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SEP 3 0 2019

Dear Mr. Kieling:

Subject:

Submittal of the 2019 Annual Long-Term Monitoring and Maintenance Report

for the Corrective Measures Implementation at Former 260 Outfall Area

Enclosed please find two hard copies with electronic files of the "2019 Annual Long-Term Monitoring and Maintenance Report for the Corrective Measures Implementation at Former 260 Outfall Area." This report summarizes activities Newport News Nuclear BWXT-Los Alamos, LLC, completed from August 2018 to July 2019 related to the deep groundwater investigation corrective measures evaluation for Consolidated Unit 16-021(c)-99, the Technical Area 16 260 Outfall. This report is being submitted to fulfill Fiscal Year 2019 Milestone 17 in Appendix B of the 2016 Compliance Order on Consent.

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Sincerely,

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1. Two hard copies with electronic files – 2019 Annual Long-Term Monitoring and Maintenance Report for the Corrective Measures Implementation at Former 260 Outfall Area (EM2019-0316)

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2019 Annual Long-Term Monitoring and Maintenance Report for the Corrective Measures Implementation at Former 260 Outfall Area



Newport News Nuclear BWXT-Los Alamos, LLC (N3B), under the U.S. Department of Energy Office of Environmental Management Contract No. 89303318CEM000007 (the Los Alamos Legacy Cleanup Contract), has prepared this document pursuant to the Compliance Order on Consent, signed June 24, 2016. The Compliance Order on Consent contains requirements for the investigation and cleanup, including corrective action, of contamination at Los Alamos National Laboratory. The U.S. government has rights to use, reproduce, and distribute this document. The public may copy and use this document without charge, provided that this notice and any statement of authorship are reproduced on all copies.

2019 Annual Long-Term Monitoring and Maintenance Report for Corrective Measures Implementation at Former 260 Outfall Area

September 2019

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1.0 INTRODUCTION

This "2019 Annual Long-Term Monitoring and Maintenance Report for Corrective Measures Implementation (CMI) at the Former 260 Outfall Area" within Technical Area 16 (TA-16) at Los Alamos National Laboratory (LANL or the Laboratory) follows the Long-Term Monitoring and Maintenance Plan requirements specified in Appendix A to the "Remedy Completion Report for Corrective Measures Implementation at Consolidated Unit 16-021(c)-99" (LANL 2017, 602597). This annual Long-Term Monitoring and Maintenance Report covers the reporting period from August 2018 to July 2019.

The former 260 Outfall area consists of the high explosives (HE) machining building (building 16-260) and associated sumps, drainlines, and troughs that discharged into the 260 Outfall drainage channel. The 260 Outfall drainage channel consists of the outfall, a former settling pond, and the lower portion of the drainage channel leading to Cañon de Valle (Figure 1.0-1). Historically, HE-contaminated water from the outfall entered the former settling pond and drained into the 260 Outfall drainage channel.

The corrective measures were implemented to address HE associated with the 260 Outfall, including RDX (Royal Demolition Explosive) and barium (a byproduct of processing HE Baratol), which are the primary contaminants addressed in the CMI remedy completion report (LANL 2017, 602597) and discussed in this report. Other compounds associated with the 260 Outfall include HMX (Her Majesty's Explosive), TNT (2,4,6-trinitrotoluene), volatile organic compounds (VOCs), metals, and HE byproducts and degradation products. As part of the long-term monitoring and maintenance plan, other analytes measured include semivolatile organic compounds (SVOCs), general inorganics, nitrogen-15/oxygen-18 isotopes in nitrate, and radionuclides. Where appropriate, these compounds are screened in accordance with the criteria set forth by the 2016 Compliance Order on Consent, and any compounds exceeding their respective screening levels are further discussed in this report. Additionally, field parameters (e.g., dissolved oxygen, oxidation-reduction potential [ORP], pH, specific conductance, temperature, and turbidity) were collected at select locations, and measurement results are provided.

This report discusses the monitoring and maintenance of the Outfall 260 former settling pond cap; monitoring of the surge bed water levels; monitoring of water quality at SWSC Spring, Burning Ground Spring, Martin Spring, and the PRB alluvial seep (16-61439); and monitoring of groundwater and surface water (base flow) quality at select locations within Cañon de Valle, S-Site Canyon, Pajarito Canyon, Water Canyon, and Fishladder Canyon.

1.1 Regulatory Context

Long-term monitoring and maintenance activities follow the approach put forth in the remedy completion report for corrective measures at Consolidated Unit 16-012(c)-99 (LANL 2017, 602597). The long-term water quality monitoring activities complement and integrate with the "Interim Facility-Wide Groundwater Monitoring Plan for the 2019 Monitoring Year, October 2018–September 2019" (IFGMP) for groundwater and surface water monitoring (N3B 2018, 700000). The Laboratory has implemented the IFGMP in accordance with Section XII of the 2016 Compliance Order on Consent. The long-term monitoring and maintenance plan was included in the CMI remedy completion report, Appendix A (LANL 2017, 602597). The New Mexico Environment Department (NMED) approved the CMI remedy completion report on November 27, 2017 (NMED 2017, 602758).

Monitoring of groundwater from springs (including SWSC, Burning Ground, Bulldog, and Martin), alluvial wells, and intermediate and regional wells in the vicinity and downgradient of the 260 Outfall has historically been conducted as part of the TA-16 260 monitoring group activities conducted under the IFGMP. With the completion of surface CMI activities at Consolidated Unit 16-021(c)-99 and NMED's

approval of the "Remedy Completion Report for Corrective Measures Implementation at Consolidated Unit 16-021(c)-99," including the long-term monitoring and maintenance plan (LANL 2017, 602597; NMED 2017, 602758), the monitoring of surface water, alluvial groundwater, and springs has been incorporated into the IFGMP.

1.2 Conceptual Model for Transport of RDX and Barium

RDX and barium were the primary chemicals of concern (COCs) in alluvial groundwater during the surface CMIs from 1999 to 2010 (LANL 2007, 098192). RDX is the most significant COC within Cañon de Valle and Water Canyon (LANL 2017, 602597). RDX is a mobile compound that does not sorb strongly to environmental media and is readily transported in water. RDX dissolved in groundwater will partition between dissolved RDX and sorbed RDX. RDX sorbs minimally to tuff and sediment, with greater sorption if organic carbon is present. RDX can be degraded both biologically (i.e., microbial degradation) and chemically (hydrolysis) (LANL 2017, 602597).

A review of the concentrations of RDX detected in alluvial monitoring wells indicates long-term declines. The CMI remedy completion report (LANL 2017, 602597) reported that the majority of detections of RDX in alluvial wells in Cañon de Valle were near or below the screening level of 9.66 µg/L. Occasionally during the past 15 yr of monitoring, there have been higher concentrations of RDX observed in alluvial monitoring wells downstream of the 260 Outfall. These transient values were associated with spring snowmelt wet periods. Figure 1.2-1 shows the mean daily flow hydrograph for the SWSC Spring from December 2016 to August 2019. The figure shows increased flow of the SWSC Spring discharge in the spring of 2019, supporting the premise that the spring of 2019 was unusually wet.

Although the majority of RDX concentrations in discharges from SWSC, Burning Ground, and Martin Springs and 16-02656 (PRB Alluvial Seep) from 2000 to 2019 were above the 9.66-µg/L screening level, overall concentrations are declining, likely because of the RDX source-reduction actions that were implemented at Outfall 260 (LANL 2017, 602597). In March 2019, higher than normal levels of RDX in SWSC Spring were measured, which can be associated with the wet winter season and spring snowmelt.

RDX concentrations at the base flow monitoring point in Cañon de Valle below Material Disposal Area (MDA) P are generally less than the NMED screening level of 9.66 µg/L but are occasionally found in higher concentrations during wet periods. RDX concentrations at the other base-flow monitoring locations (Pajarito below S&N Ancho E Basin confluence, between E252 and Water at Beta, and Water at Beta) are well below the 9.66-µg/L screening level.

The overall long-term decrease in RDX concentrations in shallow water reflects multiple factors, including the elimination of the original outfall source of RDX with cessation of National Pollutant Discharge Elimination System discharges into Cañon de Valle, surface removal activities conducted in 2001 and during the surface CMI in 2009 and 2010, and long-term reduction of RDX from the system from natural degradation processes.

Concentration trends for HE compounds have been variable and range from generally declining to stable for an extended period of time. The March 2019 sampling results did show a spike in RDX concentrations at SWSC Spring; however, consistent with the description in the CMI remedy completion report (LANL 2017, 602597), the current concentrations of RDX detected in the springs are considered protective of nearby surface water and alluvial groundwater because the concentrations decrease dramatically as the distance increases away from the source. The objective of long-term monitoring at each spring is to ensure concentrations remain low or stable with time and the regional aquifer is protected.

Barium was targeted for removal in addition to RDX during Outfall 260 source-removal activities. With the cessation of discharge from Outfall 260 to Cañon de Valle, the estimated inventory of barium has been significantly reduced (LANL 2002, 073706); however, elevated barium concentrations in Cañon de Valle alluvial groundwater and surface water persist (LANL 2017, 602597).

Barium mobility is controlled by sorption and the dynamics of surface and alluvial hydrology. Barium continues to be mobilized by fluctuating water levels in the alluvium. Barium is also irreversibly removed from groundwater when barite (barium sulfate) precipitates; however, because witherite (barium carbonate) is also present and dissolves when wet, barium concentrations in alluvial groundwater remain elevated, buffered by the geochemical processes (LANL 2017, 602597).

Barium is more persistent in shallow groundwater within Cañon de Valle and, to a lesser extent, in Martin Spring in S-Site Canyon; however, barium is not likely to migrate to perched-intermediate groundwater or the regional aquifer given its sorptive characteristics, making it considerably less mobile than RDX in oxidizing groundwater. Although it is well-buffered in the near-surface system, natural sorptive processes slowly remove barium from the system. Barium is elevated only in the surface and alluvial systems, and its mobility is limited by conditions in near-surface soils and alluvial groundwater. In addition to flushing dissolved barium from pore water and desorbing any reversibly sorbed barium, higher alluvial groundwater levels can dissolve barium minerals, primarily witherite, present in the unsaturated zone (Reid et al. 2005, 093660). Alternatively, declining alluvial groundwater levels will precipitate barium minerals. The presence of barium minerals partially buffers barium concentrations in surface waters and significantly buffers barium concentrations in alluvial waters (Reid et al. 2005, 093660).

Barium concentrations in alluvial groundwater within Cañon de Valle continue to be elevated. Concentrations in spring water are generally less than the 2000-µg/L screening level. Barium concentrations show a long-term decline in alluvial groundwater samples collected from location CDV-16-02656, located upgradient of the former PRB, suggesting a diminishing source; however, location CDV-16-611923, upstream of the former PRB cutoff wall, showed a significant spike in barium concentrations after the PRB was installed in 2010. After the cutoff wall was installed, water levels in the alluvium above the cutoff wall rose, saturating sediments that likely contained witherite, which is the mobile fraction of barium. As the witherite dissolved, barium concentrations in groundwater spiked. The elevated barium eventually dissipated after flooding breached the cutoff wall in 2011.

Surface water and alluvial groundwater include a mix of spring water and water from upgradient locations and sources. Barium concentrations at surface water and alluvial monitoring locations have been steadily declining and are currently low and stable with some seasonally driven variability, specifically at Burning Ground Spring and SWSC Spring. Barium concentrations at surface and alluvial monitoring locations are steadily declining, except at CDV-16-02659, CDV-16-611923, and 16-61439, where barium concentrations are above the screening level.

The CMI performance objectives were to reduce concentrations of barium and RDX in alluvial groundwater to prevent their migration to deeper groundwater. The long-term monitoring and maintenance plan established performance-monitoring points as follows: the five existing alluvial wells in Cañon de Valle, three existing alluvial wells in S-Site Canyon, two surface-water sampling points along the perennial surface water reach of Cañon de Valle, one surface water sampling point in S-Site Canyon, and at the springs.

1.3 Monitoring Objectives

Key objectives of the long-term monitoring program include the following:

- Monitoring effectiveness of the low-permeability cap and surge-bed grouting to ensure infiltrating
 water does not encounter and mobilize residual COCs in the outfall area and underlying shallow
 vadose zone.
- Monitoring the long-term trend in COC concentrations (primarily HE and barium) in springs, surface water, and alluvial groundwater to ensure historically declining and/or stable concentrations persist.

2.0 LONG-TERM MONITORING AND MAINTENANCE SAMPLING AND RESULTS

Section 2.0 presents the data collected for this 2019 annual Long-Term Monitoring and Maintenance Report. The focus of the discussion is RDX and barium, identified as the primary COCs targeted in the corrective measures implemented at former 260 Outfall. Other constituents are monitored as part of long-term monitoring and maintenance, and sampling results for all constituents monitored in the 2019 long-term monitoring and maintenance program are provided in this report. The results are screened against their respective screening levels, and the constituents that exceed their screening levels are discussed in more detail in this report.

2.1 Sampling

The purpose of the long-term monitoring activities is to assess the long-term effectiveness of the CMI for Consolidated Unit 16-021(c)-99, to monitor the long-term trends in COC concentrations, and to support continuous evaluation of the conceptual model for the fate and transport of residual COCs in nearby springs, surface water, and alluvial groundwater.

Sampling of groundwater, surface water, and springs for the TA-16 260 monitoring group is conducted semiannually (LANL 2017, 602406). In the CMI remedy completion report, Appendix A (LANL 2017, 602597), the analytes and sampling frequencies proposed in the IFGMP (N3B 2018, 700000) for alluvial groundwater, surface water, and springs for the TA-16 260 monitoring group have been adapted as the long-term monitoring requirements for the former 260 Outfall area. Table 2.1-1 summarizes the monitoring locations (i.e., TA-16 260 monitoring group), parameters measured, and sampling frequencies for the springs, alluvial groundwater, and surface waters that make up the 2019 long-term monitoring program. The suite of compounds measured includes HEXMOD (i.e., RDX, HMX, TNT, and degradation byproducts), VOCs, metals, SVOCs, general inorganics, radionuclides, and nitrogen-15/oxygen-18 isotopes in nitrate. In addition, field parameters (e.g., dissolved oxygen, ORP, pH, specific conductivity, temperature, and turbidity) were also collected. Table 2.1-2 provides a list of the field parameters and measurement results. Appendix A provides the field forms associated with sample collection.

2.2 Results

This section presents the results for the primary COCs associated with the Outfall 260 drainage channel (i.e., RDX and barium) and the concentrations measured in the springs, surface water, and alluvial groundwater in Cañon de Valle, S-Site Canyon, Pajarito Canyon, Water Canyon, and Fishladder Canyon. The other constituents monitored as part of the long-term monitoring and maintenance plan are screened against their respective screening levels, and any exceedances identified are further discussed in this section. All validated analytical results are provided in Appendix B.

To present and evaluate the results from the sampling events, the data are organized by canyon, beginning with the most upgradient sample location and moving downgradient within each canyon, as follows:

- Cañon de Valle segment 1
 - CDV-16-02656 (background)
 - ❖ CDV-16-02657r
 - SWSC Spring
 - Burning Ground Spring
- Cañon de Valle segment 2
 - 16-61439 (PRB alluvial seep)
 - ❖ CDV-16-611923
 - ❖ CDV-16-611937
 - Cañon de Valle below MDA P
 - ❖ CDV-16-02659
- S-Site Canyon
 - Martin Spring
 - ❖ MSC-16-06293
 - ❖ MSC-16-06294
- Pajarito Canyon
 - Bulldog Spring
 - ❖ Pajarito below S&N Ancho E Basin Confluence (Confluence)
- Water Canyon
 - Between E252 and Water at Beta
 - Water at Beta
- Fishladder Canyon
 - ❖ FLC-16-25280

The long-term monitoring and maintenance plan prescribes the sampling of spring water, surface water, and alluvial groundwater on a semiannual frequency. The 2019 long-term monitoring and maintenance plan sampling events were performed in August 2018 and March 2019. Table 2.2-1 presents the RDX results by canyon or canyon segment. Barium levels are monitored in filtered samples collected from spring water, surface water, and alluvial groundwater. Table 2.2-2 presents the barium results by canyon or canyon segment.

The SWSC Spring sample CAWA-19-167501 result (296 μ g/L) is flagged with a J+ (Table 2.2-1), indicating there is uncertainty in the estimated value, which is high and does not reflect an accurate value. Carryover of RDX was identified (i.e., RDX from previous samples remained in the gas chromatograph column and eluted with the RDX in the SWSC Spring sample, causing the result to be elevated), as observed in RDX being detected in the quality control blank sample and in other problems with the

laboratory's quality control. The laboratory's case narrative for this sample's analysis describes multiple laboratory issues with the HE analyses, such as laboratory quality control samples and calibration verification samples not meeting the proper recovery requirements. In addition, sample collection logs also show a negative HE field spot test for this sample, which further points to problems with the laboratory analysis.

The long-term monitoring and maintenance plan prescribes monitoring spring water, surface water, and alluvial groundwater for other constituents besides RDX and barium. Table 2.1-1 provides a list of compounds monitored in the 2019 sampling events. Analytes with screening levels were screened against those levels. If there are any exceedances, they are discussed in section 4.3. Table 2.2-3 presents the analytes that exceeded their respective screening levels.

3.0 INSPECTION AND MAINTENANCE

Sections 3.1 and 3.2, respectively, discuss (1) the inspection and maintenance approach for the low-permeability cap on the former settling pond and (2) monitoring of the surge bed monitoring well installed to monitor the effectiveness of the injection grouting.

3.1 Low-Permeability Cap

The objective of the low-permeability cap on top of the former settling pond is to prevent surface water run-on and infiltration into the outfall area and underlying shallow vadose zone that contain residual RDX. The low-permeability cap is inspected semiannually for evidence of settling, cracking, erosion, water ponding, undesirable vegetation growth, and animal intrusion. Each year, inspections are conducted in March or April to check for damage that may be associated with winter and snowmelt conditions and in September to monitor for damage from summer rainfall runoff.

In the September 2018 inspection of the low-permeability cap, no erosion, cracking, settlement, or ponding water was observed. There was no evidence of burrowing animals or undesirable vegetative growth, and the slopes were observed to be adequate for water runoff. No maintenance items were identified during the inspection.

In the April 2019 inspection of the low-permeability cap, no cracking, settlement, or ponding water was observed. There was no evidence of burrowing animals, and the slopes were observed to be adequate for water runoff. A sapling growing on the northeast end of the cap was removed. On the northeast side of the cap, a small rill appeared to cause water to flow towards the cap, causing slight erosion of the cap. In July 2019, the cap was revisited and the erosion appeared minimal due to the vegetative growth covering the area. The erosion rill will be inspected during the September 2019 inspection and if required, maintenance will be performed to mediate any potential erosion of the cap. The inspection forms used to document the fall and spring inspections are provided in Appendix C.

Storm water run-on and runoff controls are in place to prevent erosion of the low-permeability cap and to prevent runoff and sediment from moving farther down the 260 Outfall drainage channel. Monitoring and maintenance of the storm water control structures at the former 260 Outfall area continue under the Laboratory's National Pollutant Discharge Elimination System Individual Permit for Stormwater Discharges (Individual Permit), issued by the U.S. Environmental Protection Agency, Region 6, on September 30, 2010 (LANL 2017, 602284). Storm water controls installed at the site under the Individual Permit currently include vegetation, earthen berms, curbing, riprap, a rock check dam, and the low-permeability cap; therefore, an additional inspection of the low-permeability cap is performed when these controls are inspected as required by the Individual Permit. An inspection of the storm water control

structures, including the low-permeability cap at the former 260 Outfall area was performed on April 9, 2019. The inspection form is provided in Appendix C.

3.2 Surge Bed Monitoring Well

The surge bed monitoring well was installed to evaluate the effectiveness of the grout injected into the subsurface surge bed and of the low-permeability cap by monitoring for the appearance of water in the surge bed. Observations of water levels in the surge bed monitoring well during semiannual inspections have confirmed no detectable volume of water within the well. Additionally, throughout the monitoring year 2019 season, water levels have been monitored by a dedicated in-well transducer; no water has been detected in the surge bed monitoring well. The raw transducer data are provided in Appendix D.

4.0 DISCUSSION AND CONCLUSIONS

This section discusses the RDX and barium results from the August 2018 and March 2019 sampling events and how the results compare with the historical trends and support the conceptual model. In addition, this section describes other analytes (e.g., aluminum, iron, manganese, boron, tetrachloroethene [PCE]) detected above their respective screening levels and how these relate to the conditions in the alluvial groundwater.

4.1 RDX

The complete RDX data records for Cañon de Valle segments 1 and 2 are presented in Figures 4.1-1 and 4.1-2, respectively. These figures provide a comprehensive review of the RDX concentrations in waters in each segment and how the RDX sample results compare with the historical data trends. As described in Section 2.2, however, the SWSC Spring result from March 2019 does not provide an accurate RDX value and the result is estimated to be high; therefore, the data trend shown on Figure 4.1-1 for the SWSC Spring does not reflect actual conditions. Based on a review of these data, except for SWSC Spring, it can be concluded that the temporal and spatial trends and conditions in the surface water, alluvial groundwater, and springs are consistent with the concept that RDX concentrations are in long-term decline and are still considered protective of the regional groundwater; however, transient increases in RDX concentrations are observed during wet periods.

Plate 1 shows the spatial distribution of RDX across Cañon de Valle since the completion of the CMI. This plate illustrates a spike in RDX concentrations across sampling locations in Cañon de Valle in the spring of 2019, with a decrease in RDX concentrations downgradient of the source and an overall long-term continued decline in RDX concentrations since the completion of the corrective measures.

The S-Site Canyon RDX data record is shown in Figure 4.1-3, and the spatial distribution of RDX detected since the corrective measures is provided on Plate 1. The Martin Spring water RDX concentrations remain above the screening level, although the sample results are consistent with the conclusion that RDX levels continue to decline over time. Plate 1 shows declining levels of RDX across the canyon with no impacts to surface water downgradient of Martin Spring, suggesting the RDX concentration in Martin Spring is a localized condition.

The Pajarito Canyon locations include a spring location at Bulldog Spring and a surface water location at the Confluence. Figure 4.1-4 presents the data record for both locations. Historically, Bulldog Spring water RDX concentrations are below the screening level, as demonstrated in the results of the samples collected in August 2018 and March 2019. At the Confluence surface water location, the RDX results are

consistent with past data—concentrations are below 9.66 μ g/L and support the sharply decreasing trend in RDX concentration.

The Water Canyon RDX data record is presented in Figure 4.1-5. Figure 4.1-5 demonstrates that the samples are consistent with historical results, which indicate RDX is well below the screening level or not detected.

Figure 4.1-6 presents the data record for the Fishladder Canyon. August 2018 samples were not available because the location was dry at the time of sampling; however, the March 2019 sampling event took place, and the sampling results displayed an RDX concentration of 3.9 μ g/L, well below the screening level. The historical record indicates no impacts to Fishladder Canyon alluvial groundwater above the RDX screening level.

The sample results support the conceptual model for RDX by demonstrating the following:

- Concentrations of RDX in alluvial monitoring wells continue to show long-term declines.
- Most alluvial wells in Cañon de Valle are near or below the screening level of 9.66 μg/L, except at CDV-16-02657r. CDV-16-02657r is usually dry, and this is the first sample collected from this location in the monitoring and maintenance program. The RDX concentration in March 2019 displayed a value of 148 μg/L.
- RDX concentrations in water from Burning Ground, SWSC, and Martin Springs as well as PRB alluvial seep (16-61439) are above the 9.66-µg/L screening level.
- Concentration trends for RDX are variable but are generally declining or stable for an extended period of time; however, there is a transient increase in RDX concentrations due to wet conditions in the spring of 2019.
- The current concentrations of RDX detected in the springs suggest the water is recovering from RDX concentrations and is not impacting alluvial groundwater, as concentrations indicate a dramatic decrease away from the source but may influence surface water RDX concentration during unusually wet years.

The sample results are consistent with past RDX concentration results and do not indicate a change to the conceptual site model. In addition, the monitoring and observations support the conclusion that the low-permeability cap and the stabilized surge bed remedies continue to be effective.

4.2 Barium

Barium concentration data records for the Cañon de Valle segments 1 and 2 are presented in Figures 4.2-1 and 4.2-2, respectively. These figures provide a comprehensive review of barium impacts to each segment since the start of the IFGMP program and a comparison of the sample barium results with the existing data trends. A review of these data indicate that the temporal and spatial trends, and conditions in the surface water, alluvial groundwater, and springs, are consistent with conditions described in the CMI remedy report (LANL 2017, 602597); therefore, these conditions are still considered protective of the regional groundwater.

Plate 2 shows the spatial distribution of barium across Cañon de Valle since the completion of the CMI. In general, barium concentrations at each location are detected below the screening level except for samples collected from 16-61439 (PRB alluvial seep), CDV-16-611923, and CDV-16-02659. CDV-16-611937 barium concentrations declined between March 2018 (3470 µg/L) and August 2019

(148 μ g/L); however, the barium results support the conclusion that barium levels are declining at each location along the canyon where the barium concentrations exceed the screening level.

In S-Site Canyon, Pajarito Canyon, Water Canyon, and Fishladder Canyon, barium is not detected above the 2000-μg/L screening level, which is consistent with the historical data record as seen in Figure 4.2-3 (S-Site Canyon), Figure 4.2-4 (Pajarito Canyon), Figure 4.2-5 (Water Canyon), and Figure 4.2-6 (Fishladder Canyon).

Based on the sample results and comparison with the existing barium data records, the following observations support the conceptual model:

- Concentrations in springs are less than the 2000-μg/L screening level, except at 16-61439 (PRB alluvial seep).
- Barium concentrations at 16-61439 remain above 2000 μg/L but continue to show long-term decline.
- Barium concentrations in Cañon de Valle show a long-term decline in surface water and alluvial groundwater.
- The other canyons in the long-term monitoring and maintenance plan sampling program are not impacted with barium above the screening level.

As the sample results are consistent with past barium concentration results and the conceptual site model, no change to the conceptual model is indicated by these results. The barium results are congruent with the RDX results and support the finding of the continued effectiveness of the low-permeability cap and the stabilized surge bed.

4.3 Other Analytes Exceeding their Respective Screening Levels

All the compounds monitored as part of the long-term monitoring and maintenance plan sampling program were screened against their respective screening levels. Based on these results, iron, manganese, boron, aluminum, and PCE were identified as compounds exceeding screening levels. Table 2.2-3 presents the analytes exceeding their respective screening levels.

Iron and manganese from the August 2018 sampling event exceeded their respective screening levels from the sample collected at CDV-16-611937. Alluvial groundwater conditions at sample location CVD-16-611937 were reducing in August 2018. In August 2018, the dissolved oxygen concentration was measured at 0.46 mg/L and the ORP was measured at -62.6 mV, indicating reducing conditions. Reducing conditions at CVD-16-611937 in August 2018 are likely due to the lack of fresh water flushing the groundwater at this location.

The samples collected from Cañon de Valle location CVD-16-611937 in August 2018 (CAWA-18-160290) exceeded the iron and manganese screening levels of 1000 μ g/L and 200 μ g/L, respectively. One reason for these detections is the redox-sensitive nature of these compounds, as localized conditions become more reduced in the alluvial groundwater and the anaerobic bacteria convert iron and manganese into their more reduced (and more soluble) forms. The detection of iron and manganese above their screening levels in the August 2018 sample, therefore, correlates well with the reducing conditions in the alluvial groundwater at this localized location.

The March 2019 sampling results showed all locations sampled contained iron, with a range from 121 μ g/L to 4690 μ g/L in filtered samples. Iron concentrations exceeded 1000 μ g/L in all samples except those collected from CDV-16-02656 (882 μ g/L), 16-61439 (808 μ g/L), CDV-16-61123 (121 μ g/L), and

Cañon de Valle below MDA P (592 μ g/L). These results can be explained by the relationship between iron concentration and turbidity. Figure 4.3-1 shows iron concentrations versus turbidity levels measured in the water samples. There is a position correlation between iron concentrations and turbidity levels. The sample preparation for metals requires filtering the water sample. The filtering process includes passing the water through a 0.45- μ m glass filter; however, colloidal particles smaller than 0.45 μ m, in the range of 0.001 to 0.044 μ m, will pass through the filter, carrying iron with them. As shown on Figure 4.3-1, iron concentrations exceed the 1000- μ g/L screening level with turbidity levels above 25 nephelometric turbidity units (NTUs). Manganese was detected above its screening level in the sample collected from CDV-16-611937 (2100 μ g/L) in August 2018.

In addition to iron, other compounds that exceeded their screening levels include aluminum, boron, and PCE. Boron was detected in the August 2018 sample collected at Martin Spring (1140 μ g/L) and the March 2019 sample from MSC-16-06293 (946 μ g/L). Elevated concentrations of boron in Martin Spring water are well documented and relate to historical Laboratory releases at TA-16 (LANL 2018, 602963). Aluminum and PCE were both detected in the March 2019 sampling event. Aluminum was detected in the sample from MSC-16-06294 (8770 μ g/L), and PCE was detected at 189 μ g/L in the sample collected from FLC-16-25280.

4.4 Conclusions

The CMI objectives were to reduce the concentrations of barium and RDX in alluvial groundwater to prevent the migration of these compounds into deeper groundwater. The long-term monitoring and maintenance plan was implemented to (1) monitor the performance of the CMI in terms of these objectives to evaluate the effectiveness of the low-permeability cap and surge-bed grouting in ensuring that infiltrating water does not encounter and mobilize residual RDX in the outfall area and underlying shallow vadose zone and (2) monitor the long-term trend in concentrations of RDX and barium in springs, surface water, and alluvial groundwater to ensure historically declining and/or stable concentrations persist. The 2019 sampling and inspection program has met these objectives.

5.0 RECOMMENDATIONS

Newport News Nuclear BWXT-Los Alamos, LLC (N3B) recommends that the long-term monitoring and maintenance plan be continued through the monitoring year 2020. Sampling and inspection will be continuous to evaluate the effectiveness of the low-permeability cap and surge-bed grouting and monitor the long-term trends in COC (RDX and barium) concentrations. Alluvial groundwater, surface water, and spring water are anticipated to continue showing stable or declining concentrations of RDX and barium. If the data show a significant increase in COC concentrations over time, the conditions in the vicinity of former 260 Outfall will be reassessed to identify the cause and evaluate whether additional corrective action is necessary.

Because of the uncertainty of the March 2019 SWSC Spring RDX sample result, a sample will be collected as soon as practicable to assess if the concentration of RDX in SWSC Spring water is actually elevated and there is an increase in the RDX concentration trend at this location. SWSC Spring was scheduled to be sampled in August 2019, as part of the 2019 IFGMP but the spring was dry. Gage Station 256, just downstream of the SWSC discharge location, will be monitored. If SWSC Spring is discharging water, a sample will be collected and sent to the laboratory for HE analysis. The sample result will be reported to NMED within 30 days after the data has been validated.

Inspections of the low-permeability cap and surge bed will continue on a semiannual basis. If maintenance items are identified, they will be directly addressed and reported in the subsequent annual report.

6.0 REFERENCES AND MAP DATA SOURCES

6.1 References

The following reference list includes documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by N3B (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

- LANL (Los Alamos National Laboratory), July 2002. "Interim Measure Report for Potential Release Site 16-021(c)-99," Los Alamos National Laboratory document LA-UR-02-4229, Los Alamos, New Mexico. (LANL 2002, 073706)
- LANL (Los Alamos National Laboratory), July 2007. "Corrective Measures Implementation Plan for Consolidated Unit 16-021(c)-99, Revision 1," Los Alamos National Laboratory document LA-UR-07-4715, Los Alamos, New Mexico. (LANL 2007, 098192)
- LANL (Los Alamos National Laboratory), May 2017. "Interim Facility-Wide Groundwater Monitoring Plan for the 2018 Monitoring Year, October 2017–September 2018," Los Alamos National Laboratory document LA-UR-16-24070, Los Alamos, New Mexico. (LANL 2017, 602406)
- LANL (Los Alamos National Laboratory), May 1, 2017. "2016 Update to the Site Discharge Pollution Prevention Plan, Revision 1, NPDES Permit No. NM0030759, Water/Cañon de Valle Watershed, Receiving Waters: Cañon de Valle, Potrillo Canyon, Water Canyon, and Fence Canyon, Volume 4," Los Alamos National Laboratory document LA-UR-17-23039, Los Alamos, New Mexico. (LANL 2017, 602284)
- LANL (Los Alamos National Laboratory), September 2017. "Remedy Completion Report for Corrective Measures Implementation at Consolidated Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-17-27678, Los Alamos, New Mexico. (LANL 2017, 602597)
- LANL (Los Alamos National Laboratory), March 2018. "Compendium of Technical Reports Related to the Deep Groundwater Investigation for the RDX Project at Los Alamos National Laboratory," Los Alamos National Laboratory document LA-UR-18-21326, Los Alamos, New Mexico. (LANL 2018, 602963)
- N3B (Newport News Nuclear BWXT-Los Alamos, LLC), May 2018. "Interim Facility-Wide Groundwater Monitoring Plan for the 2019 Monitoring Year, October 2018–September 2019," Newport News Nuclear BWXT-Los Alamos, LLC, document EM2018-0004, Los Alamos, New Mexico. (N3B 2018, 700000)
- NMED (New Mexico Environment Department), November 27, 2017. "Approval with Modifications, Remedy Completion Report for Corrective Measures Implementation at Consolidated

Unit 16-021(c)-99," New Mexico Environment Department letter to D. Hintze (DOE-NA-LA) and B. Robinson (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2017, 602758)

Reid, K.D., S.L. Reneau, B.D. Newman, and D.D. Hickmott, August 2005. "Barium and High Explosives in a Semiarid Alluvial System, Cañon de Valle, New Mexico," *Vadose Zone Journal,* Vol. 4, pp. 744–759. (Reid et al. 2005, 093660)

6.2 Map Data Sources

Hillshade; Los Alamos National Laboratory, ER-ES, As published; \slip\gis\Data\HYP\LiDAR\2014Bare Earth\BareEarth DEM Mosiac.gdb; 2014.

Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Unpaved road; Los Alamos National Laboratory, ER-ES, As published, GIS projects folder; \slip\GIS\Projects\14-Projects\14-0062\project_data.gdb; digitized_site_features; digitized_road; 2017.

Paved Road Arcs; Los Alamos National Laboratory, FWO Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Drainage Channel; Los Alamos National Laboratory, ER-ES, As published, GIS projects folder; \slip\GIS\Projects\11-Projects\11-0108\gdb\gdb_11-0108_generic.mdb; drainage; 2017.

TA-16 260 Outfall, As Published, GIS project folder: Q:\14-Projects\14-0080\project_data.gdb\ polygon\outfall_260

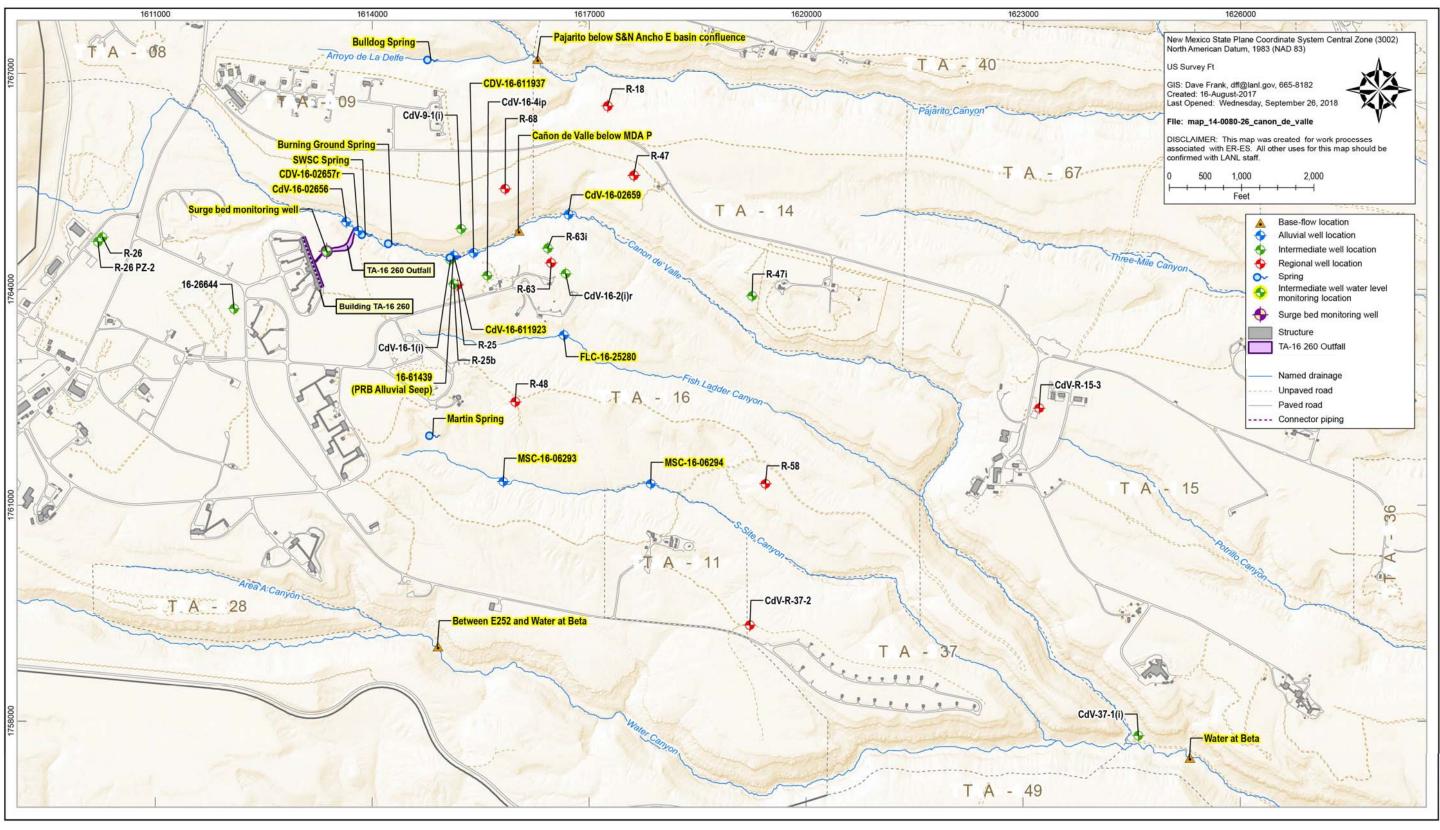
M Wall-PRB, As Published, GIS project folder: Q:\14-Projects\14-0080\project data.gdb\line\wall PRB

Connector piping, As Published, GIS project folder: Q:\14-Projects\14-0080\project data.gdb\line\connector piping

Tech areas; Los Alamos National Laboratory, Database Connections\GIS.PUB.PRD1.sde\PUB.Boundaries\PUB.tecareas

Tech Areas line; Los Alamos National Laboratory, Database Connections\GIS.PUB.PRD1.sde\PUB.Boundaries\PUB.tecareas_line

PUB.prs_all_reg_admin; Los Alamos National Laboratory, Database Connections\GIS.PUB.PRD1.sde\PUB.Regulatory\PUB.prs_all_reg_admin



Note: Yellow highlights indicate locations of interest in this report.

Figure 1.0-1 Long-Term Monitoring and Maintenance Plan locations

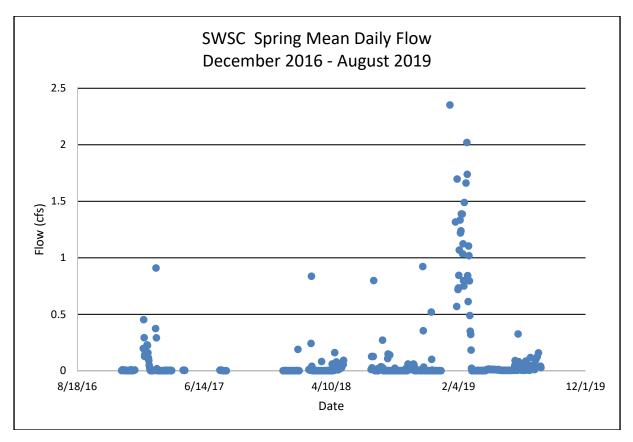


Figure 1.2-1 Hydrograph showing the Mean Daily Flow of SWSC Spring

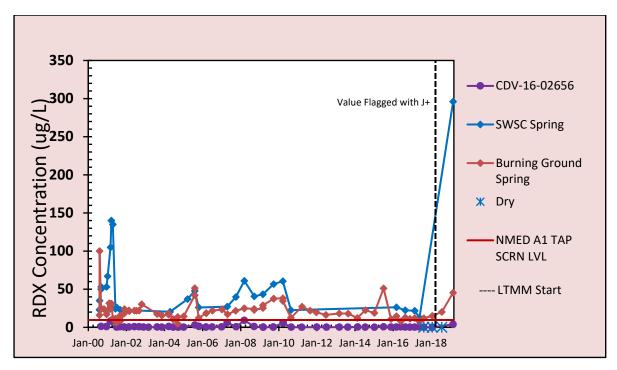


Figure 4.1-1 Cañon de Valle segment 1 RDX data record

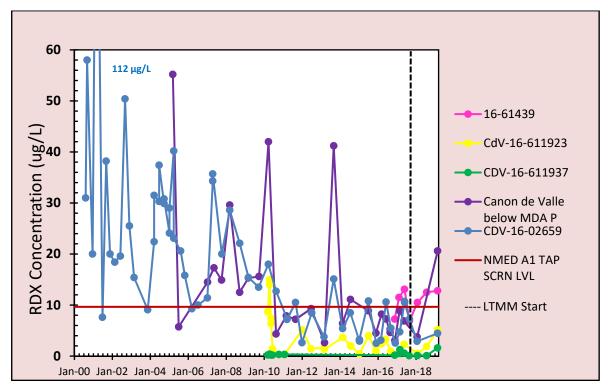


Figure 4.1-2 Cañon de Valle segment 2 RDX data record

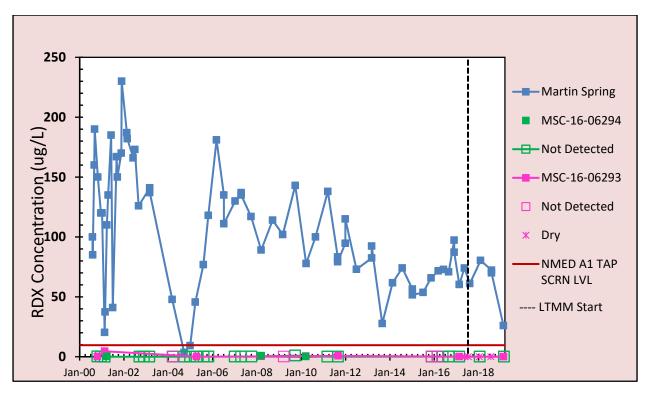


Figure 4.1-3 S-Site Canyon RDX data record

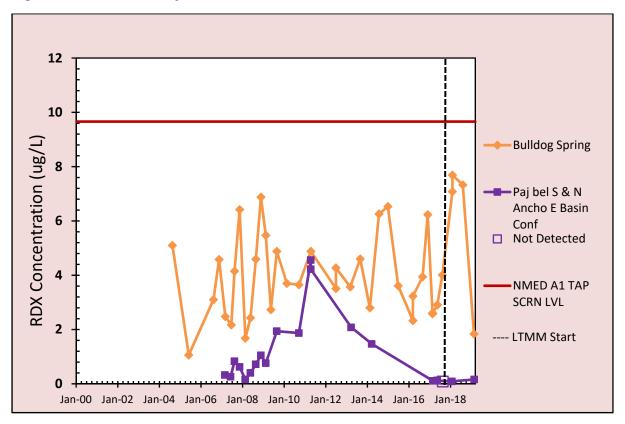


Figure 4.1-4 Pajarito Canyon RDX data record

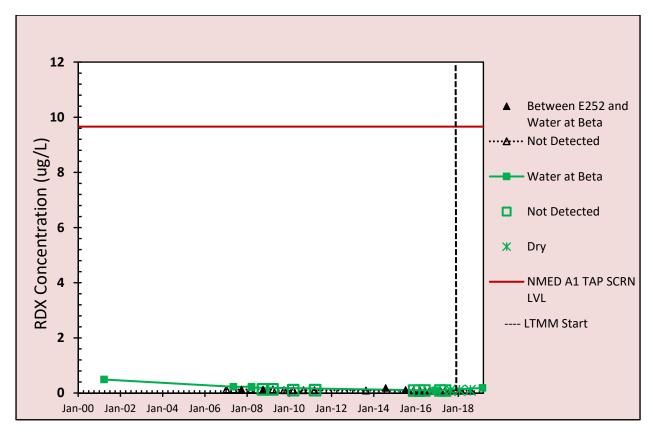


Figure 4.1-5 Water Canyon RDX data record

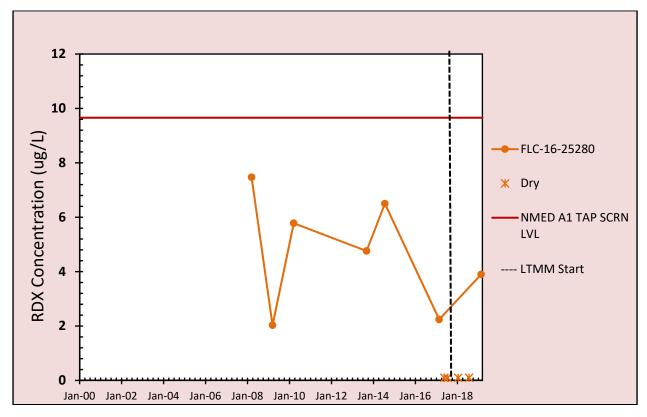


Figure 4.1-6 Fishladder Canyon RDX data record

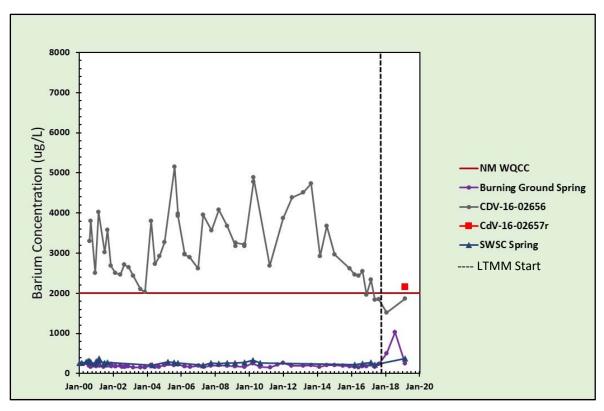


Figure 4.2-1 Cañon de Valle segment 1 barium data record

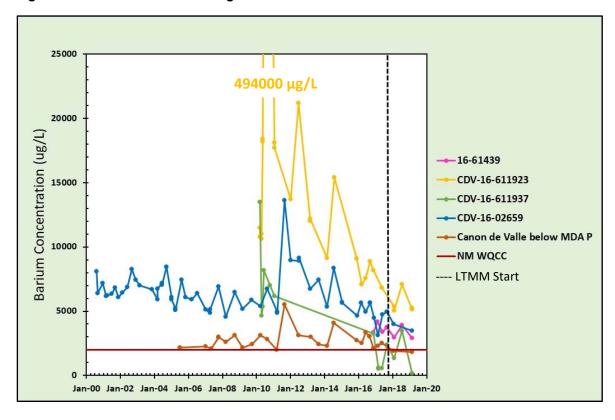


Figure 4.2-2 Cañon de Valle segment 2 barium data record

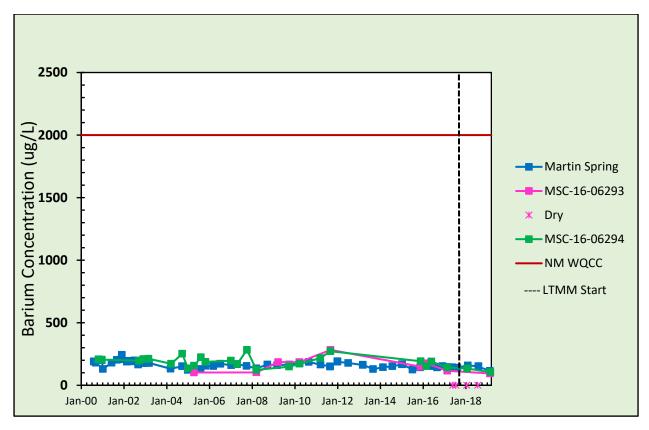


Figure 4.2-3 S-Site Canyon barium data record

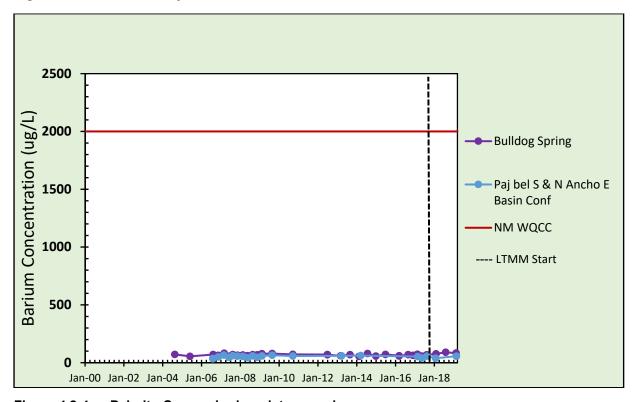


Figure 4.2-4 Pajarito Canyon barium data record

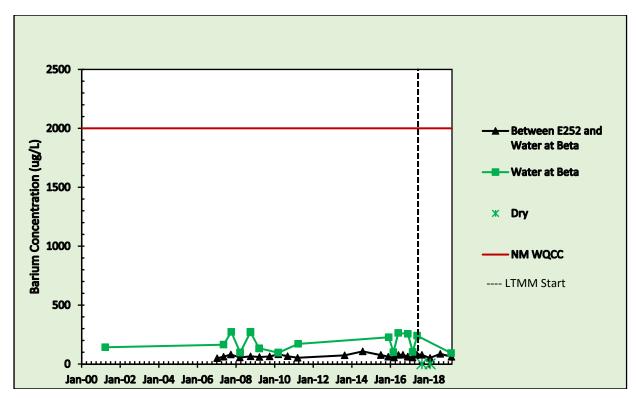


Figure 4.2-5 Water Canyon barium data record

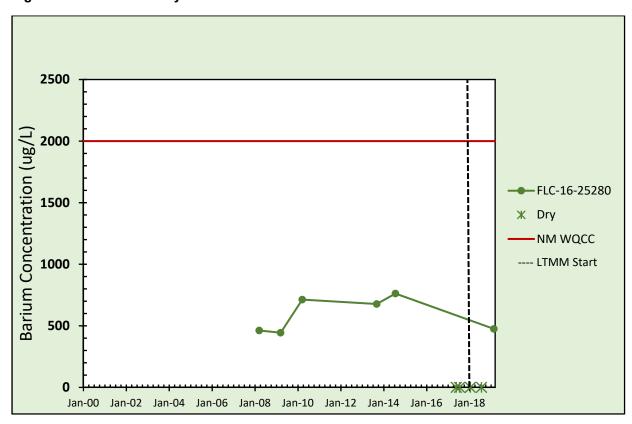


Figure 4.2-6 Fishladder Canyon barium data record

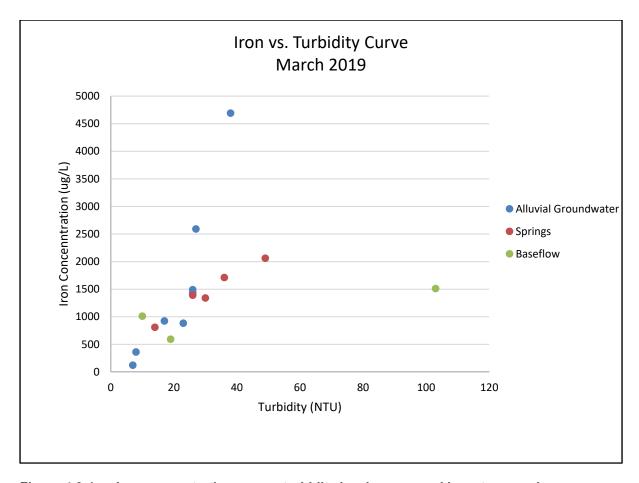


Figure 4.3-1 Iron concentration verses turbidity levels measured in water samples

Table 2.1-1
2019 Monitoring Locations and Analytes

Canyon	Location	Surface Water Body or Source Aquifer	Metals	VOCs	SVOCs	НЕХМОВ	Radionuclides	Low-Level Tritium	General Inorganics	¹⁵ N/ ¹⁸ O Isotopes in Nitrate
Cañon de Valle 1	CDV-16-02656	Alluvial	Sª	S	B ^b	S	В	NMc	S	NM
	CDV-16-02657r	Alluvial	S	S	В	S	В	NM	S	NM
	SWSC Spring	Spring	S	S	В	S	В	NM	S	A^d
	Burning Ground Spring	Spring	S	S	В	S	В	Α	S	Α
Cañon de Valle 2	16-61439 (PRB Alluvial Seep)	Spring	S	S	В	S	В	NM	S	NM
	CDV-16-611923	Alluvial	S	S	В	S	В	NM	S	NM
	CDV-16-611937	Alluvial	S	S	В	S	В	NM	S	NM
	Cañon de Valle below MDA P	Base flow	S	S	В	S	В	NM	S	NM
	CDV-16-02659	Alluvial	S	S	В	S	В	NM	S	NM
S-Site Canyon	Martin Spring	Spring	S	S	В	S	В	Α	S	Α
	MSC-16-06293	Alluvial	S	S	В	S	В	NM	S	NM
	MSC-16-06294	Alluvial	S	S	В	S	В	NM	S	NM
Pajarito Canyon	Bulldog Spring	Spring	S	S	В	S	В	NM	S	Α
	Pajarito below S-N Ancho E Basin Confluence	Base flow	S	S	В	S	В	NM	S	NM
Water Canyon	Between E252 and Water at Beta	Baseflow	S	S	В	S	В	NM	S	NM
	Water at Beta	Base flow	S	S	В	S	В	NM	S	NM
Fishladder Canyon	FLC-16-25280	Alluvial	S	S	В	S	В	NM	S	NM
n/a ^e	Surge Bed Monitor Well	Surge Bed (Intermediate)	S	S	S	S	NM	NM	S	NM

^a S = Semiannual (two times per year).

^b B = Biennial (one time per 2 years).

^c NM = Not measured. This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

^d A = Annual.

^e n/a = Not applicable.

Table 2.1-2
Long-Term Monitoring and Maintenance Plan Sampling Program Field Parameters

Watershed	Location	Date	Screen Top Depth (ft)	Dissolved Oxygen (mg/L)	Oxidation- Reduction Potential (mV)	pH (SUª)	Specific Conductance (µS/cm)	Temperature (deg C)	Turbidity (NTU)	Comments
Cañon de Valle 1	CDV-16-02656	08/11/2018	3	NS ^b	NS	NS	NS	NS	NS	Insufficient water for sampling
		03/16/2019	3	4.69	161.5	6.54	281.2	6.5	22.97	
	CDV-16-02657r	08/11/2018	1.35	NS	NS	NS	NS	NS	NS	Location dry
		03/18/2019	1.35	7.13	203	6.63	218.1	3.6	25.92	
	SWSC Spring	08/11/2018	n/a ^c	NS	NS	NS	NS	NS	NS	Location dry
		03/16/2019	n/a	8.11	30.12	6.95	264.2	8.8	8.11	
	Burning Ground	08/11/2018	n/a	8.32	NM ^d	7.22	249.2	11.4	3.8	
	Spring	03/16/2019	n/a	8.21	NM	7.28	260.4	9.7	26.14	
Cañon de Valle 2	16-61439 (PRB Alluvial Seep)	08/13/2018	n/a	7.48	9.8	7.11	258.7	13.1	9.8	
		03/11/2019	n/a	9.11	14	7.23	275.5	5	14	
	CDV-16-611923	08/11/2018	3.2	1.69	247.2	6.36	287.7	14.2	16.9	
		03/11/2019	3.2	6.87	208.8	6.6	347	3.7	7.05	
	CDV-16-611937	08/11/2018	3	0.46	-62.6	6.62	248.4	11.5	6.70*	
		03/11/2019	3	2.3	178.2	5.34	269.9	3	17.34	
	Cañon de Valle	08/10/2018	n/a	NS	NS	NS	NS	NS	NS	Location dry
	below MDA P	03/11/2019	n/a	9.73	NM	7.72	235.5	3.9	18.66	
	CDV-16-02659	08/10/2018	1.7	NS	NS	NS	NS	NS	NS	Insufficient water for sampling
		03/11/2019	1.7	6.53	202.2	6.73	248.7	3.6	7.62	

Table 2.1-2 (continued)

Watershed	Location	Date	Screen Top Depth (ft)	Dissolved Oxygen (mg/L)	Oxidation- Reduction Potential (mV)	pH (SUª)	Specific Conductance (µS/cm)	Temperature (deg C)	Turbidity (NTU)	Comments
S-Site Canyon	Martin Spring	08/22/2018	n/a	7.42	NM	7.4	332.3	12.6	8.7	
		03/06/2019	n/a	7.31	NM	7.18	256.1	10.4	49.3	
	MSC-16-06293	08/10/2018	2	NS	NS	NS	NS	NS	NS	Insufficient water for sampling
		03/08/2019	2	6.01	218	7.02	461.6	4.8	25.58	
	MSC-16-06294	08/10/2018	2.5	NS	NS	NS	NS	NS	NS	Insufficient water for sampling
		03/15/2019	2.5	2.52	161.6	6.49	116.4	3.1	76.57	
Pajarito Canyon	Bulldog Spring	08/22/2018	n/a	8.32	NM	7.66	361.5	12.1	12.3	
		03/6/2019	n/a	8.29	NM	7.6	285.1	10	36.1	
	Pajarito below	08/14/2018	n/a	NS	NS	NS	NS	NS	NS	Location dry
	S-N Ancho E Basin Confluence	03/12/2019	n/a	9.37	NM	7.44	200	6.2	103	
Water Canyon	Between E252	08/21/2018	n/a	7.21	NM	8.21	197.6	22.2	5.9	
	and Water at Beta	03/19/2019	n/a	9.75	NM	7.81	181.5	5.8	9.75	
	Water at Beta	08/17/2018	n/a	NS	NS	NS	NS	NS	NS	Location dry
		03/15/2019	n/a	10.1	NM	7.91	171.6	3.5	20.56	
Fishladder	FLC-16-25280	08/10/2018	2	NS	NS	NS	NS	NS	NS	Location dry
Canyon		03/08/2019	2	5.5	212	5.68	174.9	3	26.81	

^a SU = Standard unit.

^b NS = Not sampled.

^c n/a = Not applicable.

^d NM = Not measured. This analytical suite is not scheduled to be collected for this type of water at locations assigned to this monitoring group.

Table 2.2-1
RDX Concentrations in Groundwater, Surface Water, and Springs

Canyon	Location	Sample	Depth to Top of Screen (ft)		Field Prep	Field QC ^a Type	Result (µg/L)	NMED Screening Levels ^b	Comments
Cañon de Valle 1	CDV-16-02656	NS ^c	3	08/11/2018	NS	NS	NS	9.66	
		CAWA-19-167542	3	03/16/2019	UF ^d	REG ^e	3.93	9.66	
	CDV-16-02657r	NS	1.35	08/11/2018	NS	NS	NS	9.66	Location dry
		CAWA-19-167545	1.35	03/16/2019	UF	REG	148	9.66	
	SWSC Spring	NS	n/a ^f	08/11/2018	NS	NS	NS	9.66	Location dry
		CAWA-19-167501	n/a	03/16/2019	UF	REG	296 J+ ^g	9.66	Result is undergoing validation.
I	Burning Ground Spring	CAWA-18-160246	n/a	08/11/2018	UF	REG	20.2	9.66	
I		CAWA-19-167527	n/a	03/16/2019	UF	REG	45.4	9.66	
Cañon de Valle 2	16-61439 (PRB Alluvial	CAWA-18-160254	n/a	08/13/2018	UF	REG	12.5	9.66	
I	Seep)	CAWA-19-167536	n/a	03/11/2019	UF	REG	12.8	9.66	
I	CDV-16-611923	CAWA-18-160282	3.2	08/11/2018	UF	REG	1.87	9.66	
I		CAWA-19-167551	3.2	03/11/2019	UF	REG	5.13	9.66	
I		CAWA-19-167731	3.2	03/11/2019	UF	FD^h	5.16	9.66	
I	CDV-16-611937	CAWA-18-160291	3	08/11/2018	UF	REG	ND ⁱ (0.086)	9.66	
		CAWA-19-167561	3	03/11/2019	UF	REG	1.61	9.66	
I	Cañon de Valle below	NS	n/a	08/10/2018	NS	NS	NS	9.66	Location dry
I	MDA P	CAWA-19-167398	n/a	03/11/2019	UF	REG	20.6	9.66	
	CDV-16-02659	NS	1.7	08/10/2018	NS	NS	NS	9.66	Insufficient water for sampling
I		CAWA-19-167548	1.7	03/11/2019	UF	REG	4.47	9.66	
S-Site Canyon	Martin Spring	CAWA-18-160249	n/a	08/22/2018	UF	REG	72.3	9.66	
		CAWA-18-160252	n/a	08/22/2018	UF	FD	70	9.66	
		CAWA-19-167532	n/a	03/06/2019	UF	REG	26	9.66	

Table 2.2-1 (continued)

Canyon	Location	Sample	Depth to Top of Screen (ft)	Date	Field Prep	Field QC ^a Type	Result (µg/L)	NMED Screening Level ^b	Comments
S-Site Canyon (cont.)	MSC-16-06293	NS	2	08/10/2018	NS	NS	NS	9.66	Insufficient water for sampling
		CAWA-19-167554	2	03/08/2019	UF	REG	0.0978 J ^j	9.66	
	MSC-16-06294	NS	2.5	08/10/2018	NS	NS	NS	9.66	Insufficient water for sampling
		CAWA-19-167558	2.5	03/15/2019	UF	REG	ND (0.092)	9.66	
Pajarito Canyon	Bulldog Spring	CAPA-18-160407	n/a	08/22/2018	UF	REG	7.33	9.66	
		CAPA-19-167673	n/a	03/06/2019	UF	REG	1.84	9.66	
	Pajarito below S&N Ancho E Basin Confluence	NS	n/a	8/14/2018	NS	NS	NS	9.66	Location dry
		CAPA-19-167670	n/a	03/12/2019	UF	REG	0.161 J	9.66	
Water Canyon	Between E252 and	CAWA-18-160226	n/a	08/21/2018	UF	REG	ND (0.0833)	9.66	
	Water at Beta	CAWA-19-167497	n/a	3/15/2019	UF	REG	0.184 J	9.66	
	Water at Beta	NS	n/a	08/17/2018	NS	NS	NS	9.66	Location dry
		CAWA-19-167497	n/a	03/15/2019	UF	REG	0.184 J	9.66	
Fishladder Canyon	FLC-16-25280	NS	2	08/10/2018	NS	NS	NS	9.66	Location dry
		CAWA-19-167539	2	03/08/2019	UF	REG	3.9	9.66	

Note: (0.087) = Method detection limit.

^a QC = Quality control.

^b NMED Tap Water Screening Levels specified in the June 2019 Table A-1 of "Risk Assessment Guidance for Site Investigations and Remediation."

^c NS = Not sampled.

^d UF = Unfiltered sample.

^e REG = Regular.

^f n/a = Not applicable.

^gJ+= Higher estimated value.

^h FD = Field duplicate.

i ND = Not detected.

^j J = Estimated value.

Table 2.2-2
Barium Concentrations in Groundwater, Surface Water, and Springs

Canyon	Location	Sample	Depth to Top of Screen (ft)	Date	Field Prep	Field QC Type ^a	Result (µg/L)	Screening Level ^b	Comments
Cañon de Valle 1	CDV-16-02656	NS ^c	3	NS	NS	NS	NS	2000	Insufficient water for sampling
		CAWA-19-167541	3	03/16/2019	F ^d	REGe	1870	2000	
	CDV-16-02657r	NS	1.35	08/11/2018	NS	NS	NS	2000	Location dry
		CAWA-19-167544	1.35	03/16/2019	F	REG	2160	2000	
	SWSC Spring	NS	n/a ^f	08/11/2018	NS	NS	NS	2000	Location dry
		CAWA-19-167729	n/a	03/16/2019	F	REG	381	2000	
	Burning Ground	CAWA-18-160245	n/a	08/11/2018	F	REG	1030	2000	
	Spring	CAWA-19-167526	n/a	03/16/2019	F	REG	248	2000	
Cañon de Valle 2	16-61439 (PRB	CAWA-18-160253	n/a	08/13/2018	F	REG	3930	2000	
	Alluvial Seep)	CAWA-19-167535	n/a	03/11/2019	F	REG	2900	2000	
	CDV-16-611923	CAWA-18-160281	3.2	08/11/2018	F	REG	7080	2000	
		CAWA-19-167550	3.2	03/11/2019	F	REG	5130	2000	
		CAWA-19-167730	3.2	03/11/2019	F	FD ^g	5280	2000	
	CDV-16-611937	CAWA-18-160290	3	08/11/2018	F	REG	3470	2000	
		CAWA-19-167560	3	03/11/2019	F	REG	148	2000	
	Cañon de Valle	NS	n/a	08/10/2018	NS	NS	NS	2000	Location Dry
	below MDA P	CAWA-19-167397	n/a	03/11/2019	F	REG	1840	2000	
	CDV-16-02659	NS	1.7	08/10/2018	NS	NS	NS	2000	Insufficient water for sampling
		CAWA-19-167547	1.7	03/11/2019	F	REG	3460	2000	
S-Site Canyon	Martin Spring	CAWA-18-160248	n/a	08/22/2018	F	REG	153	2000	
		CAWA-18-160251	n/a	08/22/2018	F	FD	149	2000	
		CAWA-19-167531	n/a	03/06/2019	F	REG	115	2000	
	MSC-16-06293	NS	2	08/10/2018	NS	NS	NS	2000	Insufficient water for sampling
		CAWA-19-167553	2	03/08/2019	F	REG	94.1	2000	
	MSC-16-06294	NS	2.5	08/10/2018	NS	NS	NS	2000	Insufficient water for sampling
		CAWA-19-167557	2.5	03/15/2019	F	REG	105	2000	

Table 2.2-2 (continued)

Canyon	Location	Sample	Depth to Top of Screen (ft)	Date	Field Prep	Field QC ^a Type	Result (µg/L)	Screening Level ^b	Comments
Pajarito Canyon	Bulldog Spring	CAPA-18-160406	n/a	08/22/2018	F	REG	90	2000	
		CAPA-19-167672	n/a	03/06/2019	F	REG	82.9	2000	
	Pajarito below	NS	n/a	08/14/2018	NS	NS	NS	2000	Location dry
	S&N Ancho E Basin Confluence	CAPA-19-167669	n/a	03/12/2019	F	REG	56.4	2000	
Water Canyon	Between E252 and	CAWA-18-160225	n/a	08/21/2018	F	REG	86.2	2000	
	Water at Beta	CAWA-19-167493	n/a	03/19/2019	F	REG	61.1	2000	
	Water at Beta	NS	n/a	08/17/2018	NS	NS	NS	2000	Location dry
		CAWA-19-167496	n/a	03/15/2019	F	REG	92.4	2000	
Fishladder Canyon	FLC-16-25280	NS	2	08/10/2018	NS	NS	NS	2000	Location dry
		NS	2	03/08/2019	F	REG	475	2000	

^a QC = Quality control.

^b New Mexico Water Quality Control Commission Groundwater Standards.

^c NS = Not sampled.

^d F = Filtered sample.

^e REG = Regular.

^f n/a = Not applicable.

^g FD = Field duplicate.

Table 2.2-3
Analytes Exceeding Screening Levels

Canyon	Location	Sample	Depth to Top of Screen (ft)	Date	Field QC ^a Type	Analyte	Result (µg/L)	Screening Level ^b	Field Prep Code
Cañon de Valle 1	CdV-16-02657r	CAWA-19-167544	1.35	03/16/2019	REG ^c	Iron	1430	1000	F ^d
	SWSC Spring	CAWA-19-167729	n/a ^e	03/16/2019	REG	Iron	1340	1000	F
	Burning Ground Spring	CAWA-19-167526	n/a	03/16/2019	REG	Iron	1390	1000	F
Cañon de Valle 2	CDV-16-611937	CAWA-18-160290	3.0	08/11/2018	REG	Iron	9480	1000	F
	CDV-16-611937	CAWA-18-160290	3.0	08/11/2018	REG	Manganese	2100	200	F
	CDV-16-611937	CAWA-19-167560	3.0	03/11/2019	REG	Manganese	323	200	F
Fish Ladder	FLC-16-25280	CAWA-19-167538	2.6	03/08/2019	REG	Tetrachloroethene	189	5	UF
Canyon	FLC-16-25280	CAWA-19-167538	2.6	03/08/2019	REG	Iron	2590	1000	F
S-Site Canyon	Martin Spring	CAWA-18-160248	n/a	08/22/2018	REG	Boron	1140	750	F
	Martin Spring	CAWA-19-167531	n/a	03/06/2019	REG	Iron	2060	1000	F
	MSC-16-06293	CAWA-19-167553	2.0	03/08/2019	REG	Boron	946	750	F
	MSC-16-06293	CAWA-19-167553	2.0	03/08/2019	REG	Iron	1490	1000	F
	MSC-16-06294	CAWA-19-167557	2.0	03/08/2019	REG	Aluminum	8770	750	F
	MSC-16-06294	CAWA-19-167557	2.5	03/15/2019	REG	Iron	4670	1000	F
Pajarito Canyon	Bulldog Spring	CAPA-19-167672	n/a	03/06/2019	REG	Iron	1710	1000	F
	Paj bel S-N Anch E Basin conf	CAPA-19-167669	n/a	03/12/2019	REG	Iron	1510	1000	F
Water Canyon	Water at Beta	CAWA-19-167496	n/a	03/15/2019	REG	Iron	1010	1000	F

^a QC = Quality control.

^b New Mexico Water Quality Control Commission Groundwater Standards.

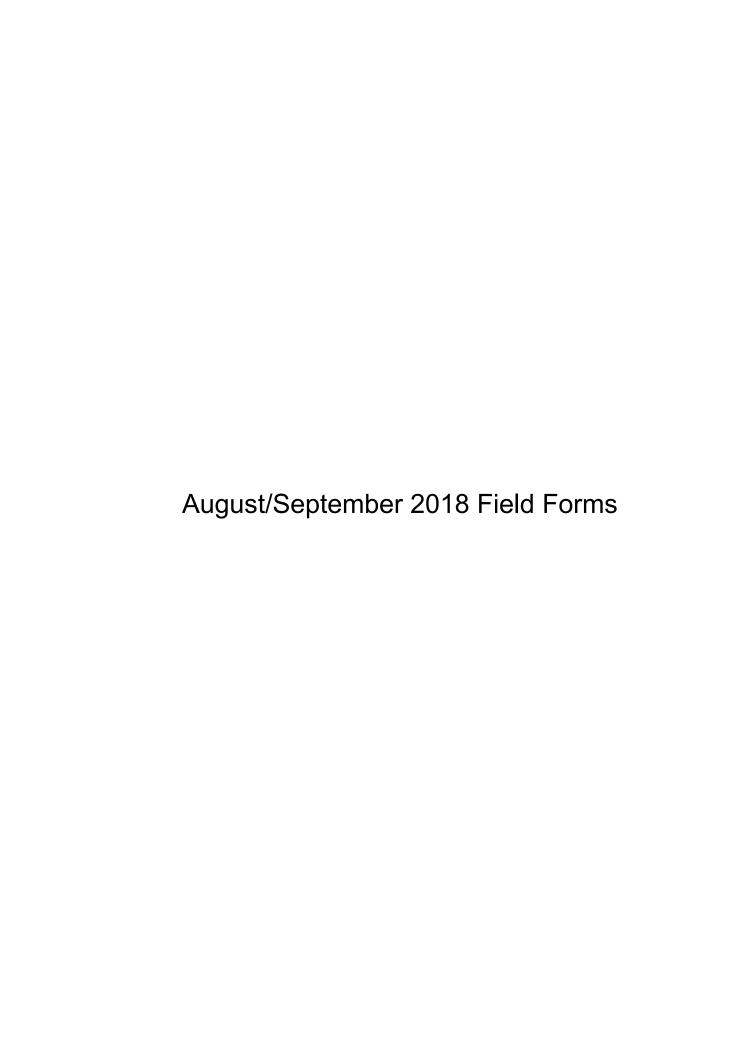
^c REG = Regular.

^d F = Filtered.

^e n/a = Not applicable.

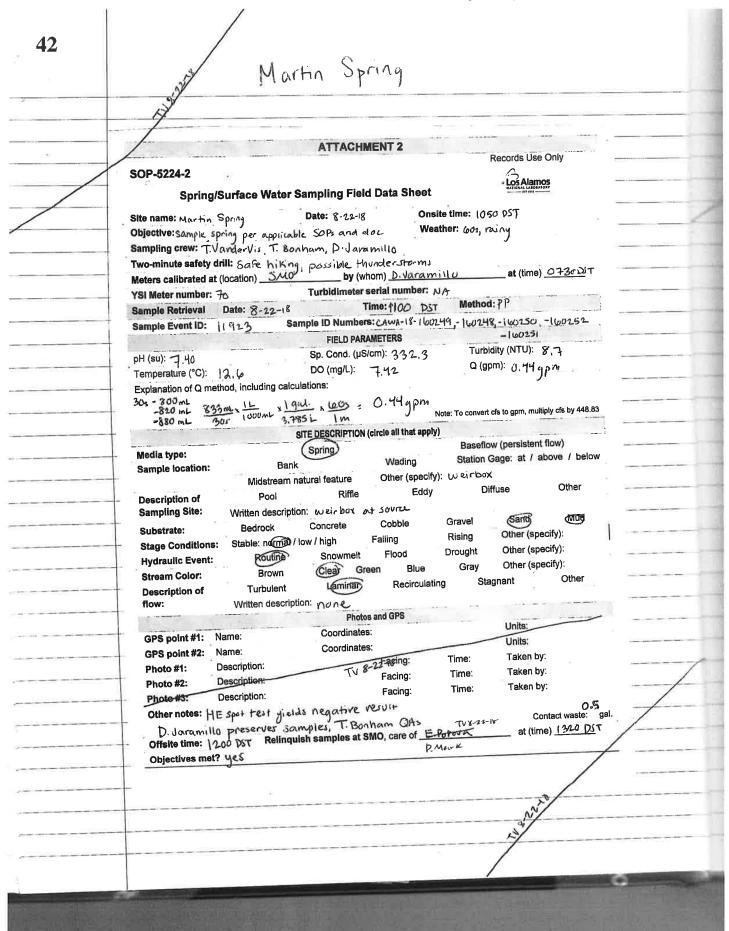


Field Forms Associated with Sample Collection



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Media type: Sample locati Description of Sampling Site Substrate: Stage Conditi Hydraulic Eve Stream Color Description of flow:	Midstream n Written description Bedrock Ions: Stable: normal / I ent: Routine Brown Turbulent Written description	STE DESCRIPTION (circle all that Spring) Wading Natural feature Other spring Riffle E Concrete Cobble Iow / high Falling Snowmelt Flood Clear Green Blu Laminar Recircle	Note: To convert apply) Basefle Station pecify): Pol G ddy Di Gravel Rising Drought e Gray	od; fred Pashan Permoders - 7.63 GPM t ofs to gpm, multiply ofs by 48.63 ow (persistent flow) Gage: at / above / below Source ffuse Other Sand Mud Other (specify): Other (specify): Other (specify):	3
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Media type: Sample locati Description of Sampling Site Substrate: Stage Conditi Hydraulic Events Stream Color Description of flow: GPS point #1 GPS point #2	Midstream n Written description Bedrock Ions: Stable: normal / I ent: Routine : Brown Turbulent Written description : Name: : Name: Name:	STE DESCRIPTION (circle all that Spring) Wading Natural feature Other spring Riffle E Concrete Cobble Iow / high Falling Snowmelt Flood Clear Green Blu Laminar Recircus Con: Photos and GPS Coordinates:	Note: To convert apply) Basefle Station Decify): Col Col ddy Di Grevel Rising Drought e Gray Ulating State	CR = 7.63 GPm t ofs to gpm, multiply ofs by 48.83 ow (persistent flow) Gage: at / above / below Other Sand Mud Other (specify): Other (specify): Other (specify): gnant Other Units: MA Units: V	3
Media type: Sample locati Description or Sampling Site Substrate: Stage Conditi Hydraulic Eve Stream Color Description or flow: GPS point #1 GPS point #2 Photo #1:	Midstream n Written description Bedrock Ions: Stable: normal / I ent: Routine Brown Turbulent Written description I Name: A Description: MA	STE DESCRIPTION (circle all that Spring) (Wading natural feature Other spring) Riffle Expring Concrete Cobble Concrete Cobble Concrete Cobble Concrete Company Concrete Concrete Cordinates: Photos and GPS Coordinates: Coordinates: Facing: N	Note: To convert apply) Basefil Station Decify): Col Col ddy Di Crevel Rising Drought e Gray ulating State Time: MA	od; Fred Pashan Permitted CFS = 7.63 GPm t ofs to gpm, multiply ofs by 48.83 ow (persistent flow) Gage: at / above / below Flow Gage: at / above / below Other Sand Mud Other (specify): Other (specify): Other (specify): gnant Other Units: MA Units: MA Units: MA	3
Media type: Sample locati Description of Sampling Site Substrate: Stage Conditi Hydraulic Eve Stream Color Description of flow: GPS point #1 GPS point #2 Photo #1: Photo #2:	Midstream n Midstream n Written description Bedrock Stable: normal / I Brown Turbulent Written description Name: Description: MA	STE DESCRIPTION (circle all that Spring) (Wading natural feature Other spring) Riffle E On: Now Concrete Cobble Snowmelt Flood Clear Green Blu Laminar Recircular Photos and GPS Coordinates: NA Coordinates: NA Facing: N Facing: N	Note: To convert apply) Basefle Station Decify): Color Rising Drought Gravel Rising Drought Gray Ulating Stat Time: MA Time:	ow (persistent flow) Gage: at / above / below Sand Mud Other (specify): Other (specify): Other (specify): Other (specify): Indies: Units: Units: Taken by: Taken by:	3
Media type: Sample locati Description of Sampling Site Substrate: Stage Conditi Hydraulic Eve Stream Color Description of flow: GPS point #1 GPS point #2 Photo #1: Photo #2: Photo #3:	Midstream n Midstream n Written description Bedrock Stable: normal / I Brown Turbulent Written description: Name: Description: Description: Description:	STE DESCRIPTION (circle all that Spring) (Wading natural feature Other spring) Riffle E On: Nonet Concrete Cobble Iow / high Falling Snowmelt Flood Clear Green Blu Caminar Recircular Photos and GPS Coordinates: NA Coordinates: NA Facing: Facing: Facing: Facing:	Note: To convert apply) Basefle Station Decify): Color Rising Drought e Gray Ulating State Time: Time: Time: Time:	ow (persistent flow) Gage: at / above / below Source ffuse Other Sand Mud Other (specify): Other (specify): Other (specify): Grant Other Units: Units: Taken by: Taken by: Taken by: Taken by:	3
Media type: Sample locati Description of Sampling Site Substrate: Stage Conditi Hydraulic Eve Stream Color Description of flow: GPS point #1 GPS point #2 Photo #1: Photo #2:	Midstream n Midstream n Written description Bedrock Stable: normal / I Brown Turbulent Written description Name: Description: MA	STE DESCRIPTION (circle all that Spring) (Wading natural feature Other spring) Riffle E On: Nonet Concrete Cobble Iow / high Falling Snowmelt Flood Clear Green Blu Caminar Recircular Photos and GPS Coordinates: NA Coordinates: NA Facing: Facing: Facing: Facing:	Note: To convert apply) Basefle Station Decify): Color Rising Drought Gravel Rising Drought Gray Ulating Stat Time: MA Time:	ow (persistent flow) Gage: at / above / below Source ffuse Other Sand Mud Other (specify): Other (specify): Other (specify): Taken by: Taken by: Taken by: Taken by:	
Media type: Sample locati Description of Sampling Site Substrate: Stage Conditi Hydraulic Even Stream Color Description of flow: GPS point #1 GPS point #2 Photo #1: Photo #2: Photo #3: Other notes:	Midstream n Midstream n Written description Bedrock Stable: normal / I Brown Turbulent Written description: Name: Description: Description: Description: Description:	STE DESCRIPTION (circle all that Spring) Wading Natural feature Other sp Riffle En: Your Concrete Concrete Iow / high Snowmelt Flood Clear Green Blu Laminar Recircular Coordinates: Coordinates: Coordinates: Facing: Facing: Facing: Facing:	Note: To convert apply) Basefil Station Pecify): Pool Condition Pecify: Pool Condition Pecify: Pool Condition Rising Drought Gray Ulating State Time: T	ow (persistent flow) Gage: at / above / below Sand Mud Other (specify): Other (specify): Other (specify): gnant Other Units: Taken by:	
Media type: Sample locati Description of Sampling Site Substrate: Stage Conditi Hydraulic Eve Stream Color Description of flow: GPS point #1 GPS point #2 Photo #1: Photo #2: Photo #3:	Midstream n Midst	STE DESCRIPTION (circle all that Spring) (Wading natural feature Other spring) Riffle E On: Nonet Concrete Cobble Iow / high Falling Snowmelt Flood Clear Green Blu Caminar Recircular Photos and GPS Coordinates: NA Coordinates: NA Facing: Facing: Facing: Facing:	Note: To convert apply) Basefil Station Pecify): Pool Condition Pecify: Pool Condition Pecify: Pool Condition Rising Drought Gray Ulating State Time: T	ow (persistent flow) Gage: at / above / below Source ffuse Other Sand Mud Other (specify): Other (specify): Other (specify): Taken by: Taken by: Taken by: Taken by:	



101					(1439)	
1/11		ATTACH	IMENT 2		Records Use Only	-
SO 5224-2	3 at 11				Kecolds osc omy	
		Complina Fid	ld Data Shee	<u> </u>	Los Alamos	
0/	ing/Surface Water			nsite time: /4	IN DST	
Site name: PRB	Hirrial Seep (16-614.	9 Date: 8/13	1000	Veather: SUM	y gos Fórezy	
Objective: Symp	ne pu restare d T. Barham # [CEVANDES (ID O	19.	/	,	
Sampling crew	ety drill: Hiking	ive , some	the same and the same and			
Meters calibrat	ed at (location) M	by (whom)		at (time)	t)
YSI Meter num		Turbidimete	r serial number	- 04 41	· DD	1
Sample Retriev		& Numb	Time: /4/2		53, 160255	
Sample Event	D: 11923 S		RAMETERS	80237,18305	33,0000	
pH (su): 7.//	/	Sp. Cond. (S/cm): ZS8.		dity (NTU): 9,8	<u> </u>
Temperature (°	0): /3 . /	DO (mg/L):	7.48	Q (g	om): 0,42	-
Explanation of	C): /3 , / Q method, including cald	culations: Manu	al measuri	nut using	igal odg zi	-
graduated	CVP 6017 /2.1.	59K, 1901	- 30.426P	-	cfs to gpm, multiply cfs by 448.83	-
- min m	NT MM 13-1	NY X 3785	L L L - II Shekar		olo to Shiri mani 1	1
		SITE DESCRIPTIO	M (CILCIS SEI MIST SI	Baseflo	w (persistent flow)	
Media type:	on: Ban	8pring	Wading	Station	Gage: at / above / below	Δ
Sample location		natural feature	Other (spec	cify):		_
Description o	Pool	Riffle	Edd	-9	fuse Other	
Sampling Site			Cobble	GraveD	Sand Mud	• • •
Substrate:	Bedrock	Concrete	Falling	Rising	Other (specify):	
Stage Conditi		Snowmelt		Drought	Other (specify):	
Hydraulic Events Stream Color			reen Blue	- be -	Other (specify):	_
Description of		Laminar	Recircul	ating Sta	gnant Other	
flow:	Written descrip	tion: //A				-
			os and GPS	A NA	Units: NA	-
GPS point #	The state of the s	Coordinat		A N	Units:	
GPS point #	Description:	Coordinat	Facing:	Time:	Taken by:	9/
Photo #1:	Description:		Facing:	Time:	Taken by:	4_
Photo #3:	Description: V		Facing: (Time: V	Taken by:	
	D. Jaromillo Co	novas HES	ipot destil	Results Neg	Contact waste: 20	ial.
		ish samples at	SMO core of F	constatt	at (time) No.5	-
Offsite time	1010	ish samples at	SWIO, Care of T			
Objectives	net? Jes				-/	
					/	
				1	/	

	11	/	Gr	nudwa	ter Samı	olie	na Loa		_=		
IFWGMP/M	ID OF	Q: 4	LSD: 7443		^		M-11 D1	ter: Z	inches	Date:8-11-2016	
Watershed:			Water Level:	NA	ft	msl	Top of Scre	en: 500 3	O a die	Notes:	
Well Col			*TD: m71)		Grac		Bottom of	Screen:/// 325	Un.	NONE	
Sampling D			*DTW: La. E				Water Colu	mn: Q. 40	ft.	Packer Pressure	
Measuring I Completio			Drop Pipe: /	VA			3CV: () . Z		gal.	Before: psi	
ft BTOC				Note I	MP height (st	_		IC for Alluvials		Actuation////psi	
DTW = (L:	SD - Water	Level)W	ater Column =	rro - DTW	Drop Pig	e =	(TD/Pump i	ntake x Drop Pipe	Diameter	Opening:psi	
	Mu	ultiplier) 1CV	= (Water Colur	nn x Well Di	ameter Multip	oller) 3 CV =	(1CV x 3)		After:psi	
US) I DST	pH SU	TEMP	SPEC COND µs/cm	DO mg/l	Turb NTU	A C H	ORP	Water Level*	Discharge Rate	NOTES	
Stability:	≤ 0.2 STU variance	.c	± 3% (>100) ± 5% (≤100)	≤ 0.3 mg/l variance	<10 or ± 10%	Yes or No	mV	n. <u>670</u>	(GPM)	10.20	
	Pum	pon									
1173	Pum)	off;	10 WO	u; mo	re dou	1.	tubi				
1124	Pump	on; b	rator to	Surfa	Ke			(20)		· · · · · · · · · · · · · · · · · · ·	
1126	Pump	aff!	Purged	dry 6	2610-1	We	wee	whe to fi	1) For	through 4011	
1126	DT	N= 11.	-311	00	ė.					V	
1130	DIM	s 11. (10/6T	$\propto c$	rew o	M	5,4				
1235	DTW	5 N. OC	600	: M	0651	1	adre	recharg	e (C	WW)	
157						L					
			1			l	12	6			
						1	11/				ļ
-					120/8						
				2111	100	1			ĺ		
				0		Г					
						╁				1.	/
						L				N/	
						H			 	ib/	_
			4//		1.0	L	<u></u>			1111	
Yes in HAC Contact Wa	12011	HACH Turb	idimeter#NA	Drum#:					Final Wate	V/ 101-	,
*Purge Wat	77.00	5		Drum#s:			Links	Desir	*Purge: Fo	rmation water purged prior to	
Total Waste			gal.		7012		Like	POV	sampling (e	rmation/water purged prior to excluding drop pipe water and ater)	

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Reference

ATTACHMENT 1 Page 1 of 1 Groundwater Level Field Form

	1040004				
CdV-/6-0	2656	Dete: 8/11/2016	Time onsite (MST): 0934	ACEVITY	Sampling
Personnel:	m, T. Vender	his & D. J	compa "110:	Cable Length(ft):	Cable SN: 236870
Telemetry: Yes \ No	Pull Transducer Yes \ No	New Transducer Needs New LT SN;	d: Yes (No	Memory % remaining:	Battery % remaining:
	Transducer SN:	New LT PSI Rating:	Manufacture Date:	Log Note Memory %	Log Note Battery %
Water Level (ft)	707	P (psi):	T(C)	Stop Test Yes (No)	Change Desicant:
Lest Start Date:	14	Data File Name:	101	NA	Yes (No/L NA
/			NA.	×	
Meesuring Point	TOC (top cuter casi	ng) TIC (inner)	Seck-up Measured on Site	Previous MP U	eed 🔯
Time (MST):	0954	Water Level Meter Se	ries No. 34244	NONE	
DTW (R bMP);	10.65 6000	Measur	aments in feet	10000	
Time (MST).	0957	LSDR	7443.18 nsi	*!	
OTW (R bMP):	10.65 600	MP Height ft.	+ Z.30	•54	
Time (MST).	m116/9	MP Elevation	CONTRACTOR OF THE PARTY OF THE		
DTW (R bMP):	8000	DTW:	-10.65'6TOC		
Time (MST). TD (RbMP):	0957 11.05'6TOL	Groundweter Elevation (GIVE) Reference Level	7434,83 ms	. 3	8
		Zip Tie on Kellim's Grip	: Yes		
Library and a second					
A 10 7 1 1	and the second		PartAsky	pointing & Flesh Ripodrops	
VVL Reading Time (MST).		Progamming Time:		Time (MST)	Reading
WL (transducer reading) (ft).	,,,,,,,	New Yest Name:		1/1/	
GIME from MM Difference In	111191	Reference Level .			
value: Error tolerance	81	Current Depth:	8/11	113	
of transducer.		Mees Interval			
Outuro Enerto		Start Date:			
	PSI-0.07 R. 100 PSI-0.		Synch Clocks: Yes 1 No		
Dalated Tests:	MA	20,711 GOS FOF 1110 C.		18	QA Date and Initial

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Groundwater Level Field Form

PART 1: Well SI	te Information				
Well Name :		Date:	Time onsite (MST):	Activity:	`
	-02657	8/11/18	1139	Cable Length(ft):	pling
Personnel:	stanfields D	. Hughes SA.1	131	Cable Length(ft):	0 /
Telemetry:	Pull Transducer:	New Transducer Need	ed: Yes\ No	Memory % remaining:	Battery % femaling
Yes \ No	Yes \ No	New LT SN:	8		8/11
Connect Time:	Transducer SN:	New LEAST Raing	Manufacture Date:	Log Note Memory %	Log Note Battery %
Water Level (ft)	1	P (psi):	T (C)	Stop Test: Yes T No	Change Desicant: Yes \ No \ NA
Last Start Date		Data File Name:	VA		
DART 2. Manual M		/	V/1		
PART 2: Manual M		ing) TIC (inned	Stick-up Measured on Site	Description MD LL	
measuring Point	TOC (top outer cas	ing) (TIC (inner) Water Level Meter Se		Previous MP Us	sed 🔼
Time (MST)	1140	3	4242	Notes:	1.16%
DTW (# bMP):	7.20 BTIC	1011-1-1-1-1	ements in feet	· Z min sater	: hiking on uneven withy work procedures
Time (MST)	1143	LSDft	7430.22 msl	, No. TO	TD=7.20'BTIC
DTW (ft bMP):	7.20'BTSC	MP Height ft.	+3.64	I my x ~	10 - 10 -
Time (MST)	2/11/18	MP Elevation	= 7433.86 ms		
DTW-HOMP):		DTW:	- 7.20'BTTZ		
Time (MST)	1143 7.20'BTC	Groundwater Elevation (GWE) Reference Level			
		Zip Tie on Kellim's Grip	: NA	1	
Transducer Perform	nance and Programming		/ NIV		
	Error\Orift Acceptance		Don't 4: Drop	gramming & Final Readings	
	I TOTAL POSSIBILITY		Pall 4. Plo	I aming a river rescuige	
WL Reading Time (MST)		Progamming Time:		Time (MST):	Reading
WL (transducer reading) (ft):		New Test Name:			
GWE from MM		Reference Level			13
Ofference in value:	1 4	Current Depth:		31	
Error tolerance of transducer:	M	Meas. Interval:		m	
With Error Tab	Chen	Start Date:			
Substantia Error Tol	orango	Start Time:			
15 PSI-0.03ft. 30	PSI-0.07 N. 100 PSI-0.	23 ft. 500 PS⊩1.16 ft.	Synch Clocks: Yes \ (No)		
Deleted Tests:					QA: Date and Initial:
	NT				8-27-2018 TV

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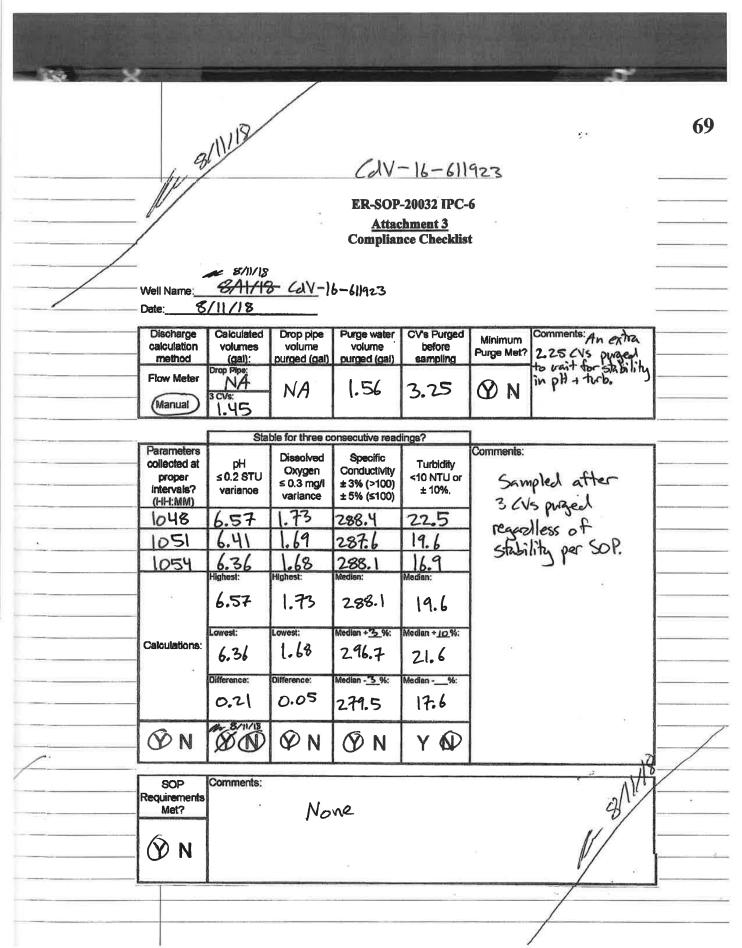
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Groundwater Level Field Form

	the state of the s				A Company of the Comp
PART 1: Well St	te information				
Well Name		Date:	Time onsite (MS)):	Activity	
CaV-16-0	2659	8-10-18	0901 DST	Presweep	
Personnel [*]	4 44 1 -	- 11 . 1		Cable Lengthift):	Cable SN
1. Vander	and the second s	>. Hughes		Joft	236863
Telemetry: Yes \ No	Pull Transducer Yes \ No	New Transducer Need New LT SN:	ed: Yest No	Memory % remaining:	Battery % remaining:
Connect Time:	Transducer SN:	New LT PSI Rating:	Manufacture Date	l og Note Memory %	Log Wide Ballery %
Water Level (ft)		P (ps ⁱ):	TICI TV 8-10-18	Stop Test: Yes \ No	Change Desicant: Yes \ No \ NA
Last Start Date:		Data File Name:	L	J.,,	
PART 2: Manual M	easurements				
the state of the s	(TOC (log) outer cas	ing) TIC (inner)	Stick-up Measured on Site	Previous MP L	Jsed 🔀
		Water Level Meter Se		Notes:	A
Time (MST)	0901	34242			
DTW (R bMP):	10.63 xw		rements in feet	none T	V 8-10-18
Time (MST)	0906	LSDft	7300.5	Changed 1	v 8-10-18 ock 1403 to M3R-2
DTW (ft bMP)	10.6063	MP Height ft.	+ 3.24	from ESt	1403 to M3R-2
Time (MST)	148	MP Elevation	= 7303.74		
DTW (# bMP):	TV8-10-18	DTW:	- 10.63		
Time (MST).	10.86	Groundwater Elevation (GWE)	7475.11		
10 (N DIVER).		Reference Level Zip Tie on Kellim's Grip			
Transducer Perform	ance and Programming		101		
Part 3: Transducer !	ErronDrift Acceptance		Part 4: Pro	gramming & Fina: Readings	
WL Reading Time (MST).		Progamming Time.		Time (MST)	Reading
Wt. (transducer reading) (ft).		New Test Name:		Time (MA)	Neading
GWE from MM		Reference Level		10-16	
Difference in value:		Current Depth:		N 8-10-16	
Error tolerance of transducer:		Meas Interval			
Water New 1 orch	cor a	Start Dete:	-		
ndied Srivitale		Start Time			
15 PSI 0.031 30 Deleted Tests:	PSI-0.07 N. 100 PSI-0.2	23 ft. 500 PSI-1.16 ft.	Synch Clocks: Yes \ No		QA Date and instal
	- December of Asilhib Valley Wood				pairs - Critic units militar
			The sales of the sales		h

110	gn		C		16-6						7
IFYMENIP M	r: 2018	Q: 4	LSD: 737		iter Sam		Well Diam	eter: 2	Inches	Date: 8/11/18	1
Watershed	Water	CUV	Water Level:	NA	fL	_	Top of Scr	-	R. BTIC	Notes: I in	-
Well: ()	-	611923 Pp	"TD: = wT)= .3º 8.39	5 BTEC	_	Bottom of Water Colu		11.87.2C	interval	-
Measuring			Drop Pipe:	N/	F	gal	1CV:	0.48			<u></u>
* Completic					-		3CV:	1.45		Before: NA psi	
nt. BTOC		-	fetor Column				• •	IC for Alluviels ntake x Drop Pipe		Actuation: pei Opening: psi	
DIAA (C	MI	uitiplier) 1CV	= (Water Colu	mn x Well D	iameter Mult	plie	r) 3 CV =	(1CV x 3)	- Diamerer	After: psi	
MST (DST	pH SU	TEMP	SPEC COND µs/cm	DO mg/l	Turb NTU	HOY	ORP	Water Levei ^a	Discharge Rate	NOTES	
Stability:	≤ 0.2 STU variance	°C	± 3% (>100) ± 5% (≤100)	≤ 0.3 mg/l variance	<10 or ± 10%	Yes or No	mV	ft <u>BTTC</u>	(GPM)		
1041	Pump	ons	Water	to sw	Tace					de V	
1042	8.26	14.8	293.2	3.09	47.3	N	188.5	8.54	0.12	cloudy no	
1045	6.93	14.2	287.9	1.64	25.7	V	218.7	8.55			<u> </u>
1048	6.57	14.2	288.4	1.73	22.5	M	233.9	8.56		V.	
1051	6.41	14.2	287.6	1.69	19.6		243.4	8.57			
1054	6.36	14.2	288.1	1.68	16.9	1	248.3	8.57	V		
1055	Pause	Dumo	: Preod	ire to	Sam	6	e >	3 CVs ova	ed		ļ
		li i	Bean		pling	1				1000	
			San			١, ١	1	.7			1
1110	rum	POR	3 Dan	pline	COM	Ы	eic				1
	-					\vdash					
						L	n				
					111		18				
				1, 1	61	1				8	-/
			1/1			T				118	/
			- for			H				all la	
						L				ha G	
					- Apple - p	L	l , , ,		G = 10 = 11	. 19/	
Yes in HACI Contact Wa		HACH Turble			endrha			ng terbiblity	Final Water	Level:	
*Purge Wat		1.56		Drum#s:		21	MAKACIED		éDuran: Enr	motion water award arise to	
Total Waste	Water:	1.57	gal.		-			Carbon Smo	sampling (ex sampling wa	cluding drop pipe water and	



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PART 1: Well St	te Information		**************************************		
Well Name		Date:	Time onsite (MST)	Activity	
CAV-16-	611923	8-10-18	0937	Preswee	Þ
CdV-16-				Cable Lengthift):	Cable SN
T. Vanda	ervis, A-Vig	il, D. Hughes		12	227809
Telemetry: Yes \ No	Full Transduce: Yes \ No	New Transoucer Need New LT SN:	ed: Yes\ No	Memory % remaining:	Battery % remaining:
Connect Time:	Transducer SN:	New LT PSI Rating:	Manufacture Date	l og Note Memory %	l og Note Battery %
Water Level (ft)		P (ps'):	म (ा	Stop Test: Yes) No	Change Desicant: Yes \ No \ NA
Last Start Date:		Data File Name:	<u> </u>		
PART 2: Manual M	easurements				
Measuring Point:	TOC (top outer cas	ing) (TIC (inner)	Stick-up Measured on Site	Previous MP	Used
		Water Level Meter Se		Notes:	Costs
Time (MST)	0937	34242			
DTW (fl bMP).	7.99	Measur	ements in feet	none	
Time (MST)	0950	LSOft	7376.43		
DTW (# bMP)	7.99	MP Height ft.	+ 0.00		
Time (MST)		MP Elevation	= 7376.43		
DTW (# bMP):		DTW:	- '7.99		
Time (MST).	0943	Groundwater			
TD (flbMP):	11.35	Elevation (GWE) Reference Level	_		
	e continue anno a continue a	Zip Tie on Kellim's Grip.	· NA		
Transducer Perform	ence and Programming				
Part 3: Transducer E	Errori Drift Acceptance		Part 4; Pro	ogramming & Fina: Resdings	
WŁ Reading Time (MST)		Progamming Time.		Time (MST)	Reading
Wt. (transducer reading) (ft).		New Test Name:			
GWE from MM		Reference Level			
Difference in /alue:		Current Depth:	TU 8-10-18		
Error tolerance of transducer:		Meas Interval			
15/0 hap Newson I grant	nr 1	Start Date:			-
] Outliet Ship Fall	سر المراد	Start Time	4		
5 PSF0.030 30 I Deleted Tests:	SI-0.07 R. 100 PSI-0.	73 ft. 500 PSI-1.16 ft.	Synch Clocks: Yes \ No		QA Date and initial
9	none				Provide duta a life gli
			The same of the sa		

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Groundwater Level Field Form

PART 1: Well Si	ta Information			night de til	ISIO IS	
Well Name:		Dete:	Time onsite (MST):	Activity:		
CdV-16-	-611973	8/11/18	0922	(01.	1 Samp	lika
Personnel:	OHILL	8111110	0-122	Cable Length	4)	Cable SN'
A.S	tanfield, D. H	ughes, A. Vigi	1	12	, itty.	227809
Telemetry:	Pull Transducer:	New Transducer Neede	M: Yes (No)	Memory % rer	naining:	Battery % remaining:
Yes (No)	Yes \ No	New LT SN:	NÁ	N		MA
Connect Time:	Transducer SN:		Manufacture Date:	Log Note Mem	ory %	Log Note Battery %
NA	NA	NA	NA	N/1	ſ	N/)
Water Level (ft)		Pipsi): NA	T [C]	Stop Test: Ye	ts \ No	Change Desicant: Yes \ No \ NA
Last Start Date:	N/d	Data File Name:		122	-	
	NA	Λ	A			
PART 2: Menual M	egaurem ords					Marine September 1
Measuring Point	TOC (top outer casi	ng) (TIC (inner))	Stick-up Measured on Site	P	revious MP Us	sed 🔀
		Water Level Meter Se		Notes:		
Time (MST):	0430	31	1242			
DTW (ft bMP);	8.39 BTJC	Measun	ements in feet		. 1	
Time (MST):	0933	LSD ft.	7376.43 msl		None	
DTW (ft bMP):	8.39 BTIC	MP Height ft.	+ 0,00			
Time (MST)	2/11/18	MP Elevation	= 7376.43 msl			
ODW IT MAP):		DTW:	- 8.39 BTIC			
Time (MST):	0934	Groundwater Elevation (GWE)	7368.04'msl			
TD (ft bMP):	11.35 BTX	Reference Lavel				
		Zip Tie on Kellim's Grip:	· NA			
Transducer Perform	ence and Programming					
Part 3: Transducer I	ErronDrift Acceptance		Part 4: Pro	gramming & Final	Readings	
WL Reading		Progamming Time:				Sanding
Time (MST): WL (transducer		New Test Name:		Inne	MST);	Reading
reading) (ft):		Calaranta i				0
GWE from MM		Reference Level				1/8
Difference in value:	1 81	Current Depth:			41)	1/8
Error tolerance of transducer:		Meas, Interval:			11/	
Avenin Error Even	onco	Start Date:		J. J.		
Subside Error Toli	by set co	Start Time:				
10 301 3 555		00 A 600 00 110 1	Synch Clocks: Yes \ (No)			
15 PSI-0.03ft. 20 Deleted Tests:	PSI-0.07 R. 100 PSI-0.	3π. 500 PSF1.16 t.				QA. Date and Initial:
्रम्स्टास्य <i>। द</i> ढार्चः	NA					8-27-2016 TV

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Groundwater Level Field Form

PART 1: Well Sit	information				ASSESSMENT OF THE PARTY
yvell Name		Date:	Time onsite (MST)	Activity	
MSC-16-0	06293	8-10-2018	1005 0859	PresurePS	
Personnel:		1 1 2		Cable Langthift):	Cable SN:
T. Bonhi	m. A. Stons	mb 8 D	Solovni/10	16	227808
Telemetry: Yes \ (G)	Puli Transducer Yes \ (10)	New Transducer Needo New LT SN:	NA	Memory % remaining: NA	Battery % remaining:
NA	Transducer SN:	New LT PSI Rating:	Manufacture Date NA	Log Note Memory %	Log Note Battery %
Water Level (ft)	NA.	P (ps:):	T(C)	Stop Test: Yes \ (6)	Change Desicant: Yes \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Last Start Date:	NA	Data File Name:	NA		
PART 2: Manual M	essurements				
Measuring Point	TOC (top outer casi	ng) (TIC (ipher)	Stick-up Measured on Site	Previous MP Us	sed 🖈
	0	Water Level Meter Se	rial No.	Notes:	4
Time (MST)	0904	3424	14	zminue Sost	y: Hiting A
DTW (R.bMP);	10.48'6TIC	Measur	ements in feet	consect w/ ac	iss control
Time (MST)	0907	LSDft	7370.79 msi	Wearre! Partly	change (80>
DTW (#LBMP):	10.48 6TIC	MP Height ft.	+2.59	Colosine Cheek	Water fevel of well s allowed in WFO
Time (MST)	18/18/	MP Elevation	= 7.373,38%	* no electronic.	3 DULL MED THE 4
DTW (# 6MP):	a living	DTW:	- 10.48'6TIC	Note: MTD- DTW:	= 0.22' of water
Time (MST)	0907	Groundwater Elevation (GWE)	126610101	Sump togeth = 0.3 It is in the	C' SUMP (CAWW)
TD (ft bMP).	10.10 8120	Reference Level Zip Tie on Kellim's Grip	5	13	, , ,
Transducer Perform	unce and Programming		15		
	Errori Drift Acceptance	_	Dec 4: Dec	gramming & Fine Readings	
	E-rorestal Asseptance			Granaland & Line Meanings	
WL Reading Time (MST)		Progamming Time		Time (MST)	Reading
WL (transducer reading) (ft).		Negli Mame			
GWE from MM	not	reference Level			
Olflerence in value:	81101201	Current Depth		10/3/8	
Error tolerance of transducer:		Meas Interval	8	101	
With East 100	retica	Start Date:			
Dublinos Er co To	feran-ro	Start Time			
	PSI-0.07 R. 100 PSI-0.	23 R. 500 PSF1.16 t.	Synch Clocks: Yes \ Ad		
Deleted Tests:	NA				QA Date and install

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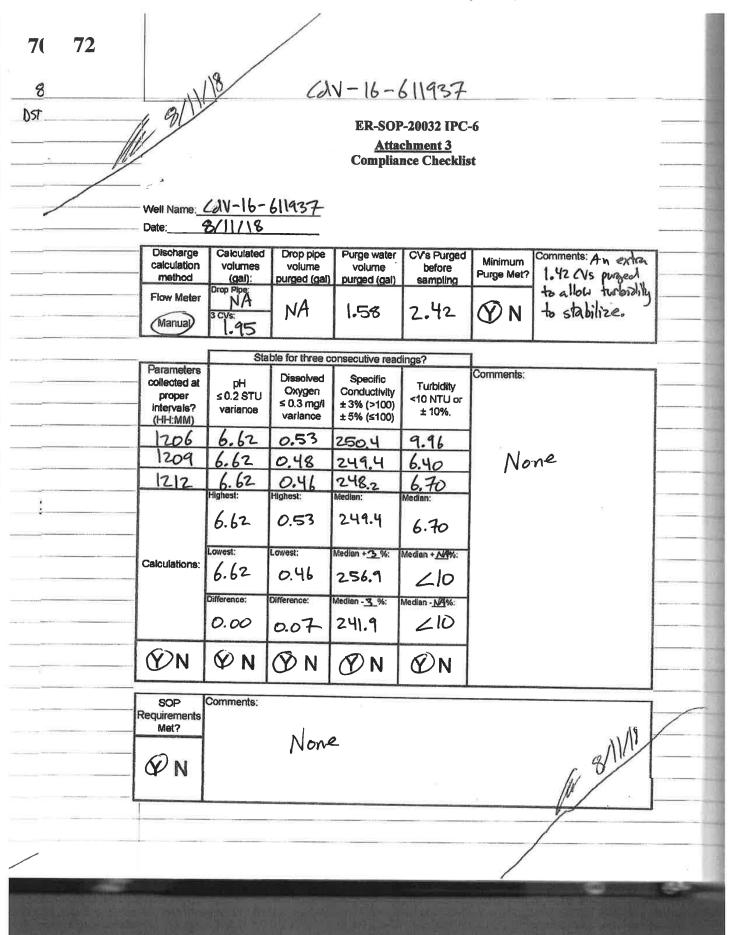
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Groundwater Level Field Form

PART 1: Well Sit	e Information				
Well Name	e monitorer	Date	Time onsite (MST):	Activity	
1000 10	06294	0111 12 11	1220	Presweep	
Personnel: T. Banh	om, D. Juan	New Transducer Needs New LT SN:	nd trot	Cable Lengthift):	Cable SN: 236 866
Telemetry: Yes \ ()	Pull Transducer Yes \ No	New Transducer Needs New LT SN:	A A	Memory % remaining:	Battery % emaining:
Connect Time:	Transducer SN:	New LT PSI Rating	Manufacture Date	Log Note Memory %	Log Note Battery %
Water Level (ft)	MA	P (ps:):	T [C]	Stop Test (es) No	Change Desicant: Yes \ NO\ NA
Last Start Date:	MA	Data File Name:	NP.		
PART Z: Manual M	easurements				
Measuring Point	TOC (top outer casi		Stick-up Measured on Site	Previous MP Us	sed X
Time (MST)	1322	Water Level Meter Se 342	rial No. 14	Notes: Zminute Softy:	RCT, HEAT GWENU
OTW (R bMP).	10.39 6TE	Measur	ements in feet	weather Purtly (Touly, 80's & Greezy
Time (MST)	1325	LSDft	7288.44 msi	7D-DTW= 0.6	
DTW (ft bMP):	10.39 STIC	MP Height ft.	+3.07	113-131W3 0.8	/ Warv Colores
Time (MST)	8/10/2018	MP Elevation	=7291,51 ms1		
DTW (# 6MP):	Silei	DTW:	-10.39'6TEC		
Time (MST).	1325 1106 box	Groundwater Elevation (GWE) Reference Level	7281.12'ms1		
		Zip Tie on Kellim's Grip	NO		
Transducer Perform	ence and Programming				
Part 3: Transducer (Errori.Drift Asseptance		Part 4: Proj	gramming & Final Readings	
WL Reading Time (MST)		Progamming Time		Time (MST)	Reading
Wt. (transducer reading) (ft).		New Test Name:			
GWE from MM		Reference		11	
Difference in value:	d/10	120 de fapin	80		
Error tolerance of transducer:		Meas Interval	06/10/201		
With the World	ear n	Start Date:	0/10/2018		
Nickrich Er is Folk	pranco	Start Time			
15 PSI-0.038 30	PSI-0.07 1 100 PSI-0.	23 ft 500 PSI-1.16 ft.	Synch Clocks: Yes \ MG)		
Deleted Tests:	AV.		V-1		QA Date and Initial

			/									
		3/1/19										,
	11.	3)				dV-1	16.	-6119	37			
	MV	- 10				iter Sam	-	-				
	IFWGMP M Watershed	7		LSD: Water Level:	7357.5 NA		-	Well Diame Top of Scn		ft. BTDC	Notes: WL	11/18 in
	Well: (V-16-	611937	TD: = mT	=11.56'	BTIC		Bottom of	Screen: 11.0	n BAZ	screene	
/	Sampling D Measuring		PP BTIC	*DTW: 7	57187 NA			Water Colu 1CV:	mn: 3,99 0.65	. gal.		r Pressure
	* Completic	- Carlotte Contract		Diop'r ipu:	140		gui	3CV:	1.95		Before:	N/A psi
	(° ft. BTOC		•						IC for Alluviale		Actuation: Opening:	psi
	DTW = (L	SD - Wate	r Level)W uitiplier) 1CV	fater Column = ' = (Water Colu	TD - DTW mn x Well D)Drop Plp lameter Multis	olier)	(TD/Pump li) 3 CV =	ntake x Drop Plpe (1CV x 3)	e Diameter	After:	psi
	MST (OST	pH SU	TEMP	SPEC COND µs/cm	DO mg/l	Turb NTU	HOH	ORP	Water Level ^o	Discharge Rate	N.	OTES
	Stability:	≤ 0.2 STU variance	•c	± 3% (>100) ± 5% (≤100)	≤ 0.3 mg/i variance	<10 or ± 10%	res or No	mV	n <u>BTF<</u>	(GPM)		O1E3
	1149	Pum	o on:	Water	to sur	face a		-0.075	apm Cmar	ual me	cylinde	
	1151	7:32	14.2	266.6	2.09	14.1	N		J. J	0.075	ogan2 "	withers'
7	1154	6.83	12.4	256.4	0.91	15.1	1	-64-6	8.76	1	.,,	1
-	1157	6.63	12.2	248.8		17.0	Ш	-53.0		0.075		\overline{V}
		6.61	18		0.73	14.2	Ш	-59.6	9.32	ſ	some fl	octrus as
	1203	6.62	11.8	251.8	0.61	12.6	\square	-65.1	9.49		Sign -	1
	1206	6.62	11.6	250.4		9.96	M					
-	1209		11.5	249.4			1		9.67			N ₂₂
				248.2			-	100	9.75	V		V
		E		o; Prep								
	1216	0	70	eain 5	2							
	1243	1	molina	Come	lete:	Pump	0	PF.				
			1 -	1		1	П					
					1	5/11	1	8				
-				1		61	П					11/2
					3 05		П					UV V
	Yes in HAC	i column =	HACH Turbic	dimeter #20	used becaus	e partrails	hes	distarti	ng turb	Final Water	Leyel:	/



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Groundwater Level Field Form

PART 1: Well Si	te information				
Well Name	_	Date:	Time onsite (MS I):	Activity P - D	
ColV-16-	611937	81018	0927	Brew Pre	SWEEP
T. Vander	Sit, A-Vigit, Pull Transduce: Yes I No	D. Hugher		Cable Length(ft):	Cable SN: 487 736
Telemetry:	Puli Transduce:	New Transducer Need	ed: Yest No	Memory % remaining:	Battery % remaining
Yes I No	Yes I No	New LT SN:			
Connect Time:	Transducer SN:	New LT PSI Rating:	Manufacture Date	Log Note Memory %	l og Note Baltery %
Water Level (ft)		P (ps ¹):	HG 70810	Slop Test: Yes \ No	Change Desicant: Yes \ No \ NA
Last Start Date:		Data File Name:	<u> </u>		
PART 2: Manual N	leasurements				
Measuring Point		sing) (IC (inner)	Stick-up Measured on Site	Previous MP	Used
Time (MST)	0927	Water Level Mater St 3 4 2 4	erial No.	Notes:	
OTW (A DMP).	7.59	Measu	tements in feet		
Time (MST)	0930	LSDft		Well is no	ot dry
OTW (R BMP)	7.59	MP Height ft.	+	1	
Time (MST)	201	MP Elevation	= 1018		
OTW (# bMP):	W8-10-11	DTW;	\display \text{'}		
Time (MST).	0928	Groundwater Elevation (GWE) Reference Level			
TD (fi bMP):	11.56	Reference Level Zip Tie on Keilkin's Orip		-	
			The same of the sa		
	sance and Programming				7
Parl 3: Transducer	Errort Drift Acceptance		Part 4; Pro	ogramming & Final Readings	
WL Reading Time (MST)		Progamming Time.		Time (MST)	Reading
Wt. (transducer reading) (ft).		New Test Name:	to when a man a me is seen in		
GWE from MM		Reference Level			
Olfference in value:		Current Depth:	3-10-18		
Error tolerance of transducer:	·	Meas Interval			
19,0 hip blesse tight	KA.	Staff Date:			
October Section		Start Time			
Deleted Tests:	PSI-0.07 N. 100 PSI-0	0.23 ft. 500 PSI-1,16 t.	Synch Clocks: Yes 1 No		
veleted ests;	nune				QA Date and install
	-	-	The second secon	Control of the Contro	J

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Groundwater Level Field Form

PART 1: Well SI	te Information		A Committee of the Comm		
Well Name		Date:	Time onsite (MST):	Activity:	
CdV-16-	611937	8/11/18	1035	6W Saw	ipling
				GU Saw Cable Length(ft):	Cable SN
		ughes, A. Vig		13	487736
Telemetry: Yes \ (No)	Pull Transducer: Yes \ (6)	New Transducer Needs		Memory % remaining:	Battery % remaining:
Connect Time:	Transducer SN:	New LT PSI Rating:	Manufacture Date:	Log Note Memory % 8/	App Note Battery %
NA	l NA	NA NA	NA .	1111	
	NA	P (psi): NA	T [C] NA	Stop Test: Yes No	Change Desicant: Yes \ No \ NA
Last Start Date:	NA	Data File Name:	VA		
PART 2: Manual M	easurements	And the supplemental Land			
Measuring Point	TOC (top outer casi	ng) (TIC (inner)	Stick-up Measured on Site	Previous MP Us	sed 🖎
		Water Level Meter Se	rial No.	Notes:	
Time (MST):	1042	3	,4242		
DTW (ft bMP):	7.57 BTJC	Measun	ements in feet	Non-	e
Time (MST):	1045	LSD ft.	7359.59 msl		
OTW (£ bMP);	7.57 BTJC	MP Height ft.	+ 3.0		
Time (MST)	8/11/18	MP Elevation	=7362,59'msl		
DIATR SMP):		DTW:	- 7.57 BTJC		
Time (MST):	1046 11.56'BTJC	Groundwater Elevation (GWE)	7355.02 msl		
TD (ft bMP):	11,00 VIJC	Reference Level Zip Tie on Kellim's Grip	No		
		and the out tourners only	IVO	<u> </u>	
Expell years a series of a gray, and	ance and Programming				
Part 3: Tremedicour I	ErroADHR Acceptance		Part-4: Proj	gramming & Final Readings	
WL Reading Time (MST):		Progamming Time:		Time (MST):	Reading
WL (transducer reading) (ft):		New Yest Name:			
GVVE from MM		Reference Level			1/8
Olffererice in value:	6.	Gurrent Depth:		31	M
Error tolerance of transducer:		Meas. Interval:		A Di	
☐ Within Error Follow	onco.	Start Date:		17	
Describe Error Tole	Eranto	Start Time:			
15 001 0 000 00	PSI-0.07 Rt. 100 PSI-0.3	22.0 4.00 051.114.5	Synch Clocks: Yes \ No		
15 PSI-0.03ft. 30 Deleted Tests:	rapolitic luit #350.	COR. JUNE POPELIOT.		V	QA. Date and Initial:
	N	7			3-27-2018 TV

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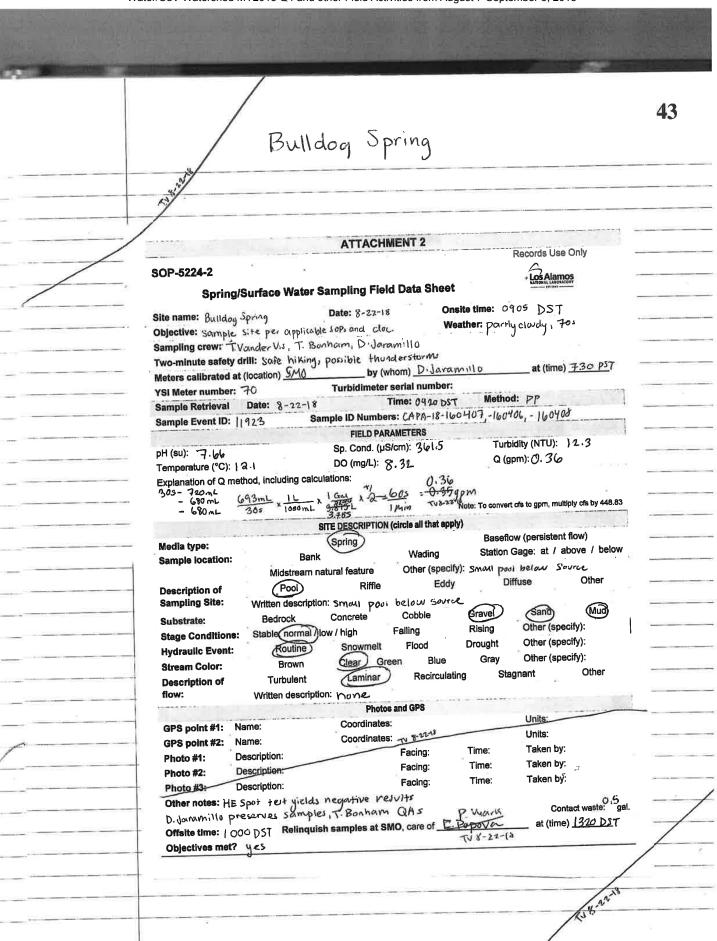
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Groundwater Level Field Form

PART 1: Well S	ite information			THE THE PERSON	
Surge bed	Monitoring Well 1K-612	Date:	Time onsite (MST):	Activity Monual It & Say Cable Langthifty:	WID L
Personnel:		ONOGE VI WE II		Cable Langthift):	Cable SN:
7. Bonho	m. T. Vendy	Visa D. Jo	rem'110	30	529/49
Yes \ No	Poll Transducer Yes \ No		VA C	Memory % remaining: MA	Battery % remaining.
Connect Time:	Transducer SN: NA	MA	Manufacture Date	Log Note Memory %	Log Note Battery %
Water Level (ft)	A	P (ps)	VA VA	Stop Test: Yes \ (Ng)	Change Desicant: Yes \ No \ NA
Last Start Date:	MA	Data File Name:	MA		
PART 2: Manual I	deasurements				
Measuring Poin	t TOC (top outer cas		Stick-up Measured on Site	Previous MP	Jsed X
Time (MST)	0905	Water Level Meter Se 392		Notes:	_
DTW (ft bMP).	27.82 6720	DRY) Measur	rements in feet	Well dry to	טוט
Time (MST)	0708	LSDft	7533.05 msi		
DTW (# bMP):	25.85, PATO	(Q)) MP Height ft.	+2,63'		
Time (MST)	1018	MP Elevation	1000		
OTW of 6MP):	8:110	DTW:	- Z7.82'6#c(0)	RY)	
Time (MST)	0908 22.82 6TEC	Groundwater Elevation (GWE) Reference Level	7513.66 ms1		
		Zip Tie on Kellim's Grip	NO		
Transducer Perfor	mence and Programming				
Parl 3: Transduor	Error/Drift Acceptance		Part 4: Pro	gramming & Fine Readings	
WL Reading Time (MST)		Progamming Tipme		Time (MST)	Reading
VVL (transducer reading) (ft):	/,	New Test Name		A	
GWE from MM	I P	Reference Level		(h	
Olflerence in value:	10/20/	Current Depth:		note	
Error tolerance of transducer:	SI III	Meas Interval	41	12016	
. Within English	prone o	Start Date:			
District Briss To	Aprom co	Start Time:			
	PSI-0.07 R. 100 PSI-0.	23 ft 500 PSH1.16 t.	Synch Clocks: Yes No		
Deleted Tests:	NA				QA Date and Initial





11-2019			-av	De	10	W /	MD	1_		
11-6017								April 2010	(13 May 2 (45)	5.236
	40.074		14. W. 15. V	ATTAC	HMEN	T 2		Records	Use Only	V
	Wile of the same past in the				95			<u> </u>	000	
	SOP-5224-2			_	 .		1	LOSA	lamos	
	Sprir	ng/S	Surface Water S	ampling F	ield Da	ita Sheet				
	V			Date: 3-//-	-N 101		site time: /Z	00	DST	
	Site name:	0e10	William I			We	ather: (low!)	1, 30 5	Tain	
	Sampling crew:	7 1	ur restence doi. Bonham, K.Ta	a D. Ju	omille)	,		_	
	Two-minute safe	ty di	rill: Histing on	uneven sh	det S	rfaces.		-A /bi	me) <u>97</u>	145
	Meters calibrated	i at (rill: Hiking on (location) SM	0by	(whom)	T. Vonder		at (u	itie) <u>31</u> /	
	YSI Meter number	· ·	^	Turbidime	ter seria	l number:	<i>N</i> / \ Method	I. 55		Section 1
	Sample Retrieva		Dete: 2 // 2 10		Time	1005			67497	
	Sample Event ID			nple ID Num	pers: ¿	AWK-17-16	7398;-K739		10000	
	- 10 - 原料 強化		Prince Control		ARAMET		Turbi	dity (NTU	D: 18/	· —
	pH (su): 7.72			Sp. Cond.	m 7-	•	O (ar	m): 93		6-
	Temperature (°C)	3	nod, including calcu	DO (mg/L)	7/3	ed Pors	hall Flum	2	30	
	Explanation of Q	meth	nod, including calcu	lations: 3"	MINION	[07	2/400	1		
	6HT=0.34	· >-6	OS, OSTO, ZO	BCFS X	448,4	77 =17 >	Note: To convert	ı	multiply of	s by 448.83
	-					- H 110,000 (100,000)	011 - PANISES ALDYS 18 81			
			S	ITE DESCRIPTI	ON (CITCLE	an mac apply	Raseflo	₩ (persist	tent flow)
	Media type:			Spring		Mading	Station C	age: at	/ above	/ below
	Sample location	ı:	Bank Midstream na	tural feature		ther (specify				
			Pool	Riffite		Eddy		fuse	С	ther
	Description of Sampling Site:		Written description							
			Bedrock	Concrete	C	bble	Gravel	Sand	> 0	Mud
	Substrate: Stage Condition	16'	Stable: normal / lo		Fallir	ng	Rising		specify):	
	Hydraulic Even		Routine	Snowmel	t F	lood	Drought		specify):	
	Stream Color:		Brown	Clear	Green	Blue	Gray	Other (specify):	
	Description of		Turbulent	Lamina		Recirculatin		nant		Other
	flow:		Written descriptio	n: Water h	as a	Gray/B	we cloudy	tint	- 	SECRETARY OF THE
		· ·		Pho	tos and C	PS		AND DESIGNATION OF		* * * * * * * * * * * * * * * * * * *
	GPS point #1:	Na	me: MA	Coordinat	tes:	MA		Units:	MA	
	GPS point #2:	_	me:	Coordinat	tes:	V	1	Units:	<u> </u>	
	Photo #1:	Des	scription: 5 mple	Source		cing: Sw	Time: /2/a	_		anham_
	Photo #2:		scription: above			cing: Sw	Time:	Taken		 - -
		De	scription: 6e10 W		Fa	cing: NE	Time: V	Taken	by.	<u> </u>
	Other notes: D	Ser	scription. Delaw	HE SPA	testy I	A'C	Negarive		Contact W	aste:\/zgal
	D. Soromilla) H	SENES SUMPLE	ייוסבו זו נכי	16001 00	-/17			ime) <u>148</u>	
	Offsite time: Z	23	Relinquish	samples at	SMO, C	are or K. I.	ALCOV CA		1110)	
	Objectives met	? >	1 25			21-3				
	1									

Between E252 and Water at Beta 46 ATTACHMENT 2 Records Use Only SOP-5224-2 Los Alamos Spring/Surface Water Sampling Field Data Sheet Site name: Between E252 and Water at Beta Onsite time: 1027 DST Date: 3-19-19 Weather: Sunny, 40s Objective: Sample per applicable SOPs and doc. Sampling crew: T. Yander Vis, M. Snendo, T. Walker Two-minute safety drill: Safe hiking, possible wildlife at (time) 803 Meters calibrated at (location) ____ by (whom) J. Meyer Turbidimeter serial number: NA YSI Meter number: Method: PP, DC Sample Retrieval Date: 3-19-19 Time: 1030 Sample ID Numbers: (AWA - 19 - 167 494, -167493, -167495 Sample Event ID: 12266 FIELD PARAMETERS Turbidity (NTU): 9.92 Sp. Cond. (µS/cm): 1 81.5 7.81 pH (su): Q (gpm): 2617 Temperature (°C): 5.8 DO (mg/L): 9.75 Explanation of Q method, including calculations: Float method Area = 252 ft = 5.83 cfs = 2617gpm
Q = 2.52 ft = 2.41 ft/s = 5.83 cfs = 2617gpm

Note: To convert cfs to gpm, multiply cfs by 448.83 W= 3.70 Ft Havg = 0.68ft Vavg = 20 ft/8.38 = 2.41 ft/s SITE DESCRIPTION (circle all that apply) Baseflow (persistent flow) Media type: Spring Station Gage: at / above / below Wading Bank Sample location: Other (specify): NA (Midstream natural feature) Other Eddy Diffuse Pool (Riffle) Description of Sampling Site: Written description: midstream Mud Gravel) Sand (Cobble) Bedrock Concrete Substrate: Other (specify): NA Rising Stable: rormal/ low / high Falling Stage Conditions: Other (specify): Flood Drought Snowmelt **Hydraulic Event:** Routine Clear Green Blue Gray Other (specify): V Brown Stream Color: Recirculating Stagnant Other Laminar Turbulent) **Description of** et 1 31949 none flow: Written description: Photos and GPS NA Units: Coordinates: NA GPS point #1: Name: Units: Coordinates: GPS point #2: Name: Time: 1035 Taken by: T. Vander Vit Facing: W Photo #1: Description: above source Taken by: Time: Facing: w Photo #2: Description: Source. Time: Taken by: Facing: E Photo #3: Description: below source Other notes: HE spot test yields negative results being manufect at Proble 0.5

Twalker preserves samples; M. snendo QAs or of to collect PEB Contact waste: gal. at (time) 1300 Offsite time: 1/30 Objectives met? yes

Appendix E Field Documentation Water/CdV Watershed MY2019 Q2 and other Field Activities from March 5-April 8, 2019

39 Records Use Only 96P-5224-2 Los Alamos Spring/Surface Water Sampling Field Data Sheet Onsite time: 1044 DST Date: 3/15/19 Weather: Sunny 305 Two-minute safety drill: hiking on slippen snow Gate 9 hight Meters calibrated at (location) 5 MO by (whom) J. Meyer at (time) 0836 181 NA Turbidimeter serial number: YSI Meter number: Date: 3/15/19 Time: |C45 DST | Method: DC Sample Retrieval Sample ID Numbers: CANA-19-1674975-167496, -167499-167498 Sample Event ID: | 2266 FIELD PARAMETERS Turbidity (NTU): 20.58 7.91 Sp. Cond. (µS/cm): 17 L pH-(su): Temperature (°C): 3,5 DO (mg/L): 10.10 Explanation of Q method, including calculations: Unable to collect flow rate due volume of flow. Note: To convert cfs to gpm, multiply cfs by 448.83 SITE DESCRIPTION (circle all that apply) Baseflow (persistent flow) Spring Media type: Wading Station Gage: at / above / below **Bank** Sample location: Midstream natural feature Other (specify): (Riffle) Diffuse Other Description of Pool Sampling Site: Written description: NA Sand Mud Cobble Gravel Bedrock Concrete Substrate: Other (specify): Stable: normal / low / high Falling Rising Stage Conditions: Other (specify): Flood Drought Routine Snowmelt Hydraulic Event: Other (specify): Cloudy Clear Green Blue Gray Stream Color: Brown (Turbulent) Recirculating Stagnant Description of Laminar flow: Written description Snowmelt, high flow Photos and GPS Units: GPS point #1: Coordinates: Name: Coordinates: Units: GPS point #2: Name: Facing: NW Time: 1100 Taken by: Photo #1: Description: Taken by: Photo #2: Description: Facing: F Time: Facing: Time: Taken by: Photo #3: Photo #3: Description: Source Facing: E Tir Other notes: A. Vizzil conducts HE spot test-presents negative A. Vizzil preserves samples A. Stanfield QAs Description: Contact waste: | gal. at (time) 1545 DST Offsite time: 110 DST | Relinquish samples at SMO, care of K. Elles Objectives met?

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SOP-5224-2		Si .					Records	s Use Only	
1-70/9 Sp	ring	/Surface Wate	r Sampling l	Field Data S	heet		LOS	Alamos	_
Site name: M	urti:	n Spring	Date: 3 -			time:		DSI	
Objective: Som	PIR	Per applica	ble refere	doc. Pg. 3	Weath	er: Clo	vdy A	40'5	
Sampling crew	:7.	Per applica. Borham, T.W.	aller, A.S.	ecver AD	Jage	סולית	/		_
Meters calibra	tety of	t (location) _ SN	PPE A SII	(whom) D.J.	Sun ib	ACCS	at (t	ime) <u>0'730</u>	_
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Sample Retriev	A PARTIES	Date: 3-6-20	1/9	Time: /27	'S	Metho	od: PP		
Sample Event	D: /	226c 3	Sámple ID Num		-16753i,	-167532	28-167	534	
pH (su): 7/4	7		A SHARE WAS ASSESSED.	PARAMETERS	/ 1	Turk	oidity (NTU	n. Vo >	
Temperature (°0))· /	0 U	DO (mg/L):	(μS/cm): Z52	, 1		pm): %. 9 0		-
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PRB Alluvial Seep (16-61439)

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OP-5224-2							Records	ise Only	* -
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ite name: PRB	Alluvia	u Seep	Date: 3-11~	19	Onsite tim	ie: 13	of DST		
bjective: Sam	ple pe	r SUPs and a	lowmentation		Weather:	rain	,30s		
			snendo, A.Vig	1					(+)
wo-minute safe	ety dri		rg in snow	rain				1.0	
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)、デ :(us) Hc			Sp. Cond. (µ		5.5		dity (NTU):	14.00	
remperature (°C			DO (mg/L):	9.11		Q (gr	om): 4.76		
Explanation of Q	metho	od, including ca	Committee Committee						
3000 mL X (0	Imin X	1 Glas = 4.	76 gpm	_			W-16-1	440 93
12535		1man 3	785mL		SCHOOL SHORT SHOWS WAS THE OWN	convert	cfs to gpm, m	ultiply crs i	oy 448.83
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		Midstream	natural feature		pecify): pool			04	
Description of		(coi)	Riffle		ddy	Diff	fuse	Oth	ier
Sampling Site:	1	Written descript	tion: pool below				6	T	Aud
Substrate:		Bedrock	Concrete	Cobble	Grave		Sand	1	/lud
Stage Condition	ns: S	Stable: normal	low / high	Falling	Risin		Other (sp		JA
Hydraulic Even	t:	Routine	Snowmelt	Flood	Droug		Other (sp		1
Stream Color:		Brown		een Blu			Other (sp		y
Description of		Turbulent	(aminar)	Recirc	ulating	Stag	nant	Oth	iei
flow:		Written descrip				AT PROPERTY.		(VIII)	
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GPS point #1:	Name	e: NA	Coordinates	,,,,,			Units:	NA	
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Other notes: H A.Vigil Pr	le spo reserv	res samples;	s negative res M. Snendo QA	ે ડ				ntact was	
Offsite time: 13		Relinqui	sh samples at SI	MO, care of _	K. Popova		at (tim	e) <u>1500</u>	/

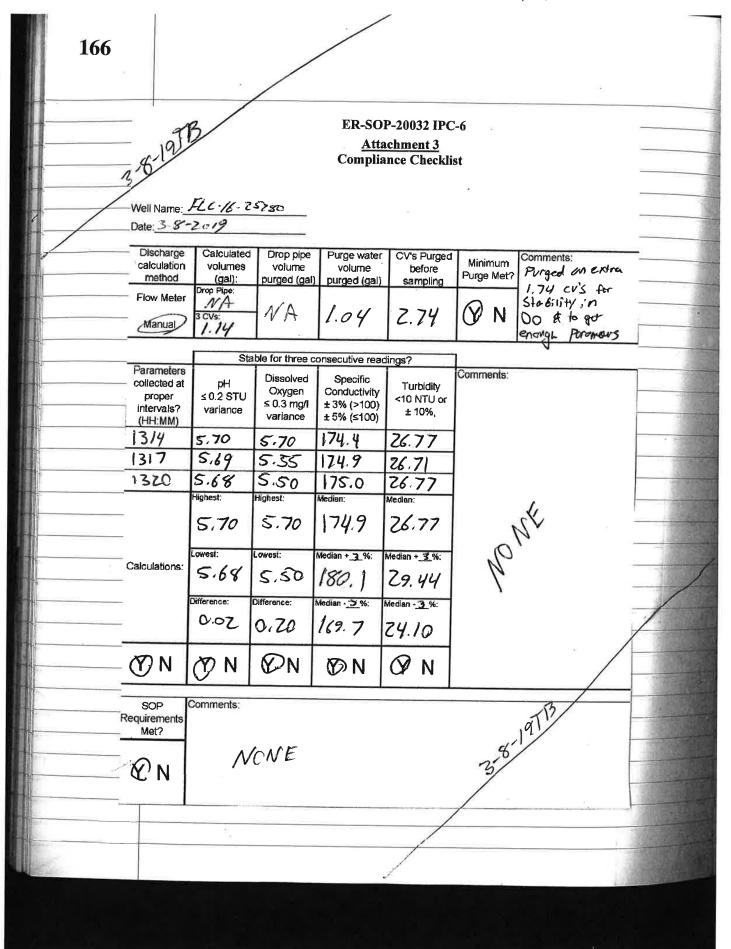
Appendix E
Field Documentation
Water/CdV Watershed MY2019 Q2 and other Field Activities from March 5-April 8, 2019

40 SWSC Spring

			The State	10/1/23	ATTAC	HMENT 2	2 1					
SOP-5224-2	20000					İt			Record	s Use Onl	У	
	ing/	Surface	e Wa	ter S	ampling Fi	eld Data S	heet		5.0	Alamos		
Site name: Swsc Spring					Date: 3-16-19 0			nsite time: LOTS DST				
Objective: Sample spring per sops an					d downertation V			Veather: Sunny, 30s				
Sampling crew												
Two-minute sat					a snowy /	muddy c	undi	H 0.75			1.0	
Meters calibrated at (location) 3M0				by (at (time) 1642							
YSI Meter numi	er:	50			Turbidimete			NA		77 P. C.	Name and Address	
Sample Retriev	al	Date: 0	1-14-				8 091	8 Metho	od: PP			
Sample Event l	D: 17	1266		Sam	ple ID Numb	ers: CAWA	17 746		See all property of	THE SECOND	5232000	
					THE REAL PROPERTY.	RAMETERS						
pH (su): 6, 95					Sp. Cond. (µS/cm): 264.2			Turbidity (NTU): 30:12				
Temperature (°Ć): 8.8					DO (mg/L): 万⋅il			Q (gpm): 0.87				
Explanation of C						Vnoten= 1						
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390 ML 75	7	5 Im	^	1mi	3:385	H644	and the same of	lote: To conver	t cfs to gpm	multiply cfs	by 448.83	
			Te all	SIT	E DESCRIPTION	(circle all tha	t apply)					
Media type:				Spring)			Baseflow (persistent flow)					
Sample location:		Bank				Wading Station Gage: at / above / below						
		Mid	strear	n natu	ıral feature	Other (s						
Description of		741110							ffuse			
Sampling Site:					podi below source cle							
Substrate:				Concrete Cobble			Gravel	Sand Mud				
Stage Conditions:		Stable: normal low			Falling		Rising	Other (specify): MA		NA		
Hydraulic Event:		Routine		Snowmelt			Drought		Other (specify):			
Stream Color:		Brown		Clean Gre			Gray	Other (specify): Cloudy				
Description of		Talbarette							gnant	Ot	ner	
flow:		Written	descri	ption:	cloudy			e Santa and the			EXCEPTION OF THE	
				, in		and GPS			(1) (5) (5) (5)	a de	Til Mary	
GPS point #1:	Nan	10/1						NA.				
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Photo #1:		cription:			tream Facing: SW			Time: 1026		Taken by: T.Vander Vis		
Photo #2:		cription:			Facing: Sw			Time:		Taken by:		
Photo #3:					ownstream		E	Time: J	Taken	by:	<u>\</u>	
Other notes:	lE sp.	preserves	5 Sau	Malez	; (Vanuer	Ail Chila		900		ontact was		
Offsite time: ()			elinqu	iish s	amples at SM	IO, care of _	K. Pop	ova	at (tii	ne) <u>073</u>		
Objectives met										3-19-	19	

FLC-16-25280 See pg. 161 of this loghook for morning activities Crew on site @ FLC-16-25280 Zminute Satety PPE, trip bazards A wind Deather; Cloudy of 40's w/ wind Descrive: Purge of Somple FLC-16-25280 per cull appricable extence documentation found on pg. 3 of this logbook
See pg. 161 of this logbook for morning activities Crew on site @ Flc-16-25280 Zminute Setety PPE, trip bazards A wind Jeather: Cloudy of 40's w/ wind Dijective: Purge & Sample Flc-16-25280, per cull applicable
See pg. 161 of this logbook for morning activities Crew on site @ Flc-16-25280 Zminute Setety PPE, trip bazards A wind Jeather: Cloudy of 40's w/ wind Dijective: Purge & Sample Flc-16-25280, per cull applicable
Zminute Screty PPE, trip bazards A wind Jeather; Cloudy of 40's w/ wind Dejective: Purge & Sample FLC-16-25280, per cull applicable
Zminute Satety PPE, trip bazards & wind Weather: Cloudy of 40's w/ wind Objective: Purge & Sample FLC-16-25:280 per cull applicable
Seather: Cloudy of 40's W/ Wind Dejective: Purge & Sample FLC-16-25280 per cull applicable
objective: Purge & Sample FLC-16. 25:280 per cill applicable
error documentation found on pass of this logicon
OTHE CHOTTE I
DTW=5.10/872C
DTW=5.10' BTIC MTD=7.43' BTIC WC= 2.33'
CV= (0.163 301) WC = 0.38 gallons
BCV= (ICV x 3) = 1.14 gallons
Pump on, water to surface DG= 0.08 GPM (minushy in graduated cup)
Flowthrong cell full; begin logging peromons on YSI#50
ile: FLC-16-25280 & GW Sampling 101
ICV purged, Puramuses unstable & not enough parameters collected
for compliance cicklist
Pump parsed; over ICV puged & paramous Stable
Tump on begin Sampaing
Sampling Complete, Pump aft
M. Shedo conducts HE sport test, Resnits = Negative
A. Vigil preserves Somples! M. Shedd OA's
Objective me to purge of Sample FLC-16-25280 per all applicable
- Case de madelica au Do S OFTINO 100000
See pgs. 165-166 Per perembers, final II, waseinto & compliance chellist Crew off 514
Crew off 51/k
Relinguish Samples to SMO %. R. Onstatt
EVENT . TD: 1226C
Somple ID'S: CAWA-19-167539, -167538 &-167540
70
3-8-209TB
soft a

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							1
0/	0	understan Com	nlin	a Loa			
14/	LSD: 735Z	ndwater Sam	msl	Well Diamet	er: Z		Date: 3-8-2019713
IFWGMPMY 2019 Q: Z	Water Level: 7	350.42 ft.	msl ·	Top of Scre	en: 5, ZZ	ft.65%(
With FLC-16-25280	*TD: = M775	=7.43 617 C		Bottom of S	creen: 6.8Z	ft. ETEL ft.	NONE
Sampling Device: PP	*DTW: 5.10			Water Colui	nn: 2,33	gal.	Packer Pressure
Measuring Point: L	Drop Pipe: N	4		3CV: 1.1	۴	gal.	Before: psi
* Completion Depth:	1	Note MP height (s	ticku	p) of TOC/TI			Actuation: ps
	A. I = /T	D DTM Dron Pit	ne =	(TD/Pump in	take x Drop Pipe	Diameter	Opening:psi After:ps
Multiplier)	1CV = (Water Column	X TYOU	TH	3 CV =	(1CV x 3)		
TIME PH	SPEC COND µs/cm	mg/l NTU	A C H			Discharge	
MST (DST) SU	P			ORP mV	Water Level*	Rate (GPM)	NOTES
Stability: \squarence	±3% (>100) ≤	0.3 mg/l <10 or ± 10%	Yes or No			(3)	
Stability variance	2 0 /0 (2 100)		र्व				
1307 Pump on	Water to	surface 62 G	20 1	0.08	6PM		Cloudy W/Green
The second second second			~	168.1	5,12	0,08	hue a odonues
1308 6.69 4.8	1 - 1		11				
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(C)			A	D.	n e3US S	612	
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1325 Someriv	CCMPIO	e: Pump of	+	Pump	on; be	in =	adum pring
10.00	V 1	Pumpe	tt			1	**
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	N.			-			
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			4		**	-	1
							199
Yes in HACH column = HAC	Turhidimeter # A/A	used because MA	_			Final Wat	
Contact Waste: 1/2	gal.	Drum#: MVNC	al			5.10	ormation water purged prior
*Purge Water: 1.04		Drum#'s: /9/0		3	gollon Corboy	*Purge: sampling sampling	(excluding drop pipe water a



Manual Groundwater Level Measurements

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ATTACHMENT 1

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Groundwater Level Field Form

PART 1: Well Si	te information				
Well Name		Date:	Time ansite (MST):	Activity	
FLC-16	25780	3-8-2019	1255	Munual I for	Sempling
7. Bent	om, M.Ste	ndo & A. Vigi	P	Cable Lengthrft):	Cable SN:
Telemetry: Yes \ (No	Pull Transducer Yes \ No	New Transducer Need New LT SN:	red. Yes (Olo)	Memory % remaining:	Battery % remaining:
Connect Time:	Transducer SN:	New LT PSI Rating:	Manufacture Date	Log Note Memory %	l og Note Battery %
Water Level (ft)		P (ps'):	TICI NA	Stop Test: Yes \ Mo	Change Desicant: Yes \ No \ (NA)
Last Start Date:	^A	Data File Name:	NA	1	
PART 2: Manual M	en surements				
Measuring Point	TOC (top outer cas	sing) (TIC (inner)	Stick-up Measured on Site	Previous MP U	Jsed X
Time (MST)	1757	Water Level Meter Se 34	erial No. 12 4 3	Notes:	
OTW (N bMP):	5.10'6TEC	Measu	rements in feet		
Time (MST)	1300	LSOft	7352.9 insl		
DTW (fibMP)	5.10'6TIC	MP Height ft.	+2.62		
Time (MST)	19t 13	MP Elevation			
OTWALE OMP)		DTW:	-5.10'6HC		
Time (MST).	1300 7.43/60c	Groundwater Elevation (GWE) Reference Level	7350.42 msi	÷	
		Zip Tie on Kellim's Grip	MA		
Transducer Perform	ance and Programming				
Parl 3: Transducer E	FronDrift Acceptance		Part 4 Pro	gramming & Final Readings	
WL Reading Time (MST)		Progamming Time	1 =0	Time (MST)	Reading
All. (transducer reading) (ft).		New Test Name		•	
GWE from MM		Reference Level			
Difference in ralue:	The state of the s	Current Depth:	3.3.20197	B	
Error tolerance of transducer:		Meas Interval	3.5		
3 Within Home Tolero		Start Date:			
Oct of Err, Yalo	id to	Start-Time	*		
5 PSI-0.03ft 30 F	SI-0.07 1. 100 PSI-0.	23 R. 500 PSI-1,16 t.	Synch Clocks: Yes 1 No		
					QA Date and Instal
					L

			/												33
				9											
	100	V				ter Sam	_								1
	Natershed	Y: 2019	Q: Z	LSD: 7년4* Water Level:				Well Diame		2			Date: 37	6-2019	
- 4	Well: Colv	-16 - 076	156	*TD: ZMTD			msı	Bottom of				Bioc	Notes:	A F	
-/	Sampling D			*DTW: 4.0				Water Colu		4		ft.	7007	· Ł	
/	Measuring	Point: 🚹.	Broc	Drop Pipe:	VA			1CV: /-/				gal.		er Pressure	1
/		on Depth:	1000	L	b1=4-	MD balakt / :		3CV: 3.		Illundal-	7		Before:	psi psi	
	* ft. BTOC			latan O-ti		MP height (st							Opening:_	psi psi	
	DTW = (L			ater Column = = (Water Colu							e Dian	eter	After:	psi	_
	TIME MST/DST	рН		SPEC COND		Turb	HAC								_
	MST/PST	SU	TEMP	µs/cm	mg/l	NTU	СН	ORP	Water	Level*		harge ate		NOTES	
	Stability:	≤ 0.2 STU	°C	± 3% (>100)	≤ 0.3 mg/i	<10 or ±	Yes o	m∨	ft. Ø	102_		PM)		10123	
•	_ Stability.	variance		± 5% (≤100)	variance	10%	or No								
	0953	Pump	on! W	ou to	Surface	@ Q=(3 1,00			i i				~
	0854	,	5.4	280.9	7.32			119.3	4.7	28	0.1	3	cloudy	V/00	
	0857	,	12	274.8			1	134.9	4.	2000000000	Ų. I		3001	l	
		6.81	6.6	277.3	5.35		H	4	_						_
	_	6.63	64			24.50	#	147.6	4.				Slightly	Cloudy	-
	0903	6.55	6.4	28a.7	4.84	Z3.48	1	154.6	4.			-	W/no C	ber	-
	0906	653	6.5	280.9		23.16	L	159.0	4	37		_			_
	0909	6.54	6.5	Z81.Z	4.69	22.97	V	161.6	4.	38		L		V	
	0909	Pump	Pan	ed; ow	ICV E	ward	i	Dorom	403	· 51	ab	ie			
	0912	Pun	p on!	Bogin Comples	Samol	na		, .	- T						
	0974	5.0		J		1	,							6	_
	2100	JOVI)	ding	compres	K, FW	mp of	-				-				-
				· -											
												_			
							H	_		/					
						3-16	26	1918		5	<u> </u>				+
						270	Γ								\vee
															_
	-						H							-5B	-
	Ves in UAC	H column -	HACH TUE	idimeter #_ ///	used because	AAA	L	L	L		Final	Water	Level:	17	+
	Contact Wa					Nunicipa	1			=	4.	21	3	#BTOC	
	*Purge Wa				Drum#'s:			5	Ballo	n	*Purg	e: Fo	rmation wate	r purged prior to pipe water and	1
	Total Wast			gal.	1				gallo Corbo	y	samp	ling (e	ater)	pipe water and	

Appendix E Field Documentation Water/CdV Watershed MY2019 Q2 and other Field Activities from March 5-April 8, 2019 ER-SOP-20032 IPC-6 Helleller Attachment 3 Compliance Checklist Well Name: <u>CdV-16-a 76-56</u> Date: 3-16-2019 Discharge Calculated Purge water CV's Purged Comments: Drop pipe Minimum Purged extra before calculation volumes volume volume Purge Met? purged (gal) sampling method (gal): purged (gal) Volumes for Flow Meter Stobility in 2.08 NA N 1.84 Turbidity, PH #DO (Manua 3.38 Stable for three consecutive readings? Comments: Parameters Specific Dissolved Turbidity collected at рΗ Oxygen Conductivity ≤ 0.2 STU <10 NTU or proper ≤ 0.3 mg/l ± 3% (>100) intervals? ± 10%. variance variance ±5% (≤100) (HH:MM) 23,48 4.84 6.55 Z80.7 23,16 4.71 6.53 Z81. Z 22.97 4.69 6.54 280.9 23.16 6.55 4.84 Median + 10 %: Median +_'3_%; Lowest: Lowest: Calculations: 289.3 25.47 6.53 4.69 Difference: 272.5 0.02 20.85 0.15 Ø N Ø N Ø N N SOP Comments: Requirements Met? NONE

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ATTACHMENT 1

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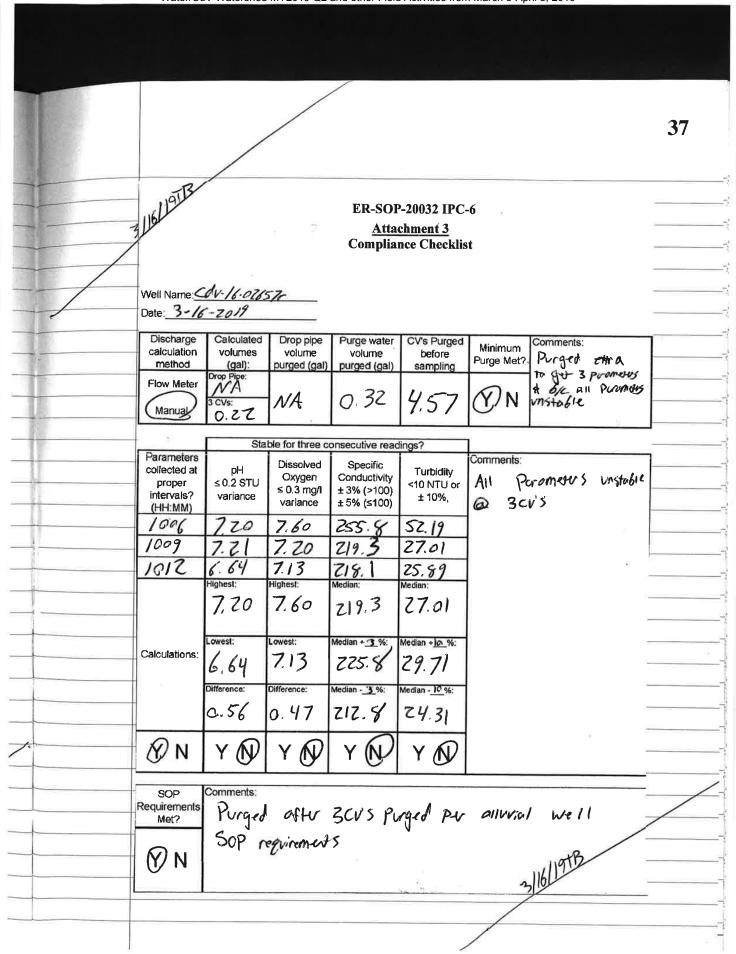
Groundwater Level Field Form

the second secon					
PART 1: Well S	ite Information				
Well Name		Date:	Time onsite (MST):	Activity:	
CdV-16-0	2656	3-16-2019	0835	Manual I Fo	- Samou 1 . a
Personnel:			10000	Cable Langthiff):	Coble Still
T. Borh	om, J. Rom	ero A.K. TOW		NA	NA
Yes Mo	Pull Transducer: Yes \ No	New Transducer Need New LT SN:	NA	Memory % remaining:	Battery % remaining:
Connect Time:	Transducer SN:	New LT PSI Rating:	Manufacture Date:	Log Note Memory %	Log Note Battery %
Water Level (ft)	20	P (psi):	TICINA	Stop Test: Yes \ MQ	Change Desicant: Yes \ (No.) NA
Last Start Date:	101	Data File Name:	ACA .	1 ///	Tes V MOX NA
PART 2: Manual A	V // I		VII		
Measuring Point		alana TIO II			
weasaing Foili	Too trop onter ca		Stick-up Measured on Site	Previous MP	Used
Time (MST)	081/0	Water Level Meter Se 3924		Notes:	
DTW (ft bMP).	4.07 BTOK	Measur	ements in feet]	
Time (MST)	0843	LSD ft	7443, 18 msi		
OTW (ft bMP):	4.07 STOL	MP Height ft.	+2.301	1	(F
Time (MST)	3/16/19/18	MP Elevation	= 7445.48 my	NON	
DTW (ft bMP):	300	DTW:	-4.0760c	,	
Time (MST).	0843 10.99'50C	Groundwater Elevation (GWE)	7441.41my		
I D (III DIVIF).	10.17 0100	Reference Level Zip Tie on Kellim's Grip:	MA		
Fransducer Perform	ance and Programming	Lati	967 S. M. C. W. C. S.		
	Errori Drift Acceptance	July 2			Lieu vekstiel komplet
	STOTISFIIL PECEPLATICE	i te vi	Part 4: Prog	gramming & Final Readings	
VL Reading Time (MST):		Progamming Time:		Time (MST):	Reading
VL (fransducer eading) (ft):		New Test Name:		-	
SWE from MM	······································	Reference Level :	Construction Co. His Tay 2 3 14 2 14 2		
Olfference in alue:		Current Depth:			1
irror tolerance f transducer:	NAMES AND DESCRIPTIONS	Meas Interval:	_ 1918		
Within Error Toises	aco	Start Date:	3-16-261918		
] Outsido Error Talia	fdr) co	Start Time:			
5 PSI-0.03ft. 30 P	SI-0.07 R. 100 PSI-0	23 ft. 500 PSI-1.16 ft.	Synch Clocks: Yes \ No		
eleted Tests:		124 1 20 101 4 10			QA. Date and Initial:
			the second line of the second		8

	35
	CdV-16-02657r
03/16/17	
Notei	See pgs. 32 of this logbook for morning activities
DAT 0937	Crev an Site @ cdv-16022657r
4937	7 minute Sofety, Hikipa PPE & Wet/icy Changing conditions
	Weather: Sunny & 30's w/ light brooze
	Clarente, ruge & sompe carrie cost per all applicable to the
	documentation found on pg. 3 of this log bat
0939	DTW=5.41'672c
0947	DTW=5.41' 6TIC mTD=7.21'6TIC WC=(TO-DTW), 1,80'
H/ID	CV= (0.041 \mathbb{#})wc = 0.07 gallons 3ev= (1cv x3) = 0.22 gallons
	Ber= (ICV x3) = 0.22 gallons
0956	pump on, No wow
0957	pump off, 'Crow lowers tobaing
Notes	Crew unade to fit workered tope into cosing w/ trobing we will called
	initial & Final I
1004	pump on, war to surface @ 0=0.04 bpm (minually w/ Gradicited cup)
1006	Flow through cell full, begin logging parameters on 151#60
	Flow through cell full; begin logging parameters on YSI#60 Fite i Cdv-16-02857r, Cw Sampling log & I-Pad # 3:T. Boxham pump pavsed, over 300's perged & parameters unstudie
1012	pump paysed, over 300's pugged & parameurs unstudie
1013	Pump on begin Sompling
1014	Pump on, begin Sompling 3. Romero Candrets HE spot test; Results Negative
1025-1835	Sampling Complete, Pump off
1040	Crew off Sige
	K. Tow preserves Somples; T. Briham QA's
Summona	objective met to purge & Somple cdv-16-02657, per all applicable
- Triming M	refrace documentation found on pg. 3 of this laybour, Devictions &
	unable to collect enough peramous & unable to collect I during purge
N Ale	unable to Collect enough peramens it unable to collect I during page. See pags 36-37 for peramens, Rinal II, weiste info & comprience chetist Relinquish Samples to SMO 901 K. Popova
7-18-19	Relinquish Semples to SME Soi K. Padava
0155	Evert ID: 12766
	Sample I)s: CAWA-19-167545,-167544 A-167546
	- 15. Sive 1-11
	112
	3-16-7019 TB

36

wante	2012	0:7	LSD: 7430		ter Samp		Well Diame	ter: 1		inches	Date: 3-/	6-Z019	
varened:			Water Level:				Top of Scre		0	ft. STAC	Notes: IZ	not able	
vell:CdV-			TD: IMTD	7.21'61			Bottom of S			4 ATT /	1062	coneced	
ampling D			*DTW: 57, 4	11'STEC		_	Water Colu		80	ft.	during		
Measuring I	Point: #	BTIC	Drop Pipe: /	M	ç		1CV: 0.0			gal.		ker Pressure	
Completio	n Depth:	TD				_	3CV: (),			gal.	Before: Actuations	psi psi	
* ft. BTOC					MP height (sti						Opening	psi	
DTW = (L	SD - Water	Level)W	ater Column = = (Water Colur	(TD - DTW)	Drop Pip ameter Multic	e =	(TD/Pump in) 3 CV =	ntake x [(1CV x 3	Orop Pipe	Diameter	After:	psi	
TIME MST / OST/	pH SU		SPEC COND µs/cm	DO mg/l	Turb NTU	H A C H	ORP		Level*	Discharge			
Stability:	≤ 0.2 STU variance	TEMP °C	± 3% (>100) ± 5% (≤100)	≤ 0.3 mg/l variance	<10 or ± 10%	Yes or No	mV	ft. <u>673</u>		Rate (GPM)		NOTES	
0956	Pum	Pon;	No w	es V								-	u
0957		off!			tussin	4							0
1004		,	worter :	o suff	ue O	þ.				COALS	Clovely	w/ na	
1006	7,20	3.7	225.8	7.60	52.17	W	202.8	N	C	0.04	1000	oder	
1009	7.21	3.6	219.3	7.20	27.01		203.2						9
1012	6.64	3.6	Z18. İ	7.13	25.89	¥	203.0		l_	<u> </u>		↓	
1012	Pump	pav.	ed										-
1013	Pum	p'an!	Begin	Sim	ping								
1035	Som		Comple		mp of	P							
		7											
×						,	019TB		_				
					3-16	1			J.				7
						-						03	
											1	H	
Yes in HAC	H column :	HACH Turb	oidimeter#///	used becau	se MA				-		er Level/3	ft BTE C	
Contact W			gal	. Drum#: /	Nunicip.	al		50011	<u> </u>	*Purge: F		nter purged prior to	
	ter: 0.3			. Drum#'s:	1726			Sgall Corb	ay	sampling sampling	excluding d	rop pipe water and	1
Wast	te Water: 0	.33	gal	·L						sampling	water)		-



Manual Groundwater Level Measurements

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ATTACHMENT 1

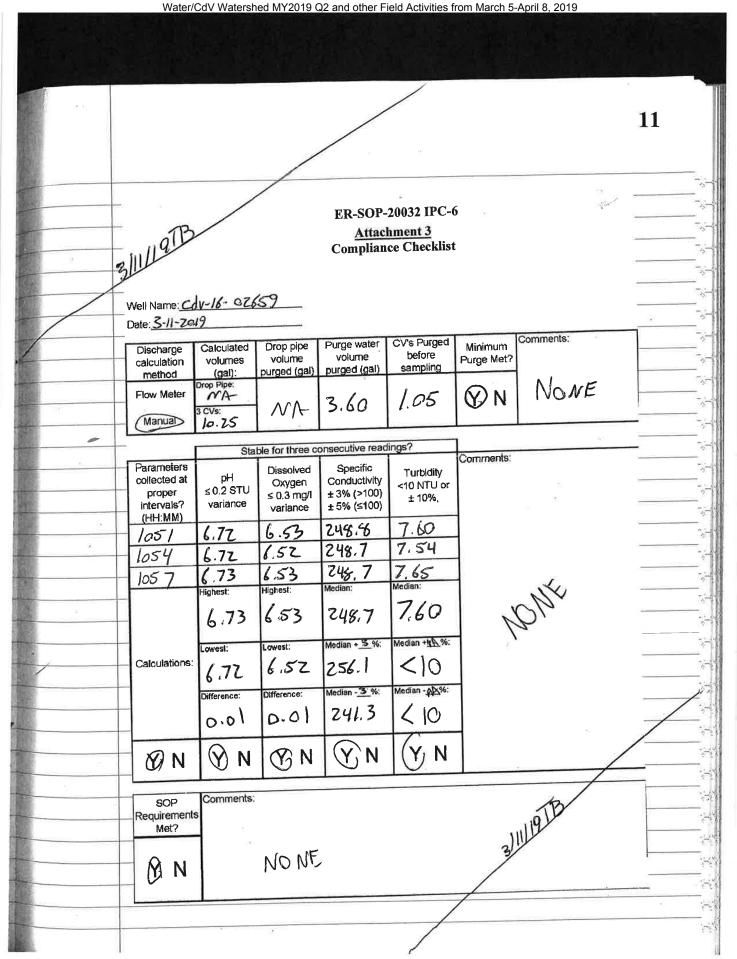
Page 1 of 1

Groundwater Level Field Form

PART 1: Well S	Site Information				NEW BUILDING WITH THE
Well Name		Date:	Time onsite (MST):	Activity:	
Cdv-16-0.	2657	3-16-2019	0937	Manual IT De	
Personnel:				Manual I for Cable Lengthift):	Sompling
T. Bonhon	Pull Transducer	New Transducer Need		NA	INA
Yes \ (70	Yes \ No NA	New LT SN:	led: Yes\Mo"	Memory % remaining:	Battery % remaining:
Connect Time:		New LT PSI Rating:	Manufacture Date:	Log Note Memory %	Log Note Battery %
MA	MA	MA	I NA	MA	NA
Water Level (ft)	MA	P (psi):	TICI MA	Stop Test: Yes \ NO	Change Desicant: Yes \ MO\ NA MA
Last Start Date:	MA	Data File Name:			3
PART 2: Manual I	The state of the s				
Measuring Point	t: TOC (top outer ca		Stick-up Measured on Site	Previous MP t	Used X
Time (MST)	0939	Water Level Meter Se 3424	250000000000000000000000000000000000000	Notes:	
DTW (ft bMP):	5.416TEC	Measu	rements in feet		
Time (MST)	0942	LSDft	7430, ZZms1	NONE	
DTW (# bMP):	5,41'6720	MP Height ft.	+ 3.65'		
Time (MST)	16 COLITE	MP Elevation			
DPW (N bMP):		DTW:	-5.41'6stc		*.
Time (MST).	7.21'6TEC	Groundwater Elevation (GWE) Reference Level	7428.46 msi		
		Zip Tie on Kellim's Grip	MA		
ransducer Perform	sance and Programming	1 167	/ V · ·		
	Errori Drift Acceptance	1.00	Death (C. Ross	ramming & Final Readings	
VL Reading Time (MST)		Progamming Time:	Pail 4: Proc	the constitute of the constitu	T /
VL (fransducer eading) (ft)		New Test Name:		Time (MST):	Reading
SWE from MM		Reference Level:			
Difference in alue:		Current Depth:			
rror tolerance f transducer:		Meas Interval:	3-16-26	191B	
Within Error Tolon	onco	Start Date:	3-16		
] Outaids En er Tolo	(ଖୁନ୍ଦ୍ର	Start Time:			
5 PSI-0.03ft. 30 F	SI-0.07 1. 100-POFO.	23 ft. 500 PSI-1.16 ft.	Synch Clocks: Yes \ No		
703.6.					QA: Date and Initial:

18/	Groundwater Sampli	Well Diameter: 4	inches	Date: 3 -11 -2019
111/2 12 0.7	SD: / 30/1 30 /mg	Top of Screen: 4,94	11.600c	Notes:
Watershed: Worth /CdV V		Bottom of Screen: 7, 74	11.570c	NOME
(Mail: Cav-16-07/57)	TD:= MTD = 10.88 6TO (Water Column: 5.23	ft.	Packer Pressure
Sampling Devices 1	Drop Pipe: NA ga	1cv: 3 4Z	gal.	Before: psi
Measuring Point: A. 610c		3CV: 10.25	3,24 ft	Actuation; 191 psi
[* ft. BTOC / BTIC / BGS / MSL]	Note MP height (stick	(up) of 100/110 lol / lild file		Opening:psi
DTM = (I SD - Water Level)Wa	ater Column = (TD - DTW)Drop Pipe = (Water Column x Well Diameter Multipli	= (TD/Pump intake x Diop 1 ipo er) 3 CV = (1CV x 3)		After:psi
William		21 1 1		
TIME I PO I	SPEC COND DO Turb ps/cm mg/l NTU	ORP Water Level*	Discharge Rate	NOTES
MST OST SU TEMP	201 (1400) < 0.3 mg/l <10 or ±	0	(GPM)	
≤ 0.2 STU	± 3% (>100) ≤ 0.3 mg/l	or No		
Stability: variance				
JOIT PUMP on;	water to signace @	0-0.09 GPM		CHECK WIND OVER
	7-01 15 67	N 202.1 5.70	0.09	
1018 7.70 4.4	CSS. / 170	218.6 5.71		
1021 6.81 3.9	250.4 7.14 10.00			
1	249.3 6.86 8.72	217.6 5.70	1	
1 2	2 20 20 10	214.4 5.70		
1027 6.68 3.8	210.	11 -		
1 1 1 2 7	249.0 6.67 8.17	ZII.1 5.70	++	
		708.8 5.70		
1033 6.68 3.7	0,1			
1036 6.69 3.7	248.7 6.61 7.85	1007	++	
1000	248.7 6.59 7.82	205.7 5.70		
1039 6.69 3.7		204.5 5.70		
1042 6.70 3.6	248.8 6.57 7.74		+	
	248.7 6.56 7.69	735 5, 70		
1045 6.70 3.6	655 - /		,	
1048 6.71 3.6	248.7 57 7.63		+	
		202.6 5.70		100
		202.3 5.70	11	100
1054 6.72 3.6		111 = 70	-	L Jasilt
	248.7 6.53 7.65	202.2 5.79	_	Viey
1057 6.73 3.6	Stable Paramers, Pumper	a 100 beg n som	pring.	Pump off @/110
1057 lav Purked +	Stoler Paromosts, Fullipes	7 7 7	Fina	Water Level:
Yes in HACH column = HACH	Turbidimeter # WA used because			14 / 11 01-
Contact Waste: 1/2	gal. Drum#: MVN:C gal. Drum#s: 1614	Squiller	eam	rge: Formation water purged pri- ipling (excluding drop pipe water
*Purge Water: 3.60	gal. Drum#s: 707 9	corboy	sam	pling water)

Appendix E Field Documentation



Manual Groundwater Level Measurements

Document No. ER-SOP-20243

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Reference

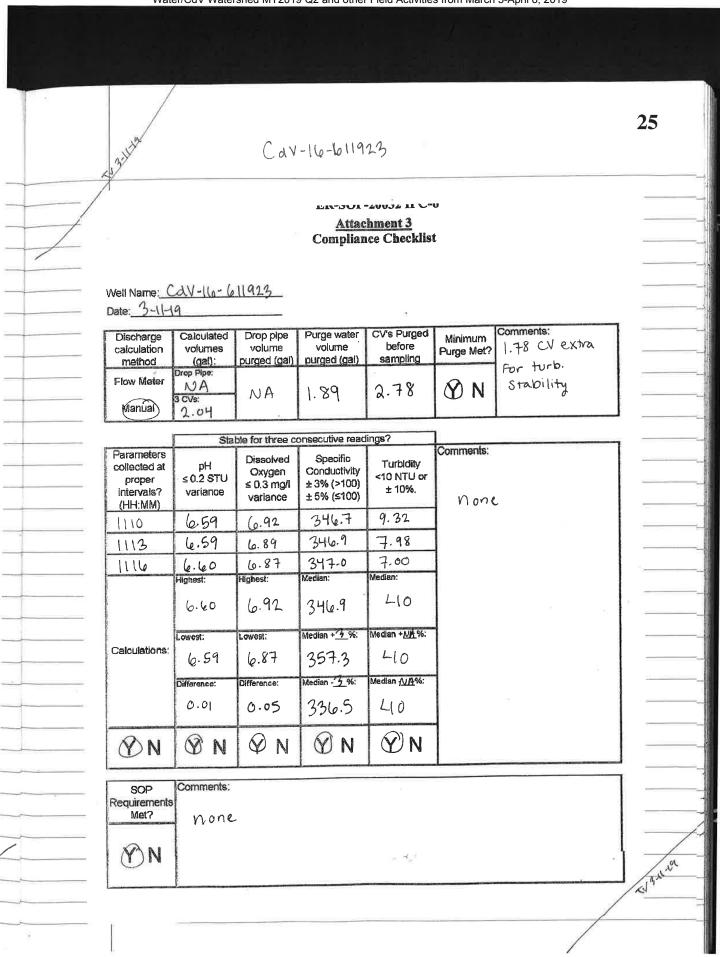
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ATTACHMENT 1

Page 1 of 1 Groundwater Level Field Form

Connect Time: WA Connect Time: WA Water Level (ft) WA P(ps): WA P(ps): WA P(ps): Data File Name: WA P(ps): WA P(ps): Data File Name: WA P(ps): Data File Name: WA P(ps): Data File Name: WA P(ps): MA P(ps): Data File Name: WA P(ps): MA P(ps): MA P(ps): MA I [C] MA P(ps): MA MA MA MA MA MA MA MA MA M					and the same of th	
Personnel: T. Bocham D. Journ 10 & K. Tow Telemetry: Pull Transduce: Ves I & New I T PSI Rating: Memory % remaining: New I T Roll Manufacture Date New I Transduce Time: NA Water Level (ft): Pull Transducer SN WA Water Level (ft): WA Data File Name: WA PART 2: Manual Measurements Measuring Point (100:160 pouter casing): Time (MST): Data File Name: Measurements in feet Measurements in feet Time (MST): Data File Name: Measurements in feet Measurements in feet Data File Name: Measurements in feet Time (MST): Data File Name: Water Level Moter Seriel No 34243 Notes: Notes: Notes: Notes: Notes: Notes: Notes: Part 4: Programming 4 Fine Readings Part 4: Programming 4 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 5 Fine Readings Part 4: Programming 6 Fine Readings Part 4: Programming 6 Fine Readings Part 6: MST) Readings Part 6: MST) Readings	***				ite information	PART 1: Well S
Telemetry: Telemetry: Telemetry: Test Manual Measurements Total Measurements in feet Time (MST): Time		[Activity	Time onsite (MST):	Date:		
Personnel: T. B. W. M. J. Larm. J. & K. T. D. L. Cable Lengthitty Cable SN Teleimetry: Pull Transduce: New Transducer New LT PSI Rating: Memory % remaining: New LT PSI Rating: Manufacture Date: New LT PSI Rating: Manufacture Date: NA Log Note Memory % Log Note Ballery % NA NA NA NA NA NA NA NA	2 2.			3.11-2019	6292	Cd v. 16-0
Telemetry Teleme	>cmpling	CONSTRUCT TEL	1 1003	(3.70-7)		Personnel:
Tes Light Pes Li		NA	V	millo & Kito	om, b. Jun	7 Bonh
Water Level (ft) WA Pips): WA Ticl WA Stop Test: Yes (No.) Change Designation Yes 1 No. (NA.) Part 2: Manual Measurements Measuring Point Clockfop outer casing) Time (MST) Ti	attery % remaining:	8 3 4		INDIA I T CNI	Yes \ Q	res (Ng
Water Level (ff) WA Pips): MA Ticl MK Stop Test: Yes (No.) Change Designation Yes I No. (NA) PART 2: Manual Measurements Measuring Point Clocklop outer casing) Time (MST) Time (Manufacture Date	New LT PSI Rating:	Transducer SN:	
Water Level (ft) WA Data File Name: WA Previous MP Used XI Change Designatives I No VNA Previous MP Used XI Change Designatives I No VNA Previous MP Used XI Mark 1 2: Manual Measurements Measurements Mater Level Moter Seriel No. 34 Z 4 3 DTW 4ft bMP) S. 65 6 To C Measurements in feet MP Height ft. LSD ft. 7300.50 m/51 DTW 4ft bMP) DTW: S. 65 6 To C MP Height ft. 43, Z 4 ' MP Elevation 733.74/m/51 DTW: S. 65 6 To C MP Height ft. To S. 65 6 To C MP Height ft. AND TO S. 65 6 To C MP Height ft. AND TO S. 65 6 To C MP Height ft. To S. 65 6 To C MP Height ft. AND To S. 65 6 To C MP Height					MA	
Data File Name: WA PART 2: Manual Messupergois Measuring Point doctop outer casing) TIC (inner) Stick-up Measured on Site Previous MP Used XI Time (MST) /006	ange Desicant		TICI	P (ps'): MA	NA	Water Level (ft)
Measurements in feet Measurements in feet Motes: Measurements in feet Motes: Measurements in feet				Data File Name:		Last Start Date:
Measuring Point Clocklop outer casing) TIC (inner) Stick-up Measured on Site Previous MP Used XI Water Level Meter Serial No. 34243 Notes: JOC						PART 2: Manual M
Filme (MST)			Total and Maria and And	cings TIC (inners)	COC don culor ca	Measuring Point
Time (MST)	XI.	The state of the s	Period No.		Session other ca	- G - OIM
Time (MST) 100)* I.SD ft 7300.50 m S1 STW (ft bMP) 5.65 6TO C MP Height ft. +3, Z4 ' Ime (MST) 197B MP Elevation = 7393.79 ms1 DTW: -5.65 0TO C Ime (MST) Groundwater Elevation (GWE) Reference Level Zip Tile on Kellim's Grip: MA Tansducer Performance and Programming and 3: Transducer ErrorDrift Acceptance Programming Time II. (transducer ErrorDrift Acceptance New Test Name. II. (transducer in live: Current Depth. Time from MM Reference Level Time from Meas Interval Meas Interval		Notes:	eriai No.	34243	1006	fime (MST)
DTW (ft bMP) 5.65'6T0 C MP Height ft. +3.24' Ime (MST) 9.11 19TB MP Elevation =7393.74'm31 DTW: -5.65'6T0 C Ime (MST) Groundwater Elevation (GWE) Reference Level Zip Tie on Kellim's Grip: MA Tansducer Performance and Programming and 3: Transducer Error/Drift Acceptance Programming Time: AL Reading Programming Programming Time: The (MST) Reading Programming Time: The (MST) Reading Programming Time: We from MM Reference Level We from MM Reference Level Time (MST) Reference Level			rements in feet	Measu	5.65 6 toc	(AWG II) W.LC
ime (MST)			7300.50 msi	LSDft	100 %	ime (MST)
Groundwater Flevation (GWE) Reference Level Zip Tie on Kellim's Grip: MA ansducer Performance and Programming and 3: Transducer Error/Drift Acceptance Part 4: Programming & Final Readings // Reading me (MST) // (transducer ading) (ft): // (t			+3,24'	MP Height ft.	5.65 6006	TW (# bMP)
Groundwater Elevation (GVVE) Reference Level Zip Tie on Kellinn's Grip: MA ransducer Performance and Programming and 3: Transducer Error/Drift Acceptance Part 4: Programming & Final Readings // Reading mine (MST) // Litransducer Mexit Name. // Reference Level We from MM Reference Level Current Depth: ror tolerance transducer: Meas Interval		1 NONE	=7303,74 msi	MP Elevation	19TB	ime (MST) g. II
Groundwater Elevation (GWE) Reference Level Zip Tie on Kellinn's Grip: MA ransducer Performance and Programming and 3: Transducer Error/Drift Acceptance Part 4: Programming 8: Final Readings W.R. Reading Programming 7 time Time (MST) We from MM Reference Level We from MM Reference Level Current Depth: Tor tolerance transducer: Meas Interval] // (1,	-5.65 BTOC	DTW:		DW (fibMP):
Zip Tie on Keillin's Grip: Aransducer Performance and Programming and 3: Transducer Error/Drift Acceptance Part 4: Programming & Finsi Readings VL Reading (MST) We WE from MM Reference Level Current Depth: Tor tolerance transducer: Meas Interval				Elevation (GWE)		
As an active Performance and Programming and 3: Transducer ErrorDrift Acceptance Part 4: Programming 8 Final Readings // Reading me (MST). // (transducer ading) (ft). WE from MM Reference Level			ΔcΛ	Zip Tie on Kellim's Grip		D (HOKE)
If 3: Transducer Error/Drift Acceptance Part 4: Programming 8 Fins: Readings If Reading me (MST) Programming Time. Time (MST) Reading If (transducer ading) (ff).			11/7		nce and Programming	ansducer Performa
TL Reading me (MST) Programming Time: Time (MST) Reading (L (transducer ading) (ft). New Test Name. Reference Level Current Depth: Tor tolerance transducer: Meas Interval						
me (MST) L (transducer ading) (ff) New Test Name. NE from MM Reference Level Current Depth: or tolerance transducer: Meas Interval		gramming & Fina: Readings	Part 4: Pro		TONDAR Acceptance	
It (transducer ading) (ft). New Test Name. Reference Level Reference in lue: Current Depth: Tor tolerance transducer: Meas Interval	Reading	Time (MST)	9	Progamming Time:		me (MST).
Current Depth: Current Depth:				New Test Name.		
lue: Current Depth: ror tolerance transducer: Meas Interval				Reference Level		
transducer: Meas Interval				Current Depth:		
W. Piro Liver L.				Meas Interval		
Start Date:				Start Date:	r ty	William Heave I Cidaded
Octodo Brior Malcopica Start Time						
PSI-0.03t 30 PSI-0.07 ft. 100 PSI-0.23 ft. 500 PSI-1.16 ft. Synch Clocks: Yes \ No			ynch Clocks: Yes \ No	3 ft. 500 PSI-1.16 t.	51-0.07 1. 100 Pero.;	PSI-0.03ft 30 PS
QA Date and initial	Date and instal	O				

24 CAV-16-611923 **Groundwater Sampling Log** ft. msi Well Diameter: inches Date: 3-11-19 IFWGMP MY: 2019 LSD: 7376.43 A. bhic Notes: 7 in 5.0 Watershed: Water/CdV Water Level: NA ft. msl Top of Screen: A. btic TD= 4.67 11.34 btc Bottom of Screen: 10.0 Screened Well: CaV-16-611 923 DTW= 5-72'btic 7.16'btig Water Column: 4.18 Interval Sampling Device: PP Packer Pressure 1CV: 0.68 gal. Measuring Point: TIC Drop Pipe: None NA Before: 3CV: 2.04 gal. Completion Depth: MTD Note MP height (stickup) of TOC/TIC for Alluvials Actuation: psi * ft. BTOC / BTIC / BGS / MSL] Opening: psi DTW = (LSD - Water Level)......Water Column = (TD - DTW).....Drop Plpe = (TD/Pump intake x Drop Plpe Diameter Multiplier) 1CV = (Water Column x Well Diameter Multiplier).....3 CV = (1CV x 3) psi TIME (MST) / DST Turb SPEC COND DΩ µs/cm mg/l NTU Discharge ORP Water Level* TEMP NOTES Rate ft. btic mV (GPM) ± 3% (>100) <10 or ± ≤ 0.2 STU ≤ 0.3 mg/l Stability: ± 5% (≤100) variance 10% variance 1054 on; water to surface pump cloudy, 52.50 N 155.1 0.09 7.19 8.91 1055 6.51 4.0 344.3 Odor 169.7 37.72 6.95 7.19 6.52 1058 3.7 346.6 177.8 7.19 6.54 3.7 6.81 1101 346.1 7.20 6.84 14.12 186.6 1104 6.57 3.7 345.7 6.97 193.6 7.20 346.5 10.78 6.58 3.7 1107 6.92 9.32 7.21 (0.59 346.7 199.3 1110 3.7 6.89 3.7 346.9 7.98 204.7 7.21 1113 6.59 7.21 6.87 1116 6.60 3.7 209.0 347.0 7.00 1 CV purged and parameter stable; pump powsed 1116 to prepare 1118 Pump on; Degin Sampl 156 Sampling complete; W 3/1-10 Final Water Level: Yes in HACH column = HACH Turbidimeter #NA used because NA ft blic 01:F gal. Drum#: Municipal Contact Waste: 0.5 *Purge: Formation water purged prior to 5 gal. 1.89 gal. Drum#'s: Purge Water: sampling (excluding drop pipe water and #1605 sampling water) 5.4 gal. Total Waste Water:



Manual Groundwater Level Measurements

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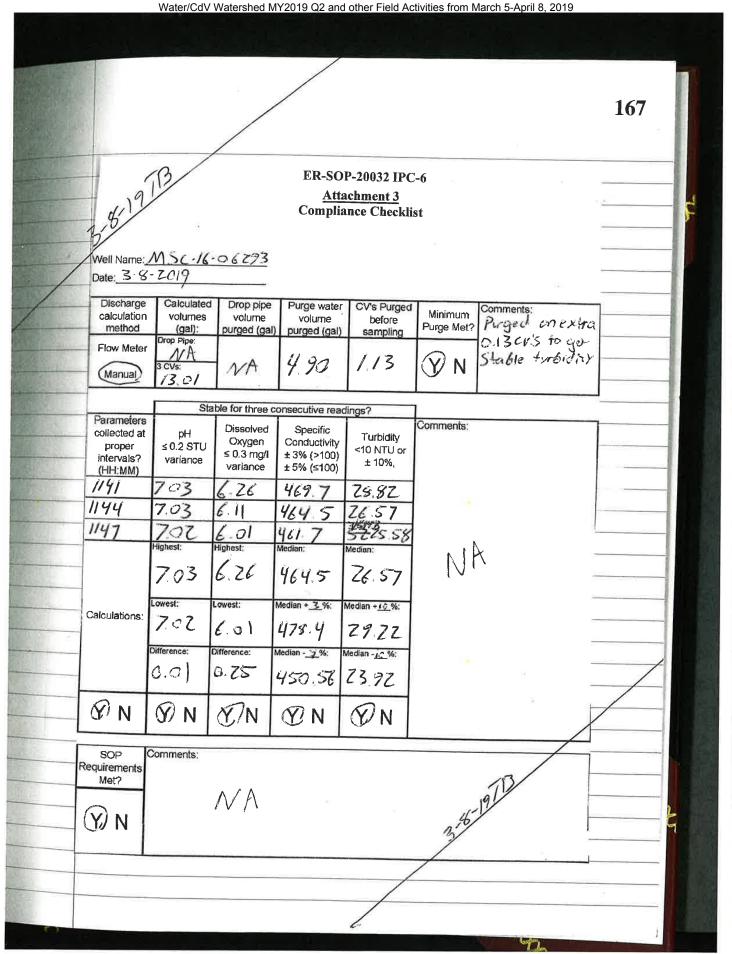
Groundwater Level Field Form

PART 1: Well S	ite Information				
Well Name		Date:	Time onsite (MST)	Activity	
CdV-16	-611923	3-11-19	1135 DST		•
Personnel				GW Samplin Cable Lengthift):	1 Control
T. Vand	ervir, A.V	igil, M. She	ndo	Cable (enginet)	Cable SN
Telemetry: Yes \ No	Yes \ No	New LT SN:	ed. Yes \ No	Memory % remaining:	Battery % remaining:
Connect Time:	Transducer SN:	New LT PSI Rating:	Manufacture Date	l og Note Memory %	Poj Note Battery %
Water Level (ft)		P (ps'):	TICI	Stop Test: Yes \ No	Change Desicant: Yes \ No \ NA
Last Start Date:		Data File Name:			TV 3-11-11
PART 2: Manual N	leasurements	-			
Measuring Point		sing) TIC (inner)	Stick-up Measured on Site	Previous MP I	
	1	Water Level Meter Se		the second secon	Jsed XI
Time (MST)	1140	3424		Notes:	
DTW (ft bMP):	7.16	Measur	ements in feel		
Time (MST)	1143	LSDft	7376.43		
OTW (R BMP)	7.16	MP Height ft.	+ 0.00		
Time (MST)	NA	MP Elevation	= 7376-43		3444
DTW (# bMP):	NA	DTW:	- 7.16	7	
Time (MST).	1143	Groundwater Elevation (GWE) Reference Level	7369.27		
		Zip Tie on Keilim's Grip	None		
Fransducer Perform	ance and Programming				
Part 3: Transducer E	Fron Drift Acceptance		Part 4: Pro	ogramming & Final Readings	
VL Reading Time (MST)		Progamming Time.		Time (MST)	Boodles
VL (transducer eading) (ft).		Now Test Name:		Time (WOT)	Reading
SWE from MM		Reference Level	The state of the s		
Offierence in alue:		Current Depth:		TV 3-449	
mor tolerance f transducer:		Meas Interval		The state of the s	
] White Name 1 Gires	alt.	Start Date:			
] Moduld Ship Falc	0.12	Start Time			
5 PSI-0.03t. 30 P Deleted Tests:	None	23 ft. 500 PSI-1,16 ft.	Bynch Clocks: Yes \ No		QA Date and Initial

Sa Me	Warshed	MERIO	/	Gı							
Sa Me	Warshed	W 2619			roundwa	ater Sam	pli	ing Log			
Sa Me				LSD: 737				Well Diam		inches	Date: 3-8-2019
Sa Me	IN ME	· Water		Water Level:			ms	Top of Scr	een: 4,59	ft. OTIC	Notes: 17 373
Me • C		L-16-0		*TD: : mTD					Screen: 9.59	ft. OUC	3:31
• 0		Device:		*DTW: 4. C			_	Water Colu	ımn: 664	ft.	Deales Brown
_		Point: BT	227.4	Drop Pipe: /	VA		gai.	3CV: 13		gal.	Packer Pressure
		/ BTIC / BO			Note	MP height (st	tickı		TC for Alluvials		Actuation: 200
		.SD - Water	r Level) W		= (TD - DTW)Drop Pip)e =	(TD/Pump i	ntake x Drop Pipe	2/8/19/12	Opening:
			ultiplier) 1CV	= (Water Colu			H) 3 CV =	(1CV x 3)		pricer.
MS	TIME ST / DST	pH SU		SPEC COND µs/cm	DO mg/l	Turb NTU	G H			Discharge	
_			TEMP °C				Yes	ORP mV	Water Level*	Rate	NOTES
S	tability:	≤ 0.2 STU variance		± 3% (>100) ± 5% (≤100)	≤ 0.3 mg/l variance	<10 or ± 10%	s or No	""	· · · ·	(GPM)	
		Variance		2 0 /0 (2 / 0 0)	7		8				
-/	254	Pun	113	1 Wat	r to	SVODA		ac=	O.lo GPM		
			1 /								very cloudy w Green tint a nord
	58		5.4						4.27	0.10	brea time aring
_/0.	28	Paus	e Fun	1P; tu	bing	not	C	ng c	nongh		
-//	02			water	1 71			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			
$-\pi$	77						2.3			010	ciently w/brees
11	20	105	6.2	488,Z		12.13	7	242.8	4.45	0.10	tint & odersess
	105	7.05	5.5	491.3	7.04	44.74		245.2	4.70		
_ <u>/</u> /	08	7.06	5.3	488.4	7.06	38,95		243.3	4.87	1	
— <u>11</u>	11	7.05	5.2	486.6			-	Z39.8	5.04		
_			5,2	485,6				236.6	5.16		
<u>_41</u>	7	7.04	5.1	483.4	6.47	35.89	_				2 2
<u>—[11</u>	Zo	7.03		482 2			\mathbf{T}		5.39		
<u> </u>	23	7.03		481.9		35.71		227.8	5,50		
-	19700	7.03		481.Z		3563	-	ZZS.9	57.55		
		7.04		480.7				2239	5.61		13
- 000		704			6.38		Н	222.1	5.67	- [-]	
		7.03					V	220 8	5.71	. ↓	, 9
		14	HACH Turbid	imeter #_W/T			Ø			Final Water L 5.69	evel ft 672 C
-	rac Was		90		Drum#: M	unicipal		South	20	Purge: Fofn	nation water purged prior
	rge Wate al Waste	Water: 4		gal. gal.	orum#S: [*	107		Sgalle	dov	sampling (ex	cluding drop pipe water a

		4												
63	10							/			Đ			
7							n L oa	nli	iter Sam	oundwa	Gr			
4		Date:	nches	i		or.	ell Diame		The second secon	ounuwa	LSD:	Q: /	N/C	
_		Notes:	_	ft.			op of Scre	_			Water Level:	2		IFWGMP M
		NAME AND ADDRESS OF THE PARTY O		ft			ottom of		16.		*TD:	/	11/	Watershed
			ft.		Charles and St.		ate Golu				*DTW:		O L	Well: Sampling
	acker Pressure	Packe	gal.	š			V:	OAL.	7.8.		Drop Pipe:		Point:	Measuring
	psi	Before:	gal.				CV:						Section 2015	· Completion
	on: psi	Actuation:	ft.		als	ofor Alluvia	of TOC/T	ticku	MP height (st	Note I	· Company to the control of the last control	SS / MSL 1	/ BTIC / BC	
-	j:psi	Opening:	eter	Diam							ater Column =	- A STATE OF THE S		ACCURATION AND ADDRESS OF
	psi	After:	O LOI	Digiti	p i ipc	1CV x 3)	3 CV =	olier	iameter Multi	mn x Well Di	= (Water Colu	Itiplier) 1CV	SD-water Mi	DTW = (L
								H A	Turb		SPEC COND		рН	TIME
			arge	Disch				C H	NTU	mg/l	μs/cm		SU	MST (DST
-	NOTES	N N		Ra	ever	Water L ft. ゟ てエ C	ORP mV	줆				TEMP °C		_
_			101)	(GF	_			Yes or	<10 or ± 10%	≤ 0.3 mg/l variance	± 3% (>100) ± 5% (≤100)	,	≤ 0.2 STU variance	Stability:
_								Š	1070	variance	1 376 (3100)		variance	
	y Werzen	Congli	0	Q. Ì		5.75	220.	1	27,000	120	11700 /	ii o	7 07	1138
	A adortess	Tint & C		100				T	36,51	6.38	475.6	7.7	1.03	1130
-	1	l i				5.79	193	П	78.87	15.3	469.7	4.9	7.03	1141
-			\vdash					ш						040, 23 /2
-					,	5.83	186		26.57	6.11	464.5	4.8	703	1144
·					,	500	1111	Ħ		. 3				1117
	V ·	¥				5.86	18.	V	25.58	601	461.7	48	7.02	1147
			.	610	610	Lee		a.	. 1	31110	310.		_	1147
				OH	2101	dus	Decim	a	Wate	ICV P	Plave	e rum	raw	117/
)		l					•		(m a)	Semp	beain	1000	Pumj	1150
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	11		119	14				П						
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			Vater I	Findia	_			_	THE RESERVE AND ADDRESS OF THE PERSON NAMED IN	used because	limeter #	HACH Turbio	column =	es in HACH
	ft			_	-		5	27	3-8-1	Drum#:			ste:	Contact Was
	ater purged prior to					3				Drum#'s:	gal:		r:	Purge Wate
	rop pipe water and	toluding alob b												

Appendix E Field Documentation



Manual Groundwater Level Measurements

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Groundwater Level Field Form

PART 1: Well S	ite Information		**************************************		the state of the s		
Well Name		Date:	fime onsite (MST):	Activity			
MSC-16-06293		3-8-2019	1040	Monval I for Sampling Cable Lengthift: Cable SN:			
Personnel:	AA ("	1 - 0 × 0.000 000		Cable Lengthift):	Cable SN		
T. Bonl		hendo A A.	Vigil	NA	I NA		
Yes V No	Yes \ No	New Transducer Need New LT SN:	NA NA	Memory % remaining:	Batte:y % remaining:		
Connect Time:	Transducer SN:	New LT PSI Rating:	Manufacture Date	l og Note Memory %	Log Note Battery %		
Water Level (ft)	VA	P (ps'):	VA.	Stop Test: Yes (No)	Change Desicant: Yes \ vo \ NA		
Last Start Date:	MA	Data File Name:	/A	Anti-contract - American (Alice - American)			
PART 2: Manual A							
Measuring Point	TOC (top outer cas		Stick-up Measured on Site	Previous MP U	sed 🔀		
Time (MST)	1046	Water Level Meter Se	erial No. 2 4 3	Notes:			
DTW (fl bMP).	4.06 STIC	Measu	ements in feet				
Time (MST)	1049	LŞÖİt	7370.79 msi				
D'TW (ft bMP)	4.06 bic	MP Height ft.	+2,59'	Nor	JE		
Time (MST)	8:19313	MP Elevation	=7373.38 mil	NC,	V D		
DIWTH MP;		DTW:	-406' bric	,			
Time (MST).	1049	Groundwater Elevation (GWE) Reference Level	7369.32 ms	z			
		Zip Tie on Kellim's Grip	NA				
Transducer Perform	nance and Programming			the state of the s			
Part 3: Transducer	Errori Drift Acceptance		Part 4: Prog	gramming & Final Readings			
WL Reading Time (MST)		Progamming Time:		Time (MST)	Reading		
Wt. (transducer reading) (ft).		New Test Name.		,			
GWE from MM		Reference Level					
Difference in value:		Current Depth:	+13	/			
Error tolerance of transducer:		Meas Interval	38-7019713				
		Start Date:		ly co			
Octud Er J Fold		Start Timo					
5 PSI-0.03t 30 Deleted Tests:	PSI-0.07 1. 100 P850.	23 ft. 500 PSI-1.16 ft.	Synch Clocks: Yes \ No		GA Date and initial		

IFWG J IPON	12/0	Q: Z		<u>oundwa</u>				7 11	-	_	2 1/7 7010	_
Waterened			LSD: 72 St Water Level:				Well Diam	een: 5.57'67			Date: 3 /4-70/9	
Well:MS			*TD: = MID			ms		Screen: JQ, 3			·	
Sampling [*DTW: 4, 19		7140			umn: 6, 9Z	ILO	ft.	NONE	
Measuring			Drop Pipe:			gal	1cv: 4.5			gal.	Packer Pressure	_
Completic		district the second	Diop i ipe. y			gui	3CV: 13.			201	Poforo: a pol	
* ft. BTOC			-	Note	MP height (s	tick		TC for Alluvials	3.07	ft.	Actuation 1919 psi	
DTW = (I	SD - Water	rlevel\ W	later Column =	. (TD - DT\)	Drop Pir	20 =	TD/Pumn i	ntake x Drop Pipe			Opening:psi	
			= (Water Colu						o Diamor	<u> </u>	Miter:psi _	
TIME MST/D3T	pH SU	TEMP	SPEC COND µs/cm	DO mg/l	Turb NTU	HACH	ORP	Watęr Level*	Dischar	_	4	
Stability:	≤ 0.2 STU variance	l ∙c	± 3% (>100) ± 5% (≤100)	≤ 0.3 mg/l variance	<10 or ± 10%	Yes or No	m∨	ft. 61IC	Rate (GPM		NOTES	
1051	Pump	on!was	for to SI	I Pace	@ Q.: (.,	O GPN					
1052	809	4.5	194.3		3206	W	151.0	4.50	0.10		hue it no odor	
1057	6.74	4.1		4.12	163,50	++	146.0	4.65				
1102	6.58		148.6			H	145.6					
		8 2/	135.3		82.68	H	145.5				Established about the	_
1117	6.52	2776			77.73	н	147.4				Stigwhy clowy wy Green have A no odor	_
117	6.50	Z TY Vivinte	122.2			Н	150.7					
	6.50		120.2			H	154.0					_
	6.49		118.9			H	156.9					
1132	6.49	3,2	117.6	2.53	16.91	П	159.3	5.13				
137	6.49	3.1	116.5	2.52	76.72	V			1			_
137	Pum	Pav	sed, ICV	Pwac	dAF	q	am d us	Stube			¥.	
138	Pum	onj	Begin	San	pring			.81				
115	Sami	vina	comple	stej Pa	gan	1	P					/
Α.,	•	0	·	3/19/12	DIGT'R							×
Sample .											-	Λ
83.79	3.	HACH Turbio	dimeter #AA			_	- E		Final Wa	17.230		
ontact Wa				Drum#:/6Z	Z 1901	ler	bry		5	-	1 6ttc	
Purge Wate			gal.	Drum#'s: /	521		5	carbo y	sampling	(ex	nation water purged prior to cluding drop pipe water and	-
otal Waste	Water: U.	10	gal.				V		sampling	wa	fer)	_

			25
	3/19/13	ER-SOP-20032 IPC-6 <u>Attachment 3</u> Compliance Checklist	
	Well Name: N	Purge water CV's Purged	Minimum Comments:
	Discharge calculation method Flow Meter	Catodicties Petore P	WN NONE
	Parameters collected at proper intervals? (HH:MM)	pH	comments:
	1/27 1/32 1/37	6.49 2.61 118.9 77.25 6.49 2.53 117.6 76.91 6.49 2.52 116.5 76.72 Highest: Median: Median: NA 2.61 117.6 76.91	MONE
	Calculation	Lowest: Lowest: Median + 3%: Median + 10%:	
	⊗ N	ON ON ON	
,	SOP Requirem Met?	NO NE	3/19/18

Manual Groundwater Level Measurements

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Reference

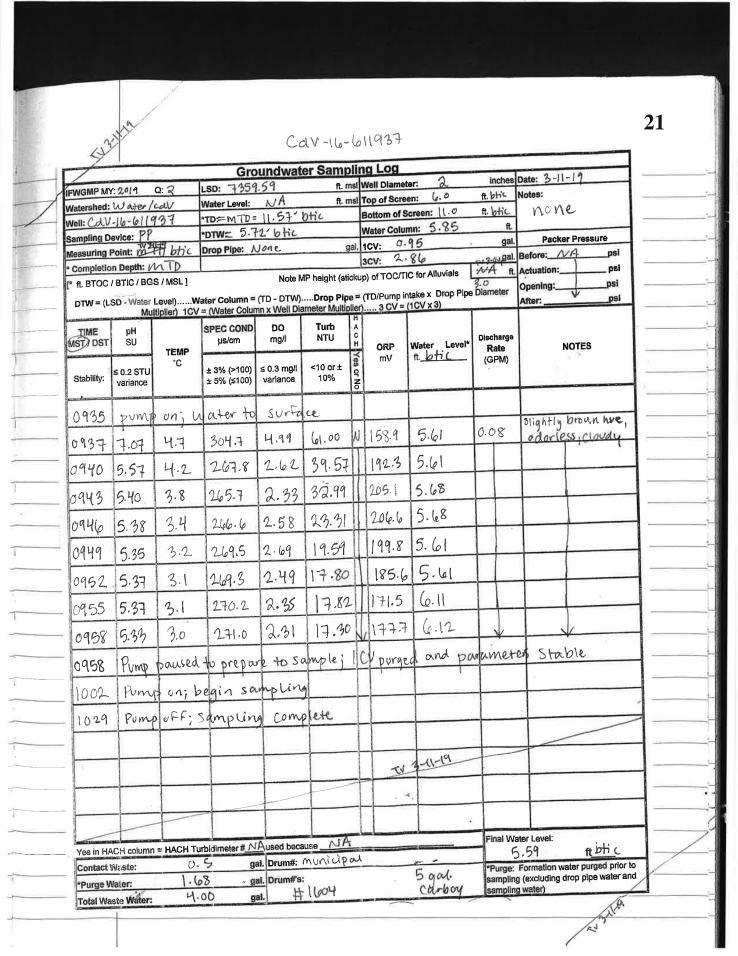
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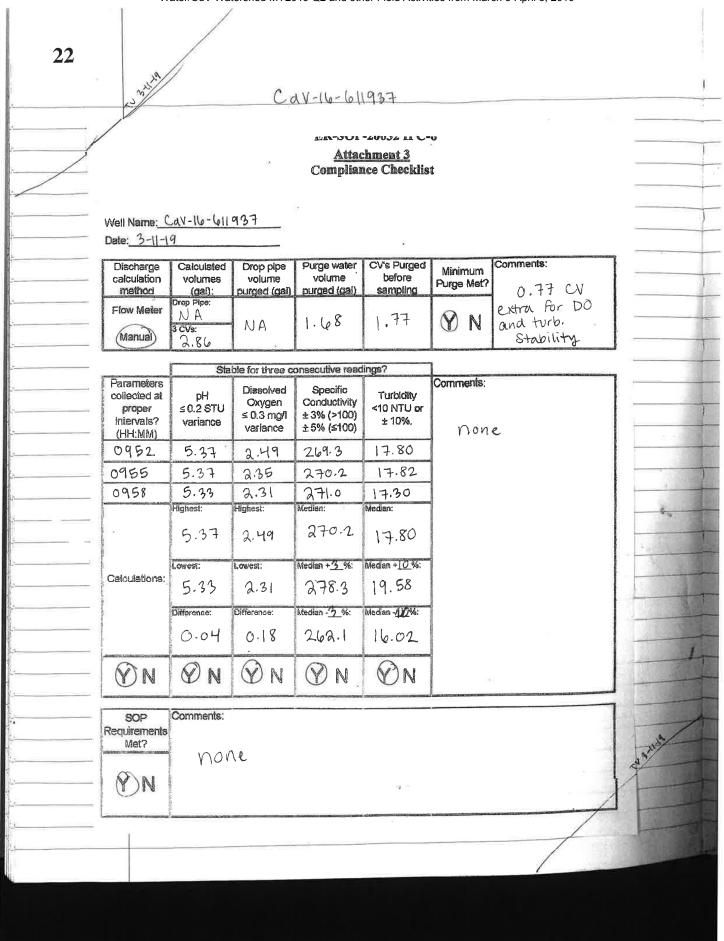
ATTACHMENT 1

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Groundwater Level Field Form

The state of the s	ite Information				
Well Name MSC-16:06294 Personnel:		Date:		Monual V Por Cable Lengthitty:	Sampling
	Pull Transduce Yes \ Mo	New LT SN:	K. Read	Cable Lengthrft):	Battery % remaining:
NA	Transducer SN:	New LT PSI Rating:	Manufacture Date	Log Note Memory %	Log Note Battery %
Vater Level (ft)	VA	P (ps'): WA	TICI MA	Stop Test: Yes (10)	Change Desicant: Yes \ No \ (A)
ART 2: Manual M	WA easurements	Data File Name:	VA	**************************************	
leasuring Point	TOC (top outer cas	sing) (TIC (inner)	Stick-up Measured on Site	Previous MP U	lead U
ime (MST)	1041	Water Level Meter Se 3424	erial No.	Notes:	lsed 📈
TW (ft bMP).	4.18 BTIC	Measu	ements in feet		
ime (MST)	1044	LSDft	7288.44 ms1	140	
TW (ft bMP):	4.18'BIC	MP Height ft.	+3.07'	1/0	NE
ime (MST)	3/14/20 BIB	MP Elevation	=7291.57 mg	110	100
TW (# bMP):		DTW:	-4.18 BILL		
me (MST).	1044 4.18' Bisc	Groundwater Elevation (GWE) Reference Level	7287.39ms	ŧ	
		Zip Tie on Keilim's Grip	NA		
ansducer Perform	ance and Programming			L	
ri 3: Transducer E	rronDrift Acceptance		Part 4: Pro	gramming & Final Readings	
L Reading me (MST)		Progamming Time		Time (MST)	Reading
L (transducer ading) (ft).		New Test Name.			
NE from MM		Reference Level			
flerence in lue:		Current Depth:	3/14/2018/8		
ror tolerance transducer:		Meas Interval	3/14/		
Wakin Himse J.C. Rec		Start Date:			DO TOTAL CONTRACTOR OF THE SECRETARY
Octob Brog Falo	1 19	Start Time			
PSI-0.03ft 10 P	SLO.07 1 100 PSLO.3	3 ft. 500 PSI-1.16 ft.	Synch Clocks: Yes 1 No		
					QA Date and Initial





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ite information				The state of the s
	Date:	Time onsite (MST):	Activity	
11937	3-11-19			
		·		To the second
er Vis, M.Sr	lendo, A.Vigil		Cause Languinty.	Cable SN
Yes \ No	New LT SN:	ed. Yes \ No	Memory % remaining:	Battery % remaining.
Transducer SN:		Manufacture Date	l og Note Memory % 73-1	og Note Battery %
	PURKIT	T [C]	Stop Test: Yes \ No	Change Desicant:
	Data File Name:	l		Yes ! No ! NA
	Data File Name:	-tv 341	-in	
leasurements	The last the			
the state of the s	esing) PIC (inner)	Slick-in Massured on Site	C Provious MO II	
		erial No.		sed 💥
1026				
5.72	Measur	ements in feet	None	
1029	LSDft	7359.585]	
5.72	MP Height ft.	+ 3.0		
NA	MP Elevation	= 7362.585		
NA	DTW:	- 5.72		
1029	Groundwater	7356.865		
11.57	Reference Level			
	A STATE OF THE PARTY OF THE PAR	NA		
Error Drift Acceptance		Part 4; Pro	gramming & Fine Readings	
	Progamming Time.		Time (MST)	D. W. H. W.
	New Test Name:		Time Time T	Reading
	Reference Level		Annah in Palas along a salah a salah ang a salah ang a	
	Current Depth:			
	Meas interval	TV 3-11	11	
dr.	Start Date:			
€ 3	Start Time	ie:		
SLO.07 R. 100 P8F0	23 ft. 500 PSI-1.16 t.	Synch Clecks: Yes 1 No		QA Date and Initial
	Pull Transducer Yes \ No Transducer SN: Reasurements TOC (top outer ce 1026 5.72 1029 5.72 NA NA 1029 11.57 since and Programming FrontDrift Acceptance	Date: 3-11-19 er Vis, M.SMendo, A.Vigil Pull Transducer Yes \ No Transducer SN: Data File Name: Data File Name: Pulls & U Data File Name: ToC (top outer casing)	Date: 3-II-19 Ilme onsite (MST): 1025 DST Pull Transducer New Transducer Needed. Yes \ No New LT SN: New LT SN: Transducer SN: New LT PSI Rating: Memufacture Date: New LT PSI Rating: New LT PSI	Date: 3-11-19 Time onsite (MST): Activity GW Sampuing 2 Vis , M. Shendo, A. Vigil Cable Lengthirth; Cable Lengthirth

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ATTACHMENT 1

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Groundwater Level Field Form

PART 1: Well Si	te Information		STATE OF CHARLES	WRITE STORY	
Well Name		Date:	Time onsite (MST):	Activity:	
Surge bed Personnel:	Monitering well	3-16-2019	0815	Manual I for	Simpling
	nom, kitow	80 1000 200	ero	Monual I for Cable Langinity:	Cable SN:
Telemetry: Les \ No	Pull Transducer: Yes \ No	New Transducer Need New LT SN:	MA Yes \ MA	Memory % remaining:	Battery % remaining:
Connect Time:	Transducer SN:	New LT PSI Rating:	Manufacture Date:	Log Note Memory %	Log Note Baltery %
NA	MA	MA	M	MA	MA
Water Level (ft)	MA	P (psi):		Stop Test: Yes \ No	Change Desicant: Yes \ No\\ NA
Last Start Date:	M	Data File Name:	NA		
PART 2: Manual M	45-02-02-10-10-10-10-10-10-10-10-10-10-10-10-10-			THE STATE OF STREET	Call the Street Street Street
Measuring Point:	TOC (top outer cas		Stick-up Measured on Site	Previous MP I	Jsed 🔀
Time (MST)	0816	Water Level Meter Se	rial No. Z 4 4	Notes:	V
DTW (ft bMP):	Dry to TO	Measur	ements in feet	MTD= 22.	84 6TEC
Time (MST)		LSDft	(1913		
DTW (ft bMP):	100	MP Height #	+		
Time (MST)	3/	MP Elevation	=		
DTW (fi bMP):	/	DTW:	-		
Time (MST).	0816 82.84	Groundwater Elevation (GWE) Reference Level	DRY		
		Zip Tie on Kellim's Grip:	MA	1	
ransducer Performa	ence and Programming	CANADA CENTRAL			
THE RESERVE AND DESCRIPTION OF THE PERSON NAMED IN	rrortDrift Acceptance		Part 4: Pro	ogramming & Final Readings	
VL Reading ime (MST):		Progamming Time:		Time (MST):	Reading
VL (fransducer eading) (ff):		New Test Name:		Time (MOT).	Accounty
SWE from MM		Reference Level:			
olfference in alue:		Current Depth:	16-2019 TB		
rror tolerance f transducer:		Meas Interval:	16		
Welvin Error Toloro:		Start Date:			
Outside Enal Talor:	31705	Start Time:			
PSI-0.03ft. 30 P. eleted Tests:	SLO.07 R. 100 PSI-0.2	3 ft. 500 PSI-1.16 ft.	Synch Clocks: Yes \ No		QA. Date and Initial:
	**************************************			-	8

Appendix B

Analytical Suites and Results (on CD included with this document)

Appendix C

Inspection Forms

Inspection Report Corrective Measures at Consolidation Unit 16-021(c)-99

Date/Time: 9/24/18 1645	Repo	ort Nu	ımber <u>:</u> 2
Personnel: P. Man F. Johns B. Willis			
Low-Permeability Cap	Inspec	tion	
	V.		
Is there evidence of new settlement?	Yes	No /	Comments
Is there evidence of cracking?		/	Te .
Is there evidence of erosion/rutting?		/	
Is there evidence of ponding?		/	
Is there evidence of burrowing animals?		/	
Is there evidence of undesirable vegetative growth?			
Are the slopes adequate for surface water drainage?	/		
Is there evidence of soil movement/slope instability? (example: cracks in the soil running parallel to the slope or soil sloughing)	ŀ		
Are there any additional conditions during the inspection NIME (WIRALL GOOD WICE TIME) Signature:			ire attention?
AB Los Alamos	1		

Inspection Report Corrective Measures at Consolidation Unit 16-021(c)-99

Date/Time: 4.9.19	Rep	Report Number: 3			
Weather: Cloudy mid-low 40°					
Personnel: John Wilcox Pavid Woody Josh Faultoner Ashley Kowallwski					
Low-Permeability Cap	Inspec	tion			
	Yes	No	Comments		
Is there evidence of new settlement?		1			
Is there evidence of cracking?		V			
Is there evidence of erosion/rutting?	J		gravel missing due to channel forming		
Is there evidence of ponding?		/			
Is there evidence of burrowing animals?		1			
Is there evidence of undesirable vegetative growth?	J		Sapling growing on North edge, clipped down though		
Are the slopes adequate for surface water drainage?	J		3		
Is there evidence of soil movement/slope instability? (example: cracks in the soil running parallel to the slope or soil sloughing)		/			
Are there any additional conditions during the inspection MORE graves needs to be added The path of erossum on the n					
the path of enosion on the n	orth	/W	est side of		
the cap.					
Signature: Whoy	r K	'OV	aleisk.		

Appendix D

Surge Bed Monitoring Well Transducer Data (on CD included with this document)