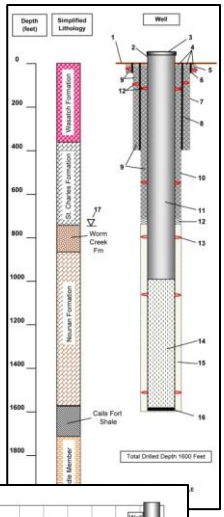
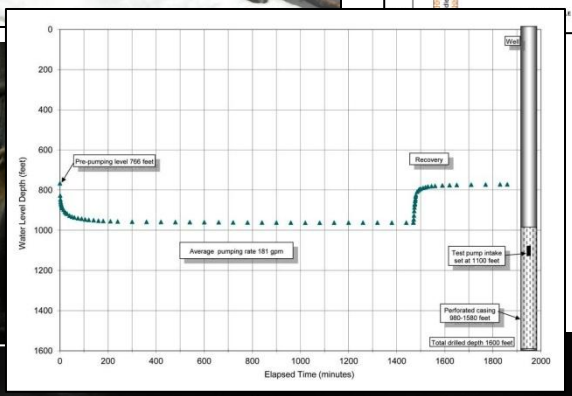
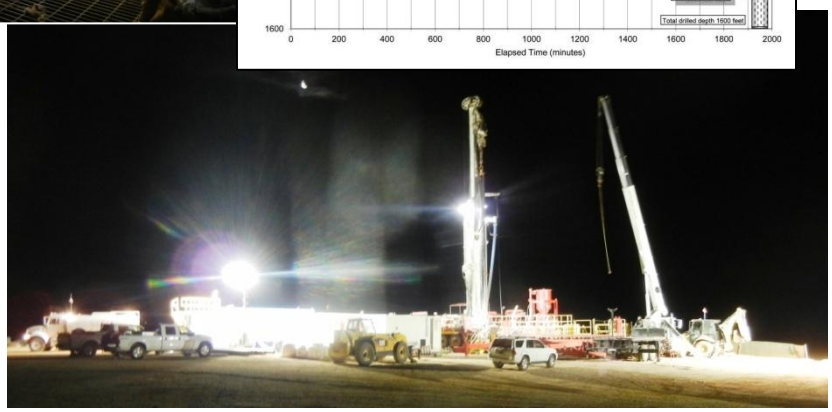
WELL DRILLING, CONSTRUCTION AND TESTING REPORT
HIDDEN LAKE WELL (WS008)
POWDER MOUNTAIN WATER & SEWER IMPROVMENT DISTRICT (PMWSID)
PUBLIC WATER SUPPLY SYSTEM NO. 29028
WEBER COUNTY, UTAH







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LOUGHLIN WATER ASSOCIATES LLC

Prepared for:

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Holladay, Utah 84117

December 2013

LOUGHLIN
WATER ASSOCIATES ▲ LLC

December 17, 2013

Utah Division of Drinking Water
Attn: Bob Hart, PE
P.O. Box 144830
Salt Lake City, Utah 84114-4830

Subject: **Transmittal of Well Construction Report**
Hidden Lake Well (WS008), DDW File #9428
Powder Mountain Water & Sewer Improvement District (PMWSID)
Utah Public Water Supply System No. 29028
Weber County, Utah

Dear Bob:

Please find enclosed our report summarizing the drilling, construction and testing of the Hidden Lake Well at Powder Mountain. This report includes: (1) a copy of the Well Driller's Report, (2) a copy of the grout seal certification letter, (3) the pumping test data, including pumping rate, pumping water level, and drawdown along with graphical presentations of the data, and (4) a copies of the chemical analysis required for a new public drinking water well. Unfortunately, radium analysis are not available at this time but will be sent to you as soon as we received them; the radium results are expected to be received on December 26, 2013.

If you have any questions or need more information, please do not hesitate to call us at (435) 649-4005 (office) or George at (435) 659-1753 (mobile).

Loughlin Water Associates, LLC

George W. Condrat, P.G., P.E.
Senior Engineer

William D. Loughlin, P.G.
Manager, Principal Hydrogeologist

Enclosure

cc: Ying-Ying Macauley - DDW
Russ Watts – Watts Enterprises
Evan Miller – PMWSID

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WELL DRILLING, CONSTRUCTION AND TESTING REPORT
HIDDEN LAKE WELL (WS008), DDW FILE #9428
POWDER MOUNTAIN WATER & SEWER IMPROVEMENT DISTRICT (PMWSID)
PUBLIC WATER SUPPLY SYSTEM NO. 29028
WEBER COUNTY, UTAH

Prepared for:

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c/o Watts Enterprises, Inc.
Attention; Russ Watts
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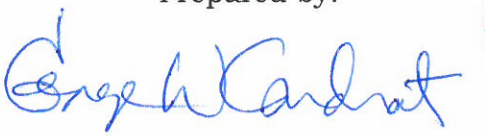
Prepared by:



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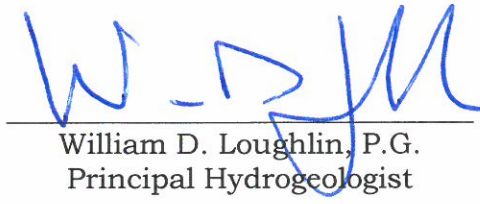

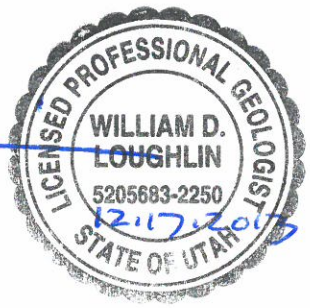

William D. Loughlin, P.G.
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Date: December 17, 2013

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EXECUTIVE SUMMARY

This report summarizes the drilling, construction and testing of the Hidden Lake Well (the well), including information required by the Utah Division of Drinking Water (DDW) for compliance with Utah Administrative Code (UAC) R309-515-6(5)(c). The Hidden Lake Well will be a new water source for Powder Mountain Water & Sewer Improvement District (PMSWID), located in Weber County, Utah. PMWSID is Utah Division of Drinking Water (DDW) Public Water System (PWS) No. 29028, and is currently classified as a transient non-community water system. The Hidden Lake Well is DDW Source WS008. Figure 1 shows the location of Powder Mountain. Figure 2 presents a topographic map of the area including the location of the Hidden Lake Well.

Loughlin Water Associates, LLC (Loughlin Water) prepared technical specifications and a Preliminary Evaluation Report (PER) for the well that were approved by the DDW in accordance with UAC R309-515-6(4). Appendix A provides a copy of the DDW plan approval. The Utah Division of Water Rights (DWRi) also known as "The Office of the State Engineer" or "The State Engineer" issued a start card and authorized construction of the well under water right E4715 (35-11995) (see Appendix B).

Drilling of the well began on July 23, 2013, and rig development finished on August 24. Well development by pumping began on October 7 and aquifer pump testing was completed on November 12, 2013. The well is completed in the Nounan Formation of Cambrian age. Table 1 and Figure 3 summarize well completion details. Table 2 summarizes lithologies encountered in the borehole. Copies of the Well Driller's Report, geophysical logs, and grout seal certification letter are provided in Appendices C, D, and E, respectively.

A constant-rate pumping test was performed on November 7-8, 2013, at an average rate of about 181 gpm. The pre-pumping water level was 764 feet below ground level. The pumping water level was about 960 feet (drawdown of 196 feet) at the end of the constant-rate test on November 8, 2013. Pumping test data are presented in Appendix F and summarized on Figures 4 through 6.

Water quality samples were collected at the end of the constant-rate pumping test and analyzed for the parameters listed in UAC R309-515-4(5) for a non-transient, community system new source sample (although PMWSID is currently classified a transient non-community water system), plus total coliform, E. coli bacteria, and iron bacteria.

Total dissolved solids (TDS) of the water sample were 244 milligrams per liter (mg/L). The dominant ions were calcium, magnesium and bicarbonate. pH, at 7.5 units, was within the secondary drinking water standard range of 6.5 to 8.5 units. The Langlier Index was +0.18, which indicates the water is non-corrosive. Total coliform, E. Coli and iron bacteria were absent in the water sample, which was collected before the well was disinfected.

The sample collected at the end of the 24-hour constant-rate test had a laboratory reported turbidity of 15 NTU, which exceeds the primary drinking water standard of 5

NTU. The iron concentration was 0.39 mg/L, which exceeds the secondary drinking water standard of 0.3 mg/L. The aluminum concentration was 0.4 mg/L, which exceeds the secondary drinking water standard of 0.2 mg/L. We believe that with further well development, turbidity will be within drinking water limits. The elevated iron and aluminum concentrations are likely due to the elevated turbidity. As indicated in Table 4 and Appendix G, no other primary or secondary drinking water standards were exceeded.

In order to further evaluate water quality with time, the well was pumped an additional 21 hours on November 11 to 12, 2013, at an average rate of 112 gpm. Chemtech-Ford Laboratory analyzed the sample collected at the end of the pumping period for turbidity and primary, secondary and additional metals. Table 4 summarizes analytical results and Appendix G provides copies of laboratory reports and chain-of-custody forms. Turbidity of the sample was 2.2 NTU, which is within the primary drinking water standard. The iron concentration was 0.10 mg/L and aluminum was 0.2 mg/L; these concentrations are at or within secondary drinking water standards. No other primary or secondary drinking water standards were exceeded. We expect that with further well development, water from the well will consistently meet turbidity and all other drinking water standards.

The contractor disinfected the well on November 12, 2013, following the pumping tests and water sample collection.

Evaluation of the pumping test data suggests the well can be equipped to pump at up to about 180 gpm, which is the same rate as the constant-rate pumping test. We recommend further development of the well before placing the well in service. We recommend developing the well using a dual swabbing system fitted with a deep-set pump. If feasible, equipping the well with a smaller-yielding permanent pump or variable frequency drive (VFD) would reduce the frequency that the pump would turn on and off, and could improve pumping efficiency. We recommend that the pump be set above the top of the slotted casing at a depth of about 980 feet or above. We recommend that the well system be equipped with a pump-to-waste device that will allow flushing the well at the start of the operating season and discharge of turbid water, if any, at the start of each pumping cycle. The long-term yield of the well should be assessed based on monitoring the production and water levels in the well to determine aquifer boundary and/or seasonal effects. Additional recommendations are included.

DIVISION OF DRINKING WATER REQUIRED INFORMATION

The following appendices provide information required by the DDW for compliance with UAC R309-515-6(5)(c) and supplementary well construction information:

- Plan Approval – Appendix A
- Start Card – Appendix B
- Well Driller's Report for Well – Appendix C
- Geophysical Logs – Appendix D

- Grout Seal Certification Letter – Appendix E
- Pumping Test Data – Appendix F
- Performance Curve for Test Pump – Appendix G
- Analytical Laboratory Report – Appendix H (awaiting radium analyses)

This report discusses the information provided in these appendices. Plans and specifications to equip and connect the Hidden Lake Well will be prepared and submitted to the DDW under separate cover by others.

WELL DRILLING, LOGGING, AND CONSTRUCTION OF HIDDEN LAKE WELL

WELL LOCATION

The approximate location of the Hidden Lake PWS Well is:

- Northing 3,658,232 feet; easting 1,568,084 feet (State Plane North Zone coordinate, NAD83);
- North 1437 feet, east 1548 feet from the south quarter corner of Section 6, Township 7 North, Range 2 East, Salt Lake Base and Meridian (SLB&M); or
- Longitude 111.763540267 degrees west; Latitude 41.3688600368 degrees north.

Loughlin Water Associates, LLC (Loughlin Water) staff estimated the well location by using a compass and tape and measuring 25 feet from a point surveyed by Adam Allen of NV5, Inc. Adam Allen reported the location of the point in State Plane coordinates. Loughlin Water staff converted the State Plane coordinates using the Utah State Engineer's location converter. The approximate well head elevation is 8904 feet, based on a site contour map prepared by Adam Allen of NV5, Inc.

DRILLING AND WELL CONSTRUCTION

Figure 2 shows, and Table 1 describes, the location of the Hidden Lake Well. National EWP, Utah-licensed Water Well Driller No. 527, drilled and constructed the well. Figure 3 shows an as-built diagram of the Hidden Lake Well.

National EWP:

- Drilled a 30-inch diameter borehole and installed 26-inch nominal diameter steel conductor casing to a depth of 40 feet using conventional mud rotary methods;
- Grouted the 26-inch diameter conductor casing from 40 feet to 10 feet in depth with neat cement; and sealed the borehole from 10 feet in depth to the surface with unhydrated bentonite in order to accommodate a future pitless adaptor;

- Drilled 24-inch diameter borehole from the base of the conductor casing (40 feet in depth) to 398 feet in depth;
- Installed 20-inch diameter steel surface casing from 398 feet to the surface; sealed the casing from 398 feet to 10 feet in depth with neat cement grout; and sealed the casing from 10 feet in depth to the surface with unhydrated bentonite;
- Drilled 19-inch diameter borehole from the base of the surface casing (398 feet in depth) to 1600 feet in depth;
- Installed 14-inch diameter inner casing and slotted casing from 1590 feet in depth to 2 feet above ground level; slotted casing extends from 980 to 1580 feet in depth; blank (unslotted) casing extends from the 2 feet above ground level to 980 feet and from 1580 to 1590 feet in depth; the casing is closed with a bull-nose bottom cap;
- Installed gravel pack from the bottom of the borehole to a depth of 779 feet in depth;
- Installed unhydrated bentonite from 779 to 759 feet, neat cement grout from 759 to 10 feet, and unhydrated bentonite from 10 feet in depth to ground level;
- Developed the well by swabbing and air-lifting; and
- Subcontracted Widdison Turbine Service LLC (Widdison) of Draper, Utah to (1) install a test pump, (2) conduct development and test pumping and (3) disinfect the well.

Table 1 summarizes, and Figure 3 illustrates, well construction. Appendix C presents a copy of the Well Driller's Report.

Loughlin Water staff observed well drilling, described drill cuttings, prepared the final well design, observed well construction and development, planned pumping tests, and collected water quality samples. Table 2 is a simplified lithologic descriptions prepared by Loughlin Water. Detailed lithologic sample descriptions are provided with the Well Driller's Report in Appendix C.

George W. Condrat, P.E., P.G., an authorized representative of the DDW, witnessed and certified the materials and installation of the grout seal installed around the conductor, surface and inner casings. A bentonite seal extends from the surface to a depth of about 10 feet to allow future installation of a pitless adaptor. Further details of the grouting procedure and grout seal are contained in the Well Seal Certification Letter, which is provided in Appendix E.

LITHOLOGIC LOG

As the well was drilled, National EWP collected drill cutting samples every 10 feet. Each sample was collected by compositing portions of the material returning up the borehole before discharge into the mud tank. Loughlin Water described the samples

and prepared the lithologic summary that is presented in Table 2 and the borehole lithologic log in Appendix C.

GEOPHYSICAL LOGS

Century Wireline Services of Tulsa, Oklahoma, geophysically logged the Hidden Lake Well on August 15, 2013, when the surface casing extended to 398 feet in depth and the 19-inch diameter open borehole extended to 1600 feet. Century Wireline Services ran the following logs: spontaneous-potential, short and long normal electrical resistance log (16- and 64-inch spacing), single point resistivity, natural gamma, 3-arm caliper, and gyroscopic deviation. Appendix D provides copies of the geophysical logs.

TEST FOR PLUMBNESS AND ALIGNMENT

As part of the geophysical logging, Century Wireline Services performed a gyroscopic deviation survey of the well when the surface casing extended to 398 feet in depth and the open borehole extended to 1600 feet. Appendix D provides a copy of the deviation survey. The survey results indicate that the Hidden Lake Well meets the plumbness and alignment requirements outlined in the Technical Specifications. A copy of the test information is contained in Appendix D.

National EWP also tested the well alignment by lowering a 40-foot long rigid apparatus (an alignment "dummy") into the inner casing from the top to the bottom of the completed well. The rigid frame of the dummy was 7-inch diameter dual tube drill pipe. The dummy had three rings located top, bottom and center on the rigid frame. The three rings had an outside diameter of 12.5 inches (½ inch less than the inside diameter of the inner casing). National EWP ran the dummy to the bottom of the well and it passed freely through the entire depth of well.

WELL DEVELOPMENT

AIR-LIFT DEVELOPMENT

National EWP developed the Hidden Lake Well by air-lifting using a dual swab from August 20 to 23, 2013. The swab tool consisted of two rubber swab flanges 7 feet apart on perforated 7-inch diameter drill pipe. The swab tool was typically run up and down over the drill pipe length (25 feet), alternately moving the pipe slowly then quickly. After reasonably reducing sand and turbidity over a 25-long section, National EWP added a drill rod and developed the next deeper 25-foot section.

PUMP DEVELOPMENT

Widdison Turbine Service LLC (Widdison) installed a submersible test pump in the well on October 7, 2013 and pumped to further develop the well. This test pump was an 11-stage Gould pump that had a capacity to pump about 330 gpm from 1000 feet,

270 gpm from 1100 feet, and 200 gpm from 1200 feet of head. The pump was powered by a 125 horse-power (HP) submersible motor and electrical generator fitted with a variable frequency drive (VFD). After pumping for a total of about 45 hours, the pump failed on October 14, 2013, caused by a thrust bearing failure in the motor. Widdison removed the pump and motor from the well.

Widdison installed a second pump and motor on October 22. The pump was a 13-stage Grundfos pump that had a capacity to pump 270 gpm from 1000 feet, 200 gpm from 1100 feet and 130 gpm from 1200 feet of head. The pump was powered by a 100 horse-power (HP) submersible motor and electrical generator fitted with a VFD. After pumping for a total of about 15 hours, the pump/electrical system unexpectedly shut down. Widdison pulled the pump and motor and determined that they were undamaged and in operational condition. After discussions with manufacturers of the components, Widdison concluded that the equipment problem was poor electrical power to the motor caused by long electrical wire distances from the VFD to the submersible motor. Widdison re-installed the pump and motor and operated them without the VFD. Widdison pumped the well an additional 27 hours prior to beginning the 24-hour constant-rate test.

Sand content of the water produced during well development are listed the Widdison's Test Pumping Report sheets in Appendix F. During the first seven days of development pumping, sand content was typically in the hundreds of parts per million (ppm). During the next four days of development pumping, sand content generally ranged from less than 1 to 50 ppm. Sand content on November 6, 2013 (the day before the constant-rate pumping test), ranged from 2 to 10 ppm.

PUMPING TESTS

Widdison installed and operated the test pumping system for development and testing the well during October and November 2013.

Widdison measured the pumping rate using a totalizing meter that had an instantaneous flow readout; totalizer measurements were checked using an orifice weir (3-inch diameter orifice in a 4-inch diameter pipe). The totalizer and orifice weir agreed within about 2 gpm. The pumping rate calculated from the totalizer readings divided by time are somewhat more accurate that those read from the instantaneous readout; totalizer readings and flow rate measurements are summarized on Tables F-1 and F-2 in Appendix F.

Widdison recorded water levels using a pressure transducer/data recorder and "by hand" using an electric water level probe during the pumping tests. The transducer showed a general response similar to the hand measurements but, unfortunately, the transducer readings had extreme short-term variations and inaccuracies that made the data unusable. Appendix F summarizes the water level measurements.

SPECIFIC CAPACITY EVALUATION

A formal step-rate pumping test was not performed because of constraints of operating the pumping system without a VFD and impending winter weather. However, pumping rate, drawdown and specific capacity data obtained during development pumping provided information from which to (1) select the maximum pumping rate for the constant-rate pumping test, (2) evaluate well and aquifer performance at different pumping rates, and (3) provide base-line data for evaluation of potential future changes in well efficiency.

Specific capacity is defined as gallons per minute [gpm] of production divided by feet of drawdown. According to Kelly et al. (1980), the specific capacity of an ideal, 100-percent efficient well in a confined aquifer will not decrease with increased pumping rate (at a given duration of pumping). The decrease in specific capacity indicates that turbulent flow occurs in the aquifer near the well bore and as water enters the well. The degree of turbulence increases with increasing pumping rates.

As expected, observed specific capacity decreased with increased pumping rate and increased pumping time. The following summarizes specific capacity of the well at several pumping rates and times:

Pumping Rate (gpm)	Duration of pumping (minutes)	Drawdown (feet)	Specific Capacity (gpm/ft)	Date
100	1240	101.08	0.99	11/12/2013
150	181	169.10	0.89	10/22/2013
150	190	170.53	0.88	10/24/2013
175	162	189.03	0.93	10/23/2013
175	190	176.83	0.99	11/6/2013
180	160	186.60	0.96	11/7/2013
180	480	193.01	0.93	11/7/2013
180	1440	196.21	0.92	11/7/2013
200	165	268.28	0.75	10/11/2013
200	480	332.64	0.60	10/11/2013
200	165	292.71	0.68	10/12/2013
200	420	343.25	0.58	10/12/2013

The data indicate that specific capacity decreases significantly at pumping rates greater than 180 gpm. The data also suggest that pumping improved the efficiency of the well with time as the well was developed.

CONSTANT-RATE PUMPING TEST

Appendix F provides the date, time, elapsed time, pumping rate, water level, drawdown, and other pumping test data for the constant-rate pumping test. Appendix G provides a copy of the performance curve for the pump used for the test.

Test pump information is summarized as follows:

Pump Manufacturer:	Grundfos
Pump Type:	8-inch diameter submersible
Pump Model:	385S
Number of stages:	13
Horsepower:	100 HP
Pump Setting Depth:	1100 feet (depth of intake)
Pump Column Diameter:	4-inch

Widdison conducted a constant-rate pumping test of the well on November 7 to 8, 2013. The well was not pumped for a period of about 14 hours prior to the start of the constant-rate test. The pre-pumping water level was 766.26 feet from top of PVC drawdown tube (about 2.04 feet above ground level).

Figure 4 is a plot of pumping water level versus elapsed time since pumping started. Figure 4 shows a diagram of the well to help relate pumping water level to the slotted intervals and the pump setting. Figure 5 is a plot of drawdown versus log-time since pumping started. We calculated a "*critical time*" of about 90 minutes using the method of Shafer (1978). Pumping water levels prior to 90 minutes are significantly affected by casing storage and do not accurately reflect aquifer response.

Widdison pumped the well during the test at an average rate of 181 gpm for 1470 minutes (about 24.5 hours). Pumping drew the water level in the well down 195.6 feet to a depth of 961.9 feet. After pumping stopped, Widdison measured the water level during the recovery period for 75 hours. The water level rose (recovered) to a depth of 771.6 feet (within 5.2 feet of the pre-pumping water level of 766.26 feet below top of the measurement tube) within 6 hours. The water level rose (recovered) to one foot above the pre-pumping water level after 75 hours (see Table F-1 in Appendix F).

We evaluated the pumping test data using the constant discharge method developed by Cooper and Jacob (1946) and described in Lohman (1972). Figure 5 summarizes the evaluation of the pumping portion of the test for the Hidden Lake Well. The semi-log graph on Figure 5 shows several distinct straight-line portions and a decreasing slope of the drawdown with time. The decreasing slope is indicative of the drawdown cone intercepting recharge boundaries or zones of higher transmissivity in the aquifer. Analysis of transmissivity under these conditions is generally unreliable because standard method assumptions are not met where recharge boundaries effect the drawdown curve. However, the analysis indicates a transmissivity on the order of 700 feet squared per day (ft^2/day) at the well.

We evaluated water level recovery as shown on Figure 6, which presents a graph of residual drawdown versus the ratio of time since pumping started/time since pumping ceased (t/t'). Figure 6 also indicates the effects of a recharge boundary. A transmissivity of about 490 ft^2/day is calculated using the slope ($\triangle$s) of straight line part of the data between t/t' equal to 5 to 25. In theory, for a well in a uniform aquifer of infinite extent and other standard assumptions, at a residual drawdown of 0 feet

(fully recovered), the ratio of t/t' approaches 1. As shown on Figure 6, the projection is relatively close to the zero point at a ratio of 1.

WATER QUALITY

We assessed water quality through (1) monitoring of "*field*" parameters during pump testing and (2) the collection of samples at the end of the constant-rate pumping test for laboratory analyses.

FIELD MONITORING OF WATER QUALITY

Table 3 summarizes specific conductance, temperature, pH, turbidity and sand content measurements during the constant-rate test. Conductivity, temperature and pH were relatively steady and averaged 371 microsiemens per centimeter (µS/cm), 42.8 degrees Fahrenheit (°F), and 8.0 units, respectively.

The initial measurement of turbidity was 113 Nephelometric Turbidity Units (NTU); turbidity decreased through the 24-hour test period to 9.6 NTU. Sand content ranged from 33 to 98 ppm during the first hour of the test, and decreased through the test period to about 2 at the end of the test. A sample was collected for laboratory analysis at the end of the 24-hour constant-rate test period (see discussion in the following section of this report).

In order to further evaluate water quality with time, the well was pumped an additional 21 hours on November 11 to 12, 2013, at an average rate of 112 gpm. Sand content during the initial three hours of pumping was 7.2 ppm. Sand content during the remaining period of pumping was about 0 ppm. Field measurement of turbidity at the end of the pumping period was 3.9 NTU. Loughlin Water staff collected a sample for laboratory analysis at the end of this pumping period (see discussion in the following section of this report).

LABORATORY ANALYSIS OF WATER QUALITY SAMPLES

Loughlin Water staff collected water quality samples at the end of the 24-hour pumping period. Collected samples were analyzed for (1) constituents required for a non-transient, community new drinking water source in accordance UAC R309-515-4(5), (2) total coliform and E. coli bacteria, and (3) iron bacteria. Table 4 summarizes analytical results; Appendix G provides copies of laboratory reports and chain-of-custody forms.

Table 4 summarizes and compares analytical results to Utah Drinking Water Standards. The drinking water standards, as defined in UAC R309-200, are divided into two groups:

- Primary Drinking Water Standards, or Maximum Contaminant Levels (MCLs), are the "*Maximum permissible level of a contaminant in water which is delivered to any user of a Public Water System.*"

- Secondary Drinking Water Standards, or Secondary MCLs, which deal with substances that "*affect the aesthetic quality of drinking water. They are presented as recommended limits or ranges and are not grounds for rejection. The taste of the water may be unpleasant and the usefulness of the water may be impaired if these standards are significantly exceeded.*"

Constituents Required By UAC R309-515-4(5) Plus Coliform and E. Coli Bacteria

Chemtech-Ford Analytical Laboratories of Salt Lake City, Utah ("*Chemtech-Ford*"), a Utah-certified laboratory, analyzed the sample for the new source constituents, including Primary and Secondary Inorganic Contaminants, copper, lead, turbidity, and the Additional Chemicals required for new drinking water sources by UAC R309-515-4(5). *Chemtech-Ford* also analyzed the sample for coliform and E. coli bacteria. Appendix G provides copies of the laboratory reports. Unfortunately, radium analytical results are not available at this time but will be sent as soon as we receive them. The radium results are expected to be received on December 26, 2013.

Loughlin Water staff collected the sample for laboratory analysis at the end of the 24-hour constant-rate test period. Total dissolved solids (TDS) of the water sample were 244 milligrams per liter (mg/L). The dominant ions were calcium, magnesium and bicarbonate. The calcium concentration was about 52 mg/L, magnesium 22 mg/L, sodium 6 mg/L, bicarbonate was 263 mg/L; chloride 3 mg/L, and sulfate 5 mg/L. The water is considered "very hard" with a reported hardness of 219 mg/L as $CaCO_3$.

pH, at 7.5 units, was within the secondary drinking water standard range of 6.5 to 8.5 units. The Langlier Index was +0.18, which indicates the water is non-corrosive.

Total coliform and E. Coli were absent in the water sample, which was collected before the well was disinfected.

The sample collected at the end of the 24-hour constant-rate test had a laboratory reported turbidity of 15 NTU, which exceeds the primary drinking water standard of 5 NTU. The iron concentration was 0.39 mg/L, which exceeds the secondary drinking water standard of 0.3 mg/L. The aluminum concentration was 0.4 mg/L, which exceeds the secondary drinking water standard of 0.2 mg/L. We believe that with further well development, turbidity will be within drinking water limits. The elevated iron and aluminum concentrations are likely due to the elevated turbidity. As indicated in Table 4 and Appendix G, no other primary or secondary drinking water standards were exceeded.

In order to further evaluate water quality with time, the well was pumped an additional 21 hours on November 11 to 12, 2013, at an average rate of 112 gpm. Chemtech-Ford Laboratory analyzed the sample collected at the end of the 21-hour pumping period for turbidity and primary/secondary and additional metals. Table 4 summarizes analytical results and Appendix G provides copies of laboratory reports and chain-of-custody forms. Turbidity of the sample was 2.2 NTU, which is within the primary drinking water standards. The iron concentration was 0.10 mg/L and aluminum was 0.2 mg/L; these concentrations are at or within secondary drinking water standards. No other primary or secondary drinking water standards were

exceeded. We expect that with further well development, water from the well will consistently meet turbidity and all other drinking water standards.

Iron Bacteria

Montana Environmental Laboratory of Kalispell, Montana, analyzed a sample for iron bacteria. As indicated in Table 4 and in the laboratory report in Appendix G, no iron bacteria were detected. Although none were detected, we recommend that the well be monitored on an annual basis for the presence of iron bacteria. If iron bacteria occur, then the need for and type of treatment process should be assessed.

WELL DISINFECTION

On November 12, following the pumping tests and water sample collection, Widdson disinfected the well in accordance with UAC R309-515-6(11), *Well Disinfection* and UAC R655-9.6.5, *Well Disinfection and Chlorination of Water*.

RECOMMENDED DISCHARGE RATE

According to the DDW in UAC R309-110, the "*desired design discharge rate*" is the:

> *"…rate selected for the permanent pump installed in a public drinking water well source. This pumping rate is selected by the water system owner or engineer and can match or be the same rate utilized during the constant rate pump test required by R309-515 and R309-600 to determine delineated protection zones. For consideration of the number of permanent residential connections or ERC's that a well source can support (see Safe Yield) the Division will consider 2/3 of the test pumping rate as the safe yield."*

Use of this "*two thirds*" rule is the first step in approximating the long-term yield of a new well. The second step is to monitor the pumping rate, water level, and water quality of the well on a long-term basis and, as appropriate, revise the pumping rate of the well.

The *"firm"* or "*safe*" yield is a groundwater resource concept originally employed to designate the rate at which water can be withdrawn from an aquifer without depleting the supply. Lohman (1972) redefined safe yield as the volume of groundwater that can be withdrawn "*…without getting into trouble.*" For the well, "*trouble*" could include:

- Excessively lowering the water level in the well;
- Adversely impacting water levels in or production from other wells or springs in the area;
- Producing from the well at a rate so much larger than the recharge to the aquifer such that water levels are permanently lowered around the well and water is mined from or permanent physical damage is done to the aquifer;
- Producing sandy or turbid water; and/or

- Causing degradation in the quality of water produced from the well.

Therefore, to avoid "*trouble*" we recommend the following:

- Further develop the well before placing the well in service. We recommend developing the well using a dual swabbing system fitted with a deep-set pump. This type of swabbing system is more efficient than conventional air-lift swabbing systems where water levels are deep. We believe use of a dual swabbing system will be more efficient and cost-effective than developing with the permanent pump.
- Equip the well to pump at not more than approximately 180 gpm, or as allowed by the DDW and DWRi. The water level recovers relatively quickly after pumping ceases. If feasible, equipping the well with a smaller yielding permanent pump or with a VFD would reduce the frequency that the pump would turn on and off, and could improve pumping efficiency.
- We recommend that the permanent pump intake be set above the top of the slotted casing, which is at a depth of about 980 feet, to preclude the water level from being lowered below the top of the slotted casing. Lowering the water below the slotted zone will cause cascading water in the well that has many adverse effects including promoting corrosion and biofouling.
- We recommend installing a shroud around the pump and motor to promote cooling of the motor.
- We recommend that the well system be equipped with a pump-to-waste device that will allow flushing the well at the start of the operating season and discharge turbid water, if any, at the start of each pumping cycle.
- If there is an extended period of non-use, thoroughly flush the well at the beginning of the new operating season.
- Beginning when the well is equipped and put into service, (1) measure and record the water level, pumping rate, and total production on a regular basis, (2) observe and record the cloudiness or turbidity of the produced water during pumping, and (3) measure and record the conductivity of the produced water on a quarterly basis.
- Monitor the pumping rates and water levels and (1) keep the pumping water level above the slotted casing and above the intake of the pump, (2) assess seasonal and long-term variation in water level and well yield, (3) evaluate the long-term capacity of the well, (4) evaluate pumping equipment behavior, (5) estimate the length of service time to schedule preventive maintenance or repairs, and (6) comply with water right requirements.
- Monitor the turbidity of the water and adjust the pumping rate as necessary to prevent the produced water from exceeding the MCL of 5 NTU. Note, however, that the well may produce turbid water on start up and then become clearer with pumping. The degree and length of time when turbid water is produced will likely decrease with time as the well is pumped and further development of the aquifer occurs. Pump water to waste that exceeds 5 NTU.

- Monitor the conductivity of the water to (1) identify changes in water quality; (2) assess the effect of long-term withdrawals on water quality; and (3) modify the pumping rate, if necessary.
- Monitor the well on an annual basis for the presence of iron bacteria.

PLANS AND SPECIFICATIONS TO EQUIP AND CONNECT WELL

Plans and specifications to equip and connect the Hidden Lake Well to the Powder Mountain water system will be prepared by others and submitted to the DDW under separate cover.

REFERENCES CITED

Cooper, H. H., Jr., and Jacob, C. E., 1946, *A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well Field History*: American Geophysical Union Transactions, vol. 27, no. 4, p. 526-534.

Lohman, S.W., 1972, *Ground-Water Hydraulics*: U.S. Geological Survey Professional Paper 708.

Loughlin Water Associates, LLC (Loughlin Water), 2013a, *Technical Specifications, Drilling, Construction and Testing of Hidden Lake Well (WS008), DDW File #9328, for Powder Mountain Water & Sewer Improvement District (PMWSID), Public Water Supply System No. 29028, Weber County, Utah*: consultant report dated August 13, 2013.

Loughlin Water Associates, LLC (Loughlin Water), 2013b, *Preliminary Evaluation Report (PER) for the Hidden Lake Well (WS008), DDW File #9225, for Powder Mountain Water & Sewer Improvement District (PMWSID), Public Water Supply System No. 29028, Weber County, Utah*: consultant report dated August 13, 2013.

Schafer, D.C., 1978, Casing Storage Can Affect Pumping Test Data: The Johnson Drillers' Journal, January – February, pp. 1-5.

Utah Department of Environmental Quality, Division of Drinking Water (DDW) 2006, Monitoring and Water Quality: Drinking Water Standards, UAC R309-200, September 4, 2009.

Table 1

Hidden Lake PWS Well Construction Summary

Well Name:	Hidden Lake Well	
Well Owner:	Powder Mountain Water and Sewer Improvement District	
Approximate Well Location: (see Figure 2)	North 1437 feet, east 1548 feet from the south quarter corner of Section 6, Township 7 North, Range 2 East, Salt Lake Base and Meridian (SLB&M).	
Ground Surface Elevation:	8904 feet, based on a site contour map prepared by Adam Allen of NV5, Inc.	
Drilled Depth: (see Appendix C)	1600 feet	
Static Water Level:	Approximately 765.23 feet below top of measuring point on 11/11/2013. Measuring point height 2.04 feet above ground.	
Summary Lithology (see Table 2 and Appendix C):	**Depth Interval**	**Predominant Lithology**
	0 - 15 feet:	Fill - gravel, boulders, clay and silt with some sand
	15 - 390 feet:	Wasatch Formation: unconsolidated to semi-consolidated clay, gravel, sand, conglomerate and sandstone
	390 - 690 feet:	St. Charles Formation: Dolomite with sandstone, siltstone and limestone
	690 - 830 feet:	Worm Creek Quartzite Member: Sandstone/quartzite,
	830 – 1590 feet:	Nounan Formation: Dolomite with some limestone and clay
	1590 – 1600 feet:	Calls Fort Shale Member: Dolomite and claystone
Borehole:	**Depth Interval**	**Borehole Diameter**
	0 - 40 feet:	30-inch
	40 - 398 feet:	24-inch
	398 - 1600 feet:	19-inch
Casing:	**Depth Interval**	**Blank Well Casing**
	0 - 40 feet:	26-inch diameter, 0.312” wall steel conductor casing
	0 - 398 feet:	20-inch diameter, 0.375” wall steel conductor casing
	+2 - 980 feet:	14-inch diameter, 0.500” wall steel casing
	1580 - 1590 feet:	14-inch diameter, 0.375” wall steel casing
Slotted Casing:	980 - 1580 feet:	14-inch diameter, 0.250” slot, 0.375-inch wall steel casing
Formation Stabilizer:	**Depth Interval**	**Formation Stabilizer (Gravel Pack)**
	779 - 1600 feet:	SRI 1/2” x 3/4” gravel
Grouted Intervals:	**Depth Interval**	**Grout or Seal Material**
	0 - 10 feet:	Unhydrated bentonite around conductor casing
	10 - 40 feet:	Neat cement grout around conductor casing
	0 - 10 feet:	Unhydrated bentonite between surface casing and conductor casing
	10 - 398 feet:	Neat cement grout around surface casing
	0 - 10 feet:	Unhydrated bentonite between inner casing and surface casing
	10 - 759 feet:	Neat cement grout around inner casing
	759 - 779 feet:	Unhydrated bentonite around inner casing

Table 1

Hidden Lake PWS Well Construction Summary

Pumping Test (see Appendix F):	Constant-rate pumping test on November 7-8, 2013 at 181 gpm with 196 feet of drawdown.
Month/Year of Construction:	Drilling and air-lift development: July - August 2013. Pumping development and pumping test: October-November 2013.
Drilling Contractor/ Method (See Appendix C)	Drilling and air-lift development: National EWP (Utah Licensed Driller No. 527): Conventional mud rotary and flooded reverse rotary. Pumping development and pumping test: Widdison Turbine Service LLC (Utah-licensed Driller No. 533): Electric submersible pump.

Table 2 - Simplified Lithology
Hidden Lake PWS Well at Powder Mountain

Depth		Thickness (feet)		Formation and Predominant Lithology
From	To			
0	15	15		Fill - gravel, boulders, clay and silt with some sand. Mostly moderate reddish brown. Unconsolidated.
15	240	225		Wasatch Formation - Clay, silt, sand, gravel and boulders. Mostly moderate reddish brown. Unconsolidated to consolidated.
240	300	60	375	Wasatch Formation - Clay with some silt and fine to medium sand. Mostly moderate reddish brown. Semi-consolidated.
300	390	90		Wasatch Formation - Clayey, fine- to medium-grained sandstone. Mostly dark yellowish brown. Semi-consolidated to consolidated.
390	690	300		St. Charles Formation - Dolomite with sandstone, siltstone, and limestone. Mostly medium to dark gray and dark yellowish orange.
690	830	140		Worm Creek Quartzite Member - Sandstone/quartzite, limestone and dolomite, Mostly dark yellowish orange.
830	1130	300		Nounan Formation - Dolomite. Mostly light gray to dark gray.
1130	1260	130		Nounan Formation - Dolomite with some limestone. Mostly light gray.
1260	1370	110	760	Nounan Formation - Dolomite with some clay. Mostly medium to dark gray.
1370	1530	160		Nounan Formation - Dolomite with some clay. Mostly medium to dark gray with some dark reddish brown coatings and particles.
1530	1590	60		Nounan Formation - Dolomite and calcareous claystone. Mostly light to dark gray, light brownish gray, greenish gray and grayish black.
1590	1600			Calls Fort Shale Member - Dolomite and claystone. Mostly medium to dark gray.

For detailed descriptions, see Borehole Lithologic Log in Appendix C.

Table 3
Field Parameters Measured During Constant-Rate Test of Hidden Lake Well

Date / Time	Conductivity (µS/cm)	Temperature (°F)	pH	Turbidity (NTU)	Sand Content (ppm)
11/7/2013 9:08	363	42.6	8.02		33
11/7/2013 9:11	358	43.0	8.03		
11/7/2013 9:18	364	43.0	8.01		
11/7/2013 9:26	365	42.8	8.03	113	
11/7/2013 9:38	392	43.3	8.09		92
11/7/2013 9:49	374	43.0	7.99	70.0	
11/7/2013 10:02	376	42.6	8.03		98
11/7/2013 10:07	376	42.7	8.05	69.0	
11/7/2013 10:28	371	42.5	8.02	68.0	
11/7/2013 10:32	374	43.1	8.01		
11/7/2013 11:03	381	43.2	8.00	180	
11/7/2013 11:31	369	43.1	7.99	51.1	28
11/7/2013 12:03	372	43.1	7.99	24.2	
11/7/2013 13:10	367	42.8	8.06	31.6	18
11/7/2013 13:35	368	43.3	7.95	35.7	
11/7/2013 14:00	371	43.2	7.97	23.4	
11/7/2013 14:30	363	42.2	7.97	43.7	
11/7/2013 15:30	369	42.3	8.02	44.2	
11/7/2013 16:00	372	42.4	7.99	65.2	
11/7/2013 17:00					24
11/7/2013 18:00	375		8.00	39.0	
11/7/2013 20:00	370		7.99	32.0	12
11/7/2013 22:00	372		7.99	31.2	
11/8/2013 0:00	371		8.02	24.0	
11/8/2013 2:00	367		7.98	27.2	
11/8/2013 4:00	369		7.98	25.6	36
11/8/2013 6:00	370		7.99	25.2	
11/8/2013 6:54	371	42.1	7.99	18.1	
11/8/2013 8:00	370	43.1	7.99	26.4	2
11/8/2013 8:40				9.6	
11/11/2013 12:30					7
11/11/2013 14:45					0
11/12/2013 8:40	-	-	-	3.9	0

Note: µS/cm means microsiemens per centimeter (same as µmhos/cm).
°F means degrees Fahrenheit; .
NTU means Nephelometric Turbidity Units .
ppm means parts per million.
- means no measurement.

Table 4
Water Quality Data and Utah Drinking Water Standards
Hidden Lake Well at Powder Mountain

Parameters (mg/L except as noted)	Primary or Secondary MCL[a]	Hidden Lake Well 11/8/13[f] and 11/12/13[g]
Primary Inorganic Contaminants R309-200-5(1)	Primary MCL	
Antimony	0.006	ND / ND[g]
Arsenic	0.01	0.0007 / 0.0008[g]
Barium	2	0.029 / 0.025[g]
Beryllium	0.004	ND / ND[g]
Cadmium	0.005	ND / ND[g]
Chromium, total	0.1	ND / ND[g]
Cyanide (free)	0.2	ND
Fluoride	2[b], 4	ND
Mercury	0.002	ND / ND[g]
Nickel	NS	ND / ND[g]
Nitrate (as Nitrogen)	10	0.9
Nitrite (as N)	1	ND
Total Nitrate and Nitrite (as Nitrogen)	10	
Selenium	0.05	ND / 0.0018[g]
Sodium	NS	5.9 / 5.1[g]
Sulfate	250[b] / 500 / 1000[c]	5
Thallium	0.002	ND / ND[g]
Total Dissolved Solids	500[b] / 1000 / 2000[d]	244
Lead and Copper R309-200-5(2)		
Copper	1.3 [b,e]	0.0025 / ND[g]
Lead	0.015 [e]	0.0008 / ND[g]
Pesticides/PCBs/SOCs R309-200-5(3)(a)		
Pesticides/PCBs/SOCs	Varies	ND
VOCs R309-200-5(3)(b)		
Volatile Organic Compounds (VOCs)	Varies	ND
Radiological Chemicals R309-200-5(4)		
Radium 226, pCi/l	5	Awaiting lab results
Radium 228, pCi/l	5	Awaiting lab results
Gross alpha, pCi/l	15	0.6
Gross beta, pCi/l	50	3.0
Turbidity (NTU) R309-200-5(5)	5.0 NTU	**15** / 2.2[g]
Secondary Inorganic Contaminants R309-200-6	**Secondary MCL**	
Aluminum	0.05 to 0.2	**0.4** / 0.2[g]
Chloride	250	3
Color (color units)	15	7
Foaming Agents (Surfactant as MBAS)	0.5	ND
Iron	0.3	**0.39** / 0.10[g]
Manganese	0.05	0.023 / 0.007[g]
Odor (threshold odor numbers)	3	ND
pH (standard units)	6.5-8.5	7.5
Silver	0.1	ND / ND[g]
Zinc	5	ND / ND[g]

Table 4
Water Quality Data and Utah Drinking Water Standards
Hidden Lake Well at Powder Mountain

Parameters (mg/L except as noted)	Primary or Secondary MCL[a]	Hidden Lake Well 11/8/13[f] and 11/12/13[g]
Additional Chemicals R309-515-4(5)(b)		
Ammonia	NS	ND
Boron	NS	0.1 / ND[g]
Calcium	NS	51.9 / 48.7[g]
Magnesium	NS	21.8 / 20.1[g]
Potassium	NS	0.8 / 0.6[g]
Specific Conductance (µS/cm @ 25°C)	NS	357
Bicarbonate (HCO3)	NS	263
Carbon Dioxide	NS	196
Carbonate	NS	ND
Hydroxide	NS	ND
Phosphorous, Ortho as P	NS	ND
Silica (as silicon dioxide)	NS	8.1 / 7.6[g]
Total Hardness as CaCO3	NS	219
Langelier Index	NS	0.18
Alkalinity, total as CaCO3	NS	216
Microbiological Quality R309-200		
Total Coliform	Negative	Absent
E. Coli	Negative	Absent
Iron Bacteria	NS	ND

Notes:

Laboratory data sheets are provided in Appendix H

ND = Not Detected; NS = No Standard; NA = Not Analyzed

MCL = Maximum Contaminant Level

MBAS = Methyl Blue Active

[a] As per UAC R309-200.

[b] Secondary MCL is 2 mg/L for fluoride, 250 mg/L for sulfate, and 500 mg/L for TDS.

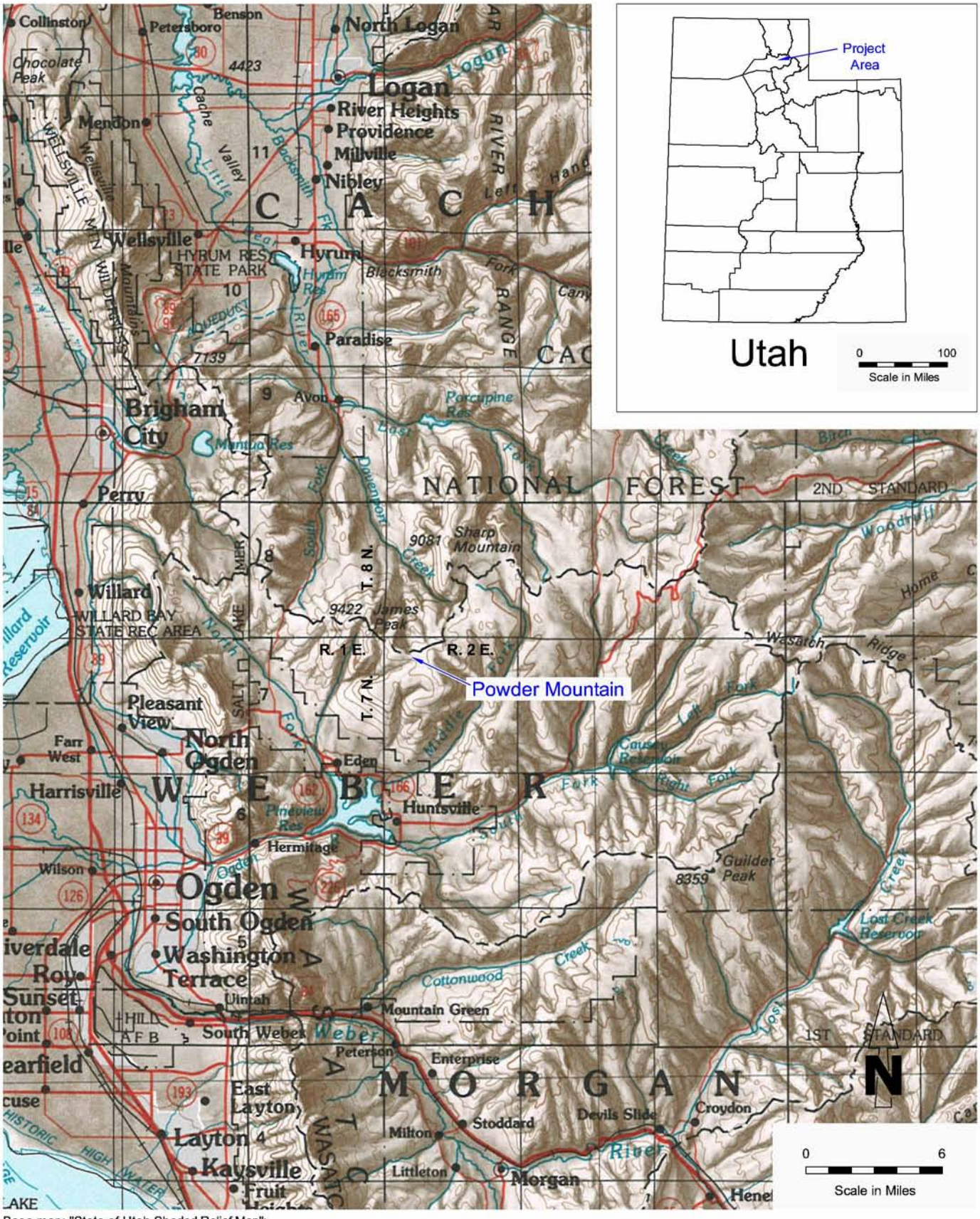
[c] If Sufate is greater than 500 mg/L, then supplier must demonstrate that (1) no better water is available and (2) the water will not be available for human commercial establishments.

[d] If TDS is greater than 1,000 mg/L, then supplier must demonstrate that no better water is available.

[e] Standard is applicable at the consumer's tap based on statistical sampling.

[f] Sample collected on 11/8/2013 after pumping at 180 gpm for 24 hours unless footnoted with "g" (see below).

[g] Sample collected on 11/12/2013 after pumping at average 112 gpm for 24 hours.



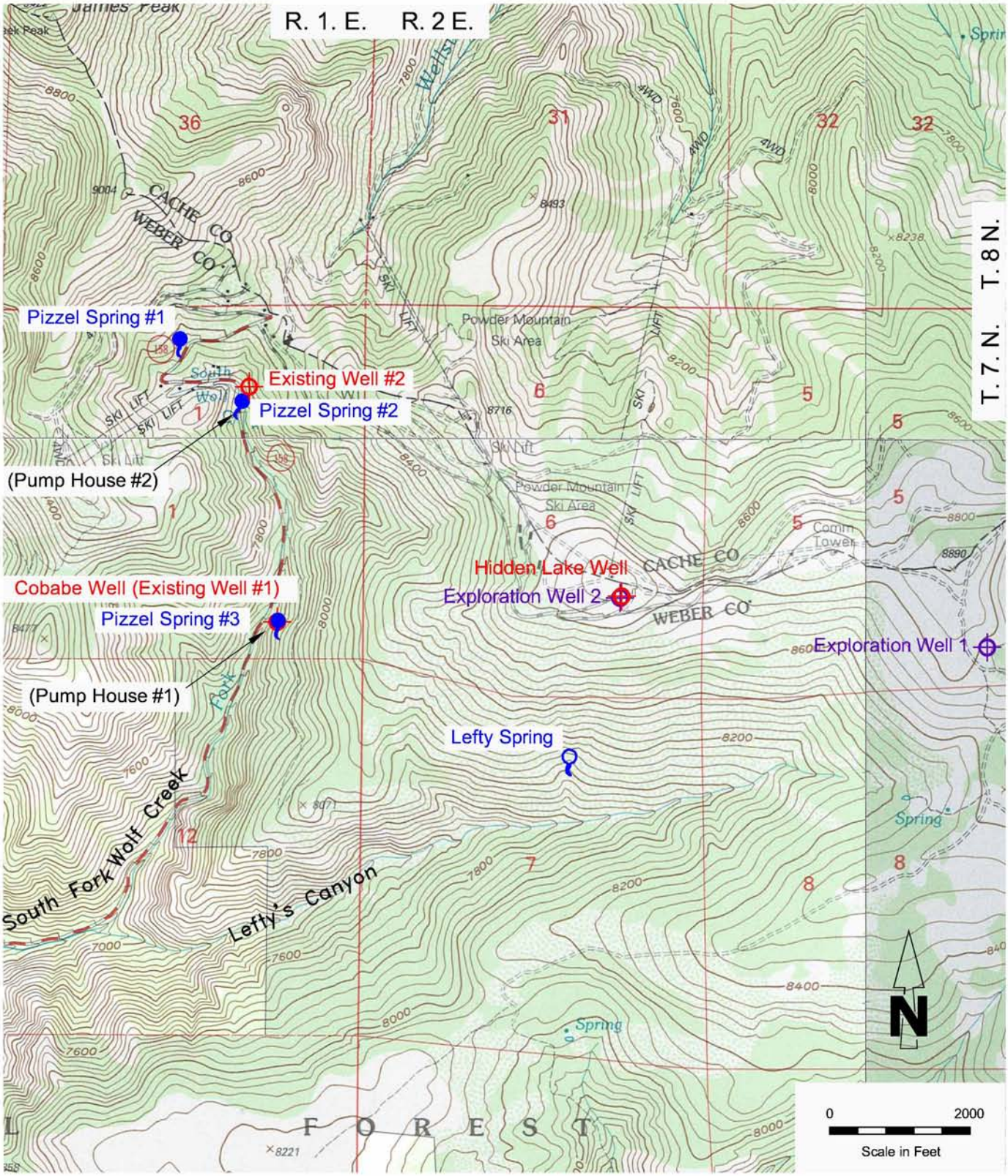
Base map: "State of Utah Shaded Relief Map":
U.S. Geological Survey (1988).
Contour interval 500 feet.

LOUGHLIN WATER ASSOCIATES, LLC

Summit Group
Powder Mountain

Location Map

Figure 1



Base maps: USGS Quadrangle maps (1998): James Peak, UT", "Sharp Mountain, UT", Huntsville, UT", and Browns Hole UT"

Note: Pizzel Spring #1 and #2 designations have been reversed in some documents. Number designations shown are those in current use by PMWSID.

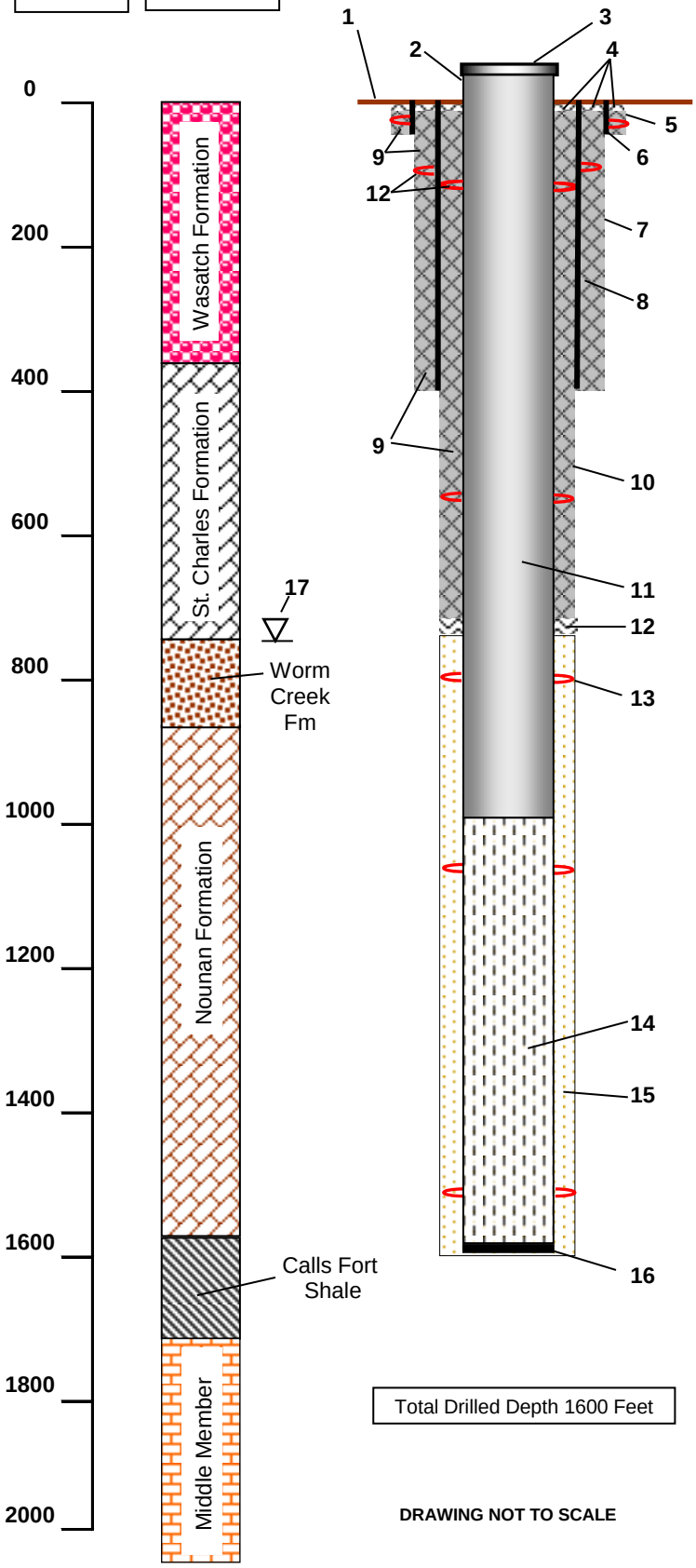
Key:

Well

Spring

LOUGHLIN WATER ASSOCIATES LLC

Summit Group
Powder Mountain
Vicinity Map
Figure 2



Notes

1 - Ground elevation at well: approx. 8904 feet

2 - Inner casing extends minimum 1.5-feet above ground

3 - Temporary steel cap

4 - Unhydrated bentonite seal (surface to 10-foot depth)

5 - 30-inch diameter borehole

6 - 26-inch diameter conductor casing; 0.312-inch wall thickness (0 - 40 feet depth)

7 - 24-inch diameter borehole

8 - 20-inch diameter steel surface casing; 0.375-inch wall thickness (0 - 398 feet)

9 - Neat cement grout (10 - 759 feet)

10 - 19-inch diameter borehole

11 - 14-inch diameter steel casing; 0.50-inch wall thickness

12 - Bentonite plug (759 - 779 feet)

13 - Centralizers every 80 feet in depth

14 - Slotted casing (0.250-inch slot width) from 1580 to 980 feet in depth

15 - Formation stabilizer (1/2 x 3/4 inch) (779 - 1600 feet in depth)

16 - 10-foot long section of blank casing with bullnose bottom cap (0.375-inch wall thickness) (1580 - 1590 feet in depth)

17 - Water level 765 feet in depth from top of casing on 11/11/2013

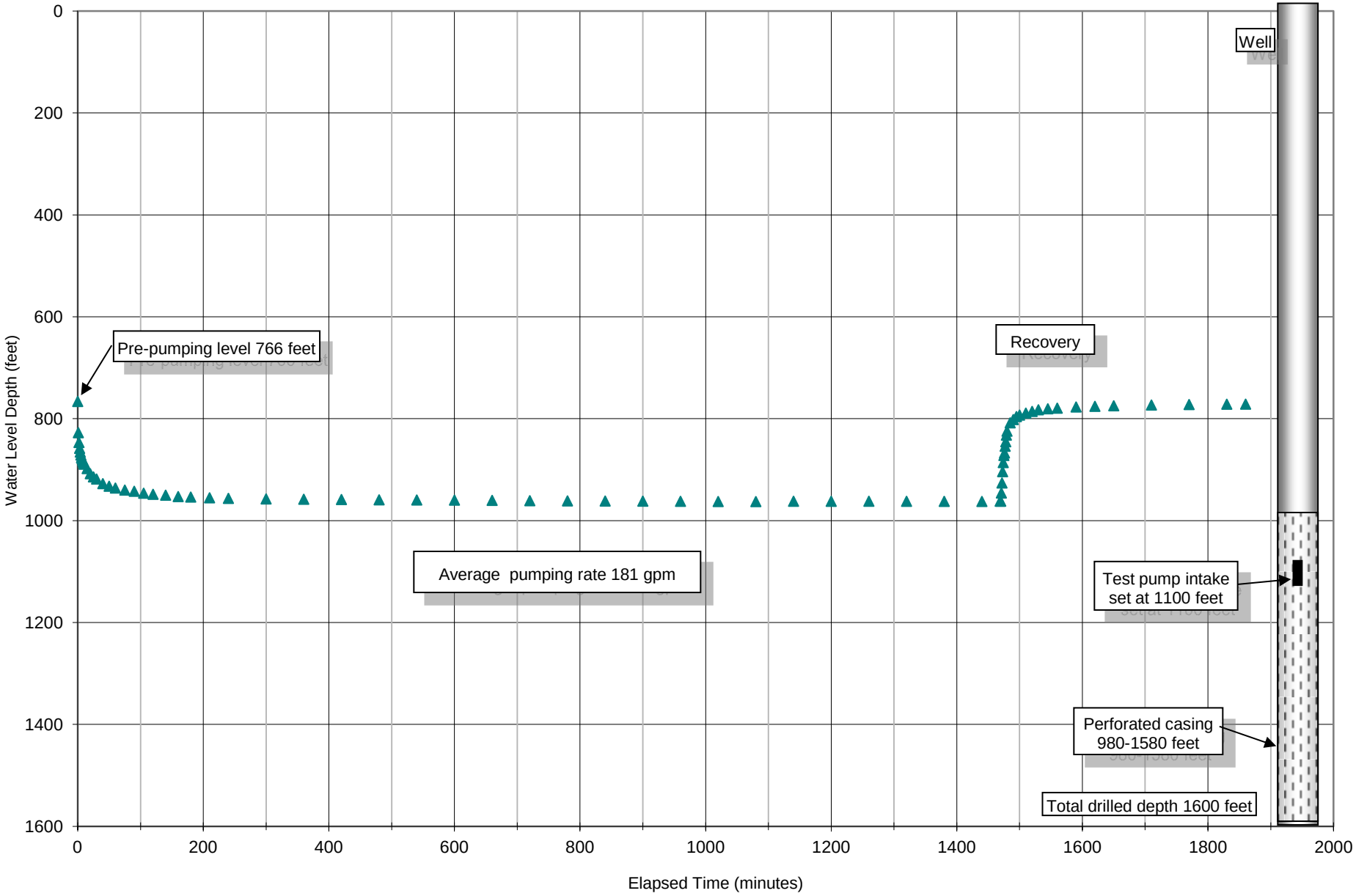
Summit Group
Hidden Lake PWS Well

As-Built Well Diagram

Figure 3

Loughlin Water Associates, LLC

PumpConstTest-HiddenLakeWell.xls

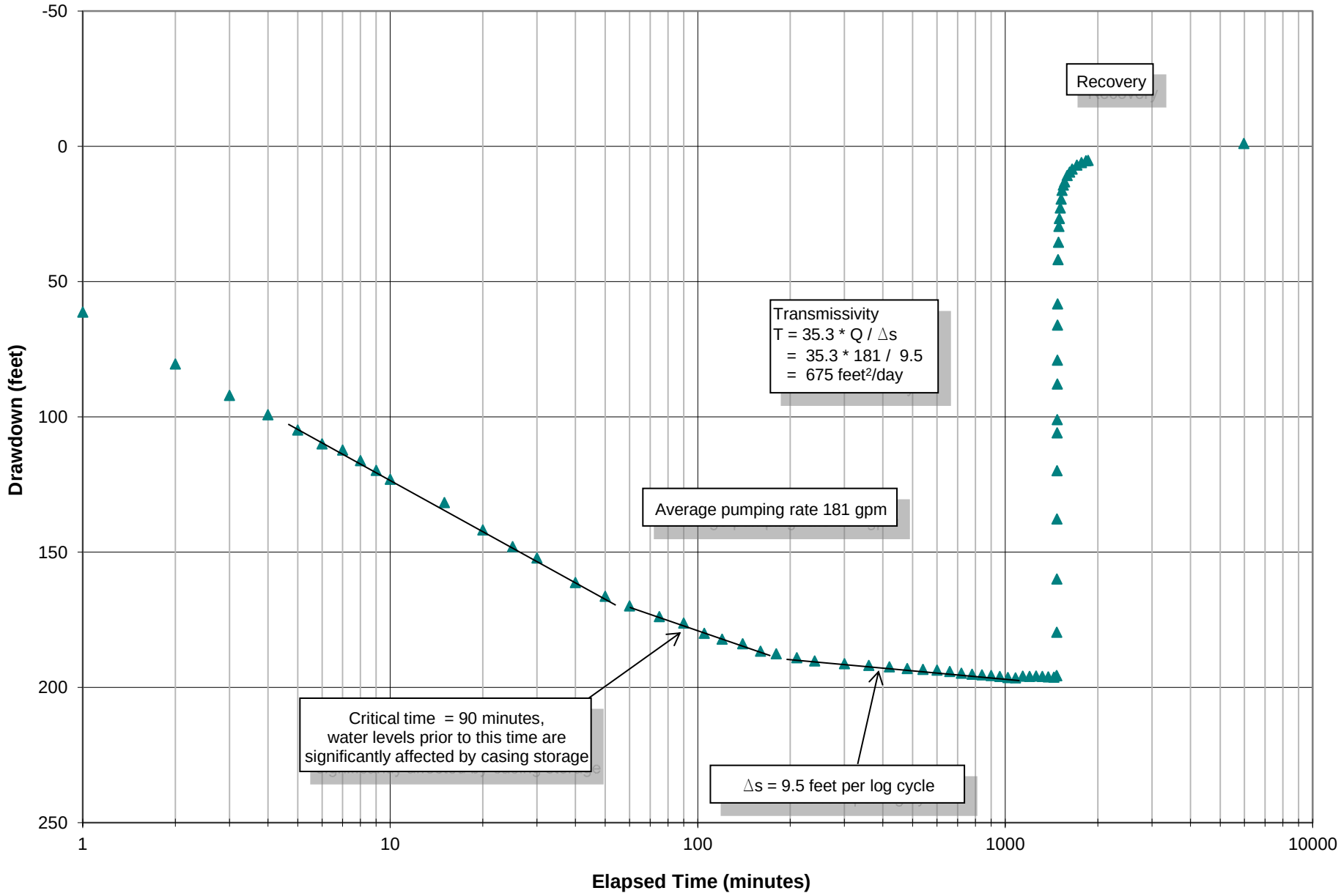


Hidden Lake Well - Constant-Rate Pumping Test - Water Level versus Time

Loughlin Water Associates LLC

Figure 4

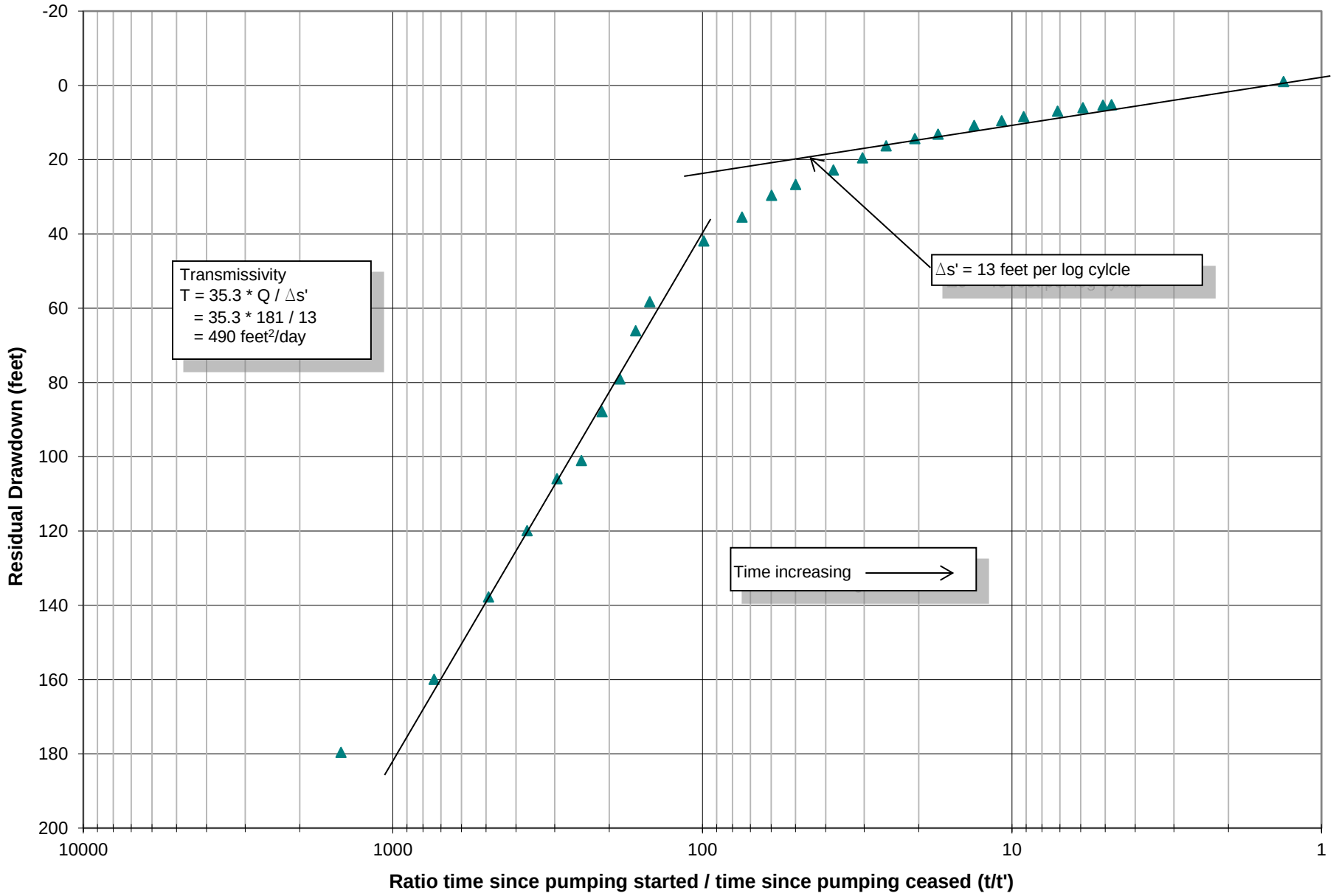
PumpConstTest-HiddenLakeWell.xls



Hidden Lake Well - Constant-Rate Pumping Test - Drawdown versus Log Time

Loughlin Water Associates LLC

Figure 5



Hidden Lake Well Constant-Rate Pumping Test - Residual Drawdown versus Log Ratio t/t'

Loughlin Water Associates LLC

Figure 6

APPENDIX A

PLAN APPROVAL

State of Utah
GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
Director

September 11, 2013

Evan D. Miller
Powder Mountain Ski Resort
P.O. Box 270
Eden, UT 84310

Dear Mr. Miller:

Subject: **Plan Approval**, Well Drilling, Hidden Lake PWS Well (WS008),
System #29028, File #9428

On August 16, 2013, the Division of Drinking Water (the Division) received the plans and specifications for the subject project from George W. Condrat, P.E., P.G., of Loughlin Water Associates, LLC, a consultant working for the Summit Group.

The Summit Group's Master Plan shows the development of 2,500 estate homes, condos, town houses, and cabins at the Powder Mountain Resort. The Phase 1 of the Summit at Powder Mountain PRUD has plans for 154 lots. The water infrastructure being developed by the Summit Group would become part of the Powder Mountain Water and Sewer District. The Division issued plan approval in a letter dated February 21, 2013, to drill the Summit Well (identified as WS006 in the Division's database) as a source for this development. However, a test well drilled at the Summit Well location indicated inadequate water to support Phase 1 of the planned development. A second test well was drilled at the Hidden Lake site which indicated there may be adequate water to support Phase 1 from an upper aquifer, about 1,500 feet down. There is also a lower aquifer, about 2,500 feet down. The decision was made to discontinue the Summit Well project and to drill a production well at the Hidden Lake site into the upper aquifer.

We understand that this project consists of drilling a well, named the Hidden Lake PWS Well and identified as WS008 in the Division's database, to provide drinking water to Phase 1 of the Summit at Powder Mountain PRUD. The proposed well is anticipated to be drilled with a 19-inch minimum borehole and a 14-inch casing to a depth of approximately 1,600 feet. It is anticipated that the completed well will be tested pump at 150 gpm.

We have completed our review of the plans and specifications, stamped and signed by George W. Condrat, P.E., P.G., and William D. Loughlin, P.G., and dated August 13, 2013, and found they basically comply with the applicable portions of *Utah's Administrative Rules for Public Drinking Water Systems*. On this basis, **the plans for the drilling the Hidden Lake PWS Well (WS008) are hereby approved.**

This plan approval pertains to well drilling, development, aquifer testing, and disinfection of Hidden Lake PWS Well (WS008) only. Please be aware that discharge permits may be required by Utah Division of Water Quality for discharges generated during well drilling and aquifer drawdown test.

The Division previously issued a conditional plan approval dated July 22, 2013, for the Hidden Lake 415K Gallon Tank (ST004) and well equipping of the Hidden Lake PWS Well (WS008) under File #9319, with the stipulation of requiring submittal of aquifer drawdown test data. **Once the drilling of the Hidden Lake PWS Well (WS008) is completed, a 24-hour or stabilized drawdown constant-rate pump test shall be conducted and the data submitted to the Division to determine the safe yield of this well.**

The safe yield is the basis for determining the maximum number of service connections that a well can serve. Based on the minimum sizing requirements of 800 gallons per day of source capacity for each residential connection for indoor use, Phase 1 (154 lots) would require a minimum safe yield of 85.6 gallons per minute (gpm) from a well. The safe yield of a well is defined in the Division's rules as two-thirds of the 24-hour or stabilized drawdown constant-rate pump test. Therefore, a well to supply the indoor water use to Phase 1 connections would be required to be tested, as a minimum, at 128.3 gpm during a 24-hour or stabilized drawdown constant-rate pump test. If any outdoor watering is allowed for the Phase 1 connections, additional source capacity would be required at the rate of 3.39 gpm of source capacity per acre of outside irrigation. Any other use of water such as swimming pools, water features, etc., would also require additional source capacity.

If the Hidden Lake PWS Well (WS008) alone does not provide an adequate safe yield of water for Phase 1 of the Summit at Powder Mountain PRUD, the Summit Group is required to drill a second production well or develop an additional water source in order to meet this water system's source requirement.

We have also reviewed your submission of the Preliminary Evaluation Report (PER) for the Hidden Lake Well provided by your consultant, Loughlin Water Associates, LLC. The Division **concurs** with this report. **This PER must be refined and a complete Drinking Water Source Protection (DWSP) Plan submitted within one year of the date of this letter.** Refer to *R309-600-13(6)* and *R309-600-7(1)*. You must submit proof that the delineation has been submitted to Weber County to be covered under the Weber County Source Protection Ordinance before the well can receive an operating permit. The proof of coverage under the ordinance may be submitted to the Division before the DWSP Plan is due.

You are required to submit the additional information outlined in *R309-515-6(5)(b)* and *(c)* for review in order to obtain an operating permit for this well. **An Operating Permit must be obtained from the Director before the Hidden Lake PWS Well (WS008) may be put in service.** A checklist outlining the well approval process, including the items required for well equipping and operating permit, is enclosed for your information.

The Hidden Lake PWS Well is referenced as WS008 in our inventory. Please label the well water samples collected for new source chemical analysis with your water system number **UTAH29028** and **WS008** (for both the facility ID and sample point ID) on all laboratory forms for this source. This will ensure proper identification and entry of the new source chemical analysis results in our database.

Approvals or permits by local authority or county may be necessary before beginning construction of this project. As the project proceeds, notice of any changes in the approved design, as well as any change affecting the quantity or quality of the delivered water, must be submitted to the Division. We may also conduct interim and final inspections of this project. Please notify us when actual construction begins so that these inspections can be scheduled.

Project approval must be renewed if construction has not begun or if substantial materials have not been ordered within one year of the date of this letter. If you have any questions regarding this letter, please contact Bob Hart, of this office, at (801) 536-0054, or Ying-Ying Macauley, Engineering Section Manager, of this office, at (801) 536-4188.

Sincerely,

Kenneth H. Bousfield, P.E.
Director

REH

Enclosure — Well Approval Checklist

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DDW-2013-008784

DIVISION OF DRINKING WATER
Checklist for New Public Drinking Water Wells

System Name: _____ System Number: _____

Well Name & & Description: _____

1. Approval to Drill the Well

- ☐ Project Notification Form
- ☐ Preliminary Evaluation Report (PER) concurrence
- ☐ Well drilling specifications and plans
- ☐ Valid Start Card or authorization to drill letter from the Division of Water Rights

2. Approval to Equip the Well

- ☐ Project Notification Form
- ☐ Well location data
- ☐ Certification of well seal
- ☐ Well driller's report (well log)
- ☐ **Aquifer drawdown test results (step drawdown test & constant-rate test) for well yield determination**
- ☐ Chemical analyses of the well water
- ☐ Plans and specifications for equipping the well
    - ☐ Pump information (e.g., pump specifications, pump curve & operating point, motor information, etc.)
    - ☐ Well head discharge piping
    - ☐ Well house design

3. Operating Permit to Introduce the Well Water

- ☐ Documentation of valid water right(s)
- ☐ Design engineer's statement of conformance with approval conditions
- ☐ Design engineer's statement of conformance with the Rule for any deviation from the plan approval
- ☐ Evidence of O&M manual delivery
- ☐ As-built drawings
- ☐ Recorded land use agreements or documentation that the requirements for coverage under the City/County source protection ordinance have been met
- ☐ Satisfactory bacteriological results

APPENDIX B

START CARD

DRILLER (START) CARD for EXCHANGE: E4715(35-11995)

IMPORTANT: THIS CARD MUST BE RECEIVED BY THE DIVISION OF WATER RIGHTS PRIOR TO THE BEGINNING OF WELL CONSTRUCTION. PROOF DUE/EXPIRATION DATE: November 30, 2016

OWNER/APPLICANT NAME: Western America Holding, LLC *

MAILING ADDRESS: 1250 E. 200 S., Lehi, UT 84043.

PHONE NUMBER:

WELL LOCATION: N 400' E 2050' from SW Cor. S06, T7N, R2E, SLB&M.

WELL UTM COORDINATES: Northing: 4579632 Easting: 435712

WELL ACTIVITY: NEW ( ) REPAIR ( ) REPLACE ( ) ABANDON ( )
CLEAN ( ) DEEPEN ( )

For surface seals in unconsolidated formations (clay, silt, sand, and gravel), will you be using a temporary conductor casing or other formation stabilizer (e.g., drilling mud) in the surface seal interval to maintain the required annular space?

YES or NO (Circle one).

Answering 'NO' suggests that you will be placing the surface seal in an open and unstabilized annular space, which may require onsite inspection of seal placement by the State Engineer's Office.

PROPOSED START DATE:

PROJECTED COMPLETION DATE:

LICENSE #: LICENSEE/COMPANY:

Licensee Signature Date

NOTICE TO APPLICANT: THIS CARD IS TO BE GIVEN TO A UTAH LICENSED WATER WELL DRILLER FOR SUBMITTAL TO THE DIVISION OF WATER RIGHTS PRIOR TO WELL CONSTRUCTION.

STATE OF UTAH DIVISION OF WATER RIGHTS Phone No. 801-538-7416
Fax No. 801-538-7467

COMMENTS: *Note from owner:
New owner is Summit Mountain Holding Group LLC
c/o Watts Enterprises, 5200 Highland Drive, Suite 101
Holladay, Utah 84117-7065. Title is being updated.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 880 SALT LAKE CITY, UT

POSTAGE WILL BE PAID BY ADDRESSEE

UTAH DIV OF WATER RIGHTS - 146300
PO BOX 31431
SALT LAKE CITY UT 84131-9988

Please fold on top and bottom lines with reply mail address showing, tape, and mail.

APPENDIX C

WELL DRILLER'S REPORT
AND
LITHOLOGIC LOG

WELL DRILLER'S REPORT
State of Utah
Division of Water Rights

For additional space, use "Additional Well Data Form" and attach

Well Identification

Exchange Application: E4715 (35-11995) WIN: 436926

Owner *Note any changes*

Western America Holding, LLC
1250 E. 200 S. Suite 2D
Lehi, UT 84043

Contact Person/Engineer: _____

Well Location *Note any changes*

N 400 E 2050 from the SW corner of section 06, Township 7N, Range 2E, SL B&M

Location Description: (address, proximity to buildings, landmarks, ground elevation,local well #)

Drillers Activity Start Date: 7/24/13 Completion Date: 11/11/13

Check all that apply: [X] New [ ] Repair [ ] Deepen [ ] Clean [ ] Replace [ ] Public Nature of Use: _____

If a replacement well, provide location of new well. _____ feet north/south and _____ feet east/west of the existing well.

DEPTH (feet) FROM	TO	BOREHOLE DIAMETER (in)	DRILLING METHOD	DRILLING FLUID
0	40	30"	Direct mud	Bentonite
40	398	24"	Air/Flooded Reverse	Bentonite
398	1600	19"	Air/Flooded Reverse	Bentonite

Well Log

DEPTH (feet) FROM	TO	WATER	PERMEABLE High	PERMEABLE Low	UNCONSOLIDATED CLAY	SILT	SAND	GRAVEL	COBBLES	BOULDER	OTHER	CONSOLIDATED ROCK TYPE	COLOR	DESCRIPTION AND REMARKS (e.g., relative %, grain size, sorting, angularity, bedding, grain composition density, plasticity, shape, cementation, consistancy, water bearing, odor, fracturing, minerology, texture,degree of weathering, hardness, water quality, etc.)
														See attached lithology log

Static Water Level

Date 11/11/13 Water Level 765 feet Flowing? [ ] Yes [X] No

Method of Water Level Measurement Static tape If Flowing, Capped Pressure _____ PSI

Point to Which Water Level Measurement was Referenced Rig table Elevation _____

Height of Water Level reference point above ground surface 2 feet Temperature cool degrees [ ] C [ ] F

Construction Information

DEPTH (feet)		CASING			DEPTH (feet)		☐SCREEN ☐PERFORATIONS ☐OPEN BOTTOM		
FROM	TO	CASING TYPE AND MATERIAL/GRADE	WALL THICK (in)	NOMINAL DIAM. (in)	FROM	TO	SCREEN SLOT SIZE OR PERF SIZE (in)	SCREEN DIAM. OR PERF LENGTH (in)	SCREEN TYPE OR NUMBER PERF (per round/interval)
0	40	Steel	.312	26					
0	398	Steel		20"					
+2	980	Steel	.500	14"					
980	1580	Steel	.375	14"	980	1580	.250	Slotted	10" sq/in/ft
1580	1590	Steel	.500	14"					

Well Head Configuration: Welded plate +24" Access Port Provided? ☒Yes ☐No

Casing Joint Type: Weld Perforator Used: No

Was a Surface Seal Installed? ☒Yes ☐No Depth of Surface Seal: 40 feet Drive Shoe? ☐Yes ☐No

Surface Seal Material Placement Method: pumped

Was a temporary surface casing used? ☐Yes ☒No If yes, depth of casing: _____ feet diameter: _____ inches

DEPTH (feet)		SURFACE SEAL / INTERVAL SEAL / FILTER PACK / PACKER INFORMATION		
FROM	TO	SEAL MATERIAL, FILTER PACK and PACKER TYPE and DESCRIPTION	Quantity of Material Used (if applicable)	GROUT DENSITY (lbs./gal., # bag mix, gal./sack etc.)
0	40	Neat Cement		15.7#
10	759	Neat Cement		15.7#

Well Development and Well Yield Test Information

DATE	METHOD	YIELD	Units Check One		DRAWDOWN (ft)	TIME PUMPED (hrs & min)
			GPM	CFS		
11/7-11/8	Pumped	181	X		196	24 hrs
11/11-11/12	Pumped	112	X		101	21 hrs

Pump (Permanent)

Pump Description: _____ Horsepower: _____ Pump Intake Depth: _____ feet

Approximate Maximum Pumping Rate: _____ Well Disinfected upon Completion? ☐Yes ☐No

Comments

Description of construction activity, additional materials used, problems encountered, extraordinary Circumstances, abandonment procedures. *Use additional well data form for more space.*

Well Driller Statement

This well was drilled and constructed under my supervision, according to applicable rules and regulations, and this report is complete and correct to the best of my knowledge and belief.

Name NATIONAL EWP (Person, Firm, or Corporation - Print or Type) License No. 805

Signature _____ (Licensed Well Driller) Date 12/15/13

Simplified Lithology
Hidden Lake PWS Well at Powder Mountain

Depth		Thickness (ft)		Formation and Predominant Lithology
From	To			
0	15	15	15	Fill - gravel, boulders, clay and silt with some sand. Mostly moderate reddish brown. Unconsolidated.
15	240	375	225	Wasatch Formation - Clay, silt, sand, gravel and boulders. Mostly moderate reddish brown. Unconsolidated to consolidated.
240	300		60	Wasatch Formation - Clay with some silt and fine to medium sand. Mostly moderate reddish brown. Semi-consolidated.
300	390		90	Wasatch Formation - Clayey, fine- to medium-grained sandstone. Mostly dark yellowish brown. Semi-consolidated to consolidated.
390	690	300	300	St. Charles Formation - Dolomite with sandstone, siltstone, and limestone. Mostly medium to dark gray and dark yellowish orange.
690	830	140	140	Worm Creek Quartzite Member - Sandstone/quartzite, limestone and dolomite, Mostly dark yellowish orange.
830	1130	760	300	Nounan Formation - Dolomite. Mostly light gray to dark gray.
1130	1260		130	Nounan Formation - Dolomite with some limestone. Mostly light gray.
1260	1370		110	Nounan Formation - Dolomite with some clay. Mostly medium to dark gray.
1370	1530		160	Nounan Formation - Dolomite with some clay. Mostly medium to dark gray with some dark reddish brown coatings and particles.
1530	1590		60	Nounan Formation - Dolomite and calcareous claystone. Mostly light to dark gray, light brownish gray, greenish gray and grayish black.
1590	1600			Calls Fort Shale Member - Dolomite and claystone. Mostly medium to dark gray.

For detailed descriptions, see Borehole Lithologic Log

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Date Started: July 24, 2013	Location: Approx. N 1437 ft, E 1548 ft, S4 cor Sec. 6 T 7 N, R 2 E, SLB&M
Date Completed: August 25, 2013	Surface Elevation: Approx. 8904 ft
Logged by: Condrat	Depth to Water / Date:

Depth	Formation	Calcareous?	USC	% fines	Description
0					
	Native Fill	N	GC-CL	70	Pad fill material. Moderate reddish brown (10R 4/6). Clay with gravel, cobbles and boulders and some sand.
10					
		N	GC-CL	70	
	Wasatch Formation (Tw) - Unconsolidated to consolidated - sandstone and conglomerate				
20		N		70	Moderate reddish-brown fine to medium sand with clay and silt
30		N		70	
40		N		70	
50		N		70	
60		N		40	same but with coarse sand and gravel particles (conglomerate)
70		N		50	
80		N		50	
90		N		40	
100					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain

Notes: Cutting samples were taken every ten feet.
If description is blank, lithology is same as described above.
Key : Calcareous? N means non-calcareous, S means slightly calcareous, M means moderately to highly calcareous;
USC is Unified Soils Classification System;
% fines is a rough visual estimate of clay, silt and fine-to-medium sand.

Depth	Formation	Calcareous?		% fines	Description
100	Wasatch Formation (Tw) - Semi-consolidated to consolidated - Conglomerate and sandstone				
		N		20	Moderate reddish-brown fine to coarse sand with silt, clay, gravel, cobbles and boulders - conglomerate
110					
		N		30	
120					
		N		90	Same but mostly sand sized particles - sandstone
130					
		N		90	
140					
		N		20	Same but mostly large sized particles - conglomerate
150					
		N		90	Same but mostly sand sized particles - sandstone
160					
		N		40	Same but mostly large sized particles - conglomerate
170					
		N		30	
180					
		N		10	
190					
		N		10	
200					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation	Calcareous?		% fines	Description
200					
	Wasatch Formation (Tw) - Semi-consolidated to consolidated - Conglomerate and sandstone	N		10	Moderate reddish-brown fine to coarse sand with silt, clay, gravel, cobbles and boulders - conglomerate
210					
		N		10	
220					
		N		10	
230					
		N		80	Same but mostly sand sized particles - sandstone
240					
	Wasatch Formation - Clay rich	N		80	Moderate reddish brown (10R 4/6), dark yellowish orange (10YR6/6) and grayish brown (5YR3/2) clay with some silt and fine- to medium-grained sand
250					
		N		100	
260					
		N		100	
270					
		N		100	
280					
		N		100	
290					
		S		80	Dark yellowish orange clayey, medium to coarse grained sand
300					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation	Calcareous?		% fines	Description
300					
	Wasatch Formation (Tw)	N		20	Dark yellowish orange sandstone / conglomerate composed of particles of medium gray dolomite and medium brown and orange-brown quartzite, trace clay
310					
		M		20	Same with varying but usually small amounts of gray dolomite chips
320					
		C		20	
330					
		M		80	Same but more sandstone chips and fewer dolomite chips - overall color is dark yellowish orange
340					
		M		80	Dark yellowish orange fine sand and silt with some medium sand and some clay
350					
		C		80	Dark yellowish orange sandstone composed of particles of quartzite / sandstone and some gray dolomite, some clay
360					
		C		80	
370					
		C		80	
380					
		C		80	
390					
	St. Charles Formation (Csc)	S			Medium gray (N4-N5) dolomite
400					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes: Dolomite chips generally do not fizz with 10% HCl, although powdered material does fizz.	

Depth	Formation				Description
400					
	St. Charles Formation (Csc)				Medium gray (N4-N5) dolomite
410					
420					
					No samples 420 feet - 550 feet. Based on driller reports, lithology is dolomite and limestone
430					
440					
450					
460					
470					
480					
490					
500					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation				Description
500					
	St. Charles Formation (Csc)				No samples 420 feet - 550 feet. Based on driller reports, lithology is dolomite and limestone
510					
520					
530					
540					
550					
					Dark yellowish orange (10YR6/6) sandstone and dark to medium gray (N3-N5) limestone and dolomite
560					
570					
580					
590					
600					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation				Description
600	St. Charles Formation (Csc)				
					Dark yellowish orange (10YR6/6) sandstone and dark to medium gray (N3-N5) limestone and dolomite
610					
620					
630					
640					
650					
660					
670					
680					
690					
	Worm Creek Qtz (Csw)				Dark yellowish orange (10YR6/6) quartzite and dark to medium gray (N3-N5) limestone and dolomite
700					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation				Description
700	Worm Creek Quartzite Member (Csw)				Dark yellowish orange (10YR6/6) quartzite and dark to medium gray (N3-N5) limestone and dolomite
710					
720					
730					
740					
750					
760					
770					
780					
790					same with some clay
800					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation				Description
800					
	Worm Creek Member (Csw)				Dark yellowish orange (10YR6/6) quartzite and dark to medium gray (N3-N5) limestone and dolomite with some clay
810					
820					
830					
	Nounan Formation (Cn)				Dark gray (N3) dolomite with some dark yellowish orange quartzite
840					
850					
860					
870					
					Dark gray (N3) dolomite
880					
890					
900					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation				Description
900	Nounan Formation (Cn)				Dark gray (N3) dolomite
910					
920					
930					
940					
950					
960					
970					
980					
990					
1000					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation				Description
1000					
	Nounan Formation (Cn)				Dark gray (N3) dolomite
1010					
1020					
1030					
1040					
1050					
					Light to dark gray (N7 - N3) dolomite
1060					
1070					
1080					
1090					
1100					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain

Depth	Formation				Description
1100					
	Nounan Formation (Cn)				Light to dark gray (N7 - N3) dolomite
1110					
1120					
1130					
					Light gray (N7) dolomite with some limestone
1140					
1150					
1160					
1170					
1180					
1190					
1200					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain

Depth	Formation				Description
1200					
	Nounan Formation (Cn)				Light gray (N7) dolomite with some limestone
1210					
1220					
1230					
1240					
1250					
1260					
					Dark to medium gray (N3 - N5) dolomite with some clay; chips duller hue and somewhat platy
1270					
1280					
1290					
1300					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation				Description
1300					
	Nounan Formation (Cn)				Dark to medium gray (N3 - N5) dolomite with some clay
1310					
1320					
1330					
1340					
1350					
1360					
1370					
					Dark to medium gray (N3 - N5) dolomite with some clay with some dark reddish brown (10R3/4) particles and coatings
1380					
					Dark to medium gray (N3 - N5) dolomite, trace clay, with some dark reddish brown particles
1390					
1400					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation	Calcareous?			Description
1400					
	Nounan Formation (Cn)				Dark to medium gray (N3 - N5) dolomite, trace clay, with some dark reddish brown particles
1410					
1420					
1430					
1440					
					Dark to medium gray (N3 - N5) dolomite
1450					
1460					
					Dark to medium gray (N3 - N5) dolomite with some clay
1470					
1480					
1490					
1500					

Borehole Lithologic Log

Hole No.: Hidden Lake PWS Well	Project: Powder Mountain
Notes:	

Depth	Formation	Calcareous?			Description
1500					
	Nounan Formation (Cn)				Dark to medium gray (N3 - N5) dolomite with some clay
1510					
1520					
1530					
					Same with some reddish brown and yellowish brown mottling
1540					
					Light brownish gray (5YR6/1), greenish gray (5G6/1) and very light gray (N8) calcareous claystone
1550					
					Medium dark gray to grayish black (N4 - N2) dolomite
1560					
					Light to medium gray (N7 - N5) with some brownish gray (5YR4/1) dolomite
1570					
1580					
					Mottled medium to dark gray (N5-N3) dolomite
1590					
	Calls Fort Shale (Cbc)				Mottled medium to dark gray (N5-N3) dolomite with some medium to dark gray claystone; some thin, white veins of calcite
1600					
					Drilled to total depth of 1600 feet on 8/14/2013

APPENDIX D

GEOPHYSICAL LOGS

Century WIRELINE SERVICES

MMA SP 16" 64" E-LOG
GAMMA E-LOG
HIDDEN LAKE PWS WELL

Company NATIONAL ESP
Well HIDDEN LAKE PWS WELL
Field 34000S 5162W
County WEBER
State UT
Country ---
API No NONE

Company : NATIONAL ESP
Well : HIDDEN LAKE PWS WELL
Field : 34000S 5162W
County : WEBER
State : UT
Country : ---
API No : NONE
Uniq ID : NONE

Location N1437' E1548' S 1/4 SEC 6

LSD: --- Sect: 6 Twp: 7N Rng: 2E

Permanent Datum:	G/L		Elevations:			Other Services:	
Drilling Measured From:	G/L		KB	G/L	FT	8074	
Log Measured From:	G/L		DF	NONE	FT	9057	
Above Permanent Datum:	G/L	FT	GL	8903	FT	9097	

Date	08/15/13			
Run Number	1			
Depth--Driller	1600	FT		
Depth--Logger	1584.90	FT		
First Reading	---			
Last Reading	---			
Casing--Driller	400	FT		
Casing--Logger	400	FT		
Bit Size	19	IN		
Casing Size	20	IN		
Hole Fluid Type	0			
Density	8.9	LBS/GAL		
Fluid Loss	---			
PH/Viscosity				
Sample Source	0			
RM@Measured Temp.	0	@ 0 F		
RMF@Measured Temp.				
RMC@Measured Temp.	0			
Source RMF/RMC	---			
RM@BHT	---			
Time Circulation Stopped	2100			
Max Recorded Temp.	---			
Equipment/Base	---			
Recorded By	SHOLT			

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

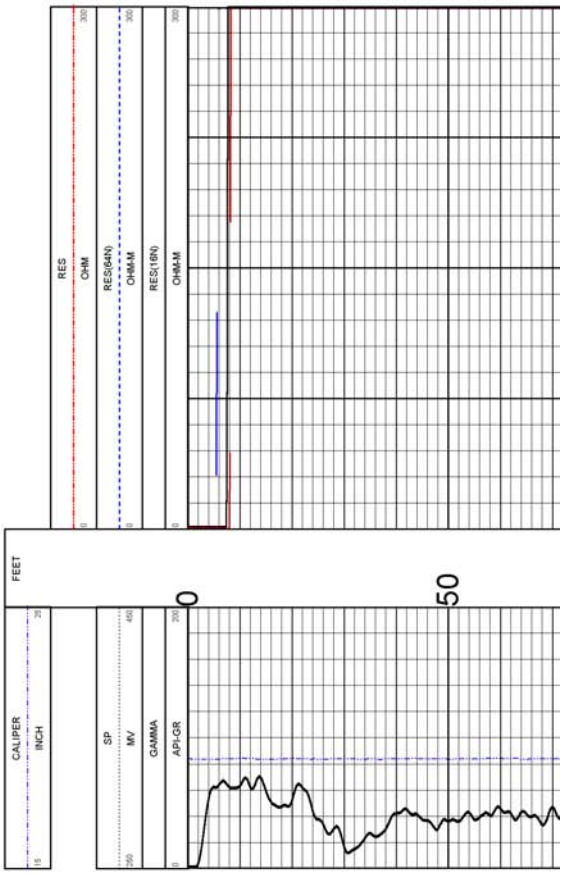
5 INCH E-LOG HIDDEN LAKE PWS WELL 08/15/13

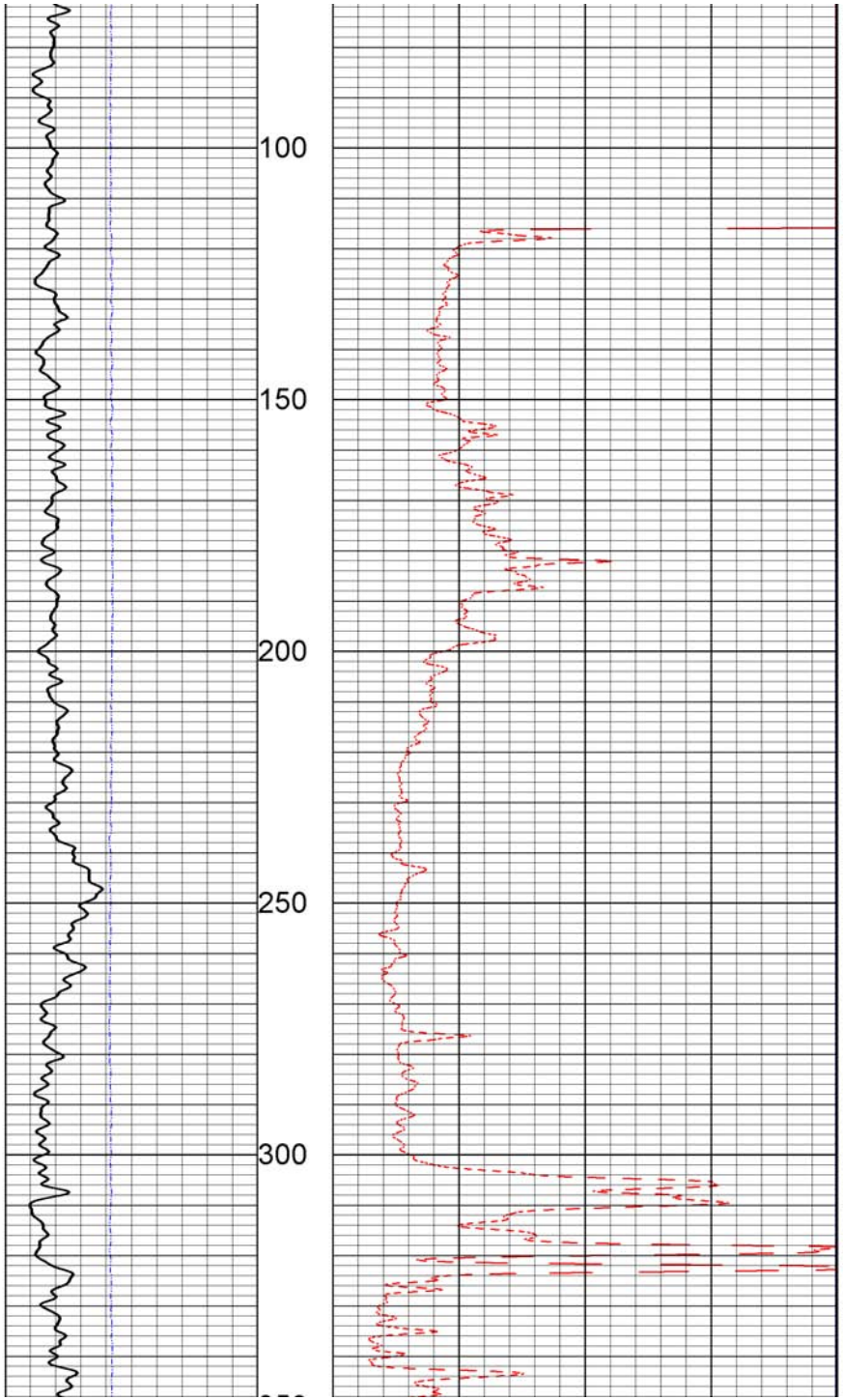
LOG PARAMETERS

MATRIX DENSITY : 2.65
MAGNETIC DECL : 12.8
PRESENTATION NAME/DATE = 9057 hidden lake cal elog.0 08/15/2013

NEUTRON MATRIX : DOLOMITE
ELECT. CUTOFF : 2500

MATRIX DELTA T : 44
BIT SIZE : 19
Version 3.65 HR

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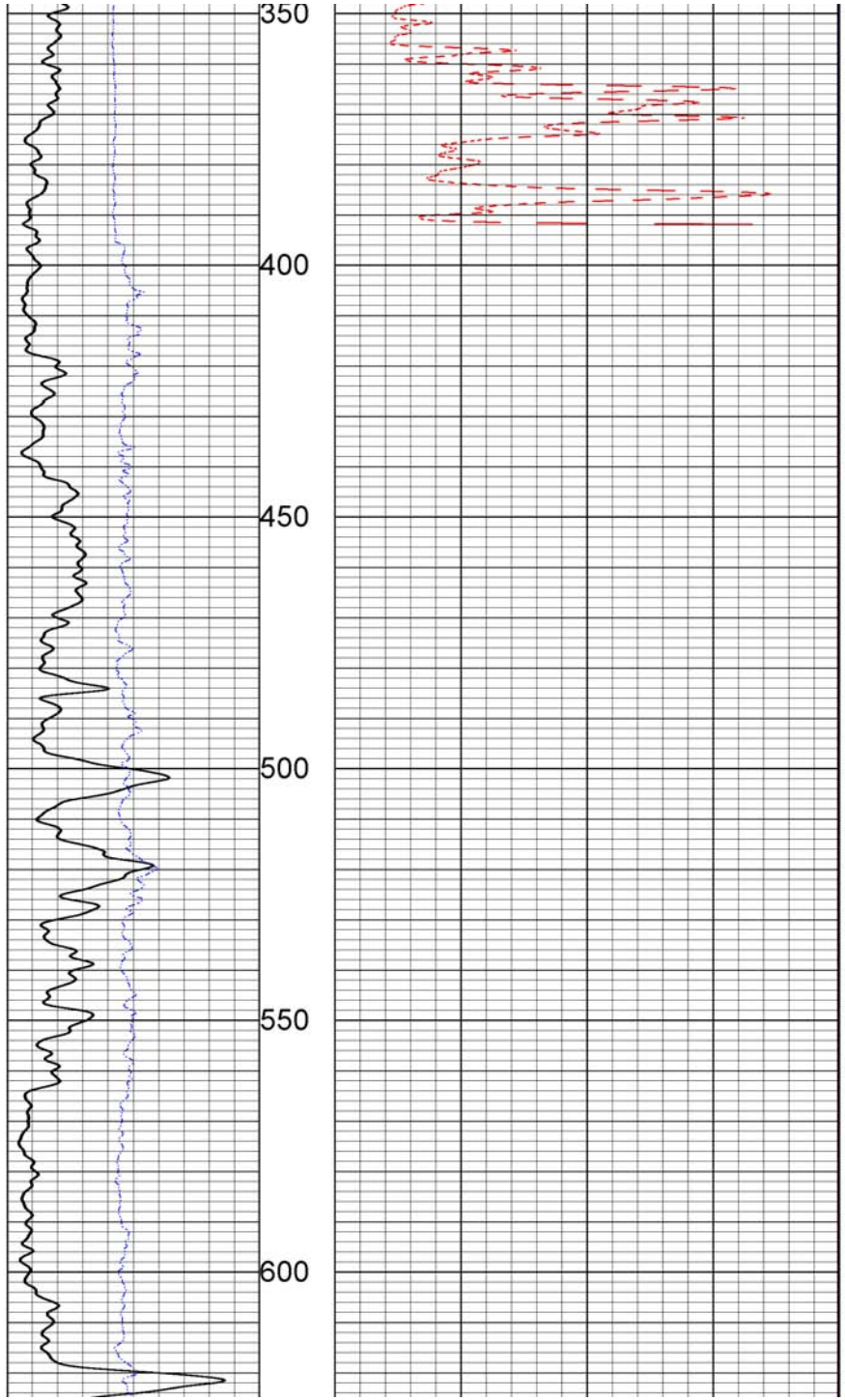
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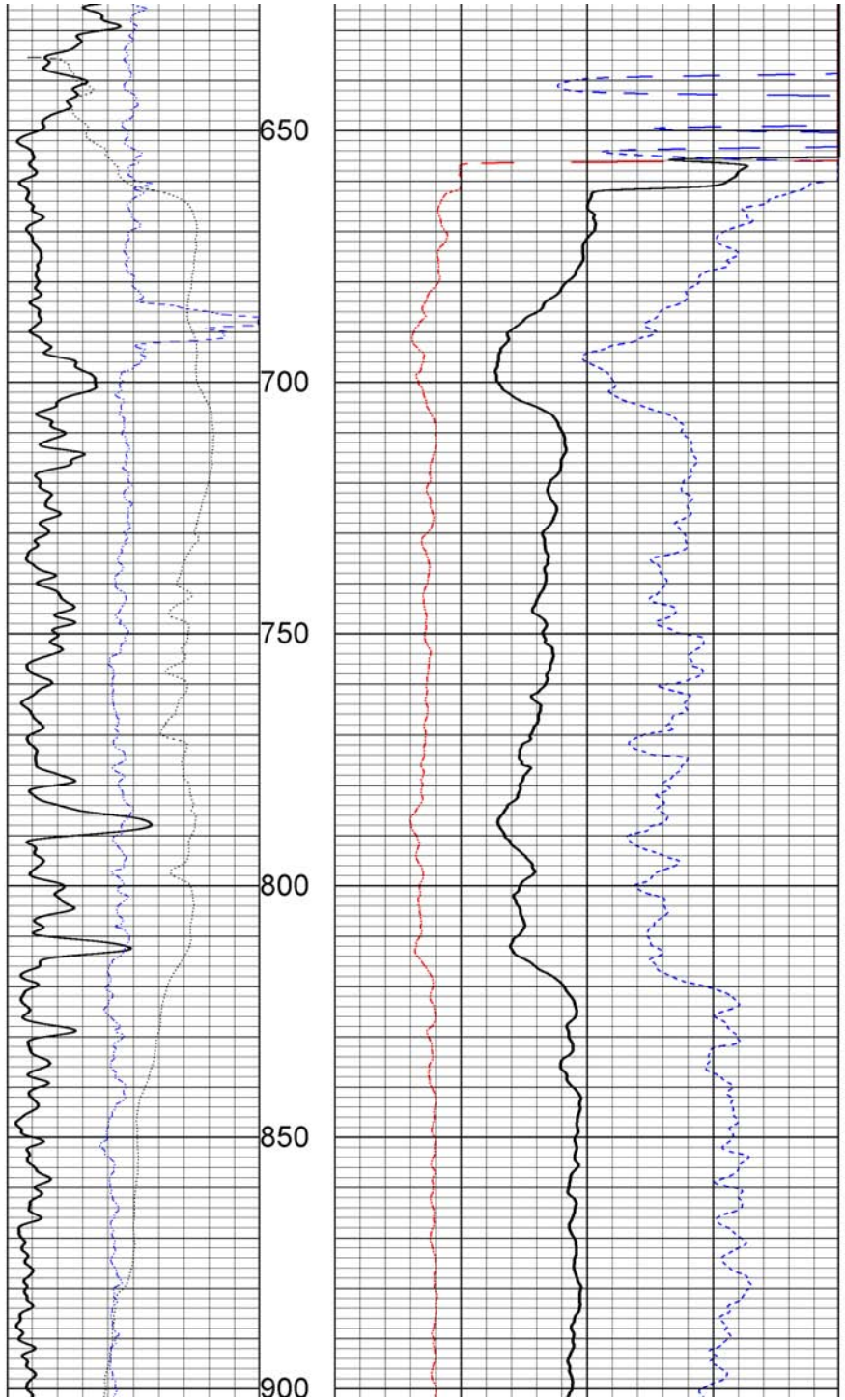
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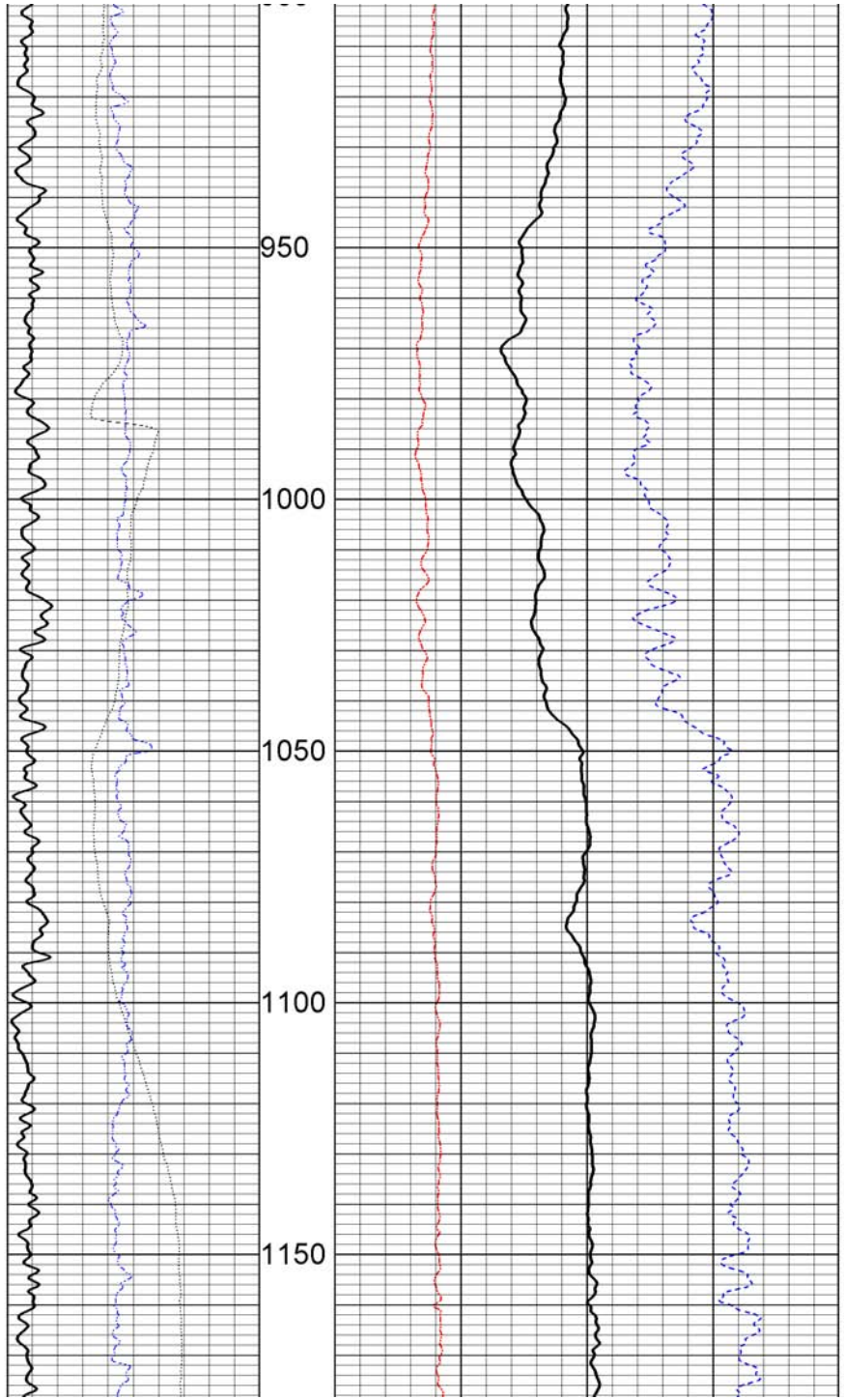
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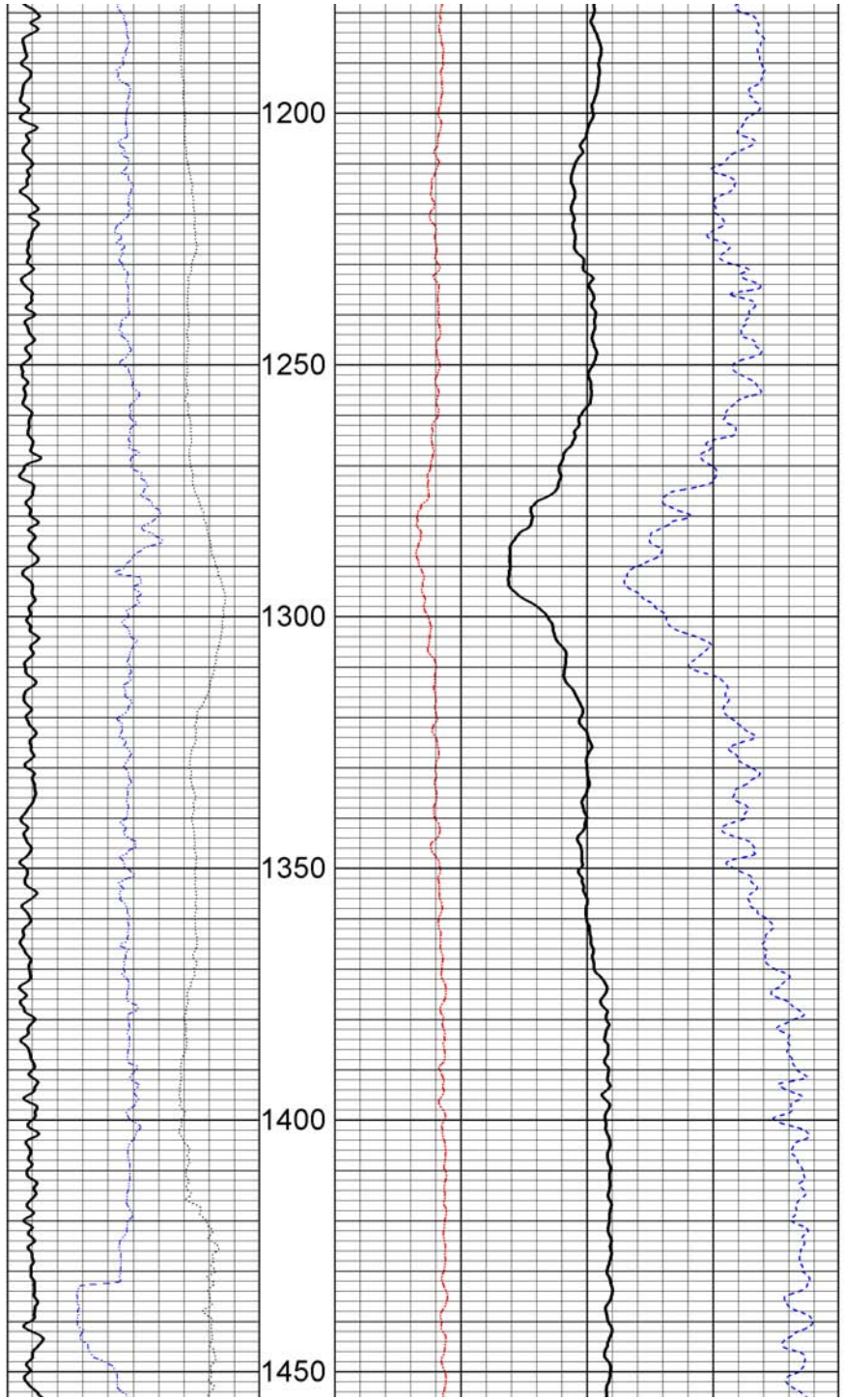
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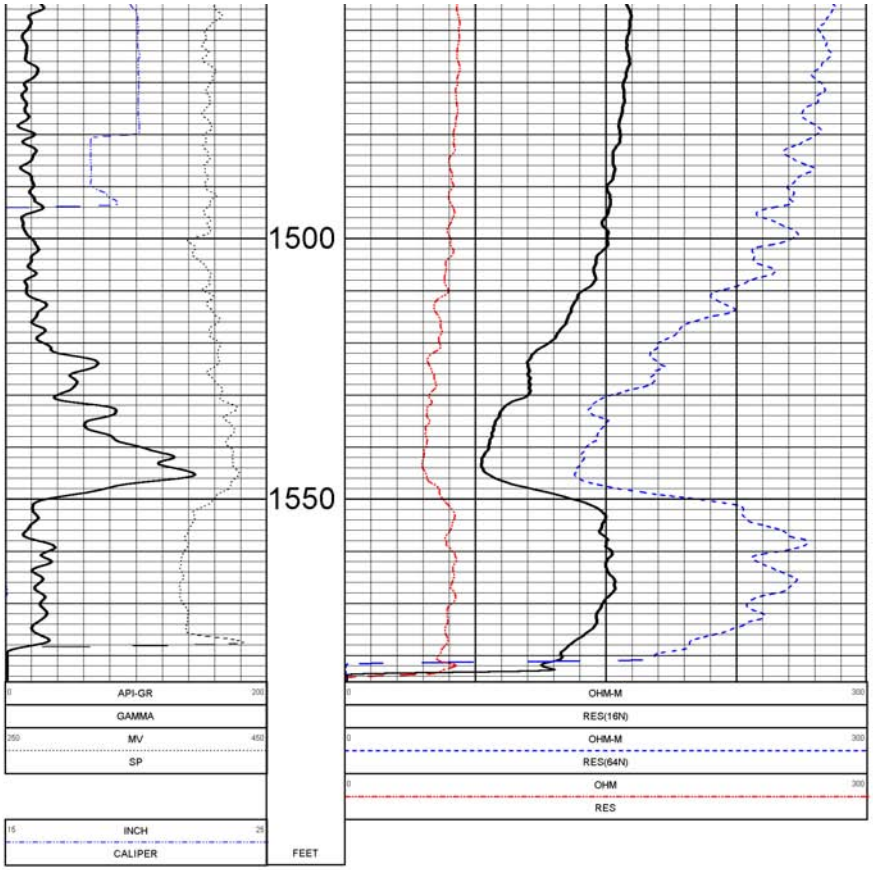


5 INCH E-LOG HIDDEN LAKE PWS WELL 08/15/13

LOG PARAMETERS

MATRIX DENSITY : 2.85	NEUTRON MATRIX : DOLOMITE	MATRIX DELTA T : 44
MAGNETIC DECL : 12.8	ELECT. CUTOFF : 2500	BIT SIZE : 19
PRESENTATION NAME/DATE =	9057 hidden lake cal elog.0 08/15/2013	Version 3.65 HR

TOOL CALIBRATION HIDDEN LAKE PWS WELL 08/15/13 10:18:
TOOL 9057A TM VERSION 28271
SERIAL NUMBER 244

	DATE	TIME	SENSOR	STANDARD		RESPONSE	
1	Jun09,13	22:44:11	GAMMA	0.000	[API-GR]	3.000	[CPS]
	Jun09,13	22:44:11	GAMMA	335.000	[API-GR]	305.000	[CPS]
2	Jun09,13	22:52:36	NEUTRON	1.000	[API-N]	0.000	[CPS]
	Jun09,13	22:52:36	NEUTRON	271.000	[API-N]	36.000	[CPS]
3	Jun09,13	22:51:28	SP	0.000	[MV]	320923.000	[CPS]
	Jun09,13	22:51:28	SP	556.000	[MV]	40690.000	[CPS]
4	Jun09,13	22:46:27	RES(16N)	0.000	[OHM-M]	3800.000	[CPS]
	Jun09,13	22:46:27	RES(16N)	1951.990	[OHM-M]	430996.000	[CPS]
5	Jun09,13	22:46:09	RES(64N)	0.000	[OHM-M]	3350.000	[CPS]
	Jun09,13	22:46:09	RES(64N)	1995.410	[OHM-M]	435889.000	[CPS]
6	Feb04,11	08:19:59	TEMP	43.400	[DEG F]	338276.000	[CPS]
	Feb04,11	08:19:59	TEMP	115.300	[DEG F]	389947.000	[CPS]
7	Jun09,13	22:45:14	RES	0.000	[OHM]	4410.000	[CPS]
	Jun09,13	22:45:14	RES	945.000	[OHM]	166114.000	[CPS]
8	May06,13	10:10:31	POR(NEU)	100.000	[PERCENT]	36.000	[CPS]

* * * * * * * COMPU-LOG - VERTICAL DEVIATION * * * * * * *

CLIENT : NATIONAL ESP HOLE ID. : HIDDEN LAKE P
FIELD OFFICE : N/A DATE OF LOG : 08/15/13
DATA FROM : 6 PROBE : 9057A , 2441
MAG. DECL. : 12.800 DEPTH UNITS : FEET
LOG: \HIDDENLAKEPWSWELL_08-15-13_10-18_9057A_.10_-13.70_1584.90_DEVI.log

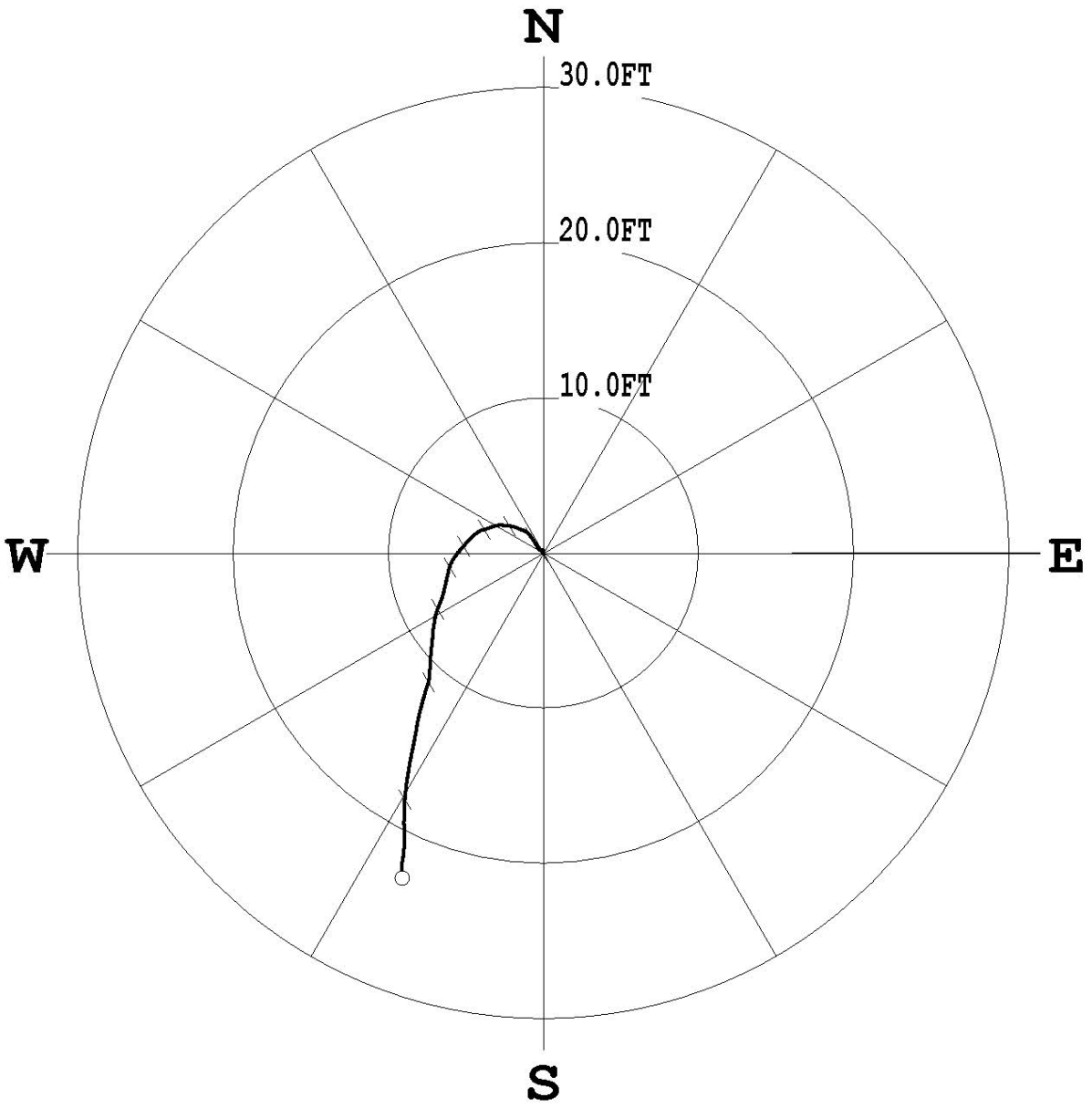
CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
2.70	2.70	0.00	0.00	0.0	0.0	0.0	0.0
16.30	16.30	0.00	0.00	0.0	1.2	0.3	124.7
46.30	46.30	-0.00	-0.03	0.0	262.0	0.2	287.9
76.30	76.30	-0.01	-0.03	0.0	249.4	0.1	293.5
106.30	106.30	0.01	-0.04	0.0	279.8	0.1	14.6
136.30	136.30	0.09	-0.09	0.1	315.9	0.5	167.9
166.30	166.30	0.17	-0.08	0.2	333.5	0.5	32.2
196.30	196.30	0.24	-0.09	0.3	339.0	0.4	66.9
226.30	226.30	0.17	-0.15	0.2	319.6	0.6	283.6
256.30	256.29	0.23	-0.19	0.3	319.6	0.5	110.2
286.30	286.29	0.23	-0.26	0.3	310.9	0.5	138.1
316.30	316.29	0.30	-0.29	0.4	316.0	0.4	130.9
346.30	346.29	0.35	-0.38	0.5	313.0	0.6	328.7
376.30	376.29	0.54	-0.47	0.7	319.1	0.5	307.3
406.30	406.29	0.70	-0.58	0.9	320.1	0.5	327.6
436.30	436.29	0.95	-0.73	1.2	322.3	0.5	327.6
466.30	466.29	1.18	-0.91	1.5	322.3	0.6	329.3
496.30	496.28	1.39	-1.14	1.8	320.7	0.6	296.1
526.30	526.28	1.53	-1.45	2.1	316.5	0.7	284.0
556.30	556.28	1.64	-1.74	2.4	313.3	0.7	298.9
586.30	586.28	1.74	-2.07	2.7	310.2	0.7	283.6
616.30	616.28	1.78	-2.41	3.0	306.4	0.9	280.8
646.30	646.27	1.81	-2.71	3.3	303.7	0.4	289.6
676.30	676.27	1.78	-3.02	3.5	300.6	0.5	252.1
706.30	706.27	1.69	-3.36	3.8	296.8	0.5	243.1
736.30	736.27	1.57	-3.69	4.0	293.1	0.8	260.9
766.30	766.27	1.48	-4.01	4.3	290.3	0.6	251.7
796.30	796.27	1.35	-4.25	4.5	287.6	0.5	222.2
826.30	826.26	1.14	-4.52	4.7	284.2	0.7	230.9
856.30	856.26	0.89	-4.78	4.9	280.5	0.8	221.9
886.30	886.26	0.59	-5.05	5.1	276.6	0.7	220.2
916.30	916.26	0.31	-5.28	5.3	273.3	0.7	213.9
946.30	946.25	0.05	-5.52	5.5	270.6	0.7	224.0
976.30	976.25	-0.20	-5.70	5.7	268.0	0.5	209.3
1006.30	1006.25	-0.42	-5.84	5.9	265.8	0.5	204.4
1036.30	1036.25	-0.73	-6.00	6.0	263.1	0.7	200.5
1066.30	1066.25	-1.13	-6.13	6.2	259.5	0.8	190.0
1096.30	1096.24	-1.60	-6.24	6.4	255.6	1.1	194.2
1126.30	1126.24	-2.14	-6.35	6.7	251.4	1.2	194.6
1156.30	1156.23	-2.74	-6.50	7.1	247.1	1.0	195.5
1186.30	1186.22	-3.30	-6.72	7.5	243.9	1.3	197.8
1216.30	1216.22	-3.95	-6.94	8.0	240.4	1.2	186.1
1246.30	1246.21	-4.73	-7.09	8.5	236.3	1.4	184.8
1276.30	1276.19	-5.56	-7.17	9.1	232.2	1.8	188.0
1306.30	1306.18	-6.56	-7.27	9.8	227.9	2.0	185.0
1336.30	1336.16	-7.71	-7.34	10.7	223.6	2.4	183.8
1366.30	1366.13	-8.98	-7.63	11.8	220.4	2.6	194.3
1396.30	1396.10	-10.31	-7.99	13.0	217.8	2.7	194.9
1426.30	1426.06	-11.80	-8.28	14.4	215.1	2.9	192.5
1456.30	1456.01	-13.37	-8.59	15.9	212.7	3.1	189.6
1486.30	1485.97	-15.02	-8.86	17.4	210.5	3.0	189.6
1516.30	1515.92	-16.77	-8.97	19.0	208.1	3.2	179.2
1546.30	1545.86	-18.55	-8.97	20.6	205.8	3.7	182.7
1576.30	1575.80	-20.40	-9.11	22.3	204.1	3.9	169.5
1584.20	1583.68	-20.93	-9.09	22.8	203.5	4.4	161.5

PLAN VIEW
COMPU-LOG DEVIATION

CLIENT: NATIONAL ESP
LOCATION:
HOLE ID: HIDDEN LAKE PWS WELL
DATE OF LOG: 08/15/13
PROBE: 9057A 2441

MAG DECL: 12.8

SCALE: 10 FT/IN
TRUE DEPTH: 1583.68 FT
AZIMUTH: 203.5
DISTANCE: 22.8 FT
+ = 150 FT INCR
○ = BOTTOM OF HOLE



APPENDIX E

GROUT SEAL CERTIFICATION

LOUGHLIN
WATER ASSOCIATES ▲ LLC

August 30, 2013

Utah Division of Drinking Water
Attention: Kenneth H. Bousfield, P.E.
Director, Division of Drinking Water Board
P.O. Box 144830
Salt Lake City, Utah 84114

Subject: Grout Witness Certification
Hidden Lake PWS Well (WS008), DDW File #09225
Powder Mountain Water & Sewer Improvement District (PMWSID)
Public Water System (PWS) No. 29028
Weber County, Utah

Dear Mr. Bousfield:

This letter verifies that the subject well seal was installed in compliance with Utah Administrative Code (UAC) R309-515-6(6)(i).

National EWP, Utah-licensed water well driller #805, drilled the well under water right E4715 (35-11995), and installed the casing and well seal.

The Hidden Lake Well will be a source for the Powder Mountain Water & Sewer Improvement District (PMWSID), Public Water System (PWS) No. 29028.

The approximate location of the Hidden Lake PWS Well is:

- Northing 3,658,232 feet; easting 1,568,084 feet (State Plane North Zone coordinate, NAD83);
- North 1437 feet, east 1548 feet from the south quarter corner of Section 6, Township 7 North, Range 2 East, Salt Lake Base and Meridian (SLB&M); or
- Longitude 111.763540267 degrees west; Latitude 41.3688600368 degrees north.

Loughlin Water Associates, LLC (Loughlin Water) staff estimated the well location by using a compass and tape and measuring 25 feet from a point surveyed by Adam Allen of NV5, Inc. Adam Allen reported the location of the point in State Plane coordinates. Loughlin Water staff converted the State Plane coordinates using the Utah State Engineer's location converter. The approximate well head elevation is 8904 feet, based on a site contour map prepared by Adam Allen of NV5, Inc.

3100 W. Pinebrook Road, Ste. 1100 ▲ Park City, Utah 84098
Phone: 435.649.4005 ▲ Fax: 435.649.4085 ▲ Mobile: 435.659.1752 ▲ www.LoughlinWater.com

National EWP constructed the well with three casing strings that were sealed: a conductor casing, a surface casing and an inner casing. National EWP installed the neat cement grout by pumping under pressure through a 2-inch outside diameter tremie pipe. National EWP kept the tremie within the grout slurry at all times during grout installation. National EWP installed unhydrated bentonite in the uppermost 10 feet of each annular space to allow later installation of a pitless adaptor.

National EWP installed the conductor casing on July 24, 2013, in a 30-inch diameter borehole. The conductor casing extends from the ground surface to a depth of 40 feet. The conductor casing has an outside diameter of 26.0 inches, an inside diameter of 25.375 inches and a wall thickness of 0.312 inches. The annulus between the conductor casing and the borehole was a minimum of 2 inches. The theoretical total required grout volume was 273 gallons to fill the annulus from 10 to 40 feet depth. National EWP mixed the neat cement grout in two batches. In order to accelerate the strengthening of the cement grout, National EWP added 2% calcium chloride to the slurry. Before pumping the grout into the annulus, George Condrat (individual authorized to witness grouting on behalf of the Division of Drinking Water [DDW]) and National EWP staff measured the grout density of the two batches to be 16.0 and 15.8 pounds per gallon, respectively. National EWP staff and George Condrat measured the grout density of each batch separately; the measurements were the same. The mixed cement slurry volume was about 337 gallons, which was 123% of the theoretical volume of the annulus. After allowing the neat cement to settle for about an hour, National EWP washed out the cement grout to a depth of 10 feet and installed unhydrated bentonite from a depth of about 10 feet to the surface. The following individuals were present during all or part of the grouting operation: George W. Condrat of Loughlin Water, and David Clark, Tyler Jones, Landon McCowen and Vince Hardie of National EWP.

National EWP installed the surface casing on July 30, 2013, in a 24-inch diameter borehole. The surface casing extends from ground level to a depth of 398 feet. The surface casing has an outside diameter of 20.0 inches, an inside diameter of 19.25 inches and a wall thickness of 0.375 inches. The annulus between the surface casing and the borehole was a minimum of 2 inches. The theoretical total required grout volume was 2794 gallons to fill the annulus from 10 to 398 feet depth. National EWP mixed the neat cement grout in 15 batches. In order to accelerate the strengthening the initial batch of the cement grout, National EWP added 2% calcium chloride to the first batch. Before pumping the grout into the annulus, George Condrat and National EWP staff measured the grout density of each batch separately; the measurements were usually the same and did not vary more than 0.1 pound per gallon. The slurry density ranged from 15.2 to 16.4 pounds per gallon, and averaged 15.9 pounds per gallon. The mixed cement slurry volume was about 3276 gallons, which was 117% of the theoretical volume of the annulus. After allowing the neat cement to settle for about an hour, National EWP washed out the cement grout to a depth of 10 feet and installed unhydrated bentonite from a depth of about 10 feet to the surface. The following individuals were present during all or part of the grouting operation: George W. Condrat of Loughlin Water, and Ron Simkins, Sander Simkins, Cameron Griggs,

Jake Mulberry, David Clark, Tyler Jones, Landon McCowen and Vince Hardie of National EWP.

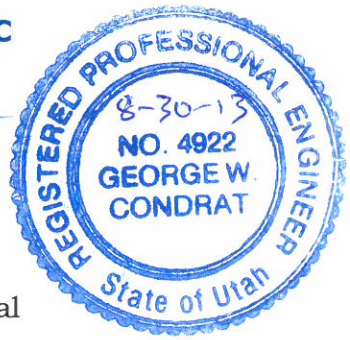
National EWP completed the installation of the inner casing and slotted casing on August 16, 2013, and completed gravel packing on August 17, 2013. The inner borehole diameter was 19-inches. National EWP filled the inner borehole annulus with ½ x ¾-inch formation stabilizer (gravel pack) from the bottom of the borehole at a depth of 1600 feet to a depth of 779 feet below ground level. National installed the well seal around the 14-inch diameter casing from August 17 to 18, 2013. The inner casing that was sealed with bentonite and neat cement grout has an outside diameter of 14.0 inches, an inside diameter of 13.00 inches and a wall thickness of 0.50 inches. The annulus between the inner casing and the borehole was a minimum of 2 inches. National installed twenty four 50-pound bags of unhydrated bentonite from 779 to 759 feet below ground level (108% of the theoretical volume). The theoretical total required volume of cement grout was 5185 gallons to fill the annulus from 10 to 759 feet depth. National EWP mixed the neat cement grout in 32 batches. In order to accelerate the strengthening of the cement grout, National EWP added 1% calcium chloride to all slurry batches. Before pumping the grout into the annulus, George Condrat and National EWP staff measured the grout density of the batch separately; the measurements were usually the same and did not vary more than 0.1 pound per gallon. The slurry density ranged from 15.3 to 16.1 pounds per gallon, and averaged 15.6 pounds per gallon. The mixed cement slurry volume was about approximately 5984 gallons, which was 115% of the theoretical volume of the annulus. After allowing the neat cement to settle for about an hour, National EWP washed out the cement grout to a depth of 10 feet and installed unhydrated bentonite from a depth of about 10 feet to the surface. The following individuals were present during all or part of the grouting operation: George W. Condrat of Loughlin Water, and Jake Mulberry, David Clark, Tyler Jones, Landon McCowen, Alex Larsen, Ryan Wright, and Kelley Simkins of National EWP.

As required by R309-515-6(5)(b)(i)(B), we have attached a copy of the letter authorizing Mr. Condrat to witness well sealing on behalf of the DDW.

If you have any questions or need more information, please do not hesitate to call us at (435) 649-4005 (office) or Bill at (435) 659-1752 (mobile) or George at (435) 659-1753 (mobile).

Very truly yours,

Loughlin Water Associates, LLC



George W. Condrat, P.G., P.E
Senior Engineer
Authorized Grout Witness Individual

William D. Loughlin, P.G.
Manager, Principal Hydrogeologist

Attachment: Grout Witness Authorization Letter

cc: Bob Hart – DDW
Ying-Ying Macauley - DDW
Russ Watts / Rick Everson – Watts Enterprises

State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
Director

June 21, 2013

George W. Condrat, P.G, P.E.
Loughlin Water Associates, LLC
3100 West Pinebrook Road, Suite 1100
Park City, UT 84098

Dear Mr. Condrat:

Subject: **Well Grout Witness Authorization**

On April 19, 2013, the Division of Drinking Water (the Division) received your request that the Director authorize you to witness the grouting procedure for a public drinking water well and issue well seal certificate per Utah Administrative Code *R309-515-6(5)(b)*.

The Division's Well Grout Witness Authorization Review Committee reviewed your application based on the below criteria:

1. At least 5 years professional experience designing wells, supervising well drilling or other equivalent experience associated with well drilling or well sealing that are acceptable to the Director [*R309-515-6(5)(b)(ii)(A)*]
2. Evidence of licensure as a professional engineer or professional geologist in Utah [*R309-515-6(5)(b)(ii)(B)(II)*]
3. No familial, former long term employee, business partnerships, etc. with a well driller [*R309-515-6(5)(b)(ii)(B)(III)*]
4. Acknowledgement that the applicant would not be acting as an agent or employee of the State of Utah and that any losses incurred while acting as a witness would not be covered by governmental immunity or Utah's insurance [*R309-515-6(5)(b)(ii)(B)(IV)*]
5. Willingness to attend training events as required by the Director [*R309-515-6(5)(b)(ii)(B)(V)*]
6. Complete, with a minimum of 75% passing grade, an examination on water well drilling rules as offered by the Division of Water Rights [*R309-515-6(5)(b)(ii)(B)(V)*]

The Well Grout Witness Authorization Review Committee determined that you have met all of the above criteria. **On this basis you are hereby authorized to witness the public drinking**

water well grouting procedure and to issue well seal certificates. This authorization is contingent upon your continuous fulfillment of the conditions for obtaining authorization per *R309-515-6(5)(b)(ii)*.

Please include all of the following information, as a minimum, in each well seal certificate per *R309-515-6(5)(b)(iii),* and send a copy of the well seal certificate to the Division.

(A) Certification that the well sealing procedure met all the requirements of Rule *R309-515-6(6)(i)*;
(B) The water right under which the well was drilled and the well driller's license number;
(C) The public water system name (if applicable);
(D) The latitude and longitude of the well and method used for its determination;
(E) The well head's approximate elevation;
(F) Casing diameter(s), length(s), and material(s);
(G) The size of the annulus between the borehole and casing;
(H) A description of the sealing process including the sealing material used, its volume, density, method of placement, and depth from surface; and
(I) The names and company affiliations of other individuals observing the sealing procedure including, but not limited to the well driller, the well owner, and/or a consultant.

Thank you for your interest in being a part of this program and congratulations on becoming an authorized well grout inspector.

Sincerely,

Kenneth H. Bousfield, P.E.
Director

NL

cc: Jim Goddard, P.G., Division of Water Rights, jimgoddard@utah.gov
Jim Martin, P.G., Division of Drinking Water, jhmartin@utah.gov
DEQ District Engineers

DDW-2013-006366.doc

APPENDIX F

PUMPING TEST DATA

Table F-1

Constant-Rate Pumping Test - Hidden Lake Well

Time	Water Level Depth (ft) *	Flow (gpm)	Elapsed Time (minutes)	Drawdown or Residual Drawdown (ft)	Comment
11/7/13 9:00	766.26	0			Pre-pumping water level
9:00	766.26		0		Start pumping
9:01	827.55		1	61.3	
9:02	846.72		2	80.5	
9:03	858.33		3	92.1	
9:04	865.48		4	99.2	
9:05	871.13		5	104.9	
9:06	876.25		6	110.0	
9:07	878.53		7	112.3	
9:08	882.44		8	116.2	
9:09	886.04		9	119.8	
9:10	889.33		10	123.1	
9:15	897.94		15	131.7	
9:20	908.05	178	20	141.8	Totalizer = 2448800 gal
9:25	914.22		25	148.0	
9:30	918.41		30	152.2	
9:40	927.50		40	161.2	
9:50	932.57		50	166.3	
9:57		179	57		Totalizer = 2455500
10:00	936.13		60	169.9	
10:15	940.08		75	173.8	
10:30	942.48		90	176.2	
10:45	946.26		105	180.0	
11:00	948.42		120	182.2	
11:20	950.11		140	183.9	
11:40	952.86		160	186.6	
12:00	953.81		180	187.6	
12:30	955.28		210	189.0	
12:31		182	211		Totalizer = 2483600
13:00	956.47		240	190.2	
14:00	957.49		300	191.2	
15:00	958.11		360	191.9	
16:00	958.64		420	192.4	
16:59		183	479		Totalizer = 2532600
17:00	959.27		480	193.0	
18:00	959.59		540	193.3	
19:00	959.86		600	193.6	
19:51		181	651		Totalizer = 2563700
20:00	960.36		660	194.1	
21:00	961.00		720	194.7	
22:00	961.38		780	195.1	
23:00	961.61		840	195.4	
11/8/13 0:00	961.87		900	195.6	
1:00	962.20		960	195.9	
2:00	962.61		1020	196.4	

Table F-1

Constant-Rate Pumping Test - Hidden Lake Well

Time	Water Level Depth (ft) *	Flow (gpm)	Elapsed Time (minutes)	Drawdown or Residual Drawdown (ft)	Comment
3:00	962.72		1080	196.5	
4:00	962.09		1140	195.8	
4:06		181	1146		Totalizer = 2653500
5:00	962.18		1200	195.9	
6:00	962.04		1260	195.8	
7:00	962.19		1320	195.9	
8:00	962.36		1380	196.1	
9:00	962.47		1440	196.2	
9:29	961.90		1469	195.6	
9:30	961.90	180	1470	195.6	Pump off, Totalizer = 2711900
9:31	945.86		1471	179.6	
9:32	926.19		1472	159.9	
9:33	904.00		1473	137.7	
9:34	886.16		1474	119.9	
9:35	872.17		1475	105.9	
9:36	867.29		1476	101.0	
9:37	854.12		1477	87.9	
9:38	845.31		1478	79.1	
9:39	832.34		1479	66.1	
9:40	824.52		1480	58.3	
9:45	808.16		1485	41.9	
9:50	801.74		1490	35.5	
9:55	795.87		1495	29.6	
10:00	792.95		1500	26.7	
10:10	789.06		1510	22.8	
10:20	785.78		1520	19.5	
10:30	782.55		1530	16.3	
10:45	780.60		1545	14.3	
11:00	779.41		1560	13.2	
11:30	777.06		1590	10.8	
12:00	775.80		1620	9.5	
12:30	774.69		1650	8.4	
13:30	773.21		1710	7.0	
14:30	772.29		1770	6.0	
15:30	771.60		1830	5.3	
11/8/13 16:00	771.48		1860	5.2	
11/11/13 12:30	765.23		5970	-1.0	

Notes:

*Water level measured by hand from top of PVC measurement tube approx. 2.04 ft above ground.

Flow rate based on totalizer readings (average rate between totalizer readings).

Average flow rate over test period was 181 gpm.

Table F-2
Additional Flow Measurements
Constant-Rate Pumping Test - Hidden Lake Well

Time	Flow (gpm)[1]	Flow (gpm)[2]	Elapsed Time (minutes)	Comment
11/7/13 9:00		0		Pre-pumping water level
9:00			0.0	Start pumping
9:12:00		175	12.0	Totalizer = 2447400 gal
9:14:00	186			After removing kink in hose
9:19:40		183	19.7	Totalizer = 2448800
9:26:12		184	26.2	Totalizer = 2450000
9:29:00	182			
9:30:00	186			After removing kink in hose
9:42:00	182			
9:44:12		183	44.2	Totalizer = 2453300
9:52:00	182			
10:31:56	181	182	91.9	Totalizer = 2462000
11:03:17	181	182	123.3	Totalizer = 2467700
11:31:10	181	183	151.2	Totalizer = 2472800
12:03:28	182	183	183.5	Totalizer = 2478700
13:08:21	181	183	248.3	Totalizer = 2490600
13:30:48	181	183	270.8	Totalizer = 2494700
14:00:27	181	182	300.5	Totalizer = 2500100
14:30:31	181	183	330.5	Totalizer = 2505600
15:00:46	181	182	360.8	Totalizer = 2511100
15:30:25	180	182	390.4	Totalizer = 2516500
16:00:35		182	420.6	Totalizer = 2522000
6:53:22	178	181	1313.4	Totalizer = 2683800
8:00:00	178	180	1380.0	Totalizer = 2695800
9:22:44	178	180	1462.7	Totalizer = 2710700
9:30:00		181[3]	1470.0	Totalizer = 2711900

[1] Flow based on orifice weir.

[2] Flow based on totalizer (average flow between totalizer readings).

[3] Average flow for test period.

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner Powder Mtn
Location Upper parking Lot
Well Name - No. Hidden Lake pws
Casing Size 16" Depth ~~1600~~ 1590
Pump Size 4" Depth 1250
Bowl Size 7GC # Stages 11 5.125"
Type of test Trial pump
Discharge Pipe ____ Orifice ____ Meter ____

Sheet No. 1 of ____
Date Oct 7 2015
Operator Matt
Engineer Gforce Control
Static Level 753.65
Datum Top of Casing NO.LC

Time of Day	ΔT	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	ΔWL	Specific Capacity	Sand Content PPM	Start / Stop	MLS	REMARKS
Install		NA	Large	few	Joints	and					Owner of the mill home is
Pre Pump		50	pump								Summit Mountain holding group
											will be turned over to
14.30			42	766.63	753.65	13.0	3.23				powder mtn water + sewer
14.54			45	831.56	753.65	77.91	0.57	4.16	15.00 / 16.00	0.05	
15.07			40	854.72	753.65	101.07	0.39				1580' - 980' slotted casing
15.15			40	868.89	753.65	115.24	0.34				
15.30			45	874.24	753.65	120.59	0.37				
15.45			45	876.34	753.65	122.69	0.36				
16.00			40	877.56	753.65	123.91	0.32				
4.10		Shut Down									

Signature: Operator ____ Engineer ____ Hours Today 12 To Date 12

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn | Sheet No. 2 of
Location: upper parking lot | Date: Oct 8 2013
Well Name - No. | Operator: MATT
Casing Size: 14" Depth | Engineer: Glory Condra
Type of test: Development | Pump Size: 4" Depth: 1250 | Static Level: 753.53
Discharge Pipe: 4" Orifice: - Meter: 4" McCrometer | Bowl Size: 7 ULC # Stages: 11 5.125" | Datum: TOP of Casing + 0.16'

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
08.40	Arrive		Start		Generator						
08:50	Set	Start	Level		Prepare	to	Run				
09:00	Beam	Pumping						4.41	09.00 / 12.01	1.6	50 HZ
09:07			50	862.98	753.53	73.45	0.68				
09.15			50	872.94	753.53	119.41	0.41				
09.30			50	880.19	753.53	126.66	0.39				
09.45			50	896.06	753.53	142.53	0.35				0931 increase speed to 51HZ
10.00			50	901.53	753.53	148.00	0.33				
10.15			50	903.26	753.53	149.73	0.33				
10.30			50	911.58	753.53	158.05	0.31				
10.45			50	916.60	753.53	163.07	0.30				
11.00			50	917.57	753.53	164.04	0.30				
11.15			50	918.32	753.53	164.79	0.30				
11.30			50	919.17	753.53	165.64	0.30				
11.45			50	919.25	753.53	165.72	0.30				
12.00			50	919.73	753.53	166.20	0.30				
12:02	Increase		Frequency		To	increase	Q				
12.15			80	949.68	753.53	196.15	0.40	27.4	12.03 / 12.56	2.8	
12.30			70	956.93	753.53	203.40	0.34				
12.45			70	972.38	753.53	218.85	0.31				Very Dirty
13.00			70	978.30	753.53	224.77	0.31	116.1	12.57 / 1331	7.9	
13.15			70	980.38	753.53	226.85	0.30				
13.30			70	981.78	753.53	228.25	0.30				

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn — Sheet No. 3 of
Location: Upper Parking Lot — Date: Oct 8 2013
Well Name - No. — Operator: Matt
Casing Size: 14" Depth — Engineer: George Condrat
Type of test: Development — Pump Size: 4" Depth: 1250' — Static Level: 753.53
Discharge Pipe: 4" Orifice: — Meter: 4" McCrometer — Bowl Size: 7CLC — # Stages: 11 5'125 mx — Datum: T.O.C. + 0.16'

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
13.45			70	952.77	753.53	230.24	0.30	104	13.32 / 14.16	9.2	
14.00			70	984.40	753.53	230.87	0.30				
14.15			70	985.00	753.53	231.47	0.30	210.5	14.17 / 15.15	12.3	
14.30			70	985.72	753.53	232.19	0.30				54.5 HZ
14.45			70	986.26	753.53	232.73	0.30				
15.00			70	987.52	753.53	233.99	0.29				
15.15			70	988.26	753.57	234.73	0.29	158.9	15.19 / 15.45	8.9	
15.30			70	988.47	753.53	234.94	0.29				
15.45			70	988.97	753.53	235.44	0.29	275	15.47 / 16.16	16.0	
16.00			70	990.28	753.53	236.75	0.29				
16.15			70	989.83	753.53	236.30	0.29	302	16.18 / 16.54	12.7	
16.30			70	989.93	753.53	236.40	0.29	447.0	16.4 / 16.52	15.2	
16.45			70	989.92	753.53	236.39	0.29				
17.00			70	990.75	753.53	237.22	0.29				
17.02	Shut	Down									

Signature: Operator — Engineer — Hours Today 8 — To Date 9½

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Ponder and Water & Sewer — Sheet No. 4 of
Location: upper pumice Lea — Date: Oct 9. 2013
Well Name - No.: Hidden Lake Pws — Operator: Matt
Casing Size: 14" — Depth: 1590 — Engineer: George Condra
Pump Size: 4" — Depth: 1250 — Static Level: 755.51
Type of test: Development
Discharge Pipe: 4" — Orifice: — — Meter: 4" McCrometer
Bowl Size: 7 GPC — # Stages: 11 5125 r.s — Datum: Top of Casing 10.16

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
08:40	Arrive +		Start	generator							
08:50	~~Begin~~		~~Pumping~~	Prepare	R	Pump					
09:00	Start	Pumping						400	Open / 09:15	11.2	Totalizer Before 350800
09:07			70	877.88	755.51	122.37	0.57				
09:15			70	915.27	755.51	159.76	0.43				
09:30			70	947.48	755.51	191.97	0.36	47.3	9:31 / 10:48	7.1	
09:45			70	960.42	755.51	204.91	0.34				
10:00			70	968.99	755.51	213.48	0.32				Totalizer @ 9:59 354500
10:15			70	973.11	755.51	217.60	0.32				
10:30			70	975.37	755.51	219.86	0.31				Totalizer @ 10:23 356100 -66.6 GPM
10:45			70	976.70	755.51	221.19	0.31	34.8	10:47 / 11:16	6.2	
11:00			70	977.64	755.51	222.13	0.31				
11:15			70	980.13	755.51	224.62	0.31				
11:30			70	981.41	755.51	225.90	0.30				
11:45			70	982.26	755.51	226.75	0.30				
12:00			70	983.34	755.51	227.83	0.30				
12:15			70	984.19	755.51	228.68	0.30	50.0	12:17 / 13:06	4.9	Totalizer @ 12:20 363400 - 62.3 gpm
12:30			60	984.72	755.51	229.21	0.26				
12:45			60	985.14	755.51	229.63	0.26				
13:00			60	985.50	755.51	229.99	0.26	38.8	11:09 / 13:52	3.5	
13:15			60	985.93	755.51	230.42	0.26				
13:30			60	986.11	755.51	230.60	0.26				
13:45			60	986.35	755.51	230.84	0.25				

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn. Water + Sewer 5 | Sheet No. ____ of ____
Location: Upper parking Lot | Date: Oct 9 2013
Well Name - No.: Hidden Lake PWS | Operator: Matt
Casing Size: 14" | Depth: 1590' | Engineer: George Condrat
Pump Size: 4" | Depth: 1250' | Static Level: 755.51
Type of test: Developement
Discharge Pipe: 4" | Orifice: - | Meter: 4" M. Crompton
Bowl Size: 7 LLC | # Stages: 11 5.125 ran | Datum: T.O.C. + 0.16'

Time of Day	ΔT	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	ΔWL	Specific Capacity	Sand Content PPM	Start / Stop	MLS	REMARKS
14.00			60	986.23	755.51	230.72	0.26	76.3	13.53 / 13.09	11.6	Mostly water
14.15			60	986.41	755.51	230.90	0.25				
14.30			60	986.92	755.51	231.41	0.25				
14.45			60	983.69	755.51	228.18	0.26	82.6	15.10 / 16.19	11.4	
15.00			60	984.21	755.51	228.70	0.26				
15.15			60	985.00	755.51	229.49	0.26				
15.30			60	984.98	755.51	229.47	0.26				
15.45			60	985.20	755.51	229.69	0.26				
16.00			60	985.67	755.51	230.16	0.26				
16.15			60	985.74	755.51	230.27	0.26	104.5	16.20 / 16.34	23	
16.30			60	985.92	755.51	230.41	0.26				
16.32	Shut Down										

Signature: Operator ____ Engineer ____ Hours Today 7½ To Date 17

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn
Location: upper Parking Lot
Well Name - No.: Hidden Lake pwrs
Casing Size: 14" Depth: 1580
Pump Size: 4" Depth: 1250
Bowl Size: 7LC # Stages: 11 5.125 trim

Sheet No. 6 of
Date: Oct 10 2013
Operator: Matt, Fabian
Engineer: Glenn Condrat
Static Level: 756.57
Datum: Top of Casing + 0.16'

Type of test
Discharge Pipe Orifice Meter

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
	At the end of the day yesterday										
	Glenn Condrat and I Checked the										
	flow with A 5 gallon bucket and										
	it seems to be much higher than the										
	GPM										
	This morning we changed the flow -										
	Meter insert and this appears to be										
	Accurate but we can verify it with										
	a 5 Gallon Drum.										

Signature: Operator Engineer Hours Today To Date

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn
Location: Upper Parking Lot
Well Name - No.: Hidden Lake PWS
Casing Size: 14" Depth: 1590
Pump Size: 4" Depth: 1250
Bowl Size: 7CLC # Stages: 11 5125 rpm

Sheet No.: 7 of
Date: Oct 10 2013
Operator: Matt, Fabian
Engineer: George Condrat
Static Level: 756.57
Datum: Top of Casing + 0.16'

Type of test: Developement
Discharge Pipe: 4" Orifice: — Meter: 4" McCrometer

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ WL	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
10:45	Arrive	and	Change	flow meter	insert						Totalizer 1709200
10:55	Start	generator			Use	Frank	Well				
11:05	Start	pumping									
11:15			180	886.26	756.57	129.69	1.38	53.7	11:07 / 12:00	5.7	
11:30			180	920.81	756.57	164.24	1.09				
11:45			180	938.95	756.57	182.38	0.98				
12:00			180	950.22	756.57	193.65	0.92	48.3	12:01 / 13:01	5.8	
12:15			180	957.48	756.57	200.91	0.89				
12:17	Increase		Speed	to	54.5	Hz					
12:30			190	970.84	756.57	214.27	0.84				
12:45			190	976.08	756.57	219.51	0.86				
13:00			190	978.81	756.57	222.24	0.85	534	13:02 / 13:46	4.7	
13:15			180	979.99	756.57	223.42	0.80				Totalizer 1732500 @ 13:17 -176 gpm
13:30			180	981.04	756.57	224.47	0.80				
13:45			180	981.71	756.57	225.14	0.79	74.4	13:47 / 14:30	6.4	
14:00			180	982.16	756.57	225.59	0.79				
14:15			180	983.06	756.57	226.49	0.79				
14:30			180	983.15	756.57	226.58	0.79	210	14:32 / 15:10	16.0	
14:45			180	983.36	756.57	226.79	0.79				
15:00			200	1007.56	756.57	250.99	0.79				1500 speed up Drive to 56.5
15:15			210	1019.48	756.57	262.91	0.79				
15:30			200	1026.89	756.57	270.32	0.73	591	15:19 / 15:31	14.2	
15:45			200	1031.16	756.57	274.59	0.72	523	15:32 / 15:45	13.6	

Signature: Operator ______ Engineer ______ Hours Today ______ To Date ______

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn | Sheet No. 8 of
Location: Upper Parking Lot | Date: Oct 10 2013
Well Name - No.: Hidden Lake PWS | Operator: Matt, Fabian
Casing Size: 14" | Depth: 1590 | Engineer: George Conroy
Pump Size: "4" | Depth: 1250 | Static Level: 756.57
Bowl Size: 7CLC | # Stages: 11 5.125 Trim | Datum: T.O.C. + 0.16'
Type of test: Development
Discharge Pipe: 4" | Orifice: – | Meter: 4" McCrometer

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
16:00			200	1032.08	756.57	275.51	0.72	571	13:46 / 16:00	16.0	
16:15			200	1035.48	756.57	278.91	0.71	377	16:02 / 16:15	9.8	565 MZ
16:30			200	1038.52	756.57	281.95	0.70	373	16:17 / 16:30	9.7	
16:45			200	1043.37	756.57	286.8	0.69	350	16:31 / 16:44	9.1	Total 1710, 1774800
1700			200	1044.77	756.57	288.2	0.69				
17:02	Shut Down										

Signature: Operator _____ Engineer _____ Hours Today 6 To Date 23

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn — Sheet No. 9 of
Location: Upper Parking Lot — Date: Oct 11 2013
Well Name - No.: Hidden Lake PWS — Operator: MAH
Casing Size: 14" — Depth: 1590 — Engineer: George Conrad
Pump Size: 4" — Depth: 1250 — Static Level: 757 76
Bowl Size: 7 CLC — # Stages: 11 — 5125 rpm — Datum: Top of Casing + 0.16'

Type of test: Development
Discharge Pipe: 4" — Orifice: - — Meter: 4" McCrometer

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
08:40	Arrive +		gt	generator		Running					
08:50	Prepare to		Pump								
09:00	Start	Pumping						85.4	09:06 / 10:49	94	52 42
09.15			200	915.66	757.76	157.90	1.26				totalizer 09:18 1777800
09:30			200	957.58	757.76	199.82	1.00				54.2 42
09.45			200	970.22	757.76	212.46	0.94				
10.00			200	982.09	757.76	224.24	0.89	186.8	10:02 / 10:21	7.1	
10:15			200	995.61	757.76	237.85	0.84	267	10:28 / 10:51	155	
10 30			200	1000.48	757.76	242.72	0.82				55.5 HZ
10.45			200	1009.07	757.76	251.31	0.79	252	10:52 / 11:17	126	
11:00			200	1016.40	757.76	258.64	0.77				
11.15			200	1019.28	757.76	261.52	0.76	144	11:18 / 12:09	124	
11:30			200	1021.74	757.76	263.98	0.75				totalizer 1803700 @ 11.34 -191 GPM
11.45			200	1026.04	757.76	268.28	0.74				
12.00			200	1027.78	757.76	270.02	0.74	134	12:08 / 13:01	157	
12.15			200	1035.04	757.76	277.28	0.72				
12.30			200	1037.01	757.76	279.25	0.71				
12.45			200	1038.42	757.76	280.66	0.71				
13:00			200	1039.51	757.76	281.75	0.70	175	13:01 / 13:46	154	56.6 HZ
13.15			200	1045.31	757.76	287.55	0.69				
13.30			200	1051.10	757.76	293.43	0.68				
13.45			200	1057.04	757.76	299.28	0.66	227.5	13:47 / 14:57	91	
14:00			200	1064.43	757.76	306.67	0.65				57.5 HZ

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder mtn — Sheet No. 10 of
Location: upper parking Lot — Date: Oct 11 2013
Well Name - No.: hidden Lake Pw5 — Operator: Matt
Casing Size: 14" — Depth: 1590 — Engineer: George Cardon
Pump Size: 4" — Depth: 1250 — Static Level: 757.76
Bowl Size: 7 CLC — # Stages: 11 5.125 Stages — Datum: T.O.C. + 0.16'
Type of test: Revelopment
Discharge Pipe: 4" — Orifice: — — Meter: 4" Mc Crometer

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
14.15			200	1068.21	757.76	311.45	0.64	200	14.08 / 14.46	15.2	
14:30			200	1073.92	757.76	316.16	0.63				
14.45			200	1075.81	757.76	318.05	0.62	195	14.47 / 15.17	11.7	
15:00			200	1082.08	757.76	324.32	0.61				
15:15			200	1083.21	757.76	325.45	0.61	177	15.19 / 16.05	16.9	
15:30			200	1085.92	757.76	328.16	0.60				
15.45			200	1087.21	757.76	329.45	0.60				
16.00			200	1090.57	757.76	332.81	0.60	75	16.05 / 16.59	6.2	
16:15			200	1090.91	757.76	333.15	0.60				
16:30			200	1091.01	757.76	333.34	0.59				
16.45			200	1091.28	757.76	333.52	0.59				
17:00			200	1090.40	757.76	332.64	0.60				57.8 Hz
17:01		Shut Down									
											1867700 totalizer at end

Signature: Operator _____ Engineer _____ Hours Today 8 To Date 51

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn
Sheet No. 11 of
Location: Upper Parking Lot
Date: Oct 12 2013
Well Name - No.: Hidden Lake Plus
Operator: Matt
Casing Size: 14" Depth: 1590
Engineer: George Cardinal
Pump Size: 4" Depth: 1250
Static Level: 758.75
Type of test: Development
Bowl Size: 7 CLC # Stages: 11 5125 rpm
Datum: Top of Casing +0.16
Discharge Pipe: 4" Orifice: – Meter: 4" McCrometer

Time of Day	ΔT	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	ΔWL	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
08:30	Arrive	.	Start	generator,		get	[illegible]	and	Depose	and	Port
08.45	Start	pumping									Totalizer Before pumping 1867700
09.00			200	918.64	758.75	132.89	1.50	128	08.47 / 10.31	134	
09.15			200	950.28	758.75	191.53	1.04				
09.30			200	971.75	758.75	213.00	0.93				
09.45			200	989.46	758.75	230.70	0.86				Totalizer @ 09.50 1880000
10.00			200	1001.97	758.76	243.22	0.82				
1015			200	1011.28	758.75	253.08	0.79		1		
10.30			200	1014.28	758.75	255.53	0.78	218	10.33 / 11.01	127	
10.45			200	1025.91	758.76	267.19	0.74				
11.00			200	1036.62	758.75	277.87	0.71	170	11.04 / 11.3[illegible]	99	
11.15			200	1043.81	758.75	285.06	0.70				
11.30			200	1051.46	758.75	292.71	0.68	166	11.32 / 11.57	6.3	
11.45			200	1058.21	758.75	299.46	0.66				
12:00			200	1066.46	758.75	307.71	0.64	157	11.58 / 12.32	107	
12.15			200	1071.40	758.75	312.65	0.63				
12:30			200	1077.16	758.75	318.41	0.62	115	12.33 / 13.1	134	1912400 Totalizer @ 12.35 - 196 GPM
12:45			200	1082.91	758.75	324.16	0.61				
13.00			200	1086.13	758.75	327.38	0.61				58.3 HZ
13:15			200	1090.00	758.75	331.25	0.60				
13.30			200	1095.97	758.75	337.22	0.59	251	13.32 / 14.0	46	
13.45			200	1096.51	758.75	337.76	0.59				
14:00			200	1095.47	758.75	337.72	0.59				

Signature: Operator ________ Engineer ________ Hours Today ________ To Date ________

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn — Sheet No. 12 of
Location: Upper Parking Lot — Date: Oct 12 2013
Well Name - No.: Hidden Lake Pw5 — Operator: Matt
Casing Size: 14" — Depth: 1590' — Engineer: George Condrat
Type of test: Development — Pump Size: 4" — Depth: 1250' — Static Level: 758.75
Discharge Pipe: 4" — Orifice: - — Meter: 4" Mc Crometer — Bowl Size: 7 LLC — # Stages: 11 5125 trim — Datum: T.O.C. + 0.16'

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
14:15			200	1097.00	758.75	338.25	0.59	484	14:01 / 14:15	12.6	Turbine @ 14:17 1932RPM - 200k
14:30			200	1100.32	758.75	341.57	0.58	533	14:16 / 14:31	16.0	
14:45			200	1099.84	758.76	341.08	0.58	450	14:44 / 15:00	14.4	
15:00			200	1100.02	758.75	341.27	0.58	414	15:01 / 15:15	11.6	
15:15			200	1100.67	758.75	341.92	0.58	270	15:16 / 15:31	10.8	58.5 HZ
15:30			200	1101.38	758.75	342.63	0.58				
15:45			200	1102.00	758.7	343.31	0.58				1950RPM Turbine at End
15:46	Shut Down										

Signature: Operator _____ Engineer _____ Hours Today 7 To Date 38

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn — Sheet No. 13 of
Location: Upper Parking Lot — Date: Oct 14 2013
Well Name - No.: Hidden Lake PWS — Operator: Matt
Casing Size: 14" — Depth: 1590' — Engineer: Grover Condrat
Type of test: Development — Pump Size: 4" — Depth: 1250' — Static Level: 758.48'
Discharge Pipe: 4" — Orifice: — — Meter: 4" McCrometer — Bowl Size: 7 CLC — # Stages: 11 — 5.125" rim Top of Casing +0.16 — Datum:

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
09:00	Arrive and		Start		Generator						Fertilize Before pumping
09:20	Get	Static	and	prepare	to	Pump					1950700
09:30	Begin	Pumping									
09:45			200	914.03	758.48	155.55	1.28	210	09:32 / 09:48	5.9	52 kz
10:00			200	946.23	758.48	187.75	1.06	154	09:47 / 16:31	13.6	
10:15			200	968.93	758.48	210.45	0.95				
10:30			200	980.84	758.48	222.36	0.89	206	10:32 / 11:02	12.4	
10:45			200	986.23	758.48	227.75	0.87				
11:00			200	991.82	758.48	233.34	0.85	235	11:03 / 11:31	13.2	
11:15			200	999.02	758.48	240.54	0.83				
11:30			200	1004.18	758.48	245.70	0.81				
11:45			200	1010.92	758.48	252.44	0.79	234	11:32 / 11:01	13.6	
12:00			200	1016.21	758.48	257.73	0.77	210	12:02 / 12:35	13.9	
12:15			200	1025.32	758.48	266.84	0.74				
12:30			200	1035.13	758.48	276.65	0.72	228	12:36 / 13:01	11.4	
12:46			200	1036.31	758.48	277.83	0.71				
13:00			200	1041.08	758.48	282.60	0.70	194	13:02 / 1330	10.9	
13:15			200	1043.01	758.48	284.53	0.70				1998800 @ 13:44 - 189 gpm
13:30			200	1043.77	758.48	285.29	0.70	145	1331 / 14:01	8.7	
13:45			200	1044.46	758.48	285.98	0.69				
13:50	Increase	flow rate	to		210	@	rpm				
14:00			210	1072.59	758.48	314.11	0.63	272	14:02 / 1431	15.8	
14:15			210	1092.70	758.48	334.22	0.62				2003200 @ 14:05 - 209 gpm

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn | Sheet No. 14 of
Location: Upper Parking Lot | Date: Oct 14 2013
Well Name - No.: Hidden Lake PW5 | Operator: Matt
Casing Size: 14" Depth: 1590' | Engineer: George Condrat
Pump Size: 4" Depth: 1250' | Static Level: 758.48
Discharge Pipe: 4" Orifice: - Meter: 4" McCrometer | Bowl Size: 7 CLC # Stages: 11 5.125 Dia | Datum: T.O.C. + 0.016'
Type of test: Development

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
14:30			210	1103.64	758.48	345.16	0.60	380	14:32 / 14:47	11.4	
14:45			210	1114.72	758.48	356.24	0.58	488	14:48 / 15:04	12.7	
15:00			210	1125.38	758.48	366.90	057	400	15:04 / 15:22	16.0	2015200 @ 15:04 - 203 GPM
15:22			200	1141.04	758.48	382.54	0.52	356	15:24 / 15:46	15.7	Frequency Drive at 100 % 60 HZ
15:35			200	1151.03	758.48	392.55	0.50				Time to Fill 50 Gallon Drum
15:45			200	1157.47	758.48	398.99	0.50	403	15:47 / 16:01	11.3	12.13 Sec 13.83 Sec 11.72 Sec
16:00			200	1161.00	758.48	402.52	0.49	407	16:04 / 16:16	11.4	2019600 @ 15:26 - 200 GPM
16:15			200	1163.53	758.48	405.05	0.49	571	16:17 / 16:31	16.0	2021500 @ 15:35 - 211 GPM
16:30			200	1159.88	758.48	401.40	0.49		16:32 / 16:42		
16:37	Pump		Failed		Pulling	out	high	Amps			
	They good		Stopped		running,		Motor	Megged			

Signature: Operator _____ Engineer _____ Hours Today 7 To Date 45

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn — Sheet No. 15 of

Location: Upper parking lot — Date: Oct - 22 - 2015

Well Name - No.: Hidden Lake PWS — Operator: Lyle

Casing Size: 14" — Depth: ~~1700~~ 1590' — Engineer: George Condrat

Type of test: Development — Pump Size: 4" — Depth: 1100' — Static Level: 759.00

Discharge Pipe: 4" — Orifice: 3" — Meter: 4" McCrometer — Bowl Size: 385 — # Stages: 11 ~~110~~ — Datum: T.O.C + 1.0

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
											Set pump at 1100 feet.
											Started generator and checked
											polarity every thing looks good.

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn — Sheet No. 16 of
Location: Upper parking lot — Date: Oct - 22 - 2013
Well Name - No.: Hidden Lake PWS — Operator: Lyle
Casing Size: 14" — Depth: 1590' — Engineer: George Condrat
Pump Size: 4" — Depth: 1100' — Static Level: 759.00
Bowl Size: 395 — # Stages: 11, 1100 — Datum: T.O.C + 1.0
Type of test: Development
Discharge Pipe: 4" — Orifice: 3" — Meter: 4" McCrometer

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
											TOT= 02033400, water to top 15:46.44
13:47			150	883.00	759.00	124.00	1.20	24	14:03 / 14:30	1.3	54 Hz at start = 150 gpm
14:30			150	904.62	759.00	145.62	0.97	27	14:35 / 15:05	1.6	55.5 Hz Neil stopped by. from
14:55			150	911.59	759.00	152.59	0.98		15:08 / 15:38	1.5	Loughlin
15:15			150	917.41	759.00	158.41	0.94				55.8 Hz
15:30			150	922.32	759.00	163.32	0.91	25	15:40 / 16:00	1.0	
15:45			150	923.58	759.00	164.58	0.91				
16:00			150	924.5	759.00	165.5	0.91				increase to 55.85 Hz
16:15			150	925.7		166.7	0.89	13.3	16:15 / 16:30	0.4	Fine sand - milky water
16:30			150	926.4		167.40	0.89				increase to 55.90 Hz
16:45			150	927.0		168	0.89	50	16:45 / 17:00	1.5	Fine powder sand -
17:00			150	924.1		169.1	0.88				milky water
											End Day - Shut Down
											TOT= 02063400

Signature: Operator _____ Engineer _____ Hours Today 3.5 To Date 3.5 / 48.5

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner Powder Mtn — Sheet No. 17 of
Location Upper parking lot — Date Oct-23-2013
Well Name - No. Hidden Lake PWS — Operator Lyle
Casing Size 14" — Depth 1590' — Engineer George Condrat
Type of test Developement — Pump Size 4" — Depth 1100' — Static Level 759 72
Discharge Pipe 4" — Orifice 3" — Meter 4" McCrometer — Bowl Size 335 — # Stages 11, 1100 — Datum TOC + 2.00 1

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
11 06			175		759 72						TOT = 0206 3400 56 Hz
11 18			175	894 00	759 72	134 28	0 76	63	11:20 / 11:50	38	11:07 22 water to Surface
11 30			175	919 00	759 72	159 28	0.91				11 13 57 Hz 11 27 575 Hz
11 45			175	935 29	759 72	175 67	1.00				
12:00			175	945 55	759 72	186 13	1 06	110	11:53 / 12 15	76	Cloudy water Fine sand
12 17			175	943 80	759 72	184 08	1 05				11 53 58 2 Hz 12 03 575 Hz
12 30			175	944 32	759 72	184 60	1 05				12 05 57 2 Hz
12 45			175	946 00	759 72	186 28	1 06	32	12 15 / 12 45	19	Slightly cloudy water Fine Sand
13:00			175	946 58	759 72	186 86	106				
13 15			175	947 45	759 72	187 73	1 07	22	12 47 / 13 13	14	Slightly cloudy water - Fine Sand
13 30			175	944 22	759 72	186 50	1 07				NTU 18
13 48			175	948 75	759 72	189 03	1 08	25	13 15 / 13 48	15	Slightly cloudy water - Fine Sand
14 17			200	953 46	759 72	195 74	0 97		13 47 / 14 10	09	14:15 58.9 Hz
14:21			200	961 82	759 72	202 10	1 01	40	14:12 / 14:27	20	14 33 59.7 Hz 14:11 59.6 Hz
14 27			200	961 99	759 72	208.27	1 04				Dark reddish water - Fine sand
14 36			200	975.00	759 72	215.28	1 07				
14 49			200	979 29	759 72	219 57	1 09	153	14 45 / 15 35	46	Cloudy water - Red & Brown Fine sand
14 53			200	981 41	759 72	221 69	1 10				15:14 59 9 Hz
15 09			200	985 82	759 72	226 10	1 13	77	14 58 / 15 20	24	Dark reddish water - Red & Brown fine sand
15 19			200	987 64	759 72	227 92	1 13				
15 33			200	989 42	759 72	229 70	1 14	85	15 24 / 15 54	51	Cloudy water - Red - Brown fine sand
15 50			200	990 43	759 72	230 71	1 15				
16 33			200	991 55	759 72	231 83	1 15	54	15 58 / 16 24	26	Cloudy water - Red & Brown fine sand

Signature: Operator _____ Engineer _____ Hours Today 5 1/2 To Date 9 / 54

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner Powder Mtn — Sheet No. 18 of
Location Upper parking lot — Date Oct-24-2015
Well Name - No. Hidden Lake PWS — Operator Lyle
Casing Size 14" — Depth 1190' — Engineer George Condrat
Pump Size 4" — Depth 1100' — Static Level 760.82
Bowl Size 395 — # Stages 11, 110' — Datum T.C. + 01
Type of test Developement
Discharge Pipe 4" Orifice 3" Meter 4" McCrometer

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
08:20					760.82						TOT = 02125000
			160								54.5 Hz 08:34 54.7 Hz
08:38			150	889.96	760.82	127.87	0.85	45	08:40 / 09:10	2.7	Cloudy water - Fine sand
08:50			150	900.09	760.82	139.27	0.92				55 Hz
09:06			150	909.81	760.82	149.99	0.99				
09:25			150	915.15	760.82	154.33	1.02	15	09:13 / 09:43	0.9	Cloudy water - Fine sand
09:40			150	920.23	760.82	159.41	1.06				
09:55			150	923.60	760.82	162.78	1.08	07	09:46 / 10:18	0.5	Cloudy water - Fine sand
10:10			150	927.07	760.82	166.25	1.10				
10:27			150	927.67	760.82	166.85	1.11	0.9	10:20 / 10:52	0.6	Mostly clear water - Fine sand
10:42			150	928.30	760.82	167.48	1.11				
10:57			150	928.75	760.82	167.93	1.11	12	10:55 / 11:25	0.7	Clear water - Fine sand
11:15			150	931.35	760.82	170.53	1.13				
11:30			150	932.07	760.82	171.25	1.14	48	11:29 / 12:00	3.0	Cloudy water - Fine Sand
11:45			175	945.67	760.82	184.85	1.05				Moving to 175 GPM 11:32
11:59			175	950.83	760.82	190.01	1.08				57.5 Hz 11:32
12:15			175	953.12	760.82	192.30	1.09	32	12:03 / 12:33	1.9	Cloudy water - Fine red & Brown Sand.
12:30			175	953.58	760.82	192.76	1.10				
12:45			175	953.99	760.82	193.17	1.10	45	12:37 / 13:07	2.7	Cloudy water - Fine red & Brown Sand.
13:00			175	954.56	760.82	193.74	1.10				
13:15			175	957.96	760.82	197.14	1.12	37	13:10 / 13:40	2.2	Cloudy water - Fine red & Brown Sand.
13:30			175	958.45	760.82	197.63	1.12				
13:45			175	961.00	760.82	200.18	1.14	32	13:44 / 14:03	1.2	

Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service L.L.C
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn — Sheet No. 19 of

Location: Upper Parking Lot — Date: Oct - 24 - 2015

Well Name - No.: Hidden Lake pws — Operator: Lyle

Casing Size: 14" — Depth: 1590' — Engineer: George Condrat

Pump Size: 4" — Depth: 1100' — Static Level: 760.82

Type of test: Developement

Discharge Pipe: 4" — Orifice: 3" — Meter: 4" McCometer — Bowl Size: 385 — # Stages: 11, 1100 — Datum: T.O.C + 01

Time of Day	Δ t	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ w.l.	Specific Capacity	Sand Content PPM	Start / Stop	M I S	REMARKS
14:00			175	962.05	760.82	201.23	1.14				Moving to 200 GPM Generator bogged down and the VFD shut off. Tried to go back to 575 Hz same thing happend.
											TOT = 02180000
											Megged Motor it Megged 4.
											Tried VFD at 500 Hz Same results.
											Cleaned up went home.

Signature: Operator _____ Engineer _____ Hours Today 5.40 1/2 To Date 14.5/595

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn — Sheet No. 20 of
Location: upper Parking Lot — Date: NOV 5 2013
Well Name - No.: Hidden Lake PWS — Operator: Matt Job #153
Casing Size: 14" — Depth: 1590' — Engineer: George Condrat
Pump Size: 4" — Depth: 1100' — Static Level: 761.80
Bowl Size: 3855 1000 — # Stages: 11 — Datum: Top of Casing +.68'
Type of test: ~~Long term~~ Development — Discharge Pipe: 4" — Orifice: — Meter: 4" McCrometer

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
12:00	Arrive on Site, Switch Generators										
	wire up the Panel to the Generator										Portable Water Pump 218 0000
	and the Pump. prepare to run										
14.30	Start		pumping								[redacted]
14.45			200	887.42	761.80	125.62	1.59	5 PM	14.40 / 8.40	12	[redacted]
15:00			200	924.09	761.80	162.29	1.23				
15:20			200	936.14	761.80	174.34	1.14				
15.40			175	932.42	761.80	170.62	1.02				15.30 Close valve Slightly to Decrease Flow
16:00			175	932.51	761.80	170.71	1.02				
16:20			175	932.41	761.80	170.61	1.02				
16.40			175	932.39	761.80	170.49	1.02				
17:00			175	932.37	761.80	170.57	1.02				
17:30			175	932.39	761.80	170.59	1.02				
14:00			175	932.42	761.80	170.62	1.02				
14:05	Pump Running Smooth. Amps are well Balanced										
	will Leave the Pump Running over night										

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mountain — Sheet No. 4 of
Location: Upper Parking Lot — Date: Nov 6 2013
Well Name - No.: hidden Lake pws — Operator: matt
Casing Size: 14" — Depth: 1890 — Engineer: George Conrad
Pump Size: 4" — Depth: 1100 — Static Level: 761.80
Bowl Size: 3 85 S1000 — # Stages: 11 — Datum: TOC + .68'
Type of test: Development
Discharge Pipe: 4 — Orifice: [illegible] — Meter: McCrometer

Time of Day	ΔT	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	ΔWL	Specific Capacity	Sand Content PPM	Start / Stop	MLS	REMARKS
08:30	Arrive on		site								
08:35			175	930.58	761.80	168.78	1.03				Totalizer @ 0845 2358500
09:00			175	930.61	761.80	168.81	1.03				165 Avg gpm
10.00			175	931.18	761.80	169.38	1.03	235	08:35 / 11:45	08	
10.30	Adjusted flow as per			per	George Conrad						Totalizer 2375700 @ 10:32 160 Avg
	request. PE		interval	read	had	dropped to					
	About 165		now	it	reads	175 GPm					
10.40			175	935.66	761.80	173.86	1.00				
11.00			175	937.52	761.80	175.72	0.99				Totalizer 2384900 @ 11:27 167 A
11.40			170	938.63	761.80	176.83	0.96				
11.45	Increase flow to 180 GPm										
12.00			180	945.34	761.80	183.54	0.96	9.94	11.46 / 14.37	3.4	Totalizer 2388800 @ 11.50 169 Av
12.30			180	953.36	761.80	191.56	0.93				Totalizer 2397400 @ 12:36 186 Av
13.00			180	954.94	761.80	193.14	0.93				
13.30			180	955.57	761.80	193.77	0.92				Totalizer 2407900 @ 13:35 178 A
14.00			180	955.86	761.80	194.06	0.92				
14.30			180	955.99	761.80	194.19	0.92		14:23 / 17:23		
15.00			180	956.26	761.80	194.46	0.92				
15.30			180	956.42	761.80	194.62	0.92				
16.00		20½	180	956.69	761.80	194.89	0.92				Totalizer 2434500 @ 16:02 180 A
16.30			180	956.76	761.80	194.96	0.92				
17.00			180	956.89	761.80	195.09	0.92				
17.02	Shut down										Totalizer 2449300 Ave

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mountain — Sheet No. 22 of
Location: upper Parking Lot — Date: Nov 7 2013
Well Name - No.: Hidden Lake PWS — Operator: Matt
Casing Size: 14" Depth: 1590' — Engineer: George Condral
Pump Size: 4" Depth: 1100 — Static Level: 766.26
Bowl Size: 385 S 1000 # Stages: 11 — Datum: Top of Casing + .68'
Type of test: Long Term
Discharge Pipe: 4" Orifice: 3" Meter: 4" McCrometer

Time of Day	ΔT	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	ΔWL	Specific Capacity	Sand Content PPM	Start / Stop	MLS	REMARKS
08.15	Arrive	Start	Generator		prepare to pump						Totalizer Before Pumping
09.00	start	pumping									2445300
09.01	1	1	180	527.55	766.26	61.29	2.93	32.8	09.01 / 09.36	2.3	
09.02	2	2	180	848.72	766.26	82.46	2.18				
09.03	3	3	180	858.33	766.26	92.07	1.95				
09.04	4	4	180	865.48	766.26	99.22	1.81				
09.05	5	5	180	871.13	766.26	104.87	1.71				
09.06	6	6	180	876.25	766.26	109.99	1.63				
09.07	7		180	878.53	766.26	112.27	1.60				
09.08	8		180	882.44	766.26	116.18	1.54				
09.09	9		180	886.04	766.26	119.78	1.50				
09.10	10		180	889.33	766.26	123.07	1.46				
09.15	15		180	897.94	766.26	131.68	1.36				
09.20	20		180	908.05	766.26	141.79	1.26				
09.25	25		180	914.22	766.26	147.96	1.21				Average Amps 111.6
09.30	30		180	918.41	766.26	152.15	1.18	91.6	09.57 / 10.07	5.5	
09.40	40		180	927.50	766.26	161.24	1.11				
09.50	50		180	932.37	766.26	166.11	1.08				Totalizer 2455500 @ 09.57 Avg 178
10.00	60		180	936.13	766.26	169.87	1.05	98.1	10.08 / 11.03	10.8	
10.15	75		180	940.08	766.26	173.82	1.03				
10.30	90	20.75	180	942.48	766.26	176.22	1.02				
10.45	105		180	944.26	766.26	178.0	1.01.0				
11.00	120		180	948.42	766.26	182.16	0.98				

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn | Sheet No. 23 of
Location: Upper Parking Lot | Date: Nov 7 2013
Well Name - No.: Hidden Lake P.W.S | Operator: Matt
Casing Size: 4" Depth: 1590 | Engineer: George Condras
Pump Size: 4" Depth: 1100 | Static Level: 766.26
Bowl Size: 3855 1000 # Stages: 11 | Datum: T.O.C. + 0.68'
Type of test: Long Term
Discharge Pipe: 4" Orifice: 3" Meter: 4" McCrometer

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
11:20	140		180	950.11	766.26	183.85	0.97	28.3	11:04 / 1332	84	
11:40	160		180	952.86	766.26	186.60	0.96				
12:00	180	21	180	953.81	766.26	187.55	0.95				
12:30	210		180	955.28	766.26	189.02	0.95				Totalizer 2483600 @ 12:31 = 182 GPM
13:00	240		180	956.47	766.26	190.21	0.94	17.7	13:33 / 17:10	77	
14:00	300	20.75	180	957.49	766.26	191.23	0.94				
15:00	360		180	958.11	766.26	191.85	0.93				
16:00	420		180	958.64	766.26	192.38	0.93				
17:00	480		180	959.27	766.26	193.01	0.93	23.5	17:11 / 20:01	80	Totalizer 2542600 @ 16:59 = 182 GPM
18:00	540		180	959.59	766.26	193.33	0.93				
19:00	600		180	959.86	766.26	193.60	0.92				Totalizer 2563700 @ 19:51 = 179 GPM
20:00	660	20½	180	960.36	766.26	194.10	0.92	12.3	20:02 / 4:04	119	
21:00	720		180	961.00	766.26	194.76	0.92				
22:00	780		180	961.38	766.26	195.12	0.92				
23:00	840		180	961.61	766.26	195.35	0.92				
24:00	900		180	961.87	766.26	195.61	0.92				
01:00	960		180	962.20	766.26	195.94	0.91				
02:00	1020		180	962.61	766.26	196.35	0.91				
03:00	1080		180	962.72	766.26	196.46	0.91				
04:00	1140		180	962.09	766.26	195.83	0.91	36.3	04:05 / 9:01	129	Totalizer @ 04:06 2653500 = 181
05:00	1200		180	962.18	766.26	195.92	0.91				
06:00	1260		180	962.04	766.26	195.78	0.91				
07:00	1320		180	962.19	766.26	195.93	0.91				

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn | Sheet No.: 24 of
Location: Upper Parking Lot | Date: Nov 8 2013
Well Name - No.: Hidden Lake Pw's | Operator: Matt
Casing Size: 4" Depth: 1590' | Engineer: George Condrat
Pump Size: 4" Depth: 1100' | Static Level: 766.26
Bowl Size: 385 S 1000 # Stages: 11 | Datum: T.O.C. + 0.68'
Type of test: Long Term
Discharge Pipe: 4" Orifice: 3" Meter: 4" McCrometer

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
08:00	1380		180	962.36	766.26	196.10	0.91	2.08	07:02 / 09:02	05	
09:00	1440	20	180	962.47	766.26	196.21	0.91				Turbine reset
09:29	1469		180	961.90	766.26	195.64	0.92				271190 181.3 GPM Average
09:30	Shut	Down	Begin		Recovery						
09:31					945.86						
09:32					926.19						
09:33					906.40						
09:34					886.16						
09:35					872.17						
09:36					867.29						
09:37					854.12						
09:38					845.31						
09:39					832.34						
09:40					824.52						
09:45					808.16						
09:50					801.74						
09:55					795.87						
10:00					792.95						
10:10					789.06						
10:20					785.78						785.551 90% Recovered
10:30					782.55						776.07 99% Recovered
10:45					780.60						
11:00					779.41						

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn
Location: upper parking lot
Well Name - No.: hidden Lake PWS
Casing Size: 14" Depth: 1590
Pump Size: 4" Depth: 1100'
Bowl Size: 385 S 1000 # Stages: 11
Type of test: Long Term Recovery
Discharge Pipe: ____ Orifice: ____ Meter: ____

Sheet No.: 25 of: ____
Date: Nov 8 2013
Operator: Matt
Engineer: George Condras
Static Level: 766.26
Datum: Top of Casing + 0.68'

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
11:30					772.06						
12:00					775.80						
12:30					774.69						
13:30					773.21						
14:30					772.29						
15:30					771.60						
16:00					771.49						

Signature: Operator ____ Engineer ____ Hours Today ____ To Date ____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder mtn | Sheet No. 26 of
Location: upper parking Lot | Date: Nov 11 2013
Well Name - No.: Hidden Lake | Operator: Matt
Casing Size: 14" Depth: 1590 | Engineer: George Cantrell
Pump Size: 4" Depth: 925 | Static Level: 765.23
Bowl Size: 385 S 1080 # Stages: 11 | Datum: Top of Casing + 0.44
Type of test: Sample collecting pumping
Discharge Pipe: 4" Orifice: 3" Meter: 4" Mc Crometer

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
10:30	Arrive		Pull	T	Screens			Set			
	Intake	out	of		Screen		How	Set			
	at	925'									
12:20	Start		Pumping								
12:30			140	820.94	765.23	55.71	2.51	7.23	1220 / 14:52	2.5	
12:45			140	880.24	765.23	114.98	1.21				
13:00			140	885.46	765.23	120.23	1.16				
13:15			140	888.66	765.23	124.43	1.12				
13:25	Slow	flow		120	Approx						
13:30			120	880.82	765.23	115.59	1.03				
13:45			120	875.52	765.23	110.29	1.08				
14:00			120	874.86	765.23	109.03	1.10				
14:15			120	873.49	765.23	108.26	1.10				
14:30			120	871.50	765.23	106.27	1.12				
14:45			120	873.27	765.23	108.04	1.11	0.04	14:53 / 09:26	0.1	
14:57	Decrease	flow		93	per	George	Request				
15:00			100	868.55	765.23	103.32	0.96				
15:15			100	864.26	765.23	98.97	1.01				
15:30			100	863.92	765.23	98.69	1.01				
15:46			100	863.31	765.23	98.10	1.01				
16:00			100	863.15	765.23	97.92	1.02				
16:15			100	862.88	765.23	97.65	1.02				
16:30			100	862.80	765.23	97.57	1.02				

Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

TEST PUMPING REPORT

Widdison Turbine Service LLC
12645 So. Minuteman Dr. Bldg B
Draper, UT 84020
801-571-8509

Well Owner: Powder Mtn — Sheet No. 27 of
Location: Upper Parking Lot — Date: Nov 11 2013
Well Name - No.: Hidden Lake — Operator: Matt
Casing Size: 14" — Depth: 1590 — Engineer: Brent Conroy
Type of test: Sample Collection Pumping — Pump Size: 4" — Depth: 925 — Static Level: 76.23
Discharge Pipe: 4" — Orifice: 3" — Meter: 4" McCrometer — Bowl Size: 385 S 1000 — # Stages: 11 — Datum: T.O.C + 0.44'

Time of Day	Δ T	Inches of Orifice Pressure	Q GPM	Pumping Level	Static Level	Δ W L	Specific Capacity	Sand Content PPM	Start / Stop	M L S	REMARKS
16.48			100	86.29	76.23	97.76	1.02				
17:08			100	86.304	76.23	97.81	1.02				
Left Pump	Running	over	night								
Nov 12 2013											
09.00			100	86.31	76.23	101.08	0.98			0	
09.27	5hr Pump										

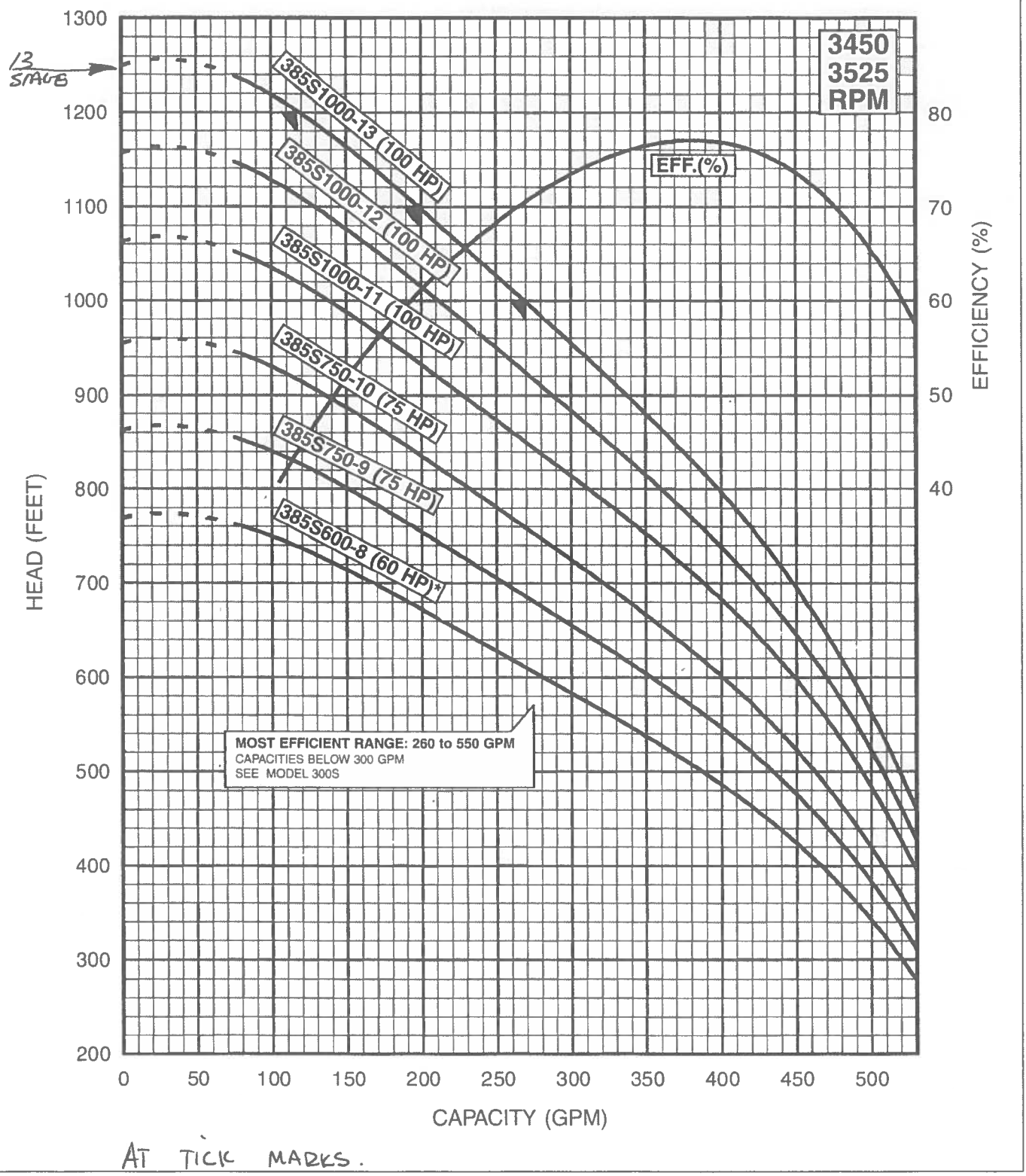
Signature: Operator _____ Engineer _____ Hours Today _____ To Date _____

APPENDIX G

PERFORMANCE CURVE FOR TEST PUMP

MODEL 385S 385 GPM PERFORMANCE CURVES

FLOW RANGE: 75 - 550 GPM **OUTLET SIZE: 4" NPT** **NOMINAL DIA. 8"**



AT TICK MARKS.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
6" MOTOR STANDARD, 7.5-60 HP/3450 RPM.
8" MOTOR STANDARD,75-100 HP/3525 RPM.
* Alternate motor sizes available.

Performance conforms to ISO 9906 Annex A
@ 8 ft. min. submergence.

130 GPM @ 1200'
200 GPM @ 1100'
270 GPM @ 1000'

GRUNDFOS

APPENDIX H

ANALYTICAL LABORATORY REPORTS

CHEMTECH-FORD
LABORATORIES

12/16/2013

Work Order: 1311146

Loughlin Water Associates, LLC

Attn: George Condrat

3100 W. Pinebrook Rd. #1100

Park City, UT 84098

Client Service Contact: Linda Daniels 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 1311146-01

Name:	**Loughlin Water Associates, LLC**	***Sample Date:***	11/8/2013 8:50 AM
Sample Site:	Hidden Lake Well	***Receipt Date:***	11/8/2013 11:53 AM
Comments:		***Sampler:***	George Condrat
Sample Type:	Drinking Water	***System No.:***	
Source Code:	***Sample Point:***	***Report to State:***	

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	Flag
Calculations								
Hardness, Total as CaCO3	219		1	mg/L	11/20/2013 11:45	PNM	SM 2340 B	
Langelier Index	0.18			None	11/20/2013 11:45	PNM	Calculation	
Inorganic								
Alkalinity - Bicarbonate (HCO3)	263		1.0	mg/L	11/12/2013 1:01	KRW	SM 2320 B	
Alkalinity - Carbonate (CO3)	ND		1.0	mg/L	11/12/2013 1:01	KRW	SM 2320 B	
Alkalinity - CO2	196		1.0	mg/L	11/12/2013 1:01	KRW	SM 2320 B	
Alkalinity - Hydroxide (OH)	ND		1.0	mg/L	11/12/2013 1:01	KRW	SM 2320 B	
Alkalinity - Total (as CaCO3)	216		1.0	mg/L	11/12/2013 1:01	KRW	SM 2320 B	
Ammonia as N	ND		0.2	mg/L	11/11/2013 7:00	TSM	SM 4500 NH3-D	
Chloride	3	250	1	mg/L	11/8/2013 16:00	TSM	EPA 300.0	
Color	7	15	0	Color Units	11/8/2013 12:42	RMC	EPA 110.2	
Conductivity	357		1	umho/cm	11/11/2013 18:51	IJH	EPA 120.1	
Cyanide, Free	ND	0.2	0.02	mg/L	11/14/2013 10:12	KRW	SM 4500 CN-E	
Fluoride	ND	4	0.1	mg/L	11/8/2013 16:00	TSM	EPA 300.0	
MBAS Surfactants	ND	0.5	0.08	mg/L	11/8/2013 16:00	RMC	SM 5540 C	
Nitrate as N	0.9	10	0.1	mg/L	11/8/2013 16:00	TSM	EPA 300.0	
Nitrite as N	ND	1	0.1	mg/L	11/8/2013 16:00	TSM	EPA 300.0	
Odor	ND	3	0	0 - 5 Scale	11/8/2013 12:42	RMC	SM 2150 B	
pH	7.5		0.1	pH Units	11/8/2013 14:06	GWB	EPA 9045C	SPH
Phosphate, ortho as P	ND		0.01	mg/L	11/8/2013 16:00	TSM	SM 4500 P-E	
Sulfate	5	250	1	mg/L	11/8/2013 16:00	TSM	EPA 300.0	
Total Dissolved Solids (TDS)	244	1000	20	mg/L	11/11/2013 9:16	RMC	SM 2540 C	
Turbidity	15	5	0.02	NTU	11/8/2013 13:50	RMC	EPA 180.1	

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 1311146-01

Name:	**Loughlin Water Associates, LLC**	***Sample Date:***	11/8/2013 8:50 AM
Sample Site:	Hidden Lake Well	***Receipt Date:***	11/8/2013 11:53 AM
Comments:		***Sampler:***	George Condrat
Sample Type:	Drinking Water	***System No.:***	
Source Code:	***Sample Point:***	***Report to State:***	

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	Flag
Metals								
Aluminum, Total	**0.4**	0.2	0.05	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Antimony, Total	ND	0.006	0.0005	mg/L	11/13/2013 11:05	KSL	EPA 200.8	
Arsenic, Total	0.0007	0.01	0.0005	mg/L	11/13/2013 11:05	KSL	EPA 200.8	
Boron, Total	0.10		0.05	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Barium, Total	0.029	2	0.005	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Beryllium, Total	ND	0.004	0.001	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Calcium, Total	51.9		0.2	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Cadmium, Total	ND	0.005	0.0002	mg/L	11/13/2013 11:05	KSL	EPA 200.8	
Chromium, Total	ND	0.1	0.005	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Copper, Total	0.0025	1.3	0.0010	mg/L	11/13/2013 11:05	KSL	EPA 200.8	
Iron, Total	**0.39**	0.3	0.02	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Lead, Total	0.0008	0.015	0.0005	mg/L	11/13/2013 11:05	KSL	EPA 200.8	
Mercury, Total	ND	0.002	0.0002	mg/L	11/19/2013 12:00	AKL	EPA 245.1	
Magnesium, Total	21.8		0.2	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Manganese, Total	0.023	0.05	0.005	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Nickel, Total	ND	0.1	0.005	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Potassium, Total	0.8		0.5	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Selenium, Total	ND	0.05	0.0005	mg/L	11/13/2013 16:35	KSL	EPA 200.8	
Silver, Total	ND	0.1	0.0005	mg/L	11/13/2013 11:05	KSL	EPA 200.8	
Silica, (as SiO2) Total	8.1		0.1	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Sodium, Total	5.9		0.5	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Thallium, Total	ND	0.002	0.0002	mg/L	11/13/2013 11:05	KSL	EPA 200.8	
Zinc, Total	ND	5	0.01	mg/L	11/13/2013 14:19	TS	EPA 200.7	
Microbiology								
Iron Bacteria	ND		0	Org/mL	11/15/2013 15:53	MEL	SM 9240	A-01, SL-15

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 1311146-01

Name:	**Loughlin Water Associates, LLC**	***Sample Date:***	11/8/2013 8:50 AM
Sample Site:	Hidden Lake Well	***Receipt Date:***	11/8/2013 11:53 AM
Comments:		***Sampler:***	George Condrat
Sample Type:	Drinking Water	***System No.:***	
Source Code:	***Sample Point:***	***Report to State:***	

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	Flag
Radiochemistry								
Gross Alpha	0.6	15		pCi/L	12/2/2013 15:26	ACZ	EPA 900.0	SL-17
Gross Alpha LLD	1.4			pCi/L	12/2/2013 15:26	ACZ	EPA 900.0	SL-17
Gross Alpha Variance	1.4			pCi/L	12/2/2013 15:26	ACZ	EPA 900.0	SL-17
Gross Beta	3.0			pCi/L	12/2/2013 15:26	ACZ	EPA 900.0	SL-17
Gross Beta LLD	3.2			pCi/L	12/2/2013 15:26	ACZ	EPA 900.0	SL-17
Gross Beta Variance	2.4			pCi/L	12/2/2013 15:26	ACZ	EPA 900.0	SL-17
Carbamates								
3-Hydroxycarbofuran	ND		1.0	ug/L	11/12/2013 19:03	RB	EPA 531.1	
Aldicarb	ND		1.0	ug/L	11/12/2013 19:03	RB	EPA 531.1	
Aldicarb sulfone	ND		1.0	ug/L	11/12/2013 19:03	RB	EPA 531.1	
Aldicarb sulfoxide	ND		1.0	ug/L	11/12/2013 19:03	RB	EPA 531.1	
Carbaryl	ND		1.0	ug/L	11/12/2013 19:03	RB	EPA 531.1	
Carbofuran	ND	40	1.0	ug/L	11/12/2013 19:03	RB	EPA 531.1	
Methomyl	ND		1.0	ug/L	11/12/2013 19:03	RB	EPA 531.1	
Oxamyl	ND	200	1.0	ug/L	11/12/2013 19:03	RB	EPA 531.1	
Herbicides								
2,4,5-TP (Silvex)	ND	50	0.440	ug/L	11/13/2013 21:26	RAH	EPA 515.3	
2,4-D	ND	70	0.220	ug/L	11/13/2013 21:26	RAH	EPA 515.3	
Dalapon	ND	200	2.20	ug/L	11/13/2013 21:26	RAH	EPA 515.3	
Dicamba	ND		1.00	ug/L	11/13/2013 21:26	RAH	EPA 515.3	
Dinoseb	ND	7	0.440	ug/L	11/13/2013 21:26	RAH	EPA 515.3	
Pentachlorophenol	ND	1	0.088	ug/L	11/13/2013 21:26	RAH	EPA 515.3	
Picloram	ND	500	0.220	ug/L	11/13/2013 21:26	RAH	EPA 515.3	

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 1311146-01

Name:	**Loughlin Water Associates, LLC**	***Sample Date:***	11/8/2013 8:50 AM
Sample Site:	Hidden Lake Well	***Receipt Date:***	11/8/2013 11:53 AM
Comments:		***Sampler:***	George Condrat
Sample Type:	Drinking Water	***System No.:***	
Source Code:	***Sample Point:***	***Report to State:***	

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	Flag
Pesticides								
Endrin	ND	2	0.022	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
Heptachlor	ND	0.4	0.088	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
Heptachlor epoxide	ND	0.2	0.044	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
Lindane	ND	0.2	0.044	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
Methoxychlor	ND	40	0.22	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
PCB-1016	ND	0.2	0.20	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
PCB-1221	ND	0.5	0.20	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
PCB-1232	ND	0.5	0.20	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
PCB-1242	ND	0.5	0.50	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
PCB-1248	ND	0.5	0.50	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
PCB-1254	ND	0.5	0.50	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
PCB-1260	ND	0.5	0.50	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
PCB - Total	ND	0.5	0.50	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
Toxaphene	ND	3	2.2	ug/L	11/12/2013 19:19	FAJ	EPA 508.1	
Semi-Volatile Compounds								
Alachlor	ND	2	0.44	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Aldrin	ND		2.00	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Atrazine	ND	3	0.22	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Benzo (a) pyrene	ND	0.2	0.04	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Bis(2-ethylhexyl) adipate	ND	400	1.30	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Bis (2-ethylhexyl) Phthalate	ND	6	1.30	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Butachlor	ND		0.50	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
alpha-Chlordane	ND	2	0.44	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
gamma-Chlordane	ND	2	0.44	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Chlordane - Total	ND	2	0.44	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Dieldrin	ND		1.00	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Hexachlorobenzene	ND	1	0.22	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Hexachlorocyclopentadiene	ND	50	0.22	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Metolachlor	ND		0.50	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Metribuzin	ND		0.50	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Propachlor	ND		0.50	ug/L	11/12/2013 19:06	FJ	EPA 525.2	
Simazine	ND	4	0.15	ug/L	11/12/2013 19:06	FJ	EPA 525.2	

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 1311146-01

Name:	**Loughlin Water Associates, LLC**	***Sample Date:***	11/8/2013 8:50 AM
Sample Site:	Hidden Lake Well	***Receipt Date:***	11/8/2013 11:53 AM
Comments:		***Sampler:***	George Condrat
Sample Type:	Drinking Water	***System No.:***	
Source Code:	***Sample Point:***	***Report to State:***	

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	Flag
Volatile Organic Compounds								
1,1,1,2-Tetrachloroethane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,1,1-Trichloroethane	ND	200	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,1,2,2-Tetrachloroethane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,1,2-Trichloroethane	ND	5	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,1,2-Trichlorotrifluoroethane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,1-Dichloroethane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,1-Dichloroethene	ND	7	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,1-Dichloropropene	ND		0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,2,3-Trichlorobenzene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,2,3-Trichloropropane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,2,4-Trichlorobenzene	ND	70	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,2,4-Trimethylbenzene	ND	70	1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,2-Dichlorobenzene	ND	600	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,2-Dichloroethane	ND	5	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,2-Dichloropropane	ND	5	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,3,5-Trimethylbenzene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,3-Dichlorobenzene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,3-Dichloropropane	ND		0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
1,4-Dichlorobenzene	ND	75	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
2,2-Dichloropropane	ND		0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
2-Chlorotoluene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
4-Chlorotoluene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Benzene	ND	5	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Bromobenzene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Bromochloromethane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Bromodichloromethane	ND		0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Bromoform	ND		0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Bromomethane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Carbon Tetrachloride	ND	5	1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Chlorobenzene	ND	100	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Chloroethane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Chloroform	ND		0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Chloromethane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
cis-1,2-Dichloroethene	ND	70	1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
cis-1,3-Dichloropropene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Dibromochloromethane	ND		0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Dibromomethane	ND	5	1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 1311146-01

Name:	**Loughlin Water Associates, LLC**	***Sample Date:***	11/8/2013 8:50 AM
Sample Site:	Hidden Lake Well	***Receipt Date:***	11/8/2013 11:53 AM
Comments:		***Sampler:***	George Condrat
Sample Type:	Drinking Water	***System No.:***	
Source Code:	***Sample Point:***	***Report to State:***	

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	Flag
Volatile Organic Compounds								
Dichlorodifluoromethane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Ethyl Benzene	ND	700	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Hexachlorobutadiene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Isopropylbenzene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Methyl tert-Butyl Ether (MTBE)	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Methylene Chloride	ND	5	1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Naphthalene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
n-Butyl Benzene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
n-Propyl Benzene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
p-Isopropyltoluene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
sec-Butyl Benzene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Styrene	ND	100	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
tert-Butylbenzene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Tetrachloroethene	ND	5	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Toluene	ND	1000	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
trans-1,2-Dichloroethene	ND	100	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
trans-1,3-Dichloropropene	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Trichloroethene	ND	5	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Trichlorofluoromethane	ND		1.0	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Vinyl Chloride	ND	2	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	
Xylenes, total	ND	10000	0.5	ug/L	11/14/2013 18:59	PE	EPA 524.2	

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter or 1 mg/Kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/Kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/Kg = one nanogram per kilogram = 1 part per trillion.
MCL = Maximum Contaminant Level as defined by USEPA

Data Comparisons

Values reported in **RED** exceed Primary Drinking Water standards.
Values reported in **BLUE** exceed Secondary Drinking Water standards.
BLANK values in the MCL column indicate no standard.

Flag Descriptions

SPH = Sample submitted past method specified holding time.

SL-17 = Analysis performed by ACZ Laboratories, 2773 Downhill Drive, Steamboat Springs, CO 80487.

SL-15 = Analysis performed by Montana Environmental Lab, 1170 North Meridian Road, Kalispell, MT 59904.

A-01 = No iron bacteria were observed in this sample.

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Loughlin Water Associates, LLC
Attn: Neil Burk
3100 W. Pinebrook Rd. #1100
Park City, UT 84098

Sample Type: Drinking Water
Sampler: George Condrat
Phone: (435) 649-4005
Fax: (435) 649-4085
Email: neil@loughlinwater.com

Lab No.	Date/Time Sampled	Analysis	Result	Units	Method	Test Initiated Date/Time	Test Finished Date/Time
Sample ID: Hidden Lake Well			*Source:*			*Use:*	
Comments:			*SP:*			*Repeat Sample:*	
System No.:			*Field Res. Chlorine:*	*mg/L*		*Failure Date:*	
1311144-01	11/8/2013 8:50	Chlorine Residual, Total	Absent	mg/L	Ortho-Tolidine	11/8/2013 15:45	11/8/2013 15:45
1311144-01	11/8/2013 8:50	Coliform, Total	Absent	Org/100 mL	SM 9223 B-PA	11/8/2013 15:45	11/9/2013 15:45
1311144-01	11/8/2013 8:50	E. Coli	Absent	Org/100 mL	SM 9223 B-PA	11/8/2013 15:45	11/9/2013 15:45

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

CHEMTECH-FORD
LABORATORIES

11/13/2013

Work Order: 1311199

Loughlin Water Associates, LLC

Attn: Neil Burk

3100 W. Pinebrook Rd. #1100

Park City, UT 84098

Client Service Contact: Linda Daniels 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 1311199-01

Name:	**Loughlin Water Associates, LLC**	***Sample Date:***	11/12/2013 9:10 AM
Sample Site:	Hidden Lake Well	***Receipt Date:***	11/12/2013 12:00 PM
Comments:		***Sampler:***	George Condrat
Sample Type:	Drinking Water	***System No.:***	
Source Code:	***Sample Point:***	***Report to State:***	

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	Flag
Inorganic								
Turbidity	2.2	5	0.02	NTU	11/12/2013 10:50	JO	EPA 180.1	

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter or 1 mg/Kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/Kg = one microgram per kilogram = 1 part per billion.

Flag Descriptions

Data Comparisons

Values reported in **RED** exceed Primary Drinking Water standards.
Values reported in **BLUE** exceed Secondary Drinking Water standards.
BLANK values in the MCL column indicate no standard.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Loughlin Water Associates LLC
ADDRESS: 3400 W. Pinebrook Rd; Suite 1100
CITY/STATE/ZIP: Park City, UT 84098
PHONE #: 435-659-1753 FAX: 435-649-4085
CONTACT: George Condrat PROJECT: PowderMountain
EMAIL: gcondrat@loughlinwater.com

BILLING ADDRESS: same
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED		Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Turbidity		Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
11199-01	1. Hidden Lake Well	11-12-13	09:10	Water		X					
	2.										
	3.										
	4.										
	5.										
	6.										
	7.										
	8.										
	9.										
	10.										

Sampled by: [print] George Condrat Sampled by: [signature] George Condrat

ON ICE NOT ON ICE Temp (C°):

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
George Condrat	11-12-13 12:00		11/12/13 1200
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

CHEMTECH-FORD LABORATORIES

CHEMTECH-FORD LABORATORIES

Sample Receipt Checklist

Lab ID #: 11199

Delivery Method: (circle one)

UPS FedEX USPS

(Walk-In) Courier Chemtech

Sample(s) sealed: Yes / (No)

Appropriate container/preserve: (Yes) / No

Temperature 5 C°

Comments:

	Lab ID #	Bottle Type	Lot # (preservative)	No. of Subsample(s)	Preserved by client / third party	Preserved in Receiving/Laboratory	Vials submitted with headspace	Sample submitted past hold time	Filtered by client in field
1	01	A1/2							
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

Bottle Type

Plastic		Glass	
A-	Plastic Unpreserved	D-	625 ($Na_2S_2O_3$)
B-	Miscellaneous Plastic	G-	Glass Unpreserved
C-	Cyanide Qt (NaOH)	H-	HAAs (NH_4Cl)
F-	Sulfide Qt (NaOH/Zn Acetate)	J-	508/515/525 (Na_2SO_3)
M-	Metals Pint (HNO_3)	O-	Oil & Grease (1:1 HCl)
N-	Nutrient Pint (H_2SO_4)	P-	Phenols (H_2SO_4)
R-	Radiological Gallon (HNO_3)	T-	TOC/TOX (H_3PO_4)
S-	Sludge Cups/Tubs	U-	531 (MCAA, $Na_2S_2O_3$)
Q-	Plastic Bags	V-	524/THMs (Ascorbic Acid)
E-	Coliform/Ecoli	W-	8260 (1:1 HCl)
Additional Volumes		X-	Vial Unpreserved
Q- quart	1/2pt- half pint	Y-	624/504 ($Na_2S_2O_3$)
P- pint	1/2- half gallon	Z-	Miscellaneous Glass

CHEMTECH-FORD
LABORATORIES

12/9/2013

Work Order: 1311965

Loughlin Water Associates, LLC

Attn: George Condrat

3100 W. Pinebrook Rd. #1100

Park City, UT 84098

Client Service Contact: Linda Daniels 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 1311965-01

Name:	**Loughlin Water Associates, LLC**	***Sample Date:***	11/12/2013 9:10 AM
Sample Site:	Hidden Lake Well	***Receipt Date:***	12/5/2013 11:36 AM
Comments:	Powder Mountain	***Sampler:***	George Condrat
Sample Type:	Drinking Water	***System No.:***	
Source Code:	***Sample Point:***	***Report to State:***	

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	Flag
Metals								
Aluminum, Total	**0.2**	0.2	0.05	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Antimony, Total	ND	0.006	0.0005	mg/L	12/6/2013 9:58	KSL	EPA 200.8	
Arsenic, Total	0.0008	0.01	0.0005	mg/L	12/6/2013 9:58	KSL	EPA 200.8	
Boron, Total	ND		0.05	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Barium, Total	0.025	2	0.005	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Beryllium, Total	ND	0.004	0.001	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Calcium, Total	48.7		0.2	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Cadmium, Total	ND	0.005	0.0002	mg/L	12/6/2013 9:58	KSL	EPA 200.8	
Chromium, Total	ND	0.1	0.005	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Copper, Total	ND	1.3	0.005	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Iron, Total	0.10	0.3	0.02	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Lead, Total	ND	0.015	0.0005	mg/L	12/6/2013 9:58	KSL	EPA 200.8	
Mercury, Total	ND	0.002	0.0002	mg/L	12/9/2013 14:22	AKL	EPA 245.1	
Magnesium, Total	20.1		0.2	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Manganese, Total	0.007	0.05	0.005	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Nickel, Total	ND	0.1	0.005	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Potassium, Total	0.6		0.5	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Selenium, Total	0.0018	0.05	0.0005	mg/L	12/6/2013 11:13	KSL	EPA 200.8	
Silver, Total	ND	0.1	0.0005	mg/L	12/6/2013 9:58	KSL	EPA 200.8	
Silica, (as SiO2) Total	7.6		0.1	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Sodium, Total	5.1		0.5	mg/L	12/6/2013 15:15	TS	EPA 200.7	
Thallium, Total	ND	0.002	0.0002	mg/L	12/6/2013 9:58	KSL	EPA 200.8	
Zinc, Total	ND	5	0.01	mg/L	12/6/2013 15:15	TS	EPA 200.7	

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter or 1 mg/Kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/Kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/Kg = one nanogram per kilogram = 1 part per trillion.
MCL = Maximum Contaminant Level as defined by USEPA

Data Comparisons

Values reported in **RED** exceed Primary Drinking Water standards.
Values reported in **BLUE** exceed Secondary Drinking Water standards.
BLANK values in the MCL column indicate no standard.

Flag Descriptions

CHEMTECH-FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY 40

COMPANY: Loughlin Water Associates LLC
ADDRESS: 3100 W. Pinebrook Rd Suite 1100
CITY/STATE/ZIP: Park City, Ut 84098
PHONE #: 435-659-9753 FAX: 435-649-4085
CONTACT: George Condrat PROJECT: Powder Mountain
EMAIL: gcondrat@loughlinwater.com

BILLING ADDRESS: Same
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:* ASAP (Monday 12-9-2013)
* Expedited turnaround subject to additional charge

Lab Use Only	CLIENT SAMPLE INFORMATION				
11965	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine
-01	1. Hidden Lake Well	11-12-13	09:10	Water	
	2.				
	3.				
	4.				
	5.				
	6.				
	7.				
	8.				
	9.				
	10.				

TESTS REQUESTED

PSA Metals	Bacteria: Total Coliform + E. coli (Present/Absent)	Bacteria: Total Coliform + E. coli (Enumerated)	Bacteria: HPC (Plate Count)	Bacteria: E. Coli Only

RUSH
S-8194, ULINE, 800-295-5510

Sampled by: [print] George Condrat
Sampled by: [signature] George Condrat

ON ICE NOT ON ICE Temp (C°):

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
George Condrat	12/5/13 11:36		12/5/13 11:36
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

CHEMTECH-FORD LABORATORIES

Sample Receipt Checklist

Lab ID #: 11965

Sample(s) sealed: Yes / ~~No~~

Appropriate container/preserve: ~~Yes~~ / No

Temperature 2 C°

Delivery Method: (circle one)

UPS FedEX USPS

(Walk-In) Courier Chemtech

Comments:

	Lab ID #	Bottle Type	Lot # (preservative)	No. of Subsample(s)	Preserved by client / third party	Preserved in Receiving/Laboratory	Vials submitted with headspace	Sample submitted past hold time	Filtered by client in field
1	01	M	992						
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

Bottle Type

Plastic		Glass	
A-	Plastic Unpreserved	D-	625 ($Na_2S_2O_3$)
B-	Miscellaneous Plastic	G-	Glass Unpreserved
C-	Cyanide Qt (NaOH)	H-	HAAs (NH_4Cl)
F-	Sulfide Qt (NaOH/Zn Acetate)	J-	508/515/525 (Na_2SO_3)
M-	Metals Pint (HNO_3)	O-	Oil & Grease (1:1 HCl)
N-	Nutrient Pint (H_2SO_4)	P-	Phenols (H_2SO_4)
R-	Radiological Gallon (HNO_3)	T-	TOC/TOX (H_3PO_4)
S-	Sludge Cups/Tubs	U-	531 (MCAA, $Na_2S_2O_3$)
Q-	Plastic Bags	V-	524/THMs (Ascorbic Acid)
E-	Coliform/Ecoli	W-	8260 (1:1 HCl)
Additional Volumes		X-	Vial Unpreserved
Q- quart	1/2pt- half pint	Y-	624/504 ($Na_2S_2O_3$)
P- pint	1/2- half gallon	Z-	Miscellaneous Glass