</td>
</tr>
<tr>
<td>HP Geotech</td>
<td>Hepworth-Pawlak Geotechnical, Inc.</td>
</tr>
<tr>
<td>µS/cm</td>
<td>microsiemens per centimeter</td>
</tr>
<tr>
<td>NTU</td>
<td>nephelometric turbidity unit</td>
</tr>
<tr>
<td>PSCo</td>
<td>Public Service Company of Colorado</td>
</tr>
<tr>
<td>SSD</td>
<td>Site Services Drilling, LLC</td>
</tr>
<tr>
<td>TOC</td>
<td>top of casing</td>
</tr>
<tr>
<td>USCS</td>
<td>Unified Soil Classification System</td>
</tr>
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</table>
1.0 Introduction

The purpose of this Monitoring Well Installation Report is to document details pertaining to the drilling, construction, and development of two groundwater monitoring wells installed in 2017 and three monitoring wells installed in 2015 at the Xcel Energy Comanche Generating Station (Comanche Station) in Pueblo, Colorado (Figure 1). The groundwater monitoring system is intended to support compliance with the U.S. Environmental Protection Agency’s final Coal Combustion Residuals (CCR) Rule (40 CFR Parts 257 and 261). Comanche Station has two units\(^1\), an impoundment and a landfill, subject to the CCR Rule. The drilling and well installation was performed in accordance with the State of Colorado Water Well Construction Rules (2 Code of Colorado Regulations 402-2).

HDR was contracted to locate, permit, and oversee the installation of the three groundwater monitoring wells at Comanche Station. HDR retained Hepworth-Pawlak Geotechnical, Inc. (HP Geotech) in 2015 and Site Services Drilling, LLC (SSD) in 2017 to provide on-site drilling services, while HDR provided field monitoring of the drilling, well installation, and development. All on-site personnel completed the site-specific safety training. Additionally, daily safety briefs were conducted by the on-site project team prior to commencing work. The training and safety briefs were documented in accordance with the PSCo CCR Rule Compliance Health & Safety Plan.

2.0 Background Information

Prior hydrogeologic and geotechnical investigations conducted at Comanche Station are identified and summarized in the Comanche Station Monitoring Well Installation Plan (HDR, 2015a). Comanche Station is underlain by unconsolidated colluvium consisting of stiff clays and silts, with interbedded sand and gravel west and northwest of the CCR landfill. Typical colluvium thickness is less than 20 feet but ranges between 5 and 75 feet (Woodward-Clyde, 1987; URS, 2005). The Pierre Shale is the uppermost bedrock at the Comanche Station and has a measured hydraulic conductivity of $3 \times 10^{-10}$ to $3 \times 10^{-7}$ cm/sec. The uppermost aquifer beneath the Site is the Dakota Sandstone at a depth of over 1,400 feet (GeoTrans, Inc., 2009). Approximately 1,400 feet of low-permeability shale deposits separate the surface impoundments from this aquifer. Tetra Tech (2015) estimated that the groundwater velocity through the Pierre Shale is 0.1 feet per year. Given that the Pierre Shale is estimated to be over 230 feet thick beneath the Site, it will take 2,300 years just to migrate through the Pierre Shale. It will take an additional 12,200 years to migrate through the underlying shale deposits before leachate from the ADF would reach the Dakota Sandstone Aquifer.

The shallow unconsolidated colluvium deposits beneath the site have been predominantly unsaturated, with some isolated areas of perched water\(^2\) (GeoTrans, Inc., 2009). Areas of perched water are likely controlled by the bedrock topography where water becomes trapped by topographic lows in the shale bedrock surface (GeoTrans, Inc., 2009). The conceptual model for surface water infiltration is that it migrates vertically into low-permeability bedrock and/or is trapped in topographic

---

\(^{1}\) Comanche Station includes three coal-fired generation units. All CCR generated at Comanche Station is stored in two active CCR units subject to compliance with the CCR Rule: a CCR impoundment and a CCR landfill (Figure 2). The CCR impoundment is located southeast of the coal storage area, and the CCR landfill is west of the raw water storage pond.

\(^{2}\) Only two of the seven previously installed wells at the site, MW-3 and W-3, have contained measurable water, and most borings previously drilled at the site, including boreholes that penetrate the Pierre Shale, have been dry.
lows in the bedrock surface prior to migrating vertically (GeoTrans, Inc., 2009). A potential south-southeasterly flow gradient is assumed based on the ground surface topography, which slopes to the south-southeast towards the St. Charles River. The alluvial aquifers associated with the Arkansas River (north), the St. Charles River (south), and Salt Creek (west) do not extend beneath the site (Xcel Energy, 2005).

Given the lack of a laterally extensive shallow groundwater system in the colluvium deposits beneath the site and the depth of the uppermost aquifer (Dakota Sandstone), a wet/dry monitoring well system has been selected to detect changes in perched groundwater conditions and/or potential contaminants from the ash landfill and CCR impoundment.

The five new monitoring wells installed at Comanche Station (W-4, W-5, W-6, MW-5, and MW-6) were sited based on monitoring requirements in the CCR Rule, facility design, and existing hydrogeologic data for the vicinity, as described in the Groundwater Monitoring System Certification (HDR, 2018). MW-5 and MW-6 were installed in 2017 to provide coverage for the lateral expansion of the landfill. Well locations are shown on Figure 2.
Figure 1. Vicinity Map for Comanche Station
Figure 2. Well Location Map, Comanche Station
3.0 Field and Laboratory Methods

3.1 Borehole Drilling

The boreholes for wells W-4, W-5, and W-6 were drilled by HP Geotech using a hollow stem auger drilling method from November 9 through 11, 2015. The boreholes for MW-5 and MW-6 were drilled by Site Services Drilling (SSD) using the same method from August 7 through 8, 2017. Utility locations were identified prior to beginning drilling operations. However, to verify the absence of any buried utilities, the driller advanced soil borings from the ground surface by using a pot-holing technique to a minimum depth of 8 feet prior to drilling. The borehole was then advanced using the hollow stem auger drilling method with a CME-55 drill rig. The nominal borehole diameter was 8 inches in 2015 and 6 inches in 2017 to accommodate construction of 2-inch diameter wells.

Screen depth was targeted for the top of a perched water-bearing zone, if encountered, or 5 feet above the top of weathered shale/claystone bedrock in order to intersect the colluvium-bedrock contact. Boreholes were drilled to a minimum of 15 feet beneath the top of the weathered shale/claystone at the site or until the borehole could not be further advanced. This resulted in total borehole depths that ranged from 25 feet to 42 feet, as further described in Section 4.3.

An HDR geologist was present during drilling operations to collect samples and log the subsurface material, in addition to overseeing site safety and proper well construction. Soil samples from boreholes were collected in plastic bags and logged every 5 feet by the field geologist during drilling to document lithologic soil characteristics. The geologist visually classified soil type, consistency/relative density, color, and water content in accordance with the Unified Soil Classification System (USCS) as well as grain size, mineralogy, sorting, rounding, hardness, and matrix/clast support, among other textural properties. Samples were placed in sample bags labeled with the borehole identification and depth interval. One undisturbed soil sample from each well was collected within the well screen depth interval and submitted to a lab for hydraulic properties analysis, as described in Section 3.2. Soil samples were not collected in 2017. Boring logs for each borehole are provided in Appendix A.

Soil cuttings, fluids, and potholing slurry generated during drilling were transported to and disposed of at the existing onsite ash landfill. Drilling equipment was decontaminated with potable water before moving to the next borehole.

3.2 Soil Samples - Geotechnical Analysis

Soils were logged from the cutting returns during drilling wells W-4, W-5, and W-6 and classified based on the USCS. During drilling, one undisturbed soil sample was obtained from each borehole at a depth coinciding with the well screen depth. An 18-inch long California Modified Style Split-Spoon Sampler was used to collect the undisturbed core of sediment. The undisturbed soil samples (one from each well) were submitted to HP Geotech for analysis of the following parameters:

- Grain-size: Sieve and Hydrometer (ASTM D421/422)
- Total Porosity (SW9100)
- Bulk Density (ASTM D2937)
- Moisture Content (ASTM D2216)
- Specific Gravity (ASTM D854)

Analysis was completed in accordance with the method for grain-size analysis using sieve and hydrometer described in ASTM D421/422 (ASTM D421-85, 1998 and ASTM D422-63, 2007). Chain of custody documentation and laboratory results are provided in Appendix B. Samples were not collected from MW-5 or MW-6 boreholes.

3.3 Well Construction

Once the target drilling depth was reached at each location, the 2-inch diameter, Schedule 40 PVC casing and well screen (0.010-inch slots) were assembled and lowered into the borehole. Approximately 10 feet of screen was installed in each new well. The top of the well screen was placed at the top of a perched water-bearing zone, where encountered. Where perched water was not encountered, the well screen was immediately above the top of weathered shale/claystone bedrock to intersect the colluvium-bedrock contact. To capture infiltrating perched water\(^3\), a 10-foot long sump consisting of blank casing was placed beneath the screen, as requested by CDPHE in a meeting with Xcel Energy on April 24, 2014 (Tetra Tech, 2014). However, a 5-foot long sump was placed beneath the well screen of MW-6 due to drilling refusal.

After PVC casing and screen placement in the borehole, sand filter pack and the bentonite seal was placed via gravity feed from the surface into the annular space. The sump was sealed in with bentonite to 2-feet below the bottom of the screen. The filter pack consisted of 10-20 (sieve size) washed silica sand emplaced from approximately 2 feet below the bottom of the screen to approximately 0.5 to 2 feet above the well screen. The annular seal of medium bentonite chips was placed above the top of the filter pack and hydrated in lifts throughout placement, while the remaining drill casing was removed from the borehole using the hydraulic jacks.

An annular surface seal consisting of neat cement was installed from the top of the bentonite to the surface. All wells were finished with a 2-foot-by-2-foot concrete pad using Quickrete fast setting concrete, extending to a depth of approximately 0.5 to 2 feet below grade (to the top of the bentonite grout). Each well included a PVC stick-up. Two bollards were placed on either side of monitoring wells W-4 and W-5, parallel to the road; three bollards were installed around monitoring wells MW-5, MW-6, and W-6. Each well was secured with a protective steel casing and lock. Well construction is further described in Section 4.3.

3.4 Well Development

Wells are typically developed over several days to improve hydraulic connectivity in the area immediately surrounding the well and remove any fluids introduced during drilling. Well development involves removing as much of the introduced drilling fluids, cuttings, and particulates from within and adjacent to the well as possible. Development did not begin until at least 12 hours after the wells had been grouted to ensure grout had sufficiently set.

Wells were to be developed by surge blocking and pumping. This method involves moving a surge block up and down the well screen and casing, which alternately forces water in and out of the

\(^3\) Previously constructed wells W-1, W-2, and W-3 incorporated a 2-foot sump to capture infiltrating perched water. Due to the lack of a laterally extensive shallow groundwater system in the colluvium deposits beneath the site and the depth of the uppermost aquifer (Dakota Sandstone), a wet/dry monitoring well system is an effective way to detect changes in perched groundwater conditions and/or potential contaminants from the ash landfill and CCR impoundment.
3.5 Well Survey
Surveying of the monitoring wells was performed by professional surveyor Edward-James Surveying, Inc. after well completion. The surveyor recorded elevations of the top of PVC casing (point at notch on the north side of the casing top) and ground surface using a level loop. The northing and easting coordinates of the wells were initially surveyed using a local coordinate system and converted to NAD 1983 UTM Zone 13 South.

3.6 Groundwater Level Measurement and Aquifer (Slug) Testing
Slug tests are typically performed on new monitoring wells to obtain estimates of hydraulic conductivity for shallow unconfined aquifers. Slug testing consists of injecting and removing a volume of water and recording the change in groundwater level over time, then calculating aquifer parameters based on the groundwater level response. Slug testing was not performed at the new Comanche Station wells because the well screens were not installed at the bottom of the well. Each well has a sump and the static water level is towards the bottom of the screen at approximately the screen/sump boundary. Therefore, dropping a slug into the water in the sump would not result in a response by the shallow groundwater geologic formation outside the well.

3.7 Decontamination of Field Equipment
Field instrumentation (such as interface probes or water quality meters) was decontaminated between sample locations by rinsing with an Alconox/distilled water solution followed by a potable water rinse and a final rinse with deionized water.

4.0 Field and Laboratory Results

4.1 Borehole Drilling
Boring logs for each borehole are provided in Appendix A. Soil cuttings from the borehole samples consisted primarily of silt and clay, with some sand. Iron staining was noted in samples collected from all three borings surrounding the impoundment. Shale was encountered at approximately 14 feet bgs in W-4, W-5, and W-6; silt with shale deposits was logged at W-6 while clay with shale was recorded at wells W-4 and W-5 at this depth. This was presumed to be the top of the Pierre Shale formation. Silt was encountered below the shale layers at all three borings drilled surrounding the impoundment. Soil cuttings ranged from dry to moist. A perched, water bearing zone was encountered at wells W-4 and W-6; W-5 was dry. Approximately 24 hours after drilling, depth to perched water was measured at 14.11 feet bgs at W-4 and 11.10 feet bgs at W-6.

Shale, presumed to be the top of the Pierre Shale formation, was encountered at approximately 24 feet below ground surface at MW-5 and approximately 35 feet at MW-6. Coarse gravel with sand and a 4-inch layer of brown clay was encountered at this depth at MW-6. Soil cuttings were dry in MW-5. Soil cuttings were dry in MW-6 until moisture was encountered beginning at 20 feet below the surface. Approximately 21 hours after drilling, depth to water was measured at 28 feet in MW-6 and MW-5 was dry.
4.2 Soil Samples – Geotechnical Analysis

The undisturbed soil samples collected from the well screen depth intervals of W-4, W-5, and W-6 analyzed for grain size and porosity by HP Geotech are summarized in Table 1. The soils laboratory results are presented in Appendix B.

<table>
<thead>
<tr>
<th>Well I.D.</th>
<th>Sample Depth (feet bgs)</th>
<th>Gradation</th>
<th>Porosity (%)</th>
<th>Moisture Content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Gravel (%)</td>
<td>Sand (%)</td>
<td>Silt and Clay (%)</td>
</tr>
<tr>
<td>W-4</td>
<td>9</td>
<td>0</td>
<td>14</td>
<td>86</td>
</tr>
<tr>
<td>W-5</td>
<td>9</td>
<td>0</td>
<td>7</td>
<td>93</td>
</tr>
<tr>
<td>W-6</td>
<td>9</td>
<td>0</td>
<td>8</td>
<td>92</td>
</tr>
</tbody>
</table>

Note: BGS = below ground surface

Laboratory results show the wells are screened in silt and clay with some sand, with porosities between 35 and 40 percent, which is consistent with the silt and clay material noted in the drilling logs. A general range of hydraulic conductivity for such sediments is 10\(^{-9}\) to 10\(^{-4}\) centimeter per second (cm/s) (Fetter, 1994).

4.3 Well Construction

A diagram for each well that documents well construction is provided in Appendix C. Approximately 10 feet of screen was installed in each well. The screen was placed above the Pierre Shale formation from approximately 3.4 to 13.4 feet bgs at W-4, 3.5 to 13.5 feet bgs at W-5, 5 to 15 feet bgs at W-6, 16 to 26 feet bgs at MW-5, and 27 to 37 feet bgs at MW-6. The 10-foot blank casing sumps were placed below each well screen; except at MW-6 a 5-foot blank casing sump was placed below the well screen. Total well depths (including the sumps) ranged from 23.4 to 42 feet bgs. Well construction details for all six wells are summarized in Table 2. State-issued well construction permits are included in Appendix D.
### Table 2. Well Construction Details for Groundwater Monitoring Wells
W-4, W-5, W-6, MW-5, MW-6 at Comanche Station, 2015 – 2017

<table>
<thead>
<tr>
<th>Well ID</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Easting (State Plane, NAD 1983 UTM Zone 13 S meters)</td>
<td>Northing (State Plane, NAD 1983 UTM Zone 13 S meters)</td>
<td>Elevation TOC (feet AMSL)</td>
<td>Well Total Depth (feet bgs)</td>
<td>Depth of Screen Interval (feet bgs)</td>
<td>Well Stickup (feet)</td>
<td>Casing Type</td>
<td>Depth to Water (feet BTOC)</td>
</tr>
<tr>
<td>W-4</td>
<td>537310.48</td>
<td>4228491.35</td>
<td>4812.47</td>
<td>23.4</td>
<td>3.4-13.4</td>
<td>3.63</td>
<td>2-inch PVC</td>
<td>22.8</td>
</tr>
<tr>
<td>W-5</td>
<td>537396.38</td>
<td>4228323.54</td>
<td>4807.46</td>
<td>23.5</td>
<td>3.5-13.5</td>
<td>3.83</td>
<td>2-inch PVC</td>
<td>12.33</td>
</tr>
<tr>
<td>W-6</td>
<td>537367.35</td>
<td>4228447.92</td>
<td>4811.89</td>
<td>24.54</td>
<td>5-15</td>
<td>3.90</td>
<td>2-inch PVC</td>
<td>15.38</td>
</tr>
<tr>
<td>MW-5</td>
<td>536379.92</td>
<td>4228619.73</td>
<td>4806.97</td>
<td>36.0</td>
<td>16-26</td>
<td>2.43</td>
<td>2-inch PVC</td>
<td>27.67</td>
</tr>
<tr>
<td>MW-6</td>
<td>536363.95</td>
<td>4228008.02</td>
<td>4823.08</td>
<td>42.0</td>
<td>27-37</td>
<td>2.23</td>
<td>2-inch PVC</td>
<td>30.04</td>
</tr>
</tbody>
</table>

Notes:
- TOC = top of casing
- BTOC = below top of casing
- BGS = below ground surface
4.4 Well Development
On November 11, 2015, the depth to water was measured in wells surrounding the impoundment in preparation to begin well development. Well W-5 was found to be dry; therefore, well development was not attempted in this monitor well.

Well development was not attempted at well W-4 due to the lack of water in the screened interval. Well development was attempted at well W-6 but was ultimately unsuccessful due to extremely slow recharge in the well, combined with a water level of only 3 feet within the wetted screened interval (above the sump).

On August 8, 2017, the depth to water was measured at MW-6 in preparation to begin well development. Well development continued on August 9 and 10; approximately 315 total gallons of water was purged during the development of MW-6. Well development was not attempted at MW-5 due to the lack of water in the screened interval.

4.5 Well Survey
Survey coordinates and elevations are provided in Table 2.

4.6 Groundwater Level Measurement and Aquifer (Slug) Testing
Slug testing was not performed at the new Comanche Station wells because the well screens were not installed at the bottom of the well. Each well has a sump and the static water level is towards the bottom of the screen at approximately the screen/sump boundary. Therefore, dropping a slug into the water in the sump would not result in a response by the shallow groundwater geologic formation outside the well. Static water level measurements are provided in Table 2.
5.0 References


Appendix A
Borehole Logs
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Blow Count</th>
<th>Depth (feet)</th>
<th>Description (USCS)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1' below ground surface (bgs)</td>
<td>N/A</td>
<td>10</td>
<td>7.5YR 3/2; Sandy Silt (ML), some gravel; nonplastic; noncohesive; dry</td>
<td>Potholed to 8' on 11/9/2015</td>
</tr>
<tr>
<td>5' bgs</td>
<td>N/A</td>
<td>5</td>
<td>10YR 5/3; Lean Clay (CL); stiff, med-high plasticity; cohesive; moist</td>
<td></td>
</tr>
<tr>
<td>W-4; 9' bgs</td>
<td>6-8 (Cal)</td>
<td>10</td>
<td>10YR 4/3; Lean Clay (CL); stiff, low plasticity; cohesive; some lamination; moist</td>
<td>Fe staining. Cal sample at 9'bgs submitted for geotech analysis</td>
</tr>
<tr>
<td>10' bgs</td>
<td>5-7-8 (SS)</td>
<td>15</td>
<td>Alluvium/bedrock contact at 14'bgs</td>
<td>Fe staining</td>
</tr>
<tr>
<td>14' bgs</td>
<td>6-7-12 (SS)</td>
<td>20</td>
<td>Dark gray Gley 1 4/N; Lean Clay (CL) Black Shale, weathered; laminated</td>
<td>Fe staining</td>
</tr>
<tr>
<td>19' bgs</td>
<td>11-15-21(SS)</td>
<td>25</td>
<td>As above</td>
<td>Fe staining; hard, very micaceous</td>
</tr>
<tr>
<td>24' bgs</td>
<td>10-18-28(SS)</td>
<td>5</td>
<td>Very dark gray Gley 1 3/N; Silt (ML); hard, non-plastic; non-cohesive; laminted; dry to moist</td>
<td>Fe staining; micaceous</td>
</tr>
</tbody>
</table>

**Total Depth (feet):** 25.5

**Water Level (feet):**
- After Drilling: 14.11
- Hours After: 24

**Logged By:** Nick Hanrahan
**Drilled/Sampled By:** Brent McDaniel

**Date Started:** 11/10/2015
**Date Completed:** 11/10/2015
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Blow Count</th>
<th>Depth (feet)</th>
<th>Description (USCS)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2' bgs</td>
<td>N/A</td>
<td>5</td>
<td>10YR 4/3; Fat Clay (CH) with Sand and some Gravel; high plasticity; cohesive; moist to wet (likely due to potholing)</td>
<td>Potholed to 8' on 11/9/2015</td>
</tr>
<tr>
<td>5' bgs</td>
<td>N/A</td>
<td>5</td>
<td>As above</td>
<td></td>
</tr>
<tr>
<td>W-5; 9' bgs</td>
<td>5-7 (Cal)</td>
<td>10</td>
<td>Brown 10YR 4/3; Lean Clay (CL), some gravel; stiff; medium plasticity; cohesive; dry to moist</td>
<td>Cal sample at 9' bgs submitted for geotech analysis</td>
</tr>
<tr>
<td>10' bgs</td>
<td>5-7-8 (SS)</td>
<td>10</td>
<td>Brown 10YR 4/3; Lean Clay (CL), some gravel; stiff; medium plasticity; cohesive; dry to moist</td>
<td>Fe staining; quartz vein visible</td>
</tr>
<tr>
<td>14' bgs</td>
<td>14-21 (Cal)</td>
<td>15</td>
<td>As above. Hit a layer of shale bedrock with quartz vein, became laminated to thinly bedded; hard</td>
<td>Fe staining; quartz vein visible</td>
</tr>
<tr>
<td>15' bgs</td>
<td>10-13-21(SS)</td>
<td>20</td>
<td>As above; laminated</td>
<td>Fe staining; gravel-size mic grains</td>
</tr>
<tr>
<td>19' bgs</td>
<td>10-12-22(SS)</td>
<td>20</td>
<td>As above; laminated</td>
<td>Fe staining; gravel-size mic grains</td>
</tr>
<tr>
<td>24' bgs</td>
<td>9-11-13 (SS)</td>
<td>25</td>
<td>Brown 7.5YR 4/4; fine-medium Sandy Silt (ML); some coarse; very stiff; non-plastic; non-cohesive; moist</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Depth (feet)</th>
<th>Water Level (feet)</th>
<th>Logged By:</th>
<th>Drilled/Sampled By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>Dry</td>
<td>Nick Hanrahan</td>
<td>Brent McDaniel</td>
</tr>
<tr>
<td></td>
<td>After Drilling:</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hours After:</td>
<td>11/9/2015</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Date Started:</td>
<td>11/9/2015</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Date Completed:</td>
<td>11/9/2015</td>
<td></td>
</tr>
<tr>
<td>Sample No.</td>
<td>Blow Count</td>
<td>Depth (feet)</td>
<td>Description (USCS)</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>--------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>1' below ground surface (bgs)</td>
<td>N/A</td>
<td>1</td>
<td>10YR 3/2; Silty Sand (SM) with Gravel; nonplastic; non-cohesive (Fill); moist</td>
</tr>
<tr>
<td>5' bgs</td>
<td>N/A</td>
<td>5</td>
<td>10YR 3/2; Silt w/ Sand (ML); nonplastic, noncohesive; wet</td>
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<tr>
<td>W-6: 9' bgs</td>
<td>8-11 (Cal)</td>
<td>10</td>
<td>Olive brown 2.5Y 4/3; Lean Clay (CL); very stiff; medium to high plasticity; cohesive; moist to wet</td>
</tr>
<tr>
<td>10.5' bgs</td>
<td>5-8-10 (SS)</td>
<td>10</td>
<td>Olive brown 2.5Y 4/3; Lean Clay (CL); very stiff; medium to high plasticity; cohesive; moist to wet</td>
</tr>
</tbody>
</table>
| 14' bgs | 4-7-8 (SS) | 15 | Top 14": As above; stiff
Bottom 6": Gray Gley 1 5/N; Silt (ML) with Shale; stiff; nonplastic; cohesive; moist | Fe staining. Alluvium; top of refusal |
| 19' bgs | 6-7-8 (SS) | 20 | Olive brown 2.5Y 4/3; Lean Clay (CL); stiff; medium plasticity, cohesive; moist | Fe staining; micaceous |
| 24' bgs | 15-20 (Cal) | 25 | Dark grayish brown 10YR 4/2; Silt (ML); nonplastic; slightly cohesive, laminated (shale); moist | Very micaceous |
| 29' bgs | 50/5” (SS) | 30 | As above; noncohesive | Very micaceous |

**Total Depth (feet)**

<table>
<thead>
<tr>
<th>Water Level (feet)</th>
<th>Logged By:</th>
<th>Drilled/Sampled By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Nick Hanrahan</td>
<td>Brent McDaniel</td>
</tr>
</tbody>
</table>

**Date Started:**

11/10/2015

**Date Completed:**

11/10/2015
**Boring Log**

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Blow Count</th>
<th>Depth (feet)</th>
<th>Description (USCS)</th>
<th>Elevation (feet)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0 - 8') Dry SILT 2.5Y 5/2</td>
<td></td>
<td>Potholed to 8 ft</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>(9 - 14') Compacted SILT with white calcite laminates, very dry, stiff 7.5YR 6/3</td>
<td></td>
<td>4' of recovery from 8 - 14' core</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>(14 - 22') Compacted SILT with trace white calcite laminates, very dry, stiff 7.5YR 5/4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>(22 - 24') Compacted SILT with increased calcite content and trace dark gray SILT laminae 7.5 YR 3/2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
<td>(24 - 29') Highly weathered SHALE bedrock 2.5Y 3/2</td>
<td></td>
<td>Well Construction: Screen 16 - 26' Sump 26 - 36'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30</td>
<td>(29 - 36') Weathered SHALE bedrock</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

**Total Depth (feet):** 36

**Logged/Sampled By:** M. Violette

**Drilled By:** Site Services Drilling, LLC

**Date Started:** 8/8/2017

**Date Completed:** 8/8/2017
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Blow Count</th>
<th>Depth (feet)</th>
<th>Description (USCS)</th>
<th>Elevation (feet)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td>5</td>
<td>(0 - 8') Dry SILT 2.5Y 5/2</td>
<td></td>
<td>Potholed to 8 ft</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>10</td>
<td>(8 - 9') SAND with brittle SILT with white CLAY pieces 2.5Y 6/4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>15</td>
<td>(9 - 12') SILT with SAND, brittle, very dry 7.5YR 5/4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>20</td>
<td>(12 - 14') Well graded coarse SAND with GRAVEL, very dry, hematite and quartz present 5YR 5/6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>25</td>
<td>(14 - 19') Coarse SAND with GRAVEL, large cobbles up to 3-inches in length, hematite and quartz present, very dry 5YR 5/6</td>
<td></td>
<td>2' of recovery from 14 - 19' core</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>30</td>
<td>(19 - 23') Coarse SAND with GRAVEL, large cobbles up to 2-inches in length, moist 2.5YR 5/4</td>
<td></td>
<td>2.5' of recovery from 19 - 24' core</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>35</td>
<td>(23 - 24') Same as above, 7.5YR 7/1</td>
<td></td>
<td>2.5' of recovery from 24 - 29' core</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>30</td>
<td>(24 - 29') Coarse GRAVEL with SAND. A 4-inch layer of brown CLAY at 27', some black SHALE pieces and cobbles up to 1-inch in length, micaceous 7.5R 5/4</td>
<td>30</td>
<td>Well Construction: Screen 27 - 37'</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>35</td>
<td>(29 - 30.5') SILT with GRAVEL, medium to coarse SAND present, moist 7.5YR 6/4</td>
<td>35</td>
<td>Sump 37 - 42'</td>
</tr>
<tr>
<td>30.5 - 31.5'</td>
<td></td>
<td>30.5 - 31.5'</td>
<td>Medium SAND with SILT 7.5YR 5/6</td>
<td>30.5 - 31.5'</td>
<td></td>
</tr>
<tr>
<td>31.5 - 33'</td>
<td></td>
<td>31.5 - 33'</td>
<td>CLAY with SILT 7.5YR 5/4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33 - 34'</td>
<td></td>
<td>33 - 34'</td>
<td>Medium to coarse SAND, moist to wet 7.5YR 5/4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34 - 35'</td>
<td></td>
<td>34 - 35'</td>
<td>CLAY with some SILT, firm, dry 7.5YR 5/3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 - 42'</td>
<td></td>
<td>35 - 42'</td>
<td>Highly weathered SHALE bedrock, trace SILT 10YR 4/2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Logged/Sampled By:**
M. Violette  
**Drilled By:**
Site Services Drilling, LLC  
**Total Depth (feet):** 42  
**Water Level (feet):**  
**After Drilling:** 28'  
**Hours After:** 21  
**Date Started:** 8/7/2017  
**Date Completed:** 8/7/2017
Appendix B

Geotechnical Soil Testing Results and Chain of Custody Records
December 14, 2015

Anna Lundin  
HDR  
1670 Broadway, Suite 3400  
Denver, CO 80202

Subject: Laboratory Tests Results – Xcel Coal Combustion Residuals Rule Compliance Project, Comanche Power Station.

Dear Ms. Lundin:

This letter presents the results of laboratory tests performed on samples submitted for the subject project. The test results are presented on the attached Figures 1-3 and Table 1.

If there are any questions, please feel free to contact us.

Sincerely,

HEPWORTH-PAWLAK GEOTECHNICAL, Inc.

Cuong Vu, Ph.D., P.E.

Reviewed by: Arben Kalaveshi, P.E.

215333B (Comanche) xmittal.doc
GRAVEL: 0%  SAND: 14%  SILT / CLAY: 86%
BORING: MW4  Specific Gravity: 2.87
DEPTH: 9 feet  Porosity: 36.2%

### Sieve Analysis

<table>
<thead>
<tr>
<th>Sieve Size / Particle Diameter</th>
<th>Percent Passing</th>
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<tbody>
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<td>(1&quot;)</td>
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<tr>
<td>(3/4&quot;)</td>
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<tr>
<td>(1/2&quot;)</td>
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<tr>
<td>(3/8&quot;)</td>
<td>100</td>
</tr>
<tr>
<td>(#4)</td>
<td>100</td>
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<td>0.0028</td>
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<td>0.0012</td>
<td>29</td>
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FIG. 1
GRAVEL: 0%  SAND: 7%  SILT / CLAY: 93%
BORING: MW5  Specific Gravity: 2.78
DEPTH: 9 feet  Porosity: 39.2%

<table>
<thead>
<tr>
<th>Sieve Size / Particle Diameter</th>
<th>Percent Passing</th>
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<tbody>
<tr>
<td>(1”)</td>
<td>100</td>
</tr>
<tr>
<td>(3/4”)</td>
<td>100</td>
</tr>
<tr>
<td>(1/2”)</td>
<td>100</td>
</tr>
<tr>
<td>(3/8”)</td>
<td>100</td>
</tr>
<tr>
<td>(#4)</td>
<td>100</td>
</tr>
<tr>
<td>(#10)</td>
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<td>0.003</td>
<td>55</td>
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<tr>
<td>0.001</td>
<td>27</td>
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</table>
GRAVEL: 0%  
SAND: 8%  
SILT / CLAY: 92%  
BORING: MW6  
DEPTH: 9 feet  

Specific Gravity: 2.85  
Porosity: 35.4%
TABLE 1
SUMMARY OF LABORATORY TEST RESULTS

<table>
<thead>
<tr>
<th>SAMPLE LOCATION</th>
<th>NATURAL MOISTURE CONTENT (%)</th>
<th>NATURAL DRY UNIT WEIGHT (PCF)</th>
<th>GRADATION</th>
<th>SPECIFIC GRAVITY</th>
<th>POROSITY (%)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>BORING DEPTH (feet)</td>
<td></td>
<td>GRAVEL (%)</td>
<td>SAND (%)</td>
<td>SILT &amp; CLAY (%)</td>
</tr>
<tr>
<td>MW4</td>
<td>9</td>
<td>17.2</td>
<td>0</td>
<td>14</td>
<td>86</td>
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<tr>
<td>MW5</td>
<td>9</td>
<td>18.9</td>
<td>0</td>
<td>7</td>
<td>93</td>
</tr>
<tr>
<td>MW6</td>
<td>9</td>
<td>17.4</td>
<td>0</td>
<td>8</td>
<td>92</td>
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</tbody>
</table>
Appendix C
Well Construction Diagrams
Protective Steel Casing w/Lock
3.625 ft.
0 ft.
Ground Surface
Protective Steel Casing
Bottom of Steel Surface Casing
Top of Well Screen
2-in. Sch. 40 PVC Well Screen
w/ 0.010-in. Slots
#10/20 Washed Silica Sand Filter Pack
23.4 ft.
2-in. Sch. 40 PVC Casing
Bentonite Grout
Bottom of Well Screen
Bottom of Sand Filter Pack
Bottom of Well
Bottom of Sand Filter Pack
Bottom of Well
Bottom of Borehole

Constructed: 11/10/2015
Drilled By: HP Geotech
PVC Casing EL: 4812.47 ft amsl
Water EL: 4789.67 ft amsl (December 2015)

Monitoring Well Construction Diagram
W-4
Comanche Station
Xcel Energy
Protective Steel Casing w/Lock
3.829 ft.
0 ft.
Ground Surface

Protective Steel Casing

Bottom of Steel Surface Casing

Bentonite Grout

Top of Sand Filter Pack

Top of Well Screen

2-in. Sch. 40 PVC Well Screen
w/ 0.010-in. Slots

Bottom of Well Screen

#10/20 Washed Silica Sand Filter Pack

Bottom of Sand Filter Pack

Bottom of Sand Filter Pack

2-in. Sch. 40 PVC Casing

23.5 ft.

2-in. Sch. 40 PVC Casing

Bentonite Grout

Bottom of Well

Bottom of Borehole

8 in.

25

23.5

16

13.5

Monitoring Well Construction Diagram

W-5

Comanche Station

Xcel Energy

Constructed: 11/9/2015
Drilled By: HP Geotech
PVC Casing EL: 4807.46 ft amsl
Water EL: 4795.13 ft amsl (December 2015)
Monitoring Well Construction Diagram

W-6
Comanche Station
Xcel Energy

Protected Steel Casing w/Lock

Protective Steel Casing
Bentonite Grout

2-in. Sch. 40 PVC Well Screen
w/ 0.010-in. Slots

#10/20 Washed Silica Sand Filter Pack

2-in. Sch. 40 PVC Casing
Bentonite Grout

Ground Surface

3.90 ft.

0 ft.

Top of Sand Filter Pack

Bottom of Steel Surface Casing

Top of Well Screen

Bottom of Well Screen

Bottom of Sand Filter Pack

Bottom of Sump

Bottom of Borehole

Constructed: 11/11/2015
Drilled By: HP Geotech
PVC Casing EL: 4811.89 ft amsl
Water EL: 4796.51 ft amsl (December 2015)
Monitoring Well Construction Diagram

MW-5
Comanche Station
Xcel Energy

Constructed: 08/08/2017
Drilled By: Site Services Drilling, LLC
PVC Casing EL: 4806.97 ft amsl
Water EL: 4779.30 ft amsl (August 2017)
Appendix D
State Well Permits
OFFICE OF THE STATE ENGINEER
COLORADO DIVISION OF WATER RESOURCES
618 Centennial Blvd., 1313 Sherman St., Denver, Colorado 80203
(303) 866-3581

WELL PERMIT NUMBER 299843
DIV. 2 WD 15 DES. BASIN MD

APPLICANT
PUBLIC SERVICE COMPANY OF COLORADO
2005 LIME RD
PUEBLO, CO 81006-
(303) 571-7340

APPROVED WELL LOCATION
PUEBLO COUNTY
NE 1/4 SE 1/4 Section 20
Township 21 S Range 64 W Sixth P.M.

DISTANCES FROM SECTION LINES
1961 Ft. from South Section Line
978 Ft. from East Section Line

UTM COORDINATES (Meters, Zone 13, NAD83)
Easting: 537307 Northing: 4228492

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT
CONDITIONS OF APPROVAL

1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of this permit does not ensure that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.

2) The construction of this well shall be in compliance with the Water Well Construction Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 18.

3) Approved pursuant to CRS 37-92-602(3)(b)(I) for uses as described in CRS 37-92-602(1)(f). Use of this well is limited to monitoring water levels and/or water quality sampling.

4) Approved for the use of an existing well known as W-4.

5) This well must be equipped with a locking cap or seal to prevent well contamination or possible hazards as an open well. The well must be kept capped and locked at all times except during sampling or measuring.

6) Records of water level measurements and water quality analyses shall be maintained by the well owner and submitted to the Division of Water Resources upon request.

7) Upon conclusion of the monitoring program the well owner shall plug this well in accordance with Rule 16 of the Water Well Construction Rules. A Well Abandonment Report must be completed and submitted to the Division of Water Resources within 60 days of plugging.

8) The owner shall mark the well in a conspicuous place with the well permit number and name of aquifer as appropriate, and shall take necessary means and precautions to preserve these markings.

9) This well must have been constructed by or under the supervision of a licensed well driller or other authorized individual according to the Water Well Construction Rules.

10) This well must be located not more than 200 feet from the location specified on this permit.

NOTE: Issuance of this permit does not guarantee that this well can be converted to a production well under a future permit. Additionally, pursuant to Rule 14.2 of the Water Well Construction Rules (2 CCR 402-2), monitoring holes constructed pursuant to a monitoring hole notice shall not be converted to a production well. (Upon obtaining a permit from the State Engineer, a monitoring hole may be converted to a monitoring well, recovery well for remediation of the aquifer, or a dewatering system for dewatering the aquifer.)

NOTICE: This permit has been approved subject to the following changes: The distances from section lines, quarter/quarter, quarter, Section, Township, Range and P.M. were determined from UTM coordinate values provided with the permit application. You are hereby notified that you have the right to appeal the issuance of this permit, by filing a written request with this office within sixty (60) days of the date of issuance, pursuant to the State Administrative Procedures Act. (See Section 24-4-104 through 108, C.R.S.)

APPROVED
GAD
Dick Wolfa by
State Engineer

Receipt No. 3672803A DATE ISSUED 01-08-2016
By EXPIRATION DATE N/A
ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT

CONDITIONS OF APPROVAL

1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of this permit does not ensure that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.

2) The construction of this well shall be in compliance with the Water Well Construction Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 16.

3) Approved pursuant to CRS 37-92-602(3)(b)(I) for uses as described in CRS 37-92-602(1)(I). Use of this well is limited to monitoring water levels and/or water quality sampling.

4) Approved for the use of an existing well known as W-5.

5) This well must be equipped with a locking cap or seal to prevent well contamination or possible hazards as an open well. The well must be kept capped and locked at all times except during sampling or measuring.

6) Records of water level measurements and water quality analyses shall be maintained by the well owner and submitted to the Division of Water Resources upon request.

7) Upon conclusion of the monitoring program the well owner shall plug this well in accordance with Rule 16 of the Water Well Construction Rules. A Well Abandonment Report must be completed and submitted to the Division of Water Resources within 60 days of plugging.

8) The owner shall mark the well in a conspicuous place with the well permit number and name of aquifer as appropriate, and shall take necessary means and precautions to preserve these markings.

9) This well must have been constructed by or under the supervision of a licensed well driller or other authorized individual according to the Water Well Construction Rules.

10) This well must be located not more than 200 feet from the location specified on this permit.

NOTE: Issuance of this permit does not guarantee that this well can be converted to a production well under a future permit. Additionally, pursuant to Rule 14.2 of the Water Well Construction Rules (2 CCR 402-2), monitoring holes constructed pursuant to a monitoring hole notice shall not be converted to a production well. (Upon obtaining a permit from the State Engineer, a monitoring hole may be converted to a monitoring well, recovery well for remediation of the aquifer, or a dewatering system for dewatering the aquifer.)

NOTICE: This permit has been approved subject to the following changes: The distances from section lines, quarter/quarter, quarter, Section, Township, Range and P.M. were determined from UTM coordinate values provided with the permit application. You are hereby notified that you have the right to appeal the issuance of this permit, by filing a written request with this office within sixty (60) days of the date of issuance, pursuant to the State Administrative Procedures Act. (See Section 24-4-104 through 106, C.R.S.)
APPLICANT

PUBLIC SERVICE COMPANY OF COLORADO
2005 LIME RD
PUEBLO, CO 81006-

(303) 571-7340

PERMIT TO USE AN EXISTING WELL

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT

CONDITIONS OF APPROVAL

1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of this permit does not ensure that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.

2) The construction of this well shall be in compliance with the Water Well Construction Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 16.

3) Approved pursuant to CRS 37-92-602(3)(b)(I) for uses as described in CRS 37-92-602(1)(I). Use of this well is limited to monitoring water levels and/or water quality sampling.

4) Approved for the use of an existing well known as W-6.

5) This well must be equipped with a locking cap or seal to prevent well contamination or possible hazards as an open well. The well must be kept capped and locked at all times except during sampling or measuring.

6) Records of water level measurements and water quality analyses shall be maintained by the well owner and submitted to the Division of Water Resources upon request.

7) Upon conclusion of the monitoring program the well owner shall plug this well in accordance with Rule 16 of the Water Well Construction Rules. A Well Abandonment Report must be completed and submitted to the Division of Water Resources within 60 days of plugging.

8) The owner shall mark the well in a conspicuous place with the well permit number and name of aquifer as appropriate, and shall take necessary means and precautions to preserve these markings.

9) This well must have been constructed by or under the supervision of a licensed well driller or other authorized individual according to the Water Well Construction Rules.

10) This well must be located not more than 200 feet from the location specified on this permit.

NOTE: Issuance of this permit does not guarantee that this well can be converted to a production well under a future permit. Additionally, pursuant to Rule 14.2 of the Water Well Construction Rules (2 CCR 402-2), monitoring holes constructed pursuant to a monitoring hole notice shall not be converted to a production well. (Upon obtaining a permit from the State Engineer, a monitoring hole may be converted to a monitoring well, recovery well for remediation of the aquifer, or a dewatering system for dewatering the aquifer.)

NOTICE: This permit has been approved subject to the following changes: The distances from section lines, quarter/quarter, quarter, Section, Township, Range and P.M. were determined from UTM coordinate values provided with the permit application. You are hereby notified that you have the right to appeal the issuance of this permit, by filing a written request with this office within sixty (60) days of the date of issuance, pursuant to the State Administrative Procedures Act. (See Section 24-4-104 through 108, C.R.S.)

APPROVED
GAD

State Engineer

Receipt No. 3672803C DATE ISSUED 01-08-2016

EXPIRATION DATE N/A
NOTICE OF INTENT TO CONSTRUCT MONITORING HOLE(S)
Please type or print legibly in black or blue ink or file online @ dwrpermitsonline@state.co.us
COLORADO DIVISION OF WATER RESOURCES-1313 SHERMAN ST-STE 821-DENVER-CO-80206
PHONE: 303-866-3581—FAX: 303-866-3586 WEB: www.waterr.state.co.us

Well Owner Name(s): Public Service Company of Colorado
Address: 6198 Franklin St., Denver, CO 80216
Phone (area code & no.): 303-571-7340
Landowner's Name: Xcel Energy - PSCo

Location: NW ¼ SW ¼, Section 20
Township 21 N R 64 E PM, Range 64 E, Town of Pueblo
County: Pueblo County
Subdivision: ___________________________
Lot: _______ Block: _______ Filing Unit: _______
Site/Property Address: 2005 Lime Rd, Pueblo, CO 81006
GPS Location In UTM format (optional):
Set GPS unit to true north, datum NAD83, and use meters for the distance units.  In Zone 12 or Zone 13.
Easting: __________ Northing: __________

# of Monitoring Hole(s) to be constructed: __________
Estimated Depth: __________, Aquifer: __________
Purpose of Monitoring Hole(s): Groundwater monitoring

Anticipated Date of Construction (mm/dd/yyyy): __________
Date Notice Submitted (mm/dd/yyyy): __________
(Must be at least 3 days prior to construction)

ACKNOWLEDGEMENT FROM STATE ENGINEER'S OFFICE
FOR OFFICE USE ONLY

569 78 - MH PROCESSED BY 11/17
Div. 2 WD 15 BAS MD DATE ACKNOWLEDGED 11/17

CONDITIONS OF MONITORING HOLE ACKNOWLEDGEMENT
A COPY OF THE WRITTEN NOTICE OR ACKNOWLEDGEMENT SHALL BE AVAILABLE AT THE DRILLING SITE.

1) Notice was provided to the State Engineer at least 3 days prior to construction of monitoring & observation hole(s).
2) Construction of the hole(s) must be completed within 90 days of the date notice was given to the State Engineer. Testing and/or pumping shall not exceed a total of 200 hours unless prior written approval is obtained from the State Engineer. Water diverted during testing shall not be used for beneficial purposes. The owner of the hole(s) is responsible for obtaining permits and complying with all rules and regulations pertaining to the discharge of fluids produced during testing.
3) All work must comply with the Water Well Construction Rules, 2 CCR 402-2. Minimum construction standards must be met or a variance obtained. Standard permit application and work report forms, including online filing instructions, are found on the DWR website at http://www.waterr.state.co.us. Well Construction and Test Reports (GWS-31) must be completed for each hole drilled. The licensed contractor or authorized individual must submit the completed forms to this office within 60 days of monitoring hole completion.
4) Unless a well permit is obtained, or variance approved, the hole(s) must be plugged and sealed within one (1) year after construction. An Abandonment Report (form GWS-9) must be submitted within 60 days of plugging & sealing. The above MH acknowledgement number, owner's structure name, and owner's name and address must be provided on all well permit application(s), well construction and abandonment reports.
5) The owner of the hole(s) shall maintain records of water quality testing and submit this data to the State Engineer upon request.
6) A MONITORING HOLE CANNOT BE CONVERTED TO A PRODUCTION WATER WELL, except for purposes of remediation (recovery) or as a permanent dewatering system, if constructed in accordance with the Water Well Construction Rules and policies of the State Engineer.
7) IF HOLES WILL NOT BE CONSTRUCTED UNDER THIS NOTICE WITHIN 90 DAYS, PLEASE WRITE, "NO HOLES CONSTRUCTED" ON A COPY OF THE ACKNOWLEDGED NOTICE WITH THE FILE NUMBER AND FAX THE COPY TO THE DIVISION OF WATER RESOURCES.

THIS ACKNOWLEDGEMENT OF NOTICE DOES NOT INDICATE THAT WELL PERMIT(S) CAN BE APPROVED.

(Use above space for labels or additional conditions as needed)
NOTICE OF INTENT TO CONSTRUCT MONITORING HOLE(S)

Please type or print legibly in black or blue ink or file online @ dwrpermitsonline@state.co.us
COLORADO DIVISION OF WATER RESOURCES-1313 SHERMAN ST-STE 821-DENVER-CO-80203
PHONE: 303-866-3581—FAX: 303-866-3589 WEB: wwwwater.state.co.us

Well Owner Name(s): Public Service Company of Colorado
Address: 6198 Franklin St, Denver, CO 80216
Phone (area code & no.): 303-571-7340

Landowner's Name: Xcel Energy - PSCo

Please check one and complete as indicated including contact info:
☐ Water Well Driller Licensed in Colorado - Lic. No. ______________
☐ Professional Engineer Registered in Colorado – Reg. No. ______________
☐ Professional Geologist per CRS 34-1-201(3)
☐ Other - anyone directly employed by or under the supervision of a licensed driller, registered professional engineer or professional geologist

Contact / Company: Richard Walther, PG / HDR
Address 1670 Broadway
City, State & Zip Denver, CO 80202
Phone (303)318-6303 Fax

Print Name: Richard Walther
Sign or enter full name here: Richard Walther

Location: SW ¼ SW ¼ Section 20
Township 21 N R S, Range 64 E T 16 W, 0° 06 PM
County Pueblo County
Subdivision:
Lot: _______ Block: _______ Filing Unit: _______
Site/Property Address 2005 Lime Rd, Pueblo, CO 81006
GPS Location in UTM format (optional):
Set GPS unit to true north, datum NAD83, and use meters for the distance units, □ Zone 12 or □ Zone 13.
Eastings _______ Northing _______

# of Monitoring Hole(s) to be constructed: 1
Estimated Depth 30 Ft., Aquifer NA
Purpose of Monitoring Hole(s) Groundwater monitoring

Anticipated Date of Construction (mm/dd/yyyy): 08/07/2017
Date Notice Submitted (mm/dd/yyyy): 07/31/2017
(Must be at least 3 days prior to construction)

ACKNOWLEDGEMENT FROM STATE ENGINEER'S OFFICE
FOR OFFICE USE ONLY

56979 - MH PROCESSED BY
Div. 2 WD 15 BAS MD DATE ACKNOWLEDGED 8-1-17

CONDITIONS OF MONITORING HOLE ACKNOWLEDGEMENT

A COPY OF THE WRITTEN NOTICE OR ACKNOWLEDGEMENT SHALL BE AVAILABLE AT THE DRILLING SITE.

1) Notice was provided to the State Engineer at least 3 days prior to construction of monitoring & observation hole(s).
2) Construction of the hole(s) must be completed within 90 days of the date notice was given to the State Engineer. Testing and/or pumping shall not exceed a total of 200 hours unless prior written approval is obtained from the State Engineer. Water diverted during testing shall not be used for beneficial purposes. The owner of the hole(s) is responsible for obtaining permit(s) and complying with all rules and regulations pertaining to the discharge of fluids produced during testing.
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(Use above space for labels or additional conditions as needed)